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OCCURRENCE OF PROTRUSIONS ON AVOCADO FRUIT AND THE CAUSATIVE AGENT

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INTRODUCTION

Peculiar protrusions on the skin of Hass fruit were found late in the 1990/91 season, mainly on the farm Lulu of Messrs. Vos & Co. in the Kiepersol area, to such an extent that approximately 30% of the fruit were culled at the packhouse. These lesions also occurred in an extended area of Kiepersol/Hazyview but with much less damage. Fruit samples from Natal also showed these protrusions but the extend of the damage was not of economic importance, except one grower from the Wartburg region claimed a 50% loss on his Hass crop due to this problem.

The lesions occurred on the fruit surface as pimply elevations without any superficial punctures from possibly insect feeding. By cutting the protrusion parallel to the fruit surface, brown corky scar tissue appeared in the centre of the lesion (Fig. 1). This scar tissue was very superficial and never extended into the fruit pulp. Thirty to 40 protrusions were found per fruit and such fruit were totally unsuited for export. This type of lesions has never been described before in any of the overseas avocado producing countries. Du Toit & Tuffin (1981) illustrated similar protrusions on Edranol fruit of unknown origin during a fruit fly study. More recently these protrusions were described by Dennill & Erasmus, 1991; Erichsen & Schoeman, 1992 and Dennill & Dupont, 1992.

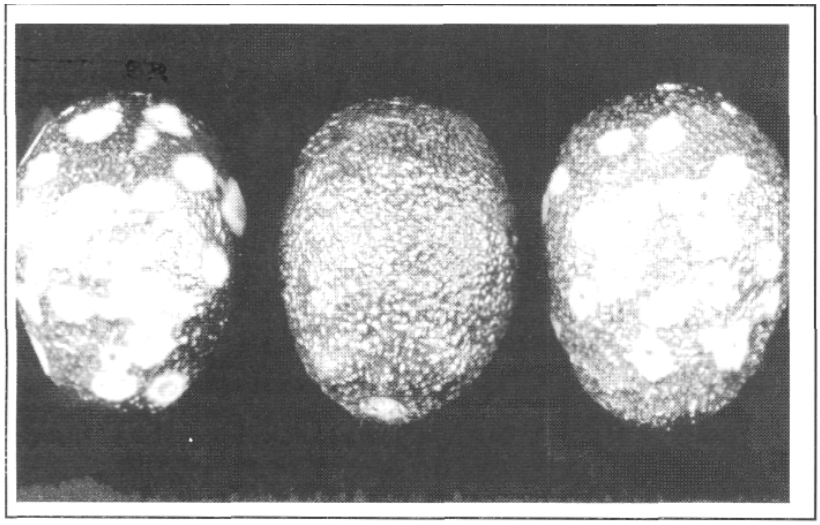

FIG. 1 Protrusions on young Hass fruit (centre). Adjacent fruit with cut lesions to show brown corky scar tissue.

MATERIALS AND METHODS

The present study started in the 1991/92 season on the farm of messrs Vos and Co. in the Kiepersol area where a heavy crop loss occurred the previous season; to determine whether the lesions were caused by insects, the occurrence of such insects through the season and possible control measures. In an experimental plot of 45 Hass trees a group of 10 trees were selected. The fruit (10 per tree) were labelled and inspected on a weekly basis from September 1991 until harvest for the occurrence of possible lesions and any insects. During the same period a total of 243 fruit with surface lesions of possible insect origin as well as a similar number of fruit without any lesions were recorded and bagged with organdie-cloth material on a two-weekly basis. Various methods of insect trapping were applied on a regular basis in the avocado trees, on grass underneath the trees as well as the surrounding bush to determine which insects occur in and around the orchard. All insects with sucking mouthparts which were trapped alive were bagged with avocado fruit of different sizes. The insect families Fulgoridae, Cicadellidae, Coreidae and Pentatomidae were of most interest. Yellow sticky traps were used in the avocado trees to monitor their numbers.

In the present 1992/1993 season the citrus leafhopper *Penthimiola bella* were collected from citrus orchards at Nelspruit (Fig. 2) and bagged with young Hass fruit varying in size from 5 to 25 mm in length.

