

does not subscribe to such a view but shows that the ligulate and bilabiate types of corollas are mere modifications of the tubular type.

A single deep sinus on the posterior side in the tubular corolla preceded by the division of the compound marginal bundle below gives rise to the ligulate type as exhibited not by the members of the tribe Cichorieae alone (Fig. 19, 21) but also by several species belonging to other tribes (Fig. 20, cf. Figs. 14, 16). A more advanced type of formation of the ligulate corolla is exhibited by those species where the posterior com-

pound marginal bundle of the petal fail to divide and the splitting of the corolla occurs between two posterior compound marginals (Figs. 22-24).

Similarly, the splitting of the corolla by the two main sinuses one on each side of a posterior and a lateral petal preceded by the splitting of the compound marginal below, results in the bilabiate types as in *Gerbera* (Figs. 12-13 cf. *Cnicus*). Therefore it can be concluded that the bilabiate and ligulate corollas are modifications of the basic tubular type. This is also borne out by the similarity in their fundamental vascular pattern.

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## STUDIES ON COPROPHILOUS FUNGI IV. SOME CLEISTO-THECIAL ASCOMYCETES<sup>1</sup>

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#### ABSTRACT

This paper deals with systematic account of 12 species of cleistothecial Ascomycetes. Of these, five are described as new : *Arachniotus hyaliostrictus* on rat dung from Jodhpur, Rajasthan ; *Kernia irregularis* on cow dung from Chakrata Hills, U. P. ; *Preussia cylindrispora* on goat dung from Jaipur, Rajasthan ; *Pseudeurotium*

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*irregulare* on goat dung from Udaipur, Rajasthan; and *P. jaipurensis* on goat dung from Jaipur. *Arachnomyces nitidus* Masee & Salmon has been recorded here for the first time after it was originally described in 1902 by Masee & Salmon. This species also represents the first record of the genus from India. *Emericellopsis mirabilis* (Malan) Stolk, *Kernia nitida* (Saccardo) Nieuw., *Pseudeurotium punctatum* Panasenkov, and *Tripterospora erostrata* (Griff.) Cain are new records for India. The other two species described here, *Gymnoascus reessii* Baranetzky and *Thielavia terricola* (Gilman & Abbot) Emmons v. *minor* (Rayss & Borut) Booth are new records from Rajasthan.

The present paper deals with the systematic account of some cleistothecial ascomycetes of coprophilous fungi.

***Arachnietus hyalioirchus* sp. nov.**  
(Fig. 1A—C).

This fungus appeared in moist chamber on rat dung collected from Jodhpur, Rajasthan. The ascocarps gregarious, rarely scattered, superficial, yellowish-green, irregularly globose, 50—100  $\mu$  in diameter. The peridial hyphae pale yellow, smooth, thin-walled, septate, 1—2  $\mu$  wide, and ending, in slightly flexuous appendage-like processes which are not conspicuous. The asci 8-spored, globose to oval, evanescent, and 8.4—10.8  $\times$  7.2—9.6  $\mu$ . Paraphyses absent. The ascospores continuous, hyaline, smooth, globose, rarely somewhat oval, 3  $\mu$  in diameter when globose and 3.4—4.2  $\times$  2.5  $\mu$  when oval, and adhering in conglomerate groups.

*A. hyalioirchus* is distinguished by its smooth and hyaline ascospores; pale yellow and slightly flexuous appendage-like processes and yellowish-green ascocarps. Since the features of this

fungus do not agree with those of any of the species of the genus so far known, it is described here as a new species.

***Arachnietus hyalioirchus* sp. nov.**—*Ascocarpi gregarii, raro dispersi, superficiales, luteovirides, irregulariter globosi, 50—100  $\mu$  diam. Peridii hyphae hyalinae, leves, parietibus tenuibus, septatae, 1—2  $\mu$  latae. Asci octospori, e globosis ovals, unitunicati, evanescentes, 8.4—10.8  $\mu$  longi, 7.2—9.6  $\mu$  lati. Paraphyses nullae. Ascosporae continuae, hyalinae, leves, globosae, raro subovales, 3  $\mu$  diam. cum globosae, 3.4—4.2  $\times$  2.5  $\mu$  cum ovals.*

Typus evolutus in stercore murino leg. B. C. Lodha ad Jodhpur die 15 julii 1961 (R. U. B. L. No. 510).

***Arachnomyces nitidus* Masee & Salmon, 1902, *Ann. Bot.* 16: 62. (Fig. 1D—F).**

The cleistothecia scattered, superficial, globose, black, opaque, about 150  $\mu$  in diameter, covered with long, thick-walled, septate, dark brown to opaque black, strong, flexuous or geniculate hairs of 1000—1200  $\times$  4.8—5.6  $\mu$ . The hairs uniformly cylindrical all along the length, but are conspicuously broader at the

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I am deeply indebted to Professor C. V. Subramanian, Centre for Advanced Studies, University Botany Laboratory, Madras, for valuable guidance during the course of the present work. I am also grateful to Professor Roy F. Cain who very kindly examined my material and confirmed my observations, also for permitting me to examine the Type of *Tripterospora erostrata* and his own collection of this species, to Dr R. K. Benjamin for sending me on loan the Type of *Kernia spirotricha* and identified specimens of *K. nitida* from Farlow Herbarium and to the late Father Dr H. Santapau for his help in translating the diagnoses of the new species into Latin. Finally I thank the University of Rajasthan for awarding me a research fellowship during the tenure of which this study was carried out.



