

Occurrence and control of avocado sooty blotch

ELIZE M SMITH, JM KOTZE and FC WEHNER

Department of Microbiology and Plant Pathology, University of Pretoria,
Pretoria 0002, Republic of South Africa

SYNOPSIS

Sooty blotch of avocado is caused by Akaropeltopsis sp, a cultivatable member of the Micropeltidaceae characterised by 16-spored asci. Pre-harvest sprays with copper oxychloride or captafol reduce the disease.

Sooty blotch of avocado (*Persea americana* Mill) was first reported in South Africa by Doidge, Bottomley, Van der Plank & Pauer (1953). They listed *Stomiopeltis citri* Bitancourt as the causal organism, presumably because of its similarity to the fungus responsible for sooty blotch of citrus. Avocado sooty blotch is characterised by sooty blotches on the branches, stems, leaf veins and fruit. It appears to be confined to southern Africa, since no report can be found of similar symptoms on *P. americana* in other parts of the world. Although the causal organism does not parasitise the host, the blotches lower the market value of the fruit. In 1985, 2,97 per cent of all avocados exported by air was rejected due to sooty blotch or sooty mould (Pieterse, 1986). The morphology, identity and control of the fungus causing sooty blotch of avocado in South Africa are reported on in this paper.

Sooty blotches originate from germinating ascospores or mycelial fragments of the pathogen. The resultant

mycelium branches out and produces small, light brown, rather inconspicuous spots on the plant surface. The blotches eventually become darker and thicker and the whole affected area turns charcoal black (Figure 1). When flower clusters and young shoots emerge in late winter or spring, the new growth forms a clear contrast with the dark twigs of the previous season. Symptoms spread during summer and the charcoal discolouration of affected fruit becomes more intense with age. Symptoms on leaves usually appear only after the second season. Haustoria have not been observed. Ascstromata (Figure 2) are abundantly produced on affected tissue during summer. They are dark brown, circular in outline, scutate, ostiolate, flat at the base, appressed to the cuticle, glabrous, 220-300 µm in diameter and 35-45 µm high, with a pseudoparenchymatous wall composed of meandrically interwoven hyphae (Figure 3). Asci are obclavate, sessile, bitunicate with apices directed to the ostiole, containing 16 ascospores each, 40-68 rim x 10-15 µm (Figure 4). Ascospores are hyaline, smooth, obclavate, two-celled, 14-16 µm x 4-5 µm. Paraphyses are filiform, single, hyaline, 1-1,5 µm in diameter. A specimen of the fungus has been deposited in the National Collection of Fungi of the Plant Protection Research Institute, Pretoria as PREM 47653.

Ascospores of the fungus from avocado germinate readily from both cells when placed in water or on nutrient medium. Ascostromata rinsed in sterile water and incubated at 22°C on potato dextrose agar (PDA) supplemented with 250 mg/dm³ chloromycetin, produce slow-growing, grey-green, leathery colonies after one month. When these colonies are transferred to fresh agar, new growth takes place. Ascostromata similar in appearance to those occurring in the field and containing 16-spored asci, are produced within four months on PDA illuminated intermittently (12h/d) under mixed near-ultra-violet (Philips RSF 40 BLB) and 'daylight'-type fluorescent tubes suspended 50 cm above the plates (Figure 5).

This fungus on avocado agrees with the description of *Akaropeltopsis* Batista and Peres (Batista, Bezerra & Castrillon, 1966). *Akaropeltopsis* is placed together with *Stomiopeltis* (Theiss.), *Akaropeltella* (Farr, 1972) and other genera in the family Micropeltidaceae by Von Arx & Muller (1975). This family includes genera characterised by their superficial growth on the cuticle of plants. Although *Akaropeltopsis* resembles *Stomiopeltis* (Figure 6) morphologically, it differs by having 16-spored asci. Batista *et al* (1966) described a single *Akaropeltopsis* sp., viz *A. machaeriifolii* Batista and Peres occurring on leaves of a *Machaerium* sp. in Brazil. The description of the Brazilian species corresponds with that of the *Akaropeltopsis* from avocado. A direct comparison could, however, not be made since the type material was in a poor condition. The available information suggests that the South African avocado sooty blotch fungus is conspecific with *A. machaeriifolii* from Brazil. *Akaropeltopsis* was also found on other hosts such as *Mangifera indica* L and *Acacia elata* Cunningh.

Pre-harvest sprays with copper oxychloride (170g ai/100 t) or captafol (160g ai/100 t) at a rate of 45f per fully grown tree, significantly reduced sooty blotch on avocado fruit and twigs. However, captafol had a slight phytotoxic effect and left unsightly residues on the fruit. Benomyl at 25g ai/100 f failed to control the disease (Kotze, Kuschke & Durand, 1981).

ACKNOWLEDGEMENT

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REFERENCES

- 1 Bastista, AC, Bezerra, JL & Castrillon, AL, 1966. *Akaropeltopsis* n. gen. e outros novos Chaetothyriaceae da Amazonia e do planalto central Brasileiro. *Atas Instituto de Mikologia Universidade do Recife*, 3, 44-57
- 2 Doidge, EM, Bottomley, AM, Van der Plank, JE & Pauer, GDC. 1953. A revised list of plant diseases occurring in South Africa. *Union of South Africa Science Bulletin*, No 346.
3. Farr, ML, 1972. The genus *Akaropeltis* Bat & Bez. *Mycologia*, 64, 252-264.

