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PRESENTATION

Operator

Good afternoon, and welcome to Arcadia Biosciences Year-End 2019 Earnings Conference Call. Today's presenters will be Matt Plavan, President and CEO; Sarah Reiter, Chief Commercial Officer; and Pam Haley, CFO.

This call is being webcast, and you can refer to the company's press release at arcadiabio.com.

Before we start, we would like to remind you that Arcadia Biosciences will be making forward-looking statements on this call based on current expectations and currently available information. However, since these statements are based on factors that involve risks and uncertainties, the company's actual performance and results may differ materially from those described or implied today. You can review the company's safe harbor language in their most recently filed 10-K and on Page 8 of today's press release.

With that, I'll now turn the call over to Matt Plavan, President and CEO.

Matthew T. Plavan - *Arcadia Biosciences, Inc. - President, CEO & Director*

Thank you, operator, and thanks to everyone who is joining us on the call today from their homes or wherever you may be sheltered in place. We very much appreciate you taking the time to tune in today.

Today, we'll briefly discuss our successes in 2019, where we built the foundations that paved the way for exceptional growth, and then update you on our progress so far in 2020 and our outlook for the rest of the year.

Dialing the lens back on 2019, without a doubt, the legalization of hemp cultivation in late 2018 opened the floodgates for new products in health, wellness and industrial application markets, creating an unparalleled opportunity in agriculture over the past century. CBD has quickly become ubiquitous as a health and wellness product ingredient, with sales topping a whopping \$4 billion globally in 2019, with other cannabinoids like CBG, CBN also getting traction and multiple other industrial applications queuing up. And as you've probably read, estimates for the retail value of products derived from hemp in this decade alone approaches \$30 billion. However, what we also know is that hemp is essentially undomesticated and will only achieve its full potential if the underlying genetics are improved to the level of broad acre row crops like wheat, corn and soy. Therefore, it logically follows that the opportunity for market-leading providers of quality hemp seeds and genetics in this market will be compelling to say the least. And with Arcadia's proven plant transformation capabilities in the very crops that I just mentioned, wheat, corn and soy, to have genetic improvement opportunity is tailor-made for Arcadia, and therefore, where we spent much of our R&D focus and cultivation accomplishments in 2019. And now we are rapidly building on the essential foundations of a leading hemp and cannabinoid extract provider.

Beginning in March 2019, we first established an advanced hemp research program situated across 3 diverse geographies. This new proprietary research discovery process that we branded ArcaTech combines modern breeding science and genomics technology with real-time market



intelligence from the field to produce superior varieties and new genetics. Through ArcaTech, we acquired new germplasm and began our accelerated breeding to develop and qualify the good hemp seed supply chain, enabling us to introduce the good hemp seed catalog and bring to market over half a dozen good hemp varieties, quality-verified and tested.

Through our Archipelago JV, we built our own vertically integrated Hawaiian good hemp supply chain, which is the foundation for a full commercial scaleup once either the state or federal rules to govern commerce go into effect by late summer. We now control good hemp cultivation, CBD extraction processing and channel sales of our branded Hawaiian products. I say channel sales because on Monday, we signed and announced our agreement with Vivion Specialties to certify and distribute our Hawaiian hemp products by managing the stateside marketing and sales of our Archipelago Hawaiian-produced products in key North American markets like food and beverage, human and pet nutrition and personal care.

When it comes to hemp and hemp-derived products like CBD, ingredient transparency and quality control are a high priority for discerning retailers and shoppers. Our partner, Vivion, has pioneered a new and rigorous standard for testing and certification of premium ingredients like those from hemp, known as VivAssure. VivAssure guarantees products are free of more than 950 contaminants, including pesticide residues, heavy metals and microbial organisms. We spent a lot of time in their labs evaluating their processes, understanding their capabilities and their 60-year history. And we're convinced that they -- that we've selected the best partner, not only to ensure our final product quality, but to most effectively market and distribute our premium Hawaiian-grown hemp-extract CBD ingredients.