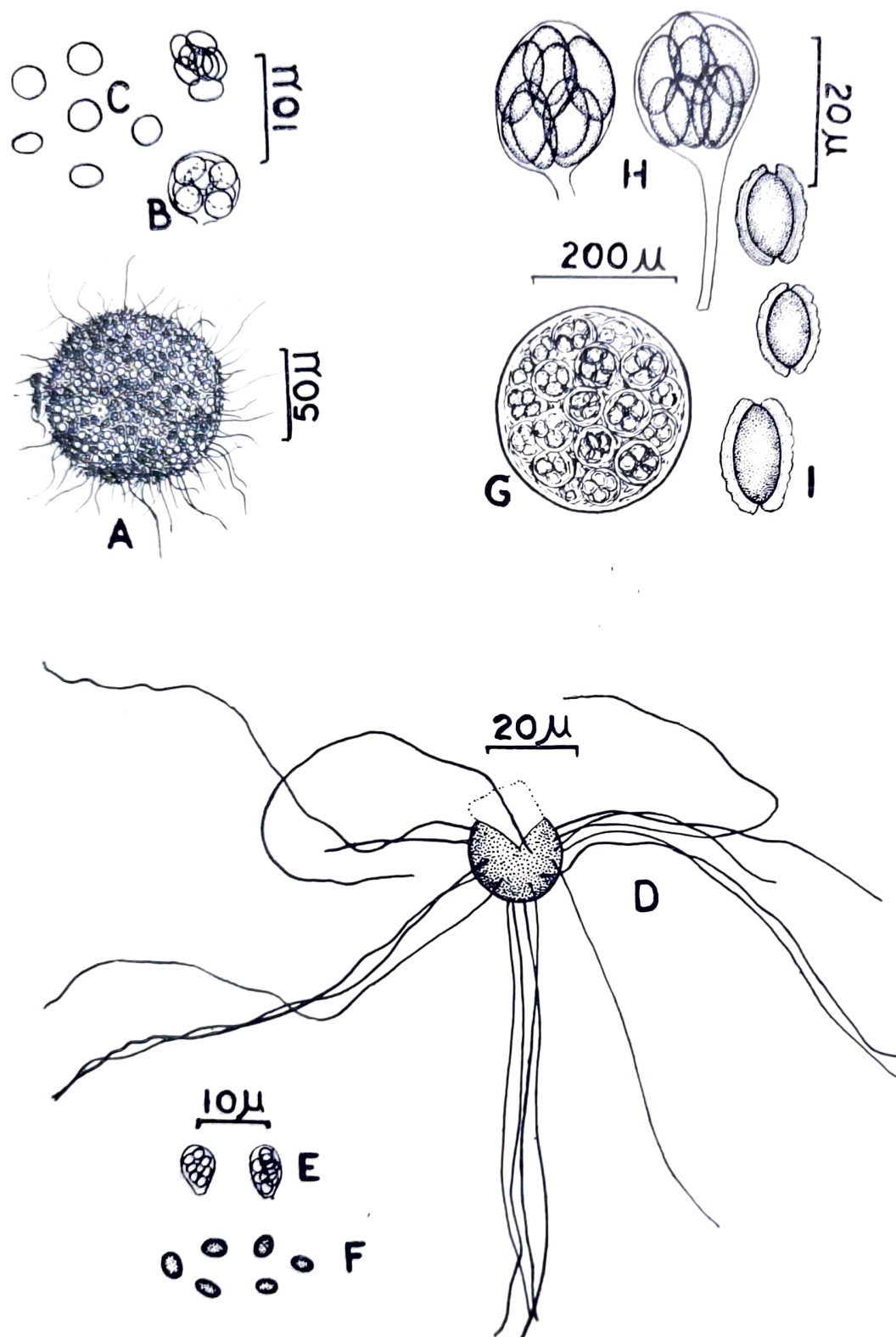


FIG. 1. A-I. A-C. *Arachniotus hyalotricha* from type collection, R. U. B. L. No. 510. A. Ascocarp B. Ascus, C. Ascospores and old ascus, without ascuswall. D-F. *Arachnomycetes nitidus* from R. U. B. L. No. 442. D. Cleistothecium. E. Asci. F. Ascospores. Figs. G-I. *Emericellopsis mirabilis* from R. U. B. L. No. 501. Fig. G. Cleistothecium. Fig. H. Asci. Fig. I. Ascospores.

base, paler in colour towards apex, and with rounded tips. The peridium thin, brittle, and dark brown. Paraphyses absent. The asci 8-spored, unitunicate, subglobose to broadly clavate, evanescent,  $8.0-10.8 \times 7.2-8.0 \mu$ . The ascospores biseriate or irregular, continuous, hyaline at first, subhyaline to pale brown later, oval or ellipsoidal, without any germ pore, smooth,  $2.8-3.6 \times 1.6-2.4 \mu$ .

by Massee and Salmon (1902).

*A. nitidus* was originally described from Britain on rat dung as the type species of the *Arachnomyces* Massee Salmon. As far as I am aware, there is no other record of this fungus since 1902. Therefore, the present report is not only a new record for the genus from Asia, but is also the first record of this species on goat dung in the world.

