

**Symptoms**

Infection spreads from lower to upper leaves and the symptoms are seen on both the surfaces of leaves in the form of small circular brown spots to start with. Later the spots enlarge and are covered by the powdery growth of the fungus (Plate 1). The infection takes place at an early stage of the plant growth, continues even after pod formation, but is confined to the leaf lamina only.

**Morphology of the fungus**

Microscopic examination revealed the presence of the conidiophores bearing each a chain of conidia numbering from 4 to 8 (Plates 2 and 3). The conidiophores are short, hyaline with 2 to 3 septa. Conidia measure  $16.8 - 33.6 \times 13.2 - 26.4 \mu$ . Under humid conditions on a dry slide, the conidia germinated by producing a single germ tube.

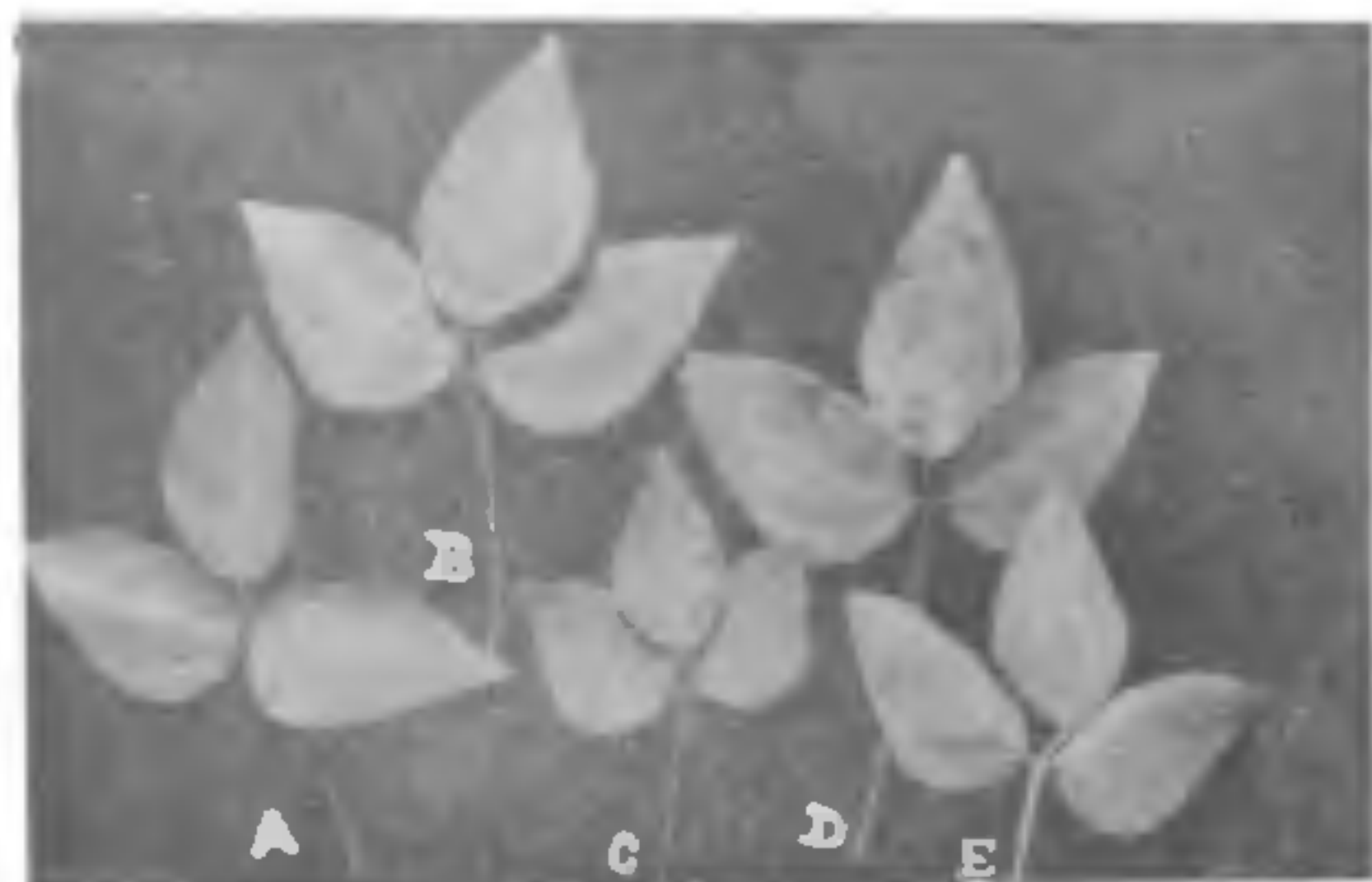


PLATE 1. A—Healthy leaf, B, C, D—Developmental stages of the disease symptoms; E—Symptoms on the lower surface of the leaf.



