

Spray thinning for crop load management of stonefruit

HIF Project 62

Conducted by

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Spray thinning for crop load management of stonefruit

- Most stonefruit varieties set excessive crops, leading to poor size development and low pack outs of marketable fruit
- Hand thinning usually occurs later than the optimal timing (as early as possible)
- Hand thinning can cost \$1500-\$4000/ha in labour. Covid-19 has disrupted farm labour supply
- Spray thinning practiced in pome fruit for 50 years

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- Stone fruits can often exhibit a synchrony of flowering, whereas apples have a sequence of crown bloom, followed by secondary florets



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- Spray thinning is needed to improve pack outs of marketable fruit to be export competitive with Chile and South Africa



Spray thinning for crop load management of stonefruit



- Stonefruit exports are rising rapidly with many new orchards commencing to bear in Victoria

Spray thinning for crop load management of stonefruit

- Commenced 12 replicated experiments in 2018 and 2019 in plums, peaches, nectarines, apricots and cherries. Nine trials were completed and reported.
- Tested ethephon, a plant growth regulator that generates ethylene, a natural plant growth regulator at 50-100 ppm, alone or in tank mixtures with NAA, a synthetic auxin @5-10 ppm (ie: a 10:1 ratio)
- Applied from full bloom to 22 days after bloom

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- Five replications of each treatment, comprising single tree plots, hand sprayed with a petrol powered knapsack
- Assessed fruit set and fruit size.

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- Ethephon plus NAA significantly reduced fruit set and increased fruit size in plums, peaches and nectarines.



