Ceres, Inc.
Form 10-K
November 26, 2013

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Form 10-K

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

For the fiscal year ended August 31, 2013

¨ **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: 001-35421

Ceres, Inc.

(Exact name of registrant as specified in its charter)

Delaware	**33-0727287**
	(I.R.S. Employer
(State of incorporation)	
	Identification No.)
1535 Rancho Conejo Boulevard	
	91320
Thousand Oaks, CA	
(Address of principal executive offices)	**(Zip code)**

Telephone: (805) 376-6500

(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, $0.01 par value per share	The Nasdaq Stock Market LLC

Securities registered pursuant to Section 12(g) of the Act: Not Applicable

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ¨ No x

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Exchange Act. Yes ¨ No x

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 x 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 during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes x No ¨

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K 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 into 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, or a smaller reporting company. See the definitions of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer	¨	Accelerated filer	¨
Non-accelerated filer	x (Do not check if a smaller reporting company)	Smaller reporting company	¨

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act.) Yes ¨ No x

Under the Jumpstart Our Business Startups Act of 2012, or the JOBS Act, Ceres, Inc. qualifies as an "emerging growth company," as defined under the JOBS Act.

As of February 28, 2013 (the last business day of the registrant's most recently completed second fiscal quarter), the aggregate market value of the registrant's Common Stock held by non-affiliates of the registrant was approximately $49,136,976 (based on the last reported trading price of the Common Stock of $4.01 per share on that date, as reported on the Nasdaq Global Market).

As of November 15, 2013, there were 25,224,269 shares of Common Stock outstanding.

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FORWARD-LOOKING STATEMENTS

Certain statements that we make from time to time, including statements contained in this Annual Report on Form 10-K constitute “forward-looking statements” within the meaning of Section 27A of the Securities Act of 1933, as amended, or the Securities Act, and Section 21E of the Securities Exchange Act of 1934, as amended, or the Exchange Act. All statements, other than statements of historical facts contained in this Annual Report on Form 10-K, including statements regarding our efforts to develop and commercialize our products, anticipated yields and product performance, our short-term and long-term business strategies, market and industry expectations and future results of operations and financial position, are forward-looking statements. In many cases, you can identify forward-looking statements by terms such as “may”, “will”, “should”, “expect”, “plan”, “anticipate”, “could”, “intend”, “target”, “project”, “cor “believe”, “estimate”, “potential”, “continue” or other similar words.

We based these forward-looking statements largely on our current expectations and projections about future events or trends that we believe may affect our business and financial performance. These forward-looking statements involve known and unknown risks and uncertainties that may cause our actual results, performance or achievements to materially differ from any future results, performance or achievements expressed or implied by these forward-looking statements. We have described in item 1A, under the heading entitled “Risk Factors,” and elsewhere in this Annual Report on Form 10-K the material risks and uncertainties that we believe could cause actual results to differ from these forward-looking statements. Because forward-looking statements are inherently subject to risks and uncertainties, some of which we cannot predict or quantify, you should not rely on these forward-looking statements as guarantees of future results, performance or achievements.

The forward-looking statements in this Annual Report on Form 10-K represent our views as of the date of this Annual Report on Form 10-K. We undertake no obligation to update publicly, except to the extent required by law, any forward-looking statements for any reason after the date of this Annual Report on Form 10-K to conform these statements to actual results or to changes in our expectations.

You should read this Annual Report on Form 10-K and the documents that we reference in this Annual Report on Form 10-K and have filed with the Securities and Exchange Commission, or the SEC, with the understanding that our actual future results, levels of activity, performance and events and circumstances may be materially different from what we expect.

Unless otherwise indicated in this Annual Report on Form 10-K, “Ceres”, “our company”, “the Company”, “we”, “us” and “ou refer to Ceres, Inc. and our subsidiary, Ceres Sementes do Brasil Ltda.

Our logos, "Ceres®", "The Energy Crop Company®", "Blade Energy Crops®", "Blade®" and "Skyscraper®" and other trademarks or service marks of Ceres, Inc. appearing in this Annual Report on Form 10-K are the property of Ceres, Inc. This Annual Report on Form 10-K contains additional trade names, trademarks and service marks of other companies. We do not intend our use or display of other companies' trade names, trademarks or service marks to imply relationships with, or endorsement or sponsorship of us by, these other companies.

This Annual Report on Form 10-K contains references to acres, hectares, gallons, liters, dry tons and kilograms. In the United States, blendstock fuels are typically measured and sold in gallons. In other parts of the world, the standard unit is liters. The following table sets forth the conversion factor between metrics.

1 Hectare	=2.471 Acres	
1 Gallon	=3.785 Liters	
1 Dry Ton	=907 Kilograms	*(Measurement commonly used to measure dry biomass for cellulosic biofuels and biopower)*

PART I

Item 1. ***Business***

Our Company

We are an agricultural biotechnology company selling seeds to produce dedicated energy crops – renewable bioenergy feedstocks that can enable the large-scale replacement of petroleum and other fossil fuels. We use a combination of advanced plant breeding and biotechnology to develop seed products that we believe address the limitations of first-generation bioenergy feedstocks, such as corn and sugarcane, increase crop productivity, reduce crop inputs and improve cultivation on marginal land.

