

First report of an *Oidium* sp. [*neolycopersici*] on *Solanum betaceum* in India

P. Baiswar^{A,C}, U. Braun^B, S. Chandra^A and S. V. Ngachan^A

^AICAR Research Complex for NEH Region, Umiam-793103, Meghalaya, India.

^BMartin-Luther-Universität, Institut für Biologie, Bereich Geobotanik, Herbarium, Neuwerk 21, D-06099 Halle/S, Germany.

^CCorresponding author. Email: pbaiswar@yahoo.com

Abstract. In February 2008, a severe outbreak of powdery mildew disease was observed on *Solanum betaceum* in India. Based on the morphological characters, the pathogen was identified as an *Oidium* [*neolycopersici*] sp. morphologically similar to *O. neolycopersici*. This is the first report of this fungus causing powdery mildew on *S. betaceum* in India.

Tamarillo or tree tomato (*Solanum betaceum*, syn. *Cyphomandra betacea*) belongs to the family Solanaceae. Based on molecular phylogenetic studies, tree tomato as well as tomato (*Solanum lycopersicum*, syn.: *Lycopersicon esculentum*), the type host of *Oidium neolycopersici*, are allied species that have to be considered members of the genus *Solanum* (Peralta and Spooner 2001; Bohs 2005). *Solanum betaceum* is a small, tender 2–3-m tall tree which prolifically bears egg-shaped berries with pointed ends in clusters near the young shoots and it is grown as a backyard venture for its edible berries in North-east and South India. Tree tomato is consumed as a chutney when raw or after roasting and peeling off the skin. People desire it due to its unique flavour (Thakur *et al.* 1988; Rai *et al.* 2004).

During February 2008, in Barapani, Meghalaya, leaves of *S. betaceum* were found to be heavily infected by powdery mildew. Almost all the plants in Barapani and nearby areas

were found to be infected. Disease symptoms included grayish-white patches (initially circular but later on irregular) consisting of epiphytic mycelia and conidia mainly on the upper surface of the leaves. Spots later turned necrotic (Fig. 1). Older leaves were found to be highly susceptible. Symptoms were not present on berries. Voucher specimens have been deposited in Martin-Luther-Universität, Institut für Biologie, Bereich Geobotanik, Herbarium, Germany (HAL 2244 F.) and in the Institute Herbarium of ICAR Research Complex for NEH Region, Umiam, Meghalaya, India (ICARHNEN 24).

Conidia were harvested by dislodging them from infected tissue onto a strip of clear tape, using a camelhair brush. The tapes were mounted on microscopic slides as described in Correll *et al.* (1987). Morphological characteristics of the pathogen such as location of mycelia on the host, shape of appressoria, presence or absence of dimorphic conidia, size and shape of conidia, and branching of conidiophores were recorded. Hyphae were up to 3–8 µm wide with lobed appressoria (4–10 µm diam.), solitary (Fig. 2) or in pairs, opposite to each other. Conidiophores were

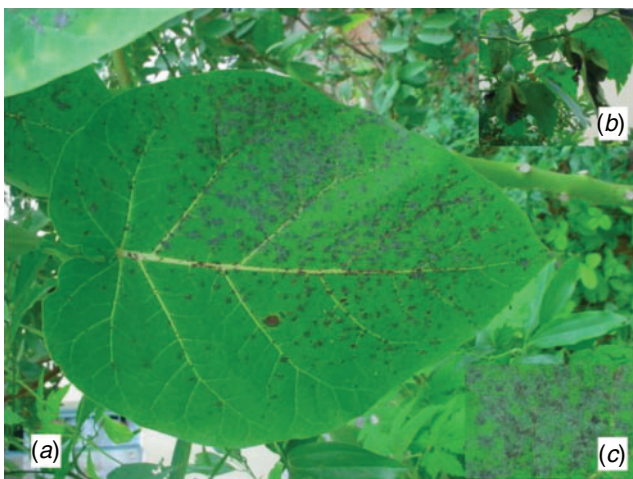


Fig. 1. Powdery mildew symptoms on leaves of *Solanum betaceum* (HAL 2244 F.).



Fig. 2. Conidiophore of *Oidium* sp. on tamarillo (HAL 2244 F.). Bar = 20 µm.

