UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

(Mark One)

☒ **ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the fiscal year ended December 31, 2017

OR

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934 FOR THE TRANSITION PERIOD FROM TO**

Commission File Number 001-37383

Arcadia Biosciences, Inc.

(Exact name of Registrant as specified in its Charter)

Delaware **(State or other jurisdiction of incorporation or organization)**	**81-0571538** **(I.R.S. Employer Identification No.)**
202 Cousteau Place, Suite 105 **Davis, CA** **(Address of principal executive offices)**	**95618** **(Zip Code)**

(530) 756-7077
(Registrant's Telephone Number, Including Area Code)

Securities registered pursuant to Section 12(b) of the Act:

Title of each class	**Name of each exchange on which registered**
Common Stock, par value $0.001 per share	**The NASDAQ Capital Market**

Securities registered pursuant to Section 12(g) of the Act: None

Indicate by check mark if the Registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. YES ☐ NO ☒

Indicate by check mark if the Registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. YES ☐ NO ☒

Indicate by check mark whether the Registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the Registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. YES ☒ NO ☐

Indicate by check mark whether the Registrant has submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the Registrant was required to submit and post such files). YES ☒ NO ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K (§229.405) is not contained herein, and will not be contained, to the best of Registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	☐	Accelerated filer	☐
Non-accelerated filer	☐ (Do not check if a smaller reporting company)	Smaller reporting company	☒
Emerging growth company	☒		

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☒

Indicate by check mark whether the Registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). YES ☐ NO ☒

The aggregate market value of the voting and non-voting common equity held by non-affiliates of the Registrant as of June 30, 2017, the last business day of the Registrant's most recently completed second fiscal quarter, was approximately $4,900,000 (based on the closing price of $9.00 on June 30, 2017 on the NASDAQ Global Market).

The number of shares outstanding of the Registrant's common stock on March 1, 2018, was 2,136,031 shares.

DOCUMENTS INCORPORATED BY REFERENCE

Information required by Part III of this Annual Report on Form 10-K is incorporated by reference to the Registrant's Definitive Proxy Statement for its 2018 Annual Meeting of Stockholders, which proxy statement will be filed with the Securities and Exchange Commission within 120 days after the end of the fiscal year covered by this Form 10-K.

INTRODUCTION

“Arcadia,” the “Company,” “we,” “our” and “us” are used interchangeably to refer to Arcadia Biosciences, Inc. and its subsidiary.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the federal securities laws, which statements involve substantial risks and uncertainties. Forward-looking statements generally relate to future events, our future financial or operating performance, growth strategies, anticipated trends in our industry, and our potential opportunities, plans, and objectives. In some cases, you can identify forward-looking statements because they contain words such as "may," "will," "should," "expects," "plans," "anticipates," "could," "intends," "target," "projects," "contemplates," "believes," "estimates," "predicts," "potential," or "continue" or the negative of these words or other similar terms or expressions that concern our expectations, strategy, plans, or intentions. Forward-looking statements contained in this Annual Report on Form 10-K include, but are not limited to, statements about:

- our or our collaborators' ability to develop commercial products that incorporate our traits and complete the regulatory process for such products;
- our ability to earn revenues from the sale of products that incorporate our traits;
- our ability to maintain our strategic collaborations and joint ventures and enter into new arrangements;
- estimated commercial value for traits;
- market conditions for products, including competitive factors and the supply and pricing of competing products;
- compliance with laws and regulations that impact our business, and changes to such laws and regulations;
- our ability to license patent rights from third parties for development as potential traits;
- our ability to maintain, protect, and enhance our intellectual property;
- our future capital requirements and our ability to satisfy our capital needs;
- industry conditions and market conditions;
- the preceding and other factors discussed in Part I, Item 1A, “Risk Factors,” and other reports we may file with the Securities and Exchange Commission from time to time; and
- the factors set forth in Part II, Item 7, “Management’s Discussion and Analysis of Financial Condition and Results of Operations.”

We caution you that the foregoing list may not contain all of the forward-looking statements made in this Annual Report on Form 10-K.

You should not rely upon forward-looking statements as predictions of future events. We have based the forward-looking statements contained in this Annual Report on Form 10-K primarily on our current expectations and projections about future events and trends that we believe may affect our business, financial condition, results of operations and prospects. The outcome of the events described in these forward-looking statements is subject to risks, uncertainties and other factors described in the section titled "Risk Factors" and elsewhere in this Annual Report on Form 10-K. Moreover, we operate in a very competitive and rapidly changing environment. New risks and uncertainties emerge from time to time and it is not possible for us to predict all risks and uncertainties that could have an impact on the forward-looking statements contained in this Annual Report on Form 10-K. We cannot assure you that the results, events and circumstances reflected in the forward-looking statements will be achieved or occur, and actual results, events or circumstances could differ materially from those described in the forward-looking statements.

The forward-looking statements made in this Annual Report on Form 10-K relate only to events as of the date on which the statements are made. We undertake no obligation to update any forward-looking statements to reflect events or circumstances or to reflect new information or the occurrence of unanticipated events, except as required by law.

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PART I

Item 1. Business.

Overview

We are a consumer-driven, agricultural food ingredient company. We aim to create value across the agricultural production and supply chain beginning with enhanced crop productivity for farmers and ultimately to deliver accelerated innovation in nutritional quality consumer foods. We use state of the art gene-editing technology and advanced breeding techniques to naturally enhance the nutritional quality of grains and oilseeds to address the rapidly evolving trends in consumer health and nutrition. In addition, we have developed a broad pipeline of high value crop productivity traits designed to enhance farm economics.

Consumers are demanding healthier, high quality foods, naturally and sustainably produced with greater ingredient simplicity and transparency from food companies. Now more than ever, consumers are paying premium pricing to satisfy their dietary health requirements, such as higher fiber and lower gluten, healthier oils and fewer processed ingredients. Conventional and transgenic breeding processes can take between 9-13 years to bring new food varieties or quality traits to market, which has resulted in consumer food companies searching for alternative means to satisfy the evolving customer demands. Consumer demand for rapid product differentiation has created a premium food market opportunity that is becoming one of the fastest growing segments in the food industry.

To address this large and growing demand, we are building on our industry leading scientific expertise and advanced plant breeding technologies developed over the past 15 years to produce nutrient-dense crops for use in the major foods we eat. By employing gene editing technology using our proprietary TILLING platform, we believe we can reduce the time to market by half for novel trait ingredients, thereby providing consumer food companies a steady and reliable source of cost effective, healthy natural food options.

We are developing a suite of branded, high value, healthy ingredients in wheat. First to market will be our high fiber Resistant Starch (RS) wheat which has more dietary fiber than conventional wheat. Increased fiber consumption is well recognized as a way to improve gut health and to control excessive weight gain. Concurrently, we are developing three additional wheat traits, a reduced gluten wheat, an extended shelf life wheat and a superior yielding wheat. In the traditional American diet more than 500 calories a day come from wheat products, 25 percent of the FDA's recommended daily caloric intake for women and 20 percent for men, which creates a natural market opportunity for our first two wheat products. We believe these varieties have broad application in the annual global wheat market which is estimated by the FDA to be 758 million metric tons or approximately $127 billion.

In years to come, we expect to achieve enhanced nutritional characteristics within a number of other broad acre crops, other than wheat, using advanced breeding and gene-editing techniques. Targets include but are not limited to higher fiber, longer shelf life and enhanced protein in crops other than wheat.

An important aspect of our business is improving farmer productivity through the development of more robust crop varieties, by developing specific crop traits designed to counteract the detrimental impact of environmental stresses on harvest yields. Traditional genetic modification (GM) trait development has concentrated on crops where the combination of large acreage and high input costs (such as pest and weed control chemical costs) create significant economic value for herbicide or insecticidal traits. However, far more deleterious to crop yields are abiotic stresses, such as drought, heat, nutrient deficiency, water scarcity, and soil salinity. Mitigation of these abiotic stresses remain largely unpenetrated by the GM seed industry today. For example, industry estimates indicate greater than 80 percent of wheat yield loss and 65 percent of corn yield loss globally are lost due to abiotic factors. These stresses are prevalent in most agricultural environments with varying degrees of severity and often have material consequences on crop production, quality, and farmer incomes.

Phillips McDougall estimates the abiotic stress mitigation trait market to be worth several billion dollars. We devoted much of our early research to building the most comprehensive array of abiotic stress traits in the world. Furthermore, through broad out-licensing arrangements with our commercialization partners, many of our traits have been bred into several global crops, including rice, wheat, and soybeans, and we have demonstrated significant yield improvements in multiple years of field testing. Upon commercialization, our commercial value share is expected to range between 10% and 50%, depending upon the geography, crop and specific trait.

Our commercial strategy is to migrate forward in the ag-food supply chain from the farmer and seed company to the consumer food company. Due to our early stage focus on the development of abiotic stress traits, we have historically been commercially aligned with farmers and seed companies. However, by also establishing commercial relationships with consumer food companies and developing consumer brand awareness of our high value premium ingredients, we expect to be better positioned to garner a greater share of the market. Consumer food companies are looking to simplify their food ingredient formulations and consumers are demanding “clean labeling” in their foods, paying more for foods having fewer artificial ingredients and more natural, recognizable and healthy ingredients. Ninety-one per cent of U.S. consumers believe food and beverage options with recognizable ingredients are healthier. Because we engineer nutrient density directly into staple grains and oils, we provide the mechanism for food formulation simplification naturally, cost effectively and in a time-frame to meet evolving consumer demands.

This forward migration in the ag-food supply chain will require we build additional organizational capabilities and industry expertise. For instance, we are expanding our in-house commercial grain production and logistics resources for greater scale capacity to bring our identity preserved products to market. We are also developing product branding strategies to build customer brand recognition and loyalty.

Our Strengths

We believe we are well positioned among our peers to capitalize on the need to increase the efficiency, quality and speed of innovation in agricultural product differentiation to meet the demand for healthier food choices. Our combination of technological innovation, assets and experience is why we believe we are uniquely positioned to best meet this challenge by improving crop yields to enhancing crop nutrition:

- ***World-class research capabilities.*** Our in-house scientific and product development expertise coupled with our advanced Targeting Induced Local Lesions in Genomes, or TILLING, know-how have resulted in the discovery and development of several traits in our commercialization pipeline. Our TILLING platform enables us to discover and develop value-added traits that are considered non-GM. This platform leverages high-throughput screening of induced genetic diversity in plant populations in major crops. Our TILLING populations currently include wheat, rice, soybean, and canola. These populations include numerous native and induced gene function alterations, which can be exploited rapidly at low cost and with minimal regulatory requirements. While the TILLING approach is also practiced elsewhere, we believe that the combination of our history and specialized background in the technology, highly refined skills in developing and screening genetic diversity in plant populations, and proprietary TILLING know-how make us a leader in commercial applications of TILLING. During 2017, we obtained a license from the Broad Institute at the Massachusetts Institute of Technology (MIT) and Harvard for research use of the CRISPR-Cas9 gene-editing technology. This new platform will enable us to accelerate the development of existing products in our portfolio, including those TILLING projects, as well as bring new products to the market faster from inception.
- ***Industry leading early phase trait development.*** Since the inception of the Company we have successfully advanced, and continue to advance, several potentially high value traits from the proof of concept stage to advanced field testing. More recently, in the case of HB4 stress tolerant soybeans we have, through our Verdeca joint venture, advanced the trait beyond field testing and into the regulatory phase. By licensing our traits at a later stage of development, we expect to reduce the risk and expense associated with bringing products to market.
- ***A broad intellectual property portfolio.*** Arcadia’s patent portfolio includes 137 issued patents with 48 pending applications worldwide, relating to our trait technologies and business methods that are either owned or exclusively controlled by us. Our ability to secure exclusive patent rights to our technologies is a key strength for the Company and one that preserves our competitive position.
- ***Expert regulatory affairs capability.*** Our regulatory team has the proven experience and demonstrated capability to manage regulatory submissions and approvals, including regulatory studies, field trials, regulatory submission, regulatory approvals and commercial launch. Our ability to bring traits through the regulatory process quickly and cost-effectively is a key differentiating factor and a capability we have deployed for our own internal development efforts, as well as in collaboration with our development and commercialization partners.

- ***We have a diverse portfolio of products and partners.*** Our product portfolio consists of a wide variety of traits that are applicable to major crops in key geographic markets and address agricultural yield and product quality. The applicability of our product portfolio to these major crops provides us access to multiple large end markets that we believe have demonstrated or have the potential for high growth, such as soybeans in North and South America and wheat and rice globally. We have a record of forming and nurturing successful partnerships with many of the leading seed companies, grain processors and health and nutrition product companies.

Our Growth Strategy

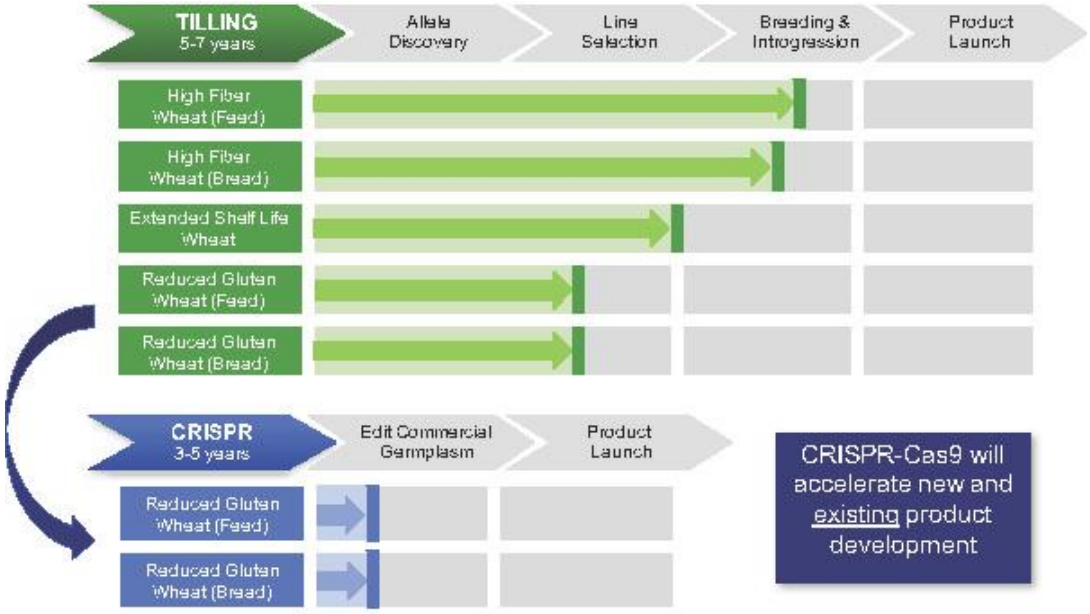
We believe there are significant opportunities to grow our business by executing the following elements of our strategy:

- ***Accelerate the commercialization of our health and nutrition trait portfolio.*** Our highest priority and primary forward investment is to accelerate the commercialization of our wheat ingredient trait portfolio, first targeting the bread, pasta and animal feed markets with our high fiber Resistance Starch and Reduced Gluten lines. We believe these products can be launched into the market over the next two to three years, and we are working with collaborators who are actively advancing the technical and commercial potential of these products. Bringing our ARA (arachidonic acid) oil from safflower and other plant-based nutritional oils to market is another area of targeted growth for us.
- ***Advance commercialization of GM traits in regions where regulatory processes are predictable.*** Our Verdeca joint venture continues to advance the HB4 Drought Tolerance trait in soybeans towards commercialization in the Americas, with Argentina to be the first launch country. Regulatory approvals were obtained in Argentina in 2015 and with US FDA in 2017. Regulatory submissions were made in 2016 for import approval of HB4 soybeans into China. We plan to submit for production approval in Brazil and import approval in the European Union in 2018.
- ***Actively support our licensees' product development, deregulation and commercialization efforts.*** Critical to our longer term strategy is unlocking the commercial potential of our key agricultural yield traits, such as Nitrogen Use Efficiency (NUE), Water Use Efficiency (WUE), and Salt Tolerance, in key food crops like rice, wheat and sugarcane and fiber crops like cotton. We are actively engaged with our partners to determine and execute optimal strategies to advance these traits through deregulation in these territories.
- ***Continue to invest in our human resources and commercialization capabilities.*** As we migrate forward in the ag-food supply chain to become more consumer facing and commercially aligned with consumer food companies, greater in-house consumer product knowledge and industry experience will be required. We will continue to invest in acquisition, development and retention of the requisite management and industry experience and production and logistics capacity to more fully participate in, and control, the route to market for our high value food ingredients.

Our Products and Product Development Pipeline

During 2017, we continued to rationalize program expenses and Company resources against a set of near, mid-term and long-term priorities to support our growth strategy which provided further clarity on commercialization priorities for health and nutrition ingredient traits and deregulation priorities for our abiotic stress trait out-licenses. Our current products and product candidates are depicted below:

The development and commercialization staging of our health and nutrition ingredient traits reflect the time to market we expect based upon the remaining breeding and production requirements to achieve optimal market penetration. In 2017, we in-licensed the CRISPR-Cas9 technology, substantially augmenting the speed at which we can bring technologies discovered through our tilling technology platform to market as well as new versions of existing traits and entirely new discoveries. Our wheat portfolio development phases are depicted in table below, along with the estimated potential impact of CRISPR-Cas9 on our commercialization timelines:



Enhanced Quality Grains

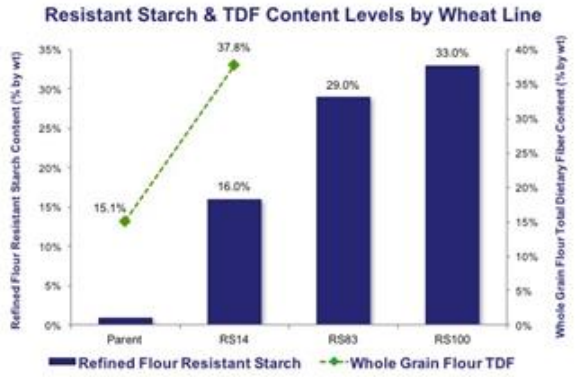
We have multiple programs aimed at developing wheat and other small grains with improved nutritional qualities. One such program generated multiple bread and pasta wheat lines with very high levels of amylose, leading to increased levels of resistant starch. Resistant starch increases the total dietary fiber content of wheat and reduces its glycemic index, which are both desirable nutritional qualities that are important in the management of diabetes and healthy blood glucose levels. High fiber Resistant Starch wheat can deliver fiber and other benefits to great-tasting refined white flour products and also whole grain food products. In 2016, the FDA approved the use of qualified health claims for corn-based resistant starch in the risk reduction of type-2 diabetes, thus establishing a key precedent for the health benefits associated with this fiber. In 2012, the average American consumed only 40% of the recommended level of daily dietary fiber, with whole grain consumption representing only 15% of targeted fiber intake and 80% of teenagers eating no whole grains. Even so, grain products make up the largest fiber source in US adults. Improving the fiber content of wheat is the ideal vehicle to deliver improved health benefits to a wide population.

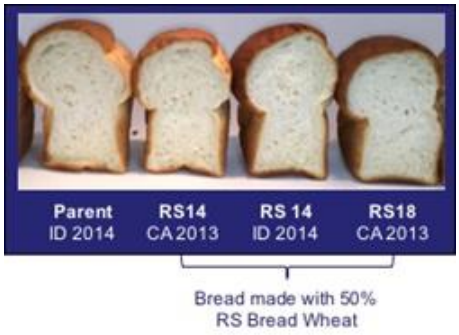
A second program aims at improving the flavor profile and shelf-life of whole wheat flour, and is funded by Ardent Mills, which combines the operations of ConAgra Mills and Horizon Milling, a Cargill-CHS joint venture. A third program, funded by the National Institutes of Health, or NIH, is aimed at reducing gluten in wheat and other grains. All three of these programs utilize our TILLING platform, and the resulting products are non-GM.

High Fiber Resistant Starch Wheat

Our high fiber Resistant Starch (RS) wheat provides a source of wheat with inherently high levels of resistant starch, increasing the total dietary fiber content of food products without the need for fiber additives from other sources. Currently, corn resistant starch is a product in two market segments: dietary fiber additives and modified starch additives. According to MarketsandMarkets, the global dietary fibers market is projected to reach $6.5 billion by 2022 and the modified starch market is projected to $12.4 billion in 2022. Major growth in these markets is being driven by the convenience health food sector and functional food sector. Flour from our RS wheat lines has resistant starch levels that are 12 to 20 times higher than the control wheat, and total dietary fiber, or TDF, which is more

than eight times higher than the control. RS wheat flour has been tested in applications in bread, where loaf quality was comparable to bread made with conventional wheat flour, and pasta, where it had the highest consumer preference rankings in tests carried out by a major consumer products company.

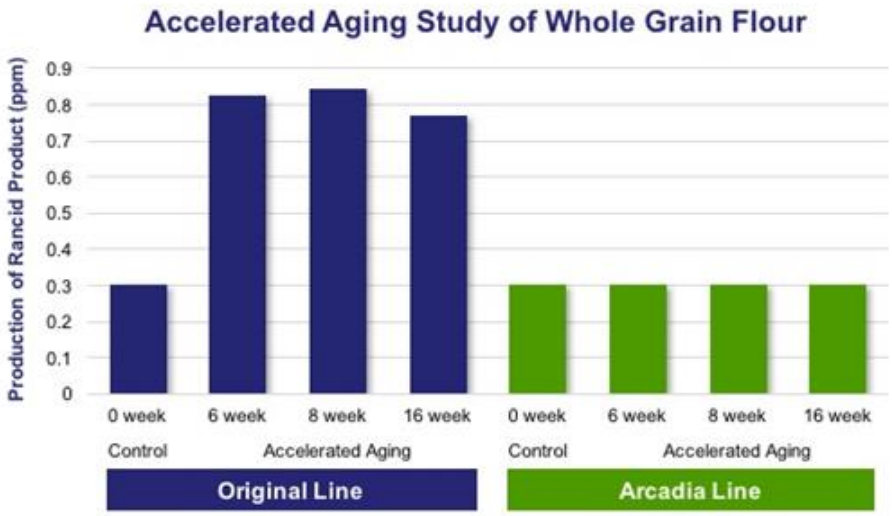




RS wheat flour is currently being tested in a range of additional bakery, ready-to-eat cereals and pasta products with industrial partners. We have many RS wheat lines that are being evaluated for optimal quality and agronomic characteristics.

Improved Shelf Life of Whole Grain Flour

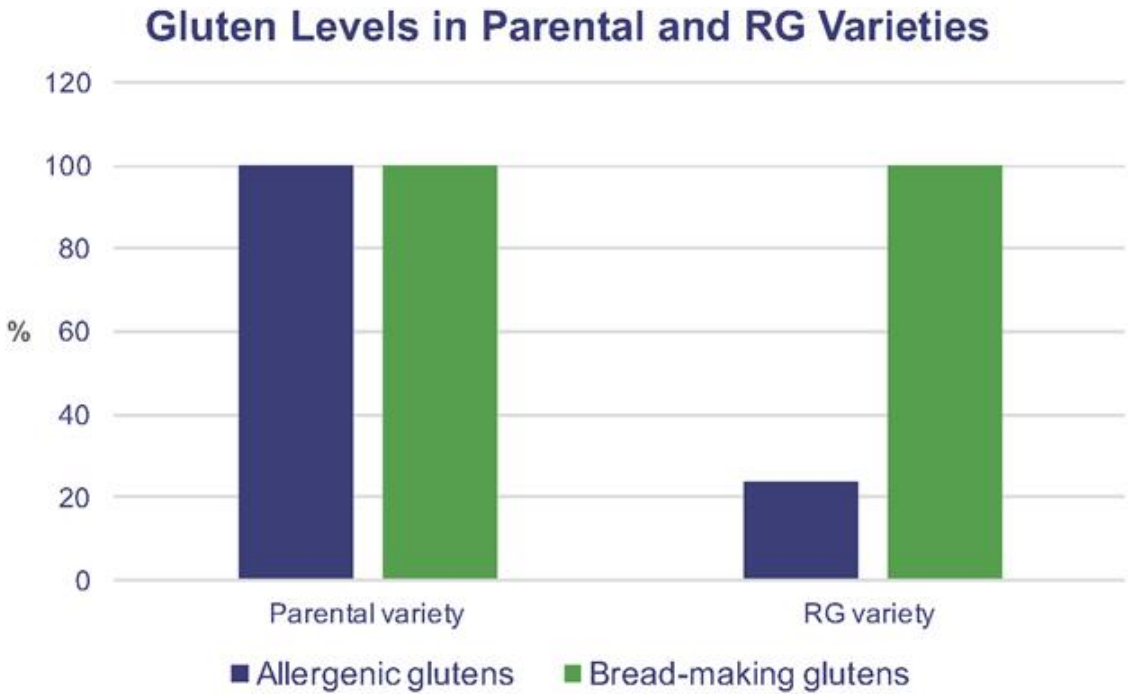
The USDA recommends that “at least one serving of grains per day must be whole grain-rich” due to evidence that a diet containing whole grains provides a multitude of benefits, including lower risk of obesity, cardiovascular disease, and type-2 diabetes. Despite these health benefits, consumption of whole grain products is negatively affected by the bitter and rancid flavors and odors that accumulate in whole wheat flour after milling. Our improved stability and flavor wheat lines greatly reduced the production of rancid and bitter compounds in aged whole grain flour. Whole wheat flour from these lines is being tested further for sensory characteristics and improved shelf life stability. This new trait could help improve the shelf life and flavor profile of whole grain products, thus reducing formulation costs and increasing consumer preference and palatability for whole grains.



Reduced Gluten Wheat

Many consumers are interested in reducing levels of gluten in their diet. Critically, for some, this is due to having Celiac disease (CD), an autoimmune disease that impacts many people worldwide with estimates from 1% in Europe to 3.5% in Mexico. Furthermore, a non-celiac gluten sensitivity (NCGS) impacts an estimated additional 6% of the population. Both CD and NCGS are characterized by sensitivity to dietary gluten. The only effective treatment of CD and NCGS requires removal of gluten sources from the diet. Since required adherence to a gluten-free diet is extremely difficult to accomplish, efforts to develop alternative approaches are needed.

Arcadia is developing a new wheat variety with reduced gluten levels. Our proprietary, non-GM wheat variety, developed using advanced screening and plant breeding techniques have reduced allergenic glutens and increased essential amino acids such as lysine, along with all the health benefits of high protein wheat. This new variety is beneficial for both food and feed applications. We're breeding the trait into commercial wheat varieties and working with food processors to give people a choice to enjoy higher quality wheat in the products they love while reducing gluten in their diet.



Nutritional Oils

Gamma Linolenic Acid (GLA) Oil

Under a license agreement with Abbott, we developed a new source of vegetable oil with very high levels of gamma linolenic acid, or GLA, an omega-6 fatty acid. To our knowledge, our GLA safflower oil product has the highest concentration of GLA available in any plant oil at 65%; conventional plant oils range from 10 to 22% GLA. We can sell the oil in the United States to manufacturers of dietary supplements, nutritional supplements, medical foods, dog food, and other products. GLA safflower oil is also approved in Canada as a natural health product. Our key customers include significant participants in those markets, such as GNC, Lindora Nutrition, JumpStart MD and others.

GLA has multiple clinically-demonstrated nutritional and medical benefits, including anti-inflammatory effects, improving skin conditions such as atopic dermatitis and healthy weight management. Multiple parties have expressed commercial interest in incorporating an enhanced GLA oil into their foods, dietary supplements, or medical products where conventional sources of GLA are not sufficiently concentrated to deliver amounts that are cost- and performance-effective.

Against a commercial target of 40% GLA concentration, we developed, deregulated and commercialized GLA safflower oil containing up to 75% GLA concentration in fewer than six years. This is significantly shorter timeline than the 13 years it takes, on average, to commercialize an agricultural biotechnology product, according to Phillips McDougall. We produce GLA safflower oil by contracting with farmers in Idaho and process the seed under contract with a manufacturer in California to make refined oil. We sell GLA safflower oil under the brand name, SONOVA, with multiple concentrations and formulations.

In January 2017 we received notification from the FDA that our GRAS petition (generally recognized as safe) for the use of SONOVA GLA in medical foods and nutritional beverages had been accepted, which means that we can now market and sell this product in a new market segment. In August 2017, the FDA published in the Federal Register a food additive regulation for the use of SONOVA GLA in dog food. These approvals and authorizations are generating additional revenue opportunities for our GLA business. In addition, a food additive petition for use of SONOVA GLA in cat food was filed in September 2017 and is currently pending.

Arachidonic Acid (ARA) Oil

Arachidonic Acid (ARA) Oil has high levels of the omega 6 fatty acid ARA, which is a key ingredient in more than 90% of U.S. infant nutrition products. ARA contributes to healthy infant eye and brain development. We estimate the global market for ARA at $160 million and believe that our ARA product will cost significantly less than currently available sources of this essential omega 6 fatty acid.

Our ARA Oil is being developed under agreements with Abbott and DuPont Pioneer, each of which licensed intellectual property to us for this program. In exchange for licenses to intellectual property, these agreements provide product access rights to Abbott and DuPont Pioneer, as well as certain royalty payments on product sales to third parties.

We currently have safflower lines with oil compositions that meet our partner specifications for being direct replacements for current sources of ARA in infant nutrition products. We are evaluating additional near term market distribution opportunities with our downstream partners.

Agriculture Productivity Traits, the Yield and Stress Pipeline

In 2017, we evaluated by licensee and geography where regulatory advancement and adoption of our abiotic productivity traits among regulators was most promising and where a lack of historical progress in trait deregulation appeared likely to persist into the foreseeable future. In regions where regulators are cooperating with our licensees to progress field trials and other deregulation activities, we continue active monitoring and providing our technical support when and where needed to ensure full resource support for ultimate commercialization. Where near term progress was not likely, we proceeded to cancel such licenses and are evaluating alternative deregulation strategies.

Arcadia is a recognized leader in the area of yield and abiotic stress and our business was built on the premise that mitigating the impact of environmental stresses, whether chronic or transient, would generate meaningful yield gains in the most important crops in the world. We believe our yield and stress pipeline holds significant promise, as evidenced by our internal data and data generated by our partners in rice, wheat, soy, corn and cotton varieties. The commercial value of these types of traits will be fully unlocked as the traits are introgressed into elite germplasm by breeding partners, tested broadly in the field under different environments and agricultural practices in order to obtain the approval for commercial sale by the relevant regulatory authorities.

The following table summarizes our current product pipeline in 2017:

	Trait	Crop	Development phase[1]	Expected launch	Partner	Key markets
Ag Productivity	Nitrogen Use Efficiency	Wheat	3	2024	Mahyco	Americas, Asia, Australia
		Rice	3	2023	Mahyco, AATF	Asia, Africa
		Cotton	2	2025	Mahyco	Americas, Asia, Australia
		Sugarcane	2	TBD	US Sugar, SASRI	Americas, Africa, Asia
		Tree crops	2	TBD	FuturaGene	Americas
	Water Use Efficiency	Rice	2	2024	Mahyco, AATF	Asia
		Cotton	2	2025	Mahyco	Americas, Asia, Australia
		Tree crops	2	TBD	Arborgen	Americas
		Potato	2	TBD	Simplot	Global
	Salinity Tolerance	Wheat	2	2025	Mahyco	Asia
		Rice	3	2024	Mahyco, AATF	Africa
		Cotton	2	2025	Mahyco	Americas, Asia, Australia
	NUE/WUE/ST Stacks	Rice	2	TBD	AATF	Asia, Africa

Note 1: 1 = Proof of Concept; 2 = Greenhouse/Early Field Trials; 3 = Additional Field Trials/Product Development; 4 = Regulatory / Pre--Commercial; 5 = Commercialized

Nitrogen Use Efficiency (NUE)

Our NUE technology enables plants to utilize nitrogen fertilizer much more efficiently than conventional plants. This allows crops to achieve significantly higher yields under normally applied levels of nitrogen fertilizer, or to achieve the same yields as conventional crops while using 30 to 50% less nitrogen fertilizer.

