THE MYXOMYCETES OF INDIA—XXIII

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This paper intends to record five more species of Myxomycetes collected from Dalhousie, Chamba and Jammu Hills (5000–8500 ft. alt.) in the North-Western Himalayas during the monsoon season of 1966. Four of these are new records for India. The previous 22 papers listed under references, cover an illustrated account of 147 species, including a few varieties and forms. The species described here constitute Nos. 148–152 of the series. The type material has been deposited in the Herbarium of the Punjab University, Botany Department, Chandigarh, India. Duplicate material is at the National Fungus Collections, Beltsville, Maryland, U.S.A.

148. *Cribraria piriformis* Schrad. (Fig. 1)

Fructifications sporangiate, stipitate, total height up to 1·8 (–2) mm.; sporangia gregarious, erect or nodding, broadly turbinate, sometimes slightly umbilicate at the base, dark brown, turning purplish-brown or purple in KOH, 0·2–0·5 mm. in diameter; stipe long, flexuous, gradually tapering upwards, longitudinally rugose, dark brown to almost black, turning purplish-brown in KOH, 1–1·5 mm. long; hypothallus well developed, concolorous with the stipe; peridium fugaceous except for the calyculus at the base and net above; calyculus well developed, sharply demarcated from the net, dentate, one-third or more of the sporangial height but not reaching up to the middle, marked by prominent numerous radiating granular lines of dictydine granules measuring up to 2·8 μ in diameter: net complete, small-meshed, composed of nodes and internodes: nodes distinct filled with large, dark brown dictydine granules measuring up to 2·8 μ in diameter: internodes slender, pale brown; free ends few.

Spores yellowish-brown in mass, pale yellowish-brown by transmitted light, globose, minutely but distinctly verrucose, 5·6–7 μ in diameter.

Collected on decaying wood under a coniferous forest, Kala Tope, Dalhousie, H. P., August 12, 1966, **1181.** New record for India.

This Dalhousie collection appears to be quite typical of *Cribraria piriformis* except that its stipe is longer. The species is easily recognized by

turbinate, brown sporangia and large dentate calyculus marked by radiating granular lines.

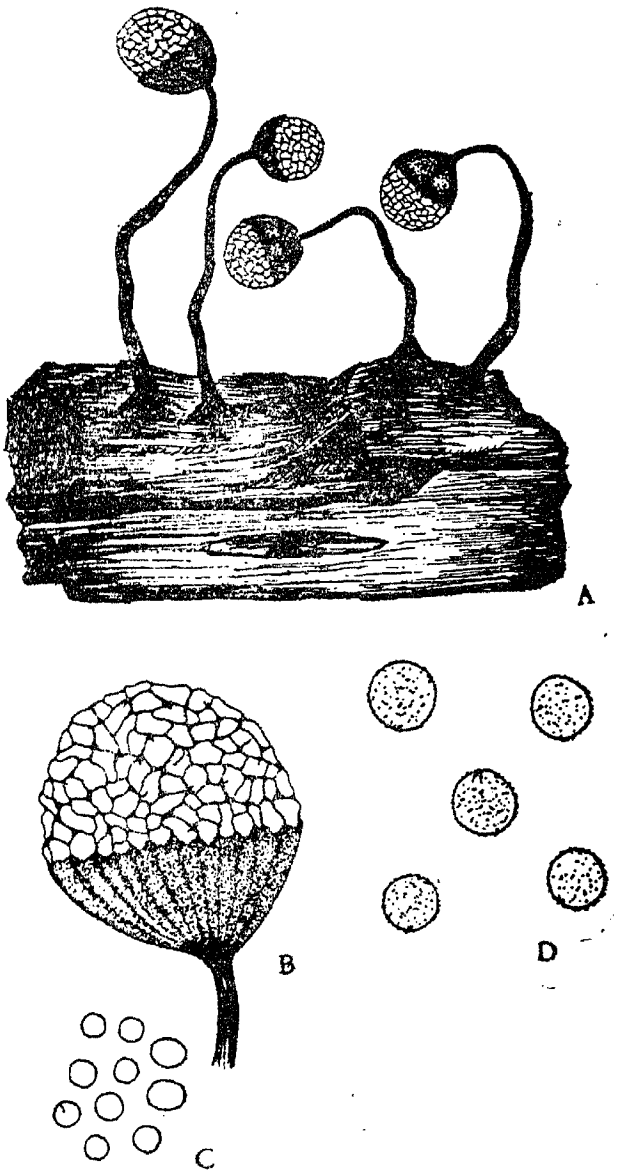

FIG. 1. *Cribraria piriformis* Schrad. A. Group of sporangia, ×20. B. A more magnified sporangium, ×50. C. Dictydine granules, ×1,000. D. Spores, ×1,000.

