

THRIPS ABUNDANCE, DIVERSITY AND DEVELOPMENT ON AVOCADOS AND MACADAMIAS IN THE LEVUBU REGION OF LIMPOPO

Note regarding publication

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INTRODUCTION

The global demand for avocados and macadamias has increased due to their nutritional value and economic importance. South Africa is a leading producer and exporter of both crops. However, thrips (Thysanoptera) are significant pests that reduce yield and quality. Previous studies identified several thrips species in South Africa, but information on their abundance, diversity, and damage at different developmental stages on different cultivars is limited. This study aimed to investigate the abundance, diversity, and susceptibility of developmental stages to thrips in avocado and macadamia orchards in the Levubu region of the province of Limpopo. The research questions included:

- Which thrips species are present in avocado and macadamia orchards?
- At what developmental stages are avocados and macadamias most susceptible to thrips damage?
- Which cultivars are most vulnerable?

The hypothesis was that young fruit, nuts, and flush are the most susceptible stages, and cultivar responses to thrips abundance and damage vary.

MATERIALS AND METHODS

The study was conducted across 12 avocado and 12 macadamia orchards of relatively similar age (10-15 years) representative of the variety in eco-geographical conditions, in the Levubu region in Limpopo, during the 2020/2021 and 2021/2022 seasons. Four avocado cultivars (Fuerte, Hass, Maluma, Pinkerton) and four macadamia cultivars (695 (Beaumont), 814, 816, A4) were studied. Thrips sampling was done from three orchards per cultivar using ten trees from all four cardinal directions, and performed from flowering to fruit/nut maturity at various developmental stages using a knock-down sampling method. Damage was assessed by scarring percentage with $\geq 10\%$ of surface area scarred, with fruit/nut set also

quantified. Thrips were reared from plant tissues and species identification done both morphologically and confirmed genetically. Data were analysed using generalised linear mixed models (GLMMs) in R to evaluate the effects of cultivar, developmental stage, and their interactions on thrips abundance, diversity, and development from plant tissues.

RESULTS AND DISCUSSION

A total of 15 535 thrips (4 499 from avocados) were collected across both seasons. Six morphotypes were identified: *Scirtothrips aurantii*, *Thrips tenellus*, *Haplothrips gowdeyi*, *Frankliniella occidentalis*, *Megalurothrips* sp., and *Caliothrips* sp. *Scirtothrips aurantii* was the most abundant and was confirmed as the main damaging species on both crops. Thrips abundance was higher on macadamias than avocados, and higher in the 2021/2022 season compared to 2020/2021. Among avocados, 'Pinkerton' suffered the most thrips damage while 'Hass' was least affected across both seasons. For macadamias, cultivar 816 was most damaged across both seasons. Young fruit (1-3 cm) and nut set/raceme stages were the most susceptible developmental stages. Results supported the hypothesis that susceptibility varies by cultivar and is greatest at early stages of fruit/nut development.

CONCLUSIONS

The study highlights *Scirtothrips aurantii* as the principal pest of avocado and macadamia in the Levubu region. Young avocado fruit and nuts were most vulnerable to thrips damage, with significant differences among cultivars. 'Fuerte' avocados and 'Macadamia 695' showed the least susceptibility, while 'Pinkerton' avocados and 'Macadamia 816' were highly susceptible. These findings have important implications for integrated pest management (IPM), suggesting that monitoring and control efforts should focus on early fruit and nut stages.

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