CSIRO PUBLISHING

www.publish.csiro.au/journals/app *Australasian Plant Pathology*, 2005, **34**, 421–422

DISEASE NOTES OR NEW RECORDS

Purple spot of asparagus caused by *Stemphylium vesicarium* in Victoria

James H. Cunnington[A] *and Gisele Irvine*[A,B]

[A]Department of Primary Industries, Primary Industries Research Victoria — Knoxfield, Private Bag 15, Ferntree Gully Delivery Centre, Vic. 3156, Australia.
[B]Corresponding author. Email: gisele.irvine@dpi.vic.gov.au

Abstract. Purple spot of asparagus is a disease of increasing importance in Victoria and Australia. Glyceraldehyde-3-phosphate dehydrogenase gene sequences and morphological characters revealed the causal agent to be *Stemphylium vesicarium*, rather than the often-reported *S. botryosum*. Implications for disease control are discussed.

Purple spot of asparagus (*Asparagus officinalis*), also known as asparagus leaf spot, stemphylium leaf spot and 'summer burning' of asparagus, is a common disease occurring in most parts of the world where asparagus is commercially grown. In Victoria, purple spot occurs in the majority of growing regions and causes extensive economic loss at harvest and compromises the photosynthetic potential of the plant by prematurely defoliating the fern.

Two species of fungi, *Stemphylium vesicarium* and *S. botryosum*, are reported in the literature to cause purple spot of asparagus. Both species have been recorded on asparagus in Australia [NSW Department of Primary Industries herbarium (DAR), Victorian Department of Primary Industries herbarium (VPRI) and the Queensland Department of Primary Industries herbarium (BRIP) records], but the occurrence of *Stemphylium* species on asparagus in Australia has not been noted in the scientific literature. *S. vesicarium* has been identified as the cause of purple spot of asparagus in New Zealand (Menzies *et al*. 1992) and South Africa (Thompson and Uys 1992), and *S. botryosum* has been recorded from Europe (Elena 1996; Leuprecht 1988).

Species in this group of *Stemphylium* can be difficult to identify, but recent molecular studies have shown that *S. vesicarium* can be differentiated from *S. botryosum* by glyceraldehyde-3-phosphate dehydrogenase (GPD) gene sequences, which are more variable than the rRNA internal transcribed spacer regions (Câmara *et al*. 2002). However, GPD sequences do not differentiate *S. vesicarium* from the similar species *S. herbarum* and *S. alfalfae*. To determine the identity of the causal agent of purple spot in Victoria, the GPD gene from seven *Stemphylium* isolates (Table 1) was sequenced using the methods described by Câmara *et al*. (2002). Comparison with GenBank sequences revealed all sequences to be identical to *S. vesicarium* (as well as *S. herbarum* and *S. alfalfae*). These sequences have been deposited on GenBank (Table 1). The majority of spores produced by these isolates have two or three constrictions at transverse septa. This is typical for *S. vesicarium* (Simmons 1969); therefore this would appear to be the best name for these isolates.

This brief study has provided the first GPD sequence data from a *Stemphylium* species associated with purple spot of asparagus. The GPD sequences were identical to sequences on GenBank for *S. vesicarium*, *S. herbarum* and *S. alfalfae*. This similarity was discussed by Câmara *et al*. (2002) who suggested that these three taxa could be conspecific, and that the morphological characters used to differentiate these species (i.e. conidial septum development and slight differences in conidial ornamentation were not taxonomically informative). As all the *S. vesicarium*, *S. herbarum*, *S. alfalfae* and *S. botryosum* isolates used by Câmara *et al*. (2002) were from legume hosts, the sequences obtained here demonstrate that GDP gene sequences cannot be used to differentiate isolates derived from different host families.

The differentiation of *S. vesicarium* from *S. botryosum* is important as these two species have different biological properties that may affect disease management. In particular, *S. botryosum* takes 8 months to form fertile ascospores (at least in culture) compared with as little as 3 months for *S. vesicarium* (Simmons 1969). As most growers have adopted a no-till cultural program, the ascomata of *S. vesicarium* in the fern debris from the previous season are the primary source of inoculum. This is consistent with the fact that infection of spears and volunteer seedlings has been observed at the beginning of harvest. Therefore,

 10.1071/AP05045 0815-3191/05/030421

Table 1. *Stemphylium vesicarium* specimens from asparagus used to obtain glyceraldehyde-3-phosphate dehydrogenase partial gene sequences

Specimen	Habit	Location	GenBank accession no.
VPRI 31964	Fern	Kooweerup, Vic., 9 May 2002	DQ000654
VPRI 31963	Fern	Nar Nar Goon, Vic., 9 May 2002	DQ000655
VPRI 31960	Debris	Kooweerup, Vic., 12 July 2001	DQ000656
VPRI 31965	Roadside volunteer	Kooweerup, Vic., 15 May 2002	DQ000657
VPRI 31961	Debris	Cranbourne, Vic., 17 July 2001	DQ000658
VPRI 31962	Fern	Clydebank, Vic., 30 Dec. 2001	DQ000659
VPRI 31990	Fern	Mildura, Vic., 1 May 2002	DQ000660

a preventative management strategy is to bury the debris quickly and deep enough to prevent ascospore dispersal, and long enough to facilitate decomposition (Johnson 1990).

References

Câmara MPS, O'Neill NR, van Berkum PB (2002) Molecular phylogeny of *Stemphylium* spp. based on ITS and glyceraldehyde-3-phosphate dehydrogenase gene sequences. *Mycologia* **94**, 660–672.

Elena K (1996) First report of *Stemphylium botryosum* causing Stemphylium leaf spot of asparagus in Greece. *Plant Disease* **80**, 342.

Johnson DA (1990) Effect of crop debris management on severity of stemphylium purple spot of asparagus. *Plant Disease* **74**, 413–415.

Leuprecht B (1988) *Stemphylium*, an important disease of asparagus. *Gemuse Munchen* **24**, 235–236.

Menzies SA, Broadhurst PG, Triggs CM (1992) *Stemphylium* disease of asparagus (*Asparagus officinalis* L.) in New Zealand. *New Zealand Journal of Crop and Horticultural Science* **20**, 427–433.

Simmons EG (1969) Perfect states of *Stemphylium. Mycologia* **61**, 1–26.

Thompson AH, Uys MDR (1992) *Stemphylium vesicarium* on asparagus: a first report from South Africa. *Phytophylactica* **24**, 351–353.

Accepted 20 April 2005