It is interesting to note that the calyculus is marked both by radial as well as concentric granular rows. However, the radial rows of granules are more prominent than the concentric ones. The granules in the concentric rows often appear to be connected by faint hyaline lines. This does not appear to be true of granules in radial lines. These faint granular rows on the calyculus are not reported for the species by previous workers.

149. *Cribraria vulgaris* Schrad. (Fig. 2)

Fructifications sporangiate, stipitate, total height up to 2 (–2·3) mm; sporangia gregarious, mostly broadly turbinate, sometimes subglobose, yellowish-brown, 0·3–0·6 mm. in diameter; stipe long, gradually tapering from base to top, erect to bent to flexuous, longitudinally rugose, dark brown, nearly black at the base, 0·7–1·4 mm. long; hypothallus small, mostly solitary, sometimes confluent (in gregarious patches), concolorous with base of the stipe; peridium thin, fugaceous except for a calyculus below and the net above: calyculus well developed, sharply demarcated from the net, about one-third of the sporangium, closely toothed, marked by close radial rows of dictydine granules measuring up to 1·4 μ in diameter: net prominent, small-meshed: nodes conspicuous, dark brown, filled with dark brown, spherical dictydine granules measuring up to 1·4 μ in diameter, rounded to angular to somewhat elongated, variable in shape and size: internodes slender, subhyaline to pale brown; free ends few.

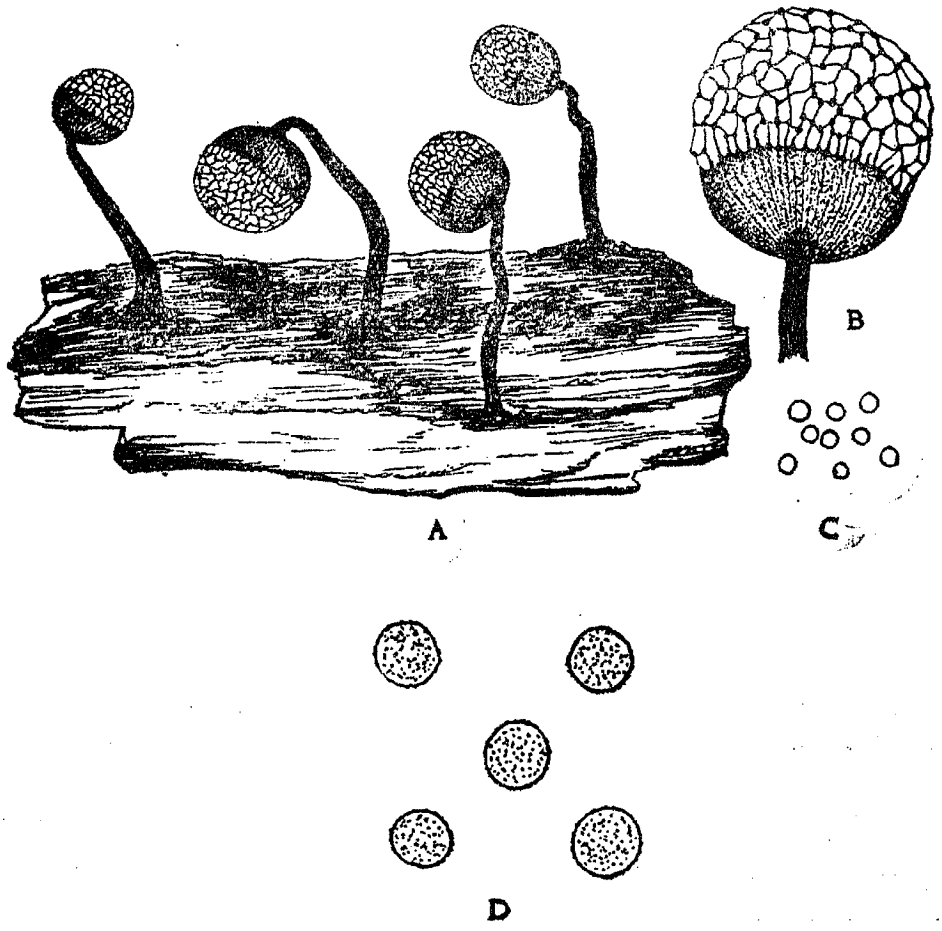

FIG. 2. *Cribraria vulgaris* Schrad. A. Group of sporangia, ×20. B. A more magnified sporangium, ×50. C. Dictydine granules, ×1,000. D. Spores, ×1,000.

