YIELD10 BIOSCIENCE, INC.

FORM 424B3

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PROSPECTUS

YIELD10 BIOSCIENCE, INC.
570,784 SHARES OF COMMON STOCK

This prospectus relates to the resale of up to 570,784 shares of our common stock issuable upon exercise of certain outstanding warrants.

These shares will be resold from time to time by the entities listed in the section titled "Selling Security Holders" beginning on page 45, which we refer to as the selling security holders or Selling Stockholders. The shares of common stock offered under this prospectus by the selling security holders are issuable upon exercise of warrants issued pursuant to the Securities Purchase Agreement by and among Yield10 Bioscience, Inc. and the selling security holders, dated as of July 3, 2017 (the "Purchase Agreement"). We are not selling any securities under this prospectus and will not receive any of the proceeds from the sale of securities by the selling security holders.

The selling security holders may sell the shares of common stock described in this prospectus in a number of different ways and at varying prices. We provide more information about how a selling security holder may sell its shares of common stock in the section titled "Plan of Distribution" on page 48. We will pay the expenses incurred in registering the securities covered by the prospectus, including legal and accounting fees.

Our common stock is traded on The NASDAQ Capital Market, or NASDAQ, under the symbol "YTEN". On August 30, 2017, the last reported sale price of our common stock was $2.60 per share.

AN INVESTMENT IN OUR COMMON STOCK INVOLVES RISKS. SEE THE SECTION ENTITLED "RISK FACTORS" BEGINNING ON PAGE 8.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined if this prospectus is truthful or complete. Any representation to the contrary is a criminal offense.

The date of this prospectus is August 31, 2017

TABLE OF CONTENTS

Prospectus Summary	1
The Offering	7
Risk Factors	8
Special Note Regarding Forward-Looking Statements	21
Selected Financial Data	21
Use of Proceeds	22
Market for Our Common Stock	22
Dividend Policy	22
Business	23
Principal Stockholders	43
Selling Stockholders	45
Plan of Distribution	48
Description of Our Capital Stock	50
Disclosure of Commission Position on Indemnification for Securities Act Liabilities	54
Legal Matters	54
Experts	54
Where You Can Find More Information	54
Incorporation of Certain Documents by Reference	54

You should read this prospectus and any applicable prospectus supplement before making an investment in the securities of Yield10 Bioscience, Inc. See "Where You Can Find More Information" for more information. You should rely only on the information contained in this prospectus or a prospectus supplement. The Company has not authorized anyone to provide you with different information. This document may be used only in jurisdictions where offers and sales of these securities are permitted. You should assume that information contained in this prospectus, or in any prospectus supplement, is accurate only as of any date on the front cover of the applicable document. Our business, financial condition, results of operations and prospects may have changed since that date. Unless otherwise noted in this prospectus, "Yield10 Bioscience," "Yield10," "the Company," "we," "us," "our" and similar terms refer to Yield10 Bioscience, Inc.

Smaller Reporting Company – Scaled Disclosure

Pursuant to Item 10(f) of Regulation S-K promulgated under the Securities Act of 1933, as indicated herein, we have elected to comply with the scaled disclosure requirements applicable to "smaller reporting companies," including providing two years of audited financial statements.

PROSPECTUS SUMMARY

This summary highlights some information from this prospectus. It may not contain all the information important to making an investment decision. You should read the following summary together with the more detailed information regarding our Company and the securities being sold in this offering, including "Risk Factors" and other information incorporated by reference herein.

Business Overview

Yield10 Bioscience, Inc. is an agricultural bioscience company focusing on the development of new technologies to enable step-change increases in crop yield to enhance global food security. We consider 10-20 percent increases in crop yield to be step-change increases. According to a United Nations report, food production must be increased by over 70 percent in the next 35 years to feed the growing global population, which is expected to increase from 7 billion to more than 9.6 billion by 2050. During that time period, there will be a reduction in available arable land as a result of infrastructure growth and increased pressure on scarce water resources. Harvestable food production per acre and per growing season must be increased to meet this demand.

Yield10 is using two proprietary advanced biotechnology trait gene discovery platforms to improve fundamental crop yield through enhanced photosynthetic carbon capture and increased carbon utilization efficiency to increase seed yield. These platforms are based on the principle that plants which capture and utilize carbon more efficiently will enable more robust crops capable of increased seed yield. Yield10 is working to develop, translate and demonstrate the commercial value of new genetically engineered yield trait genes, identified in our discovery platforms, in major crops and to identify additional genome editing targets for improved crop performance in several key food and feed crops, including canola, soybean, rice and corn. Yield10 Bioscience is headquartered in Woburn, Massachusetts and has an additional agricultural science facility with greenhouses in Saskatoon, Saskatchewan, Canada.

Yield10 Bioscience was founded as Metabolix, Inc. in 1992 and originally focused on redirecting carbon flow in living systems to produce bioplastics and biobased chemicals. In 1997, Metabolix started a crop science research program with the intent to produce the microbial bioplastic polyhydroxybutyrate ("PHB") in high concentration in the seeds of oilseed crops or in the leaves of biomass crops where it acts as an additional carbon sink or carbon store. As we made progress on our crop program, we learned that the rate of carbon supply from photosynthesis was a bottleneck to the effective utilization of carbon, and we initiated a series of exploratory programs to develop new technologies to fundamentally increase the plants' ability to fix and capture more carbon. These early research programs resulted in the establishment of our crop yield trait gene discovery platforms and the identification of a series of promising proprietary yield trait genes.

Based on encouraging early results from these gene discovery programs, we refocused our crop science efforts to yield improvement in major food and feed crops in 2015 and rebranded the effort as Yield10 Bioscience. In 2016, we sold our biopolymers assets and restructured the Company around our crop science mission. In January 2017, we completed this transition and changed the name of the company to Yield10 Bioscience, Inc. We are developing proprietary, breakthrough plant biotechnologies to improve crop productivity and seed yield based on two proprietary discovery platforms:

- the "Smart Carbon Grid for Crops Platform" — in which we are working to eliminate bottlenecks in plant photosynthesis and carbon metabolism by harnessing new metabolic capabilities from non-plant systems including microbes and algae; and
- the "T3 Platform" — in which we have identified three powerful global regulator genes in plants which control complex regulatory networks and gene cascades resulting in step-change increases in photosynthetic carbon fixation and biomass yields. Molecular genomic analysis of high yielding plants developed using these genes has identified a series of additional crop trait gene targets. Genetic engineering of this new series of crop trait gene targets can be accomplished using only

DNA sequences from the crop target species or through genome editing, potentially reducing regulatory costs and timelines.

In our work to date, our team has demonstrated step-change yield increases in Camelina seed production and in switchgrass biomass production. We are currently progressing the development of our lead yield trait genes in canola, soybean, rice and corn to provide step-change crop yield solutions for enhancing global food security.

With these two platforms, we have established a series of proprietary trait genes to enhance carbon dioxide capture and fixation in both C3 and C4 photosynthetic plants for yield improvement. C3 photosynthesis, the simplest type of plant photosynthetic system, exists in most agricultural crops used for human consumption, and includes canola, soybean, rice, wheat and potato. C4 photosynthesis is a more complex system. Plants using the C4 system have evolved an additional distinctive cellular structure, in which carbon dioxide is concentrated for the main photosynthesis enzyme RUBISCO through a series of metabolic and metabolite transports known as the C4 pathway. Corn and sugarcane are part of the C4 photosynthetic plant family. In general, C4 photosynthetic plants have up to five times inherently higher plant yield than plants in the C3 photosynthetic family. This difference in plant yield is a result of evolution, which has led plant scientists to consider the possibility that new genetic enhancements can be created to fundamentally improve the photosynthetic system in C3 plants.

Over the last 21 months, we have consolidated our crop science intellectual property position with approximately ten patent filings in prosecution, identified additional novel gene targets for improving crop performance and yield through genetic engineering or genome editing, formed a scientific advisory board with leaders in plant science, conducted several greenhouse studies and conducted our first Fast Field Testing of traits from our “Smart Carbon Grid for Crops” discovery platform. We have reported encouraging data for our lead yield trait gene, C3003 in Camelina from greenhouse and field tests and are conducting additional studies in Camelina, canola, soybean and rice.

In 2017, we are intensifying our efforts to evaluate genome editing targets for improving seed yield, seed composition and/or biomass yield in commercial crops. We believe that strategies based on C3004, a trait that complements C3003, and on C3007, an oil content boosting trait that we have an option to in-license, have the potential to provide a path to commercialization based on achieving “nonregulated” status from USDA-APHIS. If this status is achieved, this could significantly reduce the time and cost of launching new yield traits. These traits also complement the work we are doing with C3003 in oilseed crops, adding to a portfolio of yield traits targeting oilseed crops. In addition, we are advancing research with a number of genome editing targets from the C4000 series of traits, which could provide new strategies to increase biomass yield in forage and other crops.

In our 2017 field test program, we are testing both first and second generation versions of C3003 in Camelina. We are also testing first generation C3003 in canola, an important North American oilseed crop. Key agronomic and growth parameters of the plants will be monitored throughout the field test and yield data including seed weight, seed size and oil content will be measured and analyzed as compared to control plants. In field tests conducted in 2016, C3003 produced up to a 23 percent increase in seed yield (by weight) in the best performing Camelina lines and smaller seed size. The overall yield increase was due to a large increase in the number of the smaller seeds produced. Stable Camelina seed lines expressing the second generation yield trait gene C3003 were grown and evaluated in a greenhouse study. The best performing Camelina line produced up to a 24 percent increase in seed yield (seed weight per plant), while maintaining a typical individual seed weight compared to control plants. Results from greenhouse studies are indicative of trends, and that further field tests will be needed to verify the results. Because soybean is the leading North American oilseed crop, we accelerated deployment of both first and second generation C3003 into soybean last year and remain on track to obtain initial greenhouse data in late 2017 or early 2018.

In June 2017, we announced that planting has been completed at study sites in Canada for field tests to evaluate C3003 in Camelina and canola. Following completion of field tests in the fall of 2017, we plan to report results of the study in the fourth quarter of 2017. In previous studies, C3003 has shown promising improvements in oilseed yield. Results from our prior studies with C3003 suggest that it may provide an entirely new strategy to improve seed yield in oilseeds and other C3 photosynthetic crops by bringing in new metabolic functionality from non-plant systems.

Also in June 2017, we submitted an "Am I Regulated?" letter to USDA-APHIS's Biotechnology Regulatory Services (BRS) to confirm that our genome-edited Camelina plant line developed using CRISPR genome editing technology for increased oil content does not meet the definition of a regulated article under 7 CFR Part 340 regulations. Together with our wholly owned Canadian subsidiary, Metabolix Oilseeds, Inc., we developed the genome edited Camelina line. Researchers used the CRISPR genome editing tool to inactivate an enzyme expected to increase seed oil content in Camelina, a trait we have designated as C3008. There are three copies of this gene in the Camelina genome, and complete editing of all copies was achieved. This trait may have further applications when used in combination with other traits that we are developing that are expected to increase seed oil content, including C3007.

In the second quarter of 2017, our wholly owned Canadian subsidiary, Metabolix Oilseeds, Inc., signed a two-year collaboration with the National Research Council of Canada to improve yield and drought tolerance in wheat. The collaboration will focus on new trait discovery in wheat using our T3 Platform technology. Under the collaboration, we will provide access to our proprietary C4000 series of traits, which include global regulatory genes, or global transcription factors ("GTFs"). We have shown that these GTFs have the potential to significantly increase photosynthesis and yield in certain crops. Wheat is a major global staple food crop where significant yield increases could play a major role in feeding the world.

Crop yield is the primary driver of the agriculture value chain. Yield can make the difference between a profitable season and losses for growers. As such, technologies to protect crop yield or increase it are the primary determinant of the seed buying decision by growers at the start of the season. This in turn determines both revenue and market share for the major seed players. Yield10's goal is to discover, optimize and translate our yield trait gene innovations into major food and feed crops and demonstrate the economic value to growers and seed companies. In all cases our trait genes will be introduced using genetic engineering technologies either to introduce new genes, to introduce additional copies of genes from the same crop species with modified regulatory sequences from that crop species or by using genome editing technologies to reduce or eliminate the function of specific plant gene targets in individual crops. The method by which we deploy our yield trait genes has significant regulatory implications, which, in turn can affect the timelines and cost of their commercialization. We intend to create high-value assets in the form of proprietary yield gene technologies and to de-risk these assets by progressing them along the path to commercial development with increasingly larger scale field tests and multi-site field trials in major crops. We are deploying our yield trait genes into canola, soybean and corn. We are engineering these traits into the major crops with the goal that they will be suitable for the regulatory approval process and in crop varieties (germplasm) such that our traits can be readily introduced into the industry's elite crop lines by plant breeding.

Risks Affecting Us

Our business is subject to a number of risks and uncertainties that you should understand before making an investment decision. For example, we have a history of net losses and our commercial products may not achieve commercial success. Furthermore, our technologies are in the early stages of development and we may never commercialize a technology or product that will generate meaningful, or any, revenues. A portion of our revenue to date has been government grants. Over the next several years, we expect our revenue to shift from being derived primarily from collaborations and government grants to royalties based on sales of seed by our licensees containing Yield10 traits. As of June 30, 2017, we had an accumulated deficit of $338.1 million. With the exception of 2012, we have incurred losses since our inception. We expect to have significant losses and negative cash flow for at least the next several years, as we incur additional costs and expenses for the continued development of our technology, including the ongoing expenses of research, development, commercialization and administration. The Company held unrestricted cash and cash equivalents of $3.0 million at June 30, 2017. Our present capital resources are not sufficient to fund our planned operations for a twelve month period, and therefore, raise substantial doubt about our ability to continue as a going concern. As a result, our independent registered public accounting firm included an explanatory paragraph in its report on our financial statements as of and for the year ended December 31, 2016 with respect to this uncertainty. Additional risks are discussed more fully in the section entitled "Risk Factors" following this prospectus summary. These risks include, but are not limited to, the following:

- We have a history of net losses and our future profitability is uncertain.
- We will be required to raise additional funds to finance our operations and remain a going concern; we may not be able to do so when necessary, and/or the terms of any financings may not be advantageous to us.
- Raising additional funds may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies.
- We have recently changed our corporate strategy to focus on the crop science industry, and our technologies in this area are at a very early stage of development. We may never commercialize a technology or product that will generate meaningful, or any, revenues.
- A portion of our revenue to date has been generated from government grants; continued availability of government grant funding is uncertain and contingent on compliance with the requirements of the grant.
- Our government grants may subject us to government audits, which could expose us to penalties.
- Our crop science product development cycle is lengthy and uncertain and will depend heavily on future collaborative partners.
- Our crop science program may not be successful in developing commercial products.
- Even if we or our collaborators are successful in developing commercial products that incorporate our traits, such products may not achieve commercial success.
- Consumer and government resistance to genetically modified organisms may negatively affect the ability to commercialize crops containing our traits, as well as our public image.
- We may not be able to obtain or maintain the necessary regulatory approvals for our products, which could restrict our ability to sell those products in some markets.
- If ongoing or future field trials conducted 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.
- 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.
- 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.
- The products of third parties or the environment may be negatively affected by the unintended appearance of our yield trait genes.
- 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.

- If we lose key personnel or are unable to attract and retain necessary talent, we may be unable to develop or commercialize our products under development.
- Patent protection for our technologies is both important and uncertain.
- Third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result.
- Portions of our crop science technology are owned by or subject to retained rights of third parties.
- We may not be successful in obtaining necessary rights to additional technologies for the development of our products through acquisitions and in-licenses.
- The intellectual property landscape around genome editing technology, such as CRISPR, is highly dynamic and uncertain, and any resolution of this uncertainty could have a material adverse effect on our business.
- We rely in part on trade secrets to protect our technology, and our failure to obtain or maintain trade secret protection could harm our business.
- A material weakness was identified in our internal control over financial reporting, which could impact our business and financial results.
- Trading volume in our stock is low and an active trading market for our common stock may not be available on a consistent basis to provide stockholders with adequate liquidity. Our stock price may be extremely volatile, and our stockholders could lose a significant part of their investment.
- Provisions in our certificate of incorporation and by-laws and Delaware law 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.
- Concentration of ownership among our existing officers, directors and principal stockholders may prevent other stockholders from influencing significant corporate decisions and depress our stock price.

Our Corporate Information

We were incorporated in the Massachusetts in 1992 under the name Metabolix, Inc. In September 1998, we reincorporated in Delaware. We changed our name to Yield10 Bioscience, Inc. in January 2017 to reflect our change in mission around innovations in agricultural biotechnology focused on developing disruptive technologies for step-change improvements in crop yield. Our corporate headquarters are located at 19 Presidential Way, Woburn, MA 01801, and our telephone number is +1 (617) 583-1700. Our website address is www.yield10bio.com. The information contained on our website or that can be accessed through our website is not part of this prospectus supplement and the accompanying prospectus and investors should not rely on any such information in deciding whether to purchase our Common Stock.

Offering of Common Stock and Warrants

On July 3, 2017, we entered into a securities purchase agreement, or the Purchase Agreement, with certain investors, pursuant to which we agreed to issue (i) up to 570,784 shares of common stock, at a purchase price of $4.00 per share and (ii) warrants to purchase up to 570,784 shares of our common stock, or the Warrants (the “Offering”). The closing of the Offering occurred on July 7, 2017 for an aggregate purchase price of approximately

$2.3 million. The issuance and sale of the Warrants was exempt from registration pursuant to Section 4(a)(2) of the Securities Act of 1933, as amended, or the Securities Act.

The Warrants to purchase an aggregate of 570,784 shares of common stock are exercisable at any time after six months from their issuance and expire six years from their initial date of issuance. All of the Warrants have an exercise price of $5.04 per share. Shares of common stock underlying the aggregate of 570,784 Warrants are being registered for resale by the selling security holders pursuant to the Registration Statement of which this prospectus forms a part.

On May 30, 2017, the Company effected a 1-for-10 reverse stock split of its common stock. Unless otherwise indicated, all share amounts, per share data, share prices and exercise prices included in this Form S-1 have, where applicable, been adjusted retroactively to reflect this reverse stock split.

THE OFFERING

Common stock offered by the selling security holders	Up to 570,784 shares issuable upon exercise of warrants issued pursuant to the Purchase Agreement (which warrants will become exercisable on January 7, 2018 at an exercise price of $5.04 per share and expire on January 7, 2024).
Common stock to be outstanding after this offering, assuming exercise of all warrants issued pursuant to the Purchase Agreement	4,025,385 shares
Terms of the offering	The selling security holders and any of their pledgees, assignees and successors-in-interest may, from time to time, sell any or all of their shares covered hereby on the NASDAQ Capital Market or any other stock exchange, market or trading facility on which the shares are traded or in private transactions. These sales may be at fixed or negotiated prices. See "Plan of Distribution."
Use of proceeds	We will not receive any of the proceeds from the sale of our common stock by the selling security holders pursuant to this prospectus. We may receive up to approximately $2,876,751 in aggregate gross proceeds from cash exercises of the warrants, based on the per share exercise price of the warrants. Any proceeds we receive from the exercise of the warrants will be used for working capital and general corporate purposes. See "Use of Proceeds."
Nasdaq Capital Market symbol	YTEN
Risk factors	Investing in our securities involves a high degree of risk. See "Risk Factors" on page 8 of this prospectus to read about factors that you should consider carefully before buying shares of our common stock.