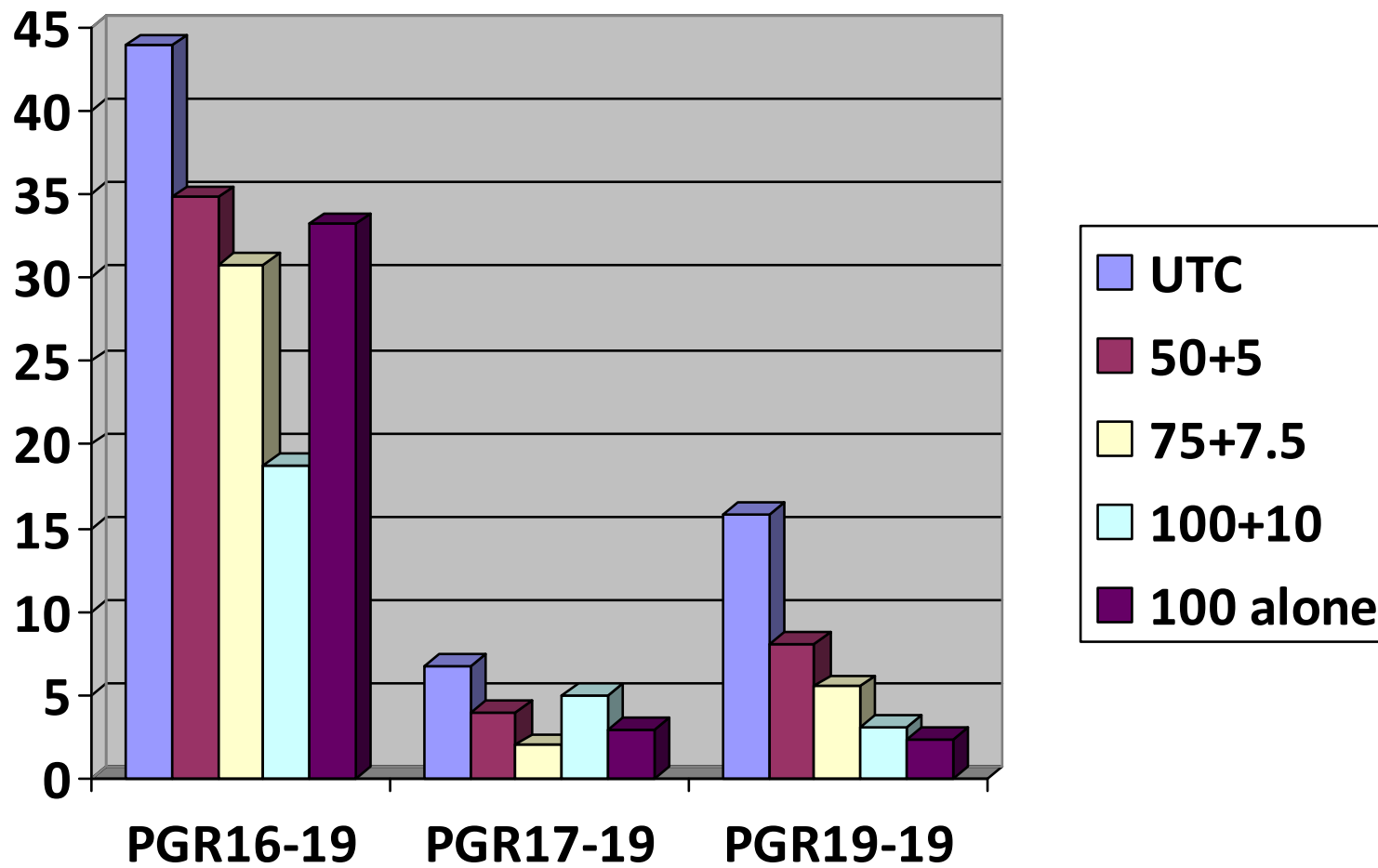
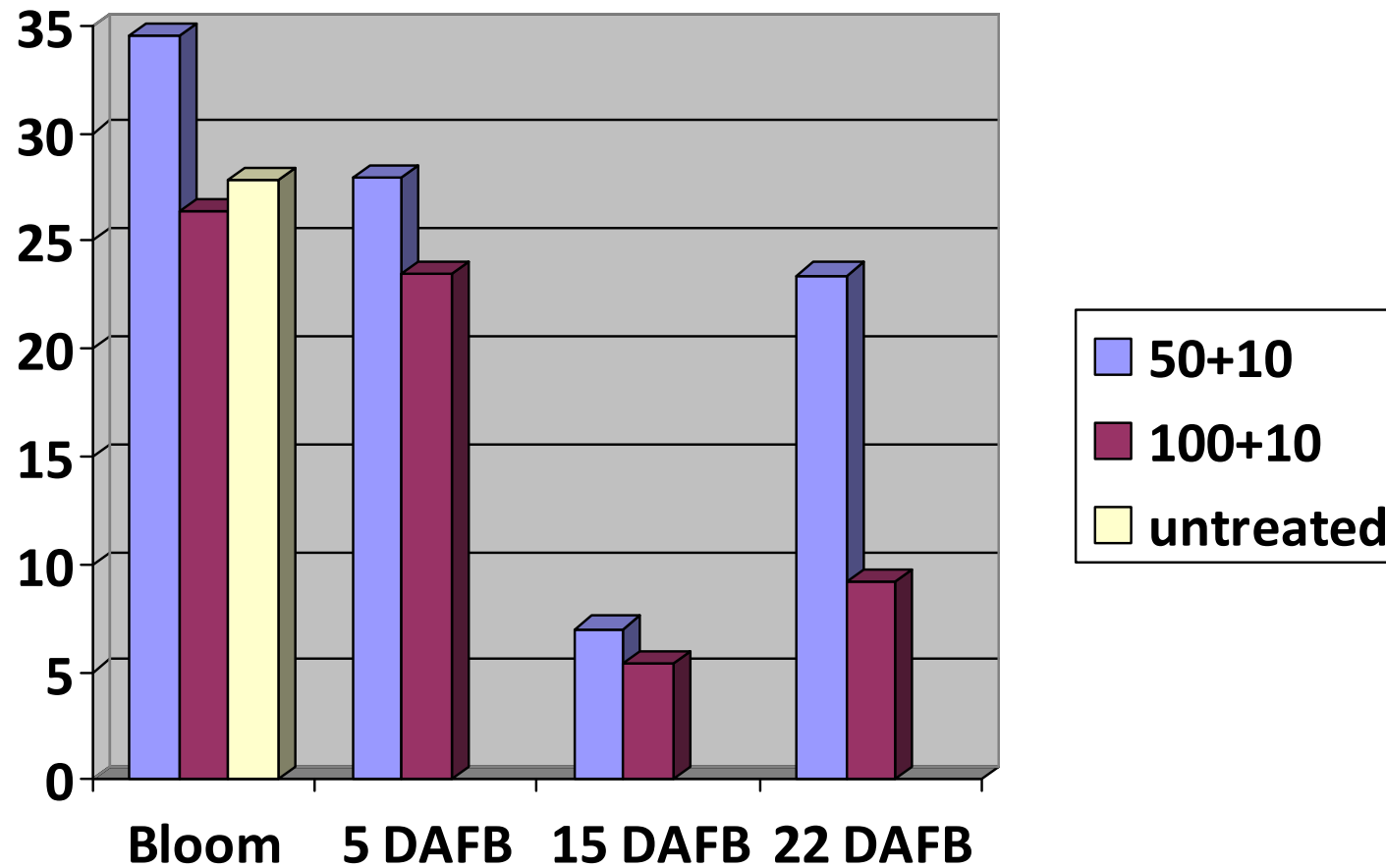