Our largest immediate commercial opportunity is in Brazil where we market sweet sorghum hybrids that can be used as a “drop-in” feedstock to complement existing feedstock supplies and extend the operating season of Brazilian sugarcane-to-ethanol mills. Our dedicated energy crops can also be used for the production of second-generation biofuels and bio-based chemicals, including cellulosic ethanol, butanol, jet fuel, diesel-like molecules and gasoline-like molecules, from non-food biomass. Finally, utility-scale electric power can be generated from the biomass feedstocks grown from our seeds. Our upstream position in the bioenergy value chain allows us to be largely independent of the success of any particular conversion technology or end use.

Due to the nature of biotechnology, we believe other crops, such as corn, rice and soybean, can benefit from many of the traits and genetic technologies we are developing for dedicated energy crops, such as traits that provide drought tolerance. We have also generated many biotech traits specifically for cereal crops, such as rice, that increase grain yields and provide greater yield stability across different environments. Our strategy is to focus on genes that have shown large, step increases in performance, and whose benefits are maintained across multiple species. To date, our field evaluations have largely confirmed previous results obtained in greenhouse and laboratory settings, and we believe that based on these multiple confirmations, we have an industry leading biotech trait technology pipeline, with applications in our energy crops as well as other crops.

We believe that the strength of our technology has been validated by our receipt of multiple competitive grants and collaborations, including a United States Agency for International Development, or USAID, grant and one of the U.S. Department of Energy’s first Advanced Research Project Agency for Energy, or ARPA-E, grants in 2009, as well as a $137 million multi-year collaboration with Monsanto Company signed in 2002. We also have significant intellectual property rights to our technology platforms, traits and seed products. We have out-licensed a portion of our traits and gene technology to existing market participants and continue to pursue opportunities to out-license these technologies.

Commercial Evaluations of Our Sorghum Products in Brazil

Since 2010, we have completed various commercial-scale evaluations of our sweet sorghum products in Brazil with over 30 ethanol mills and mill suppliers. During this time, our seeds have been planted and harvested using existing equipment and fermented into ethanol without retrofitting or altering the existing mills. The remaining biomass from this industrial process has been combusted for electricity production using existing mill boilers. We believe these experiences have demonstrated the “drop-in” nature of our sweet sorghum products, and along with higher yielding products in our pipeline, will serve as the basis for expanded adoption of this product line as a feedstock for ethanol and power production in Brazil and other markets.

With industrial processing generally well established in Brazil, we believe that field performance – primarily yields of sugars that can be fermented to ethanol – will largely determine the scale and pace at which our current and future products will be adopted. Based on industry feedback, we believe that minimum average yields in the range of 2,500 to 3,000 liters of ethanol per hectare will be necessary to achieve broad adoption. We believe that at least two growing seasons will be required to fully demonstrate this yield range. To date, we have demonstrated on a limited scale that our products can achieve such yields within their area of adaptation, provided that our crop management protocols are followed and plantings receive adequate rainfall; however, further optimizations and additional hybrids will be needed to consistently achieve economically attractive yields across wide-area plantings.

For the 2012-2013 season, ethanol yields from our sweet sorghum products ranged from approximately 450 to 3,600 liters per hectare, according to mill and company calculations. Mills that followed our recommended crop management practices generally achieved the highest average yields. Lower yields were primarily due to deviations from our recommended crop management protocols, weather-related delays during planting and disease infection late in the growing season. Yield results were available from approximately two-thirds of the more than 30 mills that planted Ceres' hybrids; remaining mills reported incomplete results, did not complete the evaluation or chose not to report results.

For the 2013-2014 season, we expect to evaluate our hybrids at approximately 50 mills and mill suppliers. These plantings primarily consist of small or multi-hybrid evaluations designed to determine yield potential, identify the best performing hybrids for specific regions and demonstrate various crop management practices. Several of these mills are expected to plant larger evaluations. Total plantings of our sorghum products are expected to cover up to approximately 1,000 hectares for the 2013-2014 sorghum growing season compared to approximately 3,000 hectares for the previous season due primarily to a greater focus among mills on field performance, which can be determined at a smaller scale than evaluations needed for confirming industrial performance.

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Due in part to the variability in yields achieved in the 2012-2013 season, we have made a number of adjustments to our product development and go-to-market approach in order to improve crop performance and consistency, and to encourage adoption of our products. We are taking the following steps based on the experience we have gained to date:

- **Focus on high performing customers**. For the 2013-2014 sweet sorghum growing season, we have prioritized evaluations with leading mill groups and innovators;

- **Target favorable geographies.** Based on our experiences to date, we have targeted geographies and environments where our current generation of products have performed at their best;

- **Help mills improve on their agronomy execution.** We have hired additional technical development staff in Brazil and have identified several straightforward agronomic optimizations that can be implemented by the mills during the 2013-2014 growing season;

- **Expand technical development network in Brazil:** We have significantly expanded the number of locations and scope of field evaluations of our pre-commercial products and advanced breeding materials in Brazil in order to better position our future products among various geographies, growing conditions and production practices;

- **Rapidly develop and commercialize new products that provide higher yields, and therefore, provide a greater buffer for poor growing conditions or execution.** Since our first industrial-scale trials in 2010-2011, we have significantly increased yields of fermentable sugars, and expect to continue to develop and launch new and improved seed products. Based on experimental hybrids already in our product development pipeline, we believe that we can continue to increase yields at a rapid pace, target additional planting and harvest times and market niches and add other performance characteristics to our products; and

- **Maintain our competitive position.** Based on customer reports, Ceres' portfolio of sweet sorghum hybrids out-yielded competing products during the past two seasons at multiple locations where side-by-side comparisons were available. We expect to further differentiate our portfolio from competitors over the next one to two years with experimental products already in our pipeline.