Nitrogen fertilizer is a primary plant nutrient and key driver of crop yield. Nitrogen fertilizer is also a significant component of crop production cost. Plant Biotechnology Journal reported that only 30% to 50% of added nitrogen fertilizer is taken up by agricultural crops, with the remainder left unutilized and potentially becoming a significant environmental pollutant.

Our NUE technology platform was initially based on a trait discovered at the University of Alberta (Canada), and we hold an exclusive, global license to the technology for use in all crops, with unlimited sublicense rights. Efficacy of this NUE technology has recently been demonstrated in field-grown rice, wheat, and canola by multiple groups.

The target crops and markets for NUE include all major agricultural crops and markets. Our NUE technology has now been incorporated, or is under evaluation by our commercial partners, in major global crops, including rice, wheat, cotton, sugarcane and eucalyptus. Field trial data to date in multiple major commodity crops has shown yield improvements greater than 10% attributable to our NUE trait. Additionally, NUE rice tests conducted by independent entities in multiple countries over multiple years have demonstrated that NUE rice lines produced significantly higher grain yield than controls at various nitrogen fertilizer rates. In the paddy low-land production environment, NUE rice lines showed an increase in grain yield of 29.5% at full nitrogen application rates when compared to the parental line. In the rainfed up-land production environment, the NUE rice lines demonstrated 33.8% grain increase at 50% nitrogen application rate.

Water Use Efficiency and Drought Tolerance

Our Water Use Efficiency (WUE) trait enables plants to better tolerate two distinct types of stress: reduced or inconsistent water availability, and severe drought. The WUE trait has been demonstrated to improve crop yield under conditions of episodic water stress and to help crops recover from severe drought conditions. A related but distinct technology, Drought Tolerance, helps plants maintain yields under conditions of prolonged water stress.

Modern agriculture is highly water intensive, using approximately 70% of world water withdrawals, according to the United Nations Educational, Scientific, and Cultural Organization, or UNESCO. UNESCO also estimates that future global agricultural water consumption will increase by about 19% by 2050 and could be even higher if the efficiency of agricultural production does not improve dramatically. The irregular availability of suitable water is one the leading causes of reduced crop yield globally. Loss due to drought in the United States, as reported to the USDA Risk Management Agency, averaged $4.1 billion per year from 2012 through 2016.

Water-limiting conditions can result from prolonged drought, leading to severe reductions in crop yields, or can result from periodic dry conditions, leading to reduced crop yields. Whenever water limitations occur, economic losses and impairment of the food supply result.

Our WUE trait technology was jointly discovered by researchers at the University of California, Davis and Technion—Israel Institute of Technology. We hold an exclusive, global license to the technology, with sublicense rights, for use in all crops. Greenhouse and field trials of our WUE traits have been completed in agronomic crops such as rice, wheat, cotton, peanuts and alfalfa. We are currently working with collaborators in rice, potato, sugarcane, cotton and multiple tree species.

Our Drought Tolerance (DT) technology was discovered by researchers at National Scientific and Technical Research Council (Argentina), and further developed by Bioceres, S.A. Verdeca, our joint venture with Bioceres, Inc., holds exclusive global rights and is developing and commercializing this technology in soybeans.

Our Drought Tolerance technology is most advanced in soybeans. Multiple seasons of field trials in test germplasm in both North and South America have shown better or equal yield performance of the HB4 drought tolerant trait relative to controls. We expect the optimum performance of this trait will be in the drought stressed regions of South America. Verdeca and seed company licensees are introgressing the trait into pre-commercial germplasm in Argentina to address this market. The Early Food Safety Evaluation process was completed in 2015 by the U.S. Food and Drug Administration (FDA) for the plant protein responsible for our Drought Tolerance trait. The trait has full approval for food safety and international commerce in Argentina (2015) and is pending approval in China. Regulatory approval application was submitted in 2016 to the FDA and the Agency completed its review in August 2017 thereby allowing for food and feed consumption in the US. USDA request for a Determination of Nonregulated Status was submitted in 2017 and is currently pending approval. Additionally, regulatory approval applications have been submitted in Uruguay and are pending final approval. Regulatory submissions were made in 2016 for import approval of Drought Tolerant HB4 soybeans into China. Further, we plan to submit for production approval in Brazil in 2018 and import approval in the European Union in 2018.

Salinity Tolerance

Our Salinity Tolerance trait allows plants to maintain yields under conditions of elevated salinity and is applicable to a wide range of crops, including wheat, rice, soybean, and cotton. The global cost of lost crop yield to salt-induced land degradation is estimated to be $27.3 billion per year according to the United Nations Natural Resources Forum. Of the current 230 million hectares of irrigated land, 45 million hectares, or about 20%, are salt-affected. Crops grown under salt-affected conditions may be inhibited in two ways. First, the presence of salt in the soil reduces the ability of the plant to take up water, leading to reductions in growth rate. Second, if excessive amounts of salt enter the plant, there can be injury to the cells, which may cause further reductions in growth. Modern agriculture is highly water intensive and the ability to manage crops in saline environments will reduce agricultural demand on critical fresh water supplies.

Our most advanced Salinity Tolerance trait technology is based on technology from the University of Toronto, the University of California, Davis, and the National Institute of Agrobiological Sciences (Japan), all of which have granted us exclusive licenses for all crops. In addition, we are conducting research on additional salinity tolerance genes under a funded research agreement with the United States Agency for International Development, or USAID.

Target markets for the Salinity Tolerance trait are areas where water or soil salinity decrease crop yield. Such areas occur globally where irrigation is prevalent, where ground water supplies are salinized due to seawater intrusion and where soils are salinized due to mineral deposits. These conditions are common in North America, India, China, additional countries in Asia, Australia, and other major crop production countries. Our Salinity Tolerance trait has been licensed to partners in rice, wheat, cotton, and oilseeds.

Crops with tolerance to soil and water salinity are in various phases of development with our primary licensee and partner for the Salinity Tolerance trait technology. Our partner previously tested the most promising rice lines with our trait in a field in which controlled amounts of salt were applied to the replicated plots. In 2015, a field trial was executed on naturally high saline farmlands in India, where grain yields typically are very low, and we saw results similar to those in prior trials. Our partner has developed wheat lines that show significant salinity tolerance under greenhouse conditions, with some lines outperforming the controls by more than 30%, and additional wheat lines are in development to expand the scope of our partner's first greenhouse evaluations. For salt tolerant cotton, our partner is preparing to conduct outdoor field trials in India.

Wheat Yield

Our non-transgenic wheat yield program, initially supported by USDA SBIR, aims to increase yield in wheat using TILLING, a non-GM reverse genetics tool, to identify novel alleles of candidate wheat yield genes in tetraploid and hexaploid wheat. These alleles are being evaluated for the ability to alter wheat architecture and improve yield in the field. As a non-GM technology, products from TILLING can rapidly advance to commercialization and do not face market or regulatory restrictions. With a conservative 5% increase in yield, the yearly value creation to the U.S. farmer is estimated at over $30 per hectare. In addition, the value of higher yielding wheat varieties to a seed company arising from this research in the U.S. alone is more than $40 million annually. By incorporating favorable alleles of plant architecture genes into a commercial wheat breeding program, we believe we can make a significant contribution to improving yield in this vital food crop.

Herbicide Tolerance

Our Herbicide Tolerance program is currently focused on wheat. We have developed a non-GM source of tolerance to glyphosate, a widely used non-selective herbicide. We believe that the discoveries under this program are applicable to other chemistries and are likely to result in similar opportunities in other major crops.

According to the International Service for the Acquisition of Agri-biotech Applications, or ISAAA, from 1996 to 2013, herbicide tolerant crops consistently occupied the largest planting area of biotech crops. In 2013 alone, herbicide tolerant crops occupied 99.4 million hectares, or 57%, of the 175.2 million hectares of biotech crops planted globally. For the first 17 years of commercialization (1996 to 2012), benefits from herbicide tolerant crops were valued at $47.7 billion, which accounted for 41% of global biotech crop value. For 2012 alone, herbicide tolerant crops were valued at $6.6 billion or 35% of global biotech crop value.

Our Herbicide Tolerance technology is in Phase 3 of development and was developed using our non-GM TILLING platform. This work is fully funded by a collaborator who has the option to obtain a non-exclusive commercial license to this trait in certain countries. We retain the right to further license this technology to additional collaborators in major wheat markets.

Testing results have shown tolerance in multiple lines to glyphosate application. This tolerance may be sufficient to control many weed species in certain wheat production areas. Individual glyphosate tolerant wheat lines are being combined via plant breeding to combine additional sources of tolerance and create products with increasing levels of tolerance.

Technology Evaluation

Our technology program teams include scientists who are leaders in their respective fields. These teams contribute to the initial evaluation of new opportunities and are responsible for development of technologies brought onboard or developed in-house. Each of our technology programs involves multiple gene, trait and crop targets, and our process focuses on rapid development of the most promising combinations. In the development of any particular trait, we carry out a series of steps including the direct evaluation of target gene function and the specific evaluation of results in key representative crop species. While common core scientific services are provided by functional groups, the technology program team manages overall progress and remains directly involved throughout the development cycle, internally as well as externally with our collaborators.

GM and Non-GM Product Development Platforms

Targeting Induced Local Lesions in Genomes (TILLING)—Non-GM Traits. Our advanced breeding TILLING platform enables us to develop value-added crops without the use of GM methods. The TILLING platform is managed by a dedicated team of scientists able to apply TILLING to multiple crops with complex genomes. TILLING technology was originally invented by a member of our science team and utilizes specialized laboratory equipment to carry out high-throughput allele screening of DNA samples from genetic diversity populations created in major crops. Our populations include wheat, rice, soybean, and canola. These populations include numerous native and induced gene function alterations, which can be discovered and evaluated rapidly at low cost and with minimal regulatory requirements. While the TILLING approach is also practiced elsewhere, we believe that the combination of our background in the technology as the first to apply TILLING to crop plants such as wheat and tomato, and our highly refined skills in developing and screening genetic diversity in plant populations makes us a leader in commercial applications of TILLING.

Transformation—GM Traits. For projects involving GM traits, the genetic construct for insertion into plants is designed and built by our relevant program team, and then the gene transfer step is accomplished by our plant transformation functional group. This group has developed a complete physical and methodological infrastructure at our laboratory facility in Davis, California to efficiently transfer genetic materials into key crop species. Our team has demonstrated transformation capabilities in all primary and some secondary agricultural crops, including rice (japonica, indica and NERICA types), wheat, corn, canola, safflower, barley, sorghum, alfalfa, tomato, potato, tobacco and grapes.

Genome Editing. Our genome editing pipeline includes a cross disciplinary group of experienced molecular biologists and plant transformation experts with demonstrated capabilities in using both biological and physical methods of plant transformation. Our expertise in both transformation and TILLING in the application of genome editing has helped to accelerate new product development.

In 2017, we obtained a license for research purposes for CRISPR- Cas9 from the Board Institute of MIT and Harvard. We believe this is the leading gene editing technology and using this technology will accelerate product development.

Controlled Growth Operations. Our controlled growth operations group manages our growth chamber facilities, where plants are grown under precisely controlled conditions, and our greenhouse facility, consisting of approximately 26,000 square feet of high quality greenhouse space, which are both at our headquarters in Davis, California. The controlled growth operations group uses these facilities to manage plant experiments and grow-outs under rigorously controlled conditions. They also carry out the initial seed increases and first stages of plant breeding for some projects. For certain projects, such as those relating to oil quality and high fiber Resistant Starch wheat, this group also manages crop pre-breeding programs to develop plant varieties for the production of commercial products.

Field Trials and Commercial Production. Our trait evaluation and development group is based in Davis, California and manages remote field operations in American Falls, Idaho and Brawley, California. The group conducts field trials throughout the United States with specialized contractors, and elsewhere globally with our collaborators and joint venture partners. The trait evaluation and development group has extensive field and specialized statistical analytical capabilities that we deploy to support their field trial execution and data analysis internally and with our collaborators.

Our agricultural operations group manages efficacy and regulatory field trials and, in the case of GLA safflower, commercial crop production. Late-stage field trials are intended to develop extensive data on a limited number of potential commercial plant varieties. These trials may be used to test new varieties developed by our collaborators containing our traits, and to test our own commercial varieties for oil quality and grain quality programs. Similarly, regulatory trials develop data for use in submissions for regulatory review and may involve plant varieties developed by our collaborators or our own oil quality and grain quality programs.

Regulatory Data Generation. Our Analytical Services and Regulatory Science group is located in Davis, California and provides automated DNA preparations, genomic blot analyses, lipid profiling, metabolomics and protein purification services and develops data for use in product selection and validation, certification of SONOVA product specifications, and regulatory submissions. These data support regulatory submissions and provide core trait regulatory packages to our collaborators for use in their crop-specific regulatory applications.

Biological Materials Inventory and Tracking. Our proprietary Pedigree and Inventory Management System, or PIMS, tracks the genetic, phenotypic and location information for all our plant materials. PIMS encompasses genetic elements such as genes and promoters, GM seeds and plant material received by us, as well as seeds and plants developed by us and used in trait development. The performance of our plant materials is recorded through a variety of laboratory and field observations, and the data are stored within PIMS. The location of all plant materials is tracked throughout the plant life cycle. This includes specific seeds planted within a specific plot of a specific field trial, harvest, seed storage location and use by, or distribution of plant material to, our collaborators or elsewhere. PIMS interfaces with our Biotechnology Quality Management System, or BQMS, to manage all movement and release of regulated GM plant materials. This ensures that all of our plant materials are accounted for, tracked and inventoried, which enables us to maintain control over and documentation of all plant materials.

Regulatory Compliance and Stewardship

Our regulatory management team provides regulatory services for all of product development programs, as well as joint ventures and selected collaborations. These services include establishing standard operating procedures and best practices, completing regulatory permits and monitoring regulatory and stewardship compliance for all products at all stages. Our regulatory team includes key employees who are directly responsible for leading all global regulatory agency interactions and providing tactical and strategic regulatory direction. Our team collectively has more than 30 years of direct involvement in the development and approvals of GM crops. The key member of our regulatory team was responsible for completing the first FDA and USDA deregulation of a GM whole food. The interactions and processes associated with these first USDA and FDA processes established benchmarks for the regulation of GM products that remain applicable today.

Our regulatory management and compliance activities encompass three broad categories: deregulation, stewardship, and authorization. In the United States, these activities are regulated by various government agencies, including the USDA, the FDA and the U.S. Environmental Protection Agency (EPA). Our regulatory team has completed significant regulatory activities (new dietary ingredient review, food additive regulation, GRAS notice and GM food consultation) with the FDA Division of Dietary Supplement Programs, with the FDA Center for Food Safety and Applied Nutrition, with the FDA Center for Veterinary Medicine and with the Health Canada Natural Health Products Directorate.

Deregulation

Our business is subject to regulations related to agriculture, food and the environment. Plant products produced using GM technology are subject to laws and regulations in countries where the plants are grown and in countries where the GM plant-derived food and feed are consumed by humans or animals. Commodity products utilizing our GM traits may require approvals in multiple countries prior to commercialization.

U.S. Regulatory Agencies:

U.S. Department of Agriculture. We must obtain USDA authorizations and permits in order to conduct the field releases of GM regulated materials that are necessary to advance the development of GM crops. Obtaining such authorizations and permits is generally routine and delays impacting the planned movement or release of GM material are uncommon. The USDA provides detailed regulations and guidance for obtaining a *"Determination of Deregulated Status,"* which authorizes the commercial and uncontained growing of GM plants. For regulated GM plants, the USDA requires that a company petition the agency to demonstrate that the product is unlikely to pose a risk. Based on the information provided, the USDA prepares an Environmental Assessment (EA) and/or an Environmental Impact Statement (EIS) in order to make its determination. These procedures afford the public an opportunity to submit written comments on the draft EA or EIS for consideration by the USDA before the final version of the EA or EIS is published. For any GM plant product, there may be delays or requests for additional information based on the USDA's review or the public comments. As of February 2018, USDA has reached 123 Determinations of Nonregulated Status. Submissions received by the USDA from all applicants prior to 2011 averaged more than 3 years for approval. Since then, the USDA has significantly shortened the time to approval.

U.S. Food and Drug Administration. The FDA is responsible for food safety under the Federal Food, Drug and Cosmetic Act. The FDA recommended in its 1992 *Statement of Policy: Foods Derived from New Plant Varieties* that developers of GM plant products consult with the agency about the safety of GM products under development. In 1996, the FDA provided additional guidance to the industry on procedures for these consultations. These procedures require a developer intending to commercialize a food or feed product derived from a GM plant to first meet with the agency to identify and discuss relevant safety, nutritional and other regulatory issues regarding the product. Subsequently, the developer submits to the FDA a scientific and regulatory assessment supporting proposed product safety. The FDA evaluates the submission and engages with the developer to resolve any questions, requests for additional data or other informational requirements. Once the FDA has determined that all requirements have been satisfied, the FDA concludes the consultation process by issuing a letter to the developer acknowledging completion of the consultation process with the addition of the product to the list of completed consultations on the FDA website. The completed consultation acknowledges product safety for use as food and feed. To date, over 150 GM products have completed this process. This process may have delays if the FDA requires additional data and information for its consultation and to resolve any questions the FDA may have. The FDA completed 21 consultations from 2015 to 2017, with consultation time periods in 2017 ranging from 11 to 15 months and averaging just over one year from first submission to conclusion.

Environmental Protection Agency. Certain products may also be regulated by the EPA, including plants that contain a plant-incorporated protectant, such as a pesticides or herbicide, or plants engineered to be treated with industrial chemicals.

International Deregulation:

When products from GM crops are expected to be exported from the United States, commercialization of such crops in the United States will require approvals in those countries into which the crops or derivative products, such as grain, oil or meal, will be exported. The laws and regulations for GM plant products are well defined in most commercially significant countries, including Australia, South American countries, India, China, several African countries and the European Union. Typically, our collaborators are responsible for obtaining all regulatory permits and approvals relevant to product development and commercialization in their licensed countries and for generating crop and transformation event-specific data required by their countries of interest. We provide basic safety data on trait expression products in accordance with generally accepted standards. In addition, we may serve as a regulatory consultant and participate in the design of regulatory protocols, data generation and development of detailed regulatory submissions. In certain countries, we may develop strategic business relationships or employ independent consultants with country-specific knowledge and expertise to support and obtain required approvals.

Stewardship

Stewardship, or the careful and responsible management of assets, forms the foundation of our regulatory compliance programs associated with GM plants. Our stewardship framework for GM plants is defined by government regulations and related internal policies and practices. In previous years, Arcadia's Biotechnology Quality Management System (now identified as ABQMS) was developed by us and then audited/certified by the USDA Animal and Plant Health Inspection Service, Biotechnology Regulatory Service (APHIS BRS). Recently, USDA updated its BQMS program renaming it the Biotechnology Quality Management Support Program, discontinuing the mandatory auditing/certification standard.

Our ABQMS program was developed to address all conditions required under USDA authority to ensure containment of regulated plant material. The ABQMS includes standard operating procedures, or SOPs, recording and reporting forms, instructions for managing all compliance related activities, and training requirements for all individuals handling GM plant materials. SOPs are highly detailed and consider all elements of each relevant activity or process. Each field trial site is accompanied by a Field Compliance Guide and Record (GUIDE) containing multiple SOPs and associated forms for each activity. For example, a GM wheat trial requires 19 SOPs and associated verification forms. A GUIDE is completed for each regulated field trial and serves as a completed record to support compliance with government regulations. Example copies of the GUIDE have been provided to our collaborators for use in other countries where they conduct GM field trials.

Our ABQMS is audited annually by our compliance manager and previously by an independent auditor trained and supervised by the USDA. Since our ABQMS program was first recognized by the USDA in 2011, each annual independent audit conducted by USDA until discontinuation of their audit program confirmed that our program was functioning as intended. Our ABQMS manager has attended USDA BQMS training programs at the request of the USDA to assist in training personnel at other companies and organizations and to share our experience and the SOPs that form the basis of our program.

Compliance with the specific parameters of regulatory requirements is only one element of stewardship. Additional activities within each functional group throughout the company are integral to the overall stewardship program. Each of our employees is trained on, and must comply with, relevant stewardship guidelines as defined and described in our ABQMS.

Authorization

The USDA APHIS Biotechnology Regulatory Service (BRS) has legal and regulatory authority over the movement and release of GM plants and seeds. "Movement" includes movement of regulated GM plant material between states and the importation of regulated GM plant material into the United States. "Release" includes field trials of any size and any other use of regulated GM plant material outside of contained greenhouses.

We have obtained more than 200 authorizations from the BRS for the movement, importation or release of GM plants under development. General and specific conditions to maintain containment during all activities associated with the movement or release are a requirement of each authorization. These conditions are defined, applied and recorded in the GUIDE following our ABQMS program.

Intellectual Property

We rely on patents and other proprietary right protections, including trade secrets and contractual protection of our proprietary know-how and confidential information, to preserve our competitive position.

As of December 31, 2017, we owned or exclusively controlled 137 issued patents and 48 pending patent applications worldwide. As of this date, we owned 10 and exclusively in-licensed 16 U.S. patents and we owned eight U.S. patent applications relating to our trait technologies and business methods. Also, as of this date, we owned 12 and exclusively in-licensed 98 foreign patents and owned 32 and exclusively in-licensed nine pending foreign patent applications. With respect to all of the foregoing patent assets, our exclusive licenses afford us control over the prosecution and maintenance of the licensed patents and patent applications. These numbers do not include in-licensed patents for which we either do not have exclusive rights (such as certain enabling technology licenses), or for which we have exclusive rights only in a limited field of use or do not control prosecution and maintenance of the licensed patents.

As of December 31, 2017, we had eight registered trademarks in the United States. As of this date, we also had eight registered trademarks in various other countries. We also have entered into in-license agreements enabling the use and commercialization of our traits, including NUE, WUE and Salinity Tolerance, and certain products that we have commercialized or are under development, including GLA safflower oil and ARA safflower oil. Under these licensing arrangements, we are obligated to pay royalty fees on sublicense revenue and net product sales ranging between low single digit percentages and percentages in the mid-teens, subject in certain cases to aggregate dollar caps. The exclusivity and royalty provisions of these agreements are generally tied to the expiration of underlying patents. After the termination of these provisions, we and our collaborators may continue to produce and sell products utilizing the technology under the expired patents. While third parties thereafter may develop products using the technology under the expired patents, in many cases, we have incremental patent rights covering our most important technologies, which we believe mitigate the impact of the expiration of these patents, or the related exclusivity provisions, on our business. We also have numerous in-licenses relating to enabling technologies utilized in our development programs, such as transformation methods (e.g., Japan Tobacco, DuPont Pioneer), genome editing tools (e.g., Broad Institute), promoters (e.g., Corteva Agriscience formerly known as Dow AgroSciences, Louisiana State University) and selectable marker technologies (e.g., Bayer). These in-licenses are non-exclusive and include some combination of upfront and annual license fees, milestone fees, and commercial royalty obligations consisting of low percentages or a low dollar per acre fee.

Below is a summary of those in-license agreements that we believe are most significant for our more advanced product development programs.

University of Alberta. We hold an exclusive license from University of Alberta to the patent portfolio that formed the basis of our NUE program, which began in 2002. In exchange for an upfront license fee and royalties on sublicense revenues and net product sales (which are capped at an aggregate amount in the mid-seven figures), and subject to the University's right to perform academic research using the technology, we exclusively control all research, development, commercialization, and sublicensing of the patented technology globally for all crops.

Blue Horse Labs. In conjunction with a sponsored research and development agreement entered into in 2003, we obtained an exclusive license from Blue Horse Labs, an affiliate entity of our majority stockholder, Moral Compass Corporation, for technology related to several of our development programs. Under the sponsored research and development agreement, Blue Horse Labs has an ownership right in patents covering technology that was developed using Blue Horse Labs funds, including certain NUE and GLA safflower patents. In the corresponding license agreement, in exchange for a single-digit royalty on net revenues and management of all aspects of the patent portfolio, we exclusively control all research, development, commercialization, and sublicensing of the patented technology globally for all crops.

University of California, Davis. Our WUE technology was developed under an exclusive option agreement with the University of California, Davis, pursuant to which we exercised our right to secure an exclusive license in 2010. We also hold an exclusive license from University of California, Davis, to the patent portfolio that forms the basis of our Salinity Tolerance program. In exchange for an upfront license fee, license maintenance fees, and royalties on sublicense revenues and net product sales, we exclusively control all for-profit research, development, commercialization, and sublicensing of the patented technology globally for all crops.

University of Toronto. We hold an exclusive license from University of Toronto to the patent portfolio that forms the basis of our Salinity Tolerance program. In exchange for an upfront license fee, a royalty on revenues, and payment of all costs associated with the patent portfolio, and subject to the University's right to use the technology for research and teaching purposes, we exclusively control all for-profit research, development, commercialization and sublicensing of the patented technology globally for all crops.

Abbott. We entered into a license and development agreement with Abbott in 2003 under which we have been granted limited exclusive rights to Abbott's portfolio of U.S. and foreign patents relating to the development of plant-based sources of GLA, ARA and essential fatty acids. Under this agreement, we provide Abbott with preferential access to commercial products from our GLA and ARA safflower programs, as well as the right to receive royalty payments on product sales to third parties, in exchange for the licenses to Abbott's intellectual property rights.

Key Collaborations

Since our founding in 2002, we have established numerous trait collaborations and have developed close relationships with industry-leading seed and consumer product companies. Our partnerships with global strategic seed and consumer product players enable us to further participate in the development and commercialization of innovative products that promise to play significant roles in improving global crop efficiency and enhancing human health. The results of these collaborations directly feed innovation and drive the progress of our ongoing programs. Moreover, the expertise and opportunities created by these collaborations represent important assets to our business. While our collaboration-focused business model has resulted in numerous strategically significant relationships, below is a summary of selected collaborative partnerships that we view as key to the achievement of our near-term and mid-term business objectives.

Mahyco

We have multiple agreements with Mahyco covering numerous programs, using our most advanced traits in multiple major crops, and have been working with Mahyco as a key partner since 2007. Our agreements with Mahyco in NUE rice and salt tolerant rice are in advanced stages of development.

Under our various agreements relating to our NUE, WUE, and Salinity Tolerance traits, Mahyco has exclusive research and commercial rights in all licensed geographies and must timely meet certain diligence milestones in order to maintain their exclusivity. Each of our agreements with Mahyco includes an upfront technology access fee, technical and regulatory milestone fees, and, once products utilizing our traits are commercialized, we are entitled to receive a portion of the commercial value of seeds sold by Mahyco incorporating our traits. Rights to new intellectual property developed under an agreement are owned by the inventing party or parties.

In December 2017, we reached agreement with Mahyco for the return of licensed geographies and crops for certain WUE, NUE & Salinity Tolerance traits where Mahyco either lacks the resources or expertise to effectively progress trait deregulation and commercialization. In addition, for other geographies where Mahyco has progressed trait development but does not possess the familiarity with, or influence on, the regulatory environment to affect deregulation, we have agreed we will endeavor to jointly pursue new incountry licensees we believe to be equipped and capable to achieve trait deregulation and commercialization. For those licenses terminated prior to December 31, 2017, the remaining balance of the upfront license fees previously deferred for such agreements has been released and recognized as revenue into the fourth quarter of 2017 totaling $528,000.

Vilmorin & Cie (Limagrain)

We selected Limagrain as our strategic partner and collaborator in wheat—the world’s largest crop by area grown and the third most valuable at $186.4 billion annual value—due to their position as the leading global breeder and marketer of wheat seeds. In 2009, we executed an agreement with Limagrain under which we partnered to develop and commercialize NUE wheat in all countries of the world except Australia, India, Pakistan, Bangladesh and Sri Lanka. Under our agreement, Limagrain has exclusive research and commercial rights in all licensed geographies except North America and South America, in which we retained co-exclusive rights, and Limagrain must timely meet diligence milestones to maintain exclusivity. Our agreement with Limagrain includes an upfront technology access fee, annual maintenance fees, and technical and regulatory milestone fees, and once an NUE wheat product is commercialized, we are entitled to receive a portion of the commercial value of the trait in the marketplace. We and Limagrain have since coordinated with collaborators in Australia to align development efforts in NUE wheat on a global basis.

Contemporaneously with Limagrain’s $25.0 million equity investment in our company, in 2010 we formed Limagrain Cereal Seeds LLC, a joint venture company focused on the development and commercialization of improved wheat seed in North America, of which a U.S. wholly owned subsidiary of Limagrain owns 65% and we own 35%.

On March 31, 2017, the Company and Vilmorin USA ("VUSA") entered into a noncash exchange agreement, whereby the Company transferred to VUSA the Company's entire membership interest in Limagrain Cereal Seeds LLC ("LCS") and VUSA transferred to the Company 92,195 shares of the Company's common stock held by Limagrain. The Company recorded the retirement of the shares using the cost method, resulting in an equity reclassification between common stock par value and additional paid-in capital.

Bioceres

In 2012, we partnered with Bioceres, an Argentina-based technology company, to form Verdeca LLC, a U.S.-based joint venture company engaged in the development and deregulation of soybean traits, of which we own 50%. We selected Bioceres as our partner in soybeans—the world's fourth largest crop by area grown and the fourth most valuable at $119.0 billion annual value—due to their desirable trait portfolio, their presence in key South American markets, and the significant presence of large soybean growers in their ownership structure.

Our joint venture agreement provides for each of the joint venture partners to license its trait technologies to Verdeca for use in soybeans, with product development and regulatory efforts equitably divided and managed by us and Bioceres under stand-alone service agreements that are executed annually. The first product in the Verdeca pipeline is a drought and abiotic stress tolerance trait that has already completed extensive validation trials and is now in the regulatory phase of development. This trait has been demonstrated to confer as high as a 14% yield advantage over conventional soybeans grown under the same suboptimal conditions. In April 2015, Verdeca received the first regulatory approval of its stress tolerance trait in soybeans in Argentina. This is the world's first regulatory approval of an abiotic stress tolerance trait in soybeans, which we believe is an important initial step in pursuing additional regulatory approvals that Verdeca intends to seek in multiple geographies globally. Verdeca has successfully negotiated favorable market access in South America through established players and is working on adding market channel partners in the United States, India, and China.

In addition to those agreements with Bioceres directly associated with Verdeca, we also have negotiated exclusive access to Bioceres' drought and abiotic stress tolerance trait for use globally, outside of South America, in wheat. Our agreement with Bioceres provides for sharing of trait value once a product is commercialized.

Dow AgroSciences

In December 2015, we entered into a strategic collaboration with Dow AgroSciences to develop and commercialize new yield traits and trait stacks in corn. In December 2017, after two years of work, the program had not met its primary performance characteristics sufficient to warrant additional investment. Instead, the parties agreed to terminate the strategic collaboration in favor of pursuing higher value, nearer term opportunities in the health and nutrition trait market.

In August 2017, we announced entry into a new strategic collaboration with Dow AgroSciences to jointly develop and commercialize a breakthrough improved wheat quality trait in North America. The collaboration leverages our TILLING platform with Dow AgroSciences' enabling technology platforms, high-quality elite germplasm and global commercial channels.

