CONTROL OF RED SPIDER MITES ON STRAWBERRIES

In Queensland most commercial strawberry crops are grown in coastal areas near Brisbane, and red spiders are serious pests. The species involved are *Tetranychus lambi* (Pritchard and Baker), *T. telarius* (L.) and *T. ludeni* Zacher.

Strawberries are planted in early March, and there are three phases in cropping. During the first, from June to August, the plants set large berries, with a production peak in early spring. This phase usually occurs before mites build up. Then after a short period of poor fruit set, a heavy crop of smaller fruit classed as jam berries is produced. This part of the crop, coming to maturity in September and October, may be destroyed by heavy mite infestations which reach a peak usually in August or September, then rapidly decline. The third phase, which occurs after the natural recovery of mite-infested plants, is a crop of small, inferior berries towards the end of the season in November; this, which is of little economic importance, is often unaffected by mites.

The effect of mites on the plants is accentuated by dry conditions.

Brimblecombe (1953) recommended sulphur, nicotine, parathion and HETP for use against red spiders in general. Since that date health regulations have limited the use of some of these materials, particularly on strawberries, which are often picked daily.

The present work, consisting of 2 screening and 3 yield trials, was prompted by the advent of new materials, and was carried out in the Redlands and Nambour districts during 1956–1958.

Materials and Methods

Materials, active strengths and methods used were:

"Aramite".—A dispersible powder containing 15 per cent. w/w active ingredient; at 2 lb/100 gal.

Diazinon.—An emulsifiable preparation containing 20 per cent. w/v active ingredient; at 0·05 per cent.

"Dipterex".—An emulsifiable preparation containing 50 per cent. w/w active ingredient (62·5 per cent. w/v); at 0·05 per cent.

"Guthion".—A dispersible powder containing 25 per cent. w/w active ingredient; at 0·05 per cent.

Kelthane.—An emulsifiable preparation containing 18·5 per cent. w/v active ingredient; at 0·025 per cent., 0·05 per cent., and 0·075 per cent. (1958 trials).

—A dispersible powder containing 18·5 per cent. w/w active ingredient; at 2 lb/100 gal (earlier trials).

Malathion.—An emulsifiable preparation containing 50 per cent. w/v active ingredient; at 0·025 per cent.

Nicotine.—A concentrate containing 40 per cent. nicotine as nicotine sulphate; at 0·07 per cent.

Parathion.—An emulsifiable preparation containing 50 per cent. w/v active ingredient; at 0·01 per cent.

Sulphur.—A dispersible powder containing 97 per cent. sulphur; at 3 lb/100 gal.

—A dusting sulphur, not less than 88 per cent. sulphur, finely ground. (Not less than 99 per cent. passing through a B.S. 200 mesh sieve).

HETP.—An emulsifiable preparation containing 16–20 per cent. w/v TEPP as active ingredient; at 0·015 per cent.

In all trials the strawberry variety Phenomenal was planted in double rows 15 in. apart with 3 ft 6 in. or 3 ft 9 in. between double-row centres. Sprays (75–140 gal/ac) were applied with a knapsack sprayer and the dust (40 lb/ac) with a rotary duster. All stages of mites, except eggs, were counted up to a maximum of 100 on one leaflet per plant, using a hand lens, in the field. Thus in expressing numbers per leaflet only the lower are actual counts; the higher figures are estimates. In yield trials, the strawberries were picked twice weekly and fruit weights and numbers were recorded. Trial layouts and further details are given with results.

Results

Screening Trial 1.—Redlands district, 1956: 8 x 4 randomized blocks with a plot size of 24 plants. Materials screened were: diazinon, "Guthion", malathion, nicotine, parathion and sulphur (dispersible powder and dust). This trial was a test of mite counting methods. Results indicated that the use of diazinon, "Guthion", malathion and parathion gave the most satisfactory pest kills.

Screening Trial 2.—Redlands district, 1957: 7 x 4 randomized blocks with a plot size of 22 plants. Materials screened were "Aramite", "Dipterex", Kelthane, sulphur (dispersible powder and dust) and HETP. The use of Kelthane and the sulphurs gave satisfactory pest kills.

Yield Trial 1.—Redlands Experiment Station, Ormiston, 1957: a 5 x 5 latin square with a plot size of 26 plants. Treatments were applied fortnightly from the pretreatment counts on July 4 to October 9. Harvesting was from mid-June to late November. Treatments and detailed results are given in Figure 1.