Market Opportunity

The world continues to seek economically and environmentally sound alternatives to fossil fuel-based transportation fuels, chemicals and power. We believe bioenergy is one of the few viable replacements for fossil fuels, particularly petroleum. Unlike other renewable technologies, biofuels are intended to utilize existing vehicles and transportation fuel infrastructure. Similarly, biopower, unlike wind and solar power, can provide baseload and dispatchable generation of renewable electricity. Despite the potential of biofuels, first-generation biofuel feedstocks have

demonstrated their limitations in terms of scale, perceived competition with food production, net energy balance and dependence on government subsidies. Similarly, current sources of biomass, such as forestry residues and agricultural wastes, are limited in scale and are not optimized for use in bioenergy. They are also by-products derived from other processes and therefore subject to supply disruptions.

Our dedicated energy crops provide an attractive combination of high yield density, high net energy balances, low input requirements, the ability to grow on marginal land and, as a dedicated source of feedstock, the potential to be tailored for specific production and refining processes. As a result, we believe that dedicated energy crops will become a critical component for the growth of the biofuel, bio-based chemicals and biopower markets.

Brazil. Our largest immediate commercial opportunity is the Brazilian ethanol market, which currently uses sugarcane as its predominant feedstock. Due to the inherent limitations of sugarcane physiology and growth patterns, Brazilian mill operators typically obtain sugarcane that makes mill operation economically feasible approximately 200 days per year, based on a report issued by the Brazilian Ministry of Agriculture's crop forecasting agency, *Companhia Nacional de Abastecimento* (Conab), dated May 2012. We believe that mill operators are seeking alternatives that will allow them to increase production utilization of their existing mills beyond their current operating schedule in order to maximize their market opportunity. Moreover, the current crush capacity in Brazil will need to increase to meet expected domestic demand. The Brazilian government's energy research institute, *Empresa de Pesquisa Energética*, projects that ethanol demand will approximately double by 2022.

In Brazil, our sorghum products also can be used to generate electricity. Ethanol mills typically combust sugarcane bagasse, the leftover biomass from ethanol production, to generate onsite power. For mills connected to the grid, excess electricity production provides an additional source of revenue. Based on field and industrial evaluations with mills and other industrial companies, we believe that sorghum has a number of favorable attributes as a biopower feedstock and can be utilized as a supplementary source of biomass, especially during the offseason or periods of sugarcane bagasse shortages.

Cellulosic Biofuels and Bio-Based Chemicals. We expect petroleum consumption will be supplemented by products made from the conversion of non-food biomass into biofuels and bio-based chemicals. According to a 2011 report published by International Energy Agency, or IEA, biofuel production could reach approximately 112 billion gallons per year by 2030, up from 26 billion gallons in 2010. To meet these targets, the IEA believes feedstock production would need to increase to 150 million acres in 2030, up from 75 million acres in 2010. We believe quadrupling the volume of biofuels while only doubling the feedstock production acres will require higher yielding second-generation feedstocks.

Biopower in Other Geographies. Our dedicated energy crops can be used to generate electricity in existing solid-fuel power facilities, such as coal-fired generating plants. In the U.S., Europe and other geographies, the conversion of biomass to power has traditionally been fueled by bio-based waste products and residues from the paper and timber industries. We believe this practice has limited the size, location, efficiency and scale of biomass power generation because power producers cannot reliably secure long-term supplies of consistent quality feedstock. We believe we will see a material increase in demand for biopower in the event that additional renewable energy legislation is passed in the United States, Europe or other regions that requires a higher percentage of generation from low-carbon sources or provides equal production incentives for the co-firing of biomass with coal, as are currently available for wind and solar power. Based on feedback from partners and industry participants, we believe that our products can be cost competitive with existing biopower feedstocks and, assuming that our products meet various biomass quality specifications, can be used by existing utilities and power producers.

Food and Feed Crops. Approximately 420 million acres of biotechnology crops were planted globally in 2012, according to a March 2013 report published by the International Service for the Acquisition of Agri-Biotech Applications. The global market value of biotechnology crop seeds was approximately $15 billion, as reported in the same report. As people in many countries become more affluent, they tend to consume more of their dietary protein in the form of meat and dairy products, driving the demand for animal feed grains higher. Therefore, greater production of food, feed, fiber and fuel will require higher crop productivity levels among all crops over time. In order to continue the productivity gains made in many crops over the past 75 years, and to do so in a more sustainable manner, we believe that advanced breeding methods, and biotech traits, in particular, will be required to produce higher performance crops that make more productive use of cultivated land, as well as to develop more robust, stress-tolerant crops that can grow under more difficult conditions and on marginal land. Our belief is consistent with historical yield improvements achieved via plant breeding and the adoption of agricultural biotechnology.

Our Solutions

We believe that nearly all bioenergy and bio-based chemical applications will ultimately depend on high yielding, low-cost, low-carbon, scalable, reliable and sustainable sources of feedstock. We believe that our dedicated energy crops and traits have the potential to become the common denominator in a broad array of bio-based products, including ethanol, butanol, jet fuel, diesel-like molecules and gasoline-like molecules, as well as electric power and heat, and can enable the development of larger-scale processing facilities given the high yield density and conversion efficiency of dedicated energy crops.