Under the collaboration, the companies will further develop and commercialize an improved wheat quality trait, which has completed initial field trials and is advancing to next-stage field trials. Dow AgroSciences will introgress Arcadia's trait into its proprietary elite germplasm lines and manage all aspects related to the trait commercialization. Certain development costs will be co-funded under the collaboration agreement, and we will share in the commercial value resulting from products produced.

Scientific Advisory Board

We maintain a scientific advisory board consisting of the members identified below. Our scientific advisory board meets on a quarterly basis and is comprised of industry and academic experts that have extensive experience in the analysis, research and development, and commercialization of biotech plants, including experience relating to discovery, transformation, and field trials. We consult with our scientific advisory board on a variety of matters pertaining to our current and future pipeline of products in development, including, for example, trait selection and development, transformation and TILLING methodologies, field trials, regulatory matters, and intellectual property evaluation.

We currently have a scientific advisory board that consists of three members as follows:

Vicki Chandler, Ph.D. is Dean of Natural Sciences at Minerva Schools at Keck Graduate Institute, a new undergraduate liberal arts college. Prior to joining Minerva, she was Chief Program Officer, Science at the Gordon and Betty Moore Foundation. She studied biochemistry for her undergraduate and doctoral degrees at the University of California, Berkeley, and the University of California, San Francisco, respectively. She then pursued postdoctoral research at Stanford University in maize genetics and was on the faculty at the University of Oregon and the University of Arizona. Dr. Chandler's research on paramutation, an epigenetic process, has implications not only for maize, which she used for the majority of her research, but also for animal and human genetics and genetic diseases. Dr. Chandler has been President of the Genetics Society of America, a member of the National Academy of Sciences, and a member of the National Science Board. Her many honors include the Presidential Young Investigator Award, Searle Scholar Award, and American Association for the Advancement of Science Fellow. She has served on advisory boards and panels for the National Research Council, National Science Foundation, Department of Energy, and National Institutes of Health. Dr. Chandler has chaired numerous conferences and served on the editorial boards of several journals, including *Genetics*, *Plant Physiology, PNAS,* and *Science*.

Luca Comai, Ph.D. is a professor of plant biology at the University of California, Davis Genome Center. Dr. Comai's lab is involved in two areas pertinent to breeding. In the first, they study genome regulation, hybridization, and heterosis responses in chromosome copy number variants and interspecific hybridization. In the second, they develop methods and resources for functional genomic discovery, including TILLING, which allows targeted inactivation of genes in crop plants. The research combines plant genetics and genomics with the use of next-generation sequencing, bioinformatics and genome editing to identify genes responsible for traits of interest as well as to discover and use natural and induced variation. Dr. Comai is known for his pioneering work creating glyphosate tolerant crops, and as a founding scientist in Calgene Pacific, Targeted Growth, Inc. and Tilligen. He is a Fellow of the American Association for the Advancement of Science.

Peter Quail, Ph.D. is a professor of plant and microbial biology at the University of California, Berkeley where he also serves as Research Director of the Plant Gene Expression Center (U.S. Department of Agriculture/Albany, California). Dr. Quail has been a pioneer in the study of phytochromes, photoreceptor proteins that play a major regulatory role in plant growth and development. Dr. Quail was elected to the National Academy of Sciences in 2004, as a Fellow of the American Association of Science in 2004, and was the recipient of the Stephen Hales Prize, American Society of Plant Biologists, 2008. He received a B.S. and Ph.D. from the University of Sydney, Australia.

Competition

The markets for seed traits and agricultural biotechnology products are highly competitive, and we face significant direct and indirect competition in several aspects of our business. Competition for improving plant genetics comes from conventional and advanced plant breeding techniques, as well as from the development of advanced biotechnology traits. Other potentially competitive sources of improvement in crop yields include improvements in crop protection chemicals, fertilizer formulations, farm mechanization, other biotechnology, and information management. Programs to improve genetics and chemistry are generally concentrated within a relatively small number of large companies, while non-genetic approaches are underway with broader set of companies.

In general, we believe that our competitors generally fall into the following categories:

- *Specialty health and nutrition ingredient companies*: In response to the growing consumer demand for healthier food alternatives, a number of agricultural and food based companies are augmenting their product and market strategies to bring new quality food ingredients to market. Calyxt, Inc. (formerly known as Cellectis Plant Sciences, Inc) is an agriculture biotechnology company that has a similar strategy as ours and is using gene editing technology to create healthier specialty food ingredients and agriculturally advantageous food crops.
- *Large Agricultural Biotechnology, Seed, and Chemical Companies:* According to Phillips McDougall, the leading 6 seed and trait companies as a group invested $3.6 billion in seed and trait research and development in 2013. This includes conventional and advanced plant breeding, as well as biotechnology trait development. According to Phillips McDougall, only a limited number of companies have been actively involved in new trait discovery, development, and commercialization: Monsanto, DuPont Pioneer, Syngenta, BASF, Bayer, Dow, KWS, and Genective (a joint venture between KWS and Limagrain). Many of these companies have substantially larger budgets for gene discovery, research, development, and product commercialization than we do. Some of these companies also have substantial resources and experience managing the regulatory process for new GM seed traits. Each of Monsanto, DuPont Pioneer, Syngenta, Dow, and Bayer, which accounted for 85% of the 2013 seed trait research and development spend noted above, also have significant chemical crop protection background and businesses. The trait pipelines of these companies are heavily weighted toward biotic stress traits, although they also have significant programs aimed at development of abiotic stress traits. While these companies have internal programs that may compete with our own, they also seek new traits externally and, as such, some of them either currently are, or may in the future be, our collaborators.
- *Trait Research and Development Companies:* There are a number of companies that specialize in research and development of agricultural yield and product quality traits, and we believe that a dozen or more companies, including Yield 10, Arista, Benson Hill Biosystems, Evogene and Keygene, among others, are competitors in our field. We believe that these companies typically focus on a limited number of traits, and do not generally have the product development and regulatory infrastructure necessary to bring traits to market. Therefore, they typically license trait technologies to large industry players with in-house development and regulatory capabilities at a relatively early stage of development. In the development of nutritional traits using non-GM methods, companies like Calyxt and Arista Cereal Technologies are competitors who are also developing quality traits in wheat and other crops.
- *Companies Focused on the Development and Commercialization of Microbial Crop Enhancements:* The use of microbial products to enhance crop performance via application to soil, seed, or to crops directly is an area where increased research and development activity has been underway for the past decade or more. We believe that there are more than 20 companies of varying size working in this space. There have been a number of acquisitions, including Becker Underwood by BASF, and joint collaborations in this space but multiple independent companies remain, including Verdesian, Marrone Bioinnovations, Biagro Agrinos, Indigo Agriculture, and Bioconsortia. While these companies could be considered to compete with us as their products seek to improve crop yields, we believe that such products and our traits may be additive, or synergistic, to our future products in terms of increasing crop yields.
- *Companies Focused on Farming Data Management, or Precision Agriculture:* Within the past several years there has been a rapid increase in technologies and companies focused on acquiring, analyzing, and acting upon data in ways that may improve farm economics via increased crop yield and more efficient management of crop production inputs. Technical approaches include weather prediction and monitoring, high-density field and crop imaging systems, precision field soil and yield mapping, and others. Companies focusing on this space include Climate Corporation (acquired by Monsanto), Granular (acquired by DuPont), Farmers Business Network, Farmers Edge, Trimble, Planet Labs, Ceres Imaging, Blue River Technologies, and others. While these products are potentially competitive with us for increasing crop yields, we believe that certain of these products could also be additive or synergistic with our traits.

- *Agricultural Research Universities and Institutions:* Given the global importance of agriculture, numerous agricultural research universities and institutions around the world focus on basic and applied research aimed at increasing crop yield. Most of this publicly funded research is focused on basic research. Many public research programs aim to understand basic biological processes and do not necessarily engage in further development and commercialization of discovered traits. While these programs are potentially competitive with us, we view them primarily as sources of innovation that is fully compatible with our business model. We have an established track record of working closely and effectively with public research programs, including a number from the U.S., Canada, Bangladesh, Japan, Australia, Ireland, and elsewhere.

We believe that we are uniquely positioned at the nexus of basic research and commercial product development. Unlike many companies in our space, we generally do not compete in the area of basic research. Our focus is on development and validation and, therefore, we provide a value-added link by which basic research can be brought to market. While internal programs at the largest seed and technology companies are competitive with ours in some cases, we are technology providers to some of these companies, and we have numerous collaborations with many of them. To remain competitive, we are pursuing multiple strategies, including further building our non-GM pipeline of new technologies, increasing the scope and range of our field testing activities, and continuing to protect our intellectual property rights in key jurisdictions globally.

Research and Development

As of December 31, 2017, we had 23 full-time employees dedicated to research and development, five of whom are development and field personnel focused on demonstration and research field trials. Our research and development team has technical expertise in molecular biology, biochemistry, genetics, genetic engineering, analytical chemistry, and plant physiology. Our research and development activities are conducted principally at our Davis, California facility, with ongoing field trials conducted in American Falls, Idaho; Brawley, California, Yuma, Arizona; and numerous other locations throughout the United States, as well as locations managed by our collaborators worldwide. We have made, and will continue to make, substantial investments in research and development. Our research and development expenses were $7.4 million and $8.7 million in the years ended December 31, 2017 and 2016, respectively.

Employees

As of December 31, 2017, we had 42 full-time employees, of whom 5 hold Ph.D. degrees. Approximately 23 employees are engaged in research and development activities, two in regulatory management, and 17 in management, operations, accounting/finance, legal and administration. We consider our employee relations to be good. None of our employees is represented by a labor union or collective bargaining agreement.

Facilities

Our corporate headquarters are located in Davis, California, in a facility consisting of approximately 20,775 square feet of office, laboratory and growth chamber space under a lease which was set to expire on June 30, 2018 and has been extended pursuant to an option to renew the lease for an additional three-year term. This facility accommodates research and development, operations, analytical services, regulatory and administrative activities. Our administrative offices in Phoenix, Arizona, consist of 2,976 square feet under a lease that expires on June 30, 2018 and accommodate our finance, legal and other administrative activities, as well as sales and marketing activities for our SONOVA products. We lease greenhouse space and farm land for agricultural use in Northern California as well as farmland in Idaho. We also lease office and warehouse space in Idaho under a lease that expires on December 31, 2021. Our Seattle research location was closed in March 2017.

We believe that our leased facilities are adequate to meet our current needs and that, if needed, suitable additional or alternative space will be available to accommodate our operations.

Item 1A. Risk Factors.

You should carefully consider the following risk factors, in addition to the other information contained in this report on Form 10K, including the section of this report titled "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our financial statements and related notes. If any of the events described in the following risk factors and the risks described elsewhere in this report occurs, our business, operating results and financial condition could be seriously harmed. This report on Form 10K also contains forward-looking statements that involve risks and uncertainties. Our actual results could differ materially from those anticipated in the forwardlooking statements as a result of factors that are described below and elsewhere in this report.

Risks Related to Our Business and Our Industry

We or our collaborators may not be successful in developing commercial products that incorporate our traits.

Our future growth depends on our ability to identify genes that will improve selected crop traits and license these genes to our collaborators to develop and commercialize seeds that contain the genes. Our long-term growth strategy is based on our expectation that revenues related to the sale of seeds containing our traits will comprise a significant portion of our future revenues. Pursuant to our collaboration agreements, we are entitled to share in the revenues from the sale of products that integrate our trait. We expect it will take several years before the first seeds integrating our agricultural yield traits complete the development process and become commercially available for sale, resulting in revenues for us. However, the development process could take longer than we anticipate or could ultimately fail to succeed in commercialization for any of the following reasons:

- our traits may not be successfully validated in one or more target crops;
- our traits may not have the desired effect sought by our collaborators in the relevant crop or geography, or under certain environmental conditions;
- relevant milestones under our agreements with collaborators may not be achieved; and
- we or our collaborators may be unable to complete the regulatory process for the products containing our traits.

If products containing our traits are never commercialized, or are commercialized on a slower timeline than we anticipate, our ability to generate revenues and become profitable, as well as our long-term growth strategy, would be materially and adversely affected. For example, the development processes for several of our key agricultural yield traits have experienced delays related to regulatory matters, particularly in India, and we expect that these development processes may continue to face delays, which have negatively impacted the commercialization timelines for products containing such traits.

Even if we or our collaborators are successful in developing commercial products that incorporate our traits, such products may not achieve commercial success.

Our long-term growth strategy is dependent upon our or our collaborators' ability to incorporate our traits into a wide range of crops with global scope. Even if we or our collaborators are able to develop commercial products that incorporate our traits, any such products may not achieve commercial success as quickly as we project, or at all, for one or more of the following reasons, among others:

- products may fail to be effective in particular crops, geographies or circumstances, limiting their commercialization potential;
- our competitors may launch competing or more effective traits or products;
- the market for abiotic seed traits is evolving and not well established, and the market opportunities for any product we or our collaborators develop may be smaller than we or our collaborators believe;
- as we do not have a sales or marketing infrastructure for our agricultural yield traits, we depend entirely on our collaborators to commercialize our products, and they may fail to devote the necessary resources and attention to sell, market and distribute our current or any future products effectively;

- significant fluctuations in market prices for agricultural inputs and crops could have an adverse effect on the value of our traits;
- farmers are generally cautious in their adoption of new products and technologies, with conservative initial purchases and proof of product required prior to widespread deployment, and accordingly, it may take several growing seasons for farmers to adopt our or our collaborators' products on a large scale;
- farmers may reuse certain non-hybrid GM seeds from prior growing seasons in violation of applicable seed license agreements;
- our collaborators may not be able to produce high-quality seeds in sufficient amounts to meet demand; and
- our collaborators may decide, for whatever reason, not to commercialize products containing our traits.

Our financial condition and results of operations could be materially and adversely affected if any of the above were to occur.

Our product development cycle is lengthy and uncertain, and we may never earn revenues from the sale of products containing our traits.

Research and development in the seed, agricultural biotechnology, and larger agriculture industries is expensive, prolonged, and entails considerable uncertainty. We and our collaborators may spend many years and dedicate significant financial and other resources, developing traits that will never be commercialized. The process of discovering, developing, and commercializing a seed trait through either genetic modification or advanced breeding involves multiple phases, and it may require from six to thirteen years or more from discovery to commercialization. The length of the process may vary depending on one or more of the complexity of the trait, the particular crop, and the intended geographical market involved. This long product development cycle is in large part attributable to the nature-driven breeding period for a commercial product, as well as a lengthy regulatory process.

There are currently multiple products in development incorporating our traits, each of which consists of the application of a specific seed trait to a specific crop. Although our SONOVA products are on the market currently, we expect that it will take at least several years before the first products containing our agricultural yield traits complete the development process and become commercially available. However, we have little to no certainty as to which, if any, of these products will eventually reach commercialization in this timeframe or at all. Because of the long product development cycle and the complexities and uncertainties associated with agricultural biotechnology research, there is significant uncertainty as to whether we will ever generate revenues from the sale of products containing one of our traits and, even if such products reach commercialization, any resulting revenues may come at a later time than we currently anticipate.

We have a history of significant losses, which we expect to continue, and we may never achieve or maintain profitability.

We have incurred significant net losses since our formation in 2002 and expect to continue to incur net losses for the foreseeable future. We incurred net losses of $15.7 million, and $19.6 million for the years ended December 31, 2017 and 2016, respectively. As of December 31, 2017, we had an accumulated deficit of $167.3 million. We expect to continue to incur losses until we begin generating revenues from our collaborators' sale of products containing traits we are currently developing, which we expect will not occur for several years, if at all. Because we have incurred and will continue to incur significant costs and expenses for these efforts before we obtain any incremental revenues from the sale of seeds incorporating our traits, our losses in future periods could be even more significant. In addition, we may find our development efforts are more expensive than we anticipate or that they do not generate revenues in the time period we anticipate, which would further increase our losses. If we are unable to adequately control the costs associated with operating our business, including costs of development and commercialization of our traits, our business, financial condition, operating results, and prospects will suffer.

In addition, our ability to generate meaningful revenues and achieve and maintain profitability depends on our ability, alone or with strategic collaborators, to successfully complete the development of and complete the regulatory process to commercialize our traits. Most of our revenues since inception have consisted of upfront and milestone payments associated with our contract research and license agreements. Additional revenues from these agreements are largely dependent on successful development of our traits by us or our collaborators. To date, we have not generated any significant revenues from product sales other than from our SONOVA products, and we do not otherwise anticipate generating revenues from product sales other than from sales of our SONOVA products for the next several years. If products containing our traits fail to achieve market acceptance or generate significant revenues, we may never become profitable.

We require additional financing and may not be able to obtain such financing on favorable terms, if at all, which could force us to delay, reduce, or eliminate our research and development activities.

We will continue to need capital to fund our research and development projects and to provide working capital to fund other aspects of our business. If our capital resources are insufficient to meet our capital requirements, we will have to raise additional funds. If future financings involve the issuance of equity securities, our existing stockholders would suffer dilution. If we are able to raise additional debt financing, which will require the consent of our current debt holder, we may be subject to additional restrictive covenants that limit our operating flexibility. We may not be able to raise sufficient additional funds on terms that are favorable to us, if at all. If we fail to raise sufficient funds and continue to incur losses, our ability to fund our operations, take advantage of strategic opportunities, develop and commercialize products or technologies, or otherwise respond to competitive pressures could be significantly limited. If this happens, we may be forced to delay or terminate research and development programs or the commercialization of products or curtail operations. If adequate funds are not available, we will not be able to successfully execute on our business strategy or continue our business.

If ongoing or future field trials by us or our collaborators are unsuccessful, we may be unable to complete the regulatory process for, or commercialize, our products in development on a timely basis.

The successful completion of field trials in United States and foreign locations is critical to the success of product development and marketing efforts for products containing our traits. If our ongoing or future field trials, or those of our collaborators, are unsuccessful or produce inconsistent results or unanticipated adverse effects on crops or on non-target organisms, or if we or our collaborators are unable to collect reliable data, regulatory review of products in development containing our traits could be delayed or commercialization of products in development containing our traits may not be possible. In addition, more than one growing season may be required to collect sufficient data to develop or market a product containing our traits, and it may be necessary to collect data from different geographies to prove performance for customer adoption. Even in cases where field trials are successful, we cannot be certain that additional field trials conducted on a greater number of acres, or in different crops or geographies, will be successful. Generally, our collaborators conduct these field trials or we pay third parties, such as farmers, consultants, contractors, and universities, to conduct field trials on our behalf. Poor trial execution or data collection, failure to follow required agronomic practices, regulatory requirements, or mishandling of products in development by our collaborators or these third parties could impair the success of these field trials.

Many factors that may adversely affect the success of our field trials are beyond our control, including weather and climatic variations, such as drought or floods, severe heat or frost, hail, tornadoes and hurricanes, uncommon pests and diseases, or acts of protest or vandalism. For example, if there was prolonged or permanent disruption to the electricity, climate control, or water supply operating systems in our greenhouses or laboratories, the crops in which we or our collaborators are testing our traits and the samples we or our collaborators store in freezers, both of which are essential to our research and development activities, could be severely damaged or destroyed, adversely affecting these activities and thereby our business and results of operations. Unfavorable weather conditions can also reduce both acreage planted and incidence, or timing of, certain crop diseases or pest infestations, each of which may halt or delay our field trials. We have also experienced crop failures in the past for then-unknown reasons, causing delays in our achievement of milestones and delivery of results and necessitating that we repeat the impacted field trials. Any field test failure we may experience may not be covered by insurance and, therefore, could result in increased cost for the field trials and development of our traits, which may negatively impact our business and results of operations. Additionally, we are subject to U.S. Department of Agriculture, or USDA, regulations, which may require us to abandon a field trial or to purchase and destroy neighboring crops that

are planted after our field trials have commenced. For example, while conducting early field trials for GLA safflower oil, we were forced to purchase and destroy an adjacent safflower crop when the placement of bee hives by a third party altered the required isolation distance between our crop and the neighboring crop, requiring us to either purchase and destroy the adjacent crop or abandon our field trial. In order to prevent the significant delays that would result from terminating our field trial, we decided to purchase and destroy the neighboring crop at a cost of approximately $30,000. Similar factors outside of our control can create substantial volatility relating to our business and results of operations.

Competition in traits and seeds is intense and requires continuous technological development, and, if we are unable to compete effectively, our financial results will suffer.

We face significant competition in the markets in which we operate. The markets for traits and agricultural biotechnology products are intensely competitive and rapidly changing. In most segments of the seed and agricultural biotechnology market, the number of products available to consumers is steadily increasing as new products are introduced. At the same time, the expiration of patents covering existing products reduces the barriers to entry for competitors. We may be unable to compete successfully against our current and future competitors, which may result in price reductions, reduced margins and the inability to achieve market acceptance for products containing our traits. In addition, several of our competitors have substantially greater financial, marketing, sales, distribution, research and development, and technical resources than us, and some of our collaborators have more experience in research and development, regulatory matters, manufacturing, and marketing. We anticipate increased competition in the future as new companies enter the market and new technologies become available. Our technologies may be rendered obsolete or uneconomical by technological advances or entirely different approaches developed by one or more of our competitors, which will prevent or limit our ability to generate revenues from the commercialization of our traits being developed.

We derive a significant portion of our current revenues from government agencies, which may not continue in the future and which may expose us to government audits and potential penalties.

We historically have derived a significant portion of our revenues from grants from U.S. government agencies. Our ability to obtain grants is subject to the availability of funds under applicable government programs and approval of our applications to participate in such programs. The application process for these grants is highly competitive. We may not be successful in obtaining any additional grants. Once we successfully obtain a grant, the awarding U.S. government agency has the right to decrease or discontinue funding on such a grant at any time. The recent political focus on reducing spending at the U.S. federal and state levels may reduce the scope and amount of funds dedicated to seed and agricultural biotechnology innovations, if such funds continue to be available at all. To the extent that we are unsuccessful in obtaining any additional government grants in the future or if funding is discontinued on an existing grant, we would lose a significant source of our current revenues.

To the extent that we do not comply with the specific requirements of a grant, amounts we invoice may not be paid and any of our existing grants or new grants that we may obtain in the future may be terminated or modified. In addition, our activities funded by our government grants are subject to audits by U.S. government agencies. As part of an audit, these agencies may review our performance, cost structures and compliance with applicable laws, regulations and standards, and the terms and conditions of the grant. An audit could result in a material adjustment to our results of operations and financial condition. Moreover, if an audit uncovers improper or illegal activities, we may also be subject to civil and criminal penalties and administrative sanctions, including termination of contracts, forfeiture of profits, suspension of payments, or fines, and we may be suspended or prohibited from doing business with the government. In addition, serious reputational harm or significant adverse financial effects could occur if allegations of impropriety are made against us, even if we are ultimately found to have done no wrong.

A significant portion of our revenues to date are from a limited number of strategic collaborations, and the termination of these collaborations would have a material adverse effect on our results of operations.

We derive a substantial amount of our revenues from a limited number of strategic collaborations, under which we generate revenues through licensing arrangements such as research and development payments, up-front payments, milestone payments, and, once a product is commercialized, a portion of the commercial value of the trait. A small number of commercial partners are expected to continue to account for a substantial amount of our revenues for the next several years, most notably among them, Mahyco. Our agreements with Mahyco are terminable by Mahyco at will upon 90 days' notice. The termination or non-renewal of our arrangements with Mahyco or our other commercial partners would have a material adverse effect on our business, financial condition, results of operations, and prospects.

We expect to derive a substantial portion of our future revenues from commercial products sold outside the United States, which subjects us to additional business risks.

A significant number of our research and collaboration agreements include products under development for markets outside the United States. Our collaborators' operations in these regions are subject to a variety of risks, including different regulatory requirements, uncertainty of contract and intellectual property rights, unstable political and regulatory environments, economic and fiscal instability, tariffs and other import and trade restrictions, restrictions on the ability to repatriate funds, business cultures accepting of various levels of corruption, and the impact of anti-corruption laws. These risks could result in additional cost, loss of materials, and delays in our commercialization timeline in international markets and have a negative effect on our operating results.

Revenues generated outside the United States could also be subject to increased difficulty in collecting delinquent or unpaid accounts receivables, adverse tax consequences, currency and exchange rate fluctuations, relatively high inflation, exchange control regulations, and governmental pricing directives. Acts of terror or war may impair our ability to operate in particular countries or regions and may impede the flow of goods and services between countries. Customers in these and other markets may be unable to purchase our products if their economies deteriorate, or it could become more expensive for them to purchase imported products in their local currency or sell their commodities at prevailing international prices, and we may be unable to collect receivables from such customers. If any of these risks materialize, our results of operations and profitability could be harmed.

We or our collaborators may fail to perform our respective obligations under contract research and collaboration agreements.

We are obligated under certain contract research agreements to perform research activities over a particular period of time. If we fail to perform our obligations under these agreements, in some cases our collaborators may terminate our agreements with them and in other cases our collaborators' obligations may be reduced and, as a result, our anticipated revenues may decrease. In addition, any of our collaborators may fail to perform their obligations under the diligence timelines in our collaboration agreements, which may delay development and commercialization of products containing our traits and materially and adversely affect our future results of operations.

Furthermore, the various payments we receive from our collaborators are a significant source of our current revenues and are expected to be the largest source of our revenues in the future. If our collaborators do not make these payments, either due to financial hardship, disagreement as to whether such payments are owed under the relevant collaboration agreement, or for any other reason, our results of operations and business could be materially and adversely affected. If disagreements with a collaborator arise, any dispute with such collaborator may negatively affect our relationship with one or more of our other collaborators and may hinder our ability to enter into future collaboration agreements, each of which could negatively impact our business and results of operations.

Our prospects for successful development and commercialization of our products are dependent upon the research, development, commercialization, and marketing efforts of our collaborators.

We primarily rely on third parties for research, development, commercialization, and marketing of our products and products in development. Other than as provided for in our collaboration agreements, we have no control over the resources, time and effort that our collaborators may devote to the development of products incorporating our traits and have limited access to information regarding or resulting from such programs. We are dependent on our third-party collaborators to fund and conduct the research and development of product candidates, to complete the regulatory process, and for the successful marketing and commercialization of one or more of such products or products in development. Such success will be subject to significant uncertainty.

Our ability to recognize revenues from successful collaborations may be impaired by multiple factors including:

- a collaborator may shift its priorities and resources away from our programs due to a change in business strategies, or a merger, acquisition, sale, or downsizing of its company or business unit;
- a collaborator may cease development in a specific crop area that is the subject of a collaboration agreement;
- a collaborator may change the success criteria for a particular program or product in development, thereby delaying or ceasing development of such program or product in development;
- a significant delay in initiation of certain development activities by a collaborator will also delay payment of milestones tied to such activities, thereby impacting our ability to fund our own activities;
- a collaborator could develop or acquire a product that competes, either directly or indirectly, with our current products or any future products;
- a collaborator with commercialization obligations may not commit sufficient financial or human resources to the marketing, distribution, or sale of a product;
- a collaborator with manufacturing responsibilities may encounter regulatory, resource, or quality issues and be unable to meet demand requirements;
- a collaborator may exercise its rights under the agreement to terminate our collaboration;
- a dispute may arise between us and a collaborator concerning the development and commercialization of a product in development, resulting in a delay in milestones, royalty payments, or termination of a program and possibly resulting in costly litigation or arbitration that may divert management attention and resources;
- a collaborator may not adequately protect the intellectual property rights associated with a product or product in development; and
- a collaborator may use our proprietary information or intellectual property in such a way as to expose us to litigation from a third party.

If our collaborators do not perform in the manner we expect or fulfill their responsibilities in a timely manner, or at all, the development, regulatory, and commercialization process could be delayed, terminated, or otherwise unsuccessful. Conflicts between us and our collaborators may arise. In the event of termination of one or more of our collaboration agreements, it may become necessary for us to assume the responsibility for any terminated products or products in development at our own expense or seek new collaborators. In that event, we likely would be required to limit the size and scope of one or more of our independent programs or increase our expenditures and seek additional funding, which may not be available on acceptable terms or at all, and our business may be materially and adversely affected.

We rely on third parties to conduct, monitor, support, and oversee field trials and, in some cases, to maintain regulatory files for those products in development, and any performance issues by third parties, or our inability to engage third parties on acceptable terms, may impact our or our collaborators' ability to complete the regulatory process for or commercialize such products.

We rely on third parties, including farmers, to conduct, monitor, support, and oversee field trials. As a result, we have less control over the timing and cost of these trials than if we conducted these trials with our own personnel. If we are unable to maintain or enter into agreements with these third parties on acceptable terms, or if any such engagement is terminated prematurely, we may be unable to conduct and complete our trials in the manner we anticipate. In addition, there is no guarantee that these third parties will devote adequate time and resources to our studies or perform as required by our contract or in accordance with regulatory requirements, including maintenance of field trial information regarding our products in development. If these third parties fail to meet expected deadlines, fail to transfer to us any regulatory information in a timely manner, fail to adhere to protocols, or fail to act in accordance with regulatory requirements or our agreements with them, or if they otherwise perform in a substandard manner or in a way that compromises the quality or accuracy of their activities or the data they obtain, then field trials of our products in development may be extended or delayed with additional costs incurred, or our data may be rejected by the USDA, the U.S. Food and Drug Administration, or FDA, the U.S. Environmental Protection Agency, or EPA, or other regulatory agencies. Ultimately, we are responsible for ensuring that each of our field trials is conducted in accordance with the applicable protocol, legal, regulatory and scientific standards, and our reliance on third parties does not relieve us of our responsibilities.

If our relationship with any of these third parties is terminated, we may be unable to enter into arrangements with alternative parties on commercially reasonable terms, or at all. Switching or adding farmers or other suppliers can involve substantial cost and require extensive management time and focus. In addition, there is a natural transition period when a new farmer or other third party commences work. As a result, delays may occur, which can materially impact our ability to meet our desired development timelines. If we are required to seek alternative supply arrangements, the resulting delays and potential inability to find a suitable replacement could materially and adversely impact our business.

In addition, recently there has been an increasing trend towards consolidation in the agricultural biotechnology industry. For example, in 2017, Dow and DuPont merged, as well as ChemChina and Syngenta. Other potential transactions, such as the proposed acquisition of Monsanto by Bayer, would further consolidate our industry if consummated. Consolidation among our competitors and third parties upon whom we rely could lead to a changing competitive landscape, capabilities, and market share allocations, which could have an adverse effect on our business and operations.

Most of our collaborators have significant resources and development capabilities and may develop their own products that compete with or negatively impact the advancement or sale of products containing our traits.

Most of our collaborators are significantly larger than us and may have substantially greater resources and development capabilities. As a result, we are subject to competition from many of our collaborators, who could develop or pursue competing products and traits that may ultimately prove more commercially viable than our traits. In addition, former collaborators, by virtue of having had access to our proprietary technology, may utilize this insight for their own development efforts, despite the fact that our collaboration agreements prohibit such use. The development or launch of a competing product by a collaborator may adversely affect the advancement and commercialization of any traits we develop and any associated research and development and milestone payments and value-sharing payments we receive from the sale of products containing our traits.

Our joint venture agreements could present a number of challenges that may have a material adverse effect on our business, financial condition, and results of operations.

We currently participate in one joint venture, Verdeca LLC, which focuses on the development and deregulation of soybean traits. We may enter into additional joint ventures in the future. Our joint venture arrangements may present financial, managerial, and operational challenges, including potential disputes, liabilities, or contingencies and may involve risks not otherwise present when operating independently, including:

- our joint venture partners may have business interests, goals or cultures that are or become inconsistent with our business interests, goals or culture;
- our joint venture partners may share certain approval rights,
- we may incur liabilities or losses as a result of an action taken by the joint venture or our joint venture partners;
- our joint venture partners may take action contrary to our instructions, requests, policies or objectives, which could reduce our return on investment, harm our reputation or restrict our ability to run our business; and
- disputes between us and our joint venture partners may result in delays, litigation or operational impasses.

