Isolations were made on potato dextrose agar (PDA) medium from roots, collar regions and stems and consistently the same fungus was isolated. Pathogenicity was tested and symptoms as seen in the field were reproduced. The fungus grew readily on PDA producing white mycelium with black sclerotia of varying sizes (2–10 mm). The fungus grew at 5–25° C but the optimum temperature for growth was found to be 20° ± 1° C. The culture of the fungus was sent to the Commonwealth Mycological Institute, England; phialidic microconidial state was observed in the culture and it has been identified as *Botrytis cinerea* Pers. ex Pers. (*IMI* 239192).

The pathogen is seedborne (2) and from India *B. cinerea* has been isolated from sunflower seeds (1) but from available literature, collar rot and subsequent death of sunflower plants due to *Botrytis cinerea in nature appears to be a new record for India* (3).

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ZONATE ANTHRACNOSE, A NEW DISEASE OF SORGHUM CAUSED BY *COLLETOTRICHUM GRAMINICOLA* VAR. *ZONATUM* VAR. NOV.

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In the course of our studies on sorghum diseases, anthracnose lesions of two distinct types were noticed and earlier we had assumed that the restricted eye-shaped ellipsiod spots characteristic of *Colletotrichum graminicola* (Ces.) Wilson, formed diffuse type spots at maturity. Continued observations revealed the existence of both types of spots side by side on the same leaf and the absence of any change from one type to the other. This increased the doubts about the taxonomy of the fungus producing diffuse type of spots and detailed studies were undertaken.

Field observations were made on the local variety of sorghum '*bili jola*', which is also used for testing the symptom expression. The pathogen was isolated on potato-dextrose-agar and oat-meal agar. Artificial inoculations were made by spraying healthy plants raised in pots with conidial suspensions prepared from pure cultures or infection spots. The inoculated plants were incubated for a day at high humidity and then under normal day conditions in isolation. Disease was scored on the sixth day. Measurements of conidia, conidiophores, setae, acervuli were taken from leaf spots on sorghum and were based on 100 measurements.

