EFFECTS OF THERAPEUTANTS AND TEMPERATURE ON POLLEN GERMINATION, POLLEN TUBE GROWTH AND FRUIT SET IN FRUIT CROPS

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ABSTRACT

This study involved assessments of therapeutant effects on pollination and fruit set; of temperature effects on pollen germination and pollen tube growth in apples, peaches and kiwifruits; of flowerage effects on pollen germination and pollen tube growth in kiwifruit styles; and of hand pollination effects on fruit set, fruit weight and seed numbers per fruit in kiwifruit vines.

From the point of view of their *in vitro* effects on pollen germination therapeutants can be listed in order of decreasing inhibitory effect as follows:

(a) for apples - mancozeb plus dinocap, triforine, dichlofluanid, bupirimate, bayleton, citowett^{R}, captan and mancozeb;

(b) for peaches - triforine, vinclozoline, streptomycin plus triforine, mancozeb, captafol, iprodione, dichlofluanid, streptomycin and benomyl; and

(c) for kiwifruits - dichlofluanid, captan and vinclozoline.

However, it appeared that while *in vitro* a therapeutant was very inhibitory, the application of a spray to anthers in an intact flower did not affect the germination of pollen subsequently released by those anthers.

Fungicides proven to be toxic to pollen *in vitro* did not necessarily produce similarly toxic effects *in vivo*. Reasons for such varying effects of fungicides on pollen germination and pollen tube growth *in vitro* and *in vivo* are suggested.

At 24 hours after pollination the number of pollen tubes growing more than 1/2 the style length of kiwifruit (Hayward) flowers one to two days old were 38% and 27% higher than in flowers less than one day old and more than three days old respectively.

In apples 5 sprays of either bayleton or captan, 3 sprays of either of the therapeutants mancozeb, mancozeb plus dinocap, and triforine and a wetting agent citowett^{R} applied during bloom period caused no effect in fruit set in Golden Delicious trees; and 3

bupirimate sprays during bloom period had no effect on the fruit set in Splendour trees.

In peaches 6 sprays of either captafol, or benomyl or iprodione, 5 sprays of either mancozeb or vinclozoline or streptomycin or triforine during bloom period caused no effect on fruit set in Golden Queen trees. Three sprays of streptomycin or dichlofluanid caused no effect but 3 sprays of triforine, triforine plus streptomycin or of ethephon caused 50%, 70% and 90% reduction in fruit set in Red Haven peach trees.

In kiwifruits 3 sprays of either dichlofluanid, captan or vinclozoline reduced seed numbers per fruit by 37% but did not affect fruit set or fruit weight.

Thus *in vitro* and *in vivo* studies were useful in determining therapeutant effects on pollen but did not necessarily provide information on their effects on fruit set in apple, peach and kiwifruit and on fruit weight and seed numbers per fruit in kiwifruit.

The germination of both apple and peach pollen was higher at 24°C than at 16°C, 20°C, 28°C and at 32°C. After 18 hours incubation pollen tubes were longer at 28°C and at 32°C than at 16°C, 20°C and 24°C. *In vivo* studies with kiwifruit (Matua) pollen showed that pollen germination at 14°C, 18°C, 22°C and 26°C did not differ significantly. Temperatures both higher and lower than the temperature range 18 to 22°C were found to be inhibitory to pollen tube growth in kiwifruit (Hayward) styles.

Hand pollination of flowers did not influence percentage fruit set but increased fruit weight and seed numbers per fruit in kiwifruit (Hayward) vines. Because fruit weight was positively correlated with seed number per fruit in fruits from both bee pollinated and bee plus hand pollinated flower clusters, supplementary pollination may play an important role in the production of fruit in kiwifruit orchards.

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