The risks described above or the failure to continue any joint venture or joint development arrangement or to resolve disagreements with our current or future joint venture partners could materially and adversely affect our ability to transact the business that is the subject of such joint venture, which would in turn negatively affect our financial condition and results of operations.

We and our collaborators may disagree over our right to receive payments under our collaboration agreements, potentially resulting in costly litigation and loss of reputation.

Our ability to receive payments under our collaboration agreements depends on our ability to clearly delineate our rights under those agreements. We typically license our intellectual property to our collaborators, who then develop and commercialize seeds with improved traits. However, a collaborator may use our intellectual property without our permission, dispute our ownership of certain intellectual property rights, or argue that our intellectual property does not cover, or add value to, their marketed product. If a dispute arises, it may result in costly patent office procedures and litigation, and our collaborator may refuse to pay us while the dispute is ongoing. Furthermore, regardless of any resort to legal action, a dispute with a collaborator over intellectual property rights may damage our relationship with that collaborator and may also harm our reputation in the industry.

Even if we are entitled to payments from our collaborators, we may not actually receive these payments, or we may experience difficulties in collecting the payments to which we believe we are entitled. After our collaborators launch commercial products containing our licensed traits, we will need to rely on the good faith of our collaborators to report to us the sales they earn from these products and to accurately calculate the payments we are entitled to, a process that will involve complicated and difficult calculations. Although we seek to address these concerns in our collaboration agreements by reserving our right to audit financial records, such provisions may not be effective.

Our business is subject to various government regulations and if we or our collaborators are unable to timely complete the regulatory process for our products in development, our or our collaborators' ability to market our traits could be delayed, prevented or limited.

Our business is generally subject to two types of regulations: regulations that apply to how we and our collaborators operate and regulations that apply to products containing our traits. We apply for and maintain the regulatory permits necessary for our operations, particularly those covering our field trials, while we or our collaborators apply for and maintain regulatory approvals necessary for the commercialization of products containing our seed traits. The large-scale field trials that our collaborators conduct during advanced stages of product development are subject to regulations similar to those to which we are subject. Even if we and our collaborators make timely and appropriate applications for regulatory permits for our field trials, government delays

in issuing such permits can significantly affect the development timelines for our products, particularly if the planting period for a crop growing season expires before the necessary permits are obtained. For example, our collaborator in India has encountered and continues to encounter delays in obtaining necessary regulatory permits for field trials, and these delays have had a negative impact on the commercialization timelines for certain of our products and may have additional future negative impacts. Pursuant to our collaboration agreements, our collaborators also apply for the requisite regulatory approvals prior to commercialization of products containing our traits. In most of our key target markets, regulatory approvals must be received prior to the importation of genetically modified products. These regulatory processes may be complex; for example, the U.S. federal government's regulation of biotechnology is divided among the EPA, which regulates activity related to the use of plant pesticides and herbicides, the USDA, which regulates the import, field testing, interstate movement, and environmental release of specific technologies that may be used in the creation of genetically modified plants, and the FDA, which regulates foods derived from new plant varieties.

In addition to regulation by the U.S. government, products containing our biotech traits may be subject to regulation in each country in which such products are tested or sold. International regulations may vary from country to country and from those of the United States. The difference in regulations under U.S. law and the laws of foreign countries may be significant and, in order to comply with the laws of foreign countries, we may have to implement global changes to our products or business practices. Such changes may result in additional expense to us and either reduce or delay product development or sales. Additionally, we or our collaborators may be required to obtain certifications or approvals by foreign governments to test and sell the products in foreign countries.

The regulatory process is expensive and time-consuming, and the time required to complete the process is difficult to predict and depends upon numerous factors, including the substantial discretion of the regulatory authorities. Other than for our SONOVA products, neither we nor our collaborators have completed all phases of the regulatory process for any of our products in development. Our traits could require a significantly longer time to complete the regulatory process than expected, or may never gain approval, even if we and our collaborators expend substantial time and resources seeking such approval. A delay or denial of regulatory approval could delay or prevent our ability to generate revenues and to achieve profitability. Changes in regulatory review policies during the development period of any of our traits, changes in, or the enactment of, additional regulations or statutes, or changes in regulatory review practices for a submitted product application may cause a delay in obtaining approval or result in the rejection of an application for regulatory approval. Regulatory approval, if obtained, may be made subject to limitations on the indicated uses for which we or our collaborators may market a product. These limitations could adversely affect our potential revenues. Failure to comply with applicable regulatory requirements may, among other things, result in fines, suspensions of regulatory approvals, product recalls, product seizures, operating restrictions, and criminal prosecution. We have on certain occasions notified the USDA of instances of noncompliance with regulations. Although these occasions did not result in any enforcement actions, we may have occasions of noncompliance in the future that result in USDA or other governmental agency enforcement action.

Consumer resistance to genetically modified organisms may negatively affect our public image and reduce sales of seeds containing our traits.

We are active in the field of agricultural biotechnology research and development in seeds and crop protection, including GM seeds. Foods made from such seeds are not accepted by many consumers due to concerns over such products' effects on food safety and the environment. The high public profile of biotechnology in food production and lack of consumer acceptance of products to which we have devoted substantial resources could negatively affect our public image and results of operations. The current resistance from consumer groups, particularly in Europe, to GM crops not only limits our access to such markets, but also has the potential to spread to and influence the acceptance of products developed through biotechnology in other regions of the world. For example, we temporarily suspended certain initiatives in response to legislative requirements in Vermont related to labeling of food products containing GM ingredients until it was determined that there would be clarity and uniformity in nationwide food labeling requirements. Certain labeling-related initiatives have heightened consumer awareness of GM crops generally and may make consumers less likely to purchase food products containing GM ingredients, which could have a negative impact on the commercial success of products that incorporate our traits and materially and adversely affect our financial condition and results of operations.

Governmental restrictions on the testing, production, and importation of GM crops may negatively affect our business and results of operations.

The production of certain GM crops is effectively prohibited in certain countries, including throughout the European Union, which limits our commercial opportunities and may influence regulators in other countries to limit or ban the testing, production, or importation of GM crops and products of GM crops. Our GM crops are grown principally in North America, South America, India and Australia, where there are fewer restrictions on the production of GM crops. If these or other countries where our GM crops are grown enact laws or regulations that ban the production of such crops or make regulations more stringent, we could experience a longer product development cycle for our products, encounter difficulty obtaining intellectual property protection, and may even have to abandon projects related to certain crops or geographies, any of which would negatively affect our business and results of operations. Furthermore, any changes in such laws and regulations or consumer acceptance of our GM crops and products made from these crops could negatively impact our collaborators, who in turn might terminate or reduce the scope of their collaborations with us or seek to alter the financial terms of our agreements with them.

Changes in laws and regulations to which we are subject, or to which we may become subject in the future, may materially increase our costs of operation, decrease our operating revenues, and disrupt our business.

Laws and regulatory standards and procedures that impact our business are continuously changing. Responding to these changes and meeting existing and new requirements may be costly and burdensome. Changes in laws and regulations could:

- impair or eliminate our ability, or increase our cost, to develop our traits, including validating our products in development through field trials;
- increase our compliance and other costs of doing business through increases in the cost to patent or otherwise protect our intellectual property or increases in the cost to our collaborators to complete the regulatory process to commercialize and market the products we develop with them;
- render any products less profitable, obsolete, or less attractive compared to competing products;
- affect our collaborators' willingness to do business with us;
- reduce the amount of revenues we receive from our collaborators; and
- discourage our collaborators from offering, and consumers from purchasing, products that incorporate our traits.

Any of these events could have a material adverse effect on our business, results of operations, and financial condition. Legislators and regulators have increased their focus on plant biotechnology in recent years, with particular attention paid to GM crops.

Our future growth relies on the ability of our collaborators to commercialize and market our products in development, and any restrictions on such activities could materially and adversely impact our business and results of operations. Any changes in regulations in countries where GM crops are grown or imported could result in our collaborators being unable or unwilling to develop, commercialize, or sell products that incorporate our traits. Any changes to these existing laws and regulations may also materially increase our costs of operation, decrease our operating revenues, and disrupt our business.

The unintended presence of our traits in other products or plants may negatively affect us.

Trace amounts of our traits may unintentionally be found outside our containment area in the products of third parties, which may result in negative publicity and claims of liability brought by such third parties against us. Furthermore, in the event of an unintended dissemination of our genetically engineered materials to the environment or the presence of unintended but unavoidable trace amounts, sometimes called "adventitious presence," of our traits in conventional seed, or in the grain or products produced from conventional or organic crops, we could be subject to claims by multiple parties, including environmental advocacy groups, as well as governmental actions such as mandated crop destruction, product recalls, or additional stewardship practices and environmental cleanup or monitoring.

Loss of or damage to our germplasm collection would significantly slow our product development efforts.

We have developed and maintain a comprehensive collection of germplasm through strategic collaborations with leading institutions, which we utilize in our non-GM programs. Germplasm comprises collections of genetic resources covering the diversity of a crop, the attributes of which are inherited from generation to generation. Germplasm is a key strategic asset since it forms the basis of seed development programs. To the extent that we lose access to such germplasm because of the termination or breach of our collaboration agreements, our product development capabilities would be severely limited. In addition, loss of or damage to these germplasm collections would significantly impair our research and development activities. Although we restrict access to our germplasm at our research facilities to protect this valuable resource, we cannot guarantee that our efforts to protect our germplasm collection will be successful. The destruction or theft of a significant portion of our germplasm collection would adversely affect our business and results of operations.

We depend on our key personnel and, if we are not able to attract and retain qualified scientific and business personnel, we may not be able to grow our business or develop and commercialize our products.

Our future performance depends on the continued services and contributions of our management team and other key employees, the loss of whose services might significantly delay or prevent the achievement of our scientific or business objectives. The replacement of any member of our management team involves significant time and costs and such loss could significantly delay or prevent the achievement of our business objectives. A member of our executive team who has been our employee for many years and therefore has significant experience and understanding of our business that would be difficult to replace.

Additionally, the vast majority of our workforce is involved in research, development, and regulatory activities. Our business is therefore dependent on our ability to recruit and maintain a highly skilled and educated workforce with expertise in a range of disciplines, including molecular biology, biochemistry, plant genetics, agronomics, mathematics, agribusiness, and other subjects relevant to our operations. All of our current employees are at-will employees, and the failure to retain or hire skilled and highly educated personnel could limit our growth and hinder our research and development efforts.

Our business is subject to the risks of earthquakes, fire, flood, crop losses and other catastrophic natural events, and security breaches, including cybersecurity incidents.

Our headquarters, certain research and development operations and our seed storage warehouse are located in Davis, California. Production of wheat is conducted in Idaho and other locations. Weather conditions, disease or pest infestation could damage the crop in spite of precautions we would normally take to avoid such losses. Our production of our SONOVA products takes place at a single facility in Northern California, and the inventory is stored in a single cold storage facility in Northern California. We take precautions to safeguard our facilities, including insurance, health and safety protocols, and off-site storage of critical research results and computer data. However, a natural disaster, such as a fire, flood, or earthquake, could cause substantial delays in our operations, damage or destroy our equipment, inventory, or development projects, and cause us to incur additional expenses. The insurance we maintain against natural disasters may not be adequate to cover our losses in any particular case.

We utilize and critically rely upon information technology systems in all aspects of our business, including increasingly large amounts of data to support our products and advance our research and development. Failure to effectively prevent, detect, and recover from the increasing number and sophistication of information security threats could result in theft, misuse, modification, and destruction of information, including trade secrets and confidential business information, and cause business disruptions, delays in research and development, and reputational damage, which could significantly affect our results of operations and financial condition.

Disruption to our IT system could adversely affect our reputation and have a material adverse effect on our business and results of operations.

Our technologies rely on our IT system to collect and analyze our genomic data, including TILLING and other experimental data, and manage our plant inventory system, which tracks every plant that we have ever produced. We can provide no assurance that our current IT system is fully protected against third-party intrusions, viruses, hacker attacks, information, or data theft, or other similar threats. Furthermore, we store significant amounts of data and, though we have back-up storage for our stored data, we cannot assure you that our back-up storage arrangements will be effective if it becomes necessary to rely on them.

If our IT system does not function properly or proves incompatible with new technologies, we could experience interruptions in data transmissions and slow response times, preventing us from completing routine research and business activities. Furthermore, disruption or failure of our IT system due to technical reasons, natural disaster, or other unanticipated catastrophic events, including power interruptions, storms, fires, floods, earthquakes, terrorist attacks, and wars could significantly impair our ability to deliver data related to our projects to our collaborators on schedule and materially and adversely affect the outcome of our collaborations, our relationships with our collaborators, our business, and our results of operations.

Our use of hazardous materials exposes us to potential liabilities.

Certain of our operations involve the storage and controlled use of hazardous materials, including laboratory chemicals, herbicides, and pesticides. This requires us to conduct our operations in compliance with applicable environmental and safety standards, and we cannot completely eliminate the risk of accidental contamination from hazardous materials. In the event of such contamination, we may be held liable for significant damages or fines, which could have a material adverse effect on our business and operating results.

Most of the licenses we grant to our collaborators to use our proprietary genes in certain crops are exclusive within certain jurisdictions, which limits our licensing opportunities.

Most of the licenses we grant our collaborators to use our proprietary genes in certain crops are exclusive within specified jurisdictions, so long as our collaborators comply with certain diligence requirements. That means that once genes are licensed to a collaborator in a specified crop or crops, we are generally prohibited from licensing those genes to any third party. The limitations imposed by these exclusive licenses could prevent us from expanding our business and increasing our product development initiatives with new collaborators, both of which could adversely affect our business and results of operations.

Our business model for discovery of genes is dependent on licensing patent rights from third parties, and any disruption of this licensing process could adversely affect our competitive position and business prospects.

Our business model involves acquiring technologies that have achieved proof of concept through rigorous development and testing by third-party basic researchers in order to avoid the significant risks and high costs associated with basic research. Only a small number of the genes we evaluate for acquisition are likely to provide viable commercial candidates and an even more limited number, if any, are likely to be commercialized by us or our collaborators. A failure by us to continue identifying genes that improve specific crop traits could make it difficult to grow our business. If we are unable to identify additional genes, we may be unable to develop new traits, which may negatively impact our ability to generate revenues.

If we are unable to enter into licensing arrangements to acquire rights to these potentially viable genes on favorable terms in the future, it may adversely affect our business. In addition, if the owners of the patents we license do not properly maintain or enforce the patents underlying such licenses, our competitive position and business prospects could be harmed. Without protection for the intellectual property we license, other companies might be able to offer substantially similar or identical products for sale, which could adversely affect our competitive business position and harm our business prospects.

If we fail to comply with our obligations under license agreements, our counterparties may have the right to terminate these agreements, in which event we may not be able to develop, manufacture, register, or market, or may be forced to cease developing, manufacturing, registering, or marketing, any product that is covered by these agreements or may face other penalties under such agreements. Such an occurrence could materially adversely affect the value of the applicable products to us and have an adverse effect on our business and result of operations.

Our success depends on our ability to protect our intellectual property and our proprietary technologies.

Our commercial success depends, in part, on our ability to obtain and maintain patent and trade secret protection for our proprietary technologies, our traits, and their uses, as well as our ability to operate without infringing upon the proprietary rights of others. If we do not adequately protect our intellectual property, competitors may be able to use our technologies and erode or negate any competitive advantage we may have, which could harm our business and ability to achieve profitability.

If we are unable to protect the confidentiality of our trade secrets, the value of our technology could be materially and adversely affected and our business could be harmed.

We treat our proprietary technologies, including unpatented know-how and other proprietary information, as trade secrets. We seek to protect these trade secrets, in part, by entering into non-disclosure and confidentiality agreements with any third parties who have access to them, such as our consultants, independent contractors, advisors, corporate collaborators, and outside scientific collaborators. We also enter into confidentiality and invention or patent assignment agreements with employees and certain consultants. Any party with whom we have executed such an agreement could breach that agreement and disclose our proprietary information, including our trade secrets, and we may not be able to obtain adequate remedies for such breaches. Enforcing a claim that a party illegally disclosed or misappropriated a trade secret is difficult, expensive, and time consuming, and the outcome is unpredictable. In addition, if any of our trade secrets were to be lawfully obtained or independently developed by a competitor, we would have no right to prevent such third party, or those to whom they communicate such technology or information, from using that technology or information to compete with us. If any of our trade secrets were to be disclosed to or independently developed by a competitor, or if we otherwise lose protection for our trade secrets or proprietary know-how, the value of this information may be greatly reduced and our business and competitive position could be harmed.

Changes in U.S. patent law could diminish the value of patents in general, thereby impairing our ability to protect our products in development.

As an agricultural biotechnology company, our success is heavily dependent on intellectual property, particularly patents. Obtaining and enforcing patents involves technological and legal complexity, and is costly, time consuming, and inherently uncertain. In addition, the U.S. Supreme Court has ruled on several patent cases in recent years, either narrowing the scope of patent protection available in certain circumstances or weakening the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents once obtained. Depending on decisions by the U.S. Congress, the federal courts, and the U.S. Patent and Trademark Office, the laws and regulations governing patents could change in unpredictable ways that may weaken or undermine our ability to obtain new patents or to enforce our existing patents and patents we might obtain in the future.

We may not be able to protect our intellectual property rights throughout the world.

Filing, prosecuting, maintaining, and defending patents on products in development in all countries throughout the world would be prohibitively expensive, and our intellectual property rights in some countries outside the United States are less extensive than those in the United States. In addition, the laws of some foreign countries do not protect intellectual property rights to the same extent as federal and state laws in the United States. For example, several countries outside the United States prohibit patents on plants and seeds entirely. In addition, we may at times license third-party technologies for which limited international patent protection exists and for which the time period for filing international patent applications has passed. Consequently, we are unable to prevent third parties from using intellectual property we develop or license in all countries outside the United States, or from selling or importing products made using our intellectual property in and into the jurisdictions in which we do not have patent

protection. Competitors may use our technologies in jurisdictions where we have not obtained patent protection to develop their own products, and we may be unable to prevent such competitors from importing those infringing products into territories where we have patent protection, but where enforcement is not as strong as in the United States. These products may compete with our products in development and our patents and other intellectual property rights may not be effective or sufficient to prevent them from competing in those jurisdictions. Moreover, farmers or others in the chain of commerce may raise legal challenges to our intellectual property rights or may infringe upon our intellectual property rights, including through means that may be difficult to prevent or detect, and local regulators may choose to not enforce our intellectual property rights.

Many companies have encountered significant problems in protecting and defending intellectual property rights in foreign jurisdictions where we have filed patent applications. The legal systems of certain countries have not historically favored the enforcement of patents or other intellectual property rights, which could hinder us from preventing the infringement of our patents or other intellectual property rights and result in substantial risks to us. Proceedings to enforce our patent rights in the United States or foreign jurisdictions could result in substantial costs and divert our efforts and attention from other aspects of our business, could put our patents at risk of being invalidated or interpreted narrowly and our patent applications at risk of not issuing and could provoke third parties to assert patent infringement or other claims against us. We may not prevail in any lawsuits that we initiate and the damages or other remedies awarded, if any, may not be commercially meaningful or even cover our associated legal costs. Accordingly, our efforts to enforce our intellectual property rights around the world may be inadequate to obtain a significant commercial advantage from the intellectual property that we develop or license from third parties.

If we or one of our collaborators are sued for infringing the intellectual property rights of a third party, such litigation could be costly and time consuming and could prevent us or our collaborators from developing or commercializing our products.

Our ability to generate significant revenues from our products depends on our and our collaborators' ability to develop, market and sell our products and utilize our proprietary technology without infringing the intellectual property and other rights of any third parties. In the United States and abroad there are numerous third-party patents and patent applications that may be applied toward our proprietary technology, business processes, or developed traits, some of which may be construed as containing claims that cover the subject matter of our products or intellectual property. Because of the rapid pace of technological change, the confidentiality of patent applications in some jurisdictions (including U.S. provisional patent applications), and the fact that patent applications can take many years to issue, there may be currently pending applications that are unknown to us that may later result in issued patents upon which our products in development or proprietary technologies infringe. Similarly, there may be issued patents relevant to our products in development of which we are not aware. These patents could reduce the value of the traits we develop or the genetically modified plants containing our traits or, to the extent they cover key technologies on which we have unknowingly relied, require that we seek to obtain licenses or cease using the technology, no matter how valuable to our business. We may not be able to obtain such a license on commercially reasonable terms. If any third party patent or patent application covers our intellectual property or proprietary rights and we are not able to obtain a license to it, we and our collaborators may be prevented from commercializing products containing our traits.

As the agricultural biotechnology industry continues to develop, we may become party to, or threatened with, litigation or other adverse proceedings regarding intellectual property or proprietary rights in our technology, processes, or developed traits. Third parties may assert claims based on existing or future intellectual property rights and the outcome of any proceedings is subject to uncertainties that cannot be adequately quantified in advance. Any litigation proceedings could be costly and time consuming, and negative outcomes could result in liability for monetary damages, including treble damages and attorneys' fees, if we are found to have willfully infringed a patent. There is also no guarantee that we would be able to obtain a license under such infringed intellectual property on commercially reasonable terms or at all. A finding of infringement could prevent us or our collaborators from developing, marketing or selling a product or force us to cease some or all of our business operations. Even if we are successful in these proceedings, we may incur substantial costs and the time and attention of our management and scientific personnel may be diverted as a result of these proceedings, which could have a material adverse effect on us. Claims that we have misappropriated the confidential information or trade secrets of third parties could similarly have a negative impact on our business.

Our results of operations will be affected by the level of royalty payments that we are required to pay to third parties.

We are a party to license agreements that require us to remit royalty payments and other payments related to in-licensed intellectual property. Under our in-license agreements, we may pay up-front fees and milestone payments and be subject to future royalties. We cannot precisely predict the amount, if any, of royalties we will owe in the future, and if our calculations of royalty payments are incorrect, we may owe additional royalties, which could negatively affect our results of operations. As our product sales increase, we may, from time to time, disagree with our third-party collaborators as to the appropriate royalties owed and the resolution of such disputes may be costly and may consume management's time. Furthermore, we may enter into additional license agreements in the future, which may also include royalty, milestone and other payments.

We are subject to governmental export and import controls that could impair our ability to compete in international markets due to licensing requirements and subject us to liability if we are not in compliance with applicable laws.

Our products and products in development are subject to export control and import laws and regulations, including the U.S. Export Administration Regulations, U.S. Customs regulations, and various economic and trade sanctions regulations administered by the U.S. Treasury Department's Office of Foreign Assets Controls. Exports of our products and technology must be made in compliance with these laws and regulations. If we fail to comply with these laws and regulations, we and certain of our employees could be subject to substantial civil or criminal penalties, including the possible loss of export or import privileges; fines, which may be imposed on us and responsible employees or managers; and, in extreme cases, the incarceration of responsible employees or managers.

In addition, changes in our products or solutions or changes in applicable export or import laws and regulations may create delays in the introduction and sale of our products and solutions in international markets, prevent our customers from deploying our products and solutions or, in some cases, prevent the export or import of our products and solutions to certain countries, governments or persons altogether. Any change in export or import laws and regulations, shift in the enforcement or scope of existing laws and regulations, or change in the countries, governments, persons or technologies targeted by such laws and regulations, could also result in decreased use of our products and solutions, or in our decreased ability to export or sell our products and solutions to existing or potential customers. Any decreased use of our products and solutions or limitation on our ability to export or sell our products and solutions would likely adversely affect our business, financial condition and results of operations.

We are subject to anti-corruption and anti-money laundering laws with respect to both our domestic and international operations, and non-compliance with such laws can subject us to criminal and civil liability and harm our business.

We are subject to the U.S. Foreign Corrupt Practices Act of 1977, as amended, the U.S. domestic bribery statute contained in 18 U.S.C. § 201, the U.S. Travel Act, the USA PATRIOT Act, and possibly other anti-bribery and anti-money laundering laws in countries in which we conduct activities. Anti-corruption laws are interpreted broadly and prohibit us and our collaborators from authorizing, offering, or directly or indirectly providing improper payments or benefits to recipients in the public or private sector. We or our collaborators may have direct and indirect interactions with government agencies and state-affiliated entities and universities in the course of our business. We may also have certain matters come before public international organizations such as the United Nations. We use third-party collaborators, joint venture and strategic partners, law firms, and other representatives for regulatory compliance, patent registration, lobbying, deregulation advocacy, field testing, and other purposes in a variety of countries, including those that are known to present a high corruption risk such as India, China, and Latin American countries. We can be held liable for the corrupt or other illegal activities of these third-party collaborators, our employees, representatives, contractors, partners, and agents, even if we do not explicitly authorize such activities. In addition, although we have implemented policies and procedures to ensure compliance with anti-corruption and related laws, there can be no assurance that all of our employees, representatives, contractors, partners, or agents will comply with these laws at all times. Noncompliance with these laws could subject us to whistleblower complaints, investigations, sanctions, settlements, prosecution, other enforcement actions, disgorgement of profits, significant fines, damages, other civil and criminal penalties or injunctions, suspension and debarment from contracting with certain governments or other persons, the loss of export privileges, reputational

harm, adverse media coverage, and other collateral consequences. If any subpoenas or investigations are launched, or governmental or other sanctions are imposed, or if we do not prevail in any possible civil or criminal litigation, our business, results of operations, and financial condition could be materially harmed. In addition, responding to any action will likely result in a materially significant diversion of management's attention and resources and significant defense costs and other professional fees. Enforcement actions and sanctions could further harm our business, results of operations, and financial condition.

Adverse outcomes in future legal proceedings could subject us to substantial damages and adversely affect our results of operations and profitability.

We may become party to legal proceedings, including matters involving personnel and employment issues, personal injury, environmental matters, and other proceedings. Some of these potential proceedings could result in substantial damages or payment awards that exceed our insurance coverage. We will estimate our exposure to any future legal proceedings and establish provisions for the estimated liabilities where it is reasonably possible to estimate and where an adverse outcome is probable. Assessing and predicting the outcome of these matters will involve substantial uncertainties. Furthermore, even if the outcome is ultimately in our favor, our costs associated with such litigation may be material. Adverse outcomes in future legal proceedings or the costs and expenses associated therewith could have an adverse effect on our results of operations.

We may be required to pay substantial damages as a result of product liability claims for which insurance coverage is not available.

We are subject to product liability claims with respect to our SONOVA products, and as additional products integrating our traits reach commercialization, product liability claims will increasingly be a commercial risk for our business, particularly as we are involved in the supply of biotechnological products, some of which may be harmful to humans and the environment. Product liability claims against us or our collaborators selling products that contain our traits, or allegations of product liability relating to seeds containing traits developed by us, could damage our reputation, harm our relationships with our collaborators, and materially and adversely affect our business, results of operations, financial condition, and prospects. Furthermore, while our collaboration agreements typically require that our collaborators indemnify us for the cost of product liability claims brought against us as a result of our collaborator's misconduct, such indemnification provisions may not always be enforced, and we may receive no indemnification if our own misconduct contributed to the claims.

We may seek to expand through acquisitions of and investments in other brands, businesses, and assets. These acquisition activities may be unsuccessful or divert management's attention.

We may consider strategic and complementary acquisitions of and investments in other agricultural biotechnology brands, businesses or other assets, and such acquisitions or investments are subject to risks that could affect our business, including risks related to:

- the necessity of coordinating geographically disparate organizations;
- implementing common systems and controls;
- integrating personnel with diverse business and cultural backgrounds;
- integrating acquired manufacturing and production facilities, technology and products;
- combining different corporate cultures and legal systems;
- unanticipated expenses related to integration, including technical and operational integration;
- increased costs and unanticipated liabilities, including with respect to registration, environmental, health and safety matters, that may affect sales and operating results;
- retaining key employees;
- obtaining required government and third-party approvals;
- legal limitations in new jurisdictions;

- installing effective internal controls and audit procedures;
- issuing common stock that could dilute the interests of our existing stockholders;
- spending cash and incurring debt;
- assuming contingent liabilities; and
- creating additional expenses.

We may not be able to identify opportunities or complete transactions on commercially reasonable terms, or at all, or actually realize any anticipated benefits from such acquisitions or investments. Similarly, we may not be able to obtain financing for acquisitions or investments on attractive terms. In addition, the success of any acquisitions or investments also will depend, in part, on our ability to integrate the acquisition or investment with our existing operations.

We have recently experienced changes in our management team, which may cause transition problems in our business.

We have recently experienced changes in our management team. Vic C. Knauf, our former Chief Scientific Officer retired in December 2016. Wendy Neal, our former Vice President and Chief Legal Officer, was terminated in February 2017. In addition, Roger Salameh, our former Chief Operating Officer was terminated in February 2017. The Company currently has no plans to fill the Chief Operating Officer role and such duties have been assumed by existing staff. Disruption to our organization as a result of these or future executive management changes could have a material adverse effect on our business, financial condition and results of operations.

We incur significant costs and devote substantial management time as a result of operating as a public company, and our management team has limited experience managing a public company.

As a public company, we incur significant legal, accounting, and other expenses that we did not incur as a private company. For example, we are subject to the reporting requirements of the Securities Exchange Act of 1934, as amended, or the Exchange Act, and are required to comply with the applicable requirements of the Sarbanes-Oxley Act and the Dodd-Frank Wall Street Reform and Consumer Protection Act, as well as rules and regulations subsequently implemented by the SEC and The Nasdaq Stock Market, including the establishment and maintenance of effective disclosure and financial controls and corporate governance practices. Compliance with these requirements has increased and will continue to increase our legal and financial compliance costs and has made and will continue to make some activities more time consuming and costly. Our management and other personnel has had to and will continue to divert attention from operational and other business matters to devote substantial time to these public company requirements, which could adversely affect our business, financial condition, and operating results.

Most members of our management team have limited experience managing a publicly-traded company, interacting with public company investors, and complying with the increasingly complex laws pertaining to public companies. Our management team’s inexperience in dealing with these complex laws could be a significant disadvantage to us, because it is likely that an increasing amount of their time will be devoted to these activities, which may result in them spending less time on the management and growth of our company. In addition, our management team may not successfully or efficiently manage being a public company subject to significant regulatory oversight and reporting obligations under the federal securities laws and the continuous scrutiny of securities analysts and investors, which could adversely affect our business, financial condition, and operating results.

As a result of being a public company, we are obligated to develop and maintain proper and effective internal control over financial reporting. We may not complete our analysis of our internal control over financial reporting in a timely manner, or these internal controls may not be determined to be effective, which may adversely affect investor confidence in our company and, as a result, the value of our common stock.

Pursuant to Section 404 of the Sarbanes-Oxley Act and the related rules adopted by the SEC and the Public Company Accounting Oversight Board, starting with the second annual report that we filed with the SEC after the consummation of our public offering, our management is required to report on the effectiveness of our internal control over financial reporting. In addition, once we no longer qualify as an emerging growth company under the JOBS Act and lose the ability to rely on the exemptions related thereto, our independent registered public accounting firm will also need to attest to the effectiveness of our internal control over financial reporting under Section 404. We are starting the process of determining whether our existing internal controls over financial reporting systems are compliant with Section 404. This process will require the investment of substantial time and resources, including by members of our senior management. As a result, this process may divert internal resources and take a significant amount of time and effort to complete. In addition, we cannot predict the outcome of this determination and whether we will need to implement remedial actions in order to implement effective internal control over financial reporting.

Our recent executive management changes (described above) and the short time interval in which they have occurred could add to the risk of control failures, including a failure in the effective operation of our internal control over financial reporting or our disclosure controls and procedures. Additionally, as we hire new executives, it might take the newly constituted management team some time to become sufficiently familiar with our business and each other to effectively develop and implement our business strategies.