Figure 5 Percentage fruit set of European plums as influenced by concentration of ethephon plus NAA mixtures (ppm), Koonoomoo, Victoria, 2019-20 season, Trials PGR16-19, PGR17-19 and PGR19-19

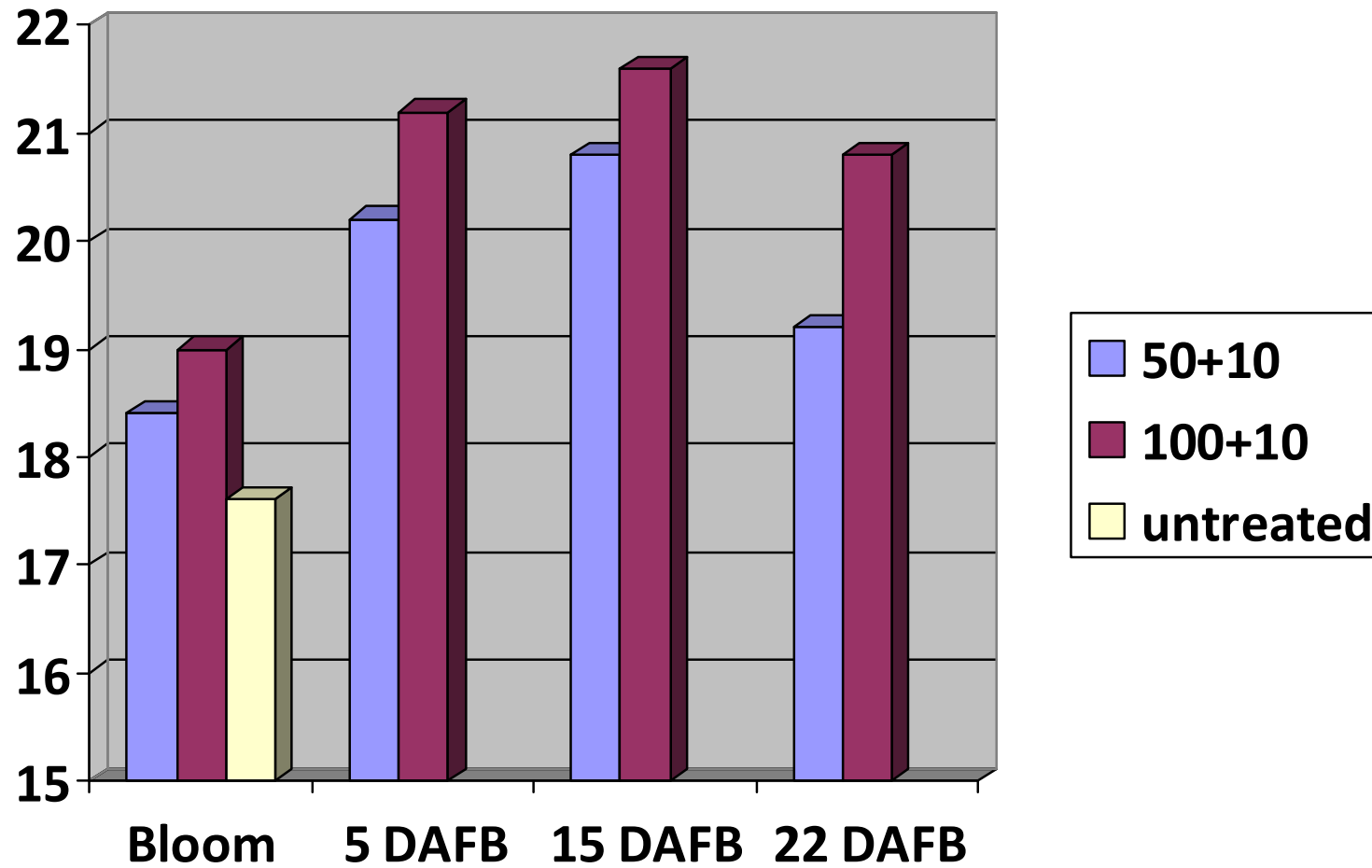
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- Optimum application timing for ethephon plus NAA was 10-15 days after full bloom





