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Q&A with Dr. Jerry Feitelson, Co-Founder and CEO of Agribody Technologies, Inc. using their Patented Genetic Technology to Significantly Increase Crop Yields and Global Food Supply

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CEOCFO: ***Dr. Feitelson, what is the focus at Agribody Technologies, Inc. today?***
Dr. Feitelson: Our mission is very simple. It is to expand the global food supply by significantly increasing crop yields using patented genetic technology.

CEOCFO: ***That is quite a mission. How do you make it happen?***
Dr. Feitelson: The company became fully operational last July when we acquired a set of 16 issued patents by full assignments, so we own them. Along with this IP, we purchased a couple of licenses and set out to do two things. One is to raise funding; the other is to obtain strategic partners. What is important to realize is that our customers are innovative seed companies. They are not directly farmers nor people who shop at organic food stores. Agribody Technologies, Inc. is interested in supporting innovative seed companies that are dissatisfied with current methods for improving crop yields.

CEOCFO: ***Would that be most of them?***
Dr. Feitelson: Probably. You could categorize seed companies many different ways. They could be in large-scale row crops, specialty crops, forage crops, biofuels, floriculture. They could be very large, multinational multibillion dollar revenue companies. They could be mid-sized companies or small companies. Our targets are comprised of the top tier Big Six, soon to be the Big Four or Three, depending on how you count. However, perhaps more likely are the mid-tier seed companies with $100 Mil to a few hundred $Mil dollars in sales, where they want to compete with the biggest ag chem companies and do so by releasing to their farmer customers proprietary seed varieties with higher yields that are also more tolerant to stress.

In a nutshell, our technology was developed by my cofounder: Professor John Thompson from the University of Waterloo. What John discovered about a dozen years ago was that in senescing leaves of *Arabidopsis* (a model plant), those that are getting old and starting to wither and die, the level of expression (amount of protein encoded) of one gene called DHS went way up. He knew that the target of the DHS protein is another protein called eIF-5A. You can think of these two genes and their protein products as a fundamental biological switch. It is probably one of the earliest, if not the earliest, switch in a cell that controls its fate. This means that a cell always has to decide whether to do one of two things: either it will continue to grow and divide or it will go into programmed cell death, also known as apoptosis in animals or senescence in plants. This switch activates a whole series of other downstream genes that cause the death of a cell. You might ask why do plants do this. The switch is universal. These same two proteins are found in all plants with very little

difference in their primary amino acid sequence. They are also found in all animal cells. The differences are very minor between the sequences of these two proteins in different species, suggesting they are very fundamental. They are really important or else evolution would have changed their sequence. In any case, the "decorator" protein DHS is highly elevated in senescing tissues. It adds an unusual chemical onto to the "decorated" protein, eIF-5A. As a result, cells are always determining the ratio between the "decorated" and "undecorated" forms of eIF-5A protein.

CEOCFO: ***How do you make the process work better?***
Dr. Feitelson: John intervened in the switch. If you can think of a light switch on or off, "on" means continued growth, "off" means programmed cell death. Usually in plants, since plants do not get cancer, it would be good to put this switch strongly in the "on" position. When he did this in *Arabidopsis*, either by decreasing the amount of "decorator" protein or increasing the amount of the "decorated" protein, he found that remarkable things happened. The plants grew much more robustly and their seed yields were many fold higher. In addition, after characterizing them more carefully, the plants were much more tolerant to abiotic stresses such as drought, lack of nutrients, high temperature, root crowding, and toxins in the soil such as salt or heavy metals. Therefore, these plants were just much more robust because cells that would normally be programmed to die did not do so. Here is how he explained it to me. Put yourself in the plants' shoes: you cannot run away, you are stuck in the same place your entire life. Therefore, when you are confronted with stress, such as in deciduous trees during the autumn, the leaves change color and then they fall off. This is an example of senescence. Those colorful leaves are returning their nutrients to the tree to help get it through a long winter without photosynthesis. Plants do that all the time when they are under stress. For example, there might be a few hours in the day when it might be a little too hot, or the soil is too dry or maybe there's not enough potassium. When the rain comes, the plants recover. Whatever it is, plants are always undergoing transient sublethal stresses. Those cells die and then when conditions get better, the plant has to re-synthesize those cells from scratch. In the case of the engineered cells, where the switch is left in the "on" position, those cells do not die. Therefore, when conditions get better then the plant does much, much better. That is the underlying basis of the technology. It is a permanent genetic change to one or the other gene in this switch. We have extensive intellectual property surrounding that switch whether you make more of one protein or less of the other. Plants with the resulting traits are claimed.