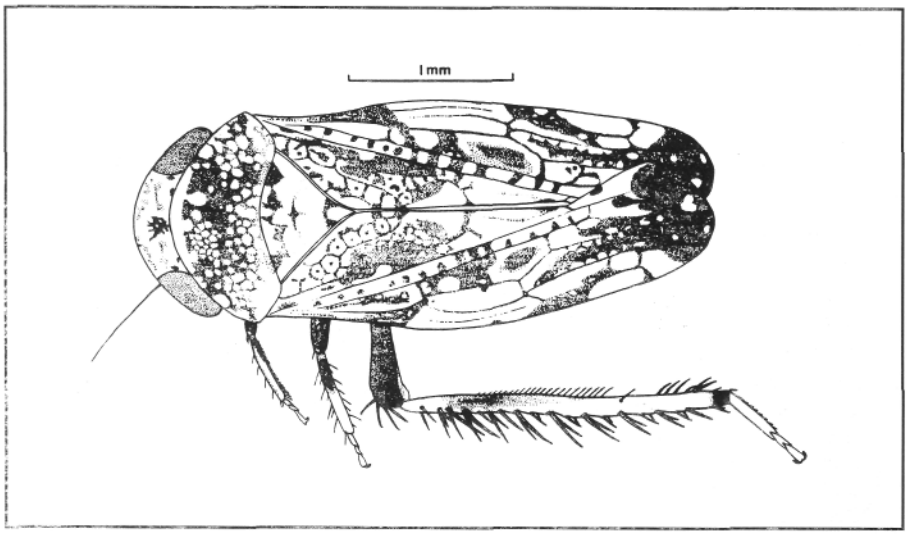

FIG. 2 Adult female of citrus leafhopper, *Penthimiola bella* (after Annecke in Bedford, 1978).

A spray trial of randomized block design was also carried out in the same orchard with nine trees per unit. Six treatments were applied with three replicates each (Table 1). Treatments nos, 2 and 3 were applied as foliar sprays while nos. 4,5 and 6 were stem treatments by means of a Calibra stem applicator on 22 September, 1992. The incidence of the leafhopper population and lesions on the fruit were monitored on a weekly basis.

TABLE 1 Chemical control of the citrus leafhopper *P. bella*.

TREATMENT & FORMULATION	DOSAGE/100ℓ WATER
1. Untreated control	
2. Sulphur (WP)	300g
3. Endosulfan (Thioflow EC)	100ml
4. Monocrotophos (Azodrin SL)	Undiluted
5. Methamidophos (Citrimet AL)	Undiluted
6. Imidachloprid (Confidor SL)	Undiluted

RESULTS AND DISCUSSION

In the 1991/92 season it was found that 20 % of the labelled fruit developed protrusions during a peak period in the third week of November (Fig. 3). The average fruit size at that stage was 37 4 mm.

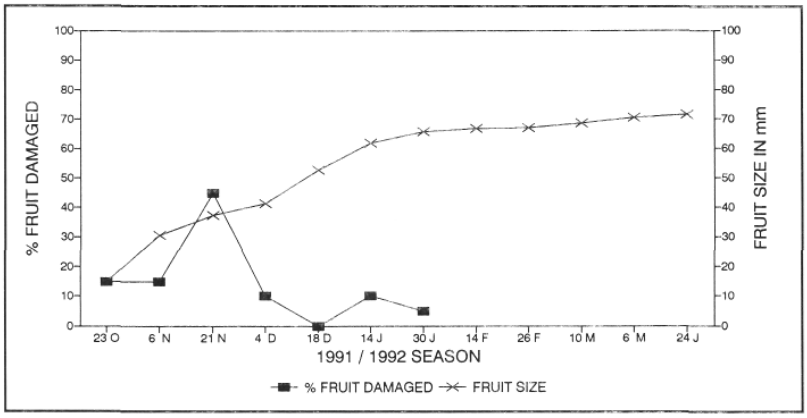

FIG. 3 Occcurrence of protrusions on avocado fruit.

In the experiment with bagged fruit the possible insect lesions in the form of white excreta developed into dark water marks within one week while the water mark took another two weeks to develop into a typical protrusion. Thus one can assume that the main damage to the fruit were done at three to four weeks prior to the development of the protrusions as in Fig. 3, i.e. the first week in September. We found no protrusions on the unmarked fruit that were bagged from early in the season, which proofed that the lesions developed from a foreign origin such as insect damage. Other irregularities on the skin of the fruit as well as malformed fruit of unknown origin were recorded in this experiment with unblemished fruit.

None of the live insects i.e. two species of unidentified leafhoppers, a Fulgorid species as well as green Coreid bugs, that were caught in the orchard and bagged with unblemished fruit caused any visible blemishes. In contrast to these negative results, the bagged *P. bella* produced the typical lesions i.e. dark spots with white excreta,

watermarks as well as protrusions on approximately 40 percent of the exposed fruit. Lesions were also found on the leaves and twigs in the bags.

The *P. bella* population in the orchard remained low during this season (Fig. 4) with much fluctuation which could be attributed to the very dry winter and late summer rains. The incidences of protrusions on the fruit were also negligible low. The chemical sprays as foliar applications (Fig. 5) were not very successful as only one to two weeks of population suppression were obtained with a single application of both the sulphur and Thioflow Similar results were obtained with the various stem treatments (Fig. 6). These chemical control experiments were discontinued due to the low population of P. *bella* in the orchard, as well as the absence of protrusions on the fruit. These experiments will be continued next season until effective control measures can be found.