Yield Trial 2.—Redlands Experiment Station, Ormiston, 1958: a 6 x 5 randomized block layout with a plot size of 40 plants. Treatments were applied fortnightly from the pretreatment counts in late June to late October. Harvesting was from June to October inclusive. Treatments and details of results are given in Figure 2.

Yield Trial 3.—Maroochy Experiment Station, Nambour, 1958: a 6 x 5 randomized block layout with a plot size of 40 plants. Treatments were applied fortnightly from early July to late November. Harvesting was from June to November inclusive. Treatments and details of results are given in Figure 3.

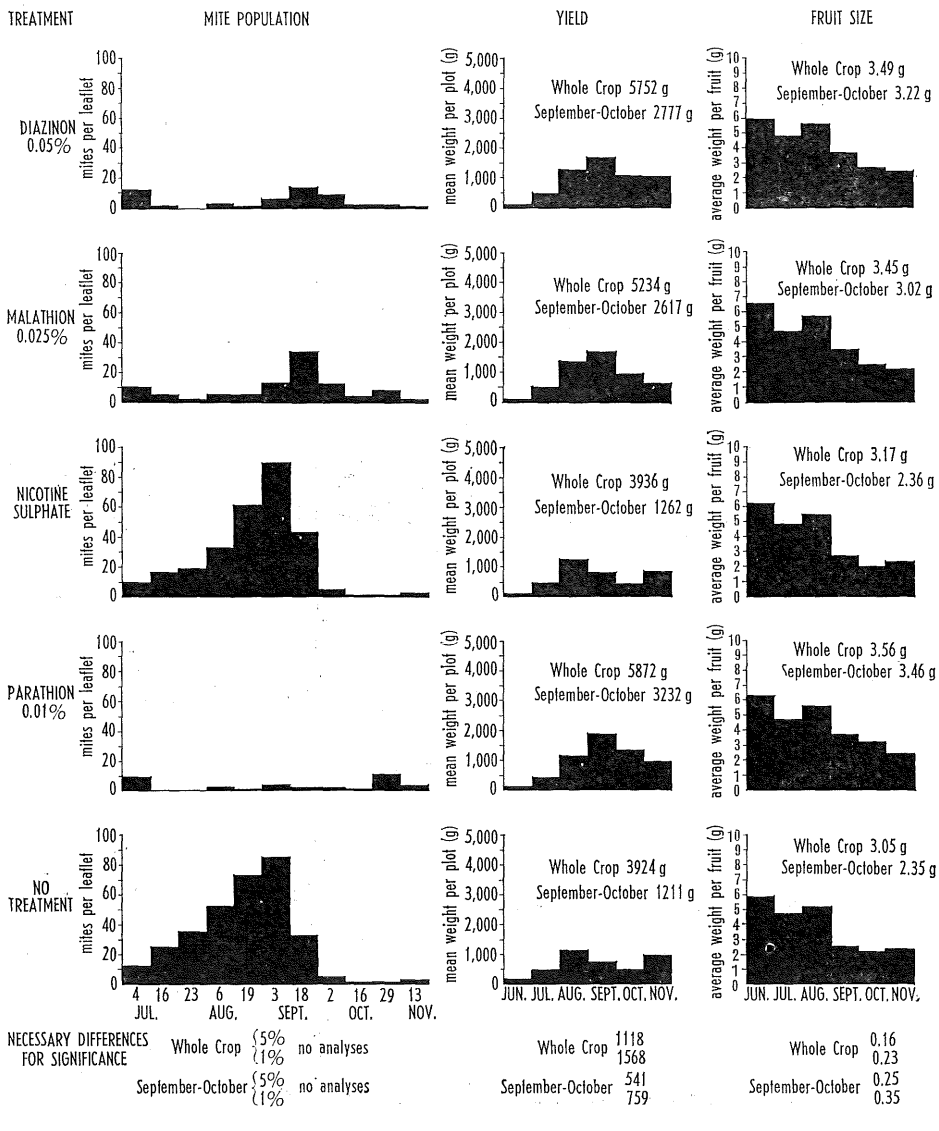

Fig. 1.—Results of Yield Trial 1.