The number of shares of common stock that will be outstanding after this offering is based on 3,454,601 shares outstanding as of July 31, 2017, plus 570,784 shares issuable upon exercise of warrants issued pursuant to the Purchase Agreement (which warrants will become exercisable on January 7, 2018 at an exercise price of $5.04 per share and expire on January 7, 2024), and excludes:

- 626,341 shares of common stock issuable upon exercise of options to purchase our common stock outstanding as of July 31, 2017 at a weighted average exercise price of $18.01 per share;
- 14,367 shares of common stock issuable upon vesting of restricted stock units as of July 31, 2017;
- 393,300 shares of common stock issuable upon exercise of other warrants to purchase our common stock outstanding as of July 31, 2017 at a weighted average exercise price of $39.80 per share; and
- 376,968 shares of common stock reserved as of July 31, 2017 for future issuance under our 2006 and 2014 Stock Option and Incentive Plans.

RISK FACTORS

An investment in shares of our common stock involves a high degree of risk. You should carefully consider the following information about these risks, together with the other information appearing elsewhere in this prospectus, including our financial statements and related notes thereto, before deciding to invest in our common stock. The occurrence of any of the following risks could have a material adverse effect on our business, financial condition, results of operations and future growth prospects. In these circumstances, the market price of our common stock could decline, and you may lose all or part of your investment . We undertake no obligation to update any forward-looking statements, whether as a result of new information, future events or otherwise. You are advised, however, to consult any further disclosure we make in our reports filed with the Securities and Exchange Commission. (All dollar amounts, except per share amounts, are stated in thousands.)

Risks Relating to our Financial Position and Need for Additional Capital

We will be required to raise additional funds to finance our operations and remain a going concern; we may not be able to do so when necessary, and/or the terms of any financings may not be advantageous to us.

As of June 30, 2017, we held unrestricted cash and cash equivalents of $3,011. On July 7, 2017, we completed an offering of our securities. Net proceeds from the transaction were approximately $2,012. Our present capital resources may not be sufficient to fund our planned operations for a twelve month period, and therefore, raise substantial doubt about our ability to continue as a going concern.

In 2016, we completed a strategic restructuring under which Yield10 Bioscience has become our core business, with a focus on developing disruptive technologies for step-change improvements in crop yield to enhance global food security.

We will require additional capital resources to support the implementation of this strategy and we may pursue one or more of a variety of financing options, including public or private equity financing, secured or unsecured debt financing, equity or debt bridge financing, as well as licensing or other collaborative arrangements. There can be no assurance that our financing efforts will be successful. If we are not able to secure such additional capital resources or otherwise fund our operations, we may be forced to explore strategic alternatives and/or wind down our operations and pursue options for liquidating our remaining assets, including intellectual property and equipment.

We continue to face significant challenges and uncertainties. Our future revenues, expenses and cash usage will depend on the successful execution of our strategic plans related to Yield10 Bioscience.

Adequate financing to implement our strategy may not be available, including as a result of:

- adverse developments in the political environment and/or financial markets;
- investor perceptions of the agricultural biotechnology industry;
- investor perceptions of investments in micro-cap stocks;
- our inability to achieve targeted milestones on a timely basis;
- illiquidity in the trading of our common stock; or
- other factors described elsewhere in these Risk Factors.

Available capital resources may be consumed more rapidly than currently expected due to any or all of the following:

- lower than expected revenues from grants, licenses, and service fees related to our Yield10 Bioscience technologies;

- changes we may make to the business that affect ongoing operating expenses;
- further changes we may make to our business strategy;
- changes in our research and development spending plans; and
- other items affecting our forecasted level of expenditures and use of cash resources.

If we issue equity or debt securities to raise additional funds, we may incur fees associated with such issuances, our existing stockholders may experience dilution from the issuance of new equity securities, we may incur ongoing interest expense and be required to grant a security interest in our assets in connection with any debt issuance, and the new equity or debt securities may have rights, preferences and privileges senior to those of our existing stockholders. In addition, utilization of our net operating loss and research and development credit carryforwards may be subject to significant annual limitations under Section 382 of the Internal Revenue Code of 1986 due to ownership changes resulting from equity financing transactions. If we raise additional funds through collaboration, licensing or other similar arrangements, it may be necessary to relinquish valuable rights to our potential products or proprietary technologies, or grant licenses on terms that are not favorable to us.

We have a history of net losses and our future profitability is uncertain.

With the exception of 2012, when we recognized $38,885 of deferred revenue from a terminated joint venture, we have recorded losses since our inception. Since 1992, we have been engaged primarily in research and development and early-stage commercial activities. Because our crop science technology is at an early stage of development, we cannot be certain that the Yield10 Bioscience business will generate sufficient revenue to become profitable. We expect to have significant losses and negative cash flow for at least the next several years, as we incur additional costs and expenses for the continued development of our technology, including the ongoing expenses of research, development, commercialization and administration. The amount we spend will impact our need for capital resources as well as our ability to become profitable and this will depend, in part, on the number of new technologies that we attempt to develop. We may not achieve any or all of these goals and, thus, we cannot provide assurances that we will ever be profitable or achieve significant revenues.

We have recently changed our corporate strategy to focus on the crop science industry, and our technologies in this area are at a very early stage of development. We may never commercialize a technology or product that will generate meaningful, or any, revenues.

In July 2016, our Board of Directors approved a plan to implement a strategic restructuring under which Yield10 Bioscience has become our core business. As part of the restructuring, we discontinued our biopolymer operations, eliminated positions in our biopolymer operations and corporate organization, and sold certain of our biopolymer business assets. We currently anticipate that our annual net cash used in operations, including anticipated payments for restructuring costs, will be approximately $8,000 during 2017, compared to approximately $25,000 prior to the restructuring.

The remaining cash restructuring costs associated with our strategic repositioning have various payment due dates through May 2018 and are estimated at approximately $1,410 as of June 30, 2017. However, the reduction in cash used in operations resulting from the restructuring may be less than expected. If we are not successful in reducing our cash used in operations, we may require more financing than anticipated or we may be forced to wind down our remaining operations.

The products and technologies we are currently developing as a result of our strategic repositioning are at a very early stage of development, and the process of developing them is lengthy and uncertain. In addition, our current management has limited experience in developing technologies for the crop science industry, and has never commercialized a product or technology in this industry. We may never reach a point at which our efforts result in products that allow us to achieve revenue from their license or sale.

Our recently implemented reverse stock split could adversely affect the market liquidity of our common stock .

On May 24, 2017, our stockholders approved an amendment to our amended and restated certificate of incorporation, as amended, and authorized our Board of Directors, if in their judgment they deemed it necessary, to effect a reverse stock split of our common stock at a ratio in the range of 1:2 to 1:10. We implemented this reverse stock split on May 30, 2017 with a ratio of 1:10. We cannot predict whether the reverse stock split will increase the market price for our common stock on a sustained basis. The history of similar stock split combinations for companies in like circumstances is varied, and we cannot predict whether:

- the reverse stock split will result in a sustained per share price that will attract brokers and investors who do not trade in lower priced stocks;
- the reverse stock split will result in a per share price that will increase our ability to attract and retain employees and other service providers; or
- the market price per share will remain at a level in excess of the $1.00 minimum bid price as required by NASDAQ, or that we will otherwise meet the requirements of NASDAQ for continued inclusion for trading on The NASDAQ Capital Market.

There can be no assurance that we will be able to comply with the continued listing standards of The NASDAQ Capital Market.

We cannot assure you that we will be able to comply with the standards that we are required to meet in order to maintain a listing of our common stock on The NASDAQ Capital Market. Our common stock is listed on The NASDAQ Capital Market, and NASDAQ provides various continued listing requirements that a company must meet in order for its stock to continue trading on The NASDAQ Capital Market. Among these requirements is the requirement that our stock trades at a minimum closing bid price of $1.00 per share. On June 30, 2016, we received a deficiency letter from The NASDAQ Stock Market which provided us a grace period of 180 calendar days, or until December 27, 2016, to regain compliance with the minimum bid price requirement; we subsequently received an additional 180 days (until June 26, 2017) to regain compliance with the requirement. On May 24, 2017, our stockholders approved an amendment to our amended and restated certificate of incorporation, as amended, authorizing a reverse stock split of our common stock. A 1-for-10 ratio for the reverse stock split was subsequently approved by our Board of Directors, and the reverse stock split took effect on May 30, 2017. As a result of the reverse stock split, every ten shares of our common stock were automatically combined and converted into one issued and outstanding share of our common stock, with no change in the par value per share. As of June 12, 2017 we regained compliance with the minimum bid price requirement.

If we fail to continue to meet all applicable NASDAQ Capital Market requirements in the future and NASDAQ determines to delist our common stock, the delisting could substantially decrease trading in our common stock and adversely affect the market liquidity of our common stock; adversely affect our ability to obtain financing on acceptable terms, if at all, for the continuation of our operations; and harm our business. Additionally, the market price of our common stock may decline further and stockholders may lose some or all of their investment.

A portion of our revenue to date has been generated from government grants; continued availability of government grant funding is uncertain and contingent on compliance with the requirements of the grant.

Historically, a portion of our revenue has been generated from payments to us from government entities in the form of government grants whereby we are reimbursed for certain expenses incurred in connection with our research and development activities, subject to our compliance with the specific requirements of the applicable grant, including rigorous documentation requirements. To the extent that we do not comply with these requirements, our expenses incurred may not be reimbursed. Any of our existing grants or new grants that we may obtain in the future may be terminated or modified.

Our ability to obtain grants or incentives from government entities in the future 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 and other incentives is highly competitive. We may not be successful in obtaining any additional grants, loans or other incentives. Recent political focus on reducing spending at the U.S. federal and state levels may continue to reduce the scope and amount of funds dedicated to crop science products, if such funds will continue to be available at all. To the extent that we are unsuccessful in being awarded any additional government grants in the future, we would lose a potential source of revenue.

Our government grants may subject us to government audits, which could expose us to penalties.

We may be subject to audits by government agencies as part of routine audits of our activities funded by our government grants. 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. If any of our costs are found to be allocated improperly, the costs may not be reimbursed and any costs already reimbursed for such contract may have to be refunded. Accordingly, 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 be subject to civil and criminal penalties and administrative sanctions.

Risks Relating to our Yield10 Bioscience Crop Science Program

Our crop science product development cycle is lengthy and uncertain and will depend heavily on future collaborative partners.

The technology and processes used in our crop science program and the application of our technology to enhance photosynthetic efficiency of crops are at an early stage of development. Research and development in the seed, agricultural biotechnology, and larger agriculture industries is expensive and prolonged and entails considerable uncertainty. Completion of our development work will require a significant investment of both time and money, if it can be completed at all. We expect that collaborations with established agricultural industry companies will be required to successfully develop and commercialize our innovations. The industry is highly concentrated and dominated by a small number of large players, which could impact efforts to form such collaborations. We may not be successful in establishing or maintaining suitable partnerships, and may not be able to negotiate collaboration agreements having terms satisfactory to us or at all. In addition, industry collaborators have significant resources and development capabilities and may develop products and technologies that compete with or negatively impact the development and commercialization of our technologies.

Our crop science program may not be successful in developing commercial products.

We and our potential future collaborators may spend many years and dedicate significant financial and other resources developing traits that will never be commercialized. Seeds containing the traits that we develop may never become commercialized for any of the following reasons:

- our traits may not be successfully validated in the target crops;
- our traits may not achieve our targeted yield improvements;
- we may not be able to secure sufficient funding to progress our traits through development and commercial validation;
- our traits may not have the desired effect sought by future collaborators for the relevant crops;
- development and validation of traits, particularly during field trials, may be adversely affected by environmental or other circumstances beyond our control;
- we or our future collaborators may be unable to obtain the requisite regulatory approvals for the seeds containing our traits;
- competitors may launch competing or more effective seed traits or seeds;

- a market may not exist for seeds containing our traits or such seeds may not be commercially successful;
- future collaborators may be unable to fully develop and commercialize products containing our seed traits or may decide, for whatever reason, not to commercialize such products; and
- we may be unable to patent our traits in the necessary jurisdictions.

If any of these things were to occur, it could have a material adverse effect on our business and our results of operations. Research and development in the crop science industry is expensive and prolonged, and entails considerable uncertainty. Because of the stringent product performance and safety criteria applied in development of crop science products, products currently under development may neither survive the development process nor ultimately receive the requisite regulatory approvals needed to market such products. Even when such approvals are obtained, there can be no assurance that a new product will be commercially successful. In addition, research undertaken by competitors may lead to the launch of competing or improved products, which may affect sales of any products that we are able to develop.

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

Our strategy depends upon our or our collaborators' ability to incorporate our traits into a wide range of crops in significant markets and geographies. Even if we or our collaborators are able to develop commercial products that incorporate our traits, any such products may not achieve commercial success 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;
- 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; and
- we may not be able to produce high-quality seeds in sufficient amounts to meet demand.

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

Consumer and government resistance to genetically modified organisms may negatively affect the ability to commercialize crops containing our traits, as well as our public image.

Food and feed made from genetically modified seeds are not accepted by many consumers and in certain countries production of certain genetically modified crops is effectively prohibited, including throughout the European Union, due to concerns over such products' effects on food safety and the environment. The high public profile of the biotechnology industry in food and feed production, and a lack of consumer acceptance of products to which we have devoted substantial resources, could have a negative impact on the commercial success of products that incorporate our traits and could materially and adversely affect our ability to obtain collaborations and to finance our crop science program. Further, we could incur substantial liability and/or legal expenses if there are claims that genetically-engineered crops damage the environment or contaminate other farm crops. This could distract our management and cause us to spend resources defending against such claims.

Actions by consumer groups and others may disrupt research and development or production of genetically modified seeds. In addition, some government authorities have enacted, and others in the future might enact, regulations regarding genetically modified organisms, which may delay and limit or even prohibit the development and sale of such products.

We may not be able to obtain or maintain the necessary regulatory approvals for our products, which could restrict our ability to sell those products in some markets.

Seeds containing the traits that we develop must receive regulatory approval before they can be marketed, but we may not be able to obtain such approvals. Regulatory standards and procedures in the crop science industry are continuously changing, and responding to these changes and meeting existing and new requirements will be costly and burdensome. Even if we are able to obtain approvals for the seeds containing the traits that we develop, changing regulatory standards may affect our ability to maintain compliance with such regulatory standards.

If ongoing or future field trials conducted 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 multi-year, multi-site field trials 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 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 including field tests, could be severely damaged or destroyed, adversely affecting these activities and thereby our business and results of operations. Unfavorable weather conditions including drought or excessive rain, or fluctuations in temperature, 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. 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, results of operations, and ability to secure financing. Such 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, most 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.

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, which we or our collaborators apply for and maintain regulatory approvals necessary for the commercialization of products containing our seed traits. 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 traits, particularly if the planting period for a crop growing season expires before the necessary permits are obtained. In most of our key target markets, regulatory approvals must be received prior to the importation of genetically modified products. These regulatory processes are complex. For example, the U.S. federal government's regulation of biotechnology includes, but is not limited to, the USDA, which regulates the import, field testing, and interstate movement 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 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. We have not completed all phases of the regulatory process for any of our traits 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. The time required for regulatory approval, or any delay or denial of such approval, could negatively impact our ability to generate revenues and to achieve profitability and finance our ongoing operations. In addition, 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 intended 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.

Our work with the Smart Carbon Grid for Crops and the T3 Platform has identified promising potential targets for gene editing, and we believe that these approaches may be subject to less regulatory complexity in the U.S. during development and along the path to commercialization. Gene editing techniques, including CRISPR, which involve making small targeted changes to the DNA of a target organism, have been of interest to the agricultural biotech industry because this approach is believed to have the potential to significantly reduce development costs and regulatory timelines for crop trait development and market introduction. Recent statements by the United States Department of Agriculture - Animal and Plant Health Inspection Service (USDA-APHIS) regarding the regulatory path for genetically edited plants and mushrooms suggest that they will not be subject to regulations typically used for genetically modified crops (i.e., they will not be considered "regulated articles") if the

modified organisms do not contain any remaining genetic elements from the procedure used for gene editing. While we believe that these industry examples suggest that crops that are gene edited may not be subject to certain GMO regulations in the U.S., we cannot assure you that this regulatory path will be found to apply to any of our seed yield traits or that the regulatory agencies will not change this approach to the regulation of genome editing or introduce new regulatory procedures applicable to such technologies.

The products of third parties or the environment may be negatively affected by the unintended appearance of our yield trait genes.

The potential for unintended but unavoidable trace amounts, sometimes called "adventitious presence," of yield trait genes in conventional seed, or in the grain or products produced from conventional or organic crops, could affect general public acceptance of these traits. Trace amounts of yield trait genes 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, 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. The occurrence of any of these events could have a material adverse effect on our business and results of operations.

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 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 any of 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 traits in development may be extended or delayed with additional costs incurred, or our data may be rejected by the applicable regulatory agencies. Ultimately, we are responsible for ensuring that each of our field trials is conducted in accordance with the applicable protocol and with 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 service providers can involve substantial cost and require extensive management time and focus. Delays may occur, which can materially impact our ability to meet our desired development timelines. If we are required to seek alternative service 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. Consolidation among our competitors and third parties upon whom we rely could lead to a changing competitive landscape, capabilities, and strategic priorities among potential service providers, which could have an adverse effect on our business and operations.

If we lose key personnel or are unable to attract and retain necessary talent, we may be unable to develop or commercialize our products under development.

We are highly dependent on our key technical and scientific personnel, who possess unique knowledge and skills related to our research and technology. If we were to lose the services of these individuals, we may be

unable to readily find suitable replacements with comparable knowledge and the experience necessary to advance the research and development of our products. Because of the unique talents and experience of many of our scientific and technical staff, competition for our personnel is intense. Our ability to attract and retain qualified employees may be affected by our efforts to manage cash usage, including reductions in total cash compensation. The loss of key personnel or our inability to hire and retain personnel who have the required expertise and skills could have a material adverse effect on our research and development efforts, our business, and our ability to secure additional required financing.

Risks Relating to Intellectual Property

Patent protection for our technologies is both important and uncertain.

Our commercial success may depend in part on our obtaining and maintaining patent protection for our technologies in the United States and other jurisdictions, as well as successfully enforcing and defending this intellectual property against third-party challenges. If we are not able to obtain or defend patent protection for our technologies, then we will not be able to exclude competitors from developing or marketing such technologies, and this could negatively impact our ability to generate sufficient revenues or profits from product sales and/or licensing to justify the cost of development of our technologies and to achieve or maintain profitability. Our currently issued patents relate to our historical business and have expiration dates ranging from 2020 through 2030. New outstanding patent applications owned by or licensed to us relating to crop yield improvements have filing dates ranging from 2013 through 2017.

Our patent position involves complex legal and factual questions. Accordingly, we cannot predict the breadth of claims that may be allowed or enforced in our patents or in third-party patents. Patents may not be issued for any pending or future pending patent applications owned by or licensed to us, and claims allowed under any issued patent or future issued patent owned or licensed by us may not be valid or sufficiently broad to protect our technologies. Moreover, we may be unable to protect certain of our intellectual property in the United States or in foreign countries. Foreign jurisdictions may not afford the same protections as U.S. law, and we cannot ensure that foreign patent applications will have the same scope as the U.S. patents. There will be many countries in which we will choose not to file or maintain patents because of the costs involved. Competitors may also design around our patents or develop competing technologies.

Additionally, any issued patents owned by or licensed to us now or in the future may be challenged, invalidated, or circumvented. We could incur substantial costs to bring suits or other proceedings in which we may assert or defend our patent rights or challenge the patent rights of third parties. An unfavorable outcome of any such litigation could have a material adverse effect on our business and results of operations.

Third parties may claim that we infringe their intellectual property, and we could suffer significant litigation or licensing expense as a result.