As for our GoodWheat portfolio of products, in 2019, importantly, we snapped the legal deadlock between Arcadia and Arista regarding the rights to our RS Wheat and where each party is authorized to sell globally. We also harvested more than 2,300 acres of GoodWheat varieties on 10x more acres in 2019 than in the previous year, supplying us with enough to meet our grain and seed supply targets for 2020 sales.

Lastly, in 2019, we made excellent progress expanding the number of countries approving for sale our HB4 drought-tolerant herbicide-resistant soybean stack, now exceeding more than 80% of the global soybean market, including U.S., Brazil, Argentina and, most recently, Paraguay.

Now let's talk about how we are building on these foundations in 2020. In hemp, a vital element of our strategy to become a market leader in high-value hemp seeds, varieties and traits is deploying the best breeding technologies in close partnership with the hemp grower community. A number of elite growers are enrolling in our good hemp innovation partners program, which is located in 6 major hubs, including Hawaii, the Pacific Northwest, Southern California, Northern California and the Desert Southwest and the Mountain West. They have begun providing invaluable feedback to us regarding their experiences, the good, the bad and the ugly, which we're using to inform our development strategies. And as we anticipated, interest in our developmental varieties is very high amongst the majority of our grower partners.

Also, interest in our good hemp new reliables remains strong and continues to grow. In fact, as of this moment, we've secured backlog purchase commitments exceeding \$3.7 million. These represent minimum order commitments from retailers and growers for our seeds to be delivered for the spring and summer plantings in 2020 and represent take-or-pay contracts that must be fulfilled no later than November of 2020. As these are take-or-pay agreements, the backlog revenue we are disclosing represents the minimum expectation for each contract. In reality, we expect the actual number of seeds sold will exceed these minimums, and in some cases, significantly. And we continue to entertain strong interest above and beyond these commitments, and we look forward to making more of our seeds available to meet these demands in 2020.

With our joint venture, Archipelago, we have tested upwards of half a dozen different hemp varieties in Hawaii and have brought several more onto the island for testing through the Hawaii Department of Agriculture's importation protocol. Since launching our pilot program just over a year ago, we've gathered highly valuable intel and experience with Hawaiian hemp agronomy, which we are now putting to good use as we ramp up our acreage and prepare for initial production harvests, CBD extraction and, ultimately, the sales of our proprietary products in coming weeks. We expect to have preliminary results from our JV to report to you in our upcoming Q1 earnings call in May.

As for GoodWheat, feedback from our partners continuing to test our GoodWheat varieties, suffice it to say, are quite strong. The results continue to exceed our own expectations for formulation, taste and baking performance of our variety -- our varieties in the hands of those evaluating our products. Sarah is going to continue to walk us through that and talk through that when we get to her section regarding these positive reports and our sales prospects for 2020.

Furthermore, as also reported in recent news, we continue to increase the strength of our intellectual property that protects our high-value traits for both RS and RG wheats.

Regarding our HB4 soybean, as recently announced in connection with our Verdecia joint venture, early participants in our HB4 program in Argentina are now able to begin testing the drought, salinity and glufosinate-tolerant soybean trait in their own fields. We are planning for the potential of more than 100,000 acres of seed production during the next crop season. We continue to evaluate the impacts of recent events on the timing of the expected approval of HB4 by Chinese regulators. That regulatory approval may impact commercial launch timing in Argentina, but the timing of access to North American markets is not expected to be affected.

ArcaTech, our proprietary rapid plant transformation platform, is well staffed and running at full throttle with 30 dedicated scientists, including 5 with PhDs and 6 with Masters degrees. Our in-house genomics, bioinformatics and advanced breeding programs are on track. This summer, we are targeting the launch of 6 new hemp prototype varieties for on-farm evaluation through our hemp innovation partner farmer network. These new varieties were deployed -- were developed to provide hemp farmers with better returns through higher yields, improved compliance rates, optimized cannabinoid profiles, architectural improvements, allowing for easier machine harvest and disease resistance.

We've also established a research pipeline to consistently deliver new hemp varieties that address challenges and deliver value, not just to the cannabinoid market segments, but also the growing grain and industrial fiber hemp markets.