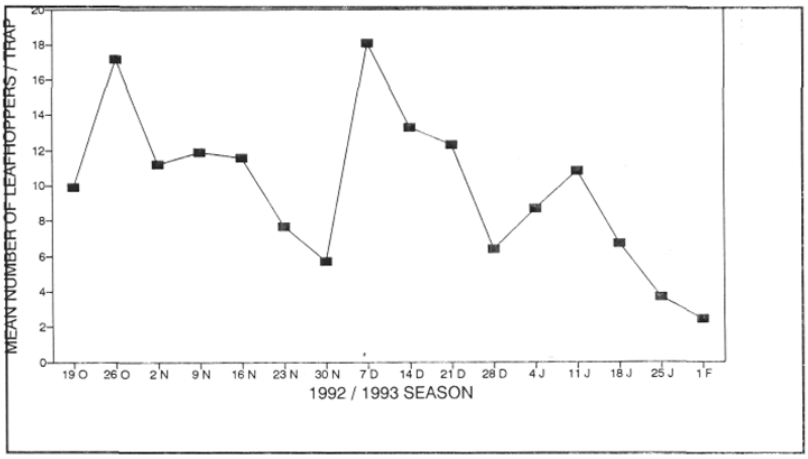

FIG. 4 Seasonal distribution of the leafhoppers in avocado orchard.

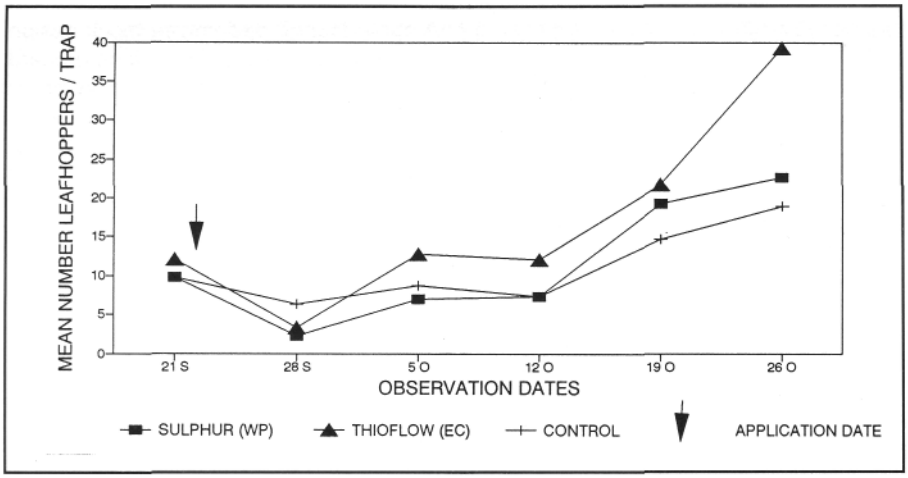

FIG. 5 Control of leafhoppers with foliar applications.

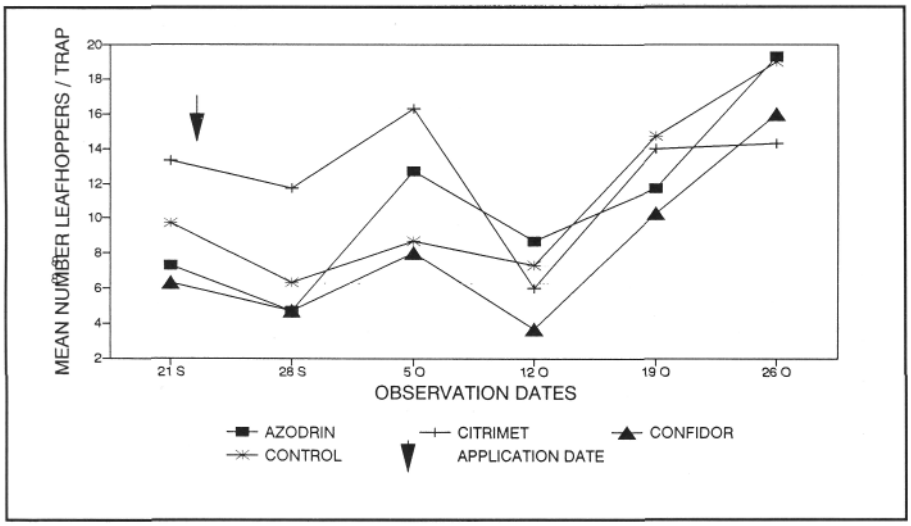

FIG. 6 Control of leafhoppers with stem treatments.

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