Spores yellowish-brown in mass, pale yellowish-brown by transmitted light, globose, minutely verrucose, 5–7 μ in diameter.

Collected on dead wood under a coniferous forest, Lakkar Mandi, Dalhousie, H. P., August 4, 1966, **1173**; on wood under a coniferous forest, Khijjiar, Chamba, H. P., August 4, 1966, **1174**. New record for India.

This species is very close to *Cribraria piriformis* Schrad. described above and differs from it chiefly in having much smaller size of the dictydine granules and in its sporangia and stipes not turning purple in KOH. Other minor differences are that in *C. vulgaris* sporangia are never umbilicate at the base, calyculus is slightly smaller and slightly more closely dentate and nodes are more prominent. It may be mentioned here that the arrangement of dictydine granules in *C. vulgaris* is more or less the same as described for *C. piriformis*.

150. *Physarum globuliferum* (Bull.) Pers. (Fig. 3)

Fructifications sporangiate, stipitate, total height up to 1·6 mm.; sporangia gregarious, sometimes fused in pairs by the fusion of stalks, globose, ashen grey to greyish-white, 0·3–0·6 mm. in diameter; stipe stout, straight, narrowed upwards, mostly broad or expanded towards the base but sometimes narrowed towards the base, pallid or cream coloured, coarsely rugose, brittle, calcareous, 0·4–1 (–1·3) mm. long; hypothallus membranous, brown; peridium thin, membranous, covered with prominent, crustose patches or flakes of lime, somewhat iridescent where devoid of lime; dehiscence irregular.

Columella small, conical, simply an extension of the stalk, concolorous with the stalk, calcareous.

Capillitium dense, persistent, retaining the shape of sporangium even after dehiscence, intricate, composed of nodes and internodes: nodes rather sparse, large to small, very variable in size, rounded to fusoid, calcareous, filled with rounded lime granules, white to pallid, turning pale orange with age in dehisced sporangia: internodes forming an extensive network of hyaline, noncalcareous, dichotomously branching and anastomosing tubules, slightly expanded at the joints; free ends present and sharply pointed.

Spores black in mass, violaceous brown by transmitted light, globose to subglobose, profusely but minutely verrucose, with a tendency to form indistinct, loose clusters of darker and bigger warts, 8·5–10 μ in diameter.

Collected on decaying log of wood under a mixed forest, Patni Top, Jammu and Kashmir, September 24, 1966, 1230. New record for India.

The species is marked by white, calcareous stipe, dense persistent capillitium with white rounded nodes and profusely developed intricate internodes and minutely verrucose spores. The Indian collection differs from the species in having somewhat sparse nodes which are very variable in size and turn pale orange with age and slightly larger spores.