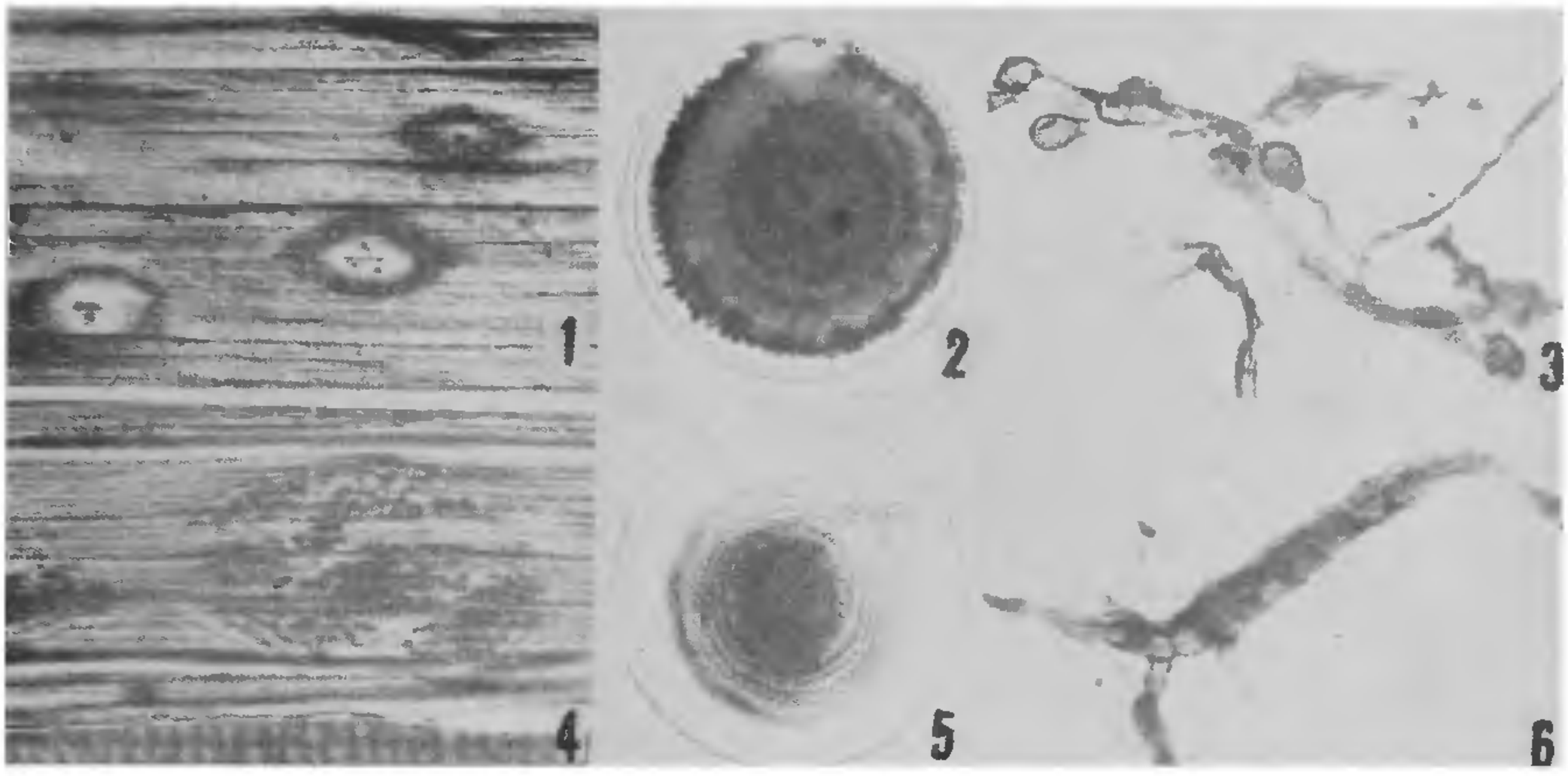
The diffuse type disease spots were larger in size (upto 50 mm) with numerous acervuli throughout the leaf spot, in parallel rows between veins often appearing in concentric circles (Fig. 4). They are produced in all growing seasons on sorghum, in the mature stages of the crop, a few weeks after the appearance of the restricted eye-shaped anthracnose spots produced by *C. graminicola* (Fig. 1). The fungus isolated from the new type disease spots, produced the typical zonate anthracnose spots on inoculation. A comparative study (Table I) of the new type with *C. graminicola* revealed many marked differences, in the number of conidia per acervuli, time of appearance of disease in field, cultural characters (Figs. 2 and 5), chlamydospores (Figs. 3 and 6) in addition to the symptoms. On the basis of these differences, the new pathogen is proposed as a new variety, *Colletotrichum graminicola* var. *zonatum* and the disease caused by it as zonate anthracnose disease of sorghum.

Colletotrichum graminicola var. zonatum var. nov.

A varietate *graminicola differt maculis foliaribus* majoribus (ad 50 mm diam.), diffusis, multis acervulis plus minusive zonatis occupatis; *in vitro* coloniae acervulis zonatae, mycelio aerio carentes. Chlamydosporae catenulatae in hyphis fasiculatis aggregatae.

Type specimen on leaves of sorghum, Mysore, India, 15th August 1979; deposited in Herb. IMI 24881 and CBS 001295.

Cross inoculations using isolates of *C. graminicola* and *C. graminicola* var. *zonatum* taken from sorghum were carried out thrice, on sorghum (3 varieties), maize and sugarcane. Maize and sugarcane were not infected by both the types. On '*billi jola*', DMS 652 and SPV 252 varieties of sorghum, inoculated with *C. graminicola*, the percentages of plants infected respectively were 95·8, 3·1 and 1·5; and the percentages of leaf area involved were 2·5, no data, and 0·5; with *C. graminicola* var. *zonatum* the corresponding figures respectively were 81·4, 8·0 and 6·0, and 1·9, 1·6 and 1·7. Some workers[1,2] have also failed to



FIGS. 1–6. Figs. 1–3. Symptoms, culture and chlamydospores of *Colletotrichum graminicola*; Figs. 4–6. of *C. graminicola* var. *zonatum* var. nov.

