THE NURSERY BUSINESS IN NORTHERN ILLINOIS

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SUMMARY

A number of nurseries in 1940 formed a group called the Ornamental Growers of Northern Illinois. The main market for these producers is landscape contractors, landscape architects, and other nurseries. This group has a high profile at public meetings and Trade Shows. The group is promoted through a newsletter and "The Plant Locator"—a list of plants and grades with nurseries able to supply.

There are 20 member nurseries growing trees, shrubs, and perennials on more than 4100 acres. Many of the nurseries in the group have been in the business for more than one generation but each nursery retains its own identity. Some members have introduced their own plants, while the group is working together with the Morton Arboretum and the Chicago Botanic Garden on a Plant Introduction Scheme modeled on the British Columbian Plant Introduction Scheme.

SUPERIOR MALE KIWIFRUIT—EVALUATION, IDENTIFICATION, AND PROPAGATION

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INTRODUCTION

Pollination is a vital factor in the successful production of kiwifruit (*Actinidia deliciosa* (A. Chev.)) C. F. Liang *et* A. R. Ferguson var. *deliciosa*. Pollen must be transferred from the anthers of the male flowers to the stigmas of the female flowers. This event is of particular importance to kiwifruit production because:

1. The plant is dioecious, i.e., male and female flowers occur on separate vines.
2. Fruit weight at harvest depends largely upon the number of seeds set (4), and seed number is influenced by the amount of pollen transferred.

At the Ruakura Agricultural Centre we have developed a method of optimising pollen transfer using spray pollination (6). As

part of that project we have also identified certain male selections which have improved seed setting ability (7).

In this paper we follow the course of these males from initial selection through to commercialisation. We also look at the identification and propagation of these nominated selections.

EVALUATION

In the 1950s male vines growing in commercial orchards in the Bay of Plenty were surveyed for flowering characteristics. Some information was also collected on pollen viability. Subsequently W. A. Fletcher assigned names to two of these males, Matua and Tomuri, which were particularly suitable as pollinators of Hayward (2). This work was continued by R. M. Davison (DSIR) who collected together 32 different male plants from commercial orchards, including Matua and Tomuri. These were evaluated in the late 1970s at the Te Puke Research Orchard for vine growth and flowering, pollen production per flower, and pollen viability (5). The best eight of these were coded as M51 to M58.

In our work on spray pollination we have used males propagated from the original M-series vines, and also Matua. We found that some of these performed poorly in field trials even though pollen viability was high. After two seasons of controlled pollination studies to further test this observation, we found that M51, M52, M54 and M56 set twice as many seeds as Matua or M55 under the same conditions. These superior males were therefore recommended for wider use in commercial orchards (7).

Recognising the need to provide true-to-type material to the industry, an agreement was entered into between the Ministry of Agriculture and Fisheries (MAF), Department of Scientific and Industrial Research (DSIR), and the New Zealand Kiwifruit Authority to supply softwood cuttings of known origin to nominated nurseries for propagation (9). These nurseries would then be able to provide to the industry, plants bearing labels ensuring that they were true-to-type.

IDENTIFICATION

Prior to this commercial release, propagation material from M-series males had already been distributed quite widely on an informal basis. With the interest in the performance of particular males, many growers wished to be able to identify those they had in their orchards. In 1986 we photographed and took leaf and flower samples from all the M-series males growing at the Rukuhia Horticultural Research Orchard at Hamilton. These were examined closely to try and determine any identifying characteristics (10). Leaves showed a high level of variability within the one vine and among vines of the same selection. Differences between floral

characteristics were more consistent but even then, some of these differences were very subtle.

Table 1 shows those features that may be able to be used to identify the recommended selections of M51, M52, M54, and M56. Selections M51 and M52 can be separated on the basis of flower shape and anther colour. There is no similar clear separation between M54 and M56.

This table is intended for use as a guide only as we found considerable variation within selections at the same site, so other locations may be different again.

Table 1. Identifying characteristics of M series kiwifruit males.

	Selections			
	M51	M52	M54	M56
Flower size	small	medium	medium	small/medium
Flower shape	flat	cupped	cupped	cupped
Anther colour	pale yellow	yellow/orange	yellow/brown	yellow/brown
Anther size	small	large	medium	small
Pollen shed	yes	no	no	yes
Flower abscission	no	no	yes	yes
Blooming coincidence with Hayward cultivar	mid	mid/late	early	mid

PROPAGATION

Propagation of both male and female kiwifruit vines has traditionally been by grafting on to seedling rootstocks, usually of the Bruno cultivar. However the use of stem cuttings has become increasingly popular. While some researchers have found hardwood cuttings very successful (3, 12), others have reported some diffficulty with their propagation (1, 11).

In our research work we propagate nominated vines by softwood cuttings. No differences have been noted between rooting percentages of male and female cultivars (11), therefore we treat both the same. The method used is based on that of Bosman and Uys (1), with modifications.