In connection with the preparation of our financial statements for the years ended December 31, 2017 and 2016, we identified certain internal control deficiencies that did not rise to the level of a significant deficiency or material weakness, on an individual basis or in the aggregate. We are continuously improving our internal control environment. As a result, we may experience higher than anticipated operating expenses, as well as higher auditor fees during and after the implementation of these changes. If we are unable to implement any of the required changes to our internal control over financial reporting effectively or efficiently or are required to do so earlier than anticipated, it could adversely affect our operations, financial reporting, and results of operations and could result in an adverse opinion on internal controls from our independent registered public accounting firm.

Our ability to use our net operating loss carryforwards to offset future taxable income may be subject to certain limitations.

Under Section 382 of the Internal Revenue Code of 1986, as amended, or the Code, a corporation that undergoes an “ownership change” is subject to limitations on its ability to utilize its NOLs to offset future taxable income. Our existing NOLs may be subject to limitations arising from previous ownership changes, and if we undergo an ownership change in the future, our ability to utilize NOLs could be further limited by Section 382 of the Code. Future changes in our stock ownership, some of which are outside of our control, could result in an ownership change under Section 382 of the Code. Furthermore, our ability to utilize NOLs of companies that we may acquire in the future may be subject to limitations. There is also a risk that, due to regulatory changes, such as suspensions on the use of NOLs, or other unforeseen reasons, our existing NOLs could expire or otherwise be unavailable to offset future income tax liabilities. For these reasons, we may not be able to realize a tax benefit from the use of our NOLs, whether or not we obtain profitability.

Risks Related to Ownership of Our Common Stock

Sales of a substantial number of shares of our common stock in the public market, or the perception that these sales might occur, could cause our stock price to decline.

Sales of a substantial number of our common stock in the public market, or the perception that these sales might occur, could cause the market price of our common stock to decline and could impair our ability to raise capital through the sale of additional equity securities. As of December 31, 2017, there were 2,134,154 shares of our common stock outstanding, of which approximately 545,000 shares were held by non-affiliates. All of our common stock is freely transferable, except shares held by our “affiliates,” as defined in Rule 144 under the Securities Act.

We may also issue common stock or options to purchase shares of our common stock that under our 2015 Omnibus Equity Incentive Plan and our 2015 Employee Stock Purchase Plan. Securities issued under these plans will be registered under a Form S-8 and are freely tradable upon issuance. There were 144,743 options exercisable as of December 31, 2017 at a weighted average exercise price of $79.53.

Our stock price has been and may continue to be volatile, and you could lose all or part of your investment.

The market price of our common stock since our initial public offering has been and may continue to be volatile. Since shares of our common stock were sold in our initial public offering in May 2015 at a price of $160.00 per share, our stock price has ranged from $3.60 to $176.00, through December 31, 2017. The market price of our common stock is subject to wide fluctuations in response to various risk factors, some of which are beyond our control and may not be related to our operating performance, including:

- addition or loss of significant customers, collaborators or distributors;
- changes in laws or regulations applicable to our industry or traits;
- additions or departures of key personnel;
- the failure of securities analysts to cover our common stock after this offering;
- actual or anticipated changes in expectations regarding our performance by investors or securities analysts;
- price and volume fluctuations in the overall stock market;
- volatility in the market price and trading volume of companies in our industry or companies that investors consider comparable;
- share price and volume fluctuations attributable to inconsistent trading volume levels of our shares;
- our ability to protect our intellectual property and other proprietary rights;
- sales of our common stock by us or our stockholders;
- the expiration of contractual lock-up agreements;
- litigation involving us, our industry, or both;
- major catastrophic events; and
- general economic and market conditions and trends.

Further, the stock markets have experienced extreme price and volume fluctuations that have affected and continue to affect the market prices of equity securities of many companies. These fluctuations often have been unrelated or disproportionate to the operating performance of those companies. In addition, the stock prices of many seed and agricultural biotechnology companies have experienced wide fluctuations that have often been unrelated to the operating performance of those companies. These broad market and industry fluctuations, as well as general economic, political, and market conditions such as recessions, interest rate changes, or international currency fluctuations, may cause the market price of our common stock to decline. If the market price of our common stock fluctuates or declines, you may not realize any return on your investment and may lose some or all of your investment.

Insiders have substantial control over us, which could limit your ability to influence the outcome of key transactions, including a change of control.

Our executive officers, directors, and two largest stockholders, in the aggregate, beneficially own approximately 74% of the outstanding shares of our common stock as of December 31, 2017. As a result, these stockholders, if acting together, would be able to influence or control matters requiring approval by our stockholders, including the election of directors and the approval of mergers, acquisitions or other extraordinary transactions. They may have interests that differ from yours and may vote in a way with which you disagree and that

may be adverse to your interests. This concentration of ownership may have the effect of delaying, preventing or deterring a change of control of our company, could deprive our stockholders of an opportunity to receive a premium for their common stock as part of a sale of our company and might affect the market price of our common stock.

As of December 31, 2017, Moral Compass Corporation, our largest stockholder, beneficially owns approximately 53% of our outstanding common stock, and Moral Compass Corporation and Mandala Capital together beneficially own approximately 73% of our outstanding common stock. For so long as Moral Compass Corporation continues to own a significant percentage of our outstanding shares, they may be able to significantly influence the composition of our board of directors and the approval of actions requiring stockholder approval. Accordingly, for such period of time, Moral Compass Corporation may be able to exercise control over our management, business plans, and policies, including the appointment and removal of our officers, and may be able to cause or prevent a change of control of our company or a change in the composition of our board of directors and could preclude any unsolicited acquisition of our company. This concentration of ownership could deprive you of an opportunity to receive a premium for your shares as part of a sale of our company and ultimately might affect the market price of our common stock.

We expect our operating results to vary significantly from quarter to quarter, which may cause our stock price to fluctuate widely.

We expect our quarterly operating results to fluctuate widely and unpredictably for the following reasons, among others:

- our significant customer concentration;
- our uncertain ability to obtain government grant funding, which affects the timing and amounts of our payments from the U.S. government;
- the variable timing, stage, and results of our and our collaborators' research, development, and regulatory activities;
- the impact of seasonality in agricultural operations on our field trials and sales of products that incorporate our seed traits;
- supplier, manufacturing, or quality problems; and
- variance in the timing of customer and distributor orders for our SONOVA products.

Further, a large proportion of our costs are fixed, due in part to our significant research and development costs and general and administrative expenses. Thus, even a small decline in revenues could disproportionately affect our quarterly operating results and could cause such results to differ materially from expectations. Any unanticipated change in revenues or operating results is likely to cause our stock price to fluctuate since such changes reflect new information available to investors and analysts.

Provisions in our amended and restated certificate of incorporation and amended and restated bylaws might discourage, delay or prevent a change of control of our company or changes in our management and, therefore, depress the trading price of our common stock.

Our amended and restated certificate of incorporation and amended and restated bylaws contain provisions that could depress the trading price of our common stock by discouraging, delaying or preventing a change of control of our company or changes in our management that the stockholders of our company may believe advantageous. These provisions include:

- establishing a classified board of directors so that not all members of our board of directors are elected at one time;
- authorizing "blank check" preferred stock that our board of directors could issue to increase the number of outstanding shares to discourage a takeover attempt;

- eliminating the ability of stockholders to call a special stockholder meeting;
- eliminating the ability of stockholders to act by written consent;
- the requirement that, to the fullest extent permitted by law and unless we consent to an alternate form, certain proceedings against or involving us or our directors, officers, or employees be brought exclusively in the Court of Chancery in the State of Delaware;
- providing that the board of directors is expressly authorized to make, alter, or repeal our bylaws; and
- establishing advance notice requirements for nominations for elections to our board of directors or for proposing matters that can be acted upon by stockholders at stockholder meetings.

If securities or industry analysts do not publish or cease publishing research or reports about us, our business, or our market, or if they change their recommendations regarding our stock adversely, our stock price and trading volume could decline.

The trading market for our common stock is influenced by the research and reports that industry or securities analysts may publish about us, our business, our market or our competitors. If any of the analysts who may cover us make adverse changes to their recommendation regarding our stock, or provide more favorable relative recommendations about our competitors, our stock price would likely decline. If any analyst who may cover us were to cease coverage of our company or fail to regularly publish reports on us, we could lose visibility in the financial markets, which in turn could cause our stock price or trading volume to decline.

As an emerging growth company within the meaning of the Securities Act, we utilize certain modified disclosure requirements, and we cannot be certain if these reduced requirements will make our common stock less attractive to investors.

We are an emerging growth company within the meaning of the rules under the Securities Act and we plan in future filings with the SEC to utilize, the modified disclosure requirements available to emerging growth companies, including reduced disclosure about our executive compensation and omission of compensation discussion and analysis, and an exemption from the requirement of holding a nonbinding advisory vote on executive compensation. In addition, we are not subject to certain requirements of Section 404 of the Sarbanes-Oxley Act, including the additional testing of our internal control over financial reporting as may occur when outside auditors attest as to our internal control over financial reporting. As a result, our stockholders may not have access to certain information they may deem important. We cannot predict if investors will find our common stock less attractive because we rely on these exemptions. If some investors find our common stock less attractive as a result, there may be a less active trading market for our common stock and our stock price may be more volatile.

We could remain an emerging growth company for up to five years, or until the earliest of (i) the last day of the first fiscal year in which our annual gross revenues exceed $1.0 billion, (ii) the date that we become a large accelerated filer as defined in Rule 12b-2 under the Exchange Act, which would occur if the market value of our common stock that is held by non-affiliates exceeds $700 million as of the last business day of our most recently completed second fiscal quarter, or (iii) the date on which we have issued more than $1.0 billion in non-convertible debt during the preceding three-year period.

Because we do not expect to pay any dividends for the foreseeable future, investors may be forced to sell their stock to realize a return on their investment.

We do not anticipate that we will pay any dividends to holders of our common stock for the foreseeable future. Any payment of cash dividends will be at the discretion of our board of directors and will depend on, among other things, our results of operations, cash requirements, financial condition, contractual restrictions including compliance with covenants under our debt agreements, and other factors that our board of directors may deem relevant. Our ability to pay dividends might be restricted by the terms of any indebtedness that we incur in the future. In addition, certain of our current outstanding debt agreements prohibit us from paying cash dividends on our common stock. Consequently, you should not rely on dividends to receive a return on your investment.

Our common stock may be delisted from The Nasdaq Capital Market if we are unable to maintain compliance with Nasdaq's continued listing standards.

As a company traded on The Nasdaq Capital Market, we are subject to compliance with The Nasdaq Stock Market's rules and requirements, which require, among other things, that our minimum bid price be $1.00 or higher and minimum shareholders' equity be $2.5 million or higher. In the event we do not meet the Nasdaq listing criteria for 30 consecutive days, Nasdaq will send a "deficiency notice" to inform the company that it will be delisted after 180 calendar days unless it meets the requirements.

On February 14, 2017, we received a letter from Nasdaq notifying us that we were not in compliance with the minimum closing bid requirement set forth in Nasdaq Listing Rule 5405. In accordance with Nasdaq Listing Rule 5450(a)(1), we were required to regain compliance with the minimum closing bid requirement by August 14, 2017.

On July 21, 2017, the Company transferred the listing of its common stock to The Nasdaq Capital Market (the "Capital Market"), and as a result, the Company was afforded the remainder of the 180-day period, or until August 14, 2017, to regain compliance with the minimum $1 bid price per share requirement. As of August 14, 2017, we were still not in compliance with the minimum $1 bid price per share requirement. However, Nasdaq determined that the Company had until February 12, 2018 to regain compliance with the minimum bid price requirement.

On February 7, 2018, we received a letter from Nasdaq notifying us that the Company has regained compliance with Listing Rule 5450(a)(1) and this matter is now closed.

In the event we are delisted from the Nasdaq Capital Market, we would be forced to list our shares on the OTC Electronic Bulletin Board or some other quotation medium, such as the pink sheets, depending on our ability to meet the specific listing requirements of those quotation systems. As a result, an investor might find it more difficult to trade or to obtain accurate price quotations for such shares.

Any delisting of our common stock could adversely affect the market liquidity of our common stock and the market price of our common stock could decrease and/or become more volatile. Furthermore, if our common stock were delisted, it could adversely affect our ability to obtain additional financing and/or result in the loss of confidence by investors, collaborators and other third parties, customers, and employees.

Item 1B. Unresolved Staff Comments.

Not applicable.

Item 2. Properties.

Our corporate headquarters are located in Davis, California, in a facility consisting of approximately 20,775 square feet of office, laboratory and growth chamber space under a lease that expires on June 30, 2018, pursuant to which we have an option to renew the lease for an additional three-year term. This facility accommodates research and development, operations, analytical services, regulatory and administrative activities. Our administrative offices in Phoenix, Arizona, consist of 2,976 square feet under a lease that expires on June 30, 2018 and accommodate our finance, legal and other administrative activities, as well as sales and marketing activities for our SONOVA products. We lease greenhouse space and farm land for agricultural use in Northern California as well as farmland in Idaho. We also lease office and warehouse space in Idaho under a lease that expires on December 31, 2021. Our Seattle research location was closed in March 2017.

We believe that our leased facilities are adequate to meet our current needs and that, if needed, suitable additional or alternative space will be available to accommodate our operations.

Item 3. Legal Proceedings.

We currently are not a party to any material litigation or other material legal proceedings. From time to time, we may be subject to legal proceedings and claims in the ordinary course of business.

Item 4. Mine Safety Disclosures.

Not applicable.

PART II

Item 5. Market for Registrant's Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities.

Our common stock has been listed on the NASDAQ Stock Market under the symbol "RKDA" since May 15, 2015. Prior to May 15, 2015, there was no public trading for our common stock. The following table sets forth for the periods indicated the high and low sales price per share of our common stock as reported on the NASDAQ Stock Market:

YEAR ENDED DECEMBER 31, 2016	HIGH	LOW
First Quarter	$ 68.40	$ 40.40
Second Quarter	$ 60.20	$ 20.20
Third Quarter	$ 55.00	$ 35.80
Fourth Quarter	$ 39.80	$ 17.20

YEAR ENDED DECEMBER 31, 2017	HIGH	LOW
First Quarter	$ 23.60	$ 13.00
Second Quarter	$ 17.00	$ 8.40
Third Quarter	$ 15.60	$ 6.00
Fourth Quarter	$ 9.80	$ 3.60

Holders of Record

As of March 1, 2018, we had 46 holders of record of our common stock. Because many of our shares of common stock are held by brokers and other institutions on behalf of stockholders, we are unable to estimate the total number of stockholders represented by these record holders.

Dividend Policy

We have never declared or paid cash dividends on our capital stock. We currently intend to retain all available funds and any future earnings for use in the operation of our business and do not anticipate paying any cash dividends in the foreseeable future. Any decision to declare and pay cash dividends in the future will be made at the discretion of our board of directors and will depend on, among other things, our results of operations, cash requirements, financial condition, contractual restrictions, and other factors that our board of directors may deem relevant.

Recent Sales of Unregistered Securities

None.

Purchases of Equity Securities by the Issuer and Affiliated Purchasers

We did not repurchase any of our equity securities during the year ended December 31, 2017.

Item 6. Selected Financial Data.

The following selected Consolidated Statements of Operations and Comprehensive Loss data for the years ended December 31, 2017 and 2016 and the Consolidated Balance Sheets data as of December 31, 2017 and 2016 are derived from our audited consolidated financial statements included herein, and should be read together with our consolidated financial statements, the notes to our consolidated financial statements and "Management's Discussion and Analysis of Financial Condition and Results of Operations."

	Year Ended December 31,	
	2017	2016
	(in thousands, except share and per share amounts)	
Revenues:		
Product	$ 514	$ 669
License	1,470	144
Contract research and government grants	2,042	2,375
Total revenues	4,026	3,188
Operating expenses:		
Cost of product revenues	283	895
Research and development(1)	7,407	8,663
Selling, general, and administrative(1)	10,651	12,250
Total operating expenses	18,341	21,808
Loss from operations	(14,315)	(18,620)
Interest expense	(747)	(1,319)
Other income, net	281	340
Loss on extinguishment of debt	(900)	—
Loss before income taxes	(15,681)	(19,599)
Income tax provision	(26)	(25)
Net loss attributable to common stockholders	(15,707)	(19,624)
Net loss per share attributable to common stockholders, basic and diluted(2)	$ (7.28)	$ (8.85)
Weighted-average number of shares used in per share calculations, basic and diluted(2)	2,156,201	2,218,341

(1) Includes stock-based compensation expense as follows:

	Year Ended December 31,	
	2017	2016
	(in thousands)	
Research and development	$ 411	$ 303
Selling, general, and administrative	1,063	756
Total stock-based compensation	$ 1,474	$ 1,059

(2) See Note 16 of the notes to our consolidated financial statements for a description of how we compute net loss per share attributable to common stockholders, basic and diluted, and pro forma net loss per share attributable to common stockholders, basic and diluted.

	As of December 31,	
	2017	2016
	(in thousands)	
Consolidated Balance Sheets Data:		
Cash and cash equivalents	$ 9,125	$ 2,013
Working capital	11,522	49,093
Total assets	16,570	56,574
Total indebtedness	—	25,127
Additional paid-in capital	175,223	173,723
Accumulated deficit	(167,257)	(151,550)
Total stockholder's equity	8,007	22,198

Item 7. Management's Discussion and Analysis of Financial Condition and Results of Operations.

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our consolidated financial statements and the related notes to those statements included herein. In addition to historical financial information, the following discussion and analysis contains forward-looking statements that involve risks, uncertainties and assumptions. Our actual results and timing of selected events may differ materially from those anticipated in these forward-looking statements as a result of many factors, including those discussed under "Risk Factors."

Overview

We are a consumer-driven, agricultural food ingredient company. We aim to create value across the agricultural production and supply chain beginning with enhanced crop productivity for farmers and ultimately to deliver accelerated innovation in nutritional quality consumer foods. We use state of the art gene-editing technology and advanced breeding techniques to naturally enhance the nutritional quality of grains and oilseeds to address the rapidly evolving trends in consumer health and nutrition. In addition, we have developed a broad pipeline of high value crop productivity traits designed to enhance farm economics.

Consumers are demanding food companies provide healthier, high quality foods, naturally and sustainably produced with greater ingredient simplicity and transparency. More now than ever, consumers are paying premium pricing to satisfy their dietary health requirements, such as higher fiber and lower gluten in grains, healthier oils and fewer processed ingredients. Consumer food companies recognize this shift but cannot rely upon the legacy ag-supply chain and traditional crop breeding techniques to meet these demands. Conventional and transgenic breeding processes can take between 9-13 years to bring new food varieties or quality traits to market, causing consumer food companies to search for alternative means to satisfy the evolving customer demands. The need for rapid product differentiation at the consumer level has opened up a premium food market opportunity that is becoming one of the fastest growing segments in the food industry.

To address this large and growing demand, we are building on our industry leading scientific expertise and advanced plant breeding and transformation technologies developed over the past 15 years, to directly edit the plant genome, without introducing foreign DNA, to produce nutrient-dense crops for use in the major foods we eat. By employing CRISPR Cas9 gene editing technology and our proprietary TILLING platform, we believe we can reduce the time to market for novel ingredient traits by half, thereby providing consumer food companies a steady and reliable source of cost effective, healthy natural food options.

We are developing a suite of consumer-branded, high value, healthy wheat varieties. First to market will be our Resistant Starch (RS) wheat, a product with more dietary fiber as conventional wheat. Increased fiber consumption is well recognized as a way to improve gut health and to control excessive weight gain. Concurrently, we are developing three additional wheat varieties, a reduced gluten wheat, an extended shelf life wheat and a superior yielding wheat. In the American diet, each day more than 500 calories come from wheat products, 25 percent of the FDA's recommended daily caloric intake for a woman and 20 percent for a man, which creates a natural market opportunity for our first two wheat products. We believe these varieties have broad application in the global wheat market which is estimated by the US FDA to be 758 million metric tons, which roughly equates to $127 billion.

In years to come, we expect to achieve enhanced nutritional characteristics within a number of other broad acre crops using advanced breeding and gene-editing techniques. Targets include but are not limited to higher fiber longer shelf life and enhanced protein in crops other than wheat.

An important aspect of our business is also improving farmer productivity through the development of more robust crop varieties, by developing specific crop traits designed to counteract the detrimental impact of environmental stresses on harvest yields. Traditional genetic modification (GM) trait development has concentrated on crops where the combination of large acreage and high input costs (such as pest and weed control chemical costs) create significant economic value for herbicidal or insecticidal traits. However, far more deleterious to crop yields are abiotic stresses, such as drought, heat, nutrient deficiency, water scarcity, and soil salinity, and remains largely unpenetrated by the GM seed industry today. For example, industry estimates indicate greater than 80 percent of

wheat yield loss and 65 percent of corn yield loss globally are lost due to abiotic factors. These stresses are prevalent in most agricultural environments with varying degrees of severity and often have material consequences on crop production, quality, and farmer incomes.

Phillips McDougall estimates the abiotic stress mitigation trait market to be worth several billion dollars. We devoted much of our early research to building the most comprehensive array of abiotic stress traits in the world. Furthermore, through broad out-licensing arrangements with our commercialization partners, many of our traits have been bred into several global crops, including rice, wheat, and soybeans, and we have demonstrated significant yield improvements in multiple years of field testing. Upon commercialization, we share in the trait fees ranging between 10% and 50%, depending upon the geography, crop and specific trait.

However, a key component of the development cycle of GM traits is local, or in some instances, global deregulation of the trait by one or more regulatory agencies which may be required. As there continues to be a significant debate about the role of GM traits in agricultural crops, we have seen this issue begin to impact some regulatory agencies which exercise control over the pace of deregulation of our products. We have recently experienced delays in the review of many of our high value traits from certain of these government regulatory authorities. For example, in India, where regulators have not approved field trials for testing of GM traits for the last two years, we estimate the impact to the trait development and crop commercialization timelines of our license partner in India, Mahyco, has been a commensurate delay.

We believe the fundamental value of these traits remains commercially significant and we, along with our development and commercialization partners, remain fully committed to their ultimate commercialization. However, to compensate for the near-term impact of these regulatory delays on our anticipated commercialization revenue share, the Company completed a comprehensive strategic review in the second half of 2016 of its technology programs, product pipeline, partner progress, competitive landscape and market conditions in order to prioritize and appropriately resource its most promising products and opportunities. As a result, some programs were terminated or placed on hold while investments in other programs were accelerated with the aim of generating the highest potential near-term value for the Company and its shareholders.

In addition, in cooperation with its primary licensee partner, Mahyco, the Company has undertaken an evaluation of the current regulatory environment by territory of its license portfolio to determine the optimal strategy for continued deregulation and commercialization of its traits. In December 2017, we reached agreement with Mahyco for the return of licensed geographies for certain WUE, NUE & Salinity Tolerance traits where Mahyco either lacks the resources or expertise to effectively progress trait deregulation and commercialization. These licenses were terminated prior to December 31, 2017, with the remaining balance of the upfront license fees previously deferred for such agreements released and recognized as revenue into the fourth quarter totaling $528,000. In addition, for other geographies where Mahyco has progressed trait development but does not possess the familiarity with, or influence on, the regulatory environment to affect deregulation, we have agreed we will endeavor to jointly pursue new in-country licensees we believe to be equipped and capable to achieve trait deregulation and commercialization. We will continue to work with our partners to closely monitor the progress of deregulation activities affecting our GM traits, and at the same time, we are realigning our core capabilities and evolving our business model to accelerate the development and near-term commercialization of non-GM nutrition and quality traits.

Balancing our near-term revenue goals with long-term value capture, we will continue to provide active support to our commercial partners working to advance our high value traits through development and deregulation for commercialization. Our trait license agreements contain two main types of financial components:

- A set of pre-commercialization payments from our commercial partners that are linked to their pursuit of technical and regulatory milestones under a well-defined diligence plan. The pre-commercialization payments typically include up-front and annual license fees, as well as multiple payments for key technical and development milestones such as demonstration of greenhouse efficacy, demonstration of field efficacy, regulatory submission, regulatory approval, and commercial launch. Under most of our license agreements, failure of our commercial partners to adhere to the diligence plan may result in a reduction, or elimination, of their license rights. The combination of diligence requirements and milestone payments motivates our commercial partners to develop and commercialize products containing our traits, while providing us with revenue to fund our development programs.

- Once a product containing one or more of our traits is commercialized, we are entitled to receive a portion of the revenue that it generates for our commercial partner. For seeds incorporating valuable traits, farmers typically pay either a premium for the seed or a trait fee. This premium or trait fee represents the additional value generated for our commercial partner by our trait(s), and we receive a percentage of this additional value. Typically, our share of this value ranges from 15 to 20%, and it can increase to a range of 37 to 50% under certain agreements if we elect to co-invest in product development and/or deregulation. We expect that our participation in joint ventures will provide us with an opportunity to recognize additional value from our traits.

While we seek patent protection on our technologies and traits, we have structured our commercial agreements so that we receive our percentage of additional commercial value whether or not patent protection is in effect at any particular time or place. Nearly all of our agreements provide access to our traits, and our right to receive a share of commercial value, continue for a set number of years after products containing our traits are commercialized. While the exclusive rights afforded by patents may enable our commercial partners to realize greater commercial value attributable to our traits, our right to receive a portion of that increased commercial value is not dependent on the existence of patent rights in a particular geography.

Our commercial strategy is to migrate forward in the ag-food supply chain from the farmer and seed company to the consumer food company. Due to early stage focus on the development of abiotic stress traits, we have historically been commercially aligned with farmers and seed companies. However, by also establishing commercial relationships with consumer food companies and developing consumer brand awareness of our high value premium ingredients, we expect to be better positioned to garner a greater share of our product's value proposition. Consumer food companies are looking to simplify their food ingredient formulations and consumer are demanding "clean labeling" in their foods, paying more for foods having fewer artificial ingredients and more natural, recognizable and healthy ingredients. Ninety-one per cent of U.S. consumers believe food and beverage options with recognizable ingredients are healthier. Because we engineer nutrient density directly into the primary grains and oils, we provide the mechanism for food formulation simplification naturally, cost effectively and in a time-frame to meet evolving consumer demands. Our branding strategy is to link consumer's health and nutrition appreciation with the nutrients we source directly from the farm, enabling us to share premium economics throughout the ag-food supply chain.

This forward migration in the ag-food supply chain will require we build additional organizational capabilities and industry expertise. For instance, we are expanding our in-house commercial grain production and logistics resources for greater scale capacity to bring our identity preserved products to market. We are also developing product branding strategies to build customer brand recognition and loyalty.

Since our inception, we have devoted substantially all of our efforts to research and development activities, including the discovery, development, and testing of our traits and products in development incorporating our traits. To date, we have not generated revenues from sales of commercial products, other than limited revenues from our SONOVA products, and we do not anticipate generating any revenues from commercial product sales other than from sales of our SONOVA products for at least the next three to five years. We do receive revenues from fees associated with the licensing of our traits to commercial partners. Our long-term business plan and growth strategy is based in part on our expectation that revenues from products that incorporate our traits will comprise a significant portion of our future revenues.

We have never been profitable and had an accumulated deficit of $167.3 million as of December 31, 2017. We incurred net losses of $15.7 million and $19.6 million for the years ended December 31, 2017 and 2016, respectively. We expect to incur substantial costs and expenses before we obtain any revenues from the sale of seeds incorporating our traits. As a result, our losses in future periods could become even more significant, and we will need additional funding to support our operating activities.

Components of Our Statements of Operations Data

Revenues

We derive our revenues from product revenues, licensing agreements, contract research agreements, and government grants. We expect that over the next several years, a substantial majority of our revenues will consist of pre-commercial license revenues, product revenues, contract research and government grant revenues until our license revenues increase with the introduction of our seed trait products to the market ensuing value-share payments, if and when they are commercially available. Further, we expect that our license revenues will vary as we enter into new license agreements and with the timing of milestone payments and recognition of deferred up-front license fees under existing license agreements.

Product Revenues

Our product revenues to date have consisted solely of sales of our SONOVA products. We generally recognize revenue from product sales upon pick up by our third-party distributors or customers. Our revenues fluctuate depending on the timing of orders from our customers and distributors.

License Revenues

Our license revenues to date consist of up-front, nonrefundable license fees, annual license fees, and subsequent milestone payments that we receive under our research and license agreements. We generally recognize nonrefundable up-front license fees and guaranteed, time-based payments as revenue proportionally over the expected development period. We recognize annual license fees proportionally over the related term subject to cancellation provisions. In the event a license is terminated prior to commercialization, the deferred balance of the unamortized up-front license is released to revenue on the effective date.

We recognize milestone payments as revenue when the related performance criteria are achieved. Milestones typically consist of significant stages of development for our traits in a potential commercial product, such as achievement of specific technological targets, completion of field trials, filing with regulatory agencies, completion of the regulatory process, and commercial launch of a product containing our traits. Given the seasonality of agriculture and time required to progress from one milestone to the next, achievement of milestones is inherently uneven, and our license revenues are likely to fluctuate significantly from period to period.

Contract Research and Government Grant Revenues

Contract research revenues consist of amounts earned from performing contracted research primarily related to breeding programs or the genetic engineering of plants for third parties. We generally recognize revenue as these services are provided. In addition, we are entitled to receive a portion of the revenues generated from sales of products that incorporate our seed traits. Products expected to result from such contract research are in various stages of the product development cycle and we do not expect to generate any revenues from the sale of any such products for at least the next two to four years.

We receive payments from government entities in the form of government grants. Government grant revenues are recognized as eligible research and development expenses are incurred. Our obligation with respect to these agreements is to perform the research on a best-efforts basis. Given the nature and uncertain timing of receipt of government grants and timing of eligible research and development expenses, such revenues are likely to fluctuate significantly from period to period.

Operating Expenses

Cost of Product Revenues

Cost of product revenues relates to the sale of our SONOVA products and consists of in-licensing and royalty fees, any adjustments to inventory, as well as the cost of raw materials, including inventory and third-party services costs related to procuring, processing, formulating, packaging, and shipping our SONOVA products.

Research and Development Expenses

Research and development expenses consist of costs incurred in the discovery, development, and testing of our products and products in development incorporating our traits. These expenses consist primarily of employee salaries and benefits, fees paid to subcontracted research providers, fees associated with in-licensing technology, land leased for field trials, chemicals and supplies, and other external expenses. These costs are expensed as incurred. Additionally, we are required from time to time to make certain milestone payments in connection with the development of technologies in-licensed from third parties. We expense these milestone payments at the time the milestone is achieved and deemed payable. We expect our research and development expenses to increase on an absolute dollar basis for the foreseeable future, although our research and development expenses may increase significantly if we choose to accelerate certain research and development programs or if we elect to take a greater role in the regulatory and commercialization process with respect to one or more of our seed traits or products in development incorporating our seed traits. Our research and development expenses may also fluctuate from period to period as a result of the timing of various research and development projects.

Selling, General, and Administrative Expenses

Selling, general, and administrative expenses consist primarily of employee costs, professional service fees, and overhead costs. Our selling, general, and administrative expenses may fluctuate from period to period.

Interest Expense

Interest expense consists primarily of contractual interest and amortization of debt discount on our term loan.

Other Income, Net

Other income, net, consists of interest income and the amortization of investment premium and discount on our cash and cash equivalents and investments.

Loss on Extinguishment of Debt

From time to time, the Company may refinance or payoff its debts if it is deemed reasonable to do so, which may result in a gain or loss on the extinguishment of debt. Loss on extinguishment of debt is comprised of amounts related to early payoff fees, end of term fees, deferred issuance costs and unamortized debt discounts.

