

The Pioneer Once Failed Gets Momentum with 250g Lettuce



Four years have passed since the old Mirai, a vertical farm venture from Chiba University, which attracted widespread attention from the industry, filed for bankruptcy. Now, the new MIRAI (Kashiwa City, Chiba Prefecture), which was established as a successor to the business, began to move in earnest with the aim of making a new leap forward. The strategy for this is to grow significantly larger lettuce, overturning the common sense that “factory vegetables are small”. The knowhow gained through overcoming the difficulties of corporate reconstruction and extensive analysis of the industry trends provides hints for further development of vertical farms.

Lettuce in No Way Inferior to Field-farmed One

A food-related exhibition was held at Tokyo Big Sight in Koto Ward, Tokyo in late August 2019. Passing through a variety of fascinating exhibits, such as various matcha beverages, U.S. beef, domestic pasta, Kumamoto horse sashimi, ramen soup and Japanese-style broth, I arrived at MIRAI’s booth. I came here because COO Nagamitsu Nozawa, the head of the company, invited me, saying, “We have finally remodeled the factory. We can show the results at the exhibition.”

What I saw there was factory grown lettuces, the size of which I had never been seen before. Today, most of the produces that are made at vertical farms are leaf lettuce with tiny cores, and their weight are mainly around 80 grams. They are sold at supermarkets and can be lifted by

fingertips. It's the right size to eat at once, but it feels small compared to lettuces grown in the field farms.



“Finally, we can move forward.” — Mr. Nozawa, MIRAI COO, at an exhibition at Tokyo Big Sight

On the other hand, the lettuces that Mr. Nozawa showed me there was 250 grams, which is more than three times the weight of traditional factory-grown lettuces. Having it in my hand, I could certainly feel the weight. Unlike an existing factory lettuce that fits in the palm of your hand, it is in no way inferior to a field-farmed lettuce in terms of the size, and it also has thick leaves.

MIRAI operates two large-scale plant factories in Kashiwa City, Chiba Prefecture and Tagajo City, Miyagi Prefecture. A part of Kashiwa factory was remodeled from June to August. One of the keys is that the number of cultivation rack shelves has been reduced from 11 to 7. Since the height remained unchanged at 4.5 meters, the space between the shelves was increased. As a result, the cultivation space has been extended. However, that alone does not mean that lettuce grows greatly.

More important is the cultivation method. According to Mr. Nozawa, “We changed the way light-emitting diode (LED) lighting is applied, the speed of water flowing through the shelves, and the flow of air between shelves”. In short, they redeveloped the cultivation method from scratch, but “we can’t talk about the details”. The idea that Mr. Nozawa has warmed up since Mirai revived as MIRAI is poured in there. No wonder he keeps it secret.



At the exhibition

Mr. Nozawa became COO after the company was re-established as MIRAI, but he worked as the head of sales in the former Mirai. Till the last moment the old Mirai broke down, he exerted himself and went to every client to increase sales. "We will never fail again." The cultivation method of "heavy lettuce" is a technology that was born from Mr. Nozawa's strong will.

For this reason, I didn't expect to get to know the details of the technology in the interview, but Mr. Nozawa kindly told me the core part of how they increased the weight. In order to make a lettuce heavier, it was necessary to enlarge the leaves. However, in addition to that, they sought to increase the number of leaves. For example, they succeeded in increasing the number of leaves from 10 to 25 with green-leaf-lettuce, which is often used for salads. Regarding LED lighting and water flow speed, they focused on this point and searched for an optimal solution.

I have been interviewing Mr. Nozawa for several years, but I don't think he was as radiant as he was today. Gazing at lettuces that grew too large to fit the metal bowl, he said:

"It's been tough three years since MIRAI was re-established, and we've managed to endure it. We have focused on doing our best with the existing equipment and increasing our sales. Now, finally, we can move forward."

Old Mirai Started Mass Production without Sales Outlets

Former Mirai was founded in 2004 based on the technology of Chiba University, which is famous for research on plant factories. Their main business was plant factory development, design, and management consulting, and it was an industry-academia collaboration startup based in Chiba University. By exporting equipment overseas and providing equipment to Syowa Station in Antarctica, the company attracted attention as a pioneer in the plant factory industry.

Interest spread beyond the boundaries of the industries, and Mitsui Fudosan and Japan GE came up as partners. With these two partners, two projects were launched, and two factories were constructed in 2004 in Kashiwa City and Tagajo City. Both of them were large facilities, with production capability of 10,000 lettuce per day. In this way, the old Mirai has expanded their business from providing equipment and know-how to operating the factories. This triggered the fall.