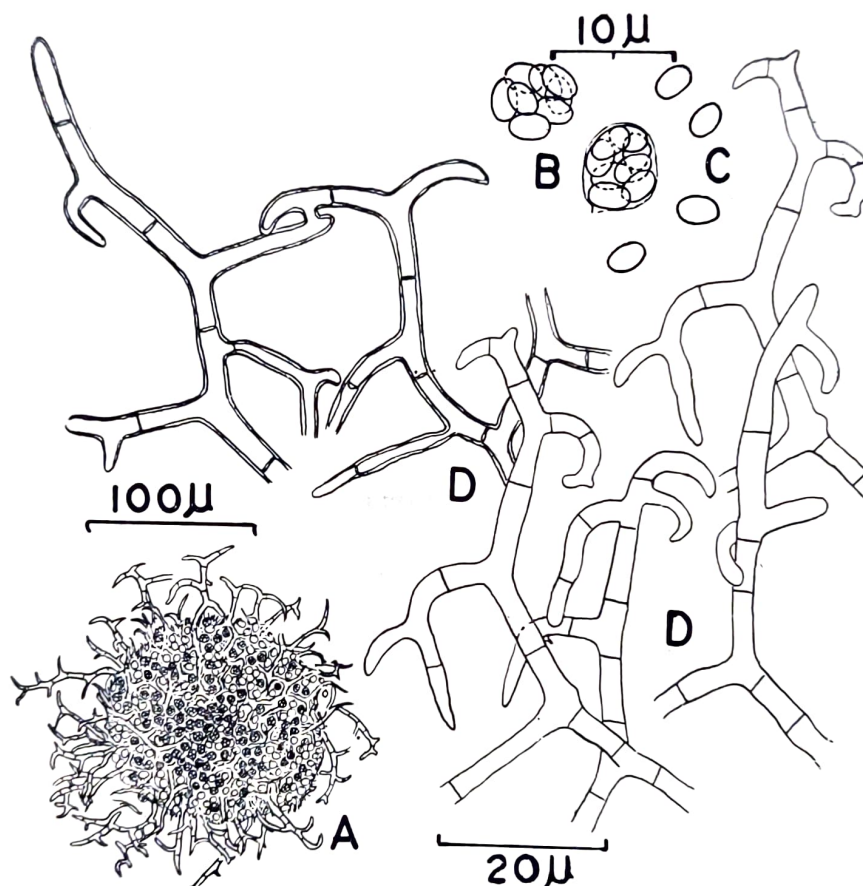


FIG. 2. A-D. *Gymnoascus reessii* from R. U. B. L. No. 508. A. ascocarp. B. Asci, young and old. C. Ascospores. D. Ascocarp appendages.

The above description is based on material which developed in moist chamber on goat dung, collected by B. C. Lodha, from Jaipur, 12th December 1963 R.U.B L. No. 442).

My collection agrees well with the description and figures of *A. nitidus* given

*Emericellopsis mirabilis* (Malan) Stolk, 1955, *Trans. Br. mycol. Soc.* **38** : 421 ; Backus, M.P. & Orpurt, P.A., 1961, *Mycologia* **53** : 64-83. (Fig. 1 G-H).

*Peyronellula Mirabilis* Malan, 1952, *Mycopath. (Mycol. appl.)* **6** : 165.

The cleistothecia scattered, superficial,



globose to subglobose, 153–336  $\mu$  in diameter, black, glabrous. The peridium is transparent and thin. The asci 8-spored, globose to subglobose above, abruptly tapering into a fairly long stalk below, unitunicate, evanescent,  $49.9-65.2 \times 19.2-23.0 \mu$ . Paraphyses absent. The ascospores continuous, dark brown, ellipsoid, with longitudinal flanges or wings, which have undulating or ragged margins, and  $12.8-14.4 \times 6.2-7.0 \mu$ . They agglutinate to form spore-balls,  $23.0-26.6 \times 19.2-21.0 \mu$ .

The above description is based on material which developed in moist chamber on a steamed sample of cow dung (6 min. steaming) collected by B. C. Lodha from Mt. Abu on 2nd October, 1961 (R.U.B.L. No. 501).

My collection agrees well with the description of *Peyronellula mirabilis* Malan which is basonym of *Emericella mirabilis* as given by Malan (1952).

This fungus is a new record from India.

***Gymnoascus reessii*** Baranetzky, 1872 *Bot. Zeit.* 30 : 158 ; Benjamin, R.K., 1956, *El. Aliso* 3 : 301–328 ; Orr, G.F., Kuehn, H.H. & Plunkett, O.A., 1963, *Mycopath. Mycol. appl.* 21 : 2–4. (Fig. 2 A–D).

The ascocarps gregarious, superficial, yellowish-brown, orange brown, reddish-brown, reddish-yellow, or yellowish-green, irregularly globose, 50–350  $\mu$  in diameter including appendages. The appendages mostly dichotomously branched, the ultimate branches being curved, septate, smooth, thick-walled, yellow, orange or yellowish-red, about 4  $\mu$  wide, anastomosing, and forming a loose reticulum or net. The asci 8-spored, globose or oval, hyaline, evanescent,  $7.0-9.6 \mu$  in diameter. Paraphyses absent. The ascospores continuous, globose in polar view, oval in lateral view, light yellow to yellow,  $3.0-4.0 \times 2.0-2.5 \mu$ , adhering in a conglom-

merate group.

The above description is based on material which developed in moist chamber on rat dung collected by B. C. Lodha from Jodhpur, 15th July, 1961 (R.U.B.L. No. 508). The following other collections made by B. C. Lodha were also examined : on dog dung collected from Jaipur, 8th July, 1963 (R.U.B.L. No. 507) ; on rat dung collected from Jaipur, 10th August 1963 (R.U.B.L. No. 509). All these collections agree well with the description given by Benjamin (1956) and Orr et al. (1963).

This fungus is a new record for Rajasthan.

***Kernia irregularis*** sp. nov. (Fig. 3, A–D).

This fungus appeared in moist chamber on horse dung collected from Chakrata Hills, U.P. The cleistothecia scattered, superficial, oblong-obtuse, 200–250  $\mu$  long, 150–180  $\mu$  wide, 150–180  $\mu$  high, black, covered with numerous hairs. The hairs are of two types : (i) Hairs which are present at two ends in loose fascicles and are conspicuously large, upto 750  $\mu$  long. They are simple, black, shining, stiff, septate, straight or flexuous below, irregularly spirally coiled above with 2–6 coils, 375–570  $\mu$  long in the spirally coiled part, and 5.0–5.5  $\mu$  wide. (ii) Hairs which are free, short, upto 100  $\mu$  long, 2–3  $\mu$  wide, subhyaline, septate, slender, thin-walled, and present all over the cleistothecium. The peridium of the ascocarp brittle, thin, and composed of angular, dark brown, uniformly thick-walled cells. The ascospores continuous, oval subhyaline, or light olivaceous brown, and  $4.0-5.0 \times 2.2-3.6 \mu$ .