Various U.S. and foreign issued patents and pending patent applications owned by third parties exist in areas relevant to our products and processes. We could incur substantial costs to challenge third party patents. If third parties assert claims against us or our customers alleging infringement of their patents or other intellectual property rights, we could incur substantial costs and diversion of management resources in defending these claims, and the defense of these claims could have a material adverse effect on our business. In addition, if we are unsuccessful in defending against these claims, these third parties may be awarded substantial damages, as well as injunctive or other equitable relief against us, which could effectively block our ability to make, use, sell, distribute, or market our technologies and services based on our technologies in the United States or abroad. Alternatively, we may seek licenses to such third party intellectual property. However, we may be unable to obtain these licenses on acceptable terms, if at all. Our failure to obtain the necessary licenses or other rights could prevent the sale, manufacture, or distribution of some of our products based on our technologies and, therefore, could have a material adverse effect on our business.

Portions of our crop science technology are owned by or subject to retained rights of third parties.

We have licensed and optioned from academic institutions certain patent rights that may be necessary or important to the development and commercialization of our crop science technology. These licenses and options may not provide exclusive rights to use such intellectual property in all fields of use in which we may wish to develop or commercialize our technology. If we fail to timely exercise our option rights and/or we are unable to negotiate license agreements for optioned patent rights on acceptable terms, the academic institutions may offer such patent rights to third parties. If we fail to comply with our obligations under these license agreements, or if we are subject to a bankruptcy or insolvency proceeding, the licensor may have the right to terminate the license. In some circumstances, we may not have the right to control the preparation, filing and prosecution of licensed patent applications or the maintenance of the licensed patents. Therefore, we cannot be certain that these patents and applications will be prosecuted, maintained and enforced in a manner consistent with the best interests of our business. Furthermore, the research resulting in certain of our licensed and optioned patent rights was funded by the U.S. government. As a result, the government may have certain rights to such patent rights and technology.

We may not be successful in obtaining necessary rights to additional technologies for the development of our products through acquisitions and in-licenses.

We may be unable to acquire or in-license additional technologies from third parties that we decide we need in order to develop our business. A number of more established companies may also pursue strategies to license or acquire crop science technologies that we may consider attractive. These established companies may have a competitive advantage over us due to their size, cash resources and greater development and commercialization capabilities. Any failure on our part to reach an agreement for any applicable intellectual property could result in a third party acquiring the related rights and thereby harm our business.

In addition, companies that perceive us to be a competitor may be unwilling to assign or license rights to us. We also may be unable to license or acquire relevant crop science technologies on terms that would allow us to make an appropriate return on our investment.

We expect that competition for acquiring and in-licensing crop science technologies that are attractive to us may increase in the future, which may mean fewer suitable opportunities for us as well as higher acquisition or licensing costs. If we are unable to successfully obtain rights to suitable crop science technologies on reasonable terms, or at all, our business and financial condition could suffer.

The intellectual property landscape around genome editing technology, such as CRISPR, is highly dynamic and uncertain, and any resolution of this uncertainty could have a material adverse effect on our business.

The field of genome editing, especially in the area of CRISPR technology, is still in its infancy, and no products using this technology have reached the market. We are currently negotiating a license for work in the CRISPR field in order to demonstrate the utility of our yield trait genes in this field. Due to the intense research and development that is taking place by several companies, including us and our competitors, in this field, the intellectual property landscape is in flux, and it may remain uncertain for the coming years. There has been, and may continue to be, significant intellectual property related litigation and proceedings relating to this area in the future. If we obtain a license to certain patent rights using the CRISPR technology, and it is later determined that such patent rights are invalid or owned by other parties, this could have a material adverse effect on our business.

We rely in part on trade secrets to protect our technology, and our failure to obtain or maintain trade secret protection could harm our business.

We rely on trade secrets to protect some of our technology and proprietary information, especially where we believe patent protection is not appropriate or obtainable. However, trade secrets are difficult to protect. Litigating a claim that a third party had illegally obtained and was using our trade secrets would be expensive and time consuming, and the outcome would be unpredictable. Moreover, if our competitors independently develop similar knowledge, methods and know-how, it will be difficult for us to enforce our rights and our business could be harmed.

Risks Relating to Owning our Common Stock

Raising additional funds may cause dilution to our existing stockholders, restrict our operations or require us to relinquish rights to our technologies.

If we raise additional funds through equity offerings or offerings of equity-linked securities, including warrants or convertible debt securities, we expect that our existing stockholders will experience significant dilution, and the terms of such securities may include liquidation or other preferences that adversely affect your rights as a stockholder. Debt financing, if available, may subject us to restrictive covenants that could limit our flexibility in conducting future business activities, including covenants limiting or restricting our ability to incur additional debt, dispose of assets or make capital expenditures. We may also incur ongoing interest expense and be required to grant a security interest in our assets in connection with any debt issuance. If we raise additional funds through strategic partnerships or licensing agreements with third parties, we may have to relinquish valuable rights to our technologies or grant licenses on terms that are not favorable to us.

A material weakness was identified in our internal control over financial reporting, which could impact our business and financial results.

Our internal control over financial reporting may not prevent or detect misstatements because of its inherent limitations, including the possibility of human error, the circumvention or overriding of controls, or fraud. Even effective internal controls can provide only reasonable assurance with respect to the preparation and fair presentation of financial statements. If we fail to maintain the adequacy of our internal controls, including any failure to implement required new or improved controls, or if we experience difficulties in their implementation, our business and financial results could be harmed and we could fail to meet our financial reporting obligations. For example, in connection with the evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2016, we determined that our controls over accounting for stock based compensation expense did not operate effectively. Specifically, our procedures did not operate as designed to validate the calculation for stock based compensation expense resulting from an option award modification. We determined that this constitutes a material weakness.

Trading volume in our stock is low and an active trading market for our common stock may not be available on a consistent basis to provide stockholders with adequate liquidity. Our stock price may be extremely volatile, and our stockholders could lose a significant part of their investment.

Trading volume in our stock is low and an active trading market for shares of our common stock may not be sustained on a consistent basis. The public trading price for our common stock will be affected by a number of factors, including:

- any change in the status of our NASDAQ listing;
- the need for near term financing to continue operations;
- reported progress in our efforts to develop crop related technologies, relative to investor expectations;
- changes in earnings estimates, investors' perceptions, recommendations by securities analysts or our failure to achieve analysts' earnings estimates;
- quarterly variations in our or our competitors' results of operations;
- general market conditions and other factors unrelated to our operating performance or the operating performance of our competitors;
- future issuances and/or sales of our securities;
- announcements or the absence of announcements by us, or our competitors, regarding acquisitions, new products, significant contracts, commercial relationships or capital commitments;
- commencement of, or involvement in, litigation;

- any major change in our board of directors or management;
- changes in governmental regulations or in the status of our regulatory approvals;
- announcements related to patents issued to us or our competitors and to litigation involving our intellectual property;
- a lack of, or limited, or negative industry or security analyst coverage;
- uncertainty regarding our ability to secure additional cash resources with which to operate our business;
- short-selling or similar activities by third parties; and
- other factors described elsewhere in these Risk Factors.

As a result of these factors, our stockholders may not be able to resell their shares at, or above, their purchase price. In addition, the stock prices of many technology companies have experienced wide fluctuations that have often been unrelated to the operating performance of those companies. Any negative change in the public's perception of the prospects of industrial or agricultural biotechnology companies could depress our stock price regardless of our results of operations. These factors may have a material adverse effect on the market price of our common stock and affect our ability to obtain required financing.

Provisions in our certificate of incorporation and by-laws and Delaware law 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.

Provisions of our certificate of incorporation and by-laws and Delaware law may discourage, delay or prevent a merger, acquisition or other change in control that stockholders may consider favorable, including transactions in which our stockholders might otherwise receive a premium for their shares of our common stock. These provisions may also prevent or frustrate attempts by our stockholders to replace or remove our management.

In addition, Section 203 of the Delaware General Corporation Law prohibits a publicly-held Delaware corporation from engaging in a business combination with an interested stockholder, which generally refers to a person which together with its affiliates owns, or within the last three years has owned, 15% or more of our voting stock, for a period of three years after the date of the transaction in which the person became an interested stockholder, unless the business combination is approved in a prescribed manner.

The existence of the foregoing provisions and anti-takeover measures could limit the price that investors might be willing to pay in the future for shares of our common stock. They could also deter potential acquirers of our company, thereby reducing the likelihood that our stockholders could receive a premium for their common stock in an acquisition.

Concentration of ownership among our officers, directors and principal stockholders may prevent other stockholders from influencing significant corporate decisions and depress our stock price.

Based on the number of shares outstanding as of July 31, 2017, our officers, directors and stockholders who hold at least 5% of our stock beneficially own a combined total of approximately 64.0% of our outstanding common stock, including shares of common stock subject to stock options and warrants that are currently exercisable or are exercisable within 60 days after July 31, 2017. If these officers, directors, and principal stockholders or a group of our principal stockholders act together, they will be able to exert a significant degree of influence over our management and affairs and control matters requiring stockholder approval, including the election of directors and approval of mergers, business combinations or other significant transactions. The interests of one or more of these stockholders may not always coincide with our interests or the interests of other stockholders. For instance, officers, directors, and principal stockholders, acting together, could cause us to enter into transactions or agreements that we would not otherwise consider. Similarly, this concentration of ownership

may have the effect of delaying or preventing a change in control of our company otherwise favored by our other stockholders. As of July 31, 2017, Jack W. Schuler and William P. Scully beneficially owned approximately 44.8% and approximately 8.5% of our common stock, respectively.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This prospectus and the information incorporated by reference in this prospectus contain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, or Securities Act, and Section 21E of the Securities Exchange Act of 1934, or Exchange Act, regarding our strategy, future, operations, future financial position, future revenues, projected costs, and plans and objectives of management. You can identify these forward-looking statements by their use of words such as "anticipate," "believe," "estimate," "expect," "intend," "may," "plan," "project," "target," "potential," "will," "would," "could," "should," "continue," and similar expressions. You also can identify them by the fact that they do not relate strictly to historical or current facts. There are a number of important risks and uncertainties that could cause our actual results to differ materially from those indicated by forward-looking statements. For a description of these risks and uncertainties, please refer to the section entitled "Risk Factors," any other risk factors set forth in any information incorporated by reference in this prospectus, as well as any other risk factors and cautionary statements we include or incorporate by reference into this prospectus in the future. While we may elect to update forward-looking statements wherever they appear in this prospectus or in the documents incorporated by reference in this prospectus, we do not assume, and specifically disclaim, any obligation to do so, whether as a result of new information, future events or otherwise.

SELECTED FINANCIAL DATA

You should read the following selected financial data together with our financial statements and the related notes contained in our Annual Report on Form 10-K for the fiscal year ended December 31, 2016, which are incorporated by reference into this prospectus, except that share and per share information for the periods ended December 31, 2016, and 2015 have been revised to reflect the 1-for-10 reverse stock split of our issued and outstanding shares of common stock effective at the close of business on May 30, 2017. The selected data in this section is not intended to replace the consolidated financial statements included in our Annual Report on Form 10-K for the year ended December 31, 2016, except that share and per share information for the periods ended December 31, 2016 and 2015 have been revised to reflect the 1-for-10 reverse stock split.

We have derived the statements of operations data for each of the two years ended December 31, 2016 and 2015 from the audited financial statements contained in our Annual Report on Form 10-K for the year ended December 31, 2016.

The unaudited historical financial information set forth below may not be indicative of our future performance and should be read together with "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our historical financial statements and notes to those statements included in Item 7 of Part II and Item 6 of Part II, respectively, of our Annual Report on Form 10-K for the year ended December 31, 2016, and any amendment or update thereto reflected in subsequent filings with the SEC, and all other annual, quarterly and other reports that we file with the SEC after the date of the initial registration statement of which this prospectus forms a part and that also are incorporated herein by reference.

	Year Ended December 31,	
	2016	**2015**
(unaudited)	(in thousands, except per share data)	
Grant revenue	$ 1,159	$ 1,350
Net loss from continuing operations	$ (9,189)	$ (12,440)
Income (loss) from discontinued operations	$ 1,585	$ (11,241)
Net loss	$ (7,604)	$ (23,681)
Basic and diluted net loss per share:		
Net loss from continuing operations	$ (3.30)	$ (4.97)
Net income (loss) from discontinued operations	0.57	(4.50)
Net loss per share	$ (2.73)	$ (9.47)
Weighted average number of common shares outstanding, basic and diluted	2,781,185	2,500,735

USE OF PROCEEDS

We will not receive any of the proceeds from the sale of securities by the selling security holders pursuant to this prospectus. We may receive up to approximately $2,876,751 in aggregate gross proceeds from cash exercises of the warrants, based on the per share exercise price of the warrants. Any proceeds we receive from the exercise of the warrants will be used for working capital and general corporate purposes.

MARKET FOR OUR COMMON STOCK

Market Information

Our common stock currently trades under the symbol "YTEN" on The NASDAQ Capital Market. The following table sets forth, for the periods indicated, the high and low sales prices for our common stock, as reported by NASDAQ.

	High	Low
2017:		
First Quarter	$ 5.00	$ 2.80
Second Quarter	$ 9.03	$ 3.80

	High	Low
2016:		
First Quarter	$ 22.90	$ 8.60
Second Quarter	$ 19.20	$ 5.40
Third Quarter	$ 8.80	$ 2.60
Fourth Quarter	$ 6.70	$ 2.50

	High	Low
2015:		
First Quarter	$ 76.80	$ 22.00
Second Quarter	$ 51.00	$ 29.30
Third Quarter	$ 40.70	$ 10.70
Fourth Quarter	$ 39.80	$ 12.50

Stockholders

As of July 31, 2017, there were approximately 54 stockholders of record.

DIVIDEND POLICY

We have never declared or paid any cash dividends on our capital stock and do not expect to pay any cash dividends for the foreseeable future. We intend to use future earnings, if any, in the operation and expansion of our business. Any future determination relating to our dividend policy will be made at the discretion of our board of directors, based on our financial condition, results of operations, contractual restrictions, capital requirements, business properties, restrictions imposed by applicable law and other factors our board of directors may deem relevant.

BUSINESS

Overview

Yield10 Bioscience, Inc. is an agricultural bioscience company focusing on the development of new technologies to enable step-change increases in crop yield to enhance global food security. We consider 10-20 percent increases in crop yield to be step-change increases. According to a United Nations report, food production must be increased by over 70 percent in the next 35 years to feed the growing global population, which is expected to increase from 7 billion to more than 9.6 billion by 2050. During that time period, there will be a reduction in available arable land as a result of infrastructure growth and increased pressure on scarce water resources. Harvestable food production per acre and per growing season must be increased to meet this demand.

Yield10 is using two proprietary advanced biotechnology trait gene discovery platforms to improve fundamental crop yield through enhanced photosynthetic carbon capture and increased carbon utilization efficiency to increase seed yield. These platforms are based on the principle that plants which capture and utilize carbon more efficiently will enable more robust crops capable of increased seed yield. Yield10 is working to develop, translate and demonstrate the commercial value of new genetically engineered yield trait genes, identified in our discovery platforms, in major crops and to identify additional genome editing targets for improved crop performance in several key food and feed crops, including canola, soybean, rice and corn. Yield10 Bioscience is headquartered in Woburn, Massachusetts and has an additional agricultural science facility with greenhouses in Saskatoon, Saskatchewan, Canada.

Yield10 Bioscience was founded as Metabolix, Inc. in 1992 and originally focused on redirecting carbon flow in living systems to produce bioplastics and biobased chemicals. In 1997, Metabolix started a crop science research program with the intent to produce the microbial bioplastic polyhydroxybutyrate ("PHB") in high concentration in the seeds of oilseed crops or in the leaves of biomass crops where it acts as an additional carbon sink or carbon store. As we made progress on our crop program, we learned that the rate of carbon supply from photosynthesis was a bottleneck to the effective utilization of carbon, and we initiated a series of exploratory programs to develop new technologies to fundamentally increase the plants' ability to fix and capture more carbon. These early research programs resulted in the establishment of our crop yield trait gene discovery platforms and the identification of a series of promising proprietary yield trait genes.

Based on encouraging early results from these gene discovery programs, we refocused our crop science efforts to yield improvement in major food and feed crops in 2015 and rebranded the effort as Yield10 Bioscience. In 2016, we sold our biopolymers assets and restructured the Company around our crop science mission. In January 2017, we completed this transition and changed the name of the company to Yield10 Bioscience, Inc. We are developing proprietary, breakthrough plant biotechnologies to improve crop productivity and seed yield based on two proprietary discovery platforms:

- the "Smart Carbon Grid for Crops Platform," — in which we are working to eliminate bottlenecks in plant photosynthesis and carbon metabolism by harnessing new metabolic capabilities from non-plant systems including microbes and algae, and;
- the "T3 Platform," — in which we have identified three powerful global regulator genes in plants which control complex regulatory networks and gene cascades resulting in step-change increases in photosynthetic carbon fixation and biomass yields. Molecular genomic analysis of high yielding plants developed using these genes has identified a series of additional crop trait gene targets. Genetic engineering of this new series of crop trait gene targets can be accomplished using only DNA sequences from the crop target species or through genome editing, potentially reducing regulatory costs and timelines.

In our work to date, our team has demonstrated step-change yield increases in Camelina seed production and in switchgrass biomass production. We are currently progressing the development of our lead yield trait genes in canola, soybean, rice and corn to provide step-change crop yield solutions for enhancing global food security.

With these two platforms, we have established a series of proprietary trait genes to enhance carbon dioxide capture and fixation in both C3 and C4 photosynthetic plants for yield improvement. C3 photosynthesis, the simplest type of plant photosynthetic system, exists in most agricultural crops used for human consumption, and includes canola, soybean, rice, wheat and potato. C4 photosynthesis is a more complex system. Plants using the C4 system have evolved an additional distinctive cellular structure, in which carbon dioxide is concentrated for the main photosynthesis enzyme RUBISCO through a series of metabolic and metabolite transports known as the C4 pathway. Corn and sugarcane are part of the C4 photosynthetic plant family. In general, C4 photosynthetic plants have up to five times inherently higher plant yield than plants in the C3 photosynthetic family. This difference in plant yield is a result of evolution, which has led plant scientists to consider the possibility that new genetic enhancements can be created to fundamentally improve the photosynthetic system in C3 plants.

Over the last 21 months, we have consolidated our crop science intellectual property position with approximately ten patent filings in prosecution, identified additional novel gene targets for improving crop performance and yield through genetic engineering or genome editing, formed a scientific advisory board with leaders in plant science, conducted several greenhouse studies and conducted our first Fast Field Testing of traits from our "Smart Carbon Grid for Crops" discovery platform. We have reported encouraging data for our lead yield trait gene, C3003 in Camelina from greenhouse and field tests and are conducting additional studies in Camelina, canola, soybean and rice.

In 2017, we are intensifying our efforts to evaluate genome editing targets for improving seed yield, seed composition and/or biomass yield in commercial crops. We believe that strategies based on C3004, a trait that complements C3003, and on C3007, an oil content boosting trait that we have an option to in-license, have the potential to provide a path to commercialization based on achieving "nonregulated" status from USDA-APHIS. If this status is achieved, this could significantly reduce the time and cost of launching new yield traits. These traits also complement the work we are doing with C3003 in oilseed crops, adding to a portfolio of yield traits targeting oilseed crops. In addition, we are advancing research with a number of genome editing targets from the C4000 series of traits, which could provide new strategies to increase biomass yield in forage and other crops.

In our 2017 field test program, we are testing both first and second generation versions of C3003 in Camelina. We are also testing first generation C3003 in canola, an important North American oilseed crop. Key agronomic and growth parameters of the plants will be monitored throughout the field test and yield data including seed weight, seed size and oil content will be measured and analyzed as compared to control plants. In field tests conducted in 2016, C3003 produced up to a 23 percent increase in seed yield (by weight) in the best performing Camelina lines and smaller seed size. The overall yield increase was due to a large increase in the number of the smaller seeds produced. Stable Camelina seed lines expressing the second generation yield trait gene C3003 were grown and evaluated in a greenhouse study. The best performing Camelina line produced up to a 24 percent increase in seed yield (seed weight per plant), while maintaining a typical individual seed weight compared to control plants. Results from greenhouse studies are indicative of trends, and that further field tests will be needed to verify the results. Because soybean is the leading North American oilseed crop, we accelerated deployment of both first and second generation C3003 into soybean last year and remain on track to obtain initial greenhouse data in late 2017 or early 2018.