"Agribody Technologies, Inc. is interested in supporting innovative seed companies that are dissatisfied with current methods for improving crop yields."- Dr. Jerry Feitelson

CEOCFO: ***Would you explain to us how you get the switch into the plant?***
Dr. Feitelson: The original technology that Professor Thompson developed was transgenic. This means he up-regulated the "decorated" gene, or down-regulated the "decorator" gene - these are permanent genetic changes. That is, he made much more RNA for one or much less RNA for the other resulting in more or less protein, respectively. Therefore, it is essentially a genetic manipulation of this critical switch by changing the levels of expression of one or the other gene with the correct direction in the "on position." What we are doing now, and we filed patents on this last year, is using genome editing and that is really important. Genome editing is distinct from transgenics because of its very specific targeting. The resulting genome edited plants are not regulated by the USDA. Therefore, genome editing in the way we envision it is very simple. It is essentially taking a little piece out of the "decorator" gene by making a very small targeted deletion. Instead of making less of the normal protein, we make a normal amount of a defective protein. By making this small deletion in a critical part of the DHS gene, then that protein is still made at the normal amount, but it does not work or it works much less efficiently. We have essentially hobbled it. We have made it defective so it does not transfer the chemical that leads to the "decorated" gene. Therefore, we basically deactivate one of the two copies in a diploid plant species. Many crops have one set of chromosomes from mom and one set from dad, just like we do. So if you remove, through genome editing, a small piece of a critical part one of those two copies, then you would have 50% of the activity in the resulting plant cell. That is one half of the activity, which corresponds quite nicely to the level of down regulation that John did with many of his transgenic plants. What is also important to know is that this technology is universal; it applies to all plants. That is because: (1) the two genes are so highly conserved, and (2) John and collaborators showed that similar beneficial traits were produced in at least a dozen different species of plants. Therefore, we believe that all types of plants can be successfully modified: monocots, dicots, annuals, perennials, etc. He showed that tomatoes, bananas, carnations and other flowers last two to three times longer post-harvest with shelf life extension, which is very important to avoid food waste. He also showed reduction in diseases during growth, avoidance of plant stress, and dramatically higher seed yields. All of those phenotypes come as a direct result in all plants tested so far by flipping this fundamental switch controlling plant cell fate in the "on" position, so the cells continue to grow and divide.

CEOCFO: ***Do you start with one plant, grow into 10, then 100 and so on? How do you get to critical mass on any one particular plant or crop?***
Dr. Feitelson: I cannot give you a universal answer. Crops are really different. Take the case of potatoes. We licensed the technology to J.R. Simplot, the largest potato company in the country. Potato "seed" is a potato that sprouts and is then cut up into ten or so pieces with each sprout as a seed. It never goes through a fertile stage of flower-derived seeds. Therefore, the variety that was developed around 1907, Russet Burbank, is still the one being sold today, 110 years later. There has been no potato yield increase in more than a century. If Simplot could flip the switch using our technology and get even a 10% yield increase, that would significantly expand their market share and substantially improve their profits. This is an example where you can only amplify pretty slowly through about 10x at each generation. In the case of flowering plants, you can get 100x or even 1,000x in a single generation. The speed of seed amplification really depends on the particular crop.

The pathway is that you do the manipulation in the laboratory using well established genetic and tissue culture techniques. We'd prefer not to use *Agrobacterium* to introduce DNA into elite varieties because this bacterial species is a plant pathogen and the resulting improved varieties might be regulated under the laws controlling transgenic crops. We plan to implement genome editing similar to what many other groups have done: making a small deletion without introducing antibiotic or herbicide resistance genes, without changing the nutritional composition of the plant nor making it weedier, without introducing plant pathogenic sequences. This way, we'd remain outside of the 7 CFR Part 340 regulations, which means that our partners' improved seed products would be non-transgenic, they're not considered "GMO." It is just genome edited with a small deletion in the "decorating" gene that could occur naturally at a very low frequency. We just ensure it happens in all of the plants that we screen in the lab and greenhouse. Depending on the speed of tissue culture, the commercial development timeline is generally increased only by about one year compared to conventional plant breeding. The other very important thing to realize is that you can make these genetic improvements directly in most elite varieties. There is no need to first genome edit a highly transformable laboratory variety and then do many back crosses into the elite commercial variety. You can go right into most commercial lines assuming they are transformable; then you only add one year to what a breeder would do anyway. You can think of this as an advanced plant breeding technique; flipping the switch in favor of continued cell growth and simultaneously getting the other additional desirable new phenotypes. The bottom line in many cases is you have only added about a year to do the laboratory work and get it to the greenhouse where it can be evaluated and then scaled up.

CEOCFO: ***How are you reaching potential partners? What has been your strategy? What will be your strategy going forward?***
Dr. Feitelson: Of course, the best tactical approach is to get warm introductions. We want to reach the decision makers in seed companies, such as business development executives, who know and trust the referral source that tells them, "This emerging ag biotech company in San Diego, Agribody Technologies, has got some really cool technology. You might take a look at it, it could help your business." Therefore, warm introductions are by far the best. Other than that, we have been very successful going to pitch competitions. On our website under Business Development, you'll see that we have presented at many events during the last year and a half. Most of these were highly competitive, where dozens of companies in the Ag space applied and the organizers only admitted a few they thought had the most interesting stories. We have done very well in these types of competitions. Therefore, it's a way to help get the word out in a broader sense, whether it is a 3-, 4-, 6- or 12-minute pitch. I think our message resonates quite strongly in these forums.

