PETER VERMEULEN: Is it possible to publish a digest of literature that has been done and is now ongoing? Also what is being done with coniferous evergreens?

PAUL READ: Tissue culture is a field that is developing so rapidly that I find it impossible to keep up with what is happening. This also raises the question of whether you, as a nurseryman, should have a tissue culture lab. Currently many nurserymen do not propagate all their plants. Maybe on a cost effective basis, tissue culture propagation should be left to selected producers.

DICK ZIMMERMAN: It is not enough to know the literature but also who is doing it on a commercial scale because their results are not in the scientific literature.

STEVE McCULLOCH: Referring to the question that Peter Vermeulen asked I would like to refer him to an abstract by Dr. McCown at the American Society for Horticultural Science Meeting at Atlanta last year. It was one of the first attempts to propagate a wide range of conifers. At present he has been successful with *Thuja*. We have also done *Thuja* and it comes quite easy.

PROGRESS IN BREEDING AROIDS

R.J. HENNY
Agricultural Research Center
Rt. 3, Box 580
Apopka, Florida 32703

We have been conducting breeding studies within the genera *Dieffenbachia* and *Aglaonema*, which are both members of the *Araceae* family. Two goals of this program are: A) development of new and better cultivars for commercial production in Florida and; B) to study the biology of their reproductive mechanisms and how it relates to other tropical plants. Our studies have included more than 50 distinct types of dieffenbachia and 15 different aglaonemas. The following discussion will center on the more important factors we have discovered which affect the breeding potential within these genera.

Stock plants are grown in greenhouses or shaded slat sheds with light intensities of 1500-2500 foot candles and a temperature regime of 65-95°F. Under these conditions, most dieffenbachia tend to produce a seasonal flush of blooms from April through June. Aglaonemas usually begin to flower in May and continue through June. However, some plants that we wanted to hybridize never seemed to bloom concurrently.

As a result, studies were initiated using gibberellic acid (GA_3) in an attempt to stimulate flowering in dieffenbachia. A single foliar spray with GA_3 at 250, 500, or 1000 ppm not only induced flowering but also increased the number of blooms per plant (2) It is now possible to flower dieffenbachia at any time of the year which greatly reduces the time between seed generations and also allows us to have plants in bloom simultaneously which would not otherwise happen Similar results also occurred with aglaonemas. The effect of the GA_3 treatments turned out to be especially important since studies with pollen storage showed that dieffenbachia pollen could not be stored for any significant period of time. Even at optimum storage conditions of cool temperature (40°F) and high relative humidity (90%) pollen was capable of only poor germination after 2 days and no germination after 5 days of storage (1)

A brief description of the hybridization method follows. The dieffenbachia and aglaonema inflorescence is made up of a spadix and a spathe. The spadix consists of an upright central axis covered with several minute petalless flowers. Staminate (male) flowers cover the upper half of the spadix and pistillate (female) flowers are located on the basal half. Pistillate flowers consist of a stigma, style, and ovary while the staminate flowers are made up of the anther and filament.

The spathe covers the spadix until anthesis (the day of flower opening) at which time it unfurls and exposes the staminate portion of the spadix. Usually the spathe unfurls during the night so flowering plants should be checked each morning for newly opened inflorescences; subsequent pollinations may be made any time during the day of anthesis. The staminate flowers of dieffenbachia do not produce pollen until 2-3 days after the spathe unfurls at which time the stigmas are no longer receptive, thus preventing self-pollination in the wild.

When making a pollination, a camel hair brush may be used to transfer pollen to the stigmatic surface of the pistillate flowers. The brush will pick up pollen readily if it is first brushed lightly across the moist sticky surface of the stigma. The stigmatic surfaces of the pistillate flowers may be identified by their golden yellow color and there may be 40-80 pistillate flowers per dieffenbachia inflorescence, and 5-25 pistillate flowers per aglaonema inflorescence. The pistillate flowers of dieffenbachia are surrounded by white apendages termed staminoidia which often extend higher than the stigmatic surface. Staminoidia are sterile and serve no function during pollination.