In June 2017, we announced that planting has been completed at study sites in Canada for field tests to evaluate C3003 in Camelina and canola. Following completion of field tests in the fall of 2017, we plan to report results of the study in the fourth quarter of 2017. In previous studies, C3003 has shown promising improvements in oilseed yield. Results from our prior studies with C3003 suggest that it may provide an entirely new strategy to improve seed yield in oilseeds and other C3 photosynthetic crops by bringing in new metabolic functionality from non-plant systems.

Also in June 2017, we submitted an "Am I Regulated?" letter to USDA-APHIS's Biotechnology Regulatory Services (BRS) to confirm that our genome-edited Camelina plant line developed using CRISPR

genome editing technology for increased oil content does not meet the definition of a regulated article under 7 CFR Part 340 regulations. Together with our wholly owned Canadian subsidiary, Metabolix Oilseeds, Inc., we developed the genome edited Camelina line. Researchers used the CRISPR genome editing tool to inactivate an enzyme expected to increase seed oil content in Camelina, a trait we have designated as C3008. There are three copies of this gene in the Camelina genome, and complete editing of all copies was achieved. This trait may have further applications when used in combination with other traits that we are developing that are expected to increase seed oil content, including C3007.

In the second quarter of 2017, our wholly owned Canadian subsidiary, Metabolix Oilseeds, Inc., signed a two-year collaboration with the National Research Council of Canada to improve yield and drought tolerance in wheat. The collaboration will focus on new trait discovery in wheat using our T3 Platform technology. Under the collaboration, we will provide access to our proprietary C4000 series of traits, which include global regulatory genes, or global transcription factors ("GTFs"). We have shown that these GTFs have the potential to significantly increase photosynthesis and yield in certain crops. Wheat is a major global staple food crop where significant yield increases could play a major role in feeding the world.

Crop yield is the primary driver of the agriculture value chain. Yield can make the difference between a profitable season and losses for growers. As such, technologies to protect crop yield or increase it are the primary determinant of the seed buying decision by growers at the start of the season. This in turn determines both revenue and market share for the major seed players. Yield10's goal is to discover, optimize and translate our yield trait gene innovations into major food and feed crops and demonstrate the economic value to growers and seed companies. In all cases our trait genes will be introduced using genetic engineering technologies either to introduce new genes, to introduce additional copies of genes from the same crop species with modified regulatory sequences from that crop species or by using genome editing technologies to reduce or eliminate the function of specific plant gene targets in individual crops. The method by which we deploy our yield trait genes has significant regulatory implications, which, in turn can affect the timelines and cost of their commercialization. We intend to create high-value assets in the form of proprietary yield gene technologies and to de-risk these assets by progressing them along the path to commercial development with increasingly larger scale field tests and multi-site field trials in major crops. We are deploying our yield trait genes into canola, soybean and corn. We are engineering these traits into the major crops with the goal that they will be suitable for the regulatory approval process and in crop varieties (germplasm) such that our traits can be readily introduced into the industry's elite crop lines by plant breeding.

The Unmet Need: Global Population Growth Outpacing Anticipated Global Food Supply

Yield10 is targeting a critical unmet need in agriculture based on the future disconnect between agricultural supply and the growing global population. According to a United Nations study, the global population is expected to exceed 9.6 billion people by 2050 and therefore there is a need to increase global food production to meet this demand. This will need to be achieved in the face of increased pressure on land and water resources in addition to increasingly variable weather patterns. Solving this problem is a major global challenge requiring new crop innovation and technologies to fundamentally enhance crop productivity.

The Yield Gap

According to several studies described in an article published in the Public Library of Science in 2013, crop yields may no longer be increasing in different regions of the globe, and current rates of crop yield increase are expected to fall significantly behind the levels needed to meet the demand for global food production. The researchers found that the top four global crops - maize (corn), rice, wheat and soybean - are currently witnessing average yield improvements of only between 0.9 to 1.6 percent per year, far slower than the required rates to double their production by 2050 solely from incremental yield gains. At these rates, global production of maize, rice, wheat and soybean crops may be required to increase by about 67 percent, 42 percent, 38 percent and 55 percent, respectively, by 2050, in order to meet the anticipated increase in demand for food production caused by population growth. For corn and soybean, the benefits of currently available Genetic Modification ("GM") traits were already factored into the data cited in the studies referenced above. The yield increases needed to meet the demands of the growing global population show that a significant "yield gap" exists for each of the crops evaluated in the study.

Yield10 is focused on addressing the yield gap for major crops by utilizing modern biotechnology strategies, including metabolic engineering (synthetic biology approaches) to "build better plants," in which technology is deployed to make the process of photosynthesis within plants more efficient at capturing atmospheric carbon and depositing that carbon in seed or biomass, with the effect of improving the overall yield of important food crops. Enhancement of the photosynthetic capacity of major crops is fundamentally important to crop science and an essential first step to increase the seed and/or biomass yield of plants and, therefore, food production. We have been working on the area of increasing photosynthetic carbon capture and crop yield technologies since 2012. As a result, we have identified a number of exciting genes for increasing yield or improving crop performance.

Business Strategy

Our goal is to build a successful agricultural biotechnology company centered on demonstrating the value of our yield traits in major food and feed crops. We have identified and are evaluating novel yield trait genes that we have discovered using our two technology platforms. We believe we have extensive and unique metabolic engineering capabilities that can be deployed to help address the growing global yield gap in food and feed crops. As the primary driver of financial returns each season, crop yield is the key decision variable for farmers in making seed buying decisions, and as a result is critical to the seed industry. Improvements in yield to the levels targeted by Yield10, for example 10-20 percent increases, can be expected to generate significant value to the seed and crop industry. For example, Yield10 is targeting an approximately 20 percent increase in canola and soybean yields, which, if successfully deployed across North American acreage, would result in annual incremental crop value of $10 billion. By ultimately increasing the output of major food and feed crops and potentially reducing strains on scarce natural resources, we believe that Yield10's technologies will also contribute to addressing global food security.

Recognizing the highly concentrated nature of the seed business, the prevalence of cross-licensing of traits, and the need to stack multiple crop traits in elite seed germplasm to provide the best options for farmers, Yield10 does not expect to become an integrated seed company. The current major seed players dominate the GM crop space based largely on the early technology innovations that resulted in herbicide and pest resistance traits and have a very successful operating track record in the sector. Therefore, rather than replicating the downstream elements of these operations and developing our own regulatory, crop breeding or seed production capabilities, we intend to seek industry collaborations and partnerships to leverage these existing core competencies of the current seed industry. Yield10 will focus on its core competency, which is breakthrough science and technology innovation.

Yield10 plans to build on its core strengths bringing new technology approaches to exploit an innovation gap in the agricultural biotechnology space due to reduced investment in basic research and development resulting from the ongoing consolidation and restructuring in the agricultural sector. Yield10's mission is to translate and optimize our step-change yield trait innovations into the major food and feed crops, and demonstrate their economic value to farmers and seed companies. We intend to create high-value assets in the form of proprietary yield trait gene technologies and to de-risk these assets by progressing them along the path to commercial development with increasingly larger scale field tests and multi-site field trials in major crops. We are currently deploying our yield trait genes into canola, soybean and corn, by designing and progressing genetically engineered events suitable for the regulatory approval process which can be readily bred into the industry's elite crop lines by plant breeding. We expect the customers for Yield10's innovations to be the large and mid-size agricultural companies that would either license or acquire rights to Yield10's yield trait genes and incorporate them into their proprietary commercial crop lines for subsequent commercialization.

We are focused on identifying and developing technologies that will enable us to produce step-change improvements to crop yield.

Yield10 is targeting a critical unmet need in agriculture based on the anticipated disconnect between agricultural supply and the growing global population. Food production must be increased by over 70 percent in the next 35 years to feed the growing global population, which is expected to increase from 7 billion to more than 9.6 billion by 2050. Global climate change is also resulting in regional shifts to historical growing conditions. Given the projection for population growth, recent studies show a "yield gap" for major food and feed crops that studies show cannot be addressed by incremental improvements to yield brought about by traditional plant breeding and existing

GM traits. Current GM traits in the industry are based primarily on using microbial-sourced genes to impart yield protection through herbicide, pest, disease and even drought resistance, whereas Yield10 is focused on increasing fundamental crop yield through enhanced carbon capture and utilization.

Yield10 is fundamentally focused on "building better plants" based on using genetic engineering technologies to deploy new yield trait genes that improve the efficiency of photosynthesis and the efficiency of converting fixed carbon to seed and/or introducing targeted genetic changes in the plant genome that allow the plant to make more seed or biomass.

Our History

We have a significant track record and expertise in the metabolic engineering of microbes and have made significant progress translating this capability to plants.

As part of the legacy biopolymers and biobased chemicals business of our predecessor company Metabolix, our research team developed an advanced metabolic engineering capability to alter key biochemical pathways and redirect the flow of carbon metabolic intermediates in microbes resulting in the production of the biomaterial polyhydroxyalkanoate or PHA, at a level of more than 80 to 90 percent by weight of microbial cells that normally did not produce any PHA. Through our experience producing PHA in plants we have demonstrated that our experience with re-engineering the metabolism of microbes can be translated to "building better plants." In 1997, Metabolix initiated a crop science research program to produce renewable bioplastics and chemicals from agricultural crops. Historically, these efforts were focused on producing PHB, a microbial carbon storage biopolymer, in high concentration in the seeds of oilseed crops or in the leaves of biomass crops such as switchgrass.

As we made progress on producing PHB in plants, we learned that basic carbon supply from photosynthesis was a bottleneck. To address this carbon shortfall, we began developing new metabolic engineering and bioinformatics approaches to enhancing basic crop photosynthetic carbon capture. Discoveries from these two approaches became the foundation of our "Smart Carbon Grid for Crops" and "T3 Platform" crop trait discovery platforms, respectively. We also began building intellectual property on novel yield trait gene technologies discovered in these programs. Photosynthesis is the most important biological process responsible for global food production. For example, according to the USDA, the output of U.S. farms contributed $177 billion, or one percent, to GDP in 2014. Improving the photosynthetic capacity of plants is an essential first step to increase the performance of crops to increase seed and/or biomass yield and, therefore, food production. We must develop plants which on a per acre basis during the growing season fix more carbon and ultimately target that additional fixed carbon to seed. Key to achieving this is increasing the rate of net photosynthetic carbon capture. Once a plant has fixed carbon, that fixed carbon can be directed to three different places: it can be used to make roots, leaf and stem tissue of biomass, used for seed or it can be released again as CO2 through normal metabolic processes.

In 2015 and 2016, we made significant progress applying our "Smart Carbon Grid for Crops" platform to plants. Using this technology platform, which we established as a result of a series of government funded internal programs and external academic collaborations, we have developed metabolic engineering strategies using microbial genes to introduce new functionality into plants to increase photosynthesis by making key metabolic pathways in plants more efficient, and to eliminate bottlenecks to efficient carbon usage. This approach is similar to what has been the bedrock of the agricultural biotech seed industry, the introduction of genes from non-plant systems to enable new functionality in the form of herbicide, pest resistance and drought tolerance. Our approaches led not only to the identification of novel yield trait genes but also encouraging early yield data from field studies with our lead yield trait gene in the industrial oilseed Camelina.

Our Approach

We have two unique, proprietary technology platforms for identifying novel yield trait genes.

Our unique approach consists of two core technology platforms. The first is based on our 30 years of experience optimizing the flow of carbon intermediates in living systems and is called the "Smart Carbon Grid for Crops." Using this approach and working with our partners in academia, Yield10 has demonstrated major step-changes in seed yield in the industrial oilseed Camelina. We currently have four novel trait genes impacting seed

yield, which we refer to as: C3003 through C3006, and we are progressing our lead yield trait gene C3003 in our key crop targets canola, soybean and corn. Recently, we reported seed yield increases of up to 23 percent in early field tests conducted in 2016 with Camelina.

In our second platform, the "T3 Platform," we developed a proprietary computational process to identify global transcription factor (GTF) genes, or master switches, which algorithms predicted could both up-regulate or down-regulate multiple gene cascades with the potential for increasing photosynthesis, reducing bottlenecks in central metabolism and positively impacting plant and biomass yield. We have tested the three lead gene targets experimentally and have shown that they produced average increases of over 40 percent in photosynthetic carbon fixation, flow of carbon through central metabolism and biomass levels in our experiments with switchgrass. In some cases the biomass yield has been increased up to 70 percent in preliminary greenhouse tests, a notable finding given that switchgrass is a high yielding C4 photosynthetic crop. Although it is a very useful model for C4 photosynthesis plants, switchgrass is not a food crop, so we identified the corresponding genes in major food crops including our key targets, soybean, rice and corn, and we are currently progressing these trait genes in those crops.

Our work with the Smart Carbon Grid for Crops and the T3 Platform has identified promising potential targets for genome editing. We believe that these approaches may be subject to less regulatory complexity in the U.S. during development and along the path to commercialization, and may provide opportunities for licensing.

Genome editing techniques, including CRISPR, which involve making small targeted changes to the DNA of a target organism, have been of interest to the agricultural biotechnology industry because this approach is believed to have the potential to significantly reduce development costs and regulatory timelines for crop trait development and market introduction. Announcements from DuPont and the United States Department of Agriculture - Animal and Plant Health Inspection Service ("USDA-APHIS") regarding a clarification on the regulatory path for a genetically edited corn line indicated that this line will not be subject to regulations typically used for genetically modified crops on the basis that while the plant DNA was edited, the final plant did not contain any remaining foreign DNA (i.e. DNA sequences not from the plant being engineered) from the procedure used to edit the plant. This industry example suggests that crops that are genome edited may not be subject to certain GMO regulations in the U.S., an outcome supported by recent developments in the USDA APHIS review of the current regulatory process for crops made using genetic engineering. This has opened the potential for Yield10 to exploit a second tier of novel traits addressable with genome editing. The challenge now for the agricultural biotechnology sector will be to identify gene targets for genome editing which can generate economic value.

Yield10 has identified from its internal discovery platforms and in-licensed through academic collaborations a number of gene targets for genome editing in crops. In the course of our work, we have introduced genes coding for new metabolic pathway enzymes or global transcription factors producing high yield lines with higher rates of photosynthetic carbon fixation. We are studying our high yield plants at the molecular level using advances in high throughput analytical systems at the whole genome level to look at what happens to every other gene in the plant as a result of the changes we have engineered in, focused specifically on which native plant genes are turned on or off. Genes whose activity is turned on in the high yield lines are worth further study on their own and genes whose activity is turned off are interesting candidates for genome editing. This type of molecular analysis of the high yielding lines where the flow of carbon is higher has given us insights into key steps to target for further improvement. We have recently made progress deploying genome editing technology against the first of these additional targets in Camelina. We expect to increase our level of effort in this area in other crops, particularly canola, over the course of 2017, eventually expanding into soybean, rice and corn. We believe our genome editing targets as well as the improved crops we develop using this approach may enable us to form collaborations or license arrangements with a broader set of commercial partners and bring these forward into development in the near-term.

In June 2017, we submitted an "Am I Regulated?" letter to USDA-APHIS's Biotechnology Regulatory Services (BRS) to confirm that our genome-edited Camelina plant line developed using CRISPR genome editing technology for increased oil content does not meet the definition of a regulated article under 7 CFR Part 340 regulations. Together with our wholly owned Canadian subsidiary, Metabolix Oilseeds, Inc., we developed the genome edited Camelina line. Researchers used the CRISPR genome editing tool to inactivate an enzyme expected to increase seed oil content in Camelina, a trait we have designated as C3008. There are three copies of this gene in

the Camelina genome, and complete editing of all copies was achieved. This trait may have further applications when used in combination with other traits that we are developing that are expected to increase seed oil content, including C3007.

We plan to use any revenues we generate from license agreements around our genome editing targets to support our ongoing research and development efforts to enable step-changes in crop yield.

We are developing the Camelina Fast Field Test model system to evaluate and de-risk novel yield trait genes.

One of the challenges the agricultural industry has faced over the years is translating early crop science discovery into value generating traits. In part this is because results from greenhouse studies in model plants have not translated well into field results in major crops. This is also in part because the plants used for discovery research have not been suitable for studies in the field and are not representative of the advanced seed or crop varieties (germplasm) used in commercial production, which have been subject to decades of intensive breeding to improve yield. Translating success when introducing non-plant genes into major crops has been very successful and the current biotech seed sector, which accounted for 444 million acres of crops worldwide in 2015 is based on using microbial genes in plants. The long timelines to progress early discoveries successfully into major crops and generate field data adds to the challenge.

For these reasons, Yield10 has put in place a process we call "Fast Field Testing" based on our Camelina oilseed platform. We believe that over time this will become a valuable tool in the trait discovery to translation effort. Camelina is an industrial oilseed well-suited to field trials, and we believe it is a good model for identifying promising new yield traits for canola and soybean. It is also very fast to modify and develop genetically stable seed sufficient for planting. Ideally, we hope to be able to progress from trait identification to field planting in about 12 months. Our process is to identify trait genes of interest in Camelina and immediately begin putting them into canola and soybean, where the timelines to transform plant lines and generate field data are much longer. We can then progress the Fast Field Testing in Camelina and generate field data and a complete molecular analysis of plant material from the field. These results and data can then be used to inform how we progress the previously transformed canola and soybean.

We believe that this will provide the opportunity for go-no-go decisions in some cases and in other cases allow us to update our approach based on the results of our Fast Field Testing in Camelina. For example with the longer development timelines needed to get canola and soybean ready for field testing, we expect to initiate additional modifications earlier in these crops, having identified the potential to further improve the outcome based on the results of our Fast Field Testing in Camelina.

In 2017, we are intensifying our efforts to evaluate genome editing targets for improving seed yield, seed composition and/or biomass yield in commercial crops. We believe that strategies based on C3004, a trait that complements C3003, and on C3007, an oil content boosting trait that we have an option to in-license, have the potential to provide a path to commercialization based on achieving "nonregulated" status from USDA-APHIS. If this status is achieved, this could significantly reduce the time and cost of launching new yield traits. These traits also complement the work we are doing with C3003 in oilseed crops, adding to a portfolio of yield traits targeting oilseed crops. In addition, we are advancing research with a number of genome editing targets from the C4000 series of traits, which could provide new strategies to increase biomass yield in forage and other crops.

In our 2017 field test program, we are testing both first and second generation versions of C3003 in Camelina. We are also testing first generation C3003 in canola, an important North American oilseed crop. Key agronomic and growth parameters of the plants will be monitored throughout the field test and yield data including seed weight, seed size and oil content will be measured and analyzed as compared to control plants. In field tests conducted in 2016, C3003 produced up to a 23 percent increase in seed yield (by weight) in the best performing Camelina lines and smaller seed size. The overall yield increase was due to a larger increase in the number of smaller seeds produced. Stable Camelina seed lines expressing the second generation yield trait gene C3003 were grown and evaluated in a greenhouse study. The best performing Camelina line produced up to a 24 percent increase in seed yield (seed weight per plant), while maintaining a typical individual seed weight compared to control plants. Results from greenhouse studies are indicative of trends, and that further field tests will be needed to verify the results. Because soybean is the leading North American oilseed crop, we accelerated deployment of both

first and second generation C3003 into soybean last year and remain on track to obtain initial greenhouse data in late 2017 or early 2018.