CEOCFO: ***Are there many companies with a somewhat similar approach?***
Dr. Feitelson: Probably any startup that says they have no competition is either ignorant or misleading. Of course, we have competition. There are many companies trying to improve crop yields. If you think about it, there is almost a trifecta of critical global problems justifying immediate action in this space. (1) The UN predicts we will have an increasing population with over 1.9 billion new people on the planet by 2050, with a growing middle class demanding more meat in their diet. (2) Global climate change is causing unpredictable and extreme weather to which agriculture must adapt. (3) Quality agricultural land is not increasing. In fact, we are probably getting less suitable land and it's degrading. These comprise really critical needs for humanity. Some say we have to double crop yields in developing countries and increase them by 50% in developed countries. So, we might need to increase overall crop yields during the next 33 growing seasons by 70%, and we are not going to get there using conventional breeding, nor even with transgenic methods using pest resistance or herbicide tolerance. There is an enormous need now for fast progress. Many other large, mid-sized and small companies jumped into this area. For example, some are looking at improving photosynthetic efficiency. Others are looking at downstream processes such as increased shelf life by inhibiting polyphenol oxidase, ethylene or hormone responses. We are the only company that has a single trait that improves all these things. Therefore, the scope of what can be achieved by a single genetic change is the broadest. Very importantly, we have two years of replicated field trial

data in an elite alfalfa variety that showed remarkable 20-45% yield improvements with no loss of quality. The main reason I personally invested in our convertible notes is because I would not trust a trait that was only shown in the lab, nor even the lab and greenhouse. If a plant science company lacks convincing field trial data, customers will not take you seriously. We have really quite impressive data in alfalfa. Therefore, when that bears out at a commercial scale, it could really upend and disrupt the alfalfa industry. I believe the same thing will happen with several other crops as they get to field trial stages through our partners and we can demonstrate the universality of this trait.

CEOCFO: ***What has been the response from potential investors? Are they looking? Are they ready to look now? Over and above the companies that you might partner with, who else and what else have you been looking at?***
Dr. Feitelson: Our earliest and one of our strongest supporters has been The Yield Lab, an accelerator in St. Louis, MO. We were in their Class of 2016 and it was a great experience! They picked 6 companies out of more than 100 applicants. All the companies were required to come to St. Louis for 2-4 days every month, and I can confirm it was an excellent use of time and money. They invested $100,000 into each of their portfolio companies, which is an important contribution to a start-up company. We have subsequently raised money from angels and an alfalfa seed company, and are continuing to try to close our Seed Round as quickly as possible. We are looking to raise a total of $950,000, close a few deals, and develop a full business plan. We hope that within 6-9 months after we close our Seed Round we can raise a $3 Million Series A and not have to do anymore dilutive fundraising after that. We expect to be profitable by the time that money runs out.

CEOCFO: ***What surprised you throughout the process so far?***
Dr. Feitelson: I think biggest surprise was the difficulty and the time required to raising funding. I think seed companies understand the technology. We have made quite a bit of progress with several companies and partners, so I don't think there are significant doubts about the technology. I suspect it is mainly about lack of Ag Biotech knowledge among investors. Certainly, there is a whiff of anti-GMO sentiment. Some people have directly told me they will not invest because they are afraid of GMO pushback in the marketplace. I explained the difference between Genome Editing and transgenic technology, but it simply does not convince some people. Others get it and believe it's a good bet in the United States, Argentina, Brazil, Vietnam, and other "GMO friendly" jurisdictions that small deletions created by Genome Editing will remain unregulated, and therefore our partners will not face the need for the expense and time required for deregulation. As mentioned, I "put my money where my mouth is" by personally investing $100,000 in our convertible note, so I don't have just skin in the game. I think it is more like a major organ system or a limb. However, I can understand why some people might feel that way. Ignorance often breeds fear, and unfortunately there has been a tremendous amount of success manipulating public opinion against transgenic crops. It's not scientifically justified, but it is real; since perception is reality in the marketplace. Therefore, we have to be very clear that we offer a non-GMO solution. This is personally difficult for me to say, having been in the field for almost 30 years and led the group that discovered most of the *B.t.* (*Bacillus thuringiensis*) toxin genes that created about $850 Million in value for Mycogen, which was sold in 1998 to Dow Agrosciences for $1.2 Billion. It was a long hard battle. Therefore, I believe that as long as genome editing is properly managed in the sense that we maintain a "public license" and people are not unduly concerned about it. They need to understand why and what we are doing, making small deletions which can naturally happen. We the public realizes that we are not putting strange-sounding genes from weird organisms into plants, then the anxiety level should go down or remain low and the government will continue to allow these improved crops to be commercialized without undue interference.

CEOCFO: ***Should the attention be on Agribody Technologies?***
Dr. Feitelson: The attention I would suggest is more investment, and support from innovative seed companies to use our technology.