In spite of repeated efforts the asci could not be seen, since they are highly evanescent, but yet from a study of all other features it is presumed that this

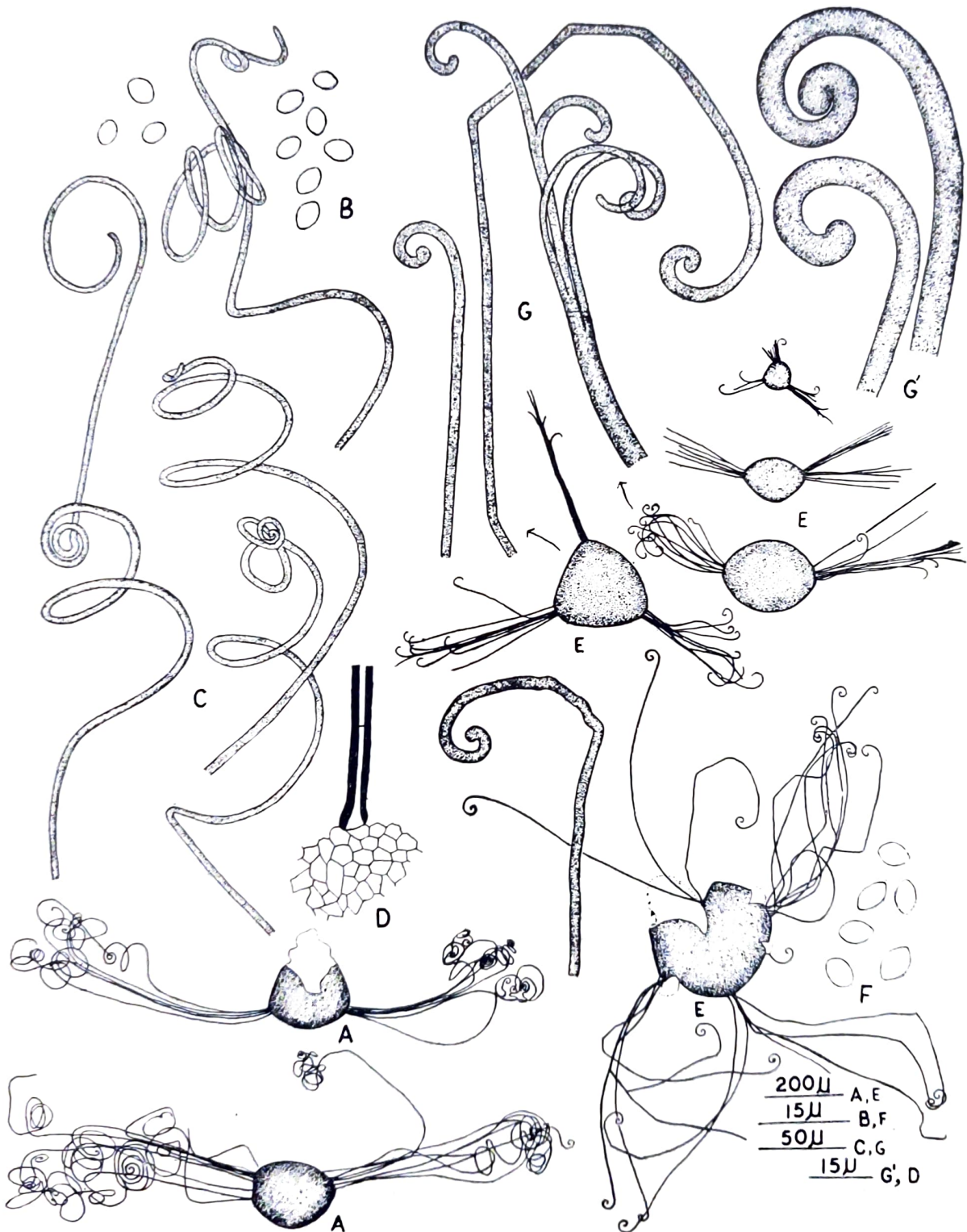


FIG. 3 A-G' A-D. *Kernia irregularis* from type collection, R. U. B. L. No. 270. A. Cleistothecia. B. Ascospores. C. Hairs. D. Peridium with a hair base. E-G. *Kernia nitida* from R. U. B. L. No. 271. E. Young to mature cleistothecia. F. Ascospores. G. hairs. G'. Terminal part of hairs, magnified.



fungus can be placed in the genus *Kernia*.

The present fungus is somewhat similar to *Kernia spirotricha* (Benjamin) Benjamin (Benjamin, 1955). I have examined the Type of the *K. spirotricha* which bears conspicuously coiled hairs, each up to 20 turns, whereas the present species bears irregularly coiled hairs with 2-6 turns in the distal part only. Further, the ascospores in *K. spirotricha* are  $7.1-8.5 \times 5.2-6.3 \mu$ , but that of the present fungus are only  $4.0-5.0 \times 2.2-3.6 \mu$ . Since the present species is distinct from all the known species of *Kernia* it is described as a new species.

***Kernia irregularis* sp. nov.**—Cleistothecia dispersa, superficialia, oblongo-obtusa,  $200-250 \mu$  longa,  $150-180 \mu$  lata,  $150-180 \mu$  alta, nigra, obtecta pilis mycelialibus, et fasciculis appendicum longarum ad utrumque apicem. Appendices simplices, nitentes, nigrae, conspicuae, rigidae, septatae, ad  $750 \mu$  longae,  $5.0-5.5 \mu$  latae, rectae vel flexuosae infra, irregulariter tortae supra spiris 2-6,  $375-570 \mu$  longae in parte non-torta. Peridium tenue, frangibile, constans cellulis brunneis angularibus, parietibus uniformiter crassis. Ascosporae continuae, ovales, subhyalinae, vel pallide olivaeobrunneae,  $4.0-5.0 \times 2.2-3.6 \mu$ .

Typus evolutus in stercore vaccino leg. B.C. Lodha in collibus Chakrata dictis, U.P., die 3 octobris 1962 (R.U.B.L. No. 270).

***Kernia nitida*** (Saccardo) Nieuw., 1916, *Am. Mid. Nat.* 4 : 379; Saccardo, P.A. 1882. *Syll. Fung.* 1 : 38; Ames, L.M. 1937. *Mycologia* 29 : 224; Benjamin, R.K. 1956. *El Aliso* 3 : 344.

*Magnusia nitida* Saccardo, 1879, *Michieli* 1 : 123. (Fig. 3 E—G)

The cleistothecia scattered, superficial, globose or oblong-obtuse, triangular or quadrangular,  $180-230 \mu$  wide,  $200-250$

$\mu$  long,  $140-170 \mu$  high, black, and covered with two types of hairs. (i) Hairs which are flexuous, shining black, conspicuous, long,  $400-800 \times 4.2-4.6 \mu$ , stiff, septate, simple with circinate tips, few to many, free or in fascicles, and arising at 2-4 points from cleistothecium. (ii) Hairs which are free, short, up to  $100 \mu$ , long,  $2-3 \mu$  wide, subhyaline, septate, myceloid, and present all over each cleistothecium. The peridium is brittle, very thin, and composed of angular cells. The asci are globose to oval, 8-spored, evanescent, and  $10-15 \times 6-8 \mu$ . The ascospores are irregularly arranged in the asci, continuous, oval subhyaline or pale brown, and  $4.4-5.2 \times 3.5-4.0 \mu$ .