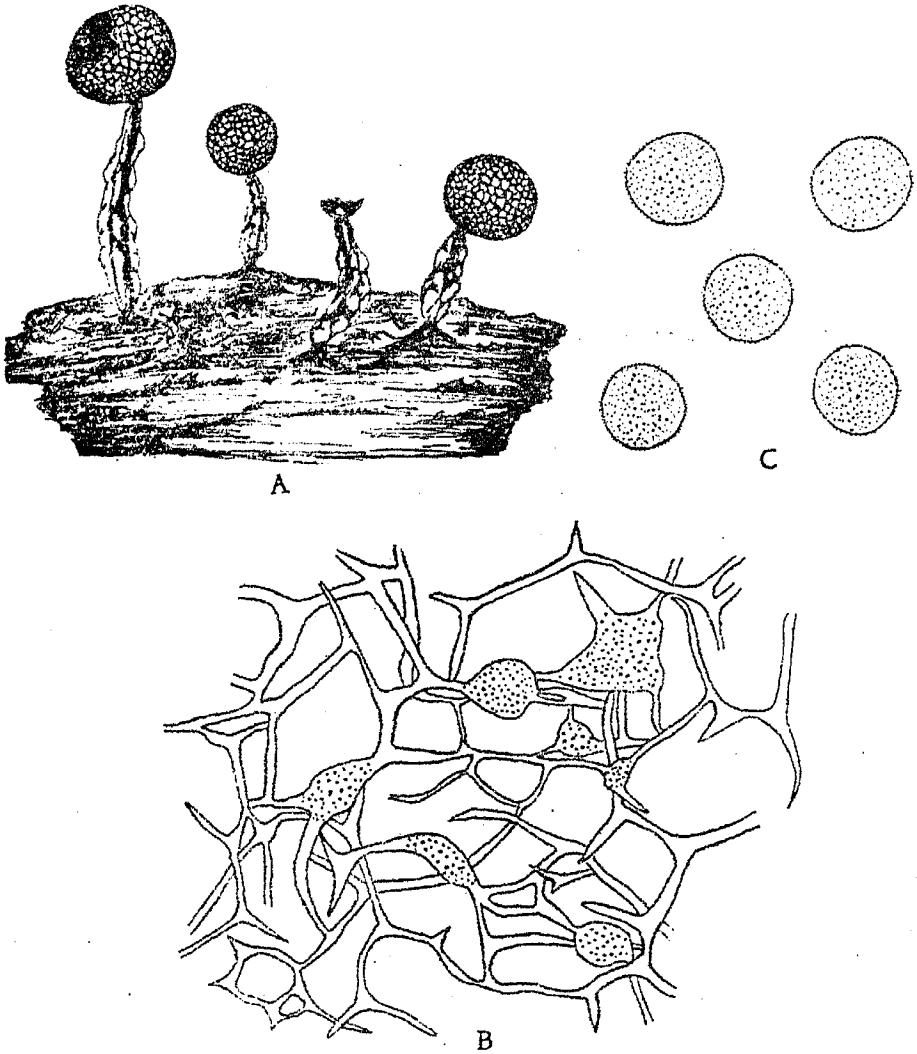

FIG. 3. *Physarum globuliferum* (Bull.) Pers. A. Group of sporangia, with one dehisced sporangium showing columella, ×20. B. Capillitium, ×400. C. Spores, ×1,000.

151. *Physarum listeri* Macbr. (Fig. 4)

Fructifications sporangiate, stipitate, total height up to 1·2 mm.; sporangia scattered or gregarious in small groups, globose to subglobose, often fused in pairs by the fusion of stalks, orange, 0·5–0·7 mm. in diameter; stipe stout, sometimes fused in pairs, white and calcareous from within,

lighter concolorous with the sporangium, white at the base, 0·4–0·8 mm. long; hypothallus small, usually confluent, concolorous with the base of stipe; peridium double: outer peridium thick, crustose, smooth, brittle, calcareous (lime granules large and up to 2·8 μ in diameter), orange, white from inside, remote from the inner peridium: inner peridium crustose but thinner than the outer one, cream coloured or ochraceous, brittle, calcareous; dehiscence irregular, the basal portions of the two peridial walls remaining persistent.