Income Tax Provision

Our income tax provision has not been historically significant, as we have incurred losses since our inception. The provision for income taxes consists of state and foreign income taxes. Due to cumulative losses, we maintain a valuation allowance against our U.S. deferred tax assets as of December 31, 2017 and 2016. We consider all available evidence, both positive and negative, including but not limited to, earnings history, projected future outcomes, industry and market trends and the nature of each of the deferred tax assets in assessing the extent to which a valuation allowance should be applied against our U.S. deferred tax assets.

Results of Operations

Comparison of the Years Ended December 31, 2017 and 2016

	Year Ended December 31,	
	2017	2016
	(in thousands)	
Revenues:		
Product	$ 514	$ 669
License	1,470	144
Contract research and government grants	2,042	2,375
Total revenues	4,026	3,188
Operating expenses:		
Cost of product revenues	283	895
Research and development	7,407	8,663
Selling, general and administrative	10,651	12,250
Total operating expenses	18,341	21,808
Loss from operations	(14,315)	(18,620)
Interest expense	(747)	(1,319)
Other income, net	281	340
Loss on extinguishment of debt	(900)	—
Loss before income taxes	(15,681)	(19,599)
Income tax provision	(26)	(25)
Net loss attributable to common stockholders	$ (15,707)	$ (19,624)

Revenues

Product revenues accounted for 13% and 21% of our total revenues for the years ended December 31, 2017 and 2016, respectively. The $155,000, or 23%, decrease in product revenues was primarily driven by larger volume distributor orders in 2016 that were not present in 2017.

License revenues accounted for 37% and 5% of our total revenues for the years ended December 31, 2017 and 2016, respectively. The $1.3 million, or 921%, increase in license revenue was due, in part, to the termination of several agreements in 2017 that resulted in the recognition of previously deferred upfront license fees. Also contributing to the increase was the delay in the estimated launch date determined in 2016 for a number of our out-licensed yield traits, thereby increasing the number of years over which these upfront license fees are to be amortized, thereby reducing the amount amortized into revenue each year, as was the case in 2016.

Contract research and government grant revenues comprise a significant portion of our total revenues, accounting for 51% and 74% of our total revenues for the years ended December 31, 2017 and 2016, respectively. The $333,000, or 14%, decrease in contract research and government grant revenues was primarily driven by contracts that were completed in 2017, partially offset by a new contract research agreement in 2017.

Cost of Product Revenues

Cost of product revenues decreased by $612,000, or 68%, for the year ended December 31, 2017 compared to the year ended December 31, 2016. The decrease was due to an inventory write-down recorded in 2016.

Research and Development

Research and development expenses decreased by $1.3 million, or 14%, for the year ended December 31, 2017 compared to the year ended December 31, 2016. The net decrease was primarily due to $1.8 million of lower salaries and benefits and $384,000 of reduced chemical and supply expenditures, mainly the result of the reductions in our workforce that occurred in 2016. Partially offsetting these decreases were a $1.1 million increase in subcontracting activity in support of Verdeca and $533,000 of license fee expense released from prepaid expenses upon the discontinuance of a license agreement in the fourth quarter of 2017.

Selling, General, and Administrative

Selling, general, and administrative expenses decreased by $1.6 million, or 13%, for the year ended December 31, 2017 compared to the year ended December 31, 2016. The decrease in SG&A costs was primarily driven by $1.3 million of lower salaries and benefits resulting from reductions in our work force in 2016, along with $1.2 million of related severance costs in 2016 that were not present in 2017. There was a $742,000 increase in the amount of incentive and bonus expense recognized in 2017 as compared to 2016, along with higher consulting fees related to our strategic review process.

Interest Expense

Interest expense decreased $572,000, or 43%, for the year ended December 31, 2017 compared to the year ended December 31, 2016. The decrease was driven by the extinguishment of debt in July 2017. See Note 10.

Other Income, Net

Other income, net, decreased $60,000, or 18%, for the year ended December 31, 2017 compared to the year ended December 31, 2016. This decrease primarily consisted of lower net investment income due to the declining investment balance from 2016 to 2017.

Loss on Extinguishment of Debt

The loss on extinguishment of debt of $900,000 was related to the debt payoff that occurred in July 2017. There was no such activity in 2016.

Income Tax Provision

The income tax provision remained relatively consistent from year to year.

Seasonality

We and our commercial partners operate in different geographies around the world and conduct field trials that are used for data generation, which must be conducted during the appropriate growing seasons for particular crops and markets. Often, there is only one crop-growing season per year for certain crops and markets. Similarly, climate conditions and other factors that may influence the sales of our products may vary from season to season and year to year. In particular, weather conditions, including natural disasters such as heavy rains, hurricanes, hail, floods, tornadoes, freezing conditions, drought, or fire, may affect the timing and outcome of field trials, which may delay milestone payments and the commercialization of products incorporating our seed traits. In the future, sales of commercial products that incorporate our seed traits will vary based on crop growing seasons and weather patterns in particular regions.

The level of seasonality in our business overall is difficult to evaluate at this time due to our relatively early stage of development, our relatively limited number of commercialized products, our expansion into new geographical markets, and our introduction of new products and traits.

Liquidity, Capital Resources and Going Concern

We have funded our operations primarily with the net proceeds from our initial public offering and private placements of equity and debt securities, as well as proceeds from the sale of our SONOVA products and payments under license agreements, contract research agreements, and government grants. Our principal use of cash is to fund our operations, which are primarily focused on progressing our agricultural yield and product quality seed traits through the regulatory process and to commercialization. This includes replicating field trials, coordinating with our partners on their development programs, and collecting, analyzing, and submitting field trial data to regulatory authorities. As of December 31, 2017, we had cash and cash equivalents of $9.1 million and short-term investments of $3.9 million.

We believe that our existing cash, cash equivalents, and short-term investments will not be sufficient to meet our anticipated cash requirements for at least the next 12 months, and thus raises substantial doubt about the Company's ability to continue as a going concern. See Note 1.

We may secure additional required funding through equity or debt financings, sales or out-licensing of intellectual property assets, seeking partnerships with other agriculture biotechnology companies or third parties to co-develop and fund research, development or commercialization efforts, or similar transactions. Our sale of additional equity would result in dilution to our stockholders. Our incurrence of additional debt would result in increased debt service obligations, and the instruments governing our debt could provide for additional operating and financing covenants that would restrict our operations. Any of these actions could materially harm our business, results of operations and financial condition.

Term Loans

In December 2015, the Company entered into a loan and security agreement ("Term Loan") with Silicon Valley Bank (the "Bank") providing for a senior secured term loan facility in the amount of $25.0 million, which proceeds were used to repay all existing debt. In July 2017, the Company repaid the $25.0 million Term Loan with Silicon Valley Bank, along with the $625,000 end-of-term fee and $500,000 prepayment fee.

The Term Loans' prepayment and end of term fees of $1.1 million were recorded as a loss on extinguishment of debt, along with $41,000 of deferred loan issuance fees, partially offset by $267,000 of end of term fees previously amortized, netting to a loss of $900,000. As of the payoff date, the Company was in compliance with all covenants.

Cash Flows

The following table summarizes our cash flows for the periods indicated (in thousands):

	Year Ended December 31,	
	2017	2016
Net cash (used in) provided by:		
Operating activities	$ (13,965)	$ (17,055)
Investing activities	47,178	(5,301)
Financing activities	(26,101)	396
Net increase (decrease) in cash and cash equivalents	$ 7,112	$ (21,960)

Cash Flows from Operating Activities

Cash used in operating activities for the year ended December 31, 2017 was $14.0 million. Our net loss of $15.7 million was partly offset by non-cash charges of $1.5 million for stock-based compensation, loss on extinguishment of debt of $900,000, and depreciation and amortization of $279,000. These were partially offset by changes in net operating assets totaling ($921,000).

Cash used in operating activities for the year ended December 31, 2016 was $17.1 million. Our net loss of $19.6 million was partly offset by non-cash charges of $1.1 million for stock-based compensation, $0.3 million for depreciation and amortization, $0.2 million for accretion of debt discount, $0.9 million of net operating assets, and $0.1 million of net amortization of investment premium.

Cash Flows from Investing Activities

Cash provided by investing activities for the year ended December 31, 2017 of $47.2 million primarily consisted of $66.7 million of proceeds from sales and maturities of investments, partially offset by $19.4 million of net investments purchased.

Cash used in investing activities for the year ended December 31, 2016 of $5.3 million primarily consisted of $41.4 million of net investments purchased and $0.2 million of property and equipment purchases, which were partially offset by $36.3 million of proceeds from sales and maturities of investments.

Cash Flows from Financing Activities

Cash used in financing activities for the year ended December 31, 2017 of $26.1 million consisted primarily of payments on notes payable and related debt extinguishment costs. See Note 10.

Cash provided by financing activities for the year ended December 31, 2016 of $0.4 million was primarily from the proceeds from exercise of stock options and purchases through our employee stock purchase plan ("ESPP").

Contractual Obligations and Other Commitments

Our future contractual obligations at December 31, 2017 were as follows (in thousands):

	Payments Due by Period(1)(2)				
	Less than 1 year	1 to 3 Years	3 to 5 Years	More than 5 years	Total
Non-cancelable operating leases	$ 422	$ 149	$ —	$ —	$ 571

(1) Does not include any amounts related to contract research or other agreements with unrelated parties that require us to pay certain funding commitments, as these agreements are cancelable by us.

(2) Does not include any payments we may have to make under the contingent liability related to the Anawah acquisition, as the amount and timing of the ultimate payments are unknown. Please see Note 12 of the notes to our consolidated financial statements for more information.

We are obligated to make future payments to related and unrelated parties under in-license agreements, including certain license fees, royalties, and milestone fees. In addition, certain royalty payments ranging from the low single digits to mid-teens are payable on net revenue amounts as defined in the in-licensing agreements. Milestone payments under these agreements may also be payable upon the successful development or implementation of various technologies. The amount and timing of these payments are uncertain and have been excluded from the above table.

Off-Balance Sheet Arrangements

Since our inception, we have not engaged in any off-balance sheet arrangements, including the use of structured finance, special purpose entities, or variable interest entity other than Verdeca, which is discussed in Note 7 – Variable Interest Entity.

Critical Accounting Polices and Estimates

Our management's discussion and analysis of our financial condition and results of operations is based on our financial statements, which have been prepared in accordance with GAAP. The preparation of these financial statements requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and the disclosure of contingent assets and liabilities at the date of the financial statements, as well as the reported revenue generated and expenses incurred during the reporting periods. Our estimates are based on our historical experience and on various other factors that we believe are reasonable under the circumstances, the results of which form the basis for making judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may differ from these estimates under different assumptions or conditions. We believe that the accounting policies discussed below are critical to understanding our historical and future performance, as these policies relate to the more significant areas involving management's judgments and estimates.

Revenue Recognition

We generate revenues through sales of product, license agreements, contract research agreements, and government grants. Revenue generated from our license agreements may include up-front, nonrefundable license fees, annual license fees, milestone payments, and future value-sharing payments subsequent to commercialization by our partners. We recognize revenue when the following criteria have been met: persuasive evidence of an arrangement with the customer exists, price and terms of the arrangement are fixed or determinable, delivery of the product has occurred or the service has been performed in accordance with the terms of the arrangement, and collectability is reasonably assured.

We generally recognize product revenues once passage of title has occurred. Shipping and handling costs charged to customers are recorded as revenues and included in cost of product revenues at the time the sale is recognized.

For revenue agreements with multiple-element arrangements, such as license and contract research agreements, we evaluate the arrangements to determine whether the deliverables can be separated or whether they must be accounted for as a single unit of accounting. This determination is generally based on whether any deliverable has stand-alone value to the customer. This analysis also establishes a selling price hierarchy for determining how to allocate arrangement consideration to identified units of accounting. When deliverables are separable, consideration received is allocated to the separate units of accounting based on the relative selling price method and the appropriate revenue recognition principles are applied to each unit. The selling price used for each unit of accounting is based on estimated selling price as neither vendor-specific nor third-party evidence is available. When we determine that an arrangement should be accounted for as a single unit of accounting, we must determine the period over which the performance obligations will be performed and revenue will be recognized over the performance period.

We have determined that, at the inception of each license agreement, there is only one deliverable for the license for, access to, and assistance with the development of the specified intellectual property. We recognize revenue from upfront payments proportionally over the term of our estimated period of performance under the agreement. On a quarterly basis, we review our estimated period of performance for our license agreements based on the progress under the arrangement and account for the impact of any changes on a prospective basis. We recognize annual license fees proportionally over the related term subject to cancellation provisions. In the event a license is terminated prior to commercialization, the deferred balance of the unamortized up-front license is released to revenue on the effective date.

We recognize revenue related to milestone payments when the contractually specified performance obligations are achieved. Performance obligations typically consist of significant milestones in the development life cycle of the related technology, such as achievement of specific technological targets, successful results from field trials, filing for approval with regulatory agencies, approvals granted by regulatory agencies and commercial launch of a product utilizing the licensed technology.

Contract research revenue consists of amounts earned from performing contracted research activities for third parties. Activities performed are related to breeding programs or the genetic engineering of plants and are subject to an executed agreement. We generally recognize fees for research activities ratably over the contractually specified performance period.

Grant revenues are recognized as eligible research and development expenses are incurred using a proportional performance recognition methodology.

Deferred revenue is primary related to upfront license fee payments received that has not been recognized.

Inventories

Inventory costs are tracked on a lot-identified basis, valued at the lower of cost or net realizable value and are included as cost of product sales when sold. We compare the cost of inventories with market value and write down inventories to net realizable value, if lower. We provide write down inventory when conditions indicate that the net realizable value may be less than cost due to physical deterioration, obsolescence, changes in price levels, or other factors. Additionally, we provide reserves for excess and slow-moving inventory to its estimated net realizable value. The inventory write-downs are based upon estimates about future demand from our customers and distributors and market conditions. Future events that could significantly influence our judgment and related estimates include conditions in target markets, introduction of new products or changes to current or future competitor products.

Stock Based Compensation

We recognize compensation expense related to the employee stock purchase plan and stock options granted to employees and directors based on the estimated fair value of the awards on the date of grant, net of estimated forfeitures. We estimate the grant date fair value, and the resulting stock-based compensation expense, using the Black-Scholes option-pricing model. The grant date fair value of the stock-based awards is generally recognized on a straight-line basis over the requisite service period, which is generally the vesting period of the respective awards.

We recognize compensation expense for equity instruments issued to non-employees based on the estimated fair value of the equity instrument. The fair value of the non-employee awards is subject to re-measurement at each reporting period until services required under the arrangement are completed, which is the vesting date.

We recorded stock-based compensation expense related to equity awards of $1.5 million and $1.1 million for the years ended December 31, 2017 and 2016, respectively.

In determining the fair value of stock-based awards, we use the Black-Scholes option-pricing model and assumptions discussed below. Each of these inputs is subjective and generally requires significant judgment to determine.

Expected Term—The expected term represents the period that stock-based awards are expected to be outstanding and was estimated based on historical and anticipated future exercise activity.

Expected Volatility—Since we were privately held and do not have sufficient trading history for our common stock, the expected volatility was estimated based on the average historical volatilities of common stock of comparable publicly traded entities over a period equal to the expected term of the stock option grants. The comparable companies were chosen based on their similar size, stage in the life cycle, or area of specialty. We will continue to apply this process until a sufficient amount of historical information regarding the volatility of our own stock price becomes available.

Risk-Free Interest Rate—The risk-free interest rate is based on the U.S. Treasury zero coupon issues in effect at the time of grant for periods corresponding with the expected term of option.

Expected Dividend—We have never paid dividends on our common stock and have no plans to pay dividends on our common stock. Therefore, we used an expected dividend yield of zero.

For stock options and other equity awards, our board of directors determine the fair value of each share of underlying common stock based on the closing price of our common stock as reported on the NASDAQ Stock Market on the date of grant.

In addition to the Black-Scholes assumptions, we estimate our forfeiture rate based on an analysis of our actual forfeitures and will continue to evaluate the adequacy of the forfeiture rate based on actual forfeiture experience, analysis of employee turnover behavior, and other factors. The impact from any forfeiture rate adjustment would be recognized in full in the period of adjustment and if the actual number of future forfeitures differs from our estimates, we might be required to record adjustments to stock-based compensation in future periods.

Income Taxes

We use the asset and liability method of accounting for income taxes. Under this method, deferred tax assets and liabilities are determined based on the differences between the financial reporting and the tax bases of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. A valuation allowance is provided when it is more likely than not that some portion or all of a deferred tax asset will not be realized.

Recent Accounting Pronouncements

For discussions of the adoption and potential impacts of recently issued accounting standards, refer to Note 3 – Recent Accounting Pronouncements to the accompanying consolidated financial statements.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk.

The primary objective of our investment activities is to preserve our capital to fund our operations. We also seek to maximize income from our investments without assuming significant risk. To achieve our objectives, we maintain a portfolio of cash equivalents and investments in a variety of securities of high credit quality. As of December 31, 2017, we had cash and cash equivalents of $9.1 million and short-term investments of $3.9 million consisting primarily of cash equivalents and other liquid investments deposited in highly rated financial institutions in the United States. A portion of our investments may be subject to interest rate risk and could fall in value if market interest rates increase. However, because our investments are primarily short-term in duration, we believe that our exposure to interest rate risk is not significant and a 1% movement in market interest rates would not have a significant impact on the total value of our portfolio. We actively monitor changes in interest rates.

Item 8. Financial Statements and Supplementary Data.

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the stockholders and the Board of Directors of Arcadia Biosciences, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Arcadia Biosciences, Inc. and its subsidiary (the "Company") as of December 31, 2017 and 2016, the related consolidated statements of operations and comprehensive loss, stockholders' equity, and cash flows, for each of the two years in the period ended December 31, 2017, and the related notes (collectively referred to as the "financial statements"). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2017 and 2016, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2017, in conformity with accounting principles generally accepted in the United States of America.

Going Concern

The accompanying consolidated financial statements have been prepared assuming that the Company will continue as a going concern. As discussed in Note 1 to the consolidated financial statements, the Company has suffered recurring losses from operations and is experiencing difficulty in generating sufficient cash flow to meet its obligations and sustain its operations, which raises substantial doubt about its ability to continue as a going concern. Management’s plans in regard to these matters are also described in Note 1. The consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company’s internal control over financial reporting. Accordingly, we express no such opinion.

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ Deloitte & Touche LLP

Phoenix, Arizona
March 20, 2018

We have served as the Company's auditor since 2007.

Arcadia Biosciences, Inc.
Consolidated Balance Sheets

(In thousands, except share data)

	As of December 31,	
	2017	**2016**
Assets		
Current assets:		
Cash and cash equivalents	$ 9,125	$ 2,013
Short-term investments	3,898	48,547
Accounts receivable	1,231	349
Unbilled revenue	4	184
Inventories — current	229	252
Prepaid expenses and other current assets	560	877
Total current assets	15,047	52,222
Property and equipment, net	299	508
Inventories — noncurrent	1,168	1,327
Long-term investments	—	2,498
Other noncurrent assets	56	19
Total assets	$ 16,570	$ 56,574
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable and accrued expenses	$ 2,496	$ 2,359
Amounts due to related parties	29	30
Unearned revenue — current	1,000	740
Total current liabilities	3,525	3,129
Notes payable	—	25,127
Unearned revenue — noncurrent	2,038	3,120
Other noncurrent liabilities	3,000	3,000
Total liabilities	8,563	34,376
Stockholders' equity:		
Common stock, $0.001 par value—150,000,000 and 400,000,000 shares authorized as of December 31, 2017 and December 31, 2016; 2,134,154 and 2,224,384 shares issued and outstanding as of December 31, 2017 and December 31, 2016, respectively.	42	44
Additional paid-in capital	175,223	173,723
Accumulated deficit	(167,257)	(151,550)
Accumulated other comprehensive loss	(1)	(19)
Total stockholders' equity	8,007	22,198
Total liabilities and stockholders' equity	$ 16,570	$ 56,574

The accompanying notes are an integral part of these consolidated financial statements.

Arcadia Biosciences, Inc.
Consolidated Statements of Operations and Comprehensive Loss
(In thousands, except share and share data)

	Year Ended December 31,	
	2017	**2016**
Revenues:		
Product	$ 514	$ 669
License	1,470	144
Contract research and government grants	2,042	2,375
Total revenues	4,026	3,188
Operating expenses:		
Cost of product revenues	283	895
Research and development	7,407	8,663
Selling, general and administrative	10,651	12,250
Total operating expenses	18,341	21,808
Loss from operations	(14,315)	(18,620)
Interest expense	(747)	(1,319)
Other income, net	281	340
Loss on extinguishment of debt	(900)	—
Net loss before income taxes	(15,681)	(19,599)
Income tax provision	(26)	(25)
Net loss attributable to common stockholders	$ (15,707)	$ (19,624)
Net loss per share attributable to common stockholders:		
Basic and diluted	$ (7.28)	$ (8.85)
Weighted-average number of shares used in per share calculations:		
Basic and diluted	2,156,201	2,218,341
Other comprehensive income, net of tax		
Unrealized gains on available-for-sale securities	18	96
Other comprehensive income	18	96
Comprehensive loss attributable to common stockholders	$ (15,689)	$ (19,528)

The accompanying notes are an integral part of these consolidated financial statements.

Arcadia Biosciences, Inc.
Consolidated Statements of Stockholders' Equity

(In thousands, except share data)

	Common Stock		Additional Paid-In Capital	Accumulated Deficit	Accumulated Other Comprehensive Loss	Total Stockholders' Equity
	Shares	Amount				
Balance at January 1, 2016	2,209,210	$ 44	$ 172,222	$ (131,926)	$ (115)	$ 40,225
Exercise of stock options	11,407	—	270	—	—	270
Issuance of shares related to employee stock purchase plan	3,767	—	172	—	—	172
Stock-based compensation	—	—	1,059	—	—	1,059
Other comprehensive income	—	—	—	—	96	96
Net loss	—	—	—	(19,624)	—	(19,624)
Balance at December 31, 2016	2,224,384	$ 44	$ 173,723	$ (151,550)	$ (19)	$ 22,198
Issuance of shares related to employee stock purchase plan	1,964	—	24	—	—	24
Stock-based compensation	—	—	1,474	—	—	1,474
Other comprehensive income	—	—	—	—	18	18
Exchange of membership interest in unconsolidated entity for common stock	(92,194)	(2)	2	—	—	0
Net loss	—	—	—	(15,707)	—	(15,707)
Balance at December 31, 2017	2,134,153	$ 42	$ 175,223	$ (167,257)	$ (1)	$ 8,007

The accompanying notes are an integral part of these consolidated financial statements.

Arcadia Biosciences, Inc.
Consolidated Statements of Cash Flows

(In thousands)

	Year Ended December 31,	
	2017	**2016**
CASH FLOWS FROM OPERATING ACTIVITIES:		
Net loss	$ (15,707)	$ (19,624)
Adjustments to reconcile net loss to cash used in operating activities:		
Depreciation and amortization	279	304
(Gain) Loss on disposal of equipment	(1)	4
Net amortization of investment premium and discount	(89)	140
Loss on sale of investments	2	—
Stock-based compensation	1,474	1,059
Accretion of debt discount	98	198
Loss on extinguishment of debt	900	—
Changes in operating assets and liabilities:		
Accounts receivable	(882)	357
Unbilled revenue	179	(102)
Inventories	183	582
Prepaid expenses and other current assets	324	(185)
Other noncurrent assets	11	5
Accounts payable and accrued expenses	87	(19)
Amounts due to related parties	(1)	11
Unearned revenue	(822)	215
Net cash used in operating activities	(13,965)	(17,055)
CASH FLOWS FROM INVESTING ACTIVITIES:		
Proceeds from sale of property and equipment	4	—
Purchases of property and equipment	(79)	(231)
Purchases of investments	(19,405)	(41,385)
Proceeds from sales and maturities of investments	66,658	36,315
Net cash provided by (used in) investing activities	47,178	(5,301)
CASH FLOWS FROM FINANCING ACTIVITIES:		
Payments of debt issuance costs	—	(46)
Payments of debt extinguishment costs	(1,125)	—
Payments on notes payable	(25,000)	—
Proceeds from exercise of stock options and purchases through ESPP	24	442
Net cash (used in) provided by financing activities	(26,101)	396
Net increase (decrease) in cash and cash equivalents	7,112	(21,960)
Cash and cash equivalents — beginning of period	2,013	23,973
Cash and cash equivalents — end of period	$ 9,125	$ 2,013
SUPPLEMENTAL DISCLOSURES OF CASH FLOW INFORMATION:		
Cash paid for interest	$ 746	$ 1,033
Cash paid for income taxes	$ 2	$ 29
NONCASH INVESTING AND FINANCING ACTIVITIES:		
Exchange of membership interest in unconsolidated entity for common stock	$ 2	$ —
Proceeds from sale of fixed assets included in prepaid expenses and other current assets	$ 7	$ —
Deferred financing costs in accounts payable and accrued expenses	$ 50	$ —

The accompanying notes are an integral part of these consolidated financial statements.

Note 1. Description of Business

Organization

Arcadia Biosciences, Inc. (the "Company"), was incorporated in the state of Arizona in 2002 and maintains its headquarters in Davis, California, with additional facilities in Phoenix, Arizona, and American Falls, Idaho. The Company was reincorporated in Delaware in March 2015.

The Company is a consumer-driven, agricultural food ingredient company. We aim to create value across the agricultural production and supply chain beginning with enhanced crop productivity for farmers and ultimately delivering accelerated innovation in nutritional quality consumer foods. We use state of the art gene-editing technology and advanced breeding techniques to naturally enhance the nutritional quality of grains and oilseeds to address the rapidly evolving trends in consumer health and nutrition. In addition, we have developed a broad pipeline of high value crop productivity traits designed to enhance farmer economics.

In February 2012, the Company formed Verdeca LLC (“Verdeca,” see Note 7), which is jointly owned with Bioceres, Inc. (“Bioceres”), a U.S. wholly owned subsidiary of Bioceres, S.A., an Argentine corporation. Bioceres, S.A. is an agricultural investment and development cooperative. Verdeca**,** which is consolidated by the Company, was formed to develop and deregulate soybean varieties using both partners’ agricultural technologies.

Reverse Stock Split

In January 2018, the Company’s board of directors approved a reverse split of 1:20 on the Company’s issued and outstanding common stock. In January 2018, the Company’s stockholders approved the certificate of amendment, which the Company filed on January 23, 2018 with the Secretary of State of Delaware to effect the reverse split. All issued and outstanding common stock, options to purchase common stock and per share amounts contained in the consolidated financial statement have been retroactively adjusted to reflect the reverse stock split for all periods presented.

Liquidity, Capital Resources, and Going Concern

The accompanying consolidated financial statements have been prepared on a going concern basis, which contemplates the realization of assets and the satisfaction of liabilities during the normal course of business. Since inception, the Company has financed its operations primarily through equity and debt financings. As of December 31, 2017, the Company had an accumulated deficit of $167.3 million, cash and cash equivalents of $9.1 million, and short-term investments of $3.9 million. As is disclosed in Note 10, the Company repaid its $25.0 million term loan and related interest, prepayment and end-of-term payments totaling $1.3 million with Silicon Valley Bank in July 2017. The Company believes that its existing cash, cash equivalents and investments will be insufficient to meet its anticipated cash requirements for at least through March 2019, and thus raises substantial doubt about the Company’s ability to continue as a going concern. The financial statements do not include any adjustments that might result from the outcome of this uncertainty.

Management’s plans include attempting to secure additional funding through equity or debt financings, sales or out-licensing of intellectual property assets, seeking partnerships with other agriculture biotechnology companies or third parties to co-develop and fund research, development or commercialization efforts, or similar transactions. There is no assurance that the Company will be successful in obtaining the necessary funding to meet its business objectives.

Note 2. Summary of Significant Accounting Policies

Basis of Presentation and Principles of Consolidation

The consolidated financial statements include the accounts of the Company and Verdeca LLC. All intercompany balances and transactions have been eliminated in consolidation. The Company prepares its consolidated financial statements in conformity with accounting principles generally accepted in the United States of America, or U.S. GAAP (“GAAP”), and with the rules of the Securities and Exchange Commission. The Company uses a qualitative approach in assessing the consolidation requirement for variable interest entities ("VIEs"). This approach focuses on determining whether the Company has the power to direct the activities of the VIE that most significantly affect the VIE’s economic performance and whether the Company has the obligation to absorb losses, or the right to receive benefits, that could potentially be significant to the VIE. For all periods presented, the Company has determined that it is the primary beneficiary of Verdeca, which is a VIE. The Company evaluates its relationships with the VIEs upon the occurrence of certain significant events that affect the design, structure or other factors pertinent to the primary beneficiary determination. Verdeca LLC has no operations, assets or liability as of and for the years ended December 31, 2017 and 2016.

Use of Estimates

The preparation of consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions in the Company’s consolidated financial statements and notes thereto. Significant estimates and assumptions made by management included the determination of the provision for income taxes, costs to complete government grants and research contracts, net realizable value of inventory, and the development period of revenue-generating technologies. Management bases its estimates on historical experience and on various other market-specific and relevant assumptions that management believes to be reasonable under the circumstances. Actual results could differ from those estimates.

Cash and Cash Equivalents

The Company considers any liquid investments with a stated maturity of three months or less at the date of purchase to be cash equivalents. Cash and cash equivalents consist of cash on deposit with banks. The Company limits cash investments to financial institutions with high credit standings; therefore, management believes that there is no significant exposure to any credit risk in the Company’s cash and cash equivalents. However, as of December 31, 2017 and 2016, a substantial portion of the Company’s cash in depository accounts is in excess of the federal deposit insurance limits.

Investments in Equity and Debt Securities

The Company uses the equity method to account for investments in equity securities if the investment provides the Company the ability to exercise significant influence over operating and financial policies of the investee. The Company includes its proportionate share of earnings and/or losses of the equity method investee in its Consolidated Statements of Operations and Comprehensive Loss. The carrying value of the equity investments is reported using the equity method in the Consolidated Balance Sheets. As of December 31, 2017 and 2016, the Company’s investment in Limagrain Cereal Seeds LLC (“LCS”) is $0. See Note 6 – Investments in Unconsolidated Entity for additional information.

Investments in equity securities in which the Company holds less than 20% voting interest and on which the Company does not have the ability to exercise significant influence, and do not have readily determinable fair values are accounted for under the cost method. Cost method investments are originally recorded at cost and are reported on the Consolidated Balance Sheets.

Investments in debt securities are carried at fair value and classified as available-for-sale. Realized gains and losses on available-for-sale securities are included in other income (loss) — net in the Consolidated Statements of Operations and Comprehensive Loss. Unrealized gains and losses, net of deferred taxes, on available-for-sale securities are included in the Consolidated Balance Sheets as a component of accumulated other comprehensive income (loss) ("AOCI"). Securities classified as available-for-sale are reported as cash and cash equivalent, short-term investments or long-term investments in the Consolidated Balance Sheets based on the nature of the investments and maturity period. Short-term investments have maturities of less than a year and long-term investments have maturities of a year and greater from the balance sheet date. The Company's debt securities are primarily comprised of U.S. government securities, U.S. government agency securities, commercial paper, certificates of deposit, and money markets. These available-for-sale investments are held in the custody of a major financial institution.