Discussion

The yield trial results provide concrete evidence in support of the conclusions from general field experience as stated earlier. Trials 1 and 2 were conducted under dry conditions; mite infestations were heavy and yield increases due to treatment for whole crops were as high as 49·6 per cent. and 211·7 per cent.,

and for the September/October period (Trial 1 only) 166·9 per cent. There was also improved fruit size. Under the good growing conditions of Trial 3, the control of the light mite infestation present resulted in a yield increase of slightly more than 22·5 per cent., all of which was concerned with the last 16 weeks of the crop.

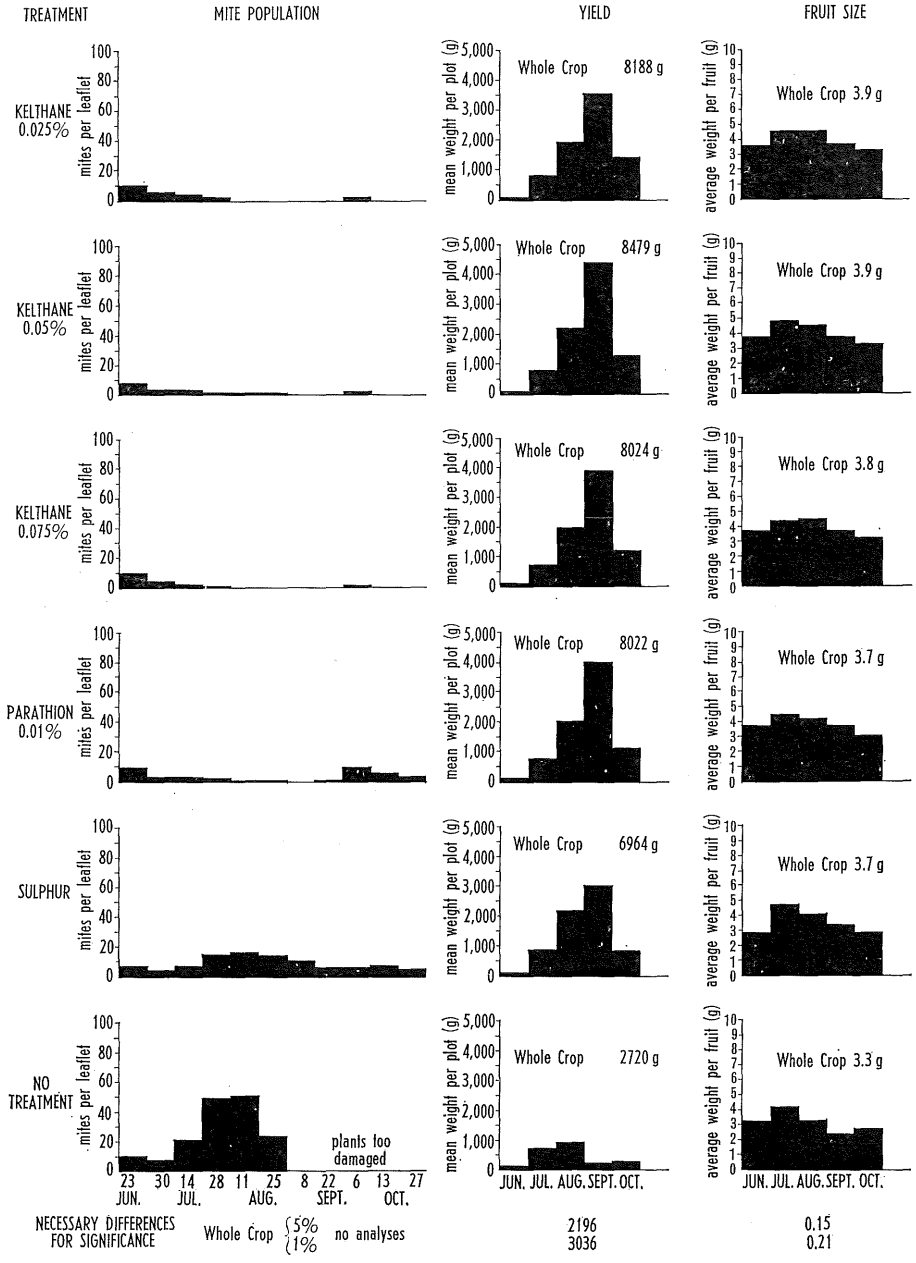

Fig. 2.—Results of Yield Trial 2.