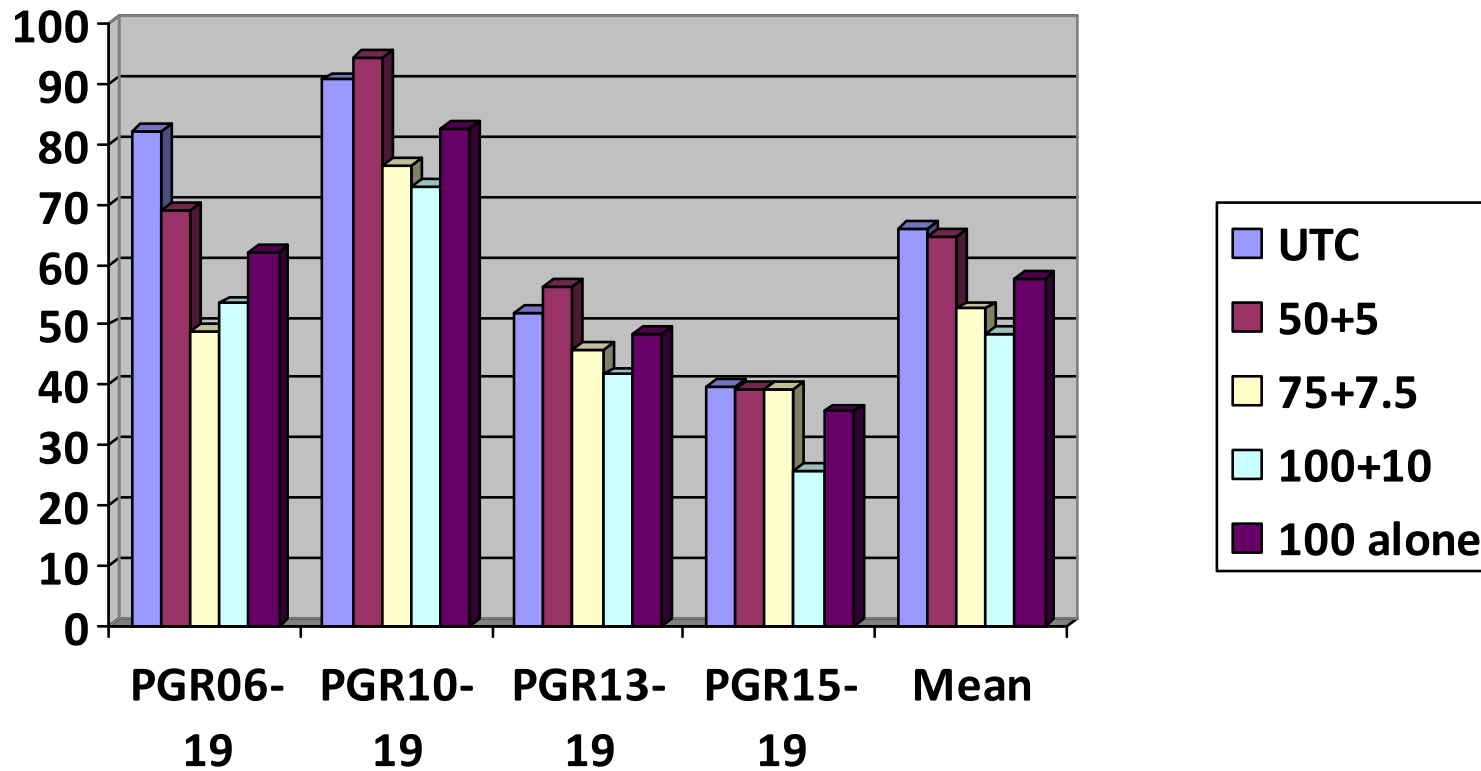
- Percentage fruit set of GF707 plums as influenced by application timing of ethephon plus NAA mixtures (ppm), Koonoomoo, Vic, 2018-19 season Trial PGR08-18