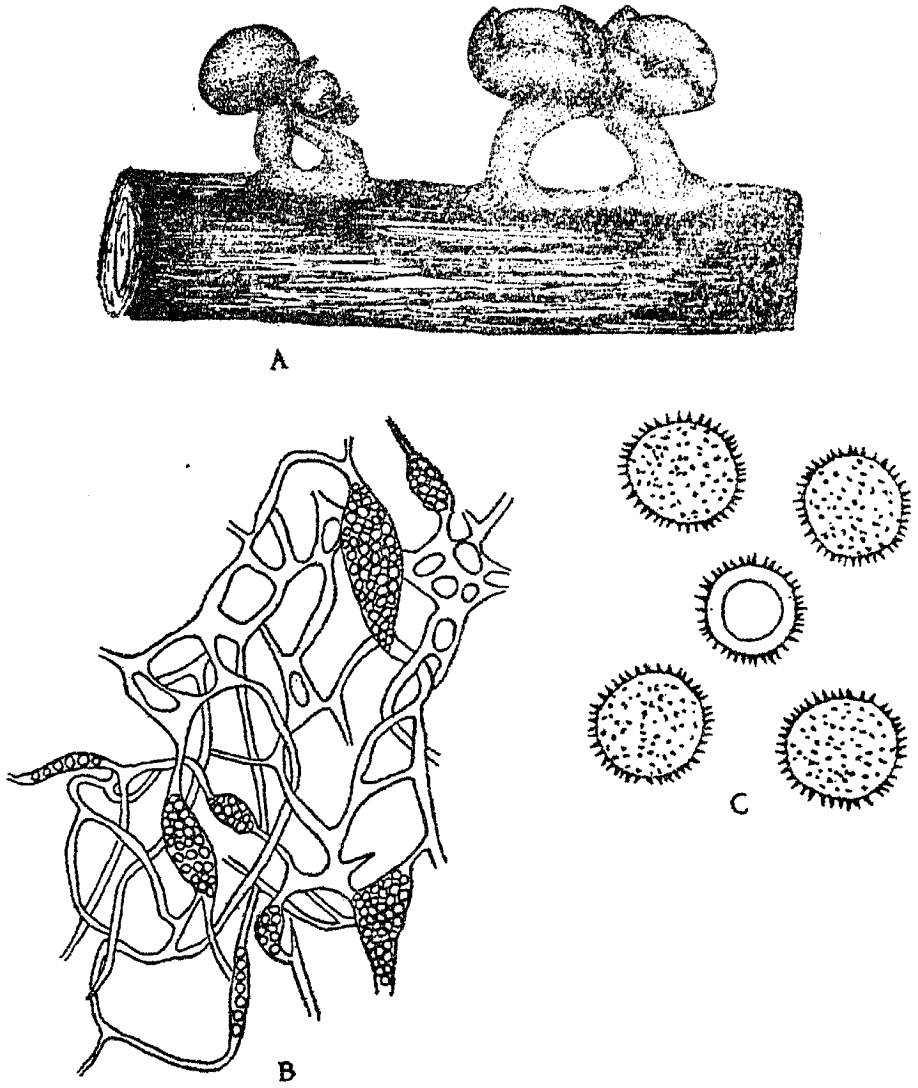

FIG. 4. *Physarum listeri* Macbr. A. Group of sporangia, one dehisced sporangium showing columella, ×20. B. Capillitium, ×400. C. Spores, ×1,000.

Columella prominent, reaching about the middle of the sporangium, subglobose to flattened, calcareous, orange.

Capillitium abundant, intricate, composed of nodes and internodes: nodes prominent, fusiform, elongated to very slender, filled with prominent,

rounded granules of lime up to 2·8 μ in diameter, these forming single row in the slender nodes, pale yellow: internodes profusely developed, composed of a dense network of branching and anastomosing limeless tubules.

Spores black in mass, dark violaceous brown by transmitted light, globose to subglobose, strongly spinulose, spines coarse and large and up to 1·4 μ long, uniguttate, 11–13 μ in diameter (including the spines).

Collected on needles and twigs of *Picea morinda* under a mixed forest, Sara (Sahu), Chamba, H. P., August 27, 1966, **1210.**

The species is marked by orange sporangia, often fused in pairs by the fusion of stipes, plainly double peridium, large columella and profusely developed capillitium with yellow, fusoid nodes and large, strongly spinulose, dark violaceous brown spores, 11–13 μ in diameter. The Indian collection is scanty but is quite typical of the species.

This collection of *P. listeri* from the Sahu forests is the only collection of the species after that of Mrs. Drake made from Kotgarh (Simla Hills) in 1912. Lister's meagre description of Mrs. Drake's collection (see *Jour. Bot.*, 1924, **62**, 16–17) resembles that of the Sahu collection.

It is interesting to note that both the Indian collections of the species made so far are from Himachal Pradesh in the North-Western Himalayas.

152. *Physarum psittacinum* Ditmar. (Fig. 5)

Fructifications sporangiate, stipitate, total height up to 1 mm.; sporangia gregarious to crowded, sometimes fused in pairs by fusion of stipes, globose, iridescent with predominantly blue metallic lustre, 0·3–0·4 mm. in diameter; stipe long, stout, broader below, narrowed upwards, but radiating at the top so as to form a prominent, orange, ridged disc at the base of sporangium, mostly singly, sometimes fused in pairs, orange, lighter coloured above, longitudinally sulcate or grooved, noncalcareous, 0·4–0·8 mm. long; hypothallus well developed, rotate, concolorous with the stipe near its base but thin, membranous, transparent and colourless towards the periphery; peridium single, thin, membranous, scantily covered over with whitish to ochraceous to rarely pinkish deposit, iridescent where devoid of any deposit as described under sporangia; dehiscence irregular.