Additionally, we've developed a network of cooperators across the U.S. and will be conducting multi-location hemp research trials in 2020 and beyond. These trials will enable us to better understand how varieties perform in different geographies, setting the stage for expansion in 2021.

So in summary, we are well on our way to establishing an industry-leading library of unique and high-value traits that will elevate available hemp genetics to that of traditional broad acre crops like wheat, soy and corn, and to do so very rapidly by architectural standards. Of course, we also expect the corresponding value of our hemp estate to be commensurate with the value of seed genetics for those same crops.

With that, I'd like to turn the call over to Sarah for a more detailed update on our commercial update. Sarah?

Sarah Reiter - Arcadia Biosciences, Inc. - Chief Commercial Officer

Thanks, Matt, and thanks to those of you listening in from wherever you are for your time. I'm going to provide a sneak peek into the recent commercial activities and our expectations.

In wheat, we continue to progress toward global launch of several GoodWheat varieties. 2019 brought our agreement with Bay State Milling and Arista Cereal Technologies, which cleared the way for North American launch of our high-fibered GoodWheat, exclusively through Bay State under the HealthSense umbrella. Our first seed sales to Bay State occurred in fourth quarter, as we anticipated. However, inhospitable weather and the accompanying increase in disease across the upper Midwest in the 2019 season did not leave us unscathed. We lost several grain production fields, reducing our initial sale by about \$250,000. The good news is that's the full extent of the impact, and in 2020, we'll support Bay State's expanded go-to-market plan with additional seed sales coming for spring planting. The February announcement of Bay State's new million-bushel elevator for specialty wheat highlights their expectations for the HealthSense brand of high-amylose wheat. An elevator of that volume is a necessity for the scaled rollout and innovation of this caliber demand.

In December, we also rolled out a limited retail release of GoodWheat Reduced Gluten flour, which reduces the allergenic components of gluten 65% or more. Additionally, the wheat is high in fiber and is about 30% lower in calories than standard all-purpose flour. Our limited supply sold out by the end of January and is currently being enjoyed by home bakers. The limited commercial release enabled us to validate earlier market research that had indicated a novel consumer segment we will call gluten reducers. These consumers reduce rather than replace wheat in their diets and are not diagnosed for celiac disease. The sellout validates our plans to expand farming of the GoodWheat Reduced Gluten variety as well as to expand product development among a number of new CPG partners who have begun testing the flour ingredient in their products since early December. Since then, 5 new companies have begun their evaluations in products as diverse as beer, pasta and bread.

As we discussed in the last earnings call, we continued progress among the list of global food companies evaluating the GoodWheat portfolio of improved wheats. In fact, target customers continued to pass key milestones in their R&D programs. For example, a major European company recently completed very positive market testing, where our GoodWheat products scored very favorably in terms of performance as a functional ingredient and in terms of taste. We remain on track to close commitments with a number of multinational, regional and local companies, and we expect to announce several consumer foods and food service companies carrying foods made with GoodWheat in 2020, well within the time frame required to meet our revenue expectations this year.

Our commercial team was also busy in 2019, preparing for the launch of good hemp. And our R&D and supply chain teams quickly went to work creating new seed products for us to bring to market. In December, we launched our hemp seed line at the American Seed Trade Association trade show with a special event featuring hemp-based foods, CBD drinks and a fireside chat with hemp farmers. These farmers, one from North Dakota and one from Oregon, discussed the challenges they experienced as hemp seed buyers and growers. Their experiences, everything from poor germination, inaccurate feminization rates to outright dishonest sales tactics underscore the reasons Arcadia entered the seed market in 2019.

There is clearly a high degree of enthusiasm among American farmers, and there are today many more acres approved for growing hemp. 17 states continued to operate under the 2014 pilot rules, 9 states are currently under review at USDA, 4 states are drafting new proposals, and 2 states are redrafting proposals. 12 states have already been approved by USDA, and 1 state has deferred to allow their growers to participate under the USDA's license. Support for commodity growers to cultivate hemp continues to grow as they begin to gain access to crop insurance, subsidies and grants become available, and we expect hemp to become a mainstream alternation option to commodity crops like cereals, beans, vegetables or cotton.

