

Report on negative ion cultivation experiment with strawberries

2004/1

Purpose of the experiment

In current agriculture, various problems such as aggravation of the soil in use of pesticides (the soil sterilization, an insecticide), increase of expense, remaining pesticide exist.

In this experiment, I evade these problems by effect of an anion and am whether I am from trouble by security and do technology development of the future type agriculture with a purpose.

When increase of fruition number, growth promotion, and improvement of fruit ingredient (rises of sugar content), thickness of a leaf and improvement of disease resistance of plant body by enlargement of thickness of a stem and these results were provided as a result of this experiment, I anticipate increase of quantity of crop.

Experiment method and materials

Location

A farm house at Houga county, Tochigi prefecture in Japan

Type of strawberries: Tochi-otome

Tasks for preparative experiment

- Fungus prevention (condition that is easier for fungus spores to stir up) → Could cause mildew.
- Maintain humidity to 40~50%

Tasks for cultivation

- Drop down of temperature during the day → enhance sour taste
Growing speed difference in north and south side

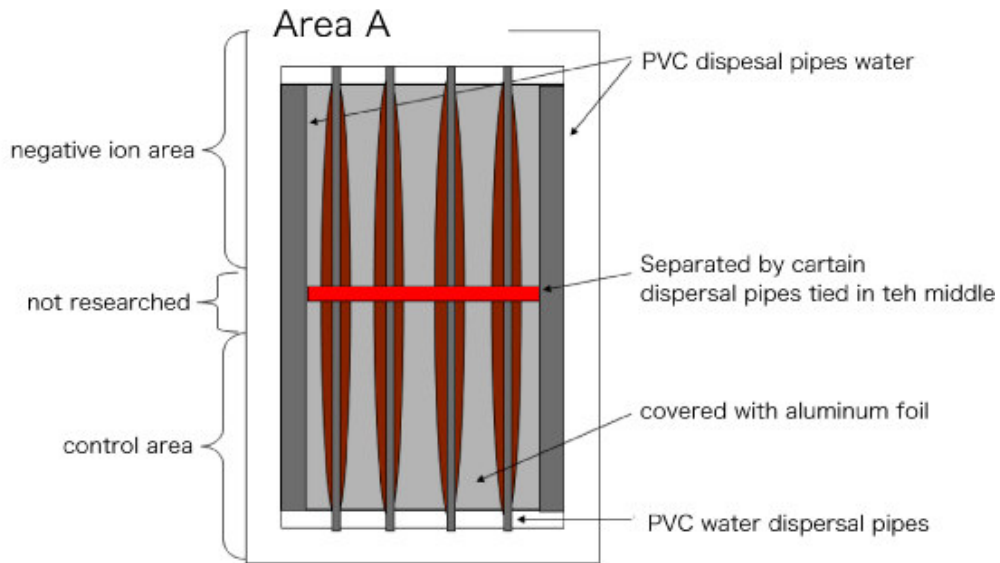
1. Experimental area A:

- notes.....Former half of the experiment→base fertilizer (rice chaff, chicken manure, oil meal) (aging promotion)

• Later half of the experiment(April) →liquid fertilizer

Separate the house into two with curtains

- Double ply vinyl house (approx. 90m)
- Install PVC dispersal pipes in each isle (tie in the middle to keep away the liquid fertilizer from control area)
- Install dispersal spray pipes in both ends (tie in the middle to keep away the liquid fertilizer from control area)
- Fully install water curtains: Maintain around 7°C in winter and set up the system for ground water flow to the internal surface of the green house
- Line between the isles with aluminum foil
 - advantage: sunbeam increasing effect by diffuse reflection
ant cow prevention
 - disadvantage : Keeps ground temperature from rising



Experimental area A (Nozawa) : 90m × 10m × 1

Experimental period: 2003/4/30~5/30

	Control A	Negative ion A
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Cultivation environment		
Negative ion disposal	None	Negative ion sheet <ul style="list-style-type: none"> ▪ Negative ion painting (developed by Shinto painting co.ltd.) painted on multi sheet ▪ Apply to whole area in the isles
Humidity	Unset	Maintain 40~50%
Foliar application	None	Mineral water : 1/1000 dilution (sulfuric acid solution of a rock) Dispersal: 500L once a week, with sprinklers in stalled on both sides of the greenhouse
Measuring items	Temperature: every day Humidity: every day Crop yields: picking day size : picking day Internal and external \pm ion of greenhouse : every two weeks radiation level : every two weeks atmosphere constituents : every two weeks odor : every two weeks questionnaire for cultivator : every three days	

Review

The damage caused by mildew disease was less in negative ion ward, and in proportion, the plants showed rapid growth after the 21st.

