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Turning Science into Business: A 40-Year Perspective on Micropropagation

Gayle R. Ladiser Suttle

Microplant Nurseries, Inc., Gervais, Oregon 97026 U.S.A.

gayle@microplantnurseries.com

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INTRODUCTION

The talk I presented to the Eastern Region this year was a pictorial story of our journey at Microplant over the past 40 years in the field of commercial micropropagation. My talk covered some of the most important developments, disasters, and discoveries we have experienced along the way. Microplant is owned by Treco® and Peter K. McGill.

In the late 1970s, there were several labs in America producing volumes of house plants, ferns, orchids, rhododendrons and azaleas using micropropagation (tissue culture) techniques. There was some micropropagation of peach almond trees going on in Italy, and University research papers being presented on a host of different kind of trees, but nobody in the world was attempting to mass produce large volumes of apples, pears, cherries, and shade trees such as maples, birch, plum, and crabapple via tissue culture (Fig. 1).

A partnership between Pete McGill, Treco®, Stark Brothers® and Adams Rootstock was formed and Microplant Nurseries, Inc. was launched in 1980 with that goal in mind.

Figure 1. Rooted microcutting of maple.

I arrived on scene that year a bright-eyed 25-year old college graduate with Science (Botany) and Agriculture (Soils) degrees, hired as "Chief Tissue Culture Technician" ready to create a million plantlets the first year. Within a few month's it was very clear that the current technology was not ready to make that happen. It eventually did though.

Fast forward from that seemingly impossible goal to our present-day situation where, over the years, we have produced several hundred million young trees, shrubs, grasses, perennials, bulbs, and small fruits for the horticultural nursery trade. We have partnered with growers, farmers and researchers to bring some of the most exciting new plants into landscapes and fields around the world.

LESSONS LEARNED FROM TRIAL AND ERROR

It has not been easy. As every person who has ever attempted to micropropagate any amount of anything knows, (and will be happy to tell you), it is very difficult to do this reliably. As we have grown our Company from two people to over 70 people, we have learned from trial and error, making many mistakes, and discovering some important lessons. Here are a few examples:

Cold Storage Is A Powerful Tool

We have found that we can store certain plants for many months at 2–4 ºC. This smooths out production peaks and saves labor during maintenance of crops. Also, *Malus* and *Pyrus* actually benefit from a cold treatment of 2–4 ℃ for at least 1,000 h prior to acclimatization, especially when the greenhouse step is done under cold short-day conditions (Fig. 2).

Figure 2. Pear rootstock OH×F-333 planted at the same time during cool/short days. Left image is without and right is with vernalization period.

Inorganic Salts

Inorganic salts play the most important role in media optimization for difficult to grow plants (Fig. 3).

Figure 3. *Acer* on basic formula (left) and *Acer* after computer aided salts optimization (right).

Cutting Plants is an Art

The discovery of where to cut and how to trim plants for maximized multiplication or rooting is critical to successful optimization (Fig. 4). There can be nuanced differences even between very closely related genetics.

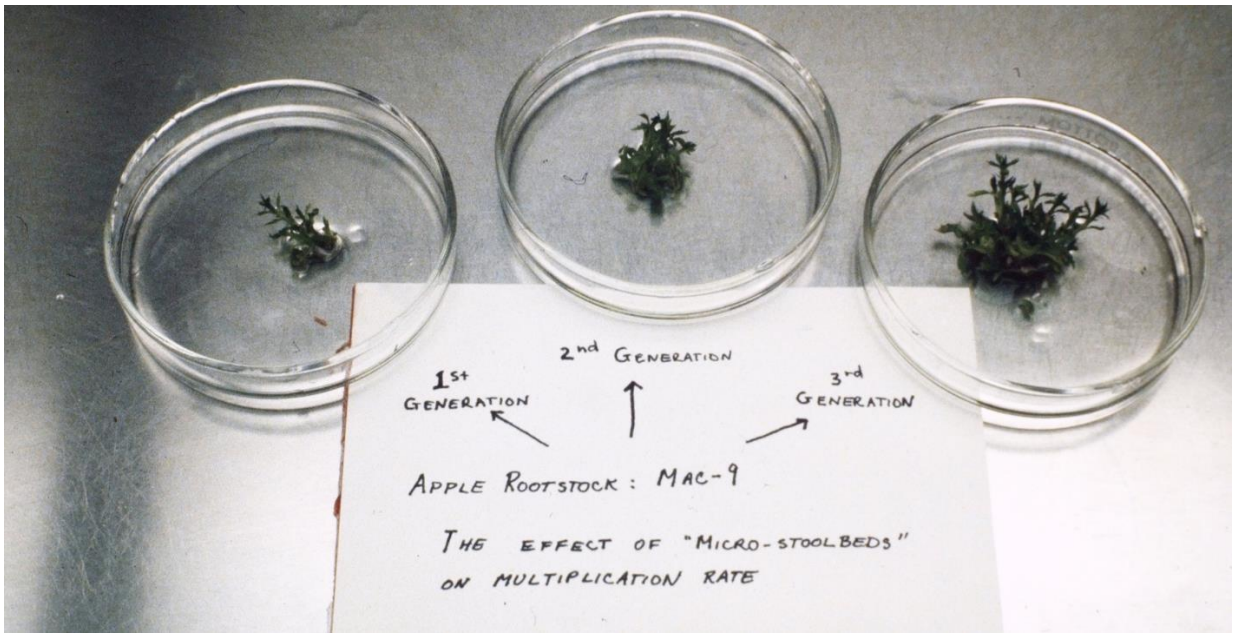

Figure 4. The cutting of an apple rootstock over several generations.

SOME BASIC BUSINESS HINTS

Here are a few key nuggets we have learned along the way that guide us every day in growing our business:

1) Know what your goal is.
2) Check your progress toward the goal often.
3) Adjust if necessary and let the customer know.
4) Make it easier to do things right, harder to do things wrong.
5) Do it excellently and have fun doing it.
6) In business, it needs to work for the customer. If it doesn't work for them, you have no business.
7) Do it once well. Baling wire works great but put in on knowing it likely needs to last forever.
8) Invest yourself in IPPS. It will provide you with ideas, information and most of all friends who will inspire you, console you and bring you great joy in your journey together.

In conclusion, over the past four decades I have seen micropropagation become a major mainstream power tool used throughout the nursery industry worldwide to solve huge problems. It will be exciting to see what happens next.