Other-than-Temporary Impairments on Investment

The Company regularly reviews each of its investments for impairment by determining if the investment has sustained an other-than-temporary decline in its value, in which case the investment is written down to its fair value by a charge to earnings. Factors that are considered by the Company in determining whether an other-than-temporary decline in value has occurred include (i) the market value of the investment in relation to its cost basis, (ii) the financial condition of the investment, and (iii) the Company's intent and ability to retain the investment for a sufficient period of time to allow for recovery of the market value of the investment. As of December 31, 2017 and 2016, there was no impairment of the Company's investments.

Accounts Receivable

Accounts receivable represents amounts owed to the Company from product sales, licenses and contract research and government grants. The carrying value of the Company's receivables represents estimated net realizable values. The Company generally does not require collateral and estimates any required allowance for doubtful accounts based on historical collection trends, the age of outstanding receivables, and existing economic conditions. If events or changes in circumstances indicate that specific receivable balances may be impaired, further consideration is given to the collectability of those balances and the allowance is recorded accordingly. Past-due receivable balances are written off when the Company's internal collection efforts have been unsuccessful in collecting the amounts due. The Company had no amounts reserved for doubtful accounts at December 31, 2017 and 2016 as the Company expected full collection of the accounts receivable balances as of each of these dates.

SONOVA® Gamma Linolenic Acid ("GLA") Safflower Oil Inventory

Proprietary safflower plants are grown, producing seed with a high-GLA content. This seed is used for subsequent plantings or processed, and sold as GLA oil, including SONOVA 400 GLA safflower oils and SONOVA Ultra GLA safflower oil, which we refer to as our SONOVA products. Amounts inventoried consist primarily of fees paid to contracted cooperators to grow the crops and costs to process and store harvested seed. Inventory costs are tracked on a lot-identified basis and are included as cost of product revenues when sold. Inventories are stated at the lower of cost or net realizable value. The Company makes adjustments to inventory when conditions indicate that the net realizable value may be less than cost due to physical deterioration, obsolescence, changes in price levels, or other factors. Additional adjustments to inventory are made for excess and slow-moving inventory on hand that is not expected to be sold within a reasonable timeframe to reduce the carrying amount to its estimated net realizable value. The write downs to inventory are based upon estimates about future demand from the Company's customers and distributors and market conditions.

The inventories—current line item in the balance sheet consists of the cost of oil inventory forecasted to be sold in the next 12 months, as of the balance sheet date. The inventories—noncurrent line item consists of oil and seed inventory expected to be used in production or sold beyond the next 12 months, as of the balance sheet date.

Raw materials inventories consist primarily of seed production costs incurred by our contracted cooperators. Finished goods inventories consist of GLA oil that is available for sale. The Company recorded a $0.5 million write-down of inventory for the year ended December 31, 2016. A write-down was not recorded for the year ended December 31, 2017. Inventories consist of the following (in thousands):

	As of December 31,	
	2017	2016
Raw Materials	$ 45	$ 44
Finished Goods	1,352	1,535
Inventories	$ 1,397	$ 1,579

Property and Equipment

Property and equipment acquisitions are recorded at cost. Provisions for depreciation are calculated using the straight-line method over the following average estimated useful lives of the assets:

	Years
Laboratory equipment	5
Software and computer equipment	3
Furniture and fixtures	7
Vehicles	5
Leasehold improvements	2-10*

* *Leasehold improvements are depreciated over the shorter of the estimated life of the asset or the remaining life of the lease.*

Impairment of Long-Lived Assets

The Company evaluates if events and circumstances have occurred that indicate the remaining estimated useful life of long-lived assets and identifiable intangible assets may warrant revision or that the remaining balance of these assets may not be recoverable. In evaluating for recoverability, the Company estimates the future undiscounted cash flows expected to result from the use of the assets and their eventual disposition. In the event that the balance of any asset exceeds the future undiscounted cash flow estimate, impairment is recognized based on the excess of the carrying amounts of the asset above its estimated fair value. As of December 31, 2017 and 2016, there was no impairment of the Company's long-lived assets.

Fair Value of Financial Instruments

Fair value accounting is applied for all financial assets and liabilities and non-financial assets and liabilities that are recognized or disclosed at fair value in the consolidated financial statements on a recurring basis. Assets and liabilities recorded at fair value in the consolidated financial statements are categorized based upon the level of judgment associated with the inputs used to measure their fair value. Hierarchical levels, which are directly related to the amount of subjectivity associated with the inputs to the valuation of these assets or liabilities, are as follows:

- Level 1 inputs are quoted prices (unadjusted) in active markets for identical assets or liabilities that the Company can access at the measurement date.
- Level 2 inputs are observable inputs other than quoted prices in active markets for identical assets and liabilities, quoted prices for identical or similar assets or liabilities in inactive markets, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities.
- Level 3 inputs are unobservable inputs for the asset or liability.

Concentration of Risk

Cash and cash equivalents are maintained with several financial institutions. Deposits held with banks may exceed the amount of insurance provided on such deposits. Generally, these deposits may be redeemed upon demand and are maintained with financial institutions with reputable credit and therefore bear minimal credit risk. The Company seeks to mitigate its credit risks by spreading such risks across multiple counterparties and monitoring the risk profiles of these counterparties.

Customer Concentration

Significant customers are those that represent greater than 10% of the Company's total revenues or gross accounts receivable balance at each respective balance sheet date.

Customers representing greater than 10% of accounts receivable were as follows (in percentages):

	As of December 31,	
	2017	2016
Customer A	18	—
Customer D	53	—
Customer E	24	36
Customer H	—	27
Customer I	—	22

Customers representing greater than 10% of total revenues were as follows (in percentages):

	For Year Ended December 31,	
	2017	2016
Customer A	26	—
Customer D	18	30
Customer G	2	21
Customer J	8	11
Customer K	14	—

Stock-Based Compensation

The Company recognizes compensation expense related to employee stock purchase plan and the cost of stock-based compensation awards made to employees and directors on a straight-line basis over the requisite service period, net of estimated forfeitures. Judgment is required in estimating the amount of stock-based awards that will be forfeited prior to vesting. Compensation expense could be revised in subsequent periods if actual forfeitures differ from those estimates. The Company has selected the Black-Scholes option-pricing model and various inputs to estimate the fair value of its stock-based awards. See Note 11 for additional information.

The Company accounts for compensation expense related to stock options granted to non-employees based on the fair values estimated using the Black-Scholes model. Stock options granted to non-employees are re-measured at each reporting date until the award is vested.

Income Taxes

The Company uses the asset and liability method of accounting for income taxes. Under this method, deferred tax assets and liabilities are determined based on the differences between the financial reporting and the tax bases of assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. A valuation allowance is provided when it is more likely than not that some portion or all of a deferred tax asset will not be realized.

Net Loss per Share

Basic net loss per share, which excludes dilution, is computed by dividing the net loss attributable to common stockholders by the weighted-average number of shares of common stock outstanding during the period. Diluted net loss per share reflects the potential dilution that could occur if securities or other contracts to issue common stock, such as stock options, convertible promissory notes, convertible preferred stock, redeemable convertible preferred stock and warrants, result in the issuance of common stock which share in the losses of the Company. Certain potential shares of common stock have been excluded from the computation of diluted net loss per share as their effect would be anti-dilutive. Such potentially dilutive shares are excluded when the effect would be to reduce the loss per share. Due to net losses, there is no impact on earnings per share calculation in applying the two-class method since the participating securities have no legal requirement to share in any losses.

Revenue Recognition

Revenue is generated through product sales, license agreements, contract research agreements, and government grants. The Company recognizes revenue when the following criteria have been met: persuasive evidence of an arrangement with the customer exists; price and terms of the arrangement are fixed or determinable; delivery of the product has occurred or the service has been performed in accordance with the terms of the arrangement; and collectability is reasonably assured.

For revenue agreements with multiple-element arrangements, such as license and contract agreements, the Company analyzes the arrangements to determine whether the deliverables can be separated or whether they must be accounted for as a single unit of accounting. This determination is generally based on whether any deliverable has stand-alone value to the customer. This analysis also establishes a selling price hierarchy for determining how to allocate arrangement consideration to identified units of accounting. When deliverables are separable, consideration received is allocated to the separate units of accounting based on the relative selling price method and the appropriate revenue recognition principles are applied to each unit. The selling price used for each unit of accounting is based on estimated selling price as neither vendor-specific nor third-party evidence is available. When the Company determines that an arrangement should be accounted for as a single unit of accounting, it must determine the period over which the performance obligations will be performed and revenue will be recognized over the performance period.

Product Revenues

Product revenues consist of sales of our SONOVA products. Product revenues are recognized once passage of title has occurred, contractually specified acceptance criteria have been met, and all other revenue recognition criteria have been met. Shipping and handling costs charged to customers are recorded as revenues and included in cost of product revenues at the time the sale is recognized.

License Revenues

The Company’s license agreements generally include up-front, nonrefundable license fees, annual license fees, and subsequent milestone payments. Upon commercialization of a product utilizing a licensed technology, the Company receives certain value-sharing payments associated with the incremental revenue attributable to the licensed technology.

The Company has determined that, at the inception of each license agreement, there is only one deliverable for the license for and access to the specified intellectual property. The up-front nonrefundable license fees are recognized as revenue proportionally over the development period. The development period is estimated based upon factors such as type of traits, nature of crops and geographies, which are used to establish the initial deferral period. The Company continually reviews such estimates based on progress toward product commercialization and performs a thorough analysis at least annually. If the deferral period estimate changes, the amount of revenue recognized during the period is either accelerated or reversed to reflect the updated deferred balances as of the current period-end, capturing the cumulative effect of the changes. The annual license fees are payable at the end of the annual period and such fees typically are not required to be paid if the agreement is cancelled prior to the due date. Therefore, annual license fees are only recognized when they become due. In the event a license is terminated prior to commercialization, the deferred balance of the unamortized up-front license is released to revenue on the effective date.

The Company's license agreements generally include contingent milestone payments in the development life cycle of the related technology, such as achievement of specific technological targets, successful results from field trials, filing for approval with regulatory agencies, approvals granted by regulatory agencies and commercial launch of a product utilizing the licensed technology. The Company evaluates whether each milestone is substantive and at risk at the time the agreement is executed. This evaluation includes an assessment of whether (a) the consideration is commensurate with either (i) the entity's performance to achieve the milestone or (ii) the enhancement of the value of the delivered item(s) as a result of a specific outcome resulting from the entity's performance to achieve the milestone; (b) the consideration relates solely to past performance; and (c) the consideration is reasonable relative to all of the deliverables and payment terms within the arrangement. The Company generally considers non-refundable milestones that the Company expects to be achieved as a result of the Company's efforts during the period of the Company's performance obligations under the license agreement to be substantive and recognizes them as revenue upon the achievement of the milestone, assuming all other revenue recognition criteria are met.

Once a product containing one or more of the Company's traits is commercialized, the Company is entitled to receive a portion of the incremental revenue that the trait generates for its commercial partner. These value-sharing payments will be recorded on the accrual basis when results are reliably measurable, collectability is reasonably assured, and all other revenue recognition criteria are met. None have been received to date.

Contract Research Revenues

Contract research revenues consist of amounts earned from performing contracted research activities for third parties. Activities performed are related to breeding programs or the genetic engineering of plants and are subject to an executed agreement. Generally, fees for research and development activities are recognized as the services are performed over the performance period, as specified in the respective agreements, assuming all other revenue recognition criteria are met.

Similar to the license agreements, under the contract research agreements, once a product containing one or more of the Company's traits is commercialized, the Company is entitled to receive a portion of the incremental revenue that the trait generates for its commercial partner. These value-sharing payments will be recorded on the accrual basis when results are reliably measurable, collectability is reasonably assured, and all other revenue recognition criteria are met.

Government Grant Revenues

Based on the terms of the government grant, the Company recognizes revenue from payments received from government entities for research and development activities over a contractually defined period. Revenues from government grants are recognized in the period during which the related costs are incurred, provided that the conditions under which the government grants were provided have been met.

Unearned Revenue

The Company defers revenue to the extent that cash received in conjunction with a license agreement, contract or grant exceeds the revenue recognized in accordance with Company policies.

Research and Development Expenses

Research and development expenses consist of costs incurred in the discovery, development, and testing of the Company's product candidates. These expenses consist primarily of employee salaries and benefits, including stock-based compensation, fees paid to subcontracted research providers, fees associated with in-licensing technology, royalty agreements, land leased for field trials, chemicals and supplies and other external expenses. These costs are expensed as incurred. Additionally, as disclosed in Note 12, the Company is required from time to time to make certain milestone payments in connection with the development of technologies. These milestone payments are expensed at the time the milestone is achieved and deemed payable.

Note 3. Recent Accounting Pronouncements

In May 2014, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") 2014-09, *Revenue from Contracts with Customers*, which requires an entity to recognize the amount of revenue to which it expects to be entitled for the transfer of promised goods or services to customers. The ASU will replace most existing revenue recognition guidance in U.S. GAAP when it becomes effective. In August 2015, the FASB issued ASU No. 2015-14, *Revenue from Contracts with Customers (Topic 606)*: Deferral of Effective Date, which defers the effective date of ASU No. 2014-09 by one year allowing early adoption as of the original effective date January 1, 2017. The deferral results in the new revenue standard being effective for the Company January 1, 2018. Additional ASUs have been issued to amend or clarify the new guidance in ASC Topic 606 as follows:

- ASU No. 2016-08 *Revenue from Contracts with Customers (Topic 606): Principal versus Agent Considerations (Reporting Revenue Gross versus Net)* was issued in March 2016. ASU No. 2016-08 requires an entity to determine whether the nature of its promise to provide goods or services to a customer is performed in a principal or agent capacity and to recognize revenue in a gross or net manner based on its principal or agent designation.
- ASU No. 2016-10 *Revenue from Contracts with Customers (Topic 606): Identifying Performance Obligations and Licensing* was issued in April 2016. ASU No. 2016-10 addresses implementation issues identified by the FASB-International Accounting Standards Board Joint Transition Resource Group for Revenue Recognition concerning identifying performance obligations and accounting for licenses of intellectual property.
- ASU No. 2016-12 *Revenue from Contracts with Customers (Topic 606): Narrow-Scope Improvements and Practical Expedients* was issued in May 2016. ASU No. 2016-12 amends the new revenue recognition standard to clarify the guidance on assessing collectability, measuring noncash consideration, presenting sales taxes and certain transition matters.
- ASU No. 2016-20 *Technical Corrections and Improvements to Topic 606, Revenue from Contracts with Customers* was issued in December 2016. ASU No. 2016-20 provides additional clarification on 13 issues or corrects unintended application of FASB Accounting Standards Codification (Topic 606).

The standard permits the use of either the retrospective or cumulative effect transition method. The Company is analyzing the impacts of the new revenue standards with the assistance of a third-party professional services firm. The Company adopted the requirements of the new standard in the first quarter of 2018 using the modified retrospective method with the likely impact per revenue stream as follows:

- Product Revenue – the Company believes there will not be an impact. Product revenues comprise of a single performance obligation for the delivery of goods for which transfer of control occurs at the shipping point.
- Grant and Contract Research Revenue – the Company believes there will not be an impact. Grant and contract research revenue will continue to be accounted for as a single performance obligation for which revenues are recognized over time using the input method (e.g. costs incurred to date relative to the total estimated costs at completion).
- License Agreement Revenue – the Company believes there will be an impact. The Company believes its license agreements are licenses of functional intellectual property consisting of a single performance obligation. A functional license requires point in time revenue recognition, which may impact this revenue stream. This is primarily due to the various payment terms of the license agreements:
    - *Up-front license fees* – the Company believes there will be a significant impact. The up-front fees will be recognized at a point in time rather than over the estimated commercialization period. The balances of unearned revenues on the balance sheet totaling $2.4 million related to up-front license fees and any associated deferred tax assets are expected to be derecognized through an opening adjustment to retained earnings on January 1, 2018. The Company believes new license agreements executed in 2018 will have up-front license fees recognized as revenue upon execution of the agreement.

- *Annual license fees* – the Company believes there will be an impact; however, no adjustment is required upon adoption. Annual license fees will be variable consideration that is initially constrained and recognized only when it is probable that such amounts would not be reversed. The Company will need to design and implement a process to assess when renewal of annual license fees are probable in order to determine the timing of revenue recognition for annual license fees.
- *Milestone fees* – the Company believes there will be an impact; however, no adjustment is required upon adoption. Milestone fees will be variable consideration that is initially constrained and recognized only when it is probable that such amounts would not be reversed. The Company will need to design and implement a process to assess when achievement of milestones are probable in order to determine the timing of revenue recognition for milestone fees.
- *Commercial Value Sharing Fees* – the Company believes there will not be an impact to revenue recognition as no license agreements within our portfolio have commercialized; however, no adjustment is required upon adoption. Commercial value share fees will be recognized based on subsequent sales by the licensee.

Internal Revenue Service rules currently allow for a one-year deferral of revenue on cash receipts, which the Company has taken. Upon adoption of Topic 606, tax recognition will follow book recognition for up-front and commercial value sharing fees. Annual license fees and milestone fees may continue to be recognized differently for book and tax to the extent that revenue recognized for book is prior to cash receipts.

In January 2016, the FASB issued ASU No. 2016-01, *Financial Instruments – Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities*. The amendments in this update impacts classification, additional fair value measurement, impairment assessment of equity investments and current required disclosures. This standard is effective for fiscal years beginning after December 15, 2017, and interim periods within those fiscal years, with early adoption permitted if the entity meets certain early application guidance. The Company is evaluating the impact of the adoption of ASU No. 2016-01 on its consolidated financial statements.

In February 2016, the FASB issued ASU No. 2016-02, *Leases (Topic 842)*. Based on the new standard, lessees would recognize lease assets and lease liabilities for those leases classified as operating leases under previous GAAP. The standard is effective for fiscal years beginning after December 15, 2019, including interim periods within those fiscal years. Early application is permitted. The Company is evaluating the impact of the adoption of ASU No. 2016-02 on its consolidated financial statements.

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments – Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments*. The amendments affect loans, debt securities, trade receivables, net investments in leases, off-balance-sheet credit exposures, reinsurance receivables, and any other financial assets not excluded from the scope that have the contractual right to receive cash. The amendments in this update are effective for fiscal years beginning after December 15, 2019, including interim periods within those fiscal years. The Company is evaluating the impact of the adoption of ASU No. 2016-13 on its consolidated financial statements.

In August 2016, the FASB issued ASU No. 2016-15, *Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments*. The amendments address cash flow issues such as debt prepayment or debt extinguishment costs and zero-coupon debt instruments. The amendments in this update are effective for fiscal years beginning after December 15, 2018, and interim periods within fiscal years beginning after December 15, 2019. Early adoption is permitted, including adoption in an interim period. The amendments are to be applied using a retrospective transition method to each period presented. If it is impractical to retrospectively apply, it can be applied prospectively as of the earliest date practicable. The Company is evaluating the impact of the adoption of ASU No. 2016-15 on its consolidated financial statements.

In May 2017, the FASB issued ASU No. 2017-09, *Compensation – Stock Compensation (Topic 718): Scope of Modification Accounting.* The amendments affect any entity that changes the terms or conditions of a share-based payment award. The amendments in this update are effective for all entities for annual periods, and interim periods within those annual periods, beginning after December 15, 2017. Early adoption is permitted, including adoption in any interim period for public business entities for reporting periods for which financial statements have not yet been issued and be applied prospectively to an award modified on or after the adoption date. The Company is currently evaluating the impact of the adoption of ASU No. 2017-09 on its consolidated financial statements.

In November 2017, the FASB issued ASU No. 2017-14, *Income Statement—Reporting Comprehensive Income (Topic 220*), Revenue Recognition (Topic 605), and Revenue from Contracts with Customers (Topic 606) (SEC Update). The ASU amends SEC paragraphs pursuant to the SEC Staff Accounting Bulletin No. 116 and SEC Release No. 33-10403, which bring existing guidance into conformity with Topic 606, Revenue from Contracts with Customers. The amendments were effective upon issuance. The Company is currently evaluating the impact on revenue recognition, however it does not expect these amendments to have a material effect on its financial statements.

Note 4. Property and Equipment, Net

Property and equipment, net consisted of the following (in thousands):

	As of December 31,	
	2017	2016
Laboratory equipment	$ 2,404	$ 2,632
Software and computer equipment	424	449
Furniture and fixtures	147	153
Vehicles	203	204
Leasehold improvements	2,002	1,991
Assets under construction	—	20
Property and equipment, gross	5,180	5,449
Less accumulated depreciation and amortization	(4,881)	(4,941)
Property and equipment, net	$ 299	$ 508

Depreciation and amortization expense is $279,000 and $304,000 for the years ended December 31, 2017 and 2016, respectively.

Note 5. Investments and Fair Value Measurements

Available-for-Sale Investments

The Company classified short-term and long-term investments as “available-for-sale.” Investments are free of trading restrictions. The investments are carried at fair value, based on quoted market prices or other readily available market information. Unrealized gains and losses, net of taxes, are included in accumulated other comprehensive loss, which is reflected as a separate component of stockholder’s equity in the Consolidated Balance Sheets. Gains and losses are recognized when realized in the Consolidated Statements of Operations and Comprehensive Loss.

The following tables summarize the amortized cost and fair value of the available-for-sale investment securities portfolio at December 31, 2017 and December 31, 2016, and the corresponding amounts of unrealized gains and losses recognized in accumulated other comprehensive income ("AOCI"):

(Dollars in thousands)	Amortized Cost	Unrealized Gains	Unrealized Losses	Estimated Fair Value
December 31, 2017				
Cash equivalents:				
Money market funds	$ 8,943	$ —	$ —	$ 8,943
Short-term investments:				
Commercial paper	1,399	—	—	1,399
U.S. government securities	2,500	—	(1)	2,499
Total Assets at Fair Value	$ 12,842	$ —	$ (1)	$ 12,841

(Dollars in thousands)	Amortized Cost	Unrealized Gains	Unrealized Losses	Estimated Fair Value
December 31, 2016				
Cash equivalents:				
Money market funds	$ 1,549	$ —	$ —	$ 1,549
Short-term investments:				
Certificates of Deposit	3,049	—	(2)	3,047
Commercial paper	21,248	—	—	21,248
U.S. government securities	19,267	—	(9)	19,258
U.S. government agency securities	5,000	—	(6)	4,994
Long-term investments:				
U.S. government securities	2,500	—	(2)	2,498
Total Assets at Fair Value	$ 52,613	$ —	$ (19)	$ 52,594

The Company did not have any investment categories that were in a continuous unrealized loss position for more than twelve months as of December 31, 2017.

As of December 31, 2017, for fixed income securities that were in unrealized loss positions, the Company has determined that (i) it does not have the intent to sell any of these investments, and (ii) it is not more likely than not that it will be required to sell any of these investments before recovery of the entire amortized cost basis. The Company anticipates that it will recover the entire amortized cost basis of such fixed income securities and has determined that no other-than-temporary impairments associated with credit losses were required to be recognized during the year ended December 31, 2017.

Fair Value Measurement

The fair value of the available-for-sale investments at December 31, 2017 were as follows:

	Fair Value Measurements at December 31, 2017			
(Dollars in thousands)	Level 1	Level 2	Level 3	Total
Assets at Fair Value				
Cash equivalents:				
Money market funds	$ 8,943	$ —	$ —	$ 8,943
Short-term investments:				
Commercial paper	—	1,399	—	1,399
U.S. government securities	2,499	—	—	2,499
Total Assets at Fair Value	$ 11,442	$ 1,399	$ —	$ 12,841

The fair value of the available-for-sale investments at December 31, 2016 were as follows:

	Fair Value Measurements at December 31, 2016			
(Dollars in thousands)	**Level 1**	**Level 2**	**Level 3**	**Total**
Assets at Fair Value				
Cash equivalents:				
Money market funds	$ 1,549	$ —	$ —	$ 1,549
Short-term investments:				
Certificates of Deposit	—	3,047	—	3,047
Commercial paper	—	21,248	—	21,248
U.S. government securities	19,258	—	—	19,258
U.S. government agency securities	—	4,994	—	4,994
Long-term investments:				
U.S. government securities	2,498	—	—	2,498
Total Assets at Fair Value	$ 23,305	$ 29,289	$ —	$ 52,594

The Company uses the market approach technique to value its financial instruments and there were no changes in valuation techniques during 2017 or 2016. The Company's financial instruments consist primarily of cash and cash equivalents, accounts receivable, accounts payable and accrued liabilities, and debt instruments. For accounts receivable, accounts payable and accrued liabilities, the carrying amounts of these financial instruments as of December 31, 2017 and 2016 were considered representative of their fair values due to their short term to maturity or repayment. Cash equivalents are carried at cost, which approximates their fair value. The carrying values of long-term debt, which approximate fair value, and debt instruments are principally measured using Level 2 inputs based on quoted market prices or pricing models using current market rates.

Note 6. Investment in Unconsolidated Entity

Limagrain Cereal Seeds LLC

At December 31, 2016, the Company owned a 35% ownership position in Limagrain Cereal Seeds LLC ("LCS"). The remaining 65% of LCS was owned by Vilmorin & Cie ("Limagrain"), a major global producer and marketer of field crop and vegetable seeds, through its wholly owned subsidiary, Vilmorin USA ("VUSA"). LCS improves and develops new wheat and barley varieties utilizing genetic and breeding resources, as well as advanced technologies, from Limagrain and the Company. Historically, funding for LCS has come from an initial pro rata equity investment from each partner and with subsequent financing in the form of debt from VUSA. As of December 31, 2016, the Company's investment in LCS had been reduced to $0 as a result of its equity method loss recognition.

On March 31, 2017, the Company and VUSA entered into a non-cash exchange agreement, which the Company transferred to VUSA the Company's entire membership interest in LCS and VUSA transferred to the Company 92,194 shares of the Company's common stock held by Limagrain. The Company recorded the retirement of the shares using the cost method, resulting in an equity reclassification between common stock par value and additional paid-in capital.

As of December 31, 2017, the Company does not have an investment in an unconsolidated entity.

Summarized condensed financial information related to the unconsolidated entity, accounted for using the equity method is as follows (in thousands):

	As of and for the year ended December 31,	
	2017 (3)	2016
Assets:		
Current assets	$ —	$ 2,963
Non-current assets	—	9,776
Total assets	—	12,739
Liabilities and equity:		
Current liabilities	—	26,992
Equity of Arcadia Biosciences, Inc.(1)	—	(4,989)
Equity of VUSA	—	(9,264)
Total liabilities and equity	$ —	$ 12,739
Revenue	$ 216	$ 3,635
Gross profit	118	1,594
Loss from continuing operations	(1,422)	(5,268)
Net loss (2)	(1,539)	(5,413)

(1) Effective June 2014, the investment balance was reduced to $0.

(2) As the Company' investment balance was reduced to $0 in 2014, the Company's share of the pretax loss is $0 for the years ended December 31, 2017 and 2016.

(3) Represents year to date activity through transaction date of March 31, 2017.

Note 7. Variable Interest Entity

In February 2012, the Company formed Verdeca LLC ("Verdeca"), which is equally owned with Bioceres, Inc. ("Bioceres"), a U.S. wholly owned subsidiary of Bioceres, S.A., an Argentine corporation. Bioceres, S.A. is an agricultural investment and development cooperative owned by approximately 300 shareholders, including some of South America's largest soybean growers. Verdeca was formed to develop and deregulate soybean varieties using both partners' agricultural technologies.

Both the Company and Bioceres incur expenses in support of specific activities agreed, as defined by joint work plans, which apply fair market value to each partner's activities. Unequal contributions of services are equalized by the partners through cash payments. Verdeca is not the primary obligor for these activities performed by the Company or Bioceres. An agreement executed in conjunction with the formation of Verdeca specified that if Bioceres determines it requires cash to fund its contributed services (subject to certain annual limits), Bioceres, S.A. may elect to sell shares of its common stock to the Company for an amount not exceeding $5.0 million in the aggregate over a four-year period. The Company determined that its commitment to purchase common stock in Bioceres, S.A. as a means to provide capital to Verdeca resulted in a de facto agency relationship between the Company and Bioceres. The Company considers qualitative factors in assessing the primary beneficiary which include understanding the purpose and design of the VIE, associated risks that the VIE creates, activities that could be directed by the Company, and the expected relative impact of those activities on the economic performance of the VIE. Based on an evaluation of these factors, the Company concluded that it is the primary beneficiary of Verdeca.

As a result of the agreement to fund future contributions by Bioceres, the Company purchased common stock of Bioceres, S.A. in the aggregate amount of $2.0 million between January 2013 and August 2014. The Company's maximum commitment to purchase stock in Bioceres, S.A. under the original funding agreement amounted to $2.0 million for 2014 and $1.2 million for 2015. In September 2014, the Company and Bioceres, S.A. entered into an agreement to reduce the annual commitment for 2014 to $500,000 and to eliminate the 2015 commitment. In consideration for these amendments, the Company surrendered 1,832 shares of Bioceres, S.A. held by the Company. The Company recorded a research and development expense of $1.5 million related to this agreement during the year ended December 31, 2014.

In addition, the Company had a right to require Bioceres, S.A. to repurchase any shares of common stock then owned by the Company upon the occurrence of certain events specified in the agreement, and similarly, Bioceres, S.A. had the right to require the Company to sell back any shares of common stock owned by the Company under certain circumstances. The Company entered into a subcontracted research agreement in 2015 with Bioceres S.A. and Bioceres Semillas, S.A., a subsidiary of Bioceres S.A. Per the agreement, the Company could pay for these services with a combination of cash and Bioceres S.A. shares. In 2015, the liability for the aforementioned agreement was settled with $205,000 of cash and the remaining 632 Bioceres S.A. shares, with a fair value of $500,000, held by the Company, thus reducing the cost investment on the Company's Consolidated Balance Sheet to $0.

Under the terms of the joint development agreement, the Company has incurred direct expenses and allocated overhead in the amount of $912,000 and $416,000 for the years ended December 31, 2017 and 2016, respectively.

Note 8. Accounts Payable and Accrued Expenses

Accounts payable and accrued expenses consisted of the following (in thousands):

	As of December 31,	
	2017	**2016**
Accounts payable—trade	$ 366	$ 222
Payroll and benefits	805	1,331
Research and development	899	182
Royalty fees due to unrelated parties	177	170
Accrued interest on notes payable	—	98
Consulting	32	29
Rent and utilities	51	85
Legal	83	45
Accrued withholding taxes	24	—
Other	59	197
Total accounts payable and accrued expenses	$ 2,496	$ 2,359

Exit or Disposal Activities

As of December 2016, the Company completed a comprehensive strategic review of its technology programs, pipeline, partner program progress, competitive landscape and market conditions, which resulted in the decision to realign its organizational capabilities to best support the Company's near term product commercialization needs and preserve cash. As a result, a number of personnel changes were made, including the elimination of 23 positions. The severance costs associated with this reduction in force were $192,000 for one-time employee termination benefits, and $224,000 in severance costs in connection with an executive employment contract, both of which, are recorded in Selling, General, and Administrative expense for the year ended December 31, 2016. A portion of the one-time employee termination benefits was paid out in December 2016 and the remaining severance amount of $389,000 was accrued under payroll and benefits as of December 31, 2016 and paid in 2017. Additionally, the Company closed its Seattle office in March 2017. The Company has no other associated exit or disposal costs pertaining to the years ended December 31, 2017 and 2016.

9. Collaborative Arrangements

In August 2017, the Company entered into a collaborative arrangement for the research, development and commercialization of an improved wheat quality trait in North America. This collaborative arrangement is a contractual agreement with a third party and involves a joint operating activity where both Arcadia and the third party are active participants in the activities of the collaboration. Arcadia and the third party participate in the research and development, and Arcadia has the primary responsibility for the intellectual property strategy while the third party will generally lead the marketing and commercialization efforts. Both parties are exposed to significant risks and rewards of the collaboration and the agreement includes both cost sharing and profit sharing. The activities are performed with no guarantee of either technological or commercial success.

