

Biotechnology in the Field . . . and on the Farm

The future of plant production no longer depends upon seed selection and the farmer alone. Today, it also depends upon the contribution of laboratories where biologists and geneticists create greater varieties of new "made-to-order" plants that are healthier, more resistant and more productive — plants that will eventually grow without the use of nitrogen fertilizers.

Micropropagation: A second green revolution

Propagating a rose bush to obtain 300 000 identical bushes or producing 100 000 strawberry plants from a single one in only a few months and in an area measuring only a few cubic metres are miracles that have already been made possible by micropropagation, or the *in vitro* culture of plants.

Cellular or *in vitro* culture, enabling the reproduction of plants from cells rather than seeds, is one of the many revolutionary techniques developed in the field of biotechnology. *In vitro* culture makes it possible to grow new plant varieties that are sometimes impossible to obtain through traditional genetic techniques, and it also makes it possible to propagate healthy, vigorous and disease-free plants in large quantities. Initially used with ornamental or garden market plants (carnations, strawberries, potatoes, etc.), *in vitro* culture is now being used with fruit trees and forest species.

The development of exceptional varieties of plants utilizing *in vitro* culture techniques is of great interest to industry. Indeed, micropropagation is a continually expanding industry in Canada.

Agriforest Technologies Ltd. of Kelowna, British Columbia, is one of the leaders in this field. The company produces over 500 000 plants per year by micropropagation. Unlike most other firms working in the micropropagation area that use tissues obtained from buds, Agriforest specializes in the culture of root tissues. The firm has used this method to produce fruit trees, assorted varieties of fruit plants, ornamental plants and a new product just recently put on the

market called "Roselets." Agriforest has also developed a technique for the micropropagation of woody species which has been patented in Canada, the United States, Holland and Belgium. A micropropagation method for the reproduction of superior strains of Douglas fir and white pine is also being developed.

Les Clay & Son Limited of Langley, British Columbia, has already marketed about 400 different cultivars obtained by micropropagation in various countries throughout the world. This company is also conducting research in order to select and propagate various species of ornamental and forest plants on the basis of tissue culture.

High-performance biological fertilizers

Research in biotechnology has led to the discovery of micro-organisms that can be grown and used as actual living fertilizers.

These micro-organisms (bacteria or fungi) bond with the plant roots in order to retain atmospheric nitrogen (as in the case of bacteria of the *Rhizobium* genus), provide them with minerals essential to their growth (as in the case of mycorrhiza) or facilitate plant growth and help control diseases, as in the case of rhizobacteria. Thus, in the field, these micro-organisms take over and take on the work of the farmer and fertilizers — all without cost!

Microbio-Rhizogen Corporation of Saskatoon, Saskatchewan, produces and markets rhizobium inoculants that can be used to grow assorted varieties of legumes, mainly peas, lentils, alfalfa, clover, etc. The Microbio-Rhizogen product is sold in a ready-to-use form. The firm is



Growth chamber, culture of plant fragments.

(Microelite Plant Laboratories Inc.)