In June 2017, we announced that planting has been completed at study sites in Canada for field tests to evaluate C3003 in Camelina and canola. Following completion of field tests in the fall of 2017, we plan to report results of the study in the fourth quarter of 2017. In previous studies, C3003 has shown promising improvements in oilseed yield. Results from our prior studies with C3003 suggest that it may provide an entirely new strategy to improve seed yield in oilseeds and other C3 photosynthetic crops by bringing in new metabolic functionality from non-plant systems.

We are using this process to de-risk and accelerate the demonstration of the trait gene value in major crops through the use of Fast Field Testing in a model system. As a particular trait is de-risked there is the potential for inflection points in value. If we can establish a strong correlation between the results from the Camelina system with future field data first from canola and then with soybean, then we may be able to leverage this to enter partnership and licensing discussions earlier while preserving the opportunity to capture a meaningful share of the upside value.

If results of testing new yield traits in our Camelina Fast Field Testing model are shown to be predictive of results that can be obtained in other C3 crops, we may be able to accelerate translation of new traits into important food and feed crops.

We developed our Camelina Fast Field Testing model as a system to develop and optimize yield traits based on novel metabolic pathways. We have significant expertise in the genetic transformation and breeding of Camelina. We believe that if we can show that the results we obtain for potential yield traits are directionally predictive for the results we obtain in oilseed crops and other C3 crops, then we will be able to use the system to effectively screen for novel traits and accelerate their deployment into additional crops having the C3 photosynthetic system, including canola, soybean, rice and wheat. For this reason, our Camelina Fast Field testing system may prove to be a valuable tool for novel yield trait discovery facilitating translation into commercially important crops.

Our Oilseed Operation based in Canada provides us with unique capabilities in the development of oilseed crops.

We established our oilseeds subsidiary in Canada in 2010 to produce robust oilseed germplasm with engineered value-added traits for commercial crop production in western North America. Our oilseeds team is based in Saskatoon, Saskatchewan, with laboratories in the NRC Plant Biotechnology Institute ("PBI") and commercial greenhouse and laboratory facilities at nearby Innovation Place. Our team has developed and implemented technology to improve and accelerate engineering, trait evaluation and breeding of Camelina and canola. The team also plays a key role in designing and conducting greenhouse and field tests required to effectively evaluate novel yield traits.

We have established a lean organizational footprint which is capable of evaluating our initial novel yield traits in greenhouse and field tests while maintaining efficient use of cash resources.

As of December 31, 2016, we had 20 full-time employees, with the majority directly involved with our research and development activities. We believe that our organizational capabilities are aligned with our research priorities and are complemented by our use of third party infrastructure and certain service providers. With this approach we can leverage third party infrastructure and capability without having to spend the time and capital needed to recreate them in-house. This will allow us to focus our limited resources on deploying our core strengths against our key development goals. We expect to grow our research and development operations over time commensurate with building value in our business and advancing our traits through development while at the same time tightly managing overhead costs.

We have established academic collaborations which provide us with opportunities to access government grant revenue to support our research as well as key intellectual property.

Yield10 has pursued academic collaborations that have led to the discovery of novel yield trait genes. Researcher Danny Schnell, Ph.D. discovered the C3003 trait in an ARPA-e funded collaborative project at the University of Massachusetts in which Yield10 was a partner. In 2015, Prof. Schnell moved to Michigan State

University where he is Chairperson, Department of Plant Biology and remains a collaborator. Heike Sederoff, Ph.D. Professor, Department of Plant and Microbial Biology at North Carolina State University developed the C3004 and C3005 traits with ARPA-e funding which Yield10 is now progressing under a license agreement. Both Dr. Schnell and Dr. Sederoff are members of our Scientific Advisory Board. In early 2017, Yield10 announced taking an option to a global license agreement from the University of Missouri. This license covers a genome editing target based on the recent discovery of a key regulatory mechanism controlling oil production in oilseed crops which can be used to increase the oil content. Oil content is the key economic driver in crops such as canola, sunflower and safflower. We plan to exercise this option later in 2017.

We plan to seek U.S. and Canadian government grants to support our research and development goals.

Yield10 has been awarded grants over the last several years supporting research on strategies to improve the efficiency of photosynthesis, identify novel yield traits and test novel yield traits in Camelina. This work is valuable because traits developed in Camelina have the potential to be developed and deployed in other oilseed crops. We plan to continue to pursue government grants to defray research costs associated with our research and development activities.

We plan to deploy our novel yield trait genes to generate proof points across a range of crops.

Current biotech-generated crop protection traits such as "Roundup Ready" and insect resistance are deployed broadly in the Americas in the canola, soybean and corn crops. For novel yield trait genes, such as C3003, we envision deployment of the trait in C3 photosynthetic oilseed crops such as Camelina, canola and soybean and potentially in other C3 crops such as rice, alfalfa, cotton, potato and wheat. We are currently testing C3003 and C4003 in rice where genetically modified plants have not yet been widely introduced commercially. We also believe there is an opportunity to deploy our novel yield traits into existing GM crops as "stacked traits" included in branded seeds marketed and sold to farmers. "Stacked traits" refers to the practice of adding multiple biotech traits to an elite plant line as a strategy to further increase value.

In the second quarter of 2017, our wholly owned Canadian subsidiary, Metabolix Oilseeds, Inc., signed a two-year collaboration with the National Research Council of Canada to improve yield and drought tolerance in wheat. The collaboration will focus on new trait discovery in wheat using our T3 Platform technology. Under the collaboration, we will provide access to our proprietary C4000 series of traits, which include global regulatory genes, or global transcription factors ("GTFs"). We have shown that these GTFs have the potential to significantly increase photosynthesis and yield in certain crops. Wheat is a major global staple food crop where significant yield increases could play a major role in feeding the world.

In addition we view our genome editing targets as a complement to plant breeding techniques and plan to test our genome editing targets in oilseed crops, as well as in rice, corn and forage crops as a way to improve seed yield and/or biomass and generate opportunities for licensing or collaboration with established industry partners.

We believe our business model will allow us to capture value for our discoveries and provide a path to commercialization for important new yield traits for major crops.

We are positioning Yield10 as a discovery company whereby we will work to advance our own developments as well as form business alliances to progress our traits through development and early commercialization. Our goal is to capture an attractive share of the added economic value resulting from the deployment of our trait genes and technologies in key crops. We are currently working on the development and deployment of our trait genes into canola, soybean, rice and corn, an approach facilitated by the expiration of much of the early foundation patents in the agricultural biotechnology sector, and one of our key objectives in that regard is to demonstrate commercial proof points through multi-site field tests. Yield10 has a number of opportunities and models for value capture including partnering or licensing with established agricultural industry players. Key to our strategy is to retain, where practical, control of timelines and maximize, where possible, the opportunity for value creation and optionality around future exit strategies.

Technology Platforms

In the last decade there has been a dramatic expansion of new genetic engineering and systems biology tools: genomics data; metabolic engineering; high-throughput analytical tools, including whole organism gene expression analysis and metabolomics, and powerful genome editing technologies. At Yield10 we plan to build value by leveraging genome editing targets for revenue generation in the near-term while we independently work to demonstrate the economic value of our transformative genetic engineering based yield breakthroughs in the longer term. The recent expiration of early blocking patents on plant genetic engineering means we can now be more effective in research and development, leverage third party service providers and independently drive key proof points in major commercial crops such as canola, soybean and corn while focusing our resources on our core strengths. Yield10 is focused on increasing the inherent yield of major food and feed crops. With regard to forming collaborations, we recognize there are considerable headwinds to overcome in this sector, including industry skepticism based on disappointing outcomes from major investments made screening large numbers of single crop genes. This has resulted in a challenging environment for early crop innovations prior to demonstration of key proof points in commercial crops. Our goal is to "build better plants" which requires new approaches and innovation and in our view will most likely involve gene combinations and/or multi-gene systems.

Increasing crop yield is a complex two-step carbon optimization problem. Harvested seed is mostly carbon fixed from carbon dioxide in the air by photosynthesis with oxygen coming from water in the soil and smaller amounts of nitrogen and phosphate both of which are applied as fertilizer. To achieve increased yield, the rate at which crops can fix carbon has to be increased. Based on our experience optimizing carbon flow in living systems, we know that increasing seed yield will likely require multiple trait genes to increase carbon fixation by photosynthesis at the front-end and direct the increased fixed carbon to the seed. One analogy would be the fact that simply filling the gas tank in a car does not make it go faster. If successful in increasing photosynthesis, we expect to reach metabolic bottlenecks downstream, some of which will likely prevent some of the additional fixed carbon from reaching the seed. However, with new analytical tools available we expect to be able to identify bottlenecks and develop solutions to achieve our targeted outcomes, step-change increases in seed yield. This leads to our theme of enhanced carbon capture from photosynthesis and targeted carbon deposition to seed.

Plants can be categorized generally into two different groups based on their system of photosynthesis. C3 photosynthesis, the simplest type of plant photosynthetic system, exists in most agricultural crops used for human consumption, and includes canola, soybean, rice, wheat and potato. C4 photosynthesis is a more complex system. Plants using the C4 system have evolved an additional distinctive cellular structure, in which carbon dioxide is concentrated for the main photosynthesis enzyme RUBISCO through a series of metabolic and metabolite transports known as the C4 pathway. Corn and sugarcane are part of the C4 photosynthetic plant family. In general, C4 photosynthetic plants have up to five times inherently higher plant yield than plants in the C3 photosynthetic family. This difference in plant yield is a result of evolution, which has led plant scientists to consider the possibility that new genetic enhancements can be created to fundamentally improve the photosynthetic system in C3 plants.

Smart Carbon Grid for Crops Technology Platform

Yield10 is leveraging over a decade of metabolic engineering experience to optimize photosynthetic carbon capture and utilization in plant systems, which is critical to increasing seed yield. The "Smart Carbon Grid for Crops" is an advanced metabolic engineering platform that we believe has the potential to address well known metabolic limitations in crops and in C3 crops in particular. Similar to the electric grid where much of the investment made to generate the power is lost in the distribution system, plants having the C3 photosynthetic system are similar in that they lose over half the carbon the grower has paid to fix in input costs due to metabolic inefficiencies. We plan to mirror an approach taken by many of the current herbicide and pest resistance GM traits where genes from non-plant sources were used successfully to impart new functionality to crops. In our case, we are exploiting non-plant genes such as genes from microbial or algal sources to fix or reduce the impact of well-understood carbon capture metabolic pathway limitations in C3 crops. For example, photorespiration is a wasteful side reaction or carbon capture inefficiency in crops having the C3 photosynthetic system which represent approximately 70 percent of the food consumed by humans and include wheat, rice, soybean, canola and potato. We believe reducing photorespiration should lead to improved net carbon fixation from photosynthesis and as a result, we would expect to see step-change increases in seed yield.

To illustrate the value creation potential, yield loss in C3 crops due to photorespiration was recently quantified in a paper published in the Annual Reviews of Plant Biology. The authors estimated that yield in U.S. soybean crops is reduced by 36 percent and the yield in U.S. wheat crops is reduced by 20 percent due to photorespiration. They also estimated that achieving a five percent reduction of photorespiration in soybean and wheat in the U.S. would add approximately $500 million per year of value. Some models suggest that photosynthesis could improve by 12 to 55 percent in the absence of photorespiration. Therefore, photorespiration has been a major topic in plant science and researchers have employed multiple strategies in attempts to reduce photorespiration in C3 plants as a means to improve yield.

Reducing photorespiration is one of the key targets of our Smart Carbon Grid for Crops technology platform. This platform is an innovative, systems based approach to boost yield by increasing the amount of carbon fixed by photosynthesis and targeting the increased carbon to harvestable seed. Our lead trait, C3003, has been shown to enhance carbon fixation and seed yield in the oilseed Camelina where it impacts photorespiration. C3003 is a scientific discovery made in one of our academic collaborations and Yield10 has exclusive rights to this technology. While our collaborator continues to work on characterizing the mechanism of this yield trait gene, current data suggests C3003 is a very unique gene that reduces photorespiration in an unexpected manner. New science also represents a key aspect of de-risking our technologies. If the science provides new insights or addresses a well-defined bottleneck in a key limiting pathway common to a large number of crops, then the expectations for broadly translating initial results should be higher. We are excited about the prospects of C3003 in reducing the well-known yield losses that occur through photorespiration in C3 crops. We are currently studying C3003's effect in the food crops canola, soybean and rice. We know C3003 has increased the rate of photosynthetic carbon fixation in our Camelina plants and we have been able to study these plants at the molecular level. Consistent with our initial hypothesis that downstream bottlenecks can be identified, we have found that in high yielding plants expressing C3003, the expression of other genes, including our C3004 trait gene is changed. We believe the C3004 trait gene is involved in controlling the flow of fixed carbon to seed as part of the plants natural regulatory system. It is well known that the flow of carbon in plants is tightly controlled and we believe our approach to engineering the C3004 gene using genome editing has the potential to remove one of these control points and can be combined with the C3003 trait gene to further increase yield beyond what can be achieved with C3003 alone.

T3 Platform and Plant Targets for Genome Editing

In crops having the evolutionary advanced, more efficient C4 photosynthetic system, including corn, sugarcane and sorghum, the yield is already several-fold higher than in C3 crops. In this case, the hurdle to accomplish step-change increases in seed yield is higher as these crops are already more metabolically efficient. Leveraging the industry's significant investment in crop genomics research over the last 20 years, we developed the "T3 platform," which is an algorithm-based approach to "big data" mining of publicly available genomics data sets. We focused not on individual genes but on specific gene expression patterns. Gene expression patterns tell the researcher which genes are turned on and off under different growth conditions. With the T3 platform we wanted to identify and focus our activities on a small number of very important plant genes. Using this approach we were able to identify and select novel genes, which could function as global regulators or master switches to control cascades of other genes and metabolic systems. The strategy was to use the T3 platform to significantly narrow the number of candidate genes to be tested and then test them experimentally in our high throughput gene transformation platform in our C4 photosynthetic crop model system, switchgrass. We validated the T3 platform approach by verifying with experimental results the positive yield impact of the three gene targets we identified computationally, an exceptional hit rate. These three yield genes, C4001, C4002 and C4003, increased photosynthetic carbon capture and biomass production by over 40 percent in our switchgrass plants. In this case our early experiments have been successful in demonstrating the potential to increase the rate of carbon fixation even in a high yielding C4 crop.

In June 2017, we reported that our novel C4001 trait, a global regulatory gene or transcription factor, has been shown to significantly increase plant biomass yield in switchgrass. Switchgrass plants expressing C4001 had significantly more aboveground biomass (75-100 percent increase in dry weight) as compared to controls and more root biomass (85-145 percent increase in dry weight) as compared to controls. The C4001 trait in switchgrass plants increased a key measure of photosynthetic efficiency, the electron transport rate, by approximately 75 percent. Yield10 researchers challenged the C4001 plants by engineering a novel carbon sink, the production of a biopolymer that typically reduces plant yield when expressed and accumulated at high levels in plants. Expression of C4001 in

biopolymer producing plants partially restored biomass production, yielding plants that were healthier in terms of size and weight as compared to control plants, while producing the same amount of biopolymer. As a next step, we are planning to evaluate C4001-like traits in forage crops and major commercial crops including corn and rice. We are currently evaluating the trait in rice in greenhouse studies, where we are seeing evidence of increased biomass and are awaiting results from ongoing research to determine the impact on seed yield.

We believe Yield10 is in a unique position to expand our learning and discover additional gene targets, or genes that need to be modulated, to optimize the flow of carbon to seed in these plants and have made considerable progress in this regard. Molecular analysis of high yielding plants expressing the global transcription factors has allowed the identification of 71 downstream transcription factors that are differentially expressed in the high yielding lines and thus are themselves targets for genetic manipulation. The expression of some of these genes is down regulated in the high yielding plants making them exciting targets for genome editing through well-known approaches such as CRISPR. We are beginning to validate these second generation gene targets in switchgrass and have thus far validated the predicted role of the first three genes. These trait genes have been named C4004, C4005 and C4006. We know the industry has struggled to deploy downstream transcription factors to improve crops particularly in hybrid corn. However, we are optimistic that we will be more successful introducing our global regulator genes given the impact we saw in our experiments, and we believe genome edited traits, particularly simple gene deletions, will be significantly easier to implement and translate across all varieties of a crop.

Fast Field Testing System in Camelina

One of the challenges the agricultural industry has faced over the years is translating early crop science discoveries into value generating traits. This is in part because most of the plants used for discovery research have not been suitable for studies in the field. In addition, the plant systems used for discovery are not representative of the advanced seed or germplasm used in commercial production which have been subject to decades of intensive breeding to improve yield. The long timelines to progress early discoveries successfully into major crops and generate field data adds to the challenge.

In 2010, we established a research and development operation in Saskatoon, Canada staffed with leading oilseed researchers. Our team established a model for testing novel trait genes called the “Fast Field Testing” system based on our Camelina oilseed platform. We believe that this system has the potential to become a valuable tool for our yield trait discovery and translation effort. Camelina is an industrial oilseed, with reasonable field performance providing a robust model for canola and soybean and is well suited to large scale multi-site field tests and larger scale trials. Camelina is a plant that can be readily genetically modified and bred through the efforts of our skilled staff to deliver genetically stable seed sufficient for planting in field tests. We have shown that we can go from the identification of a potential yield trait gene or combinations of genes to field planting in about 12 months. In our Fast Field Tests, we collect and analyze a broad set of data on our transgenic plants including parameters such as stand establishment, flowering, maturity, seed weight, seed size, oil content and oil composition. We also perform molecular analysis on plants of interest. We are using our Camelina Fast Field Test system to identify and screen trait genes of interest while deploying them in parallel into canola, soybean and rice where the timelines to obtain stable plant lines and field data are longer.

Traits in Development

With the benefit of more than five years of investment, the Company has been able to launch itself as Yield10 Bioscience with ownership or licensed rights to several crop trait genes in hand and with the lead yield trait gene C3003 well-positioned in terms of translation and demonstration in key crops. Yield10 has exclusive rights through ownership or licensing or is preparing to file patent applications covering the trait genes listed in Table 1 below.

Under our “Smart Carbon Grid for Crops” technology platform we have identified the C3000 series of novel yield traits based on establishing new metabolic pathways in crops. We have tested our lead yield trait gene, C3003 in Camelina in both greenhouse and initial field tests and have reported results from these initial tests. We are moving this promising trait forward in additional crops including canola, soybean and rice and expect to report data once additional greenhouse tests and/or field tests have been completed and analyzed.

Under our "T3 Platform" we have identified the C4000 series of novel yield traits and gene editing targets. We expect to progress in our C4 monocot model a select few of the C4000 series traits, global regulatory genes discovered through our T3 Platform research program which we have shown to significantly enhance photosynthesis and carbon capture in switchgrass. We are also progressing the C4003 trait gene in rice using our internal resources and we expect to report initial rice data once greenhouse tests have been completed and analyzed.

Table 1: Summary of our crop yield traits currently in development.

