

## SHORT RESEARCH NOTES

*Peronospora lamii* on Lamiaceae in Australia

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**Abstract.** A detailed description and illustration of the Australian specimens of *Peronospora lamii* on *Salvia* spp. and on *Lamium amplexicaule* (Lamiaceae) are given.

In June 2005, a downy mildew (Oomycetes: Peronosporales) was found infecting plants of *Salvia officinalis* (sage, Lamiaceae) on a commercial herb farm in Mareeba, north Queensland. Symptoms first occurred on leaves as a light brown blotch and then matured to a darker brown lesion with an angular appearance and delimited by the veins (Fig. 1). Leaves became blighted and eventually dropped. The organism was identified as *Peronospora lamii* A. Braun, based on the description given by Francis *et al.* (1981).

The occurrence of downy mildew on Lamiaceae in Australia has previously been reported by Simmonds (1966) and Cunnington (2003), who listed *Peronospora* sp. on *Lamium amplexicaule* in Queensland and *P. lamii*

on *Salvia* in Victoria, respectively. However, their publications are lists of plant diseases and so far there is no information available about the geographical distribution, the symptoms and characteristics of the Australian specimens of *P. lamii*. A search for downy mildew on Lamiaceae in the Australian Plant Disease Database (<http://www.planthealthaustralia.com.au/>, verified 11 April 2006) found eight other specimens identified as *Peronospora* sp. or *P. lamii* on three genera of Lamiaceae: *Salvia*, *Lamium* and *Mentha*. Six of these were re-examined and their identification was confirmed as *P. lamii*. A description of this pathogen is given below. Its features were measured in lactic acid.

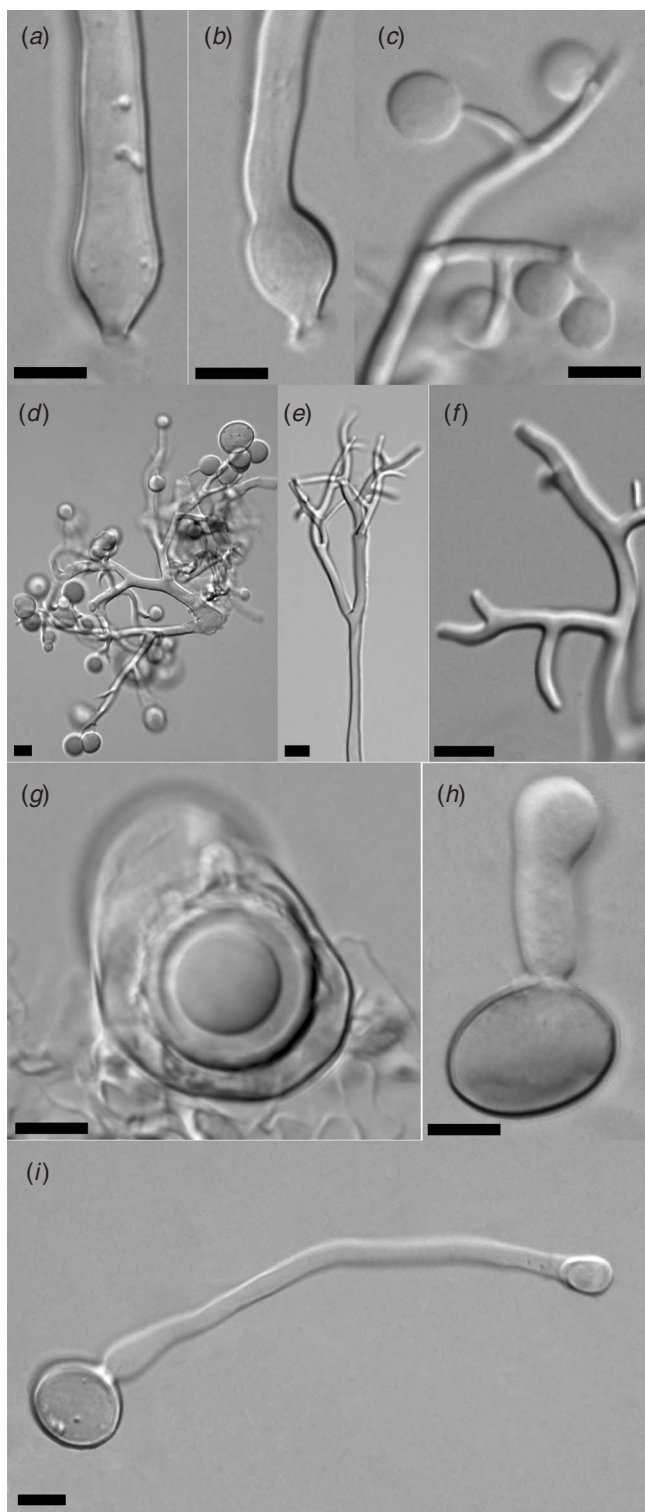
***Peronospora lamii*** A. Braun in Rabenhorst, Herbarium mycologicum ed. II, n. 325 (1857) on *Salvia* spp. (Fig. 2)

