

First report on the identification of possible causes of pimple-like skin protuberances on avocado fruit in the Soutpansberg area

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SUMMARY

Ugly pimple like protuberances on the skin of Fuerte and Hass avocado fruit in the Soutpansberg district make them unsuitable for export. Microscope photos showed necrotic patches of skin tissue on the protuberances suggesting minute insect activity.

A trial was set up in the spring of 2003 to discover the cause of this malformation. Sticky colored plastic cards were placed on the trees from flowering until the November fruit drop. All the captured insects were counted and classified into their major families on a weekly basis.

The first symptoms appeared very early, just after fruit set. Many pollinating insects were captured every week while the trees were flowering. Eleven species of Hemiptera were captured that could cause the skin malformations. Five heteropteran species and six auchenorrhynchan species were also distinguished.

Further work needs to be done to positively identify the insects and to make sure that they caused the skin protuberances. An integrated pest management program will then have to be developed to control them.

OPSOMMING

Opsigtelike puisie-agtige skilletsels op Fuerte- en Hassvrugte in die Soutpansberg-gebied verhoed dat dit uitgevoer kan word. Mikroskopiese foto's toon nekrotiese weefsel op die punt van die puisies wat die vermoede laat ontstaan dat dit as gevolg van insekte kan wees.

In 'n proef is taai, gekleurde plastiese kaartjies gebruik om insekte vanaf blomtyd tot die Novembervrugval te vang. Al die insekte wat weekliks gevang is, is tot familievlak geklassifiseer.

Die eerste puisie-agtige skilletsels is baie vroeg, net na vrugset, waargeneem. Baie insekte is weekliks gevang. Die meeste insekte was bestuiwers maar elf Heteroptera-pesies, wat moonlik die skade kon veroorsaak, is ook gevang. Vyf het aan die Hemiptera behoort en ses aan die Auchenorrhyncha.

Verdere werk sal gedoen moet word om die insek wat die puisies veroorsaak het te identifiseer. Daarna sal 'n geïntegreerde plaagbestuursprogram ontwikkel moet word om die insekte te beheer.

INTRODUCTION

In 1993 Du Toit *et al.* reported on a mirid causing bumps on avocado fruit. These bumps were called "vosknoppe" and are caused by the avocado bug (*Taylorilygus* sp.) feeding on the fruit at early stages. A typical white exudate on the fruit was also observed as a result of feeding by this bug. The typical "vosknoppe" appeared about a month after feeding.

Work done on the Hemiptera since 1996 by Bruwer was reported at several avocado symposia (Bruwer, 1996, 1997, 1998, 2000). It was found that a *Taylorilygus* sp. infested early cultivars (e.g. Fuerte) at flowering as a first generation, causing little damage. Their offspring

infested the later flowering cultivars (e.g. Hass) and caused considerable damage.

Skin protuberances were observed on avocado fruit in the Soutpansberg for some years. These skin protuberances on avocado fruit lacked the typical white exudate and never developed into "vosknoppe". A pimple like protuberance occurred only on the skin of the avocado and no damage to the flesh was observed. This cosmetic damage was responsible for up to 40% cull in export quality fruit in some orchards.

MATERIAL AND METHODS

Orchard: This trial was laid out in a Fuerte orchard where many fruit were discarded the pre-

vious season as a result of the pimple like protuberances. This specific orchard is flanked by a eucalyptus plantation and indigenous bush. A pine plantation is about 200 meters distant.

Sticky cards: Coloured sticky cards measuring 125 mm x 75 mm were used to trap insects. Five colours were used: yellow, green, red, white and blue. Yellow cards are usually used to capture minute flying insects like aphids or thrips. The other colours were added to find out which colour would capture the causative insect best.