In turn, as more growers learn to grow this crop, the demand for reliable, standardized, high-performing varieties increases. That's a major reason we announced our -- last week, our plans to work with Buttonwillow Warehouse Company and Grow West, 2 of California's best farming input distributors to expand our market reach among California growers. These companies work every day alongside farmers to optimize harvest across many crops. And because their footprint -- of the footprints of these 2 partners, we feel confident we can reach every California hemp production acre. We believe, as do many of our peers, that the floodgates to the downstream market will open wide as U.S. FDA issues guidance as to the process and time line for evaluating CBD as a dietary ingredient in foods, beverages and supplements. Many consumer packaged goods companies are positioning themselves to make ambitious entry into the market once FDA's position becomes clear. For example, recent press coverage highlighted that the Unilever-owned Ben & Jerry's ice cream line has plans to produce CBD-infused frozen treats once regulations are a bit clearer. And Molson Coors established a controlling interest in Hydropothecary Corporation, which introduced sparkling CBD, a line of hemp-derived CBD sodas and sparkling beverages in Colorado.

CBD, as a product ingredient, has made even deeper inroads in cosmetics and personal care. Some major recognizable companies have already taken the leap into the CBD space. For example, Estée Lauder, Unilever with their brand, Murad, and L'oréal with their brand, Kiehl's, have all introduced hemp-based products into the U.S. market in the last 6 months.

Recent comments from FDA's newly appointed commissioner, Stephen Hahn, on February 26, acknowledged CBD products are here to stay. Said the commissioner, "People are using these products. We're not going to be able to say, you can't use these products. It's a fool's game to try to even approach that." And Commissioner Hahn further recognized that, "We have to be open to the fact that there might be some value in these products and, certainly, Americans think that's the case, but we want to get them information to help them make the right decisions."

New guidance on CBD products has also been issued in the United Kingdom by its Food Standards Agency. This guidance allows current CBD products to remain on shelves, but requires businesses to submit novel food authorization applications by March 31, 2021. After that date, only products for which the FSA has a valid application will be allowed to remain in the market. This guidance should facilitate the availability of regulated CBD products in the U.K.

The World Health Organization also recently weighed in on CBD products, emphasizing CBD is not subject to control under the 1961 Single Convention because it shows no potential for abuse or dependence and no -- and any ill effects are minimal. In its January 31, 2020 report for the UN Commission on narcotic drugs, the World Health Organization stated, "It was aware that CBD products such as food are being sold in many countries and that member states can regulate its availability using their own national legislation." As a company with a history of successful

approvals of novel dietary ingredients by FDA, we welcome their oversight. We look forward to the opportunity to provide data in support of the analysis of the safety of CBD and hemp-derived oils. We applaud the proactive efforts FDA described in their March 5, 2020 update to Congress in which the agency said it's taken, "a highly proactive approach to analyzing relevant safety questions" about CBD, considering the significant public interest in CBD supplements. It wrote, "Rather than waiting for data to be submitted, we've been actively working to identify and review all available data to understand the risk profile of CBD and the potential for CBD to be used safely in dietary supplements under certain conditions of use." We look forward to the next scheduled step in FDA's process, the results of their CBD product sampling study due to be reported to Congress by June 20 of this year.

Finally, let's turn to soybeans and our progress with the introduction of HB4 drought and herbicide tolerant soybeans globally. In November of '19, we announced the regulatory approval of the HB4 trait by Paraguay. This means this new technology which ensures yield under drought and other environmental stresses now has regulatory approval in more than 80% of the global soybean market. The trait has already been approved in the United States, in Argentina and Brazil with regulatory submissions currently under consideration by China, among other relevant production and consumption territories. At the Expoagro trade fair in Argentina earlier this month, Verdecia, our joint venture with Bioceres Crop Solutions, presented field plots of HB4 soybeans, demonstrating the trait stack tolerance to drought, salinity and glufosinate herbicide. Early adopters to the HB4 program can evaluate the trait in their own fields, and Verdecia is currently scaling seed production of the pre-commercial varieties on more than 7,400 acres and has developed the potential to expand seed production to more than 100,000 acres in the upcoming season. Approval from China is needed for commercial launch in Argentina and has been expected in late 2020. We continue to monitor recent events to measure the impacts of the timing of our broad market introduction in Argentina.