“Drop-In” Products

In Brazil, there is a well-established biofuel industry. Our products are “drop-in” solutions because they can be planted, harvested and processed using existing agricultural equipment with little or no modification and are being developed to be “drop-in” for all conversion technologies using sugarcane or biomass feedstocks. In other countries, there are a

wide range of cellulosic to biofuel conversion technologies currently being developed; however none have any appreciable market share at this time. To explore this opportunity, we have conducted smaller trials using certain of our energy crops with numerous industry participants involved in cellulosic or advanced biofuels and biopower production. These tests have confirmed that biomass from our energy grasses can be converted and processed into various fuels or bio-based products, and have provided data we have used to further enhance our energy crops for use with these conversion technologies.

High Yield Density

Our dedicated energy crops are developed to produce high biomass or sugar yields per acre. For cellulosic biofuels, bio-based chemicals and biopower, energy grasses can yield significantly more dry tons per acre per year compared to agricultural residues and woody biomass. This maximizes the productivity of available land and shortens the collection radius for a conversion facility of a particular size. As harvest and transportation costs can be a significant element in the total cost of biomass, we believe our high yield density crops will facilitate the construction of larger processing facilities because more biomass could be collected from a defined area of land around the facility. In turn, these larger facilities will benefit from economies of scale, resulting in lower production and capital cost per gallon produced.

Dedicated to Bioenergy and Bio-based Chemicals

Unlike many other bioenergy feedstocks, our dedicated energy crops are currently not intended for other uses and are typically grown exclusively to be harvested as part of the bioenergy and bio-chemical value chain, creating a stable supply that will appeal to owners of conversion technologies who have invested significant capital in their infrastructure and therefore require reliable and cost-effective feedstocks. Additionally, we are working to tailor our products to improve the efficiency and reduce the cost of certain conversion technologies. We believe that our ability to deliver products such as these to our customers will facilitate adoption of dedicated energy crops over other forms of biomass.

Suited to Marginal Land

Our dedicated energy crops can grow in a broad range of environments, including those not well-suited for most food crops. For example, our switchgrass products need substantially less water and fertilizer than traditional row crops to grow to harvestable maturity. We are also developing biotech traits for multiple crops that provide salt tolerance, drought tolerance and greater nitrogen use efficiency. We believe that by facilitating the use of marginal land, our crops will create opportunities for landowners who previously could not use their land as productively.

Scalable to Meet Demand

Our energy crops are highly scalable, allowing us to match our production with growing demand for our seeds on relatively short notice compared to sugarcane, which can take several years to scale up commercially. Our products are generally seed-propagated, similar to row crops such as corn and soybean, which makes them cost-effective to plant on a large scale using existing seed planting equipment. Several of our products also have shorter growing cycles and can be rapidly cultivated as compared to other feedstocks, such as trees or sugarcane.

Competitive Strengths

We believe that we possess a number of competitive strengths that position us to become a leading provider of dedicated energy crop seeds and traits, including:

Commercial Products Available Today

We currently have a number of commercially available seed products, including sweet sorghum, switchgrass and high biomass sorghum. Our sweet sorghum hybrids have been successfully planted, harvested and processed into ethanol and power in Brazil at commercial scale. We believe that the experience of using our products as a “drop-in” feedstock for the past three growing seasons, as well as new higher yielding hybrids in our product portfolio, will serve as the basis for expanded adoption of this product line as a feedstock for ethanol and power production in Brazil and other markets.

Attractive Business Model

Seed businesses traditionally incur significant research and development expenditures and have long product development time lines, but benefit from a combination of high gross margins, low capital expenditure requirements and intellectual property protection. Once developed, seeds require little physical infrastructure or production cost to be replicated for sale. Seeds are typically priced, however, based on a share of the value created to the customer as opposed to their cost of production. In general, seed costs to a grower are a relatively small percentage of their total production cost, but the performance of those seeds is critical to the growers' economics. We believe we can position our business to take advantage of low production costs relative to the high value of our products to our customers.

Innovative R&D Technology Platforms

In order to maintain the strong position we have established with our combined strengths in our proprietary collection of energy crop parental lines, known as germplasm, and field-validated traits, we use our research and development expertise to continually improve our product offerings. To develop higher performing varieties and traits, we use several advanced research and development methods, including biotechnology, marker-assisted breeding and genomics. We believe that our innovative integrated breeding and biotechnology approach allows us to efficiently identify traits, effectively introduce these traits into crops, and more quickly commercialize new and improved seeds and traits for the market. We have both biotech traits and non-biotech traits. Our biotech traits for high biomass yield, nitrogen use efficiency, drought tolerance and altered flower development, among others, have been successfully evaluated in the field; however, they are still at least four years away from commercialization. We believe we were one of the first companies to implement the practice of developing biotech traits using two test species, rather than just one, which we believe allows us to more successfully select gene-trait combinations that enhance commercial crops. We believe that our ability to continue to apply our advanced research and development methods will enable us to further enhance our proprietary germplasm and traits portfolios going forward.

