

Utiliozing See War, as a Source of Nutrition,
for Farm Products Cultivation (Report.2)
Comparison of two kinds of Irrigations between
Dropping Irrigation and Spray Irrigation

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Desert and Arid land which domain 1/4 to 1/3 of the global land, are not sufficiently developed for farm products cultivation, because of the shortage of irrigation water. Inview of the present state, I tried to establish the way of utilizing of irrigation sea water in this experimentation. On the previous report, I took thirteen kinds of spinach on the experimentation. Giving deluted sea water 1,000ppm of salt density, by the dropping irrigation, they showed the average yield of 13 varieties compared to fresh water was increased by 30 %. In view of the results so far achieved, it can be thought the deluted low salt density sea water is sufficiently utilized for agriculture.

In this experimentation, I took lettuce (kind: Okayama lettuce, Takii & Co. Ltd) on the trial and I compared two ways of irrigation, with two kinds of hose, evaflo-D type in the dropping irrigation and evaflo-A type (MITSUI-SEKIKI) in the spray irrigation. I made the deluted 1,000ppm salt density sea water. Mixing it with the super-green 1 liquid fertilizer (SUMITOMO KAGAKU) to be 200ppm of nitrogen density, I irrigated from three to six times a day little by little. I started to irrigate sea water on the 4th of June after two weeks of seeding (five true leaves) and harvested them on the 24th of June. Simultaneously with the comparison of two ways of irrigation, I investigated to compare with the effects of salt water irrigation by the super absorb-ment polymer (moisturelizer).

The result of the growth of lettuce (the 2 chart) is that the dropping irrigation is superior. In comparison with the spray irrigation, the yield was increased by 37% in the case of mixing the moisturelizer and 74% in the case of without mixing. Compared to the case of mixing the moisturelizer and without it, the former is superior in both irrigation. It was increased by 54% in spray irrigation and by 21% in the dropping irrigation. It proves that the dropping irrigation with some salt distiny water is suit to the practical irrigation in the desert. The use of the moisturelizer of which the saction force goes down with the increase of the salt density causes the increase of the yield with 1000ppm low salt density irrigation. It indicates the efficiency of the moisturelizer in the desert which has the week water holding ability. Some reasons can be considered that why spray irrigation wasn't effective than dropping. One is, salt was attached to lettuce leaves, and it didn't suit to lettuce which likes dry air had gotten wet. At the second, dropping irrigation can supply water certainly, pertiently on the plant foot. To see consavative effects, all amount of irrigated water during cultivation (which is 5.59 ℓ /plant), and the weight (that is showed in chart 2) was made use of calculating to see gross water requirement and irrigation efficiency (chart 3). As a result, to harvest 1kg lettuce it needed 125ℓ irrigation water in the case of without the moisturelizer with spray irrigation. Even with the same irrigation, it needed 81 ℓ with mixing the moisturelizer. On the other hand, in the case of mixing the moisturelizer and dropping irrigation only needed 59ℓ. Considering to many results of past experimentations, it can be thought that in the desert we will get the same result as we got on the condition of shutting off rainfall in Tottori univ. And utilizing the deluted sea water as irrigation water not only means saving of irrigation water but also mean throwing salt into the cultivated land. On irrigation agriculture in the arid land, the avoidance of salt accumulation is one of the most important subjects. In this experimentation we used 1.4t/ha salt. However sand has poor ability and it is difficult to generate salt accumulation. I think it would be easy to leach by little quantity of irrigation water and it will be important to study about leaching and salt accumulation in the future.