Proc. Indian natn. Sci. Acad. **B46** No. 3 pp 410–413 (1980)

Powdery Mildews of Some Timber-yielding and Other Trees

J RAGHAVA REDDY* and A PURNA CHANDRA REDDI†
**Department of Environmental Sciences*
†Department of Pharmaceutical Sciences
Andhra Univevsity, Visakhapatnam 530003, Andhra Pradesh

(Received 15 March 1979)

During a survey of powdery mildews on flora of Andhra Pradesh, we encountered five woody plants heavily infected with powdery mildew fungi which were not hitherto reported from India. They are: a species of *Uncinula* on *Pterocarpus santalinus*; a species of *Phyllactinia* on *Ficus benghalensis*; a species of *Uncinula* on *Anogeissus latifolia*; an *Oidium* species on *Peltophorum pterocarpum* and *Phyllactinia subspiralis* on *Dalbergia latifolia.*

Key Words: Powdery mildews—new host records

Introduction

During our survey of powdery mildews on flora of Andhra Pradesh, we came across some mildew-infected timber-yielding and other plants which were not hitherto reported from India or elsewhere. Severe mildew infection of young timber-yielding and other plants cause early defoliation, chlorosis, and dwarfed appearance of the leaves resulting in heavy financial loss to the grower. The paper presents a brief description of the powdery mildews and the symptoms caused thereby.

Observations

1. A species of Uncinula on green leaves of Pterocarpus santalinus Linn. in Ganjam forest near Andhra-Orissa Boarder in April 1977 (JRR)

Pterocarpus santalinus Linn. is a tall, deciduous tree and its wood is widely used for carvings and toys.

The mildew appeared on either surface of the younger leaflets of the host as white patches when we first observed them in April 1977. Gradually the fungus covered the entire surface causing discoloration, malformation, wilted and dwarfed appearance of the leaflets and sometimes even defoliation.

Mycelium is hyaline, septate, superficial prostrate, 3.0–4.5 μm wide, attached to leaf surfaces by means of appressoria. Bulbous haustoria were observed in the epidermal cells

and sometimes in hypodermal cells also of the host. Conidiophores (figure 1A) are erect simple septate, hyaline, 75–102 × 52–63μm. Conidia are hyaline, vacuolated, oval measuring 49–76 × 28–34 μm. Fruit bodies (figure 1 B) are dark black in colour, spherical, scattered, and present only on the older leaves of the host, measure 40–120 μm in diameter. About 16–30 appendages of variable size, smooth, thick-walled, simple, hyaline, septate and hooked at the tip are present. Each perithecium contains 4 to 8 elliptical asci (figure 1C) containing 2 or 3 ascospores each. Ascospores are oval to elliptical, hyaline, 19–28 × 12–19μm. Asci are stalked and measure 68–86 × 15–25μm.

Based on the morphological features, the powdery mildew is identified as a species of *Uncinula* according to the key to Erysiphales of Yarwood (1973).

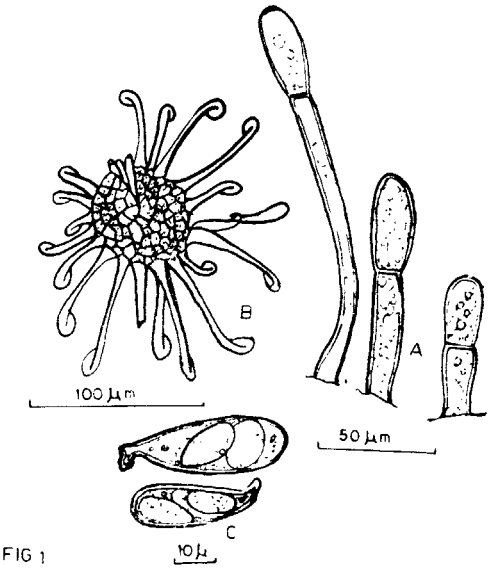

Figure 1 Camera lucida drawings of *Uncinula* species on *Pterocarpus santalinus*; *A*, Conidiophores with conidium; *B*, Perithecium; *C*, asci with ascospores

2. A species of Phyllactinia on leaves of Ficus benghalensis Linn. in November 1976 (JRR)

The mildew produces inconspicuous patches on the undersurface of the leaves of Banyan tree growing in Seethammadhara area of Visakhapatnam.

Mycelium hyaline, superficial, septate and evanescent. Conidiophores (figure 2B)simple. septate, bearing single *ovulariopsis* type conidia (figure 2 A) measuring 42–63 × 15–22μm. Perithecia (figure 2C) are gregarious, amphiphyllous, globose brown, 180—240μm in diameter. Appendages are 12 to 22, equatorially arranged, hyaline, with bulbous base (figure 2C) and with acicular apex and rarely bifurcated. Several 2 or 3 or spored asci are present, measuring 58–89 × 30–40μm. Ascospores are oblong and measure 20–35 × 17–23μm.