Method: One colour set (5 cards) was hung on the outside of an avocado tree next to the flowers on four sites around the orchard. The positions were chosen to attract insects flying



Figure 1. Pimple like protuberances visible just after flowering

Table 1. The taxonomy of the different insects caught over the 12-week period on avocado trees

Order	Suborder (division)	Family	Common name
Diptera	Nematocera	Culicidae	Mosquitoes
Diptera	Nematocera	Bibionidae	March flies
Diptera	Brachychera (Orthorrhapha)	Dolichopodidae	Long legged flies
Diptera	Brachychera (Cyclorrhapha)	Drosophilidae	Vinegar flies
Diptera	Brachychera (Cyclorrhapha)	Muscidae	Common flies
Diptera		Psychodidae	Moth flies
Thysanoptera		Thripidae	Thrips
Hymenoptera	Parasitica		Predatory wasps
Hymenoptera	Apocrita	Apidae	Honey bee
Hymenoptera	Apocrita		Ants
Hemiptera	Heteroptera	Miridae	Plant bugs
Hemiptera	Auchenorrhyncha	Cicadellidae	Planthoppers
Neuroptera		Chrysopidae	Green lacewings
Coleoptera	Polyphaga	Chrysomelidae	Leaf beetles
Coleoptera	Polyphaga	Cochinellidae	Ladybugs
Lepidoptera	Glossata		Moths

Literature cited to identify the insects: MCGAVIN, 2001; PICKER *et. al.*, 2003; VAN DEN BERG *et. al.*, 2001.)

in from the adjacent areas to the orchard.

RESULTS AND DISCUSSION

A total of 2 784 insects were caught on the sticky traps over the 12-week period. The vast majority (94.25%) was visiting avocado trees to pollinate the flowers. The major orders were Diptera and Hymenoptera. Only one bee was caught whilst many thousands visited the flowers. The potential causative insect

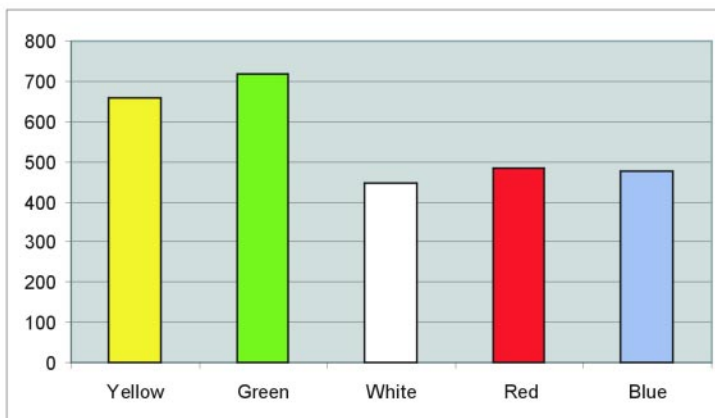


Figure 2. Total amount insects caught with the different coloured sticky cards in 12 weeks

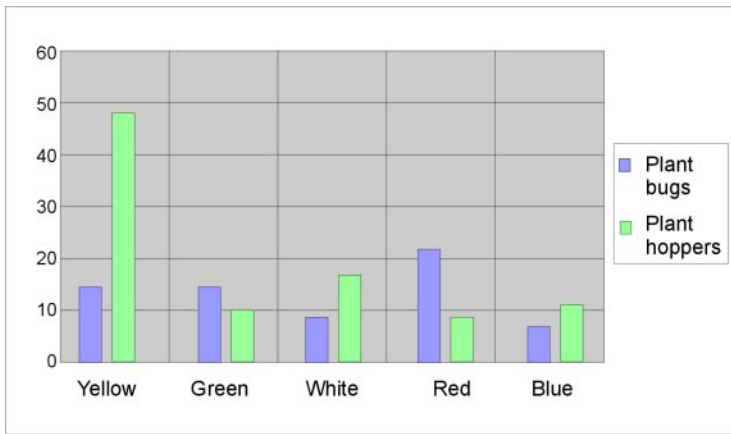


Figure 3. The total number of plant bugs and planthoppers caught with the different coloured sticky cards