Extensive Proprietary Portfolios of Germplasm and Traits

While many companies have developed portfolios of germplasm or traits, we believe we are one of the only companies focused on dedicated energy crops that has large portfolios of both field-validated traits and germplasm, which includes thousands of specimens and breeding lines, as well as multiple pools of regionally adapted germplasm spanning northern temperate to tropical climates. We have also identified to date numerous genes and their relatives from different species that significantly enhance agriculturally relevant traits. Having both germplasm and field-validated trait portfolios allows us to leverage the synergies created by combining the two and facilitates innovation in a way that would not be possible with germplasm or traits alone. We believe new market entrants would need to cultivate several generations of germplasm to achieve performance equivalent to our current product portfolio, by which time we believe we will have further evolved our germplasm. Therefore, we believe our proprietary position would be difficult and time-consuming to replicate. We also believe that we have established a strong intellectual property position in plant genes, traits and energy crop germplasm. As of November 15, 2013, we owned or had exclusive licensed rights to approximately 85 issued patents and approximately 120 pending patent applications in the United States and in various foreign jurisdictions.

Management Team with Significant Industry Experience

Our Chairman, Walter De Logi, is one of the founders of Ceres. Dr. De Logi and Richard Hamilton, our Chief Executive Officer, have been with Ceres for 17 and 15 years, respectively, and have extensive experience in the field of agricultural biotechnology. Our experienced management team possesses a deep understanding of a variety of agricultural, chemical and industrial biotechnology businesses, including the seed industry, as well as our regional markets of Brazil, the United States and Europe. Our management team also includes top scientists and industry experts, some of whom have served in leadership roles at large, multinational corporations and have served on advisory committees for the U.S. Department of Energy.

Our Strategy

Our objective is to be the leading provider of dedicated energy crop seeds and traits to the renewable energy industry, including first-generation biofuels, such as ethanol, as well as cellulosic biofuels, biopower and bio-based chemicals. We also plan to pursue other opportunities to leverage our traits and genetic technology platforms. Key elements of our business strategy include:

Expand Our Presence in Brazil

Brazil represents our largest immediate commercial opportunity and we have prioritized both product development and commercial resources for this market. Since our first industrial-scale trials in 2010-2011, we have significantly increased yields of fermentable sugars, and expect to continue to develop and launch new and improved seed products. We also continue to build commercial relationships directly with ethanol mills and mill suppliers. For the 2013-2014 sweet sorghum growing season, we have prioritized evaluations with leading mill groups and innovators. We also intend to expand our product development network with ethanol mills and other industry participants interested in, among other objectives, gaining experience with sorghum, determining yield potential and identifying specific products for their growing conditions. We believe the adoption of sweet sorghum in Brazil can follow similar rapid adoption curves seen for other seed and agricultural innovations. Our belief is based on the drop-in nature of our sweet sorghum products and industry feedback which indicates that rapid adoption can occur once mills reliably achieve economically attractive yields with our products.

Collaborate with Leading Companies to Develop the Market for Cellulosic Biofuels

We plan to play a significant role in the second-generation biofuels and bio-based chemicals market, which is developing more slowly than the industry originally anticipated, but that we believe will represent a significant opportunity. We are continuing to adjust the pace and nature of our research activities with these extended timelines in mind. As the industry develops, we intend to collaborate with leading cellulosic biorefining companies, technology providers and project developers to analyze feedstock supply plans and to produce optimized feedstocks that are tailored to meet the specifications of existing and new refining technologies.

Expand Our Business into New Markets

We intend to market our Blade Energy Crops brand as a symbol of quality, innovation and value across multiple biofuel, bio-based chemicals and biopower markets in a broad range of climates and geographies. We intend to use our large portfolios of field-validated traits and germplasm, combined with our advanced technology platforms, to develop products for a wide variety of niches and seize upon future market opportunities, regardless of the fuel or chemical molecule (e.g., ethanol, butanol, farnesene, biogasoline, biodiesel, biocrude), biochemical (e.g., bioplastics, lubricants) or engine choice (e.g., all-electric, E85, E15, diesel, hybrid, plug-in hybrid).

Build New Relationships and Enhance Established Collaborations in the Global Biopower Market

We believe that our switchgrass, high biomass sorghum and miscanthus crops can be used in power generation generally, and in particular, for co-firing with coal using the existing power generation infrastructure. To date, we have engaged in field trials of our energy crops with utility companies and independent power producers. We intend to cultivate collaborations with new parties, particularly those in Europe where we believe the market opportunity for biopower is more established today and the market need is more immediate in light of existing government regulations. For instance, field evaluations were commenced recently with two leading power companies in the U.K and Europe via our germplasm partner in the U.K. and an industry consortium.

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Continue Innovation and New Product Development

We are continuing to develop innovative solutions using a broad range of technological tools, including genomics, biotechnology and proprietary bioinformatics in order to produce crop varieties with improved yields and other performance characteristics. We believe we can accomplish these goals by finding innovative ways to utilize and combine traits and germplasm to further enhance our products. We will also continue to develop varieties of seeds to meet the specific needs of growers in different geographic regions. For example, we have identified traits that will help optimize results for growers located in geographies with varying day lengths, rainfall, temperatures and soil composition (e.g., salt, aluminum and nitrogen).

Pursue Additional Outlets for Our Technology and Genes

We intend to pursue additional outlets for our genetic technology and genes, including out-licensing opportunities with existing seed industry participants. For example, we believe other crops, such as corn, rice and soybean, can benefit from many of the traits and genetic technologies we are developing for dedicated energy crops, such as traits that provide drought tolerance. We have also generated many biotech traits specifically for cereal crops such as rice that increase grain yields and provide greater yield stability across environments.