The Company accounts for research and development ("R&D") costs in accordance ASC 730, *Research and Development*, which states R&D costs must be charged to expense as incurred. Accordingly, internal R&D costs are expensed as incurred. Third-party R&D costs are expensed when the contracted work has been performed or as milestone results are achieved.

Note 10. Long-Term Debt and Other Financing Arrangements

There was no long-term debt as of the year ended December 31, 2017. Longterm debt as of the year ended December 31, 2016 consisted of the following (in thousands):

Notes payable	$	25,127
Total	$	25,127
Less current portion		—
Long-term portion	$	25,127

Term Loan

In December 2015, the Company entered into a loan and security agreement ("Term Loan") with Silicon Valley Bank (the "Bank") providing for a senior secured term loan facility in the amount of $25.0 million, which proceeds were used to repay all existing debt. In July 2017, the Company repaid the Term Loan with Silicon Valley Bank, along with the $625,000 end-of-term fee and $500,000 prepayment fee.

The Term Loans' prepayment and end of term fees of $1.1 million were recorded as a loss on extinguishment of debt, along with $41,000 of deferred loan issuance fees, partially offset by $267,000 of end of term fees previously amortized, netting to a loss of $900,000. As of the payoff date, the Company was in compliance with all covenants.

The Company recognized related interest expense of $747,000 for the year ended December 31, 2017, of which $98,000 was related to the debt discount. During 2016, the Company recognized interest expense of $1.3 million for the year of which $198,000 was related to the debt discount.

Note 11. Stock-Based Compensation

Stock Incentive Plans

The Company has two equity incentive plans: the 2006 Stock Plan ("2006 Plan") and the 2015 Omnibus Equity Incentive Plan ("2015 Plan").

In 2006, the Company adopted the 2006 Plan, which provided for the granting of stock options to executives, employees, and other service providers under terms and provisions established by the Board of Directors. The Company granted non-statutory stock options ("NSOs") under the 2006 Plan until May 2015, when it was terminated as to future awards, although it continues to govern the terms of options that remain outstanding and were issued under the 2006 Plan. The 2015 Plan became effective upon the Company's IPO in May 2015 and all shares that were reserved, but not issued, under the 2006 Plan were assumed by the 2015 Plan. Upon effectiveness, the 2015 Plan had 154,387 shares of common stock reserved for future issuance, which included 10,637 that were transferred to and assumed by the 2015 Plan. The 2015 Plan provides for automatic annual increases in shares available for grant. In addition, shares subject to awards under the 2006 Plan that are forfeited or canceled will be added to the 2015 Plan. The 2015 Plan provides for the grant of incentive stock options ("ISOs"), NSOs, restricted stock awards, stock units, stock appreciation rights, and other forms of equity compensation, all of which may be granted to employees, officers, non-employee directors, and consultants. The ISOs and NSOs will be granted at a price per share not less than the fair value at the date of grant. Options granted generally vest over a four-year period, with 25% vesting at the end of one year and the remaining vesting monthly thereafter. Options granted, once vested, are generally exercisable for up to 10 years, after grant.

As of December 31, 2017, a total of 395,808 shares of common stock were reserved for issuance under the 2015 Plan, of which 224,647 shares of common stock are available for future grant. As of December 31, 2017, a total of 116,949 and 171,181 options are outstanding under the 2006 and 2015 Plans, respectively.

The following is a summary of stock option information and weighted average exercise prices under the Company's stock incentive plans (in thousands, except share data and price per share):

	Shares Subject to Outstanding Options	Weighted-Average Exercise Price Per Share	Aggregate Intrinsic Value
Outstanding — Balance at December 31, 2015	171,375	$ 75.20	$ 3,707
Options granted	89,970	103.50	
Options exercised	(11,407)	23.63	
Options cancelled and forfeited	(20,999)	89.84	
Outstanding — Balance at December 31, 2016	228,939	$ 87.60	$ —
Options granted	111,336	13.47	
Options exercised	—	—	
Options cancelled and forfeited	(52,146)	61.60	
Outstanding — Balance at December 31, 2017	288,129	63.62	$ —
Vested and expected to vest — December 31, 2017	282,394	63.95	$ —
Exercisable —December 31, 2017	144,743	$ 79.53	$ —

Aggregate intrinsic value represents the difference between the exercise price of the options and the estimated fair value of the Company's common stock determined by the Board of Directors for each of the respective periods. The intrinsic value of options exercised was $0 for the year ended December 31, 2016. There were not any options exercised during 2017.

At December 31, 2017 and 2016, there were no expired options, and the total fair value of shares vested during the years was $449,000 and $283,000, respectively.

As of December 31, 2017, there was $1.1 million of unrecognized compensation cost related to unvested stock-based compensation grants that will be recognized over the weighted-average remaining recognition period of 2.74 years.

In determining the fair value of the stock-based awards, the Company uses the Black-Scholes option-pricing model and assumptions discussed below. Each of these inputs is subjective and generally requires significant judgment to determine.

Expected Term—The expected term is the estimated period of time outstanding for stock options granted and was estimated based on historical, as well as anticipated future, exercise activity.

Expected Volatility—Since the Company was privately held and does not have a long trading history for its common stock, the expected volatility was estimated based on the average volatility for comparable publicly traded biotechnology companies over a period equal to the expected term of the stock option grants. When selecting comparable publicly traded biotechnology companies on which it has based its expected stock price volatility, the Company selected companies with comparable characteristics to it, including enterprise value, risk profiles, position within the industry, and with historical share price information sufficient to meet the expected life of the stock-based awards. The historical volatility data was computed using the daily closing prices for the selected companies' shares during the equivalent period of the calculated expected term of the stock-based awards. The Company will continue to apply this process until a sufficient amount of historical information regarding the volatility of its own stock price becomes available.

Risk-Free Interest Rate—The risk-free interest rate is based on the interest rate of U.S. Treasuries of comparable maturities on the date the options were granted.

Expected Dividend—The expected dividend yield is based on the Company's expectation of future dividend payouts to common stockholders.

The fair value of stock option awards to employees was estimated at the date of grant using a Black-Scholes option-pricing model with the following weighted-average assumption:

	Year Ended December 31,	
Assumptions	**2017**	**2016**
Expected term (years)	6.12	6.06
Expected volatility	79%	92%
Risk-free interest rate	1.90%	1.76%
Expected dividend yield	—	—

The weighted- average, estimated grant-date fair value of employee stock options granted during the years ended December 31, 2017 and 2016 was $9.20 and $22.60, respectively. The Company recognized $1.5 million and $1.1 million of compensation expense for stock options to employees and board members for the years ended December 31, 2017 and 2016, respectively.

Employee Stock Purchase Plan

The Company's 2015 Employee Stock Purchase Plan ("ESPP") became effective on May 14, 2015. The ESPP allows eligible employees to purchase shares of the Company's common stock at a discount of up to 15% of their eligible compensation through payroll deductions, subject to any plan limitations. After the first offering period, which began on May 14, 2015 and ended on February 1, 2016, the ESPP provides for six-month offering periods, and at the end of each offering period, employees are able to purchase shares at 85% of the lower of the fair market value of the Company's common stock on the first trading day of the offering period or on the last day of the offering period. As of December 31, 2017, the number of shares of common stock reserved for future issuance under the ESPP is 69,270. The ESPP provides for automatic annual increases in the shares available for purchase beginning on January 1, 2016. As of December 31, 2017, 5,731 shares had been issued under the ESPP. The Company recorded $13,000 and $80,000 of ESPP related compensation expense for the years ended December 31, 2017 and 2016, respectively.

Note 12. Commitments and Contingencies

Leases

The Company leases office and laboratory space, greenhouse space, grain storage bins, warehouse space, and equipment under operating lease agreements having initial lease terms ranging from three to five years, including certain renewal options available to the Company at market rates. The Company also leases land for field trials on a short-term basis. Future minimum payments under non-cancelable operating leases in effect as of December 31, 2017, are presented below (in thousands):

Years Ending December 31,	**Amounts**
2018	422
2019	77
2020	72
Total future minimum payments under non-cancelable operating leases	$ 571

Rent expense under all operating leases totaled $1.2 and $1.3 million for years ended December 31, 2017 and 2016, respectively.

Legal Matters

From time to time, in the ordinary course of business, the Company may become involved in certain legal proceedings. As of December 31, 2017 and 2016, the Company was not involved in any material legal proceedings.

Contingent Liability Related to the Anawah Acquisition

On June 15, 2005, the Company completed its agreement and plan of merger and reorganization with Anawah, Inc. ("Anawah"), to purchase the Anawah's food and agricultural research company through a non-cash stock purchase. Pursuant to the merger with Anawah, and in accordance with the ASC 805 - Business Combinations, the Company incurred a contingent liability not to exceed $5.0 million. This liability represents amounts to be paid to Anawah's previous stockholders for cash collected on revenue recognized by the Company upon commercial sale of certain specific products developed using technology acquired in the purchase. As of December 31, 2010, the Company ceased activities relating to three of the six Anawah product programs thus, the contingent liability was reduced to $3.0 million. During the third quarter of 2016, one of the programs previously accrued for was abandoned and another program previously abandoned was reactivated. As of December 31, 2017, the Company continues to pursue a total of three development programs using this technology and believes that the contingent liability is probable. As a result, $3.0 million remains on the Consolidated Balance Sheet as an other noncurrent liability.

Contracts

The Company has entered into contract research agreements with unrelated parties that require the Company to pay certain funding commitments. The initial terms of these agreements range from one to three years in duration and in certain cases are cancelable.

The Company licenses certain technologies via executed agreements ("In-Licensing Agreements") that are used to develop and advance the Company's own technologies. The Company has entered into various In-Licensing Agreements with related and unrelated parties that require the Company to pay certain license fees, royalties, and/or milestone fees. In addition, certain royalty payments ranging from 2% to 15% of net revenue amounts as defined in the In-Licensing Agreements will be due.

Royalties due to both related and unrelated parties on license revenue accrued as of December 31, 2017 and 2016 were $206,000 and $201,000, respectively. Royalties are included within research and development on the Consolidated Statements of Operations and Comprehensive Loss.

Milestone payments are contingent upon the successful development or implementation of various technologies. Payments for milestones yet to be achieved totaled $2.0 million for both years ended December 31, 2017 and 2016. The timing of the payments is not determinable at this time pending research and development currently in progress; however, no significant payments were made during the years ended December 31, 2017 and 2016.

The Company could be adversely affected by certain actions by the government as it relates to government contract revenue received in prior years. Government agencies, such as the Defense Contract Audit Agency routinely audit and investigate government contractors. These agencies review a contractor's performance under its agreements; cost structure; and compliance with applicable laws, regulations and standards. The agencies also review the adequacy of, and a contractor's compliance with, its internal control systems and policies, including the contractor's purchasing, property, estimating, compensation and management information systems. While the Company's management anticipates no adverse result from an audit, should any costs be found to be improperly allocated to a government agreement, such costs will not be reimbursed, or if already reimbursed, may need to be refunded. If an audit uncovers improper or illegal activities, civil and criminal penalties and administrative sanctions, including termination of contracts, forfeiture of profits, suspension of payments or fines, and suspension or prohibition from doing business with the government could occur. In addition, serious reputational harm or significant adverse financial effects could occur if allegations of impropriety were made against the Company. There currently are routine audits in process relating to government grant revenues.

Note 13. Income Taxes

The components of loss before income taxes are as follows (in thousands):

	Year Ended December 31,	
	2017	2016
Domestic	$ (15,681)	$ (19,599)
Foreign	—	—
Loss before income taxes	$ (15,681)	$ (19,599)

The components of the provision for income taxes for the years ended December 31, 2017 and 2016 are as follows (in thousands):

	Year Ended December 31,	
	2017	2016
Current:		
Federal	$ —	$ —
State	2	1
Foreign	24	24
Total current tax expense	26	25
Deferred:		
Federal	—	—
State	—	—
Foreign	—	—
Total deferred tax benefit	—	—
Total tax expense	$ 26	$ 25

The Company operates in only one federal jurisdiction, the United States. The following is a reconciliation of the statutory federal income tax rate to the Company's effective tax rate is as follows:

	Year Ended December 31,	
	2017	2016
Expected income tax provision at the federal statutory rate	34.0%	34.0%
State taxes, net of federal benefit	2.6%	4.7%
Change in valuation allowance	91.4%	(37.8)%
Nondeductible expenses	0.1%	(0.9)%
Impact of change in federal tax rate	(124.6)%	—
Withholding taxes	(0.2)%	(0.1)%
Other	(3.5)%	—
Income tax provision	(0.2)%	(0.1)%

The total income tax expense for the years ended December 31, 2017 and 2016 was $26,000 and $25,000, respectively, and is comprised of current state taxes and foreign taxes withheld by governmental agencies outside of the United States.

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes, net operating loss carryforwards ("NOLs") and other tax credits. Significant components of the Company's deferred tax assets are as follows (in thousands):

	As of December 31,	
	2017	2016
Deferred tax assets:		
Net operating loss carryforwards	$ 37,498	$ 49,593
Unearned revenue	783	1,501
Stock-based compensation	2,273	2,861
Accrued payroll and benefits	51	215
Research and development credits	171	143
Capital loss carryover	—	13
Fixed asset basis difference	128	191
Inventory reserve	396	1,110
Charitable contributions	3	5
Total deferred tax assets	41,303	55,632
Less valuation allowance	(41,303)	(55,632)
Net deferred tax assets	$ —	$ —

Realization of the deferred tax assets is dependent upon future taxable income, if any, the amount and timing of which are uncertain. Accordingly, the net deferred tax assets have been offset by a valuation allowance. The net valuation allowance decreased by $14.3 million and increased by $8.5 million during the years ended December 31, 2017 and 2016, respectively.

On December 22, 2017, the Tax Cuts and Jobs Act (the "Tax Act") was signed into law making significant changes to the Internal Revenue Code. Changes include, but are not limited to, a corporate tax rate decrease from 35% to 21%, effective for tax years beginning after December 31, 2017. We use the asset and liability method of accounting for income taxes. Under this method, deferred tax assets and liabilities are recognized for the future tax consequences attributable to differences between the financial statement carrying amounts of existing assets and liabilities and their respective tax basis. Deferred tax assets and liabilities are measured using enacted tax rates expected to apply to taxable income in the years in which those temporary differences are expected to reverse. As a result of the reduction in the U.S. corporate income tax rate from 35% to 21% under the Tax Act, we revalued our ending net deferred tax assets at December 31, 2017, which were fully offset by a valuation allowance. The Company has evaluated the other changes resulting from the Tax Act and does not expect them to have a material impact on the tax provision, therefore, the Company considers the accounting complete.

At December 31, 2017, the Company had federal and state NOLs aggregating approximately $152.9 million and $105.3 million, respectively. At December 31, 2017, the utilization of a portion of our NOLs is subject to an annual limitation under Section 382 of the Internal Revenue Code (IRC). Of the $152.9 million generated, $7.2 million will not be available to be utilized within the carryforward period. If not utilized, these federal NOLs will begin to expire in 2020 and these state NOLs began to expire in 2017. The Company continues to evaluate IRC Section 382, which may limit NOLs generated in future years.

The Company evaluates deferred tax assets, including the benefit from NOLs, to determine if a valuation allowance is required. Such evaluation is based on consideration of all available evidence using a "more likely than not" standard with significant weight being given to evidence that can be objectively verified. This assessment considers, among other matters, the nature, frequency, and severity of current and cumulative losses; forecasts of future profitability; the length of statutory carryforward periods; the Company's experience with operating losses; and tax-planning alternatives. The significant piece of objective negative evidence evaluated was the cumulative loss incurred through the year ended December 31, 2017. Given this evidence and the expectation to incur operating losses in the foreseeable future, a full valuation allowance has been recorded against the net deferred tax asset. The Company will continue to maintain a full valuation allowance against the entire amount of its net deferred tax asset, until such time as the Company has determined that the weight of the objectively verifiable positive evidence

exceeds that of the negative evidence and it is likely that the Company will be able to utilize all of its net deferred tax asset relating to its federal and state NOL carryforwards. Although the Company has established a full valuation allowance on its net deferred tax asset, it has not forfeited the right to carryforward tax losses up to 20 years and apply such tax losses against taxable income in such years, thereby reducing its future tax obligations. The Company is subject to taxation in the United States and various state jurisdictions. As of December 31, 2017, the Company's tax years for 2000 through 2017 are generally subject to examination by the tax authorities. The years are open back to 2000 to the extent the NOLs being carried forward were generated then.

The Company applies the provisions of ASC 740 related to accounting for uncertain tax positions and concluded there were no such positions associated with the Company requiring accrual of a liability. As of December 31, 2017, the Company has not accrued for any such positions. The Company is currently not under audit for federal or state tax purposes. The Company does not expect a significant change to occur within the next 12 months.

Note 14. Retirement Benefits

The Company has a 401(k) retirement plan (the "Plan") available for participation by all regular full-time employees who have completed three months of service with the Company. The Company established the Plan in 2008. The Plan provides for a discretionary matching contribution equal to 50% of the amount of the employee's salary deduction, not to exceed 3% of the salary per employee. Highly compensated employees are excluded from receiving any discretionary matching contribution. Employees' rights to employer contributions vest on the one-year anniversary of their date of employment. The Company has the option to make discretionary matching contributions. The Company did not make discretionary matching contributions during the years ended December 31, 2017 and 2016.

Note 15. Segment and Geographic Information

Management has determined that it has one business activity and operates in one segment as it only reports financial information on an aggregate and consolidated basis to its Chief Executive Officer, who is the Company's chief operating decision maker.

Revenues based on the location of the customers, are as follows (in thousands):

	Year Ended December 31,	
	2017	2016
United States	$ 1,588	$ 2,715
India (1)	1,064	(100)
Africa	315	353
France	220	18
Canada	181	202
China	586	—
Belgium	72	—
Total	$ 4,026	$ 3,188

(1) *The negative amount is due to the change in estimated commercialization dates in 2016, which impacted the timing of revenue recognition.*

Note 16. Net Loss per Share

Basic net loss per share is calculated by dividing net loss attributable to common stockholders by the weightedaverage number of common shares outstanding during the period and excludes any dilutive effects of stockbased awards and warrants. Diluted net loss per share attributable to common stockholders is computed giving effect to all potentially dilutive common shares, including common stock issuable upon exercise of stock options and warrants. As the Company had net losses for the years ended December 31, 2017 and 2016, all potentially dilutive common shares were determined to be antidilutive.

Securities that were not included in the diluted per share calculations because they would be antidilutive were as follows (in shares):

	Year Ended December 31,	
	2017	2016
Options to purchase common stock	288,129	228,939
Warrants to purchase common stock	66,845	66,845
Total	354,974	295,784

Note 17. Related Party Transactions

The Company's related parties include MCC and Blue Horse Labs, Inc. ("BHL"). BHL is deemed a related party of the Company because MCC, the Company's controlling stockholder, and BHL have some common officers and directors.

Transactions with related parties are reflected in the consolidated financial statements under amounts due to related parties and notes payable to related party. Outlined below are details of agreements between the Company and its related parties:

Under a license agreement executed in 2003 and amended in 2009, BHL receives a singledigit royalty from the Company when revenue has been collected on product sales or for license payments from third parties that involve certain intellectual property developed under research funding from BHL. Royalty fees due to BHL were $29,000 and $30,000 as of December 31, 2017 and December 31, 2016, respectively, and are included in the Consolidated Balance Sheets as amounts due to related parties.

Note 18. Subsequent Event

On February 7, 2018, the Company received a letter from Nasdaq, indicating the Company has regained compliance with Listing Rule 5450(a)(1). On February 14, 2017, Nasdaq notified the Company that its common stock failed to maintain a minimum bid price of $1.00 over the previous 30 consecutive business days as required by the Listing Rules of The Nasdaq Stock Market. Since then, Nasdaq determined that for 10 consecutive business days, from January 24, 2018 to February 6, 2018, the closing bid price of the Company's common stock has been at $1.00 per share or greater and this matter is now closed.

On March 19, 2018, the Company entered into definitive securities purchase agreements with institutional investors in connection with a private placement of common stock and warrants in the amount of $10 million, exclusive of any related transaction fees. The number of shares to be issued and at what price are variable and subject to the terms of the agreement. The offering is expected to close on or about March 21, 2018, subject to satisfaction of customary closing conditions.

Item 9. Changes in and Disagreements With Accountants on Accounting and Financial Disclosure.

None.

Item 9A. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

As of December 31, 2017, Arcadia's disclosure controls and procedures were evaluated, with the participation of Arcadia's principal executive officer and principal financial officer, to assess whether they are effective in providing reasonable assurance that information required to be disclosed by Arcadia in the reports that it files or submits under the Securities Exchange Act of 1934 is accumulated and communicated to management, including its principal executive officer and principal financial officer, as appropriate, to allow timely decisions regarding required disclosure and to provide reasonable assurance that such information is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms. Based on this evaluation, Rajendra Ketkar, Arcadia's principal executive officer, and Matthew T. Plavan, Arcadia's principal financial officer, concluded that these disclosure controls and procedures were effective as of December 31, 2017.

Management's Report on Internal Control Over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)). Arcadia's management, including Rajendra Ketkar, its principal executive officer, and Matthew T. Plavan, its principal financial officer, evaluated the effectiveness of Arcadia's internal control over financial reporting using the framework in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on this evaluation, management concluded that Arcadia's internal control over financial reporting was effective as of December 31, 2017.

Changes in Internal Control over Financial Reporting

Under the supervision and with the participation of our management, including our Principal Executive Officer and Principal Financial Officer, we conducted an evaluation of any changes in our internal control over financial reporting (as such term is defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) that occurred during our most recently completed fiscal quarter. Based on that evaluation, our Principal Executive Officer and Principal Financial Officer concluded that there has not been any change in our internal control over financial reporting during that quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.

None.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

The information required by this item will be contained in our definitive proxy statement to be filed with the Securities and Exchange Commission on Schedule 14A in connection with our 2018 Annual Meeting of Stockholders (the "Proxy Statement"), which is expected to be filed no later than 120 days after the end of our fiscal year ended December 31, 2017, under the headings "Executive Officers," "Election of Directors," "Corporate Governance," and "Section 16(a) Beneficial Ownership Reporting Compliance," and is incorporated herein by reference.

The Company has adopted a written code of business conduct and ethics that applies to our directors, officers, and employees, including our principal executive officer, principal financial officer, principal accounting officer or controller, or persons performing similar functions. A current copy of the code is posed on the Corporate Governance section of our website, which is located at www.arcadiabio.com. If Arcadia makes any substantive amendments to, or grant any waivers from, the code of business conduct and ethics for our principal executive officer, principal financial officer, principal accounting officer, controller or persons performing similar functions, or any officer or director, the Company will disclose the nature of such amendment or waiver on our website or in a current report on Form 8-K.

Item 11. Executive Compensation.

The information required by this item will be contained in Proxy Statement under the headings "Executive Compensation" and "Director Compensation," and is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

The information required by this item will be contained in Proxy Statement under the headings "Security Ownership of Certain Beneficial Owners and Management" and "Equity Compensation Plan Information," and is incorporated herein by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

The information required by this item will be contained in Proxy Statement under the headings "Certain Relationships and Related Party Transactions" and "Corporate Governance," and is incorporated herein by reference.

Item 14. Principal Accounting Fees and Services.

The information required by this item will be contained in Proxy Statement under the heading "Ratification of Independent Registered Public Accounting Firm-Principal Accounting Fees and Services," and is incorporated herein by reference.

PART IV

Item 15. Exhibits, Financial Statement Schedules.

The financial statements schedules and exhibits filed as part of this Annual Report on Form 10-K are as follows:

(a)(1) Financial Statements

Reference is made to the financial statements included in Item 8 of Part II hereof.

(a)(2) Financial Statement Schedules

All other schedules are omitted because they are not required or the required information is included in the statements or notes thereto.

(a)(3) Exhibits

Reference is made to the Exhibit Index accompanying this Annual Report on Form 10-K.

Item 16. Form 10-K Summary.

Not Applicable

Exhibit Index

Exhibit Number	Exhibit Description	Incorporated by Reference				Filed Herewith
		Form	File No.	Exhibit	Filing Date	
3.1	Amended and Restated Certificate of Incorporation of Registrant.	8-K	001-37383	3.1	5/26/2015	
3.2	Amendment to the Amended and Restated Certificate of Incorporation of Registrant.	8-K	001-37383	3.1	1/23/2018	
3.3	Amended and Restated Bylaws of Registrant.	8-K	001-37383	3.2	5/26/2015	
4.1	Form of Registrant's common stock certificate.	S-1/A	333-202124	4.1	4/6/2015	
4.2	Amended and Restated Stock Purchase Warrant dated December 11, 2013 between the Registrant and Mahyco International Pte Ltd.	S-1/A	333-202124	4.7	4/30/2015	
4.3	Form of Common Stock Purchase Warrant between the Registrant and certain purchasers of its Series D Preferred Stock.	S-1	333-202124	4.8	2/17/2015	
10.1†	License Agreement dated October 2, 2006 between the Registrant and The Governors of the University of Alberta.	S-1	333-202124	10.1	2/17/2015	
10.2†	Intellectual Property License Agreement dated January 1, 2003 between the Registrant and Blue Horse Labs, Inc., as amended.	8-K	001-37383	10.2	6/10/2015	
10.3†	Exclusive License Agreement for Drought-Resistant Plants dated July 2, 2010 between the Registrant and The Regents of the University of California, as amended.	S-1/A	333-202124	10.3	4/6/2015	
10.4†	License Agreement dated February 14, 2002 between the Registrant and The University of Toronto Innovations Foundation.	S-1	333-202124	10.4	2/17/2015	
10.5†	Amended and Restated License Agreement dated July 25, 2007 between the Registrant and Ross Products Division of Abbott Laboratories, as amended.	S-1/A	333-202124	10.5	4/6/2015	
10.6†	Collaborative Research and Development Agreement dated July 31, 2009 between the Registrant and Maharashtra Hybrid Seeds Co. Ltd.	S-1	333-202124	10.6	2/17/2015	
10.7†	Cooperative Agreement dated September 30, 2008 between the Registrant and the United States Agency for International Development, as amended.	S-1	333-202124	10.13	2/17/2015	
10.8†	Cooperative Agreement dated October 11, 2012 between the Registrant and the United States Agency for International Development, as amended.	S-1	333-202124	10.14	2/17/2015	

Exhibit Number	Exhibit Description	Incorporated by Reference				Filed Herewith
		Form	File No.	Exhibit	Filing Date	
10.9*	Form of Indemnification Agreement between the Registrant and each of its Officers and Directors.	S-1	333-202124	10.7	2/17/2015	
10.10*	2006 Stock Plan, as amended and restated, and form of agreement thereunder.	S-1	333-202124	10.8	2/17/2015	
10.11*	2015 Omnibus Equity Incentive Plan and forms of agreement thereunder.	S-1/A	333-202124	10.9	5/11/2015	
10.12*	2015 Employee Stock Purchase Plan and form of agreement thereunder.	S-1/A	333-202124	10.10	5/11/2015	
10.13*	Executive Incentive Bonus Plan.	S-1/A	333-202124	10.15	5/11/2015	
10.14*	Director Compensation Policy.	10-Q	001-37383	10.16	6/25/2015	
10.15*	Form of Severance and Change in Control Agreement.	S-1/A	333-202124	10.18	4/6/2015	
10.16	Office Lease dated March 17, 2003 between the Registrant and Buzz Oates LLC as successor to Marvin L. Oates, Trustee of the Marvin L. Oates Trust, as amended.	S-1	333-202124	10.12	2/17/2015	
10.17	Loan and Security Agreement dated December 29, 2015 between the Registrant, as borrower, and Silicon Valley Bank, as lender.	8-K	001-37383	10.1	12/30/2015	
21.1	List of subsidiaries of the Registrant.	S-1	333-202124	21.1	2/17/2015	
31.1	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					X
31.2	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					X
32.1	Certification of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					X
32.2	Certification of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					X
101.INS	XBRL Instance Document.					X
101.SCH	XBRL Taxonomy Extension Schema Document.					X
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document.					X

Exhibit Number	Exhibit Description	Incorporated by Reference				Filed Herewith
		Form	File No.	Exhibit	Filing Date	
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document.					X
101.LAB	XBRL Taxonomy Extension Label Linkbase Document.					X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document					X

* Indicates a management contract or compensatory plan or arrangement.

† Confidential treatment has been requested to certain portions of this exhibit. Omitted portions have been separately filed with the SEC.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, as amended, the Registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

ARCADIA BIOSCIENCES, INC.

Date: March 20, 2018

By: /s/ RAJENDRA KETKAR

Rajendra Ketkar
President and Chief Executive Officer
(Principal Executive Officer)

Date: March 20, 2018

By: /s/ MATTHEW T. PLAVAN

Matthew T. Plavan
Chief Financial Officer
(Principal Financial and Accounting Officer)

Each person whose individual signature appears below hereby authorizes and appoints Matthew T. Plavan with full power of substitution and resubstitution and full power to act without the other, as his or her true and lawful attorney-in-fact and agent to act in his or her name, place and stead and to execute in the name and on behalf of each person, individually and in each capacity stated below, and to file any and all amendments to this Annual Report on Form 10-K, and to file the same, with all exhibits thereto, and other documents in connection therewith, with the Securities and Exchange Commission, granting unto said attorneys-in-fact and agents, and each of them, full power and authority to do and perform each and every act and thing, ratifying and confirming all that said attorneys-in-fact and agents or any of them or their or his substitute or substitutes may lawfully do or cause to be done by virtue thereof.

Pursuant to the requirements of the Securities Exchange Act of 1934, as amended, this Report has been signed below by the following persons on behalf of the registrant in the capacities and on the dates indicated.

Name	Title	Date
/s/ RAJENDRA KETKAR **Rajendra Ketkar**	**Director**	March 20, 2018
/s/ KEVIN COMCOWICH **Kevin Comcowich**	**Director**	March 20, 2018
/s/ UDAY GARG **Uday Garg**	**Director**	March 20, 2018
/s/ ERIC J. REY **Eric J. Rey**	**Director**	March 20, 2018
/s/ GREGORY D. WALLER **Gregory D. Waller**	**Director**	March 20, 2018
/s/ AMY YODER **Amy Yoder**	**Director**	March 20, 2018

Exhibit 31.1

CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Rajendra Ketkar, certify that:

1. I have reviewed this Annual Report on Form 10-K of Arcadia Biosciences, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 20, 2018

By: /s/ RAJENDRA KETKAR
Rajendra Ketkar
President and Chief Executive Officer
(Principal Executive Officer)

Exhibit 31.2

CERTIFICATION PURSUANT TO
RULES 13a-14(a) AND 15d-14(a) UNDER THE SECURITIES EXCHANGE ACT OF 1934,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Matthew T. Plavan, certify that:

1. I have reviewed this Annual Report on Form 10-K of Arcadia Biosciences, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 20, 2018

By: /s/ MATTHEW T. PLAVAN
Matthew T. Plavan
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of Arcadia Biosciences, Inc. (the "Company") on Form 10-K for the year ended December 31, 2017 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1) the Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 20, 2018

By: /s/ RAJENDRA KETKAR
Rajendra Ketkar
President and Chief Executive Officer
(Principal Executive Officer)

Exhibit 32.2

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Annual Report of Arcadia Biosciences, Inc. (the "Company") on Form 10-K for the year ended December 31, 2017 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), I certify, pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1) the Report fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) the information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: March 20, 2018

By: /s/ MATTHEW T. PLAVAN
Matthew T. Plavan
Chief Financial Officer
(Principal Financial Officer)