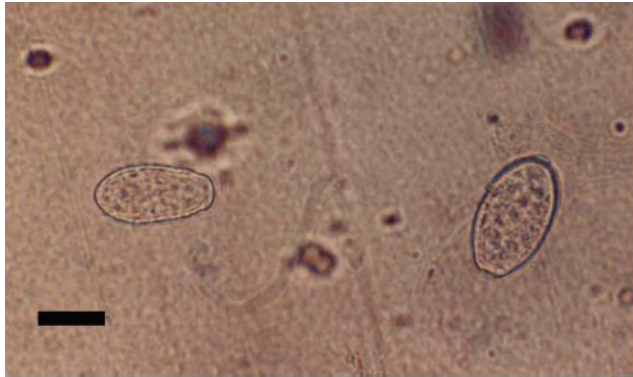


Fig. 3. Conidia of *Oidium* sp. on tamarillo (HAL 2244 F.). Bar=20 μ m.



Fig. 4. Germinating conidium of *Oidium* sp. on tamarillo (HAL 2244 F.). Bar=20 μ m.

mostly erect, consisting of a foot cell (24–45 \times 7–11 μ m) followed by two or three short cells (Fig. 2). Conidia were ellipsoid-doliiform (-cylindrical), (24–) 28–42 \times 13–20 (-25) μ m and produced singly (Fig. 3). Fibrosin bodies were absent in conidia. Germ tubes with lobed appressoria arose sub-terminally from conidia (Fig. 4). Based on these morphological characters the pathogen was identified as *Oidium neolycopersici* (Kiss *et al.* 2001). No perfect stage (chasmothecium) was found to be associated with this fungus. Pathogenicity was confirmed by dusting conidia on healthy leaves of *S. betaceum*, non-inoculated plants served as control. Inoculated plants

developed symptoms after 8–10 days whereas control plants remained healthy.

An *Oidium* sp. and '*Erysiphe communis*', which might refer to the same fungus, have been recorded on this host from the USA (Amano 1986; Farr *et al.* 1989). *Golovinomyces cichoracearum* has been recorded on this host from Australia and New Zealand, *Leveillula taurica* from Guinea, and *Oidium* sp. from Argentina, Australia, New Zealand and Sri Lanka (Amano 1986). *Oidium* sp. on *Cyphomandra* sp. is also reported from Nepal (Amano 1986). *Oidium* sp. is also reported from tamarillo in India (Gupta and Srivastava 1994). However, to our knowledge, this is the first record of a morphologically well-characterised powdery mildew fungus on *Solanum betaceum* in India.

References

- Amano K (1986) 'Host range and geographical distribution of the powdery mildew fungi.' (Japan Scientific Societies Press: Tokyo, Japan)
- Bohs L (2005) Major clades in *Solanum* based on ndhF sequence data. In 'Solanaceae: William D'Arcy Memorial, Monographs in Systematic Botany from the Missouri Botanical Garden'. (Eds V Hollowell, R Keating, W Lewis, T Croat) pp. 27–49. (Missouri Botanical Garden Press, St. Louis, MO)
- Correll JC, Gordon TR, Elliott VJ (1987) Host range, specificity and biometrical measurements of *Leveillula taurica* in California. *Plant Disease* **71**, 248–251. doi: 10.1094/PD-71-0248
- Farr DF, Bills GF, Chamuris GP, Rossman AY (1989) 'Fungi on Plants and Plant Products in the St. Paul, Mn, USA.' (APS Press, Saint Paul, MN)
- Gupta DK, Srivastava LS (1994) Powdery Mildew Flora of Sikkim. *Indian Journal of Hill Farming* **7**, 207–209.
- Kiss L, Cook RTA, Saenz GS, Cunningham JH, Takamatsu S, Pascoe I, Bardin M, Nicot PC, Sato Y, Rossman AY (2001) Identification of two powdery mildew fungi, *Oidium neolycopersici* sp. nov. and an *Oidium* subgenus *Reticuloidium*, infecting tomato in different parts of the world. *Mycological Research* **105**, 684–697. doi: 10.1017/S0953756201004105
- Peralta IE, Spooner DM (2001) Granule-bound starch synthase (GbsSI) gene phylogeny of wild tomatoes (*Solanum* L. section *Lycopersicon* [Mill.] Wettst. subsection *Lycopersicon*). *American Journal of Botany* **88**, 1888–1902. doi: 10.2307/3558365
- Rai N, Asati BS, Patel RK, Patel KK, Yadav DS (2004) Underutilized horticultural crops in north eastern region. *ENVIS Bulletin Himalayan Ecology* **13**, 46–52.
- Thakur NSA, Sharma YP, Barwal RN (1988) Tree tomato cultivation in Meghalaya. *Indian Farming* **37**, 3.

Manuscript received 18 July 2008, accepted 12 March 2009