	Trait	Biological Mechanism	Value Add	GMO	Editing	Current Activity Next Steps
Smart Carbon Grid	C3003 1st Gen	Impact photorespiration	Seed yield Water use	+	No	Camelina field test results encouraging, field testing expanding to canola, deploying in soybean and rice
	C3003 2 nd Gen	Impact photorespiration	Seed yield Water use	+	No	Camelina greenhouse results encouraging, deploying in canola, soybean and rice
	C3004	Carbon partitioning	Seed yield	+	+	Camelina field testing, editing underway
	C3005/6	Increased carbon conversion efficient	Oil content, Seed yield	+	No	Camelina field testing
	C3007	Carbon partitioning	Oil content	+	+	Laboratory work in progress
T3 Platform	C4001	Global regulator gene Photosynthesis	Yield	+	+ / -	Wheat program and rice ongoing, corn in planning
	C4002	Global regulator gene Photosynthesis	Yield	+	+ / -	Planning for corn transformation studies
	C4003	Global regulator gene Photosynthesis	Yield	+	+ / -	Wheat program and rice ongoing, corn in planning
	C4004	Regulator gene	Yield	+	+	Planning for wheat program and corn transformation studies
	C4005	Regulator gene	Drought	+	+ / -	Planning for corn transformation studies
	C4006	Regulator gene	Drought	+	+ / -	Planning for corn transformation studies

Novel Yield Trait Gene C3003

C3003 represents the lead novel yield trait gene in our "Smart Carbon Grid for Plants" technology platform. C3003 is a scientific discovery made in one of our academic collaborations funded by ARPA-e, a division of the Department of Energy. Our academic collaborator is continuing work to characterize C3003. C3003 appears to be a very unique gene that impacts photorespiration, a biochemical pathway in C3 plants, which is responsible for significant losses in yield. Yield10 is progressing the introduction of the C3003 trait gene as well as improvements to the C3003 trait in Camelina, canola, soybean and rice, and we expect to disclose additional results from a number of these activities throughout 2017.

In the 2016 growing season, we conducted a small scale field test which was designed primarily to establish our Camelina Fast Field Testing platform and accelerate the generation of field data for crop trait discovery and improvement. As part of this study, we planted stable Camelina seed lines expressing C3003. In early 2017, we reported field test results showing that C3003 produced significant improvements in seed yield where the best C3003 line produced a 23 percent increase as measured by average seed weight per hectare. This result was statistically significant ($p<0.05$) as compared to control plants. In addition, the highest yielding line expressing the C3003 gene matured an average of six days earlier than the control plants. Expression of C3003 did not change the percentage of oil content in the seed as measured by the weight of the oil in relation to the weight of the seed.

While expression of C3003 enabled some of the Camelina lines we tested to produce higher seed yields by weight per hectare, the individual seed size in these lines was decreased as compared to controls, likely due to a change in carbon partitioning in the plant. This reduction in seed size was expected based on data from prior greenhouse trials and Yield10 is addressing this finding with our second generation C3003 trait which is expressed specifically in the seed tissue of plants.

We believe that the results of our 2016 field tests in Camelina are encouraging and suggest that our approach to engineering new metabolic pathways in plants has the potential to produce step-changes in crop yield. These results also illustrate that our Fast Field Testing system in Camelina may be a valuable tool for effectively screening novel yield trait genes and dynamically adapting our approach to trait development as we translate these improvements into commercially important crops.

Based on prior greenhouse data suggesting that constitutive expression of C3003 in Camelina could increase overall seed yield, but produce this increase with the production of smaller, lighter weight seeds, we produced a second generation C3003 where the C3003 gene is expressed only in seed tissue. We believe that the reason for the smaller seeds is that the added influx of carbon produced by C3003 produces a “bottleneck” in plant metabolism that results in the production of more, but smaller seeds. In 2016, we tested second generation C3003 in Camelina in greenhouse studies. In early 2017, we reported preliminary greenhouse data showing that the second generation C3003 produced an increase in seed yield, while maintaining typical seed weight.

Based on encouraging data produced in Camelina with first and second generation C3003, we are continuing to progress the evaluation of the C3003 gene trait in parallel in canola, soybean and rice, key target crops where step-change increases in seed yield would improve the prospects for global food security and we believe create considerable economic value.

We are conducting additional field tests of C3003 in the 2017 growing season. In these studies, we are evaluating Camelina lines transformed with each of our first and second generation C3003 trait as well as canola lines containing the first generation C3003 trait. We plan to report preliminary data from this field test in fourth quarter 2017 once the field tests have been completed and resulting data analyzed.

Prior to that, we expect to report results from greenhouse studies in 2017 with the first generation C3003 trait in canola. We also recently introduced the second generation C3003 trait into canola, and greenhouse data on seed yield and seed size may be available by the end of 2017 or early 2018. If the data meet our expectations, we may test second generation C3003 in canola in field tests in spring 2018.

We are expanding our research into soybean by leveraging the capabilities and technical resources of a collaborator under an agreement in which Yield10 retains all commercial rights. This activity is underway for both the first and second generation versions of the C3003 trait. Assuming the research plan remains on track, we expect to be able to report results from initial greenhouse studies in late 2017 or early 2018.

We have also initiated the introduction of the first and second generation versions of the C3003 yield trait gene in rice and expect to report our observations from those studies when testing has been completed and results have been analyzed.

We plan to leverage third party services where the resources and infrastructure are already in place to transform and test novel traits in corn lines. We believe this will enable Yield10 to cost effectively expand its capabilities and enable us to progress our corn targets at least to the stage of initial corn hybrid field results.

We also plan to selectively partner with others for the development of different crops and/or traits. In particular we expect to progress a select few of the C4000 series traits, global regulatory genes discovered in our T3 Platform which we have shown to significantly enhance photosynthesis and carbon capture in our C4 monocot model plant switchgrass. In the meantime, we have been able to progress the C4003 trait gene in rice using our internal resources and we expect to report initial rice data as soon as it is available.

Target Crops

Our initial work in our C3000 and C4000 series traits suggests that our technology may be applicable to a wide range of crops harvested for food and animal feed uses. We believe that if novel yield traits could be successfully developed and commercialized in any of these crops, farmers would be able to improve the productivity of their land to meet rising demand for food and feed, and significant economic value would be created.

In considering our strategy to develop our technologies we segregate our trait genes into two classes: trait genes based on using non-plant genes to add new functionality to crops which are by definition GM; and trait genes which we may be able to deploy outside of the GM regulations, which encompasses our trait genes which are based exclusively on plant genes. We see the opportunity to deploy our trait technology in a broader set of food and feed crops many of which are not currently GM. We plan to pursue our GM trait genes in crops which are currently GM and where the economics can sustain the cost and timelines for deregulation. We are aware of the current USDA-APHIS GM crop regulation review and the reality that GM likely will remain an issue for some NGO groups regardless of the science. For our GM yield trait genes, we are targeting seed yield increases of the order of 10 to 20 percent over the current elite seed lines, increases which reflect the order of magnitude step-changes necessary to address global food security.

The crops we are targeting for development are described below.

Camelina or Camelina sativa is an oilseed crop in limited cultivation in North America and Europe. Camelina has received recent attention as an industrial oilseed for the production of biofuels, novel industrial lipids, and oleochemicals. In addition, its meal has been identified for development as an animal and fish feed supplement. While it is not currently a commercially significant crop, research suggests that efforts to improve seed yield, oil content and fatty acid composition, and tolerance to heat stress may expand the commercial adoption and cultivation of Camelina.

Canola or Brassica napus is a cultivar of rapeseed which produces a higher value edible oil favored by consumers because it has a healthier fatty acid profile than corn or soybean oil. The canola crop was developed in Canada where it is primarily grown today with additional acreage grown in the U.S. Currently the vast majority of the canola grown in North America contains two seed enhancement technologies, herbicide tolerance and hybrid seed. Both Roundup Ready (Monsanto) and Liberty-Link (Bayer) varieties of canola are grown and were introduced to the market in 1990s. Approximately 22 million acres were planted in Canada and the U.S. in the 2016 growing season. Yield10 is targeting a 20 percent or greater increase in canola seed yield. With a 2016 harvest of 812 million bushels of canola (Statistics Canada) and an average farm gate price of $10.00 per bushel, a 20 percent yield increase in canola represents a total potential added annual value of $1.6 billion that could be shared among the players in the canola value chain.

Soybean or Glycine max is an oilseed crop used for food, food ingredients, food additives and animal feed. The soybean can be harvested for oil used in food and industrial applications, and soybean meal is a significant source of protein for use mostly in animal feed but also for direct human consumption. Fermented soy foods include soy sauce and tempeh, and non-fermented food uses include soy milk and tofu. Soybeans are widely cultivated in North and South America, where a majority of the seed planted is genetically modified. Approximately 88 million acres of soybean were planted in the U.S. and Canada in the 2016 growing season. According to the USDA, the U.S., Brazil and Argentina grow approximately 80 percent of global soybean production. Yield10 is targeting a 20 percent or greater increase in soybean seed yield. With a 2016 U.S. harvest of 4.36 billion bushels (USDA) and an average farm gate price of $10.00 per bushel, a 20 percent yield increase in soybean represents a total potential added annual value of $8.7 billion that could be shared among the players in the soybean value chain.

Corn is a crop grown globally and used for animal feed and for producing starch which can be used as a raw material for producing food ingredients and food additives, as well as for use in the production of paper, packaging materials and other items. GM maize was grown for the first time in the U.S. and Canada in 1997. Currently, about 80 percent of maize/corn production in the U.S. is genetically modified. It was estimated that more than 90 million acres of corn were planted in North America in the 2016 growing season. The traits commonly used in today's corn cultivars provide insect resistance and herbicide tolerance. In many GM seeds sold today, both of these traits are expressed (or "stacked" which refers to the practice of adding multiple traits to an elite plant line as a strategy to protect yield). Europe has limited production of GM corn, where Spain is a leading producer of GM corn. In this case, the most widely used GM trait (Bt) protects against the corn borer insect. Special protocols must be followed in Europe to avoid mixing of GM corn with conventional corn. Corn has the more efficient C4 photosynthesis system and Yield10 is targeting a 10 percent yield increase in corn. With a 2016 U.S. harvest of 15.2 billion bushels and an average per bushel price of $3.50, a 10 percent yield increase in corn represents a total potential added annual value of $5.32 billion that could be shared among the players in the corn value chain.

Rice is the staple food for over 50 percent of the global population. World crop production of rice was estimated at approximately 480 million metric tons in 2016. Rice is grown in tropical and subtropical regions around the world. Rice cultivation takes place primarily in China, India and Southeast Asia. Typically, improvements to rice yield have been achieved through traditional plant breeding approaches. Genetic engineering approaches are being investigated to protect rice from weeds and insect pests. Additional biotechnology approaches are being taken to improve the nutritional value of rice. While Yield10 has not established a target for yield improvement in rice, early work is underway to evaluate the potential of our technologies in this globally important food crop.

Wheat is a species of grass cultivated broadly worldwide as a staple cereal crop. Wheat requires processing to be used as food, mainly in the form of flour for bread, baked goods and pasta. Wheat may also be used as an industrial starch as a food additive or as a production component in the textile and paper industries. Improvements to wheat yield have typically been achieved through plant breeding approaches. Wheat production ranks third among U.S. field crops in planted acreage, production and gross farm receipts behind corn and soybeans. The U.S. planted wheat area for 2017-2018 is projected at 46 million acres.

Forage crops are grown expressly for biomass used for feeding livestock. Typical forage crops include both annual and perennial crops such as various grasses, silage corn, alfalfa and sorghum. Biotechnology traits have been previously introduced into silage corn and alfalfa. Other forage crops could be amenable to gene editing strategies to increase biomass yield per acre. We believe that our technology and traits that increase biomass may have application to forage crops.

Regulatory Requirements

Since the first successful commercialization of a biotechnology-derived crop in the 1990s, many new GM crop varieties have been developed and made available to U.S. farmers and farmers worldwide. U.S. farmers have rapidly adopted many of these new GM varieties, so that in 2016, 92 percent of the corn, 93 percent of the cotton, and 94 percent of the soybeans planted in the U.S. were varieties produced through genetic engineering. A significant percentage of the production of other crops, such as alfalfa, papaya and sugar beet, are also biotech-derived.

Genetically modified crops are subject to a significant amount of regulation in the U.S. and around the world. Field tests and field trials of GM crops need to ensure that traits in development do not escape or mix with native plants. The U.S. Government agencies responsible for oversight of the products of modern agricultural biotechnology are the United States Department of Agriculture, the U.S. Environmental Protection Agency (EPA), and the U.S. Food and Drug Administration (FDA). Depending on its characteristics, a product may be subject to the jurisdiction of one or more of these agencies under the federal government's 1986 Coordinated Framework for the Regulation of Biotechnology (most recently updated in January 2017). Regulatory officials from the three agencies regularly communicate and exchange information to ensure that any safety or regulatory issues that may arise are appropriately resolved within the scope of authority afforded to each agency under their respective statutes. Other environmental laws or regulations also may be implicated, depending on the specific product.

Within USDA, the Animal and Plant Health Inspection Service (APHIS) is responsible for protecting agricultural plants from pests, diseases and noxious weeds. Under the Plant Protection Act, USDA-APHIS has regulatory oversight over products of modern biotechnology that could pose such a risk. Accordingly, USDA-APHIS regulates organisms and products that are known or suspected to be plant pests or to pose a plant pest risk, including those that have been altered or produced through genetic engineering. These are called "regulated articles." USDA-APHIS regulates the import, handling, interstate movement, and release into the environment of regulated organisms that are products of biotechnology, including organisms undergoing confined experimental use or field trials. Regulated articles are reviewed to ensure that, under the proposed conditions of use, they do not present a plant pest risk through ensuring appropriate handling, confinement and disposal. The developer may then petition USDA-APHIS for a determination of non-regulated status for the article. If the agency determines that the GE plant is unlikely to present a greater plant pest risk than its unmodified counterpart, the new crop will no longer be subject to the permitting and other regulatory processes that are overseen by USDA-APHIS (i.e., it will no longer be treated as a potential plant pest).

In June 2017, we submitted an "Am I Regulated?" letter to USDA-APHIS's Biotechnology Regulatory Services (BRS) to confirm that our genome-edited Camelina plant line developed using CRISPR genome editing technology for increased oil content does not meet the definition of a regulated article under 7 CFR Part 340 regulations. Together with our wholly owned Canadian subsidiary, Metabolix Oilseeds, Inc., we developed the genome edited Camelina line. Researchers used the CRISPR genome editing tool to inactivate an enzyme expected to increase seed oil content in Camelina, a trait we have designated as C3008. There are three copies of this gene in the Camelina genome, and complete editing of all copies was achieved. This trait may have further applications when used in combination with other traits that we are developing that are expected to increase seed oil content, including C3007.

Subsequently, depending on the intended use of the non-regulated genetically engineered plant, the developer may need to work within separate EPA or FDA oversight rules before commercial introduction of the final product. EPA primarily regulates products of biotechnology that are intended for use as pesticides, under the authorities granted to EPA by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). FDA is the agency responsible for overseeing the safety of biotechnology-derived products that are intended to be used as human or animal food, or that may end up in the food supply. Since 1992, FDA has had in place a voluntary consultation process for developers of bioengineered food, and final agency decisions and other information from these Biotechnology Consultations are made publicly available by FDA. Consultations are data-intensive and examine the new food product's safety and nutritional profile, among other issues. Generally, FDA has found that such food products do not pose unique health risks to humans or animals, but if a novel allergen or other distinction from the conventional food is present in the new plant variety, the agency may require specific label statements on the product to ensure that consumers are made aware of material differences between GE and conventional versions.

In Canada, the largest producer of GM canola, GM crops and the food products into which they are incorporated also are regulated by multiple government agencies under a federal framework for the regulation of biotechnology products that is similar to the U.S. system. First, the Canadian Food Inspection Agency (CFIA) is the lead agency for ensuring that a new agricultural biotechnology crop will not pose new risks to Canadian plants, animals and other agricultural commodities. The CFIA's Plant Biosafety Office (PBO) is responsible for conducting environmental assessments of biotechnology-derived plants. Authority for the PBO includes both approving confined field trials with the GM crop through permits and authorizing their "unconfined release" as a first step towards commercialization.

Second, under the Food and Drugs Act and related regulations, Health Canada is responsible for reviewing a pre-market safety assessment that must be submitted by the manufacturer or importer of a "novel food," a term of art which includes GM or biotechnology-derived foods. The safety assessment should provide assurances that the novel food is safe when prepared or consumed according to its intended use. A multi-disciplinary team of experts from Health Canada will evaluate the data and information about the novel food and make a determination regarding whether it can be sold in Canada, and whether any restrictions are warranted under applicable law or the product's safety profile. Health Canada's final decision documents regarding the safety of these novel foods are made publicly available by the government.

As the lead agency for public health and safety, Health Canada also works in conjunction with the CFIA on food labeling oversight when it has identified a potential health or safety issues with a food that could be mitigated through labeling or other disclosures. For example, if the biotechnology-derived food contains a new allergen that is otherwise not present in the conventional version of the food, then specific label statements will be required to alert consumers to that important health information. However, the CFIA has primary oversight over non-health issues related to food labeling, packaging and advertising. Accordingly, the CFIA is the lead agency for ensuring that food labeling and advertising meet the legal requirements of the Food and Drugs Act, and that labeling representations do not create a potential risk of fraud or consumer confusion and are compliant with Canada's voluntary disclosure standard for genetically engineered food ingredients.

Finally, Environment Canada is available to serve as a regulatory "safety net" if a novel product does not naturally fall within the jurisdiction of the CFIA, Health Canada, or the Pest Management Regulatory Agency that oversees pesticide products.

Our work involving the development, greenhouse testing and field testing of novel yield trait genes in crop plants requires certain government and municipal permits and we must ensure compliance with all applicable regulations including regulations relating to GM crops. With laboratories and greenhouse in both the U.S. and Canada, we are subject to regulations governing the shipment of seeds and other plant material (including GM seeds and GM plant material) between our facilities in the U.S. and Canada, including USDA-APHIS permits for the import and export of plant materials that could pose a risk to domestic agriculture.

License Agreement with the University of Massachusetts

Pursuant to a license agreement with the University of Massachusetts ("UMASS") dated as of June 30, 2015, we have an exclusive, worldwide license under certain patents and patent applications to make, have made, use, offer for sale, sell, have sold and import any transgenic plant seed or plant grown there from or transgenic plant material developed for sale to a farmer or grower for planting in the field, which transgenic plant seed or plant grown therefrom or transgenic plant material is covered by, embodies or is derived from (in whole or in part) one or more issued or pending claims of the licensed patents or patent applications. The licensed patent rights include issued patents covering our yield trait gene C3003.

We are required to use diligent efforts to develop licensed products throughout the field of use and to introduce licensed products into the commercial market. In that regard, we are obligated to fulfill certain development and regulatory milestones relating to C3003, including completion of multi-site field demonstrations of a crop species in which C3003 has been introduced, and filing for regulatory approval of a crop species in which C3003 has been introduced within a specified period. Our failure to achieve any milestone provided for under the agreement would, if we are unable to reach agreement with UMASS as to a potential adjustment of the applicable milestone, give UMASS the right to terminate the agreement, following a notice period.

We are obligated to pay UMASS milestone payments relating to any regulatory filings and approvals covered by the agreement, royalties on any sales of licensed products following regulatory approval, as well as a percentage of any sublicense income related to the licensed products.

We may terminate the agreement at any time upon 90 days prior written notice to UMASS. Either party may terminate for material breach immediately upon written notice for a breach that is not cured within 60 days after receiving written notice of the breach. In addition, UMASS may terminate this agreement with respect to certain patent rights immediately upon written notice in the event we contest the validity or enforceability of such patent rights.

Agricultural Industry Landscape

Following advances in biotechnology in the 1970s through early 1990s, the first genetically modified crops were commercially introduced in the U.S. in the years 1994 and 1995. Today, the U.S. leads the world in the adoption of GM crops in terms of crop value and acreage planted. GM crops have had both their supporters and their detractors over the years. Consumer sentiment including concerns about the safety of GM crops have limited the

introduction and adoption of GM crops in Europe. However, recent studies by the National Academy of Science continue to support the 20 year history of safe use of GM crops.