Average fruit weight (g) of GF707 plums as influenced by application timing of ethephon plus NAA mixtures (ppm), Koonoomoo, Vic, 2018-19 season Trial PGR08-18

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- Ethephon plus NAA significantly reduced fruit set and increased fruit size in plums, peaches and nectarines.
- Addition of NAA to ethephon increased the effectiveness of the spray treatment.
- No crop injury was observed



Percentage fruit set of peaches and nectarines (across four trials) as influenced by concentration of ethephon plus NAA mixtures (ppm), Cobram and Bunbartha, Victoria, 2019-20 season

Spray thinning for crop load management of stonefruit

- Results ought to be submitted to the APVMA to obtain a minor use permit for this technique
- 3 seasons of work in European plums
- Additional work required in fresh market nectarines, peaches, Japanese plums, apricots and cherries
- Enables Australian stonefruit growers to increase their international competitiveness, by producing better pack outs of high quality fruit at a lower cost

Spray thinning for crop load management of stonefruit

- Murray and Goulburn Valleys are ideally suited to fresh stonefruit production
- Adequate winter chilling that is not available in coastal or more northerly areas
- Most reliable water supply in the Murray Darling basin
- Suitable soil types
- Large farm sizes

Spray thinning for crop load management of stonefruit

- Project was conducted efficiently by experienced people
- Literature search gave us understanding of prior knowledge
- Industry collaboration ensured the project addressed a critical unmet challenge in stone fruit production
- Results demonstrated consistency between trials.

Spray thinning for crop load management of stonefruit

- Investment from the HIF has enabled the project to proceed and fill a market failure
- Author encourages any horticultural industry with a commitment to quality R&D to apply for support if their project will advance Victorian production horticulture.

Summary

Rate definition field trials were established to test ethephon plus NAA combinations in a ratio of 10:1 (gram for gram), as these treatments were identified as the most promising for post blossom thinning during previous Agropraisals field trials. Twelve replicated trials were commenced and treated within peach, nectarine, plum, apricot and cherry crops during spring 2018 and 2019 in northern Victoria.

Randomised complete block trial designs were chosen with single tree plots. Buffer trees were used in high density orchards, whilst no buffers were required with free standing trees. Treatments were applied using a petrol powered knapsack using a hand lance fitted with a single cone nozzle.

Minor – major rate responses to ethephon plus NAA were evident in assessments of fruit set in peaches (number of trials [n]=2), nectarines (n=2) and plums (n=5).

Addition of NAA to ethephon mildly increased thinning in six out of eight comparisons.

Optimum application timing appeared to be 10-15 days after full bloom (n=1).

No crop injury was noted in any of the experiments.

These results could be used to support a recommendation for ethephon @ 75-100 ppm plus NAA @ 7.5-10ppm as post bloom thinning sprays in stonefruit crops.

Adoption of ethephon plus NAA thinning sprays are likely to offer substantial improvements in the economic performance of Victorian stone fruit crops.

Acknowledgements

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