Based on the morphological features, the powdery mildew is identified as a species af *Phyllactinia* in accordance with the key of Yarwood (1973).

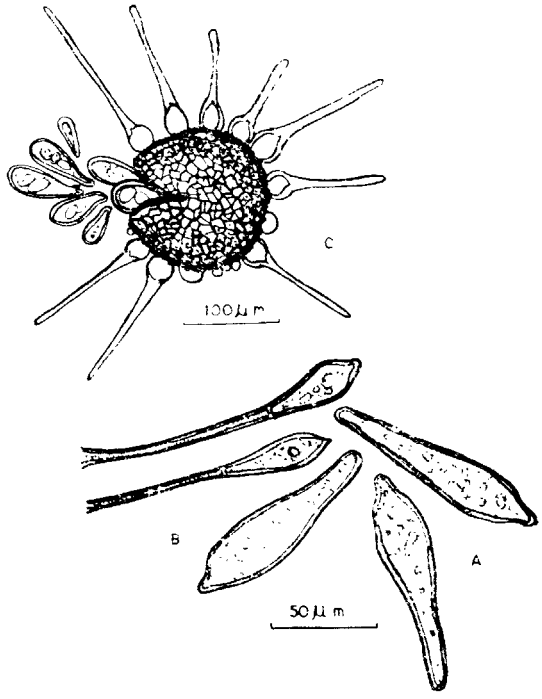

Figure 2 Camera lucida drawings of a species of *Phyllactinia* on *Ficus benghalensis*; *A*, conidia; *B*, condiophore with conidium; *C*, perithecium with asci and ascospores

3. A species of Uncinula on the leaves of Anogeissus latifolia in April 1977 (JRR)

Anogeissus latifolia is an erect tree and its wood is valuable for carts, agriculture implements and even minor building works. It is grown abundantly in Ganjam forest near Andhra-Orissa Boarder. In April, 1977, these trees were found infected with powdery mildew infection. Only perithecia (figure 3A) of the powdery mildew were observed on the leaves of the tree. Conidia were not observed. Irregular, black patches of perithecia were observed on the leaves. Perithecia were numerous, gregarious hypophyllous, dark, globose, 80–180μm in diameter. Appendages were short, numerous, hyaline, unbranched, equatorially arranged, crowded, uncinate tip at the free ends. Asci (figure 3B) numerous, ellipsoidal, stalked, 78–124×22–31μm in size; ascospores are 3 in number, oblong to ellipsoidal, 20–32×15–20μm.

As per the key of Yarwood, the fungus is identified as a species of *Uncinula*.

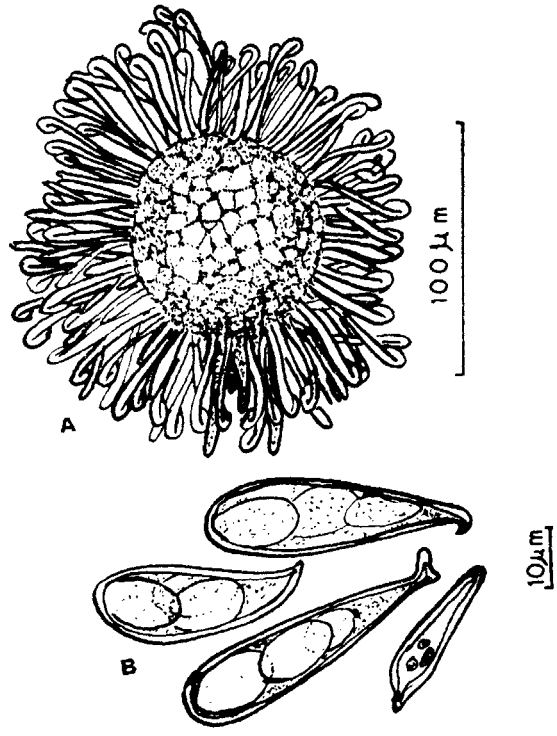

Figure 3 Camera lucida drawings of an *Uncinula* species on *Anogeissus latifolia*; *A*, perithecium; *B*, asci with ascospores

4. An Oidium species on the leaves of Peltophorum pterocarpum in November 1976 (JRR)

Peltophorum pterocarpum is a large evergreen tree and its wood is used for cabinet work. These trees growing in the University area were found infected with a powdery mildew during winter every year since 1976.

The mildew appears as irregular, white patches on the leaflets of the cost gradually covering the entire surface of the leaves. Mycelium hyaline, septate, 4–6μm wide, producing erect, septate, conidiophores (figure 4 A) measuring 72–120×60μm bearing chains of oval to oblong conidia (figure 4B) of 45–66×15–18μm size. No perithecial stage was observed.

In accordance with the Yarwood's key to Erysiphales (1973), the powdery mildew was identified as a *Oidium* species.