The above description is based on an isolate made from cow dung collected by B.C. Lodha from Udaipur, Rajasthan, 20th September, 1961 (R.U.B.L. No. 271). Following collections made by B. C. Lodha were also examined : On cow dung from Jodhpur, Rajasthan, 1st September 1961 (R.U.B.L. No. 258); on cow dung from Chakrata Hills, 3rd October, 1962 (R.U.B.L. No. 273); on buffalo dung from Coimbatore. 1st October, 1960 (R.U.B.L. No. 274). on camel dung from Jodhpur, 22nd July, 1961 (R.U.B.L. No. 275); on horse dung from Mt. Abu 3rd October, 1961 (R.U.B.L. No. 272); on goat dung from Jaipur, 10 July, 1964 (R.U.B.L. No. 354); on rat dung from Jodhpur, 15th July, 1961 (R.U.B.L. No. 499); and on rat dung from Jaipur, 10th August, 1963 (R.U.B.L. No. 500). All these collections are similar and agree well with the description given by Saccardo (1882) and Ames (1937.)

I have also examined three collections of *K. nitida* (under the name *Magnusia nitida*) from the Farlow Herbarium, they are : (1) No. 0-527, on dung of unknown animal, identified by Linder; (2) No. 886,

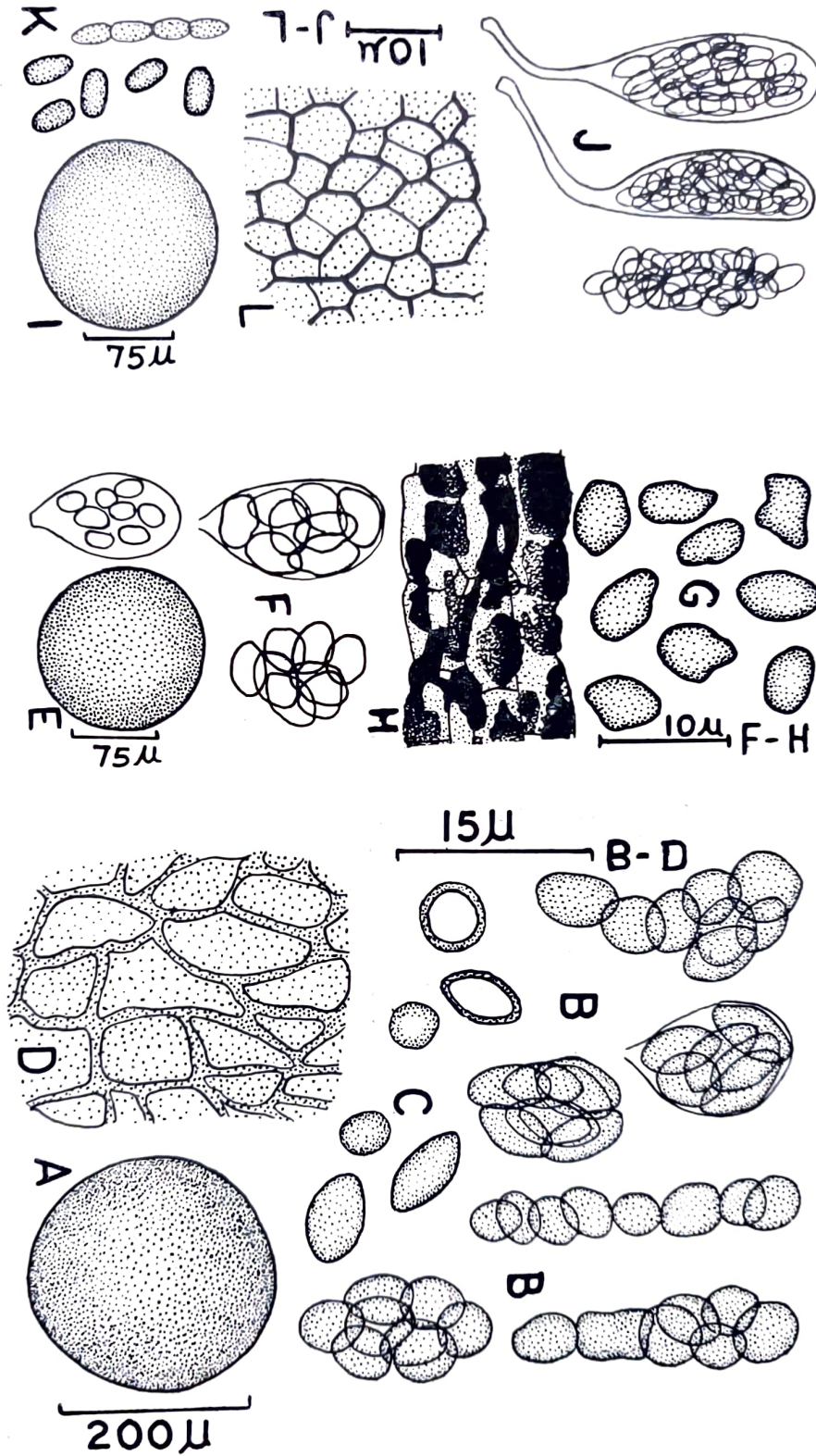


FIG. 4 A-L. A-D. *Pseudurotium jaipurensis* from type collection, R. U. B. L. No. 353. A. Cleistothecium. B. Asci, young and old. C. Asci, young and old. D. Peridium. E-H. *Pseudurotium irregulare* from type collection, R. U. B. L. No. 295. E. Asci, young and old. F. Asci, young and old. G. Asci, young and old. H. Peridium. I-L. *Preussia cylindrispora* from type collection, R. U. B. L. No. 301. I. Cleistothecium. J. Asci, young and old. K. Asci, young and old. L. Peridium.



on dung of unknown animal, identified by Thaxter; and (3) No. 714, on rabbit dung, identified by Sweet. Apart from these I have also examined a culture of *K. nitida* from C.B.S. Baarn. My collections agree well with all these specimens also.