Initially, poor seed set hampered breeding efforts; however, recent studies concerning environmental effects on seed

production in dieffenbachia have led to methods of increasing seed yield Tests have shown that a critical factor affecting seed production in dieffenbachia is the relative humidity level at the time of pollination (3). Seeds were rarely produced on inflorescences pollinated at a low relative humidity (40-50%), whereas a high percentage of inflorescences pollinated at a high relative humidity (near 100%) produced seed. Pollen failed to germinate on stigmas pollinated at a relative humdity less than 50%. As a result of these studies, following pollination the pistillate portion of the spadix is wrapped with a wet paper towel and the entire inflorescences enclosed in a plastic bag for 24 hours Increasing the relative humidity in this manner greatly increased the percentage of pollen germination and seed set. Using this method we have been able to obtain consistent seed production from some cultivars which had never yielded seed before. Preliminary studies have shown that aglaonemas may not be as sensitive to low relative humidity at the time of pollination as dieffenbachia.

In 3 to 4 weeks following a successful pollination, the pistillate flowers (or fruits) will turn green and begin to enlarge During this period the stigmas and the staminoidia will have deteriorated and disappeared. As the fruits enlarge they change color from green to cream-colored to orange to bright red when mature, approximately 4-5 months after pollination. The fruits will not immediately fall off the spadix after they have turned red, although it is best to harvest them quickly.

Once harvested, mature fruit should be planted as soon as possible Each dieffenbachia and aglaonema fruit generally contains 1 seed and it is very important not to let the seeds dry or they will lose viability rapidly. We removed the fleshy outer covering from the fruit before planting to help prevent development of bacteria or fungi After cleaning, seeds are soaked in a 10% Clorox solution for 5-10 minutes followed by a dip in a Benlate® solution Seeds are then placed in small plastic trays on top of shallow depressions made in a moistened medium consisting of 1 part German peat and 1 part perlite by volume and amended with 3 lbs/yd^3 dolomite and 1 lb/yd^3 Perk (a micronutrient source). Each container is enclosed in a plastic bag to maintain the high relative humidity around the seeds The trays are placed under fluorescent lights which are on 12 hours daily in growth rooms held at 80°F. In 3-4 weeks the seeds have germinated and the plastic cover is removed When seedlings have produced 4-5 leaves they are transplanted into 5-inch pots and grown in the greenhouse for evaluation

To date, there has been no evidence of any sexual incompatibility present in any dieffenbachias or aglaonemas. Most F_1

dieffenbachia hybrids have been fertile. Data from aglaonema hybrids will be available in the spring of 1982. This information combined with the great deal of natural variation within these genera lead to a great deal of optimism concerning the development of new and better cultivars for the future

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INFLUENCE OF EXTENDED PHOTOPERIOD AND FERTILIZATION ON ROOTING *ACER RUBRUM* L. 'RED SUNSET' CUTTINGS

BRYCE H. LANE and STEVE STILL

Department of Horticulture
The Ohio State University
Columbus, Ohio 43210

Abstract. Terminal unbranched *Acer rubrum* L 'Red Sunset' cuttings were propagated in June, July and August, 1980 Cuttings were stuck in an Osmocote 18-6-12, 5 4 kg/m^3 amended medium, a 20-20-20 (200 ppm N) liquid fertilizer applied to the medium, or a control medium containing no fertilizer, and placed under a 4 hour extended or natural photoperiod The cuttings had higher rooting percentages when they were propagated in June and July under an extended photoperiod, regardless of fertility Cuttings propagated in August had significantly lower rooting percentages for all treatments There were no differences observed in rooting percentages, or root dry weights, due to fertilizer in the rooting medium for cuttings propagated in a natural photoperiod Cuttings had greatest root dry weights when they were rooted in an Osmocote-amended medium, and under an extended photoperiod

Acer rubrum L cultivars are most commonly propagated by budding onto seedling understcok of the same species. However, this practice has recently come under review because of graft incompatibility problems. Schwab (14) reported *Acer rubrum* graft incompatibility losses of 50% the first year after budding, and an additional 10 to 20% during the second growing season. The graft incompatibility losses necessitate that an alternative vegetative propagation method be developed.

Softwood *Acer rubrum* cuttings have been successfully rooted (1,5,13,14,15,20) However the actual propagation procedure varies greatly. May through September cutting dates have