



Fig. 1. Chlorotic spot (a); sporulating tan-brown lesion (b); husk spot symptoms on diseased macadamia fruits (c); electron and light micrographs of fungal structures penetrating through stomates (d, e); and conidioma (f). Photo credits: Andrew Miles (a, b,d, f); Olufemi Akinsanmi (c); and P.W Sutherland (e).

Disease: Husk spot

Pathogen: *Pseudocercospora macadamiae*

Classification: K: Fungi; P: Ascomycota; C: Loculoascomycota, O: Dothideales, F: Mycosphaerellaceae.

Husk spot is the most important disease affecting macadamia in Australia. It occurs in nearly all macadamia orchards on the Australian east coast. It costs the Australian macadamia industry in excess of \$8 million in lost production annually. Husk spot has not been reported from any other macadamia producing nations including the United States of America (Hawaii), Brazil, Guatemala, Costa Rica, China, Kenya, Malawi, South Africa, Thailand, and Zimbabwe.

The Pathogen: The macadamia husk spot pathogen was first documented by B. L. Oxenham in 1951 on specimens collected from Nambour, Queensland. The pathogen was initially identified as *Cercospora* sp., then *Cercoseptoria* sp., and finally as *Pseudocercospora macadamiae* in 2003.

Disease symptoms: Husk spot symptoms develop very slowly and first appear on the green husk (pericarp) as chlorotic spots that later turn tan to dark brown (Fig. 1). A characteristic feature of the spot is that it is harder than the surrounding tissue.

P. macadamiae conidia are produced on the dark brown spots and appear as greyish velvet mat (Fig. 1b). Conidia are easily dispersed from the diseased husk by rain splash onto developing fruits.

Further Reading:

Akinsanmi *et al.* (2006) *Plant Disease* 91: 1675-1681; Akinsanmi *et al.* (2010) *Australasian Plant Pathology* 39: 125-131; Beilharz *et al.* (2003) *Australasian Plant Pathology* 32:279-282; Miles *et al.* (2009) *Australasian Plant Pathology* 38:36-43; Miles *et al.* (2010) *Australasian Plant Pathology* 39:453-462; Miles *et al.* (2010) *Crop Protection* 29:1347-1353.

Host Range: Species of macadamia including *Macadamia integrifolia*, *M. tetraphylla*, *M. ternifolia*, and their hybrids.

Impact: Its greatest impact is extensive premature abscission of fruit. Direct yield losses of up to 40% have been reported. Current commercial macadamia varieties are susceptible and the impact increases with tree age. Husk spot also impacts upon the saleable edible kernel, it increases operational costs at the processing stage and a harvested crop with high levels of immature kernel is downgraded, resulting in lower financial returns.

Control: An integrated management approach consisting of a combination of control measures including routine spray applications of fungicides, cultural practices to reduce the source of inoculum and use of more tolerant varieties have reduced the impact of husk spot.

Key Contact: Dr. Olufemi (Femi) Akinsanmi; e-mail: uqoakins@uq.edu.au; Phone: (07) 3255 4338