Continue to Build Our Intellectual Property Portfolio

We believe we have established a strong intellectual property position in plant genes, traits and energy crop germplasm, based on the nature, size and filing dates of our patent portfolio and plant variety protection certificates. We believe we are one of the few companies focused on dedicated energy crops that have this combination of intellectual property assets. We use our integrated technology platforms to continually improve our products and develop innovations that will further strengthen our intellectual property position.

Our Technology Platforms

Our integrated technology platforms are a combination of existing genetic assets, specifically germplasm and traits, and competences in genomics and gene mapping, biotechnology and bioinformatics. Integration of these platforms allows us to improve our existing genetic assets as well as develop and commercialize new products from them.

We believe we are one of the only companies focused on dedicated energy crops that has large portfolios of both field-validated traits and germplasm, which includes thousands of specimens and breeding lines, as well as multiple pools of regionally adapted germplasm spanning northern temperate to tropical climates. We have also identified to date numerous genes and their relatives from different species that significantly enhance agriculturally relevant traits. Having both germplasm and field-validated trait portfolios allows us to leverage the synergies created by combining the two and facilitates innovation in a way that would not be possible with germplasm or traits alone.

We believe that our innovative integrated breeding and biotechnology approach allows us to efficiently identify traits, effectively express these traits in crops, and more quickly commercialize new and improved seeds and traits for the market.

Germplasm

We believe we have the most comprehensive germplasm collections for our dedicated energy crops. Our belief is based on the diversity and nature of the entries we have and how well they have been evaluated and measured and cataloged. Germplasm comprises collections of parental lines and other genetic resources representing 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 plant breeding programs.

Our early entry into the energy crop industry has allowed us to acquire access to valuable germplasm through strategic collaborations with leading institutions. We believe our competitors would need to cultivate several generations of germplasm to achieve performance equivalent to our current product portfolio, by which time we will have further evolved our germplasm. Therefore, we believe that we have a strong proprietary position that would be difficult and time-consuming to replicate. We are currently involved in three major germplasm development collaborations, each with a history of successful research and germplasm development in an energy crop. When we sell varieties developed during such collaborations, or based on the results of such collaborations, we will typically pay our collaborators royalties on net sales of such varieties.

Traits

We are able to further improve the quality of our future product offerings by adding our proprietary traits to our germplasm collections. The majority of our traits are developed through biotechnology, also known as genetic engineering. Biotechnology allows us to precisely add traits not readily achievable through conventional breeding methods. In most cases, the same trait can be added to multiple crops with similar effect. In some instances, a gene introduced through biotechnology may confer more than one beneficial trait, such as salt tolerance and drought tolerance. Our strategy is to focus on genes that have shown large, step increases in performance, and whose benefits are largely maintained across multiple species.

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We believe we were one of the first companies to implement the practice of developing biotech traits using two test species, rather than just one, which allows us to more successfully select gene-trait combinations that enhance commercial crops. Our current portfolio includes genes that have been shown to substantially increase sugar levels or biomass growth per plant as well as genes that have been shown to increase biomass under normal and reduced levels of nitrogen fertilizer. We have genes that allow plants to use water more efficiently and/or recover from water deficits more readily. We also have genes that have been shown to provide tolerance and enhanced recovery to both acute and prolonged salt stress, as well as withstand toxic levels of aluminum in the soil. In addition, we are developing genes that have demonstrated enhanced conversion of biomass to fermentable sugars and genes that regulate flower development.

Our biotech traits are at various stages of development in our pipeline. We are currently evaluating their performance in various target crops primarily through replicated, multi-year field evaluations. These evaluations are designed to validate the function of the gene and measure the performance of the biotech trait in a specific crop. To date, our field evaluations have largely confirmed previous results obtained in greenhouse and laboratory settings.

The commercial development of biotech traits in commercial crops is a multi-year process. Following transformation, when the selected gene is inserted in a target crop, the resulting plants are evaluated in the greenhouse for one to two years, and then in the field to confirm results for two to four years. Following field trials, specific gene-trait combinations are typically selected and, if required, submitted for regulatory approval, or deregulation, which has historically been a multi-year process in the United States and Brazil. Assuming these averages, we believe that we could introduce our first regulated biotech trait or traits to the market in 2018 at the earliest.

We also develop non-biotech traits, including Skyscraper, a commercially available trait that provides a significant increase in biomass yields. Since Skyscraper was identified and developed using molecular marker technology, we have been able to rapidly incorporate it into our elite breeding lines and commercial products.

We intend to price our traits based on the added value they create, which can vary by crop and geography. For our biotech traits, we are considering various pricing models, including separate annual trait fees per acre as well as blended seed and trait prices. For our commercial Skyscraper trait, a per-bag trait fee is included in the seed price. In row crops, we have licensed and intend to license our traits to existing market participants. These licensing agreements are expected to vary by crop, geography, the nature and economic benefit of the trait, and how well advanced the trait is within our pipeline. Future payments to us may be based on a percentage of sales or other performance metrics or milestones.

Research and Development Programs

In order to maintain the lead we have established through our combination of superior germplasm and field-validated traits, we have developed research and development expertise that we believe will allow us to continue to improve our offerings over time. To develop higher performing seeds and traits, we deploy a variety of research and development methods and tools, including genomics, conventional and marker-assisted breeding, agronomy and other genomics-based technologies.