PLATE 2. Conidiophores with conidia in chain on host cell,  $\times 192$ .

The mycelium is superficial, creeping, hyaline, septate and branched. In the absence of any cleistothecial bodies the exact species of the pathogen could not be ascertained. From the shape and mode of formation of the conidia the fungus is identified

as species of *oidium*. Pathogenicity of the causal organism was proved by dusting dry conidia on the young healthy leaves of the plants. The disease symptoms appeared on the 5th day after inoculation.



PLATE 3. Conidia in chain,  $\times 192$ .

The author is grateful to Professor S. G. Abhyankar, Head, Department of Plant Pathology, for guidance and to Dr. S. B. Kadrekar, Associate Dean, for providing facilities. Thanks are also due to Mr. V. C. Lele, Mycologist, IARI, New Delhi, for identification of the pathogen.

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#### INDUCTION OF SPORULATION IN *CLATHRIDIMUM CORTICOLA* (FCKL.) SHOEM. AND MULLER

CONIDIAL state of *Clathridium corticola* (IMI 191203) has earlier been reported to cause a serious fruit rot disease of apple<sup>1</sup>. Repeated isolations from the diseased tissue on potato dextrose agar medium yielded a fungus with vegetative growth only. It was grown on a



number of media, viz., Czapek's, Asthana-Hawker's, Malt extract, Sabouraud's dextrose, Peptone maltose, Oat meal and Fruit pulp agars at 28° C, but sporulation did not occur on any of them. With a view that temperature might be playing some role in the sporulation of this pathogen, the present investigations were carried out and some interesting results were obtained.

The sterilized potato dextrose agar dishes were inoculated each with a 5 mm disc cut out from the margin of seven-day old fungal colony and incubated at a range of temperatures (2 to 35° C) maintained in different incubators. There were three dishes at each temperature except at 28° and 35° C which had 18 and 21 dishes respectively. Radial growth of the fungal colony and sporulation were recorded after 10 days. Following this, all but three dishes each from 28° and 35° C were transferred to lower temperatures so that each received three dishes of the above sets separately. Growth and sporulation were recorded after 16 days in these cases.

It is apparent from the data (Table I) that temperature had a marked effect on growth and sporulation in *C. corticola*. It grew well between a temperature range of 22° to 28° C. No growth was noticed at 35° C. At 28° C, the colony consisted of white vegetative hyphae (Fig. 1). It was noteworthy that sporulation occurred at low temperatures only. Below 22° C, i.e., at 10, 6° and 4° C, whatever growth appeared was that of dark-brown sporulating hyphae bearing coridiophores and groups of conidia (Fig. 1). Best sporulation was observed at 10° C and it did not occur at all at 2° C. At 22° C, the colony consisted mainly of vegetative mycelium with few interspersed spores but dark sporulating hyphae were lacking.

TABLE I  
Influence of temperature on the growth and sporulation in *Clathridium corticola*

Temp. (°C)	Av. colony diam. (mm) <sup>a</sup>	Av. colony diam. (mm) <sup>b</sup>	
			A B
2	..	26.5 (M)	..
4	0.5 (S)	26.5 (M) + 0.5 (S)	..
6	1.0 (S)	26.5 (M) + 1.0 (S)	..
10	28.5 (S)	26.5 (M) + 11.5 (S)	..
22	46 (MS)	42 (MS)	..
28	26.5 (M)	38 (M)	..
35	..	..	..

<sup>a</sup>after 10 days; <sup>b</sup>after 16 days; S = Sporulation only; M = Mycelial growth only; MS = Mycelium interspersed with few spores.

A, B = Dishes kept previously at 28° and 35° C respectively for 10 days.

When the dishes set previously at 28° C for 10 days were brought to lower temperatures, it was observed

that at 10, 6° and 4° C further vegetative growth ceased completely and sporulation was induced in the form of dark-brown zone around the already present vegetative colony whereas mycelial growth continued and only a few spores appeared at 22° C. This indicates that low temperature has a definite role to play in the sporulation of *C. corticola*. Sporulation occurred earlier at 10° C (on the 13th day) and slightly later at 6° and 4° C (on 14th and 15th day respectively). No spores were formed at 2° C. The dishes from set at 35° C could neither produce mycelium nor induce sporulation when kept at lower temperatures.