The International Service for the Acquisition of Agri-Biotech Applications (ISAAA), an industry research group, reported that 444 million acres worldwide were planted with GM crops in 2015, the most recent year where data is available. The planting of GM crops is centered in the Americas with North America at approximately 45.5 percent of the acres and Latin America at approximately 43 percent. China and India follow with approximately 8 percent and the balance of the total worldwide GM crop acreage in 2015 was planted in European Union and the rest of world. The primary GM crops in the U.S. are corn, soybean, cotton and sugar beet. In Canada, the oilseed crop canola is the primary GM crop. Cotton is the primary GM crop grown in India and China.

In contrast to the Americas, the European Union has been relatively slow to adopt GM crops and has relied heavily on plant breeding programs for capturing crop yield improvements over the last 20 years. In 2013, Spain was the largest producer of GM crops in Europe, based on cultivation of GM corn representing approximately 20 percent of the country's crop that year. Certain GM crops have been approved for cultivation in some European countries, while other countries have imposed outright bans on cultivation of GM crops.

According to the market research firm, Research and Markets, the total global seed business was estimated at $53 billion in 2014 and is projected to grow to more than $100 billion by 2022. According to an ISAAA report, the global GM seed business represented a $15.3 billion market in 2015. The traits being commercialized today by the agricultural industry mainly address crop protection, which involves preventing crop damage by weeds, insects and other pests that lower expected crop yield. As technology has advanced, "trait stacking," or the practice of adding multiple traits to an elite plant line, has become commonplace as a strategy to protect yield. As the industry has developed, the practice of inter-licensing traits between research and development driven seed companies has led to a proliferation of branded seed products on the market today.

The GM seed business is dominated by large multinational companies and their subsidiaries including BASF, Bayer, Dow, DuPont Pioneer, Monsanto, Syngenta and AgReliant. These companies have significant resources, experience and track records of successfully developing, testing and commercializing high performing seed lines as well as new traits for GM crops. They offer farmers conventional and biotechnology seeds as well as crop protection chemicals, biologicals, fertilizers and other products and technologies aimed at supporting the on-farm efficiency of managing crops in the field as well as managing the overall cost of crop production to successful harvest. Many of these companies are involved in the current sector consolidation with the Dow/ DuPont merger and the acquisition of Syngenta by ChemChina nearing completion and the acquisition of Monsanto by Bayer ongoing.

Privately owned, U.S. retail seed companies play a key role in the industry by developing, marketing and selling high performing seed to U.S. farmers. These companies include Beck's Hybrids and Stine Seed. These companies have capabilities in both biotechnology and plant breeding. They source traits from the multinational companies and input these traits into elite plant germplasm to produce seeds optimized for a variety of soil, climate and field conditions. Both companies offer a broad arrange of GM corn and soybean products to their customers.

Recent advances in biotechnology including gene editing have led to the formation of companies focusing on yield trait discovery, biologicals for pest control, agbiome strategies and precision agriculture. There are startups, privately held and publicly traded companies involved in this space. Such companies include AgBiome, Arcadia Biosciences, Benson Hill Biosystems, Calyxt, Cibus, Evogene, Indigo, Kaiima, and Marrone Bio Innovation, many of which have greater resources and experience than we have.

Intellectual Property

Our continued success depends in large part on our proprietary technology. As of May 31, 2017, we owned or held exclusive rights to 10 pending patent applications worldwide related to advanced technologies for increasing yield in crops. Our portfolio of patent applications includes plant science technologies we have in-licensed globally and exclusively from The University of Massachusetts and North Carolina State University related to the yield trait gene C3003 and other advanced technologies based on advanced metabolic engineering methods to improve carbon capture and selectively control carbon partitioning in plants.

We continue to seek, develop and evaluate new technologies and related intellectual property that might enhance our Company's business strategy, industry position or deployment options.

Employees

As of May 31, 2017, we had 20 full-time employees. Of those employees, 16 were in research and development. Among our staff, 8 hold Ph.D.'s and 12 hold masters' or bachelors' degrees in their respective disciplines. Our technical staff has expertise in the following areas: plant genetics, plant biology, microbial genetics, bioinformatics, metabolic engineering and systems biology. Our headquarters are located in Massachusetts, and we maintain a research and development facility, including greenhouse facilities, in Saskatoon, Canada. None of our employees are subject to a collective bargaining agreement. We consider our relationship with our employees to be good.

PRINCIPAL STOCKHOLDERS

The following table sets forth certain information with respect to the beneficial ownership of our common stock as of July 31, 2017 for (a) our named executive officers, (b) our directors, (c) our executive officers and directors as a group, and (d) each stockholder known to us to beneficially own more than five percent of our common stock. Beneficial ownership is determined in accordance with the rules of the SEC and includes voting or investment power with respect to the securities. We deem shares that may be acquired by an individual or group within 60 days following July 31, 2017 pursuant to the exercise of options or warrants to be outstanding for the purpose of computing the percentage ownership of such individual or group, but are not deemed to be outstanding for the purpose of computing the percentage ownership of any other person shown in the table. Except as otherwise indicated, we believe that the stockholders named in the table have sole voting and investment power with respect to all shares shown to be beneficially owned by them based on information provided to us by these stockholders. Percentage ownership is based on a total of 3,454,601 shares of our common stock issued and outstanding on July 31, 2017. Unless otherwise noted below, the address of each person listed on the table is c/o Yield10 Bioscience, Inc., 19 Presidential Way, Woburn, MA 01801.

Category	Beneficial Owner	Shares of Common Stock (1)	Options Exercisable Within 60 Days (2)	Warrants Exercisable Within 60 Days (2)	RSUs Vesting Within 60 Days (2)	Total Shares Beneficially Owned	Percentage of Outstanding Shares (3)
5% Stockholders	Jack W. Schuler (4) 100 N. Field Drive Suite 360 Lake Forest, IL 60045	1,383,421	-	299,670	-	1,683,091	44.8%
	William P. Scully (5) 771 Manatee Cove Vero Beach, FL 32963	293,333	-	-	-	293,333	8.5%
	Matthew Strobeck (6) C/O Birchview Capital 688 Pine Street, Suite D Burlington, VT 05401	228,493	-	13,110	-	241,603	7.0%
Directors and Named Executive Officers	Lynne H. Brum (7)	8,953	14,084	1,311	-	24,348	0.7%
	Oliver P. Peoples (8)	27,151	48,835	1,311	-	77,297	2.2%
	Kristi Snell (9)	6,510	28,589	-	-	35,099	1.0%
	Richard Hamilton	3,041	3,000	-	-	6,041	0.2%
	Peter Kellogg	5,302	2,002	-	-	7,304	0.2%
	Joseph Shaulson (10)	35,295	94,167	3,150	-	132,612	3.7%
	Anthony J. Sinskey (11)	12,372	2,002	-	-	14,374	0.4%
	Robert van Nostrand	11,293	2,252	-	-	13,545	0.4%
All directors and executive officers as a group (9 persons) (12)		**114,511**	**210,068**	**5,772**	**-**	**330,351**	**9.0%**

(1) Beneficial ownership, as such term is used herein, is determined in accordance with Rule 13d-3(d)(1) promulgated under the Securities Exchange Act of 1934, as amended, and includes voting and/or investment power with respect to shares of our common stock. Unless otherwise indicated, the named person possesses sole voting and investment power with respect to the shares.

(2) Consists of shares of common stock subject to stock options, warrants and restricted stock units ("RSUs") held by the person that are currently vested or will vest within 60 days after July 31, 2017.

(3) Percentages of ownership are based upon 3,454,601 shares of Common Stock issued and outstanding as of July 31, 2017. Shares of common stock that may be acquired pursuant to options, warrants and RSUs that are vested and exercisable within 60 days after July 31, 2017, are deemed outstanding for computing the percentage ownership of the person holding such options, but are not deemed outstanding for the percentage ownership of any other person.

(4) The reported securities consist of 218,565 shares of common stock and 149,835 shares of common stock underlying the warrants owned by Jack W. Schuler, 978,414 shares of common stock and 149,835 shares of common stock underlying the warrants owned by the Schuler Family Foundation, 160,392 shares of common stock owned by the Jack W. Schuler Living Trust, and 26,050 shares of common stock owned by Schuler Grandchildren LLC. Mr. Schuler has sole voting and investment power over the shares issued to Schuler Grandchildren LLC and the Jack W. Schuler Living Trust. He disclaims beneficial ownership over the shares held by Schuler Grandchildren LLC and has beneficial ownership over the shares held by the Jack W. Schuler Living Trust.

(5) Information regarding Mr. Scully is based solely on a Schedule 13D/A filed with the SEC on January 7, 2016. According to such Schedule 13D/A, Mr. Scully reported sole voting power and sole dispositive power as to all of the shares.

(6) Includes 71,036 shares held by Birchview Fund, LLC and 3,933 shares subject to warrants held by Birchview Fund, LLC. Dr. Strobeck is the sole member of Birchview Capital GP, LLC (the "GP"), the general partner of Birchview Capital, LP (the "Investment Manager"), which is the investment Manager of Birchview Fund, LLC (the "Fund") and the sole member of Birchview Partners, LLC (the "Manager"), which is a member of the Fund. Dr. Strobeck disclaims Section 16 beneficial ownership of the shares of Common Stock held by the Fund (collectively, the "Fund Shares"), except to the extent of his pecuniary interest, if any, in the Fund Shares by virtue of his membership interest in the GP. Also includes 6,666 shares held in accounts for minor children for which Dr. Strobeck serves as a custodian, 1,494 shares held by Dr. Strobeck's spouse as custodian for their children, and 681 shares held indirectly by a trust for the benefit of Dr. Strobeck's children. Dr. Strobeck is a trustee of the trust. Dr. Strobeck disclaims beneficial ownership of these shares except to the extent of his pecuniary interest in them, if any. Dr. Strobeck resigned from our Board on January 10, 2017.

(7) Includes 3,922 shares held for Ms. Brum in the Company's 401(k) plan.

(8) Includes 2,849 shares held for Dr. Peoples in the Company's 401(k) plan.

(9) Includes 3,782 shares held for Dr. Snell in the Company's 401(k) plan.

(10) Includes 1,470 shares held for Mr. Shaulson in the Company's 401(k) plan.

(11) Includes 822 shares owned by Dr. Sinskey's spouse and 166 shares owned by a trust over which Dr. Sinskey may be deemed to share voting and investment power. Dr. Sinskey disclaims beneficial ownership of such shares.

(12) Includes a total of 15,245 shares held for current executive officers and Mr. Shaulson, our former President and Chief Executive Officer, in the Company's 401(k) plan.

SELLING SECURITY HOLDERS

The shares of common stock being offered by the selling security holders are those issuable upon the exercise of the Warrants. For additional information regarding the issuance of these securities, see "Prospectus Summary —Offering of Common Stock and Warrants" above. We are registering the shares of common stock in order to permit the selling security holders to offer the shares for resale from time to time. The Warrants will become exercisable on January 7, 2018 at an exercise price of $5.04 per share and will expire on January 7, 2014. Except for the ownership of the Warrants, the transactions contemplated pursuant to the Purchase Agreement, and as described below with regard to entities affiliated with Jack Schuler, the selling security holders have not had any material relationship with us within the past three years.

The following table sets forth certain information with respect to each selling stockholder, including (i) the shares of our common stock beneficially owned by the selling stockholder prior to this offering, (ii) the number of shares being offered by the selling stockholder pursuant to this prospectus and (iii) the selling stockholder's beneficial ownership after completion of this offering. The registration of the shares of common stock issuable to the selling stockholders upon the exercise of the warrants does not necessarily mean that the selling stockholders will sell all or any of such shares.

The table is based on information supplied to us by the selling stockholders, with beneficial ownership and percentage ownership determined in accordance with the rules and regulations of the SEC and includes voting or investment power with respect to shares of stock. This information does not necessarily indicate beneficial ownership for any other purpose. In computing the number of shares beneficially owned by a selling stockholder and the percentage ownership of that selling stockholder, shares of common stock subject to warrants held by that selling stockholder that are exercisable within 60 days after July 31, 2017, are deemed outstanding. Such shares, however, are not deemed outstanding for the purposes of computing the percentage ownership of any other person. The percentage of beneficial ownership after this offering is based on 3,454,601 shares outstanding on July 31, 2017.

This prospectus covers the resale of 570,784 shares of our common stock that may be sold or otherwise disposed of by the selling stockholders. Such shares are issuable to the selling stockholders upon the exercise of the Warrants. The Warrants are exercisable at any time after the six month anniversary of their issuance and expire six years from their initial date of issuance. All of the Warrants have an exercise price of $5.04 per share. See "Prospectus Summary — Offering of Common Stock and Warrants" above for a complete description of the warrants. The selling security holders may sell all, some or none of their shares in this offering. See "Plan of Distribution."

Selling Security Holder (1)	Number of Shares of Common Stock Beneficially Owned Prior to Offering (2)	Number of Shares of Common Stock Underlying Warrants Offered Hereby (3)	Number of Shares of Common Stock Beneficially Owned After Offering	Number of Shares of Common Stock Underlying Options or Warrants Beneficially Owned After Offering	% of Shares of Common Stock Beneficially Owned After Offering
Jack W. Schuler Living Trust (4)	160,392	160,392	160,392	0	4.64 %
Schuler Grandchildren LLC (5)	26,050	25,000	26,050	0	*
Schuler Grandchildren 2010 Continuation Trust (6)	26,050	25,000	26,050	0	*
Tino Hans Schuler Trust (7)	33,059	25,000	33,059	0	*
Therese Heidi Schuler Trust (8)	32,962	25,000	32,962	0	*
Tanya Eva Schuler Trust (9)	33,070	25,000	33,070	0	*
Lincoln Park Capital Fund, LLC (10)	62,048	71,348	62,048	0	1.8 %
Brio Capital Master Fund Ltd. (11)	91,344	71,348	91,344	0	2.64 %
Hades Investment SPC OBO FGP Protective Opportunity Fund, SP (12)	0	71,348	0	0	*
Iroquois Capital Investment Group LLC (13)	3,309	35,674	3,309	0	*
Iroquois Master Fund Ltd (14)	3,310	35,674	3,310	0	*

* Less than 1%.

(1) This table and the information in the notes below are based upon information supplied by the selling security holders, including reports and amendments thereto filed with the SEC on Schedule 13D.

(2) The shares of common stock underlying options or warrants are convertible or exercisable within 60 days of July 31, 2017.

(3) The actual number of shares of common stock offered hereby and included in the registration statement of which this prospectus forms a part includes, in accordance with Rule 416 under the Securities Act, such indeterminate number of additional shares of our common stock as may become issuable in connection with any proportionate adjustment for any stock splits, stock combinations, stock dividends, recapitalizations or similar events with respect to the common stock.

(4) Jack W. Schuler is the trustee of the Jack W. Schuler Living Trust, an Illinois trust, and has sole voting and investment control over the shares being offered. Mr. Schuler may be deemed to be the beneficial owner of all shares of common stock held by the Jack W. Schuler Living Trust.

(5) Mr. Schuler is the sole manager of Schuler Grandchildren LLC, an Illinois limited liability company, and has sole voting and investment control over the shares being offered. Mr. Schuler disclaims beneficial ownership over the shares held by Schuler Grandchildren LLC.

(6) George Schuler is trustee of the Schuler Grandchildren 2010 Continuation Trust, an Illinois trust, and has voting and investment control over the shares being offered.

(7) George Schuler is trustee of the Tino Hans Schuler Trust, an Illinois trust, and has voting and investment control over the shares being offered.

(8) George Schuler is trustee of the Heidi Schuler Trust, an Illinois trust, and has voting and investment control over the shares being offered.

(9) George Schuler is trustee of the Tanya Eva Schuler Trust, an Illinois trust, and has voting and investment control over the shares being offered.

(10) Josh Scheinfeld and Jonathan Cope, the Managing Members of Lincoln Park Capital, LLC, are deemed to be beneficial owners of all of the shares of common stock owned by Lincoln Park Capital Fund, LLC. Messrs. Cope and Scheinfeld have shared voting and investment power over the shares being offered. Lincoln Park Capital, LLC is not a licensed broker dealer or an affiliate of a licensed broker dealer.

(11) Shaye Hirsch, as Director of Brio Capital Master Fund Ltd., has the power to vote and dispose of the shares held by Brio Capital Master Fund Ltd.

(12) The beneficial owner in FGP Protective is Somerville Holdings Ltd ("Somerville"). The beneficial owner of Somerville is ITA Bank and Trust Company Ltd.

(13) Mr. Richard Abbe has the sole authority and responsibility for the investments made on behalf of Iroquois Capital Management, LLC ("ICIG") as its managing member. Mr. Abbe may be deemed to be the beneficial owner of all shares of Common Stock held by ICIG.

(14) Mr. Richard Abbe and Ms. Kimberly Page share authority and responsibility for the investments made on behalf of Iroquois Master Fund, Ltd ("IMF") as directors of IMF. Iroquois Capital Management, LLC ("Iroquois") is the investment manager for IMF and Mr. Abbe is the President of Iroquois. Mr. Abbe and Ms. Page may be deemed to be the beneficial owner of all shares of Common Stock held by IMF.

Relationships With Selling Security Holders

The transactions described below involve entities affiliated with Jack Schuler within the past three years. All share amounts and share prices below have been adjusted to reflect the 1-for-6 reverse stock split that took effect on May 26, 2015 and the 1-for-10 reverse stock split that took effect on May 30, 2017.

August 2014 Securities Purchase Agreement

On August 4, 2014, we entered into a Securities Purchase Agreement (the "August Purchase Agreement") with the Schuler Family Foundation and certain other qualified institutional and individual investors (collectively, the "August Investors"), pursuant to which we agreed to sell to the August Investors units of our securities (the "August Units") for an aggregate purchase price of $25 million (the "August Transaction"). The August Transaction and sale of August Units closed on August 22, 2014. The price of each August Unit was $30.00, or $15.00 per share of Common Stock, on an as-converted basis. Each August Unit consisted of one share of Common Stock and one one-thousandth (1/1,000) of a share of the Issuer's Series B Preferred Stock, par value $0.01 per share (the "Preferred Stock"). Under the terms of the August Purchase Agreement, the Schuler Family

Foundation received 390,000 Units in exchange for the payment of an aggregate purchase price of $11,700,000. Each share of Preferred Stock issued in the August Transaction automatically converted into 60,000 shares of Common Stock on October 30, 2014.

In connection with the August Purchase Agreement, entities affiliated with Jack Schuler (the "Schuler Entities") also entered into that certain Amended and Restated Letter Agreement, dated August 4, 2014, with us (the "August Letter Agreement") whereby each of the Schuler Entities agreed that none of such persons nor any of their respective affiliates or associates shall purchase any shares of Common Stock, if after such purchase, such persons' aggregate beneficial ownership would equal or exceed 44% of our then outstanding shares of Common Stock.

June 2015 Securities Purchase Agreement

On June 15, 2015, we entered into a Securities Purchase Agreement (the "June Purchase Agreement") with the Schuler Family Foundation, Jack W. Schuler and certain other qualified institutional and individual investors (collectively, the "June Investors"), pursuant to which we agreed to sell to the June Investors units of our securities (the "June Units" and together with the August Units, collectively, the "Units") for an aggregate purchase price of $15 million (the "June Transaction"). The June Transaction and sale of June Units closed on June 19, 2015. The price of each June Unit was $34.325 and each June Unit consisted of one share of Common Stock and nine-tenths of a Common Stock warrant to purchase one share of Common Stock at an exercise price of $39.80 per share (subject to adjustment in the event of stock splits, stock dividends, reclassifications and the like), which warrants may be exercised at the option of the holder until June 19, 2019. Under the terms of the June Purchase Agreement, (i) the Schuler Family Foundation received 166,484 Units in exchange for the payment of an aggregate purchase price of $5,714,563.30 and (ii) Jack W. Schuler received 166,484 Units in exchange for the payment of an aggregate purchase price of $5,714,563.30.