Columella absent.

Capillitium abundant, composed of a network of nodes and internodes: nodes prominent, rounded to angular, irregular in shape and size, bright orange, not fading with age, often massed together in the centre to

form a pseudocolumella: internodes also prominent, hyaline, limeless, branching and anastomosing at places.

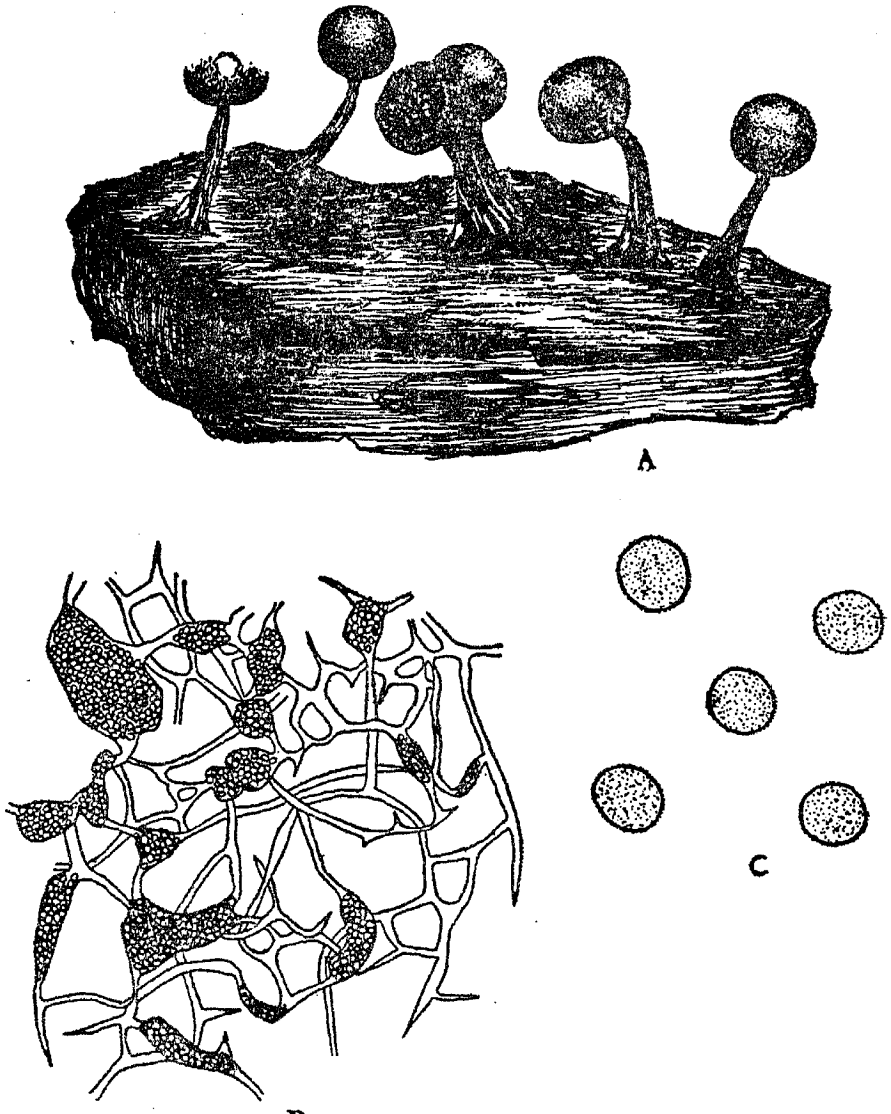

FIG. 5. *Physarum psittacinum* Ditmar. A. Group of sporangia with one dehisced sporangium showing pseudocolumella, ×20. B. Capillitium, ×400. C. Spores, ×1,000.

Spores black in mass, violaceous brown by transmitted light, globose, minutely but profusely verrucose, 6·5–7·5 μ in diameter.

Collected on dead and decaying wood under a mixed forest, Banikhet, Dalhousie, H. P., July 23, 1966, **1132**. New record for India.

This Dalhousie collection comes near *Physarum psittacinum* but differs from it in having smaller sporangia and smaller spores which lack clusters of warts. These differences are considered to be well within the range of variation of this species, however.

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