With that, I'll turn it over to Pam to discuss our financials. Pam?

Pamela Haley - Arcadia Biosciences, Inc. - CFO

Thank you, Sarah. As we've discussed throughout the year, our financial results in 2019 were going to reflect the impact of our transformation from a predominantly research and licensing business model to one of a consumer products, health and ingredients company. We see the impact of these factors on our overall revenue in the fourth quarter and in the full year. Our legacy revenue sources have wound down as we shift to new revenue sources in 2020, contributing to a 6% reduction in revenues this quarter over the prior year fourth quarter and a 20% reduction for the full year over annual 2018. We've continued to invest in key added resources and external expertise we deem necessary for success as a commercial company. And as such, our annual 2019 operating expense was \$2.2 million greater than in annual 2018.

Operating expense for the current quarter was \$393,000 or 8% lower than in the fourth quarter of 2018, primarily due to a \$1 million noncash gain related to the reduction in the fair value of the company's contingent consideration liability.

Total R&D expense was \$166,000 higher for the quarter and \$1 million higher year-to-date as compared to 2018. The increase for fourth quarter was primarily due to higher employee-related expenses and hemp-related costs. The drivers for the year-to-date increase were consistent with the fourth quarter increase along with additional soybean pre-commercial activities.

Total SG&A expense was \$110,000 higher in the fourth quarter of 2019 than in the fourth quarter of 2018 and \$2 million higher year-to-date. The increase for both periods was mostly due to higher employee-related expenses, hemp-related consulting fees and marketing activities during 2019. The annual unfavorability was partially offset by strategic advisory costs recognized in 2018, but not present in 2019.

Net loss attributable to common stockholders for the fourth quarter of 2019 was \$6.2 million compared to \$646,000 in the fourth quarter of 2018. The registered direct offerings completed in June and September resulted in the recording of liabilities with significant noncash charges that hit the P&L, as the liabilities were remeasured at the end of the applicable quarters. Please refer to footnote 11 in our 10-K for a detailed description of the accounting for these transactions.

Regarding our liquidity and capital resources, cash on hand, cash equivalents and short-term investments totaled \$25.3 million at the end of the year. Our net cash used in operating activities for 2019 was \$17.2 million, and the equity offerings generated \$17.5 million of gross proceeds in 2019 along with \$5.3 million of proceeds from the exercise of investor warrants.

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That wraps up our financial highlights for 2019. Thank you for your time and attention today. And with that, I'd like to now turn the call back over to Matt for a wrap-up. Matt?

Matthew T. Plavan - *Arcadia Biosciences, Inc. - President, CEO & Director*

Thanks, Pam. In closing, we are energized by the foundations laid in 2019 and how well positioned we are to achieve our growth goals in '20 and '21. As we take stock of our progress so far this year in the context of our outstanding guidance, we remain confident we will achieve our projections to exceed \$10 million in revenues in 2020. Our confidence lies in a few factors. First, our strong minimum backlog commitment for good hemp seed orders early this year and the breadth of the ongoing interest for more in 2020. Also, we're beginning to harvest our biomass from our Hawaiian hemp acreage and will begin soon processing the extracts for CBD sales. And lastly, we remain on track to scale up our wheat sales as planned this year.

However, I would be remiss if I were not to caveat our confidence in achieving our guidance subject to the unknown forward implications of the coronavirus. Although, agriculture is deemed an essential industry, meaning our growers, ourselves and the rest of our supply chain are able to continue operating despite the current quarantine conditions, should market conditions worsen significantly or it become apparent that the current conditions are likely to extend over a longer period of time, we'll have to evaluate and reset our guidance at that time.

And with that, I'll turn the call over to you all for questions. Thank you.

QUESTIONS AND ANSWERS

Operator

(Operator Instructions) Our first question comes from Ram Selvaraju with H.C. Wainwright.