It was going well while dealing with a small facility in Chiba University. Although they were selling some vegetables to a nearby restaurant, their main business was consulting. However, the production capacity of the factories in Tagajo City and Kashiwa City is a total of 20,000 heads a day, which were hard to sell even for normal lettuce farmers. Having difficulties finding buyers, they sometimes thrown away more than half of the entire production.

The size of lettuce was the bottleneck in finding buyers. Having declared that the daily production is 20,000 heads, they made the space between the shelves narrow so that they could meet the figure. The result was a cultivation rack with a height of 4.5 meters and 11 levels. Only now they can still make 80 grams of lettuce with the equipment, but back then, they could make only 50-60 grams. "Nobody will buy such small lettuce." The sales team was at a loss with a small lettuce.



The biggest hurdle was the high break even point. The price of lettuce from field farms is about 200 to 400 yen per kilogram in a normal season. On the other hand, the old Mirai had to sell for 1000 yen to make profit. Now it is known that plant factories are not low-cost because of the large initial investment, as well as the cost of electricity and labor for operation. Also now, more efficient cultivation method have been developed. However, back then, the old Mirai realized such challenges only after launching the two large factories.

At that time, Mr. Nozawa was working hard to develop sales channels. He particularly focused on business use needs such as for restaurants and delicatessen. Even if lettuces disappear at the supermarket's fresh vegetables corner, consumers can manage. However "lettuce salad" and

“lettuce sandwich” cannot be made without lettuce. Moreover, when the price of lettuce rises due to bad harvest, supermarkets can increase the price, but that’s hard for restaurant menu or ready-to-eat products. In this respect, the consistency of factory vegetables gained advantage.

Strategies aimed at businesses use led to discovering the advantages of plant factory vegetables. However, the increasing deficit has gone beyond such efforts, and in June 2015, the former Mirai filed an application for the Civil Rehabilitation Law with the Tokyo District Court. The total amount of debt revealed at the time of bankruptcy was 1,092 million yen. It was an unusual large bankruptcy in the agricultural industry.

The former Mirai was later acquired by wiring cover manufacturer Masaru Industries (Toshima-ku, Tokyo) and relaunched as MIRAI in November 2015. Mr. Nozawa, who worked from former company, soon became COO. Being recognized the sales achievement and the market insight, he was appointed to lead the corporate’s reconstruction.

Pursued the Benefit for Users

Now, let's go back to the 250 gram lettuce that MIRAI can now grow. When a restaurant or delicatessen uses lettuce to make salads, they usually cut the lettuce and separate the leaves.



The number of leaves increased to 25

Since the weight increased from 80 grams to 250 grams, the amount of this operation can be reduced to one third. This alone can reduce the operational burden, but the benefits of the lettuce are not the only one.

As you can see from the image above, the size and the shape of the leaves are almost the same, except for the small leaves around the core. It's just the right size to serve on a plate and make a salad. If they prioritized enlarging the leaves and increased the weight, it would have been necessary to cut them before serving on the plate. Focusing on the benefits for the users, the ideal result was realized. Such approach must have been taken thanks to Mr. Nozawa's experience of sales.

Here, some of you might wonder, "The weight of one lettuce has certainly increased. However, because the number of cultivation shelves has been reduced, the production amount of the entire rack must have been decreased...?". The reality is the opposite: MIRAI can expect more than twice the total weight after remodeling their rack. Moreover, the operational cost is significantly reduced because the number of light, work process, and even the lettuce losses have been reduced. This is the result of Mr. Nozawa's pursuits during the last tough 3 years.



The large lettuce produced by the new cultivation method

The plant factory technology is constantly evolving, and no conclusion has been drawn as to which is the best equipment. Therefore, factories that looked state-of-the-art may become obsolete in a few years. MIRAI finally found his own answer and took a new step.

However, their factory remodeling process is still at the beginning. The Kashiwa Factory has two cultivation buildings, A and B, but only one of the 10 cultivation racks in building B was remodeled. From 2020, they plan to remodel other racks as well.

Last but not least, let me introduce Mr. Nozawa's words.

“In the plant factory world, even if you are successful in trial cultivation, you can easily fail when you move on to large scale production due to slight environmental change or small skill gap of staff. That’s why we newly set up the quality control department.”

Some companies that develop plant factories emphasize that they are “state-of-the-art” on the basis of a small successes while their operation of the plant is not yet on track. However, the superiority of the technology can be proved only after stable supply, in other words mass production, is achieved. Mr. Nozawa’s words include lessons learned through various experiences until today.

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