Lesions on living leaves. Conidiophores hypophyllous, arborescent, 225–480 × 6–10 µm, usually swollen at the base, up to 12 µm wide, colourless, aseptate, smooth, thick-walled, branching up to six times dichotomously at a right or acute angle in upper two-fifths, with tips up to 20 × 2 µm at the base, gently tapered to a point, ceasing growth when spores are produced. The angle between the ends usually is a right angle. Conidia 16–30 × 15–25 µm, ovoid, pale yellowish brown, smooth, thin-walled, attached to a branch tip, non-papillate, germinating to give hyphae. Germ tube, one per conidium, small to long, from one to six times the length of the conidium, usually swollen at tip. Oospore 20.5–44 µm, wall 1.5–2.0 µm thick, pale yellowish brown, encased in the oogonial membrane, a single nucleus.

**Material examined:** **Australia** – on *Salvia officinalis*, Mareeba, Queensland, 7 June 2005, K.R. Grice (BRIP 46594); Riverstone, NSW, 8 July 1998, S.K. Alwiss



**Fig. 1.** Leaf symptoms of *Peronospora lamii* on *Salvia officinalis* (sage).



**Fig. 2.** *Peronospora lamii* on *Salvia officinalis* (BRIP 46594). (a, b) Swollen base of the conidiophore. (c, d) Conidiophore and immature conidia. (e, f) Branches of conidiophore. (g) Oospore. (h, i) Germinated conidium. (Bar = 10 µm).

(VPRI 21852); Warnervale, NSW, 19 Nov. 1997, J. Bailey (DAR 73684); on *Salvia farinacea*, Burpengary, Queensland, 1 Aug. 2003, S. McGovern (BRIP 40124); on *Lamium amplexicaule*, Baulkham Hills, NSW, 3 Sept. 1981, J. Walker (DAR 41276); Narrabri, NSW, 14 July 1970, G. Evans (DAR 20511, BRIP 11787); Canungra, Queensland, 11 Aug. 1965, G.M. Behncken (BRIP 1922).

*P. lamii* has a worldwide distribution, infecting several genera of Lamiaceae, namely *Lamium*, *Ocimum*, *Plectranthus*, *Salvia*, *Satureja* and *Ziziphora* (Francis *et al.* 1981). *P. lamii* has been reported on *S. officinalis* in Florida (McMillan and Graves 1994) and Italy (Minuto *et al.* 1999), on *S. splendens* and *S. coccinea* in the United States (Holcomb 2000, Wood *et al.* 2001), on *Lamium maculatum* in the UK (Bentley 1980) and on *S. verticillata*, *S. pratensis* and *S. officinalis* in the Czech Republic, as *Peronospora swinglei* Ellis & Everh. (Müller 1999). Although *Peronospora* on members of the Lamiaceae has been recorded in Australia since the 1960s, its distribution is restricted to five regions, including Five Ways, Vic. (VPRI 22992, specimen not examined) and the others listed above.

#### Acknowledgements

The author acknowledges the herbaria DAR and VPRI for specimen loans. J. R. Liberato acknowledges financial support from the Brazilian Fundação Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES).

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Received 10 December 2005, accepted 22 December 2005