In connection with the June Purchase Agreement, the Schuler Entities also entered into that certain Standstill Agreement, dated June 19, 2015, with the Issuer (the "June Letter Agreement") which replaced in its entirety the August Letter Agreement, whereby the Schuler Entities agreed that (i) neither the Schuler Entities nor any of their affiliates or associates shall purchase or acquire any additional shares of Common Stock, if after such purchase, such persons' aggregate beneficial ownership would exceed the percentage of the then outstanding shares of Common Stock that such persons beneficially own after the consummation of the June Transaction (including for this purpose the deemed exercise of all the warrants issued in such transaction), and (ii) the Schuler Entities shall vote all shares acquired under the June Purchase Agreement (including any shares acquired upon the exercise of the warrants), in the same proportion as the votes cast by all other holders of all of our classes of voting securities, and (iii) neither the Schuler Entities nor any of their affiliates or associates shall sell, transfer or otherwise convey any shares of Common Stock (or warrants to purchase Common Stock) to anyone who will own our shares in excess of the greater of (A) the number of shares that the Schuler Entities own, together with the number of shares owned by the trusts for the benefit of Jack W. Schuler's children, as of the date thereof, immediately prior to giving effect to the transactions contemplated in the June Purchase Agreement, or (B) 40% beneficial ownership (calculated based on the number of shares of Common Stock then outstanding plus shares of Common Stock that could be issued to such person upon the exercise of outstanding options, warrants or other rights held by such person that are then exercisable or exercisable within 60 days of such transfer), as a result of such transfer and other transfers from third parties).

PLAN OF DISTRIBUTION

Each selling stockholder of the shares of the securities and any of their pledgees, assignees and successors-in-interest may, from time to time, sell any or all of their securities covered hereby on the NASDAQ Capital Market or any other stock exchange, market or trading facility on which the securities are traded or in private transactions. These sales may be at fixed or negotiated prices. A Selling Stockholder may use any one or more of the following methods when selling securities:

- ordinary brokerage transactions and transactions in which the broker-dealer solicits purchasers;
- block trades in which the broker-dealer will attempt to sell the securities as agent but may position and resell a portion of the block as principal to facilitate the transaction;
- purchases by a broker-dealer as principal and resale by the broker-dealer for its account;
- an exchange distribution in accordance with the rules of the applicable exchange;
- privately negotiated transactions;
- settlement of short sales;
- in transactions through broker-dealers that agree with the Selling Stockholders to sell a specified number of such securities at a stipulated price per security;
- through the writing or settlement of options or other hedging transactions, whether through an options exchange or otherwise;
- a combination of any such methods of sale; or
- any other method permitted pursuant to applicable law.

The Selling Stockholders may also sell securities under Rule 144 or any other exemption from registration under the Securities Act of 1933, as amended (the "Securities Act"), if available, rather than under this prospectus.

Broker-dealers engaged by the Selling Stockholders may arrange for other brokers-dealers to participate in sales. Broker-dealers may receive commissions or discounts from the Selling Stockholders (or, if any broker-dealer acts as agent for the purchaser of securities, from the purchaser) in amounts to be negotiated, but, except as set forth in a supplement to this Prospectus, in the case of an agency transaction not in excess of a customary brokerage commission in compliance with FINRA Rule 2440; and in the case of a principal transaction a markup or markdown in compliance with FINRA IM-2440.

In connection with the sale of the securities or interests therein, the Selling Stockholders may enter into hedging transactions with broker-dealers or other financial institutions, which may in turn engage in short sales of the securities in the course of hedging the positions they assume. The Selling Stockholders may also sell securities short and deliver these securities to close out their short positions, or loan or pledge the securities to broker-dealers that in turn may sell these securities. The Selling Stockholders may also enter into option or other transactions with broker-dealers or other financial institutions or create one or more derivative securities which require the delivery to such broker-dealer or other financial institution of securities offered by this prospectus, which securities such broker-dealer or other financial institution may resell pursuant to this prospectus (as supplemented or amended to reflect such transaction).

The Selling Stockholders and any broker-dealers or agents that are involved in selling the securities may be deemed to be "underwriters" within the meaning of the Securities Act in connection with such sales. In such event, any commissions received by such broker-dealers or agents and any profit on the resale of the securities purchased by them may be deemed to be underwriting commissions or discounts under the Securities Act. Each Selling

Stockholder has informed the Company that it does not have any written or oral agreement or understanding, directly or indirectly, with any person to distribute the securities.

The Company is required to pay certain fees and expenses incurred by the Company incident to the registration of the securities. The Company has agreed to indemnify the Selling Stockholders against certain losses, claims, damages and liabilities, including liabilities under the Securities Act.

We agreed to keep this prospectus effective until the earlier of (i) the date on which the securities may be resold by the Selling Stockholders without registration and without regard to any volume or manner-of-sale limitations by reason of Rule 144, without the requirement for the Company to be in compliance with the current public information under Rule 144 under the Securities Act or any other rule of similar effect or (ii) all of the securities have been sold pursuant to this prospectus or Rule 144 under the Securities Act or any other rule of similar effect. The resale securities will be sold only through registered or licensed brokers or dealers if required under applicable state securities laws. In addition, in certain states, the resale securities covered hereby may not be sold unless they have been registered or qualified for sale in the applicable state or an exemption from the registration or qualification requirement is available and is complied with.

Under applicable rules and regulations under the Exchange Act, any person engaged in the distribution of the resale securities may not simultaneously engage in market making activities with respect to the common stock for the applicable restricted period, as defined in Regulation M, prior to the commencement of the distribution. In addition, the Selling Stockholders will be subject to applicable provisions of the Exchange Act and the rules and regulations thereunder, including Regulation M, which may limit the timing of purchases and sales of the common stock by the Selling Stockholders or any other person. We will make copies of this prospectus available to the Selling Stockholders and have informed them of the need to deliver a copy of this prospectus to each purchaser at or prior to the time of the sale (including by compliance with Rule 172 under the Securities Act).

DESCRIPTION OF OUR CAPITAL STOCK

General

The following summary of our capital stock is based on certain provisions of our amended and restated certificate of incorporation, as amended, and bylaws and on the applicable provisions of the Delaware General Corporation Law, or DGCL. This summary does not purport to be complete and is qualified in its entirety by reference to the applicable provisions in our amended and restated certificate of incorporation, as amended, and bylaws and the DGCL. For a complete description you should refer to our amended and restated certificate of incorporation, as amended, and our amended and restated bylaws, copies of which have been incorporated by reference herein, and to the applicable provisions of the Delaware General Corporation Law.

Our authorized capital stock consists of 250,000,000 shares, with a par value of $0.01 per share, of which:

- 255,000,000 shares are designated as Common Stock; and
- 5,000,000 shares are designated as undesignated preferred stock.

On May 24, 2017, our Annual Meeting of Stockholders approved an amendment to our amended and restated certificate of incorporation, as amended, authorizing a reverse stock split of our Common Stock. A one-for-ten ratio for the reverse stock split was subsequently approved by our board of directors and the reverse stock split took effect on May 30, 2017. As a result of the reverse stock split, every ten shares of our Common Stock were automatically combined and converted into one issued and outstanding share of our Common Stock, with no change in the par value per share. All share amounts, per share amounts and share prices in this prospectus supplement have been adjusted to reflect the reverse stock split.

Common Stock

The holders of our Common Stock are entitled to one vote per share on all matters submitted to a vote of our stockholders and do not have cumulative voting rights. Subject to preferences that may be applicable to any preferred stock outstanding at the time, the holders of outstanding shares of Common Stock are entitled to receive ratably any dividends declared by our board of directors out of assets legally available. Upon our liquidation, dissolution or winding up, holders of our Common Stock are entitled to share ratably in all assets remaining after payment of liabilities and the liquidation preference of any then outstanding shares of preferred stock. Holders of Common Stock have no preemptive or conversion rights or other subscription rights. There are no redemption or sinking fund provisions applicable to our Common Stock.

Preferred Stock

Our amended and restated certificate of incorporation, as amended, authorizes it to issue up to 5,000,000 shares of $0.01 par value undesignated preferred stock. Our board of directors may designate the rights, preferences, privileges and restrictions of the preferred stock, including dividend rights, conversion rights, voting rights, terms of redemption, liquidation preference, sinking fund terms and the number of shares constituting any series or the designation of any series. As of July 31, 2017, no preferred stock was issued or outstanding.

Warrants

As of July 31, 2017, we had warrants outstanding to purchase 964,084 shares of our Common Stock.

Anti-Takeover Provisions

Certain provisions of the DGCL and our amended and restated certificate of incorporation, as amended, and bylaws may have the effect of delaying, deferring or discouraging another party from acquiring control of our company. These provisions, which are summarized below, may discourage certain types of coercive takeover practices and inadequate takeover bids and encourage anyone seeking to acquire control of our company to first negotiate with our board of directors. These provisions might also have the effect of preventing changes in our

management and could make it more difficult to accomplish transactions that stockholders might otherwise deem to be in their best interests. However, we believe that the advantages gained by protecting our ability to negotiate with any unsolicited and potentially unfriendly acquirer outweigh the disadvantages of discouraging such proposals, because, among other reasons, the negotiation of such proposals could result in improving their terms.

Amended and Restated Certificate of Incorporation and Bylaw Provisions

Our amended and restated certificate of incorporation, as amended, and bylaws include a number of provisions that may have the effect of delaying, deferring or discouraging another party from acquiring control of our company or preventing changes in our management, including the following:

- *Issuance of Undesignated Preferred Stock* . Our board of directors has the authority, without further action by the stockholders, to issue up to 5,000,000 shares of undesignated preferred stock with rights, preferences and privileges designated from time to time by our board of directors without further action by stockholders. These rights, preferences and privileges could include dividend rights, conversion rights, voting rights, terms of redemption, liquidation preferences and sinking fund terms, any or all of which may be greater than the rights of Common Stock.

- *Size of the Board of Directors and Filling Vacancies* . The number of directors constituting our board of directors may be set only by resolution adopted by a majority vote of our entire board of directors. Any vacancy on our board of directors, however occurring, including a vacancy resulting from an increase in the size of the board of directors, may only be filled by the affirmative vote of a majority of our directors then in office, even if less than a quorum.

- *Classified Board* . Our board of directors is divided into three classes of directors, with staggered three-year terms. Only one class of directors will be elected at each annual meeting of our stockholders, with the other classes continuing for the remainder of their respective three-year terms.

- *No Cumulative Voting* . Our amended and restated certificate of incorporation, as amended, and bylaws do not permit cumulative voting in the election of directors. Cumulative voting allows a stockholder to vote a portion, or all of its shares for one or more candidates. The absence of cumulative voting makes it more difficult for a minority stockholder to gain a seat.

- *Removal of Directors* . Directors can only be removed by our stockholders for cause and removal of a director will require a 75% stockholder vote.

- *No Written Consent of Stockholders* . All stockholder actions are required to be taken by a vote of the stockholders at an annual or special meeting. Stockholders may not take action by written consent in lieu of a meeting. The inability of stockholders to take action by written consent means that a stockholder would need to wait until the next annual or special meeting to bring business before the stockholders for a vote.

- *Special Meetings of Stockholders* . Special meetings of our stockholders may be called only by our board of directors acting pursuant to a resolution approved by the affirmative vote of a majority of the directors then in office. Only those matters set forth in the notice of the special meeting may be considered or acted upon at a special meeting of our stockholders.

- *Advance Notice Requirements for Stockholder Proposals and Director Nominations* . Our amended and restated bylaws provide advance notice procedures for stockholders seeking to bring business before our annual meeting of stockholders or to nominate candidates for election as directors at our annual meeting of stockholders. These procedures provide that notice must be given in writing not later than

the close of business on the 90 th day nor earlier than the close of business on the 120 th day prior to the first anniversary of the preceding year's annual meeting. These procedures may have the effect of precluding the conduct of certain business at a meeting if the proper procedures are not followed or may discourage or deter a potential acquirer from conducting a solicitation of proxies to elect its own slate of directors or otherwise attempt to obtain control of us.

- *Amendment to Amended and Restated Certificate of Incorporation and Bylaws* . Any amendment, repeal or modification of certain provisions of our amended and restated certificate of incorporation and bylaws requires a 75% stockholder vote. Provisions requiring such supermajority vote include, among other things, any amendment, repeal or modification of the provisions relating to the classification of our board of directors, the requirement that stockholder actions be effected at a duly called annual or special meeting of our stockholders and the designated parties entitled to call a special meeting of our stockholders.

Section 203 of the DGCL

We are subject to Section 203 of the DGCL. In general, Section 203 of the DGCL prohibits a publicly held Delaware corporation from engaging in a "business combination" with an "interested stockholder" for a three-year period following the time that this stockholder becomes an interested stockholder, unless it satisfies one of the following conditions:

- the transaction is approved by the board of directors prior to the time that the interested stockholder became an interested stockholder;
- upon consummation of the transaction which resulted in the stockholder becoming an interested stockholder, the interested stockholder owned at least 85% of the voting stock of the corporation outstanding at the time the transaction commenced; or

In general, Section 203 defines "business combination" to include the following:

- at or subsequent to such time that the stockholder became an interested stockholder, the business combination was approved by the board of directors and authorized at an annual or special meeting of stockholders by at least two-thirds of the outstanding voting stock which is not owned by the interested stockholder.
- any merger or consolidation involving the corporation and the interested stockholder;
- any sale, lease, exchange, mortgage, pledge, transfer or other disposition of the assets of the corporation with an aggregate market value of 10% or more of either the aggregate market value of all assets of the corporation on a consolidated basis or the aggregate market value of all of the outstanding stock of the corporation involving the interested stockholder;
- subject to certain exceptions, any transaction that results in the issuance or transfer by the corporation of any stock of the corporation to the interested stockholder;
- any transaction involving the corporation that has the effect of increasing the proportionate share of the stock or any class or series of the corporation beneficially owned by the interested stockholder; or
- the receipt by the interested stockholder of the benefit of any loans, advances, guarantees, pledges or other financial benefits by or through the corporation.

In general, Section 203 defines an "interested stockholder" as an entity or person who, together with the stockholder's affiliates and associates (as defined in Section 203), beneficially owns, or within three years prior to the time of determination of interested stockholder status did own, 15% or more of the outstanding voting stock of the corporation.

Treatment of Options Upon Change of Control

In general, under the terms of our Stock Option and Incentive Plans and our Stock Issuance Plan and our executive employment agreements, in the event of certain change in control transactions, if the successor corporation does not assume our outstanding options or issue replacement awards, or if an option holder's employment is involuntarily terminated in connection with such change in control, the vesting of the options outstanding under such plans will accelerate.

Transfer Agent and Registrar

The transfer agent and registrar for our Common Stock is American Stock Transfer & Trust Company, LLC. The transfer agent's telephone number is (718) 921-8200.

Stock Exchange Listing

Our Common Stock is listed on the Nasdaq Capital Market under the symbol YTEN.

DISCLOSURE OF COMMISSION POSITION ON INDEMNIFICATION FOR SECURITIES ACT LIABILITIES

Insofar as indemnification for liabilities arising under the Securities Act may be permitted to directors, officers, and controlling persons of the registrant pursuant to the foregoing provisions, or otherwise, the registrant has been informed that in the opinion of the Securities and Exchange Commission such indemnification is against public policy as expressed in the Securities Act and is, therefore, unenforceable.

LEGAL MATTERS

Mintz, Levin, Cohn, Ferris, Glovsky and Popeo, P.C., Boston, Massachusetts, will pass upon the validity of the issuance of the securities offered by this prospectus.

EXPERTS

The consolidated financial statements of Yield10 Bioscience, Inc. as of December 31, 2016, and for the year then ended, incorporated in this prospectus by reference from the Yield10 Bioscience, Inc. Annual Report on Form 10-K for the year ended December 31, 2016 have been audited by RSM US LLP, an independent registered public accounting firm, as stated in their report thereon (which expresses an unqualified opinion and includes an explanatory paragraph relating to the Company's ability to continue as a going concern), incorporated herein by reference, and have been incorporated in this prospectus and registration statement in reliance upon such report and upon authority of such firm as experts in accounting and auditing.

The financial statements for the year ended December 31, 2015 incorporated in this Prospectus by reference to the Annual Report on Form 10-K for the year ended December 31, 2016 have been so incorporated in reliance on the report (which contains an explanatory paragraph relating to the Company's ability to continue as a going concern as described in Note 1 to the financial statements) of PricewaterhouseCoopers LLP, an independent registered public accounting firm, given on the authority of said firm as experts in auditing and accounting.

WHERE YOU CAN FIND MORE INFORMATION

We file annual, quarterly and other periodic reports, proxy statements and other information with the SEC. You can read our SEC filings over the Internet at the SEC's website at www.sec.gov. You may also read and copy any document we file with the SEC at its public reference facilities at 100 F Street NE, Washington, D.C. 20549. You may also obtain copies of these documents at prescribed rates by writing to the Public Reference Section of the SEC at 100 F Street NE, Washington, D.C. 20549. Please call the SEC at 1-800-SEC-0330 for further information on the operation of the public reference facilities.

Our Internet address is *www.yield10bio.com* . There we make available free of charge, on or through the investor relations section of our website, annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and amendments to those reports filed pursuant to Section 13(a) or 15(d) of the Exchange Act as soon as reasonably practicable after we electronically file such material with the SEC. The information found on our website is not part of this prospectus supplement or the accompanying prospectus.

INCORPORATION OF CERTAIN DOCUMENTS BY REFERENCE

The SEC allows us to "incorporate by reference" much of the information we file with them, which means that we can disclose important information to you by referring you to those publicly available documents. The information that we incorporate by reference in this prospectus is considered to be part of this prospectus. Because we are incorporating by reference future filings with the SEC, this prospectus is continually updated and those future filings may modify or supersede some of the information included or incorporated in this prospectus. You should refer to the registration statement, including the exhibits, for further information about us and the securities we may offer pursuant to this prospectus. Statements in this prospectus regarding the provisions of certain documents filed with, or incorporated by reference in, the registration statement are not necessarily complete and each statement is qualified in all respects by that reference. We incorporate by reference into this prospectus the documents listed below and any future filings made by us with the SEC under Sections 13(a), 13(c), 14 or 15(d) of the Exchange Act

(1) after the date of this prospectus and prior to the time that all of the securities offered by this prospectus are sold or the earlier termination of the offering, and (2) after the date of the initial registration statement of which this prospectus forms a part and prior to the effectiveness of the registration statement (except in each case in which the information contained in such documents is “furnished” and not “filed”). The documents we are incorporating by reference as of their respective dates of filing are:

- Annual Report on Form 10-K for the year ended December 31, 2016, filed with the SEC on March 30, 2017;
- the portions of our Definitive Proxy Statement on Schedule 14A that are deemed "filed" with the SEC under the Securities Exchange Act of 1934, as amended, filed on April 12, 2017;
- Quarterly Reports on Form 10-Q filed with the SEC on May 12, 2017 and August 11, 2017;
- Current Reports on Form 8-K filed with the SEC on January 3, 2017, January 5, 2017, January 6, 2017, January 11, 2017, January 26, 2017, March 2, 2017, May 26, 2017, June 13, 2017, June 27, 2017, July 5, 2017 and August 17, 2017; and
- The description of our common stock contained in Item 1 of our Registration Statement on Form 8-A filed with the SEC on November 6, 2006, including any amendments or reports filed for the purpose of updating the description.

We will provide, without charge to each person, including any beneficial owner, to whom this prospectus is delivered, upon written or oral request of such person, a copy of any or all of the documents incorporated herein by reference other than exhibits, unless such exhibits are specifically incorporated by reference into such documents or this document. Requests for such documents should be addressed in writing or by telephone to:

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