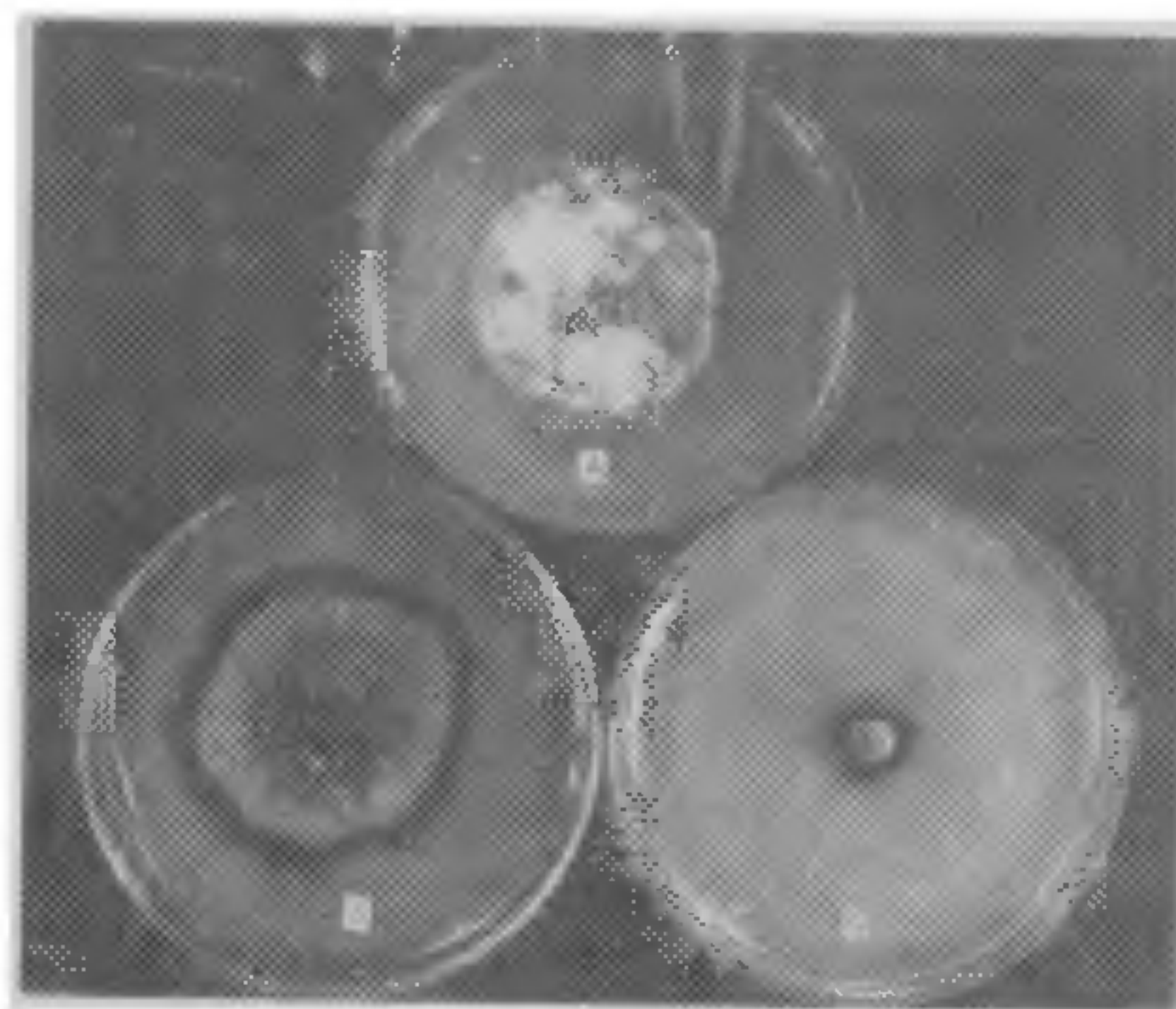


FIG. 1. Showing dishes of *C. corticola* at three different temperatures: (A) white vegetative colony at 28° C; (B) Dark sporulation zone around vegetative colony when kept at 10° C after 10 days at 28° C; (C) Dark sporulating colony from inoculum disc at 10° C.

It is inferred from the above study that for asexual sporulation, the present isolate of *Clathridium corticola* required lower temperatures than needed for its vegetative growth and this reflects on the psychrophilic tendencies of the pathogen. Sporulation in *Glomerell rufomaculans*<sup>2</sup> and *Fusarium discolor sulphureum*<sup>3</sup> has also been reported to be temperature-dependant.

We are thankful to U.G.C., Delhi, for providing financial help to one of us (T. S. T.).

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April 3, 1978.

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