Raghuram Selvaraju - *H.C. Wainwright & Co, LLC, Research Division - MD of Equity Research & Senior Healthcare Analyst*

Congratulations on all the progress. I was wondering, if you can first comment on the revenue guidance and what you expect the relative split to be between the hemp and wheat product lines.

Matthew T. Plavan - *Arcadia Biosciences, Inc. - President, CEO & Director*

Thanks, Ram. I think at the beginning of the year, we probably would have said, it was a race to see who was going to be the majority between those 2. But I think at this point, we'd be more comfortable saying that between the hemp seed sales and the CBD sales, they are likely to dominate revenues. But I think we still have a pretty good shot at pulling in a meaningful amount of wheat as well. But if I had to give you a split, I would definitely err towards more on the hemp side.

Raghuram Selvaraju - *H.C. Wainwright & Co, LLC, Research Division - MD of Equity Research & Senior Healthcare Analyst*

So like, it's reasonable to say it might potentially be 60-40 in favor of hemp, right?

Matthew T. Plavan - *Arcadia Biosciences, Inc. - President, CEO & Director*

Yes, that is reasonable.



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Raghuram Selvaraju - *H.C. Wainwright & Co, LLC, Research Division - MD of Equity Research & Senior Healthcare Analyst*

Okay. Can you provide some commentary on the impact of social distancing and the broader economic downturn in the United States on wheat consumption in general? If you're seeing any directionality with respect to that?

Matthew T. Plavan - *Arcadia Biosciences, Inc. - President, CEO & Director*

Yes, yes. Thanks for that question as well. It's a good one, and Sarah has a good answer for that.

Sarah Reiter - *Arcadia Biosciences, Inc. - Chief Commercial Officer*

Yes. So thanks, Ram. It's a great question. For those of us who've been to the grocery store, we've obviously seen the transition away from being able to eat out in quarantine areas to home cooking, and that has meant that most of the milling capacity in the United States has, in the past 10 days, shifted to 24/7 production. The grain industry is reporting about 180% week-on-week volume gain and reporting that the current production -- sorry, the current ship rate of what is called family flour, the flour that you or I encounter at the grocery store, is running better than holiday volumes, which is really unusual for March. There is a question about what this will look like long term, but certainly, the wheat industry or the pasta industry are both operating at full capacity and are meeting demand today and expect to be able to meet demands through their additional hours and additional capacity as we shelter in place.

Raghuram Selvaraju - *H.C. Wainwright & Co, LLC, Research Division - MD of Equity Research & Senior Healthcare Analyst*

Okay. That's very helpful. I also wanted to ask kind of in that same vein, whether you see added potential for GoodWheat's brand lines to potentially gain an additional foothold due to perhaps some supply chain disruption, maybe some changes and shifts in the overall wheat production segment within the United States. And also, if you can give me a sense -- a better sense at this juncture, of which GoodWheat line is likely to be the most popular? Reduced Starch or Reduced -- Resistance Starch or Reduced Gluten?

Sarah Reiter - *Arcadia Biosciences, Inc. - Chief Commercial Officer*

Well, as Matt said earlier, that's a bit of a horse race. I believe that over time, we will get a better sense. Frankly, the value of the Resistant Starch product is amazing. It brings 10x normal fiber value to a flour without having to go to a whole wheat presentation. So it's lovely for folks who want to eat pizza and want to eat bread and all sorts of wheat-based foods and still eat healthily. For Reduced Gluten, it has about 2 years lag in terms of our understanding of its fit in the market. And I believe that it will catch and potentially surpass the Resistant Starch, high-fiber material in the market. Because its offer is -- also includes an increase in fiber and the reduction in calories, I think it is a broader offer. So both are really compelling, and it's fabulous to have both in our portfolio.

You had another question. Oh, your other question was, how do we see our wheat fitting into the market. We're beginning to develop a view of that. And if you would allow us a few more weeks, I think we'll have a better perspective to come back to you with maybe at the next call. Clearly, there will be a demand for -- especially for things like durum, which is one of our Resistant Starch, high-fiber executions. Durum is a specialty flour, and we grow a desert durum, which is particularly valued for its use in pasta. And so certainly, we anticipate that our inventory of Reduced -- sorry, Resistant Starch, high-fiber durum will be hitting the market in 2020.