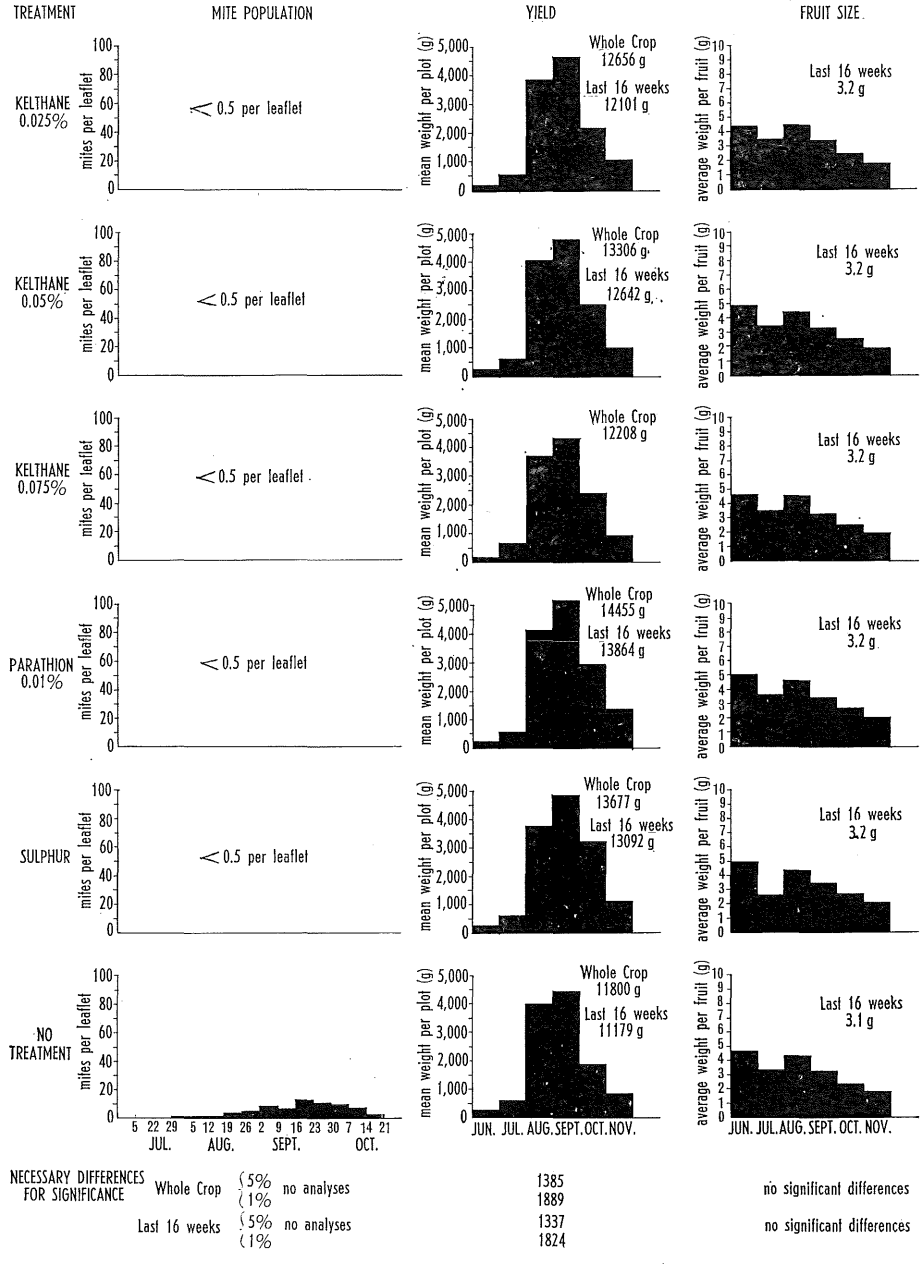

Fig. 3.—Results of Yield Trial 3. The yield for Kelthane 0·075% over the last 16 weeks, which has been omitted from the diagram, was 11,637g.

Primarily with these results as a basis, Davis (1961) recommended sulphur and "Kelthane" for the control of red spider mites on strawberries:

> "Sulphur is cheap and non-poisonous, and for routine purposes is quite satisfactory when properly applied. It may not, however, kill fast enough during a peak in breeding or when heavy infestations are present. It may also leave a visible residue on the fruit.
>
> Kelthane 0·05 per cent. as a spray is most efficacious against red spider mites, particularly on strawberries. Do not exceed the recommended strength."

There is some evidence from field observations that Kelthane at strengths above 0·05 per cent. may depress yields.

REFERENCES

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