This fungus is a new record for India. It was earlier recorded from Lahore which is now in Pakistan.

***Preussia cylindrispora* sp. nov.** (Fig. 4 I-L).

This fungus appeared in moist chamber on goat dung collected from Jaipur, Rajasthan. The cleistothecia scattered, superficial, globose, about  $150\ \mu$  in diameter, black, opaque, and glabrous. The peridium of the ascocarp thin, membranous, and brown. The asci 8-spored, unitunicate, clavate to broadly ellipsoid,  $23.0\text{--}30.7 \times 7\text{--}8\ \mu$ , broader near apex, rounded above without any marking, and abruptly narrowed below into a very long stipe. Paraphyses absent. The ascospores arranged irregularly in 3-4 series, cylindrical, 3-septate, constricted at the septa, and separating into segments at a very early stage. The ascospore segments are 32, irregularly crowded in the asci, cylindric-oval, with rounded ends  $4.4\text{--}4.8 \times 2.4\text{--}2.8\ \mu$ , almost equal in size and shape, brown, and without germ slit.

*P. cylindrispora* comes very near to *P. nigra* (Routien) Cain (Cain, 1961), but differs in having smaller asci ( $23.0\text{--}30.7 \times 7\text{--}8\ \mu$ ) with conspicuously large stipe. The asci in *P. nigra* are larger ( $30\text{--}41 \times 10\text{--}11\ \mu$ ) and with a short stipe. Further, the ascospore segment in the present fungus are cylindric-oval, whereas in *p. nigra* are ellipsoid. Since this fungus differs from any of the other species of *Pruessia*, it is described as a new species.

***Preussia cylindrispora* sp. nov.**—Cleistothecia dispersa, superficialia, globosa,

nigra, glabra, ca.  $150\ \mu$  diam. Peridium tenue, membranaceo, brunneum. Asci octosporis, unitunicati, late clavatis vel subellipsoideis,  $23.0\text{--}30.7 \times 7.0\text{--}8.0\ \mu$ , latissimis prope apicem, superne late rotundatis, basin versus in stipitem longitudine abrupte. Paraphyses nullae. Ascosporae tribus septis, profunde constrictis, brunneis. Segmentis ascosporarum novellrum ad septa omnino separatis, cylindraco-ovalibus, a utroque termino late rotundatis,  $4.4\text{--}4.8 \times 2.4\text{--}2.8\ \mu$ , pari amplitudine et forma ferme praeditis. Hilo germinali nullae.

Typus evolutus in stercore caprino lecto a B.C. Lodha ad Jaipur in Rajasthania, die 10 julii anni 1963 et positus in R.U.B.L. sub numero 301.

***Pseudeurotium irregulare* sp. nov.** (Fig. 4 E-H).

This fungus appeared in moist chamber on goat dung from Udaipur. The cleistothecia superficial, globose, about  $150\ \mu$  in diameter, brown, and glabrous. The peridium thin, membranous, and brown with black patches. Paraphyses absent. The asci 8-spored, globose to clavate, unitunicate, evanescent,  $12\text{--}16 \times 8\text{--}9\ \mu$ . The ascospores irregularly arranged in the asci, continuous, brown, irregularly oval, smooth, without germ pore,  $5.7\text{--}7.2 \times 4.0\text{--}5.0\ \mu$ .

The shape and size of the ascospores of *P. irregulare* do not agree with any other species of *Pseudeurotium*. Therefore, it has been described here as a new species.

***Pseudeurotium irregulare* sp. nov.**—Cleistothecia superficialia, globosa, ca.  $150\ \mu$  diam. brunnea peridium tenue, membranaceum, pallide brunneum. Paraphyses nullae. Asci octospori, unitunicati, evanescentes, clavati,  $12\text{--}16 \times 8\text{--}9\ \mu$ . Ascosporae irregulariter dispositae in asco, continuae, brunneae, irregulariter ovales,