Raghuram Selvaraju - *H.C. Wainwright & Co, LLC, Research Division - MD of Equity Research & Senior Healthcare Analyst*

Okay. That's very helpful also. Just a very quick question here. How many production acres are accessible through Grow West and Buttonwillow? I mean just -- I think that equates to all the production acres in the state of Florida. Do you have a number on that?

Sarah Reiter - *Arcadia Biosciences, Inc. - Chief Commercial Officer*

It's actually all of California. If you give me a second, I will get you a number. I don't have it at the tip of my fingertips.

Matthew T. Plavan - *Arcadia Biosciences, Inc. - President, CEO & Director*

Suffice it to say, anybody who's growing -- a known sizable grower growing hemp is going to be accessible to us through either of those channels. Do you agree?

Sarah Reiter - *Arcadia Biosciences, Inc. - Chief Commercial Officer*

Yes. And their footprints are really interesting for us because they cover growers who grow crops as diverse as perennials, trees and vines, which aren't really available to hemp, but also tons of acres that are available in commodities like cereals, cotton, rice, up here at this end of the state, alfalfa. And we've seen not very healthy returns in some of those crops, which makes growers really interested in an alternation to a crop where they can be profitable.

Raghuram Selvaraju - *H.C. Wainwright & Co, LLC, Research Division - MD of Equity Research & Senior Healthcare Analyst*

Okay. Great. Yes, if you can provide the specific number of production acres in California when you get a chance, that would be helpful.

Matthew T. Plavan - *Arcadia Biosciences, Inc. - President, CEO & Director*

Yes. Thanks, Ram. We'll follow up with you afterwards with that information.

Operator

Our next question comes from Ben Klieve with National Securities.

Benjamin David Klieve - *National Securities Corporation, Research Division - Analyst*

First, on the hemp side, you talked about the likelihood that your backlog represents kind of the low bar, given that it's just minimum commitment. But can you talk about kind of the incremental opportunity that you think is still out there for the balance of the year to add additional purchase commitments, particularly from harvest that may come in the second half of the year that you can then market by the end of the year?

Matthew T. Plavan - *Arcadia Biosciences, Inc. - President, CEO & Director*

Sure. So that is right, Ben. The minimum number is simply a way to capture a minimum number of acres sold at a minimum seed price. Generally, the retailers are looking at a multiple of the number of minimum acres and an average, so to speak, of seed price. So let's say, somebody signs up for a minimum of 1,000 acres, they're probably more likely going to be bringing growers to us that will represent 1,500 to 2,000 acres with pricing for premium seed as well as nonpremium seed. So that's the first way to look at that minimum. As that comes in as revenue, it should be substantially more than the minimum. There are a couple of factors that are at play that we think are going to -- or we think have delayed some of the decisions for committing the seeds already that are going to dissipate. And so we think that in May, June, we will see a significant inflow of commitments that -- with growers that were waiting on the fence. And I think Sarah can -- I can defer to her to outline what a couple of those are, which I'm sure, you're probably aware of. So our expectations are that the number is going to continue to grow meaningfully over the next 90 days as growers make their decisions for the spring and summer plantings.



Sarah Reiter - *Arcadia Biosciences, Inc. - Chief Commercial Officer*

Yes, Ben, let me just add. We wouldn't want anyone to think that the \$3.7 million that we've talked about is the upper limit in hemp sales for this spring, it's not. The hemp season this year is a little bit disjointed in part because the transition that each of the states are making under the new USDA rules mean that states are coming online at different timings. You have to submit your state -- the program each state is going to operate under to the USDA, and USDA has 60 days to approve it. So what we're seeing is a staggered release of available acres in places like California and Florida, which just finished drafting their plans last week, in Georgia, in Texas. And so we see more and more acres coming on and available to us. And the majority of acres, actually, seed purchases occur a little bit later than we had maybe originally hoped. So you'll see, even if you look around industry publications, the majority of seed sales occur March, April, May and June. And so we're right on track to deliver our plans in hemp seed. And we can, obviously, with the next call, give you a better sense of that.