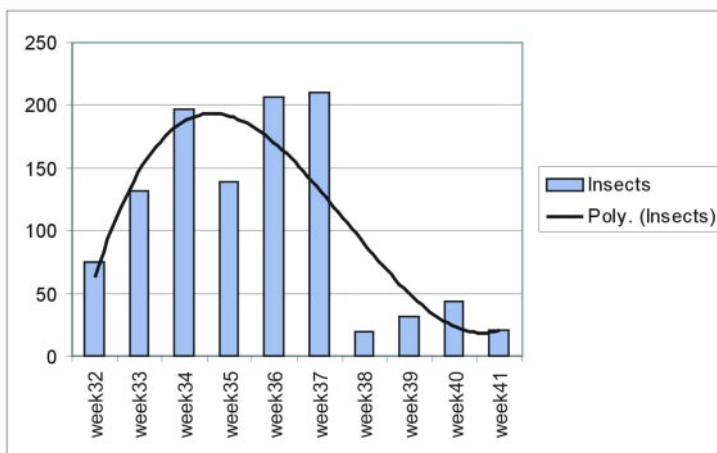


Figure 4. The total number of insects caught per week

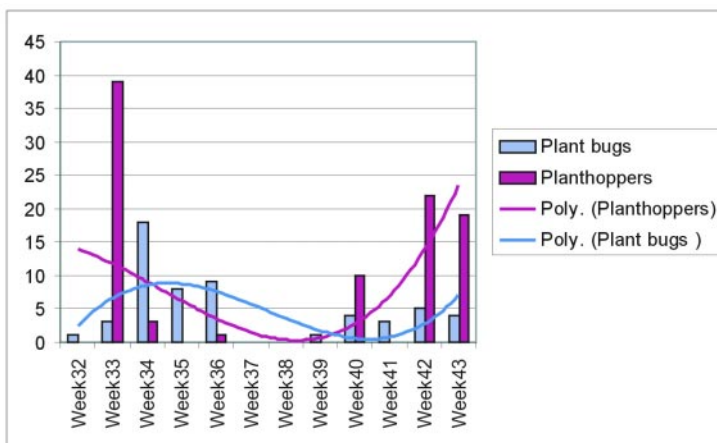


Figure 5. The trend in numbers of plant bugs and plant hoppers over the 12-week captive period

order was Hemiptera. A vast 160 hemipteran insects (5.25% of the total) were caught. A high population of planthoppers (suborder Auchenorrhyncha) were observed on the flowers during this period. Table 1 describes the

taxonomy of the major families. Predatory wasps, ants and moths were not classified lower than order level.

The first pimple like protuberances were seen very early after fruit set (Figure 1). Microscope photos show small patches of necrotic tissue on the top of the pimple. The damage was obviously done during the flowering period.

The standard yellow sticky card and the green cards caught the highest number of insects (Figure 2).

The standard yellow sticky cards also caught the highest number of planthoppers (suborder Auchenorrhyncha) whilst the red sticky card caught the most plant bugs (suborder Hemiptera) (Figure 3).

The sticky cards were hung onto the trees during week 32 (4 August 2003) just before the flowers opened. Comparatively few insects were caught during this week. From week 33 up to week 37, whilst the avocado trees were flowering, many insects were caught every week (Figure 4). Most of the insects visiting the avocado trees were pollinators. This can clearly be seen from the decline in numbers caught weekly since week 38 after the trees finished flowering.

Plant bugs and planthoppers moved into the avocado orchards when flowering started. The decline in numbers after flowering (Figure 5) could be a emigration away to other food sources after flowering. The rise in numbers of hemipterans from week 40 suggests either a new population coming in or a second generation of the first population infesting the orchard. No further damage was observed on the fruit.

CONCLUSIONS

Many insects visit avocado trees in the flowering period. Most insects come to feed on pollen or nectar. In this process they pollinate the trees. Some insect species, however, come to feed on the flowers and young fruit, causing

bumps (Vosknoppe) in the Kiepersol area or pimple like protuberances in the Soutpansberg district. Five distinct species of Hemiptera and six distinct species of Auchenorrhyncha were captured. It is not certain which insect caused the damage. Further work needs to be done to positively identify the insects and to develop an integrated pest monitoring and pest managing program.

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