For the fiscal years ended August 31, 2011, 2012 and 2013, we spent $19.0 million, $19.2 million and $16.4 million, respectively, on research and development, with the main emphasis on breeding and traits.

Genomics

Plant genomics involves the large-scale, simultaneous study of large numbers of genes, their effects and their interactions. One of our strengths in genomics involves our ability to organize the genetic data we amass into actionable information via proprietary relational databases, software and algorithms. In order to capitalize upon our internal catalog of genetic information as well as information in the public realm, we developed our own proprietary software, including our Persephone genome viewer software, which serves as an important tool for locating, mapping and annotating genetic information in plants. This software program has been non-exclusively licensed to Syngenta Biotechnology, Inc.

We believe that both our technological capabilities and proprietary knowledge base in the field of plant genomics are highly advanced, and their application to both our breeding program, through the development of trait-linked molecular markers, and our trait development program provides us a substantial competitive advantage. In general, we have focused our research efforts on determining gene function, gene regulation and finding which genes enhance desirable traits. In addition to identifying novel gene-trait combinations, our genomics tools allow us to work with large groups of genes and complex biological processes controlled by multiple genes.

Conventional and Marker-Assisted Breeding

Plant breeding is the act of bringing together specific parent plants to produce a new “offspring” plant. This “cross,” as plant breeders call it, creates a new plant that will contain a mixture of the characteristics of its parents. The offspring are tested under various conditions to determine which has the superior combination of desired attributes. Further improvements are made by mating and continuing selection of superior parents and offspring through succeeding generations. Plant breeding allows researchers to identify plants with the most favorable combination of desired characteristics to serve as both parental lines and products.

In addition to conventional plant breeding, we believe that our genomics expertise makes the identification of proprietary molecular markers more direct and more comprehensive, which allows us to select key crop characteristics more rapidly and accurately than conventional plant breeding alone. Marker-assisted breeding integrates molecular biology and information systems with plant breeding to identify and flag important genetic sequences so that they can be readily found in seeds or plant tissue at any stage of plant development. This platform allows us to track and select the most effective combination of genes, increase the number of progenies and breeding lines created at early stages in the breeding program, and cull them using marker-based selection and thereby making greater gains per breeding cycle. Markers are especially useful when seeking to combine multiple non-biotech traits into elite commercial lines.

Agronomy

The performance of plant varieties and traits is influenced by the growing environment, which includes climate, day length, soil quality, pests, length of the growing season and crop management practices. Our network of field trials extends across numerous hardiness zones and regions. This network provides regional performance data and market fit information to support our research and commercialization efforts. In Brazil, for the 2013-2014 sorghum growing season, we have significantly expanded the number of locations and scope of field evaluations of our pre-commercial products and advanced breeding materials in Brazil in order to better position our future products among various geographies, growing conditions and production practices.

Our Current Product Lines and Product Pipeline

We believe that a portfolio of energy crops will be required to produce biofuel, biopower and bio-based chemicals at greater scale than today. The mix of crops will be heavily dependent upon geographic and climatic considerations, soil quality, storage characteristics and harvest timing, among other considerations.

The following table summarizes our product lines and product pipeline:

Crop	Status	Initial Geography	Primary Market Opportunity	Key Advantages
Sorghum, Sweet	Commercial	Brazil	Existing mills for ethanol and onsite biopower	Season extension; fast growing; quick scale up; low water usage
Sorghum, High Biomass	Commercial	U.S. and Brazil	Existing mills for onsite biopower; cellulosic biofuels and bio-based chemicals; utility-scale biopower	High yields; fast growing; low water usage

Switchgrass	Commercial Seed-propagated	U.S. and Europe	Cellulosic biofuels and bio-based chemicals; utility-scale biopower	High yields; low water usage; perennial crop
Miscanthus	varieties under development	U.S. and Europe	Cellulosic biofuels and bio-based chemicals; utility-scale biopower	High yields; highly efficient, perennial crop

Sweet Sorghum

Sweet sorghum is a type of sorghum that accumulates free sugars in its stalk much like sugarcane. It is sown by seed, grows faster than sugarcane, and typically requires substantially less water and nitrogen fertilizer than sugarcane to grow to harvestable maturity. In Brazil, sweet sorghum can be planted from October through January, and harvested from February to May, or later if conditions permit. This complements sugarcane, which is grown year-round, but harvested from April to December depending on weather and market conditions. In practice, sweet sorghum juice is extracted through crushing in existing sugarcane equipment, and then fermented to fuel. The leftover biomass, called bagasse, is combusted for biopower like sugarcane bagasse. Because sweet sorghum plants mature more quickly than sugarcane, and reach optimal sugar levels at different times of the year, we believe existing sugar-to-ethanol mills can extend their operational season through the use of our sweet sorghum product by up to 60 days. Our current sweet sorghum product line consists of improved, proprietary seed varieties and hybrids developed through conventional and marker-assisted breeding. We are developing sweet sorghum hybrids that, among other objectives, provide greater yield potential and yield stability, offer higher sucrose purity, maintain peak sugar levels longer and have greater adaptation to various growing conditions and harvest times.

