

## First report of *Phoma terrestris* causing pink root rot of Chinese onion in Vietnam

T. M. Luong<sup>A</sup>, L. M. T. Huynh<sup>A</sup>, U. Tran<sup>A</sup>, V. T. Dau<sup>B</sup>, L. W. Burgess<sup>C</sup>, H. T. Phan<sup>D,F</sup>,  
M. M. Aveskamp<sup>E</sup> and A. D. Vo<sup>A</sup>

<sup>A</sup>Quang Nam Plant Protection Sub-Department, Tam Ky, Quang Nam, Vietnam.

<sup>B</sup>Nghe An Plant Protection Sub-Department, Vinh, Nghe An, Vietnam.

<sup>C</sup>Faculty of Agriculture, Food and Natural Resources, The University of Sydney, NSW 2006, Australia.

<sup>D</sup>National Institute of Medicinal Materials, Hanoi, Vietnam.

<sup>E</sup>CBS Fungal Biodiversity Centre, PO Box 85167, 3508 AD Utrecht, The Netherlands.

<sup>F</sup>Corresponding author. Email: phanthuyhien@yahoo.com

**Abstract.** Typical symptoms of pink root rot were observed in Chinese onions in Quang Nam and Nghe An provinces in Vietnam in 2007. The pathogen recognised as the cause of pink root rot in onions, *Phoma terrestris*, was isolated from diseased roots. This is the first report of pink root rot and *P. terrestris* in Vietnam.

The cause of stunting and yellowing in some crops of Chinese onions (oriental onions, rakkyo) (*Allium chinense*) (Figs 1 and 2) in Binh Phuc Commune, Thanh Binh District, Quang Nam Province, in January 2007 was investigated. The crops were growing in sandy soil in old sand dunes within 5 km of the coast. The problem was most obvious in poorly drained areas. Pink roots (Figs 3 and 4) were evident on all diseased plants and on many otherwise symptomless plants indicating that the disease symptoms were similar to pink root rot of onion, *Allium cepa*, caused by *Phoma terrestris* (Schwartz and Mohan 2008). In addition, pycnidia, typical of *Phoma* were present on some of the pink roots.



**Fig. 1.** Crop of Chinese onions with a patch of plants affected severely by pink root rot.

Samples of diseased plants were collected and taken to the laboratory for isolation and identification of the causal organism of the disease symptoms, using the procedures described in Burgess *et al.* (2008).

Samples of pink roots were washed in tap water, surface sterilised in 70% ethyl alcohol for 5 s, immediately rinsed in sterile water and damp-dried on sterile paper tissues. Sections of root (2–3 mm) were removed from the margin of diseased and symptomless tissue and plated on water agar containing streptomycin sulfate (1.0 g/L) and neomycin sulfate (0.12 g/L). Colonies that developed from the sections were transferred to carnation leaf-piece agar (CLA), and then purified by single spore transfer to CLA and potato dextrose agar (PDA), using conidia from pycnidia on the original CLA plate. Typical colonies of *P. terrestris* developed on PDA (Fig. 5). Abundant pycnidia, also typical of the species, formed on the leaf pieces on CLA (Fig. 6).

Subsequently, we found pink root rot in Chinese onions in Quynh Luong commune, Quynh Luu district in Nghe An province, in crops on sandy coastal soil. Putative cultures of *P. terrestris* were isolated from pink roots from a composite sample from several crops. One culture from Quang Nam (QN32) and one from Nghe An (NA1) were forwarded to the CBS Fungal Biodiversity Centre, where the identification was confirmed according to the culturing and morphological methods for *Phoma* as described by Boerema *et al.* (2004). In addition to the obvious red pigment produced in cultures, microscopical studies revealed typical setose pycnidia and conidia, being 4.5–6 × 2–2.5 μm with 2–5(–7) large guttules as are described by de Gruyter and Boerema (2002). Subsequently cultures QN32 and NA1 were accessioned as CBS 122483 and CBS 122484, respectively.



**Fig. 2.** Chinese onions with symptoms of severe root rot and stunting (left and centre) compared with symptomless plant (right).



**Fig. 3.** Apparently healthy Chinese onion with some pink and necrotic roots.

Pathogenicity tests were not undertaken, as no uninfected source of planting material was available. Although the role of *P. terrestris* as the cause of pink root rot in onions is well



**Fig. 4.** Chinese onion roots affected by early symptoms of pink root rot.



**Fig. 5.** Colonies of *Phoma terrestris* from Vietnam on potato dextrose agar: lower side (left); upper side (right).

documented (Schwartz and Mohan 2008), this is the first report of pink root rot of Chinese onions and of *P. terrestris* occurring in Vietnam. It is likely that the fungus is widely distributed given it has a wide host range (Schwartz and Mohan 2008). Further studies on the distribution and role of this pathogen in Vietnam are warranted.



**Fig. 6.** Pycnidia of *Phoma terrestris* on leaf pieces in carnation leaf agar.

### Acknowledgements

The authors gratefully acknowledge financial support from the Australian Centre for International Agricultural Research.

### References

- Boerema GH, de Gruyter J, Noordeloos ME, Hamers MEC (2004) '*Phoma* identification manual. Differentiation of specific and infra-specific taxa in culture.' (CABI Publishing: Wallingford, UK)
- Burgess LW, Knight T, Tesoriero L, Phan HT (2008) 'Diagnostic manual for plant diseases in Vietnam.' ACIAR Monograph 129. (Australian Centre for International Agricultural Research: Canberra)
- de Gruyter J, Boerema GH (2002) Contributions towards a monograph of *Phoma* (Coelomycetes)—VIII. Section *Paraphoma*: Taxa with setose pycnidia. *Persoonia* **17**, 541–561.
- Schwartz HF, Mohan SK (2008) 'Compendium of onion and garlic diseases.' 2nd edn. (American Phytopathological Society Press: St Paul, MN)

Manuscript received 26 August 2008, accepted 5 November 2008