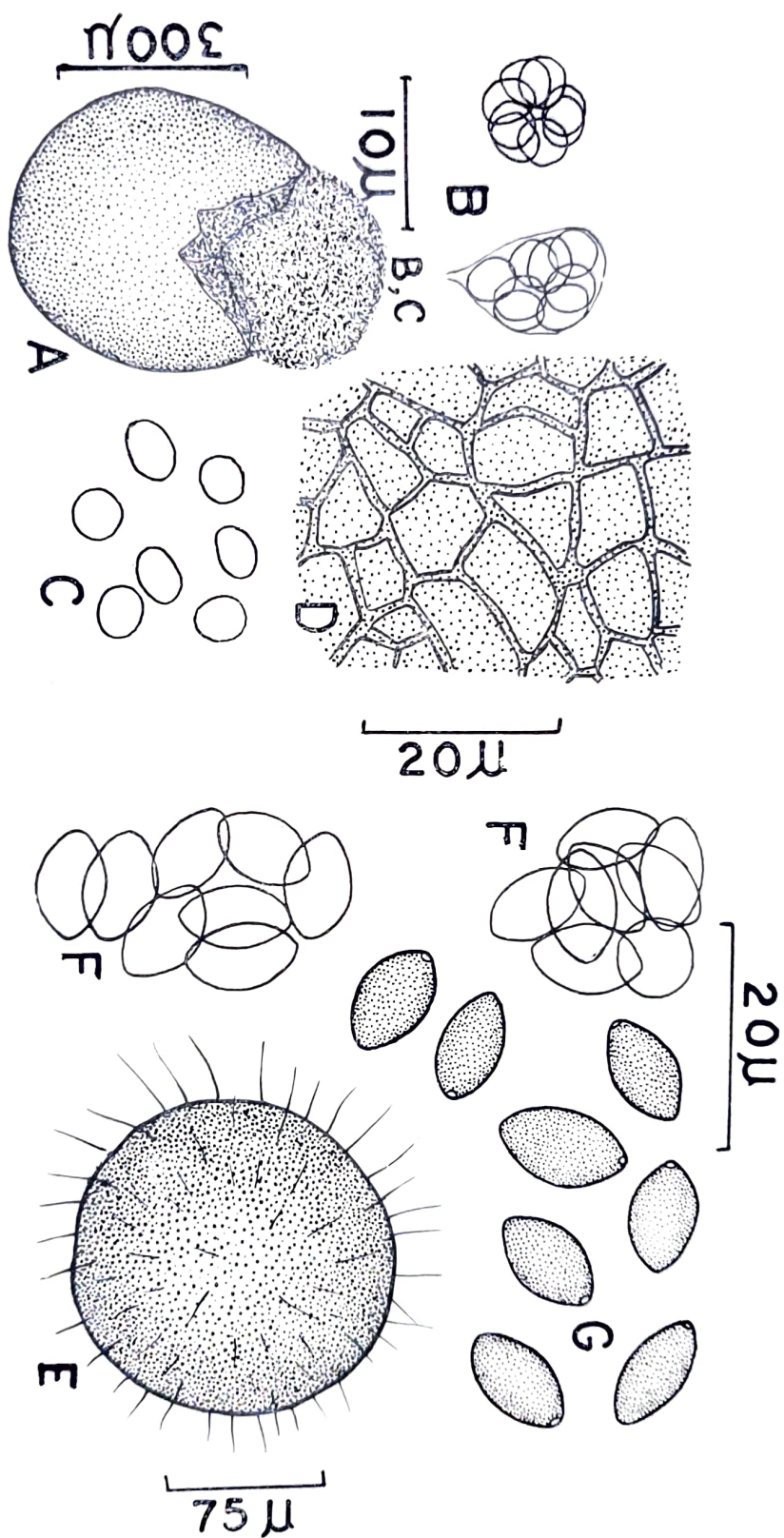


FIG. 5 A-G. A-D. *Pseudurotium punctatum* from R. U. B. L. No. 443. A. Cleistothecium. B. Asci, young and old. C. Ascospores. D. Peridium. E-G. *Thielavia terricola* v. *minor* from R. U. B. L. No. 262. E. Cleistothecium F. Old asci, ascus wall not observed being evanescent G. ascospores.



leves, absque germinationis poro,  $5.6-7.2 \times 4.0-5.0 \mu$ .

Typus evolutus in stercore caprino ad Udaipur in Rajasthania leg. BCL die 20 septembris 1961 (R.U.B.L. No. 295).

***Pseudeurotium jaipurens*** sp. nov. (Fig. 4 A-D).

This fungus appeared in moist chamber on goat dung collected from Jaipur. The cleistothecia superficial, scattered, globose, black, glabrous,  $150-225 \mu$ . The peridium thin, firm, carbonaceous, and brown. Paraphyses absent. The asci unitunicate, evanescent, globose to clavate or sometimes cylindrical,  $9.6-24.0 \times 8.0-12.8 \mu$ . The ascospores irregularly arranged in asci, continuous, brown, globose to oval, sometimes ellipsoid or irregular in shape, smooth, without a germ pore, and  $5.2-7.4 \times 5.2-6.4 \mu$ .

Since the shape and size of the asci and ascospores of this species do not agree with those of any other species of the genus so far known, it is described here as a new species.

***Pseudeurotium jaipurens*** sp. nov.—Cleistothecia superficialia, dispersa, globosa,  $150-225 \mu$  diam. peridium tenue, firmum, carbonaceum. Paraphyses nullae. Asci ectospori, unitunicati, evanescentes, globosi ad clavatos, interdum cylindranei,  $9.6-24.0 \times 8.0-12.8 \mu$ . Ascospores continuae, brunneae, globosis ovals, interdum ellipsoideae, vel irregulares, leves, absque germinationis poro,  $5.2-7.4 \times 5.2-6.4 \mu$ .

Typum evolutum e stercore caprino ad Jaipur in Rajasthania legit BCL die 10 julii 1963 et posuit in R. U. B. L. No. 353.

***Pseudeurotium punctatum*** Panasenko, 1964, *Mycologia* 56: 61-62. (Fig. 5 A-D).

The cleistothecia are scattered, superficial, globose,  $150-225 \mu$  in diameter,

brown, with mycelial appendages. The peridium thin, membranous, and brown. Paraphyses absent. The asci 8-spored, unitunicate, evanescent, globose to clavate, and  $8.8-12.8 \times 7.2-8.8 \mu$ . The ascospores irregularly arranged in the asci, continuous, subhyaline, globose to oval, smooth,  $4.0-4.8 \times 3.2-4.0 \mu$ , and without a germ pore.

The description of this fungus is based on a material which developed in moist chamber on goat dung collected by B. C. Lodha from Jaipur on 10th July, 1963 (R. U. B. L. No. 443).

This collection agrees well with the description given by Panasenko (1964).

This fungus is a new record from India.

***Thielavia terricola*** (Gilman & Abbot) Emmons v. *minor* (Rayss & Borut) Booth, 1961, *Mycol Pap.* 83: 7.

*Thielavia terricola* (f. *minor* Rayss & Borut, 1959) *Mycopath. Mycol. appl.* 10: 160. (Fig. 5, E-G).

The cleistothecia superficial, globose,  $120-180 \mu$  in diameter, brown to dark brown, and with few, small, brown, smooth, septate hair like structures all over. The peridium membranous, thin, and brown. The asci 8-spored, unitunicate, evanescent, globose to broadly clavate. Paraphyses absent. The ascospores irregularly arranged in the asci, continuous, ellipsoid,  $12.8-15.2 \times 8.0-8.8 \mu$ , smooth, olivaceous-gray, narrowly rounded at the ends, and with germ pore at one end.

The above description is based on material which developed in moist chamber on monkey dung collected by B. C. Lodha from Mt. Abu on 3rd October, 1961 (R. U. B. L. No. 262).

This fungus is a new record from Rajasthan, but on dung this is being reported for the first time from India.

