

### *Bottled Flowers*

In closing this presentation, which is not as much science fiction as it sounds, may I just mention a discovery which has been made at the Phytotron at Gif. It is the formation of flowers in test tubes and bottles, as shown in the next slide. If a piece of chicory root is planted in a test tube, under certain conditions which we are studying presently, it will produce a bud which gives rise to a flower. Such a production of flowers has also been obtained on pieces of tobacco stem grown in flasks on artificial nutrients. Other species will be grown in this way in the future, even roses perhaps. At that time then, one will be able, truly, to buy "Four Roses" in a bottle for Saturday night.

On this happy thought let me end my talk about the year 2000. Thank you very much.

DARA EMERY: What was the name of the cytokinin?

DR. NITSCH: The one I mentioned for keeping leaves green was benzyladenine. I think it is now produced commercially. You can get it from the Shell Company; ask Dr. J. Van Overbeek, Shell Agricultural Research Center, Modesto, California.

CHARLES LUGER: Would the cytokinin be of use right now in the spraying of cuttings?

DR. NITSCH: It is at your own risk, but you could try the chemicals now available, although better ones may be developed. A little word of warning: be sure to treat all the leaves that you want to keep on the cutting, because, if you treat only one leaf or two, these treated leaves not only will remain green, but will deplete the food from the other leaves, causing the untreated ones to become yellow faster.

CROCKER TEAGUE: I would like to know what concentration of gibberellic acid you use to produce flowering?

DR. NITSCH: Which flower are you referring to? Chrysanthemum? Well, actually 0.05 mg were applied to the growing point in a lanolin paste. You could obtain similar results with sprays containing about 100 milligrams per liter.

### **BREEDING NEW FRUITS AND NUT CROPS**

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The Department of Pomology in the California Agricultural Experiment Station has had an active program in fruit and nut breeding for many years. The various aspects of these breeding programs include:

a. Maintenance of collections of species, varieties and breeding materials although there is no attempt to maintain a complete collection.

b. Development and evaluation of new varieties with emphasis on commercial orcharding.

c. Study of genetics and inheritance of the fruit and nut species.

Most of the work involves seedling growing but some work is starting in induction of mutations. With the establishment of the radioactive cobalt source on the campus, more work is contemplated. However, there is some doubt as to whether potential usefulness of this method is as great as conventional methods. Probably it will be useful in particular types of plants or in achieving specific objectives.

My own work deals mostly with almond breeding and I would like to tell you something about our efforts relative to the production of hybrids between peach and almond. One of our objectives is to transfer self-fertility from peach to almond; another is to use the F1 hybrid for rootstocks. The F1 hybrid is uniform, vigorous, and involves possible useful characteristics, such as nematode resistance and resistance to lime-induced chlorosis, depending upon the particular combination of parents.

Methods of production have not been developed to commercial usefulness. Vegetative propagation is variable depending upon the individual clone. Tests have shown that the almond parent is literally impossible to root by soft or hardwood cuttings; the peach parent can be rooted by softwood cuttings under mist and to some extent by hardwood cuttings; but the hybrid offspring seedlings tested have shown a range of from poor to good rooting.

Seed propagation may be possible through controlled cross-pollination. To date it has not been achieved in high proportion through hand pollination in our tests.

The F2 hybrid population is very heterozygous and seedlings are extremely variable. These could not be used as rootstocks but might be useful for other purposes.

We have also produced more complicated hybrids mostly involving backcrosses to almond. Some individual clones of these are being considered for their ornamental value. Potentially valuable characteristics for which we have selected include double flowering, vigor, fruitlessness, and some degree of resistance to peach leaf curl.

(Slides were used to illustrate this material)

## **PRODUCTION AND PROPAGATION OF ROOTSTOCKS**

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I will limit my remarks to some of the vegetative methods of propagation that we are using for fruit tree rootstocks.

In the June, 1963 issue of the "Plant Propagator" Dr. H. T. Hartmann, Dr. W. H. Griggs and I published an article de-