TABLE 1

Data on the comparative study of two types of anthracnose diseases on sorghum and their pathogens

Character	*C. graminicola*	*C. graminicola* var. *zonatum*
Symptoms	Restricted eye-shaped spots with brown or red margins, white or tan with few acervuli as black dots at centre	Diffuse spots with or without faint red margin with numerous black acervuli often in concentric zones throughout the spot.
Appearance of disease in the field	At all growth stages with peak incidence at 10–11 leaf stages	From 11-leaf stage reaching a peak in ripening stages
Virulence	Infects young green leaves	Infects matured green leaves
Size of spots	0·7–3 × 0·7–6 mm (Av. 1·2 × 2·3)	1–7 × 1–49 mm (Av. 2 × 5·3)
Infection under artificial inoculation	At all growth stages expresses on 5 or 6 day after incoulation	At all growth stages, expresses on 6 or 7 day after inoculation
No. of acervuli/cm²	5	414
No. of conidia/acervulus	1852	492
Length of setae	87–143 μm (Av. 137 μm)	74–138 μm (Av. 113 μm)
Breadth of setae	2·7–4·5 μm (Av. 3·4 μm)	2·7–4·5 μm (Av. 3·5 μm)
Length of conidiophore	9–20·7 μm (Av. 15·5 μm)	10·8–19·8 μm (Av. 17·0 μm)
Size of conidia	22·5–27·9 × 3·6–4·5 μm (Av. 24·9 — 4·0 μm)	18·9–27·0 × 1·7–4·5 μm) (Av. 24·0–3·9 μm)
Cultural characters	Profuse aerial mycelium Acervuli pinkish, produced at the edge of the colony only after 15 days Acervuli few per plate Chlamydospores free	Scanty aerial mycelium Acervuli pinksih produced in concentric zones from 3 day Acervuli numerous per plate Chlamydospores in chains produced in rhizomorph-like multihyphal structures.

infect maize by *C. graminicola* isolates taken from sorghum, while others[3] succeeded. Probably a number of races exist in these pathogens[1,5].

The new taxa *C. graminicola* var. *zonatum*, reported here is one of the first fungi to colonise the downy mildew infected leaves. One of us had noticed this fungus (along with *C. graminicola*) producing epidemics on sorghum plants which are subjected to flooding by cyclonic rains in coastal Andhra Pradesh. The foliage as well as the earheads, including grains, were reddened with these infections.

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REPORT ON *FUSARIUM* WILT IN *PINUS KESIYA* ROYLE

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Pinus kesiya Royle is the main source of timber and fuel at higher altitudes of Meghalaya. It has been observed during the last three years that when soil temperature and humidity is high (June-July) the newly emerging seedlings get infected with a white mycelial fungus which causes heavy seedling mortality within 15–25 days of their germination. This could be visually observed in the pine forest floor in the form of prostrate seedlings heavily infested with white mycelium. On isolation the organism involved was identified to be *Fusarium oxysporum* (Schl.) emend Snyd and Huns.

Pathogenicity tests were carried out by sowing surface sterilized healthy seed, of *P. kesiya* in pots containing soil earlier inoculated with the fungus. In another experiment the surface sterilized pine seeds

FIG. 1

were transferred to sterilized moist chambers pre-inoculated with the fungus. It was observed that in pot culture the seedlings emerged successfully and after their establishment, the fungus attacked the cortical region of the stem base and exhibited the symptoms of chlorosis. Soon after a visible wilting of the seedlings was observed. In the moist chamber experiment, just after the germination, the plumule and radicle were attacked by the fungus and thereafter the seedlings grew abnormally and could survive upto 7–10 days (Fig. 1).

The species of *Fusarium* have been reported to be distributed in soils and are known to cause wilt disease of vascular plants[1–4] however, *F. oxysporum* is a new record for *P. kesiya* Royle.

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CHROMATIC ADAPTATION IN *MERISMOPEDIA MINIMA* AT TWO DEPTHS IN DAMDAMA LAKE

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During a limnological survey of some fresh water bodies in and around Delhi State, water samples