As for disease damage, it was in proportion to the growth of plants body.

It is possible to frame a hypothesis that disease control was due to masking and disease resistance improving effect by negative ion.

The plants growth had tendency to be accelerated as time advanced, and we were able to see the result of stem and leave thickened and enlarged.

When examined the highest temperature, it exceeded 20 degrees C on May 3rd, 6th, 21st, and 24th

Plants in negative ion ward had a tendency to show remarkable growth on the days when the highest temperature exceeds 20 degrees C, and the plants in the ward with negative ion sheets presumably grew along with internal factor such

as temperature which they have high sensitivity to.

As for crop yields, decreased fruit number shows that more nutrients were absorbed to plants body more than to fruits, however, considering the shape of strawberry fruits generally being unstable, the fact plant growth turned positive in the end of May and tendency of widening gap in crop yields can presumably show that in negative ion ward where more positive growth stood out, plants bodies were revitalized by negative ion effect.

However, on the 24th, different from the previous tendency, the crop yields in negative ion ward dropped below control ward.

What caused the drop is indistinct as growth rate for every particular item had rising trend.

Regarding the size of fruits, there were slightly more (approximately 2.6 %) large size fruits on average in negative ion ward than in control ward, but for medium size, 0.6% less in negative ion ward, so no clear difference was shown this time. It is hard to say that negative ion effect was exerted for the size of fruits, as quantity of large fruit crop was more in control ward on the 24th.

There was a difference of 32129 kg in quantity of total crop and it can be said that negative ion ward is superior in producing more fruit number.

Negative ion ward has resulted not only in more fruit number and crop yields of plants body, but also sugar content is 0.82 higher than that in control ward and quality of fruit has been improved.

Regrettably there was just one measurement of crop yields on the 14th. The crop yields showed the maximum on the 15th. It is another research issue in future whether sugar content becomes higher or lower when the number of ripened fruits is higher.

As for the number of particles, usually in the area with higher population density, there are 300.000 particles, and around 1.000 in a clean room. When the negative ion sheet was installed in the negative ion ward, the number of 0.3 μ m particles was reduced to be 10948(27.4th of normal count).

Later on, the number of 0.3 μ m particles was between 134,000~201,000 in both wards. It is presumably caused by the fact the sides of green houses had to be opened when the weather became warmer, as this enabled negative ions to come into the both wards. (It shows that the number of particles in control wards was reduced.) The same tendency was seen for 0.5 μ m particles.

Greenhouse environment where there is no dense population showed lower

particles count in general compared to the average particle count. However masking effect for atmospheric particle by negative ions was the most obvious when the greenhouse was completely shut off from external environment as particle count was reduced extremely then. But as greenhouses with the sides open were vulnerable to external impact, negative ion sheet effect was not seen in this environment.

There have been some reports on negative ion for improving germination rate of agricultural crop and enlarging size of plant body.

In this experiment, there seem to have been growth promotion effect on plants body very similar to the result above, but in the final crop on the 24th, the total quantity was reduced.

It requires more experiments of longer term to pin down the cause, but there is a possibility of premature aging

However, every single crop yields in the last four times before the 24th has shown an upturn tendency and additional positive growth in the end of the plants growing period indicates new possibility for agricultural application.

If enlargement of plants such as leaves and stems was due to improvement of photosynthesis ability of the plant body influenced by negative ion (or increase photosynthesized amount by negative ion effect causes plant body to be enlarged), there is a possibility of cultivating crop plants only by thermal effect with natural light when temperature was in control by heater during winter time.

In this way, profit increase along with running cost reduction for farmers is to be expected.

In negative ion ward, the leaves have become thicker and larger and the stems have grown to be longer and thicker. This presumably accelerated photosynthesis, leading the number and size of strawberries to be improved.

The dispersal of mineral liquid was done once a week during the experiment period. This is a new method for nutritional support and growth promotion by providing minerals, electrons (anti oxidizing power) and water directly to the leaves with water in the form of a fine mist (negative ions).

In the past, organic agricultural method was from first to last it has been focused on soil nourishment or the number of microorganism in soil.

That was of course an important factor, but this method of enabling leaves to absorb nano-size minerals and electrons(anti-oxidizing power) can be even more important and new agricultural method.

From this point of view, the examination of foliar application quantity and frequency, also the most effective negative ion application method is necessary. We would like to propose a kind of agriculture to strengthen the primary role of plants, which is turning inorganic nutrients to organic ones, by feeding organic nutrients to the roots and nano-size inorganic nutrients to the leaves.