4. Kotze, JM, Kuschke, F & Du Rand, B, 1981. Pre-harvest chemical control of anthracnose and sooty blotch. *S Afr Avocado Growers' Assoc Yrb*, 4, 69-70.
5. Pieterse, CL, 1986. Afkeuringsfaktore by uitvoeravokado's, *S Afr Avocado Growers' Assoc Yrb*, 9, 14.
6. Von Arx, JA & Muller, E, 1975. A re-evaluation of the bitunicate Ascomycetes with keys to families and genera. *Studies in Mycology*, No 9.

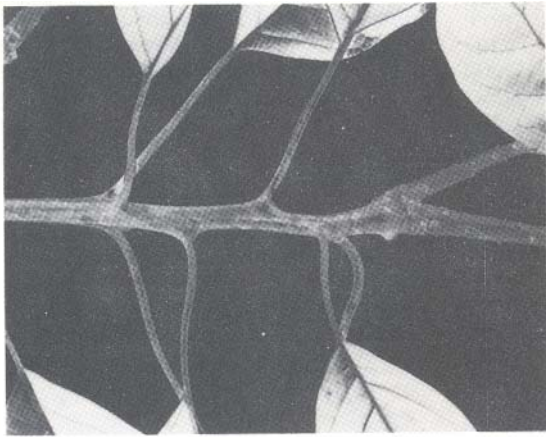


Fig 1 Sooty blotch on an avocado stem.

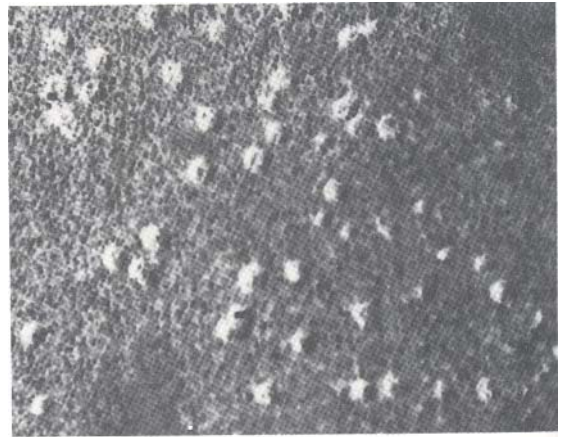


Fig 2 *Akaropeltopsis* ascostromata on the surface of an avocado stem.

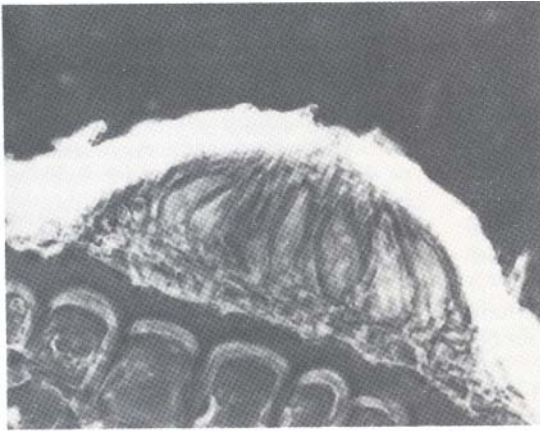


Fig 3 Longitudinal section of an *Akaropeltopsis* ascostroma on an avocado stem.

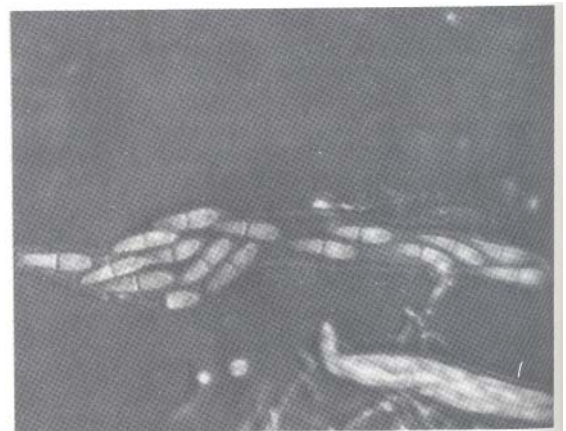


Fig 4 Ascus of *Akaropeltopsis* containing 16 ascospores.

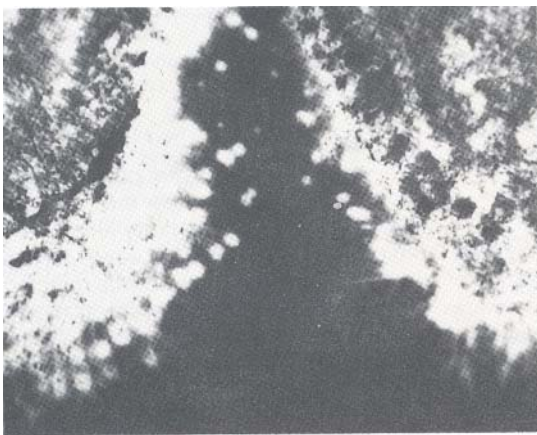


Fig 5 Two-month-old colonies of *Akaropeltopsis* on water agar.

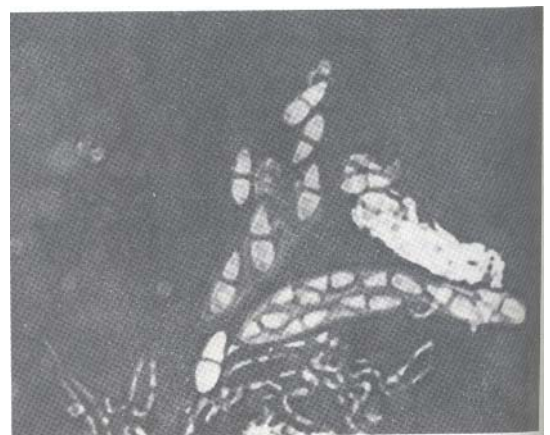


Fig 6 Asci of *Stomiopeltis* containing eight ascospores.