High Biomass Sorghum

High biomass sorghum is a type of sorghum which is developed and grown primarily for enhanced biomass yield potential as opposed to sugar or juice content. High biomass sorghum is well suited for the generation of renewable electric power and the creation of cellulosic biofuels. Like other types of sorghum, high biomass types are seed propagated, and generally require less water and nitrogen fertilizer than Brazilian sugarcane and U.S.-grown corn. There are many similarities with sweet types and, in fact, some hybrids can be utilized for either purpose, depending on when they are planted and harvested, and how the crop is managed. Our current high biomass sorghum product line consists of improved hybrids developed through conventional and marker-assisted breeding. We are developing hybrids that offer, among other objectives, additional increases in biomass.

Switchgrass

Switchgrass is a perennial grass indigenous to North America that tolerates a wide range of environmental conditions and offers high biomass yield potential compared to many other perennial grasses and crop plants. It generally requires substantially less water and nitrogen fertilizer than corn, and can grow under semi-arid conditions. Like sorghum, switchgrass is seed propagated. As a perennial, switchgrass is generally not harvested for sale during the first year when the crop is being established. A properly managed stand of switchgrass may persist for a decade. However, we believe that producers will likely choose to upgrade to a new variety in approximately 5 to 7 years as new generations of switchgrass seeds with even higher yields or more desirable characteristics become available. Our current switchgrass products have demonstrated higher biomass yields on average over comparable varieties depending on the variety and trial location. In our development pipeline, we have switchgrass varieties that can offer additional increases in biomass, including the first hybrid switchgrass developed for bioenergy. These pre-commercial products represent an important step in switchgrass plant breeding and have shown significant yield increases over our current products.

Miscanthus

The Miscanthus genus includes several perennial species that have potential as dedicated energy crops. The variety adopted in the United States and Europe to date is a sterile hybrid of two miscanthus species. While biomass yields for this variety may exceed those of switchgrass within its region of adaptation, very large-scale production is not commercially feasible at this time due to prohibitive establishment costs and propagation speed. Through our collaboration with the Institute of Biological, Environmental, and Rural Sciences of Aberystwyth University in Wales, U.K., or IBERS, and the Sustainable Bioenergy Centre of the U.K.'s Biotechnology and Biological Sciences Research Council (BBSRC,) we are developing seed-propagated varieties that have the same high-yielding attributes of comparable vegetatively propagated miscanthus hybrids, yet with establishment costs and propagation speed more comparable to other energy crops. Extending the region of adaptation is another focus area.

Row Crops

Due to the conservation across species of mechanisms underlying traits, other crops can benefit from many of the biotech traits we have developed for energy crops. This provides us with an additional outlet for our technology and genes, and mitigates the cost and risk of trait development. We have chosen primarily to be a technology provider or a trait provider to companies in this sector, rather than a direct producer and marketer of seeds.

We have already generated many biotech traits specifically for cereal crops, such as rice, that increase grain yields and provide greater yield stability across environments. Some of these have demonstrated double-digit percentage yield increases in rice, relative to average annual yield improvements for grain of approximately 1%, as reported by Economic Botany. In rice, our drought tolerance genes have also outperformed a competitor's biotech drought trait in research evaluations. We have inferred from the trial data that our drought genes could maintain grain and biomass yields under the type of drought conditions that commonly afflict crop production. Moreover, in India, rice evaluations completed in November 2013 have confirmed that certain of our genes provided improved yield stability under drought and other stress conditions. These genes are currently being introduced into breeding lines by our commercialization partner in India. In China, field evaluations of several our biotech traits in corn have demonstrated significantly higher grain yields under drought conditions. The company intends to seek out-licensing opportunities for certain of these traits in corn after further evaluations next year. Based on these and similar results, we believe we have an industry leading biotech trait technology pipeline, with applications in numerous crops.

Seed Production and Operations

The production of commercial-scale quantities of seeds requires the multiplication of seeds through a succession of plantings and seed harvests. For perennials, like switchgrass, an established stand can produce saleable seed for multiple years. Annual seed crops like sorghum are planted for each seed harvest. Healthy seeds can remain saleable for several years if stored under optimal conditions. We produce commercial seed either on leased land managed by us or with contract seed producers. In the United States, we receive, condition, treat, package and warehouse our seed grown in the northern hemisphere at our seed warehouse and order fulfillment center in Amarillo, Texas. We anticipate that we will be able to warehouse and process up to 8 to 10 million pounds of seed annually at this facility, or about 1.5 million or 2 million acres of commercial switchgrass or sorghum production.

In Brazil and other countries in South America, we contract with farmers to produce our seeds. In addition, we work with several third parties who have complete production and packaging capabilities to complement our own production capabilities. All of these seeds are processed, packaged and warehoused by third parties who are experienced in these functions. This method of production is able to supply enough seeds to plant up to 250,000 hectares of commercial sweet sorghum. In the event we begin to generate orders in this range, we plan to invest in our own facilities to be able to handle production amounts capable of planting 2 million or more hectares of commercial sweet sorghum.

Sales and Marketing

We market our seed varieties and traits under the trade name Blade Energy Crops, or Blade. We are positioning Blade in the marketplace as a premium brand that represents the latest technology in energy crops. As a result, we price our proprietary products based on their added value, and not on production costs. Our seed prices are determined based on a series of complex considerations, including the best alternative use of land and perceived added value to growers and mill owners. Our pricing philosophy is to share a portion of the added value we create w