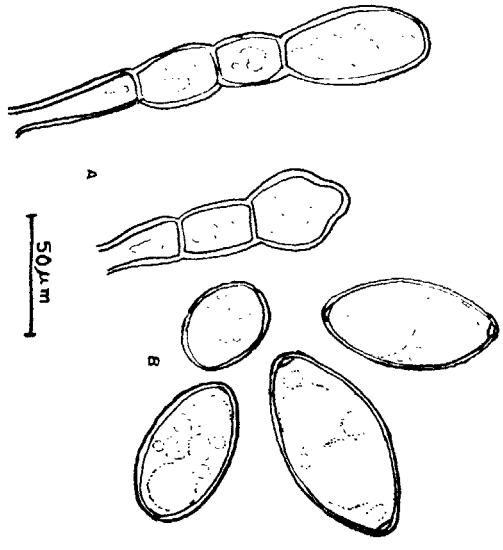

Figure 4 Camera lucida drawings of an *Oidium* species on *Peltophorum pterocarpum*; *A*, Conidiophores with chains of conidia; *B*, conidia

5. *Phyllactinia subspiralis (Salmon) Blumer on the leaflets of Dalbergia latifolia Roxb, in June 1976 (JRR)*

Dalbergia latifolia is a deciduous tree and its timber is valuable for furniture, carving and cabinet making. These trees growing in the university area were found infected heavily with a powdery mildew fungus in June, 1976. The infection was found to be present throughout the year. Only during April–May, it was found to be on the wane. The over-wintering mycelium was found inside the dark and auxilliary buds during summer. The early symptoms of the disease were the appearance of white, circular mildew sopts on the underneath of the leaves, gradually covering the entire under-surface of leaves as a thick white patch. With the advance of age, the white patches turned gradually to gray. Early senescence premature leaf-fall and dwarfness of the leaves are the symptoms sometimes observed on the infected host.

The mycelium of the fungus is greyish-white, superficial, hyaline, prostrate, septate, 4–6.8μm wide, develops bulbous haustoria (figure 5B) into the epidermal and sometimes the hypodermal cells of the host. Conidiophores (figure 5A) erect, septate, coiled at the base, measuring 231–346×34–46μm. Conidia (figure 5C) are hyaline, single *orulariopsis* type, measuring 50–73×27μm. No fruit bodies were observed.

Based on the morphological features, the fungus was identified as *Phyllactinia subspiralis* (Salmon) Blumer. Earlier, *Phyllactinia subspiralis* was reported on *Dalbergia sissoo* (Kamat et al. 1935). *Dalbergia lanceolaria* and *Dalbergia volubilis* (Patwardhan 1962), but there was no previous record of this fungus on *Dalbergia latifoita.*

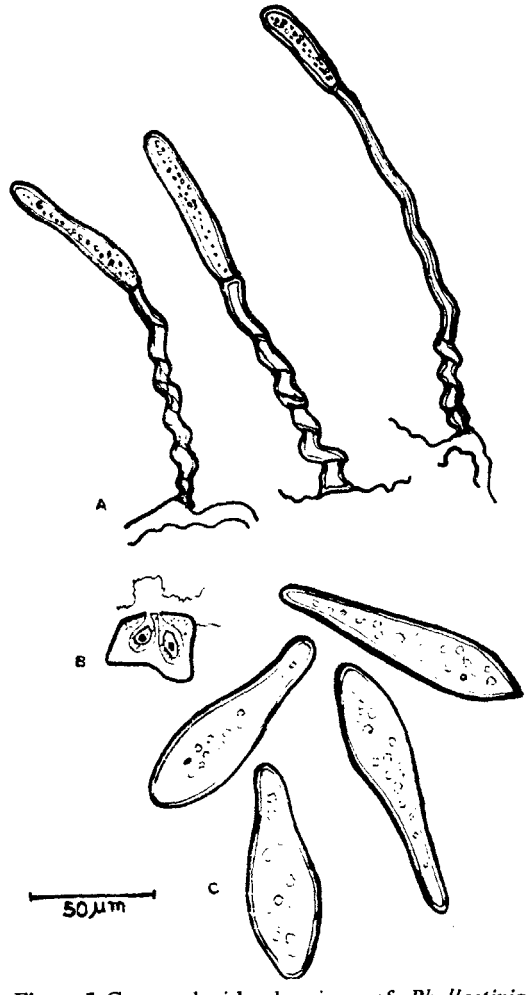

Figure 5 Camera lucida drawings of *Phyllactinia subspiralis* on *Dalbergia latifolia*; *A*, Conidiophores with conidium; *B*, haustorium; *C*, conidia

References

Kamat M N and Patel M K 1935 *The Fungi of Bombay*, VIII 1–56

Patwardhan P G 1962 Some new host records for *Phyllactinia* species; *Mycopath. Mycol. Appl.* **18** 149–150

Salmon E S 1900 A monograph of Erysiphaceae; *Mem. Torrey Bot. Club* **91** 1–292

Yarwood C E 1973 The Pyrenomycetes: Erysiphales; *The Fnngi—An Advanced Treatise* pp 71–86 eds G C Ainsworth, F K Sparrow and A S Sussman (Academic Press)