With males the cuttings are taken from the orchard at pruning time, which is immediately after flowering finishes in early summer (December), whereas for females mid-to-late summer (January to February) is the usual time. Male cuttings are made from flowered laterals or from surplus replacement canes which are thinned out. The latter provides preferred material, but it is less abundant. However the same effect would be achieved by having managed stock plants. Single bud cuttings are prepared from firm wood which is preferably about as thick as a pencil. The leaves are reduced in size by about one-half. The base of the cutting is dipped

for five sec. in 5000 ppm IBA in 50% ethanol. No wounding is done, and we have not found it necessary to apply a wound protectant, as used by Bosman and Uys. The cuttings are planted in a pumice-filled bed with bottom heat at 27°C. Mist is set for 10 sec. every 10 min. The bed is covered with 60% shade cloth. Roots normally appear within two weeks, and the cuttings are ready for potting a further two weeks later. Rooting percentages vary between 60 and 80%.

At the time the cutting is potted, a shoot may or may not have emerged from the bud. If the bud does burst early the plant could be expected to make up to 50 to 60 cm growth in the first season. A proportion of cuttings may not break bud in the first season. Once these cuttings have been identified after potting it may be beneficial to remove the bud cover with a sharp knife as there is evidence to suggest this tissue contains an inhibitor (8). If left, these cuttings would still be expected to make strong growth the following spring.

Our practice has been to line out all rooted cuttings in nursery rows in the spring (September/October) for a further year's growth before transplanting to their final orchard position.

SUMMARY

The male selections evaluated in this study were taken from a survey limited in size and carried out some years ago. Since that time other males have been found which have seed-setting ability equal to or better than the M-series selections, and further improvements in male performance may still lie ahead.

We have found differentiation among male selections by means of botanical features to be very difficult given the degree of variability encountered. It is likely that positive identification can only be made by means of some biochemical analysis.

Propagation of the vines by softwood cuttings presents few problems, although our system could undoubtedly be improved. The provision of softwood cuttings to nominated nurseries proved to be a successful means of quickly introducing relatively large amounts of true-to-type plant material to growers for the betterment of the kiwifruit industry.

LITERATURE CITED

1. Bosman, D. C. and D. C. Uys. 1978. Propagation of kiwifruit from softwood cuttings. *The Deciduous Fruit Grower,* pp. 334–336.
2. Brooks, R. M. and H. P. Olmo. 1975. Register of New Fruit and Nut Varieties, List 30. *HortScience 10:*474.
3. Chen, K. and Z. Zhang. 1985. Growth and development of Chinese gooseberry hardwood cuttings. *Hort. Abst.* 55: No. 145.

4. Hopping, M. E. 1976. Effect of exogenous auxins, gibberellins, and cytokinins on fruit development in Chinese gooseberry (*Actinidia chinensis* Planch.). *N.Z. Journal of Botany* 14:69–75.
5. Hopping, M. E. 1981. Kiwifruit pollination: influence of male clones. In: Proceedings of Kiwifruit Seminar held at Tauranga, MAF, New Zealand, pp. 21–25.
6. Hopping, M. E. 1982. Spray pollination of kiwifruit. *N.Z. Agri. Sci.* 16:46–48.
7. Hopping, M. E., J. A. K. Marytn, and N. J. A. Hacking. 1985. Selection of superior males for kiwifruit. *Suppl.* to N.Z. *Kiwifruit*, July 1985.
8. Lionakis, S. M. and W. W. Schwabe. 1984. Bud dormancy in the kiwifruit, *Actinidia chinensis* Planch. *Ann. bot.* 54:467–484.
9. Lyttleton, S. 1985. More superior males on sale next winter. *N.Z. Kiwifruit*, September, 1985.
10. Martyn, J. A. K. and M. E. Hopping. 1988. How to identify superior males. *N.Z. Kiwifruit*, February 1988, p. 29.
11. Sim, B. L. and G. S. Lawes. 1981. Propagation of kiwifruit from stem cuttings. *Gartenbauw.* 42:65–68.
12. Testolin, R. and C. Vitagliano. 1987. Influence of temperature and applied auxins during winter propagation of kiwifruit. *HortScience* 22:573–574.

CHEMICAL USE IN NEW ZEALAND—THE UNDOCUMENTED SIDE EFFECTS

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Standards governing the use and sale of chemical pesticides in New Zealand are based on international guidelines. A Pesticides board administers Government regulations intended to safeguard end users, the public, and the environment. Representatives from grower groups, manufacturers and resellers, and Government departments make up a Board of twelve. Its their task, with guidance from independent counsultants and referees, to make judgements and set parameters by which pesticides may be pruchased and applied. These decisions are invariably made on "hard facts" presented as documented evidence by the intending marketer of the product.

History has demonstrated that while this process of regulating pesticide availability to the market place has mostly met the aims of the legislators, exceptions have and will likely always occur. Knowledge is not finite and documented evidence will not necessarily always present all of the hard facts on which such judgements can be made. It is the prupose of this paper to trace some of the recent documented and undocumented history of pesticide use in New Zealand which has resulted in some of the causes of general