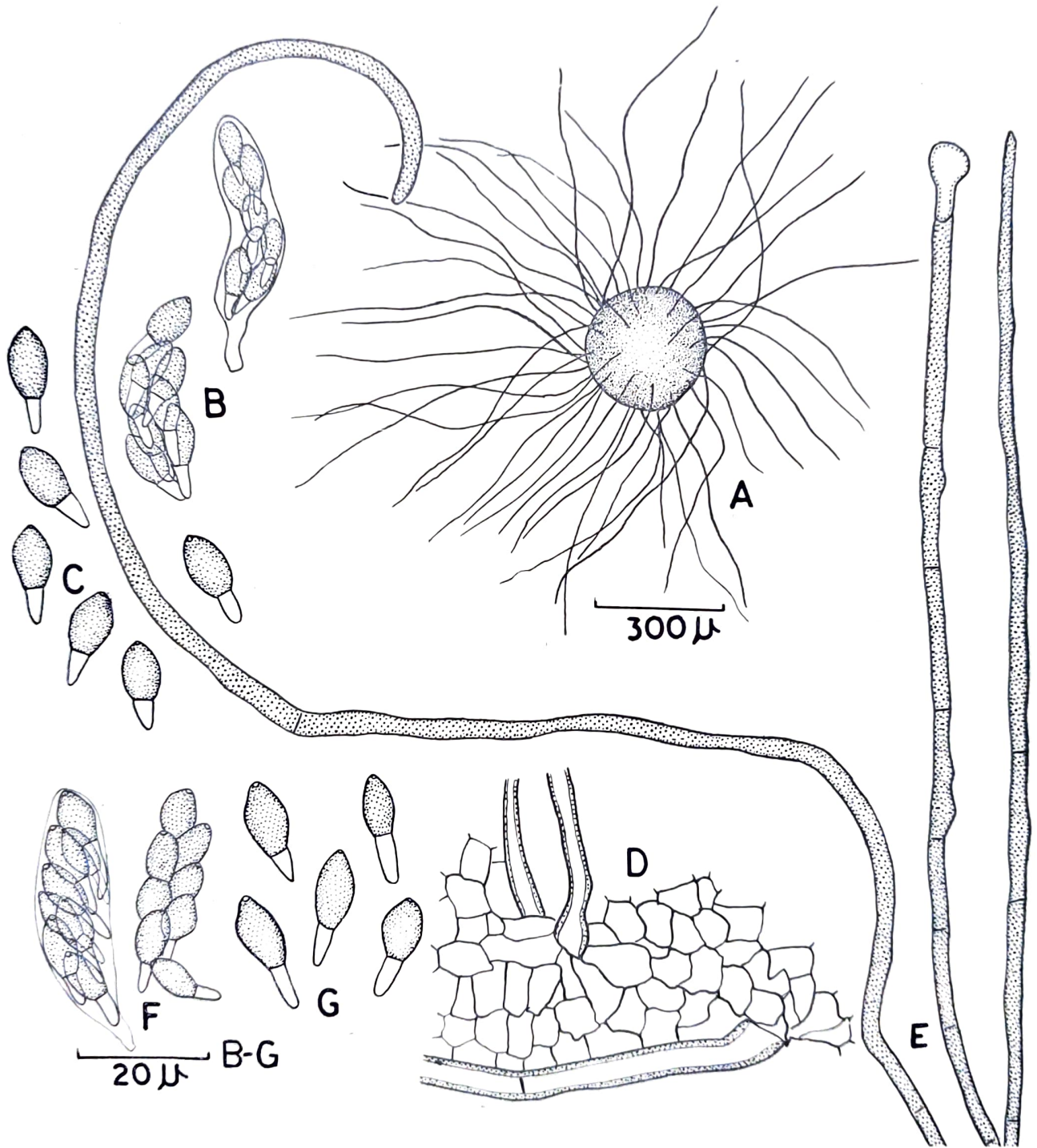


FIG. 6 A-G. *Tripterospora erostrata* from R. U. B. L. No. 441. A. Cleistothecia B. Asci, young and old. C. Ascospores. D. Peridium with bases of hairs. E. Hairs. F, G. From R. U. B. L. No. 390. F. Asci, young and old. G. Ascospores.



*Tsapterospora erostrata* (Griff.) Cain, 1956, *Can. J. Bot.* 34: 702. (Fig. 6).

*Pleurage erostrata* Griff., 1901 *Mem. Torrey bot. Cl.* II: 71-72.

The cleistothecia scattered, superficial, globose, (150)-230-350  $\mu$  in diameter, black, opaque, and profusely covered with long flexuous, septate and dark olivaceous-brown hairs. The hairs up to 1 mm long and 2.4-4.8  $\mu$  wide dark brown, thick-walled near the base, gradually becoming light-coloured and thin-walled towards the apex, and with narrowly rounded apex. The peridium membranous, dark brown, and composed of angular cells. The asci 8-spored, clavate, unitunicate, 46-61  $\times$  9-12  $\mu$ , rounded above, and narrow below forming a short stalk. The ascospores biserial, at first hyaline, clavate, and 1-celled becoming later 2-celled. The upper head cells are dark olivaceous brown, opaque, ovate, acutely rounded above with a minute germ pore at the tip, broadly rounded to truncate at the base, and 11.2-12.8  $\times$  7.2-8.8  $\mu$ . The basal tail-like cell, which remains hyaline is broadly cylindrical or conical, straight, 4.0-6.4  $\mu$  long, and 2.0-3.2  $\mu$  wide in the broadest region. The ascospores are without any gela-

tinous appendages or sheaths.

The above description is based on material which developed in moist chamber on elephant dung collected by B. C. Lodha at Jodhpur, Rajasthan in September, 1962 (R. U. B. L. No. 441). Also on goat dung collected by B. C. Lodha from the Rajasthan University area, Jaipur on 10th July, 1963 (R. U. B. L. No. 390). Both collections were very similar.

I have examined the type of *T. erostrata* (Griff.) Cain and a number of isolates of this species from Canada. The Indian isolates are similar to the Type and Canadian isolates in all characters except in the ascospore shape. The ascospores in the former are narrowly apiculate with a comparatively smaller germ pore, whereas in the latter the ascospores are broadly apiculate with a conspicuous germ pore. Since these differences are minor, the Indian isolates have been placed under *T. erostrata*.

This fungus is a new record from India. Originally it was described on horse, cow, rabbit, and sheep dung from U. S. A. by Griffiths (1901). Subsequently it was reported on rabbit and horse dung from Canada by Cain (1956).

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