

OBTAINING AN ANNUAL YIELD IN A FORTNIGHT

YURI MESHKOV

4, Zabolovski Bulver, Moscow 119021, USSR.

ACCORDING to forecasts, in the year 2000 the earth will be inhabited by 6.3 billion people. To feed all people in the early 21st century the yield of the cereals must almost be doubled, which is a highly complex and important task. The scientists of the Institute of Medico-Biological Problems (the Ministry of Public Health of the USSR, Moscow) have come up with an interesting and unexpected solution.

With the land tilling methods used presently in the majority of countries, says Valentin Golovin, Cand. Sc. (Tech.) and head of the Institute's laboratory, to meet the world population's food requirements by the year 2000 the spendings on fertilizer will have to be increased by 550%, and power consumption would have to be trebled. Meanwhile the food production in the world today consumes 25% of the energy output. Drinking water deficit is growing, and has become an item of international trade. By the year 2000 double and treble the amount of water will be required. What is the way out?

We consider that the introduction of the conveyor method of agricultural production, which we have elaborated for future space settlements and interplanetary expeditions, will be instrumental in solving many problems on the surface of the earth as well, because that would lead to industrialized production of crops.

A SPACE "VEGETABLE GARDEN" ON THE EARTH

Small plastic containers are filled with seeds and put into a tank full of nutrient. At the beginning of the conveyor the containers are close to each other, unlike during the field sowing on the earth, where the intervals between beds correspond to the conditions necessary for the normal development of adult plants. When the crown develops, the intervals are increased with due account taken of the plants, age and technological demands. In this way the acreage is used optimally, and (which is of paramount importance) all of the radiant energy is absorbed by the sown plants.

This drawing of plants apart was earlier known in hothouse farming. But the priority of the next step belongs to the Moscow Institute of Medico-Biological Problems. That step is called the organization of drawn-apart conveyor plant production. The idea is simple enough: the plants of all ages are put in a row according to their development stages, and yields can be taken in daily (depending on the length of the conveyor belt).

Having experimentally tested the method for hothouses in outer space, scientists began experimenting with the conveyor principle on the surface of the earth.

The very first results surpassed all expectations. Traditionally sown on the earth, the plants make use of all but 0.5% of the solar energy reaching them. Meanwhile by the conveyor method they consumed 20 to 30 times more.

NUTRIENT INSTEAD OF SOIL

What has happened when soil was removed? First, it is easier to supply plants with nutrients containing optimal concentrations of all elements, needed for the plants to grow (there are but 16 of them). Oxygen supplies for the roots can now be verified. And the plants got rid of the pests living in soil. In a nutshell, the best conditions for plant development have been created.

The first conveyor installation (called, Samorod-Arktika) was made for researchers within the Arctic Circle. It can be kept on the table, or hung on the wall, like a bookshelf.

This "vegetable garden" calls for three-minute care every 24 hours: you just take in the yield, put in another container with seeds, and add a 24-hour amount of mineral salts.

Presently about ten conveyor installations for growing vegetables in the Soviet Union's northern areas are providing people there with the vitamins they direly need. For example, the installation on an island in the Kara Sea produces up to 1 kg of cabbages per square metre a day.

The Institute has made 14- and 20-metre conveyors

whose yields can be taken in hourly. Multi-tier installations greatly increase the acreage.

Greens and fodder crops have been experimentally grown on nutrients with both artificial and natural lighting. High efficacy of the conveyor method was proved by experiments near the city of Simferopol in the Crimea.

WHAT ABOUT THE QUALITY?

Here is an excerpt from the scientific report, prepared by the Institute of Medico-Biological Problems jointly with several other research bodies which had taken part in this work: "The vitamin value of the biomass of the plants grown under artificial conditions is no lower, and in many cases much higher than that of the plants grown by traditional methods". The same can be said about the feeding value of such products. Besides, the new method for growing crops is ecologically clean because it involves no pollution of the groundwater.

PHYTODROME, THE FODDER WORKSHOP OF THE FUTURE

Let us imagine a complex which covers an area of 10 by 10 km. Dozens of such enterprises in the Soviet Union's southern areas with their high number of sunny days would solve the problem of fodder supplies for cattle. Under natural conditions the conveyor method can produce, on the average, 3.5 tonnes of alfalfa a day. In other words, a yearly yield can be obtained in a fortnight.

The new method has yet another important advantage: if plants are grown on nutrients and without soil, no farming will be needed. It means, hundreds of square kilometres of soil will not have to be annually reploughed. And just think of the amount of farming machinery to be released, and of fuel saved. And last but not the least, having assembled the whole of the fodder workshop on compact phytodromes, hundreds of millions of hectares can be sown to other crops.

Large space stations and interplanetary ships equipped with space "vegetable gardens" supplying the crews with vitamins are a thing of the future. But the idea can be used by Earthmen now.

NEWS

THE MEGHNAD SAHA AWARD FOR RESEARCH IN THEORETICAL SCIENCES FOR 1983 AND 1984

Prof. C. K. Majumdar of the Indian Association for the Cultivation of Science, Jadavpur, Calcutta, and Prof. G. Rajasekaran of the Institute of

Mathematical Sciences, Madras received the Meghnad Saha Award for Research in Theoretical Sciences for the year 1983 and 1984 respectively.

THE JAGADISH CHANDRA BOSE AWARD FOR RESEARCH IN LIFE SCIENCES FOR 1983 AND 1984

Prof. D. P. Burma of Banaras Hindu University, Varanasi, and Prof. A. S. Mukherjee of Calcutta University, Calcutta received the Jagadish Chandra

Bose Award for Research in Life Sciences for 1983 and 1984 respectively.