Benjamin David Klieve - *National Securities Corporation, Research Division - Analyst*

Okay. Perfect. Moving on to HB4, you talked about the kind of acreage expectations in South America, which seem to be unchanged from prior announcements. But I'm wondering, if you can elaborate a bit on kind of your expectations on bringing HB4 into North America. I know that's still ways off, but what are really the milestones you're hoping to hit here in 2020 as you move towards that end goal? What really can we look for here over the next 9 months out of North America for that product?

Matthew T. Plavan - *Arcadia Biosciences, Inc. - President, CEO & Director*

Sarah, what do you think?

Sarah Reiter - *Arcadia Biosciences, Inc. - Chief Commercial Officer*

So I think the milestones in North America are really about partnership and localization. So we have a plan to execute field trials that are about the traits performance on the germplasm that we're bringing from Argentina. Obviously, Argentine germplasm isn't going to grow in many parts of the U.S. soybean production areas very successfully, but it will grow in some of the drier and warmer areas. So we're evaluating that right now or planning to evaluate that in our 2020 field season. And we are also actively pursuing partnership with a number of different North American soybean seed companies, who would be bringing this trait to market under their portfolios if we are successful. We have Canadian registration underway. So that's another milestone. And we continue to work hard to bring this trait to market, either directly ourselves if we find that our germplasm performs effectively up here or through partners or both.

Benjamin David Klieve - *National Securities Corporation, Research Division - Analyst*

Got it. Okay. And then kind of a modeling question. Now that 2020 is going to be the first year that you have material product revenues, how can we think about kind of the evolution of cost of goods sold, R&D and SG&A this year as compared to 2019? And do you expect kind of any material shifting from OpEx, up to cost of goods sold as you now have a good to sell? Or can we look at the OpEx line staying relatively consistent with what you saw in kind of the back half of 2019?

Matthew T. Plavan - *Arcadia Biosciences, Inc. - President, CEO & Director*

Yes, that's the right question. I think we're going to see a lot of change in 2020 in terms of the financial metrics and proportionality. The -- I think it's fair to say that the uptick in our investment in R&D towards the back end of the year in '19 will continue into 2020. As the -- as was the sales and marketing costs, we're investing there as well. Don't expect it to ramp significantly during 2020, but we will start to have gross margin and some cost of sales. And I think cost of sales is going to be -- there is going to be an evolution there. I think that in addition to selling our premium seed this year, we're investing in seed production in 2020 for a meaningful scaleup in 2021, which will drive our cost of sales down substantially in 2021.



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So I want to -- I don't mind leading with some visibility into our expectation that although we think the margins of our good hemp seed sales this year will be good, we're positioning to make them very good in 2021. How, over what period of time in the back end of 2020 and 2021 that occurs, is difficult to predict, but I would expect that we're going to see strong margins back end and early part of 2021 in our hemp business. And we'll start to really experience and know what our margins are in wheat in 2020 as well. And that will vary depending upon the model we're selling through, whether it's a straight trait model or whether we're actually selling grain. So there is a lot of moving parts that we need to get comfortable with in 2020 before we can give better guidance than that. But I think it's good to have the conversation and let folks know that it is not our expectation that our operating expenses are going to need to change significantly in order to scale this business. We think there is a fair amount of leverage in our operating expenses.

Operator

And I'm showing no further questions in the queue at this time. I'd like to turn the call back to the speakers for any closing remarks.

Matthew T. Plavan - Arcadia Biosciences, Inc. - President, CEO & Director

Okay. Thank you, everyone, for joining the call and your continued interest and support. We'll continue working hard every day to bring new and improved healthy foods and wellness products to market while maintaining a single-minded focus on profitable growth. And we continue to report real time, our key milestone achievements in the lab, in the field and in the commercial market. So thanks, again, for tuning in, and we wish you all safety and good health in these very difficult times. Thank you.

Operator

Ladies and gentlemen, thank you for your participation on today's conference. This does conclude your program, and you may now disconnect.

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