Carnation Shoot Tip Culture - Progress Report

by

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In 1934 the general field of plant tissue culture was definitely opened. This led to work on the cultivation of sterile crown-gall tissue, experimental study of plant cancers, the effect of plant growth substances, and studies on plant embryos (2). Recently a mature plant was grown from a single cell (1). The development of tissue culture techniques has opened the way for a number of investigations pertaining to plant pathogens. Some of these experiments are concerned with the intimate relationships of the host and parasite at the cellular level. Others are concerned with the metabolism of the host and pathogen. Such studies give great promise of clarifying basic problems of pathogenicity and disease resistance (1).

A plant free of contamination would be highly desirable from the stand point of a clean stock program. Sterilizing seed treatment or embryo culture may serve as a means of establishing a clean stock in seed propagated plants. However, in vegetatively propagated crops, such as carnations, it is desirable to grow a shoot tip in sterile culture. Morel and Martin have made tissue cultures of such tips and grown the whole plant (1). They have freed potatoes, dahlias, and carnations from viruses.

In an attempt to learn and improve the techniques involved in shoot tip culture, a series of experiments was initiated last year at Colorado State University. The technique is generally outlined in figure 1.

The continuing studies are ultimately aimed at producing a stock of plants free of pathogens. The cultures, also, may serve as a means for studying carnation diseases in a new way and help increase our knowledge of plant pathogens.

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1. Riker, A. J., and Hildebrandt, A. C., 1958. Plant Tissue Cultures Open a Botanical Frontier. Annual Review of Microbiology 12: 469-489.

2. White, Philips R., 1954. The cultivation of Animal and Plant Cells. The Ronald Press Company, New York.

Table 1. -- The effect of gibberellin on the growth rate of carnation shoot tips.

Original length of the shoot tip (mm)	Growth of tip after 14 days in the standard medium (pH 7)[a] (mm)	Growth of tip after 14 days in the standard medium containing gibberellin (pH 7) 25 ppm (mm)	50 ppm (mm)
4	2.5	8.7	
4	2.7		5.2
4	2.7		5.9
1	1.5		3.0

[a] Each figure represents the average length of 10 tips.

your editor,
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