

THE PEZIZALES OF INDIA—XIV

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ABSTRACT

Three new species of Pezizales from Himalayas are fully described here. These are *Aleuria dalhousiensis*, *Octospora gigantea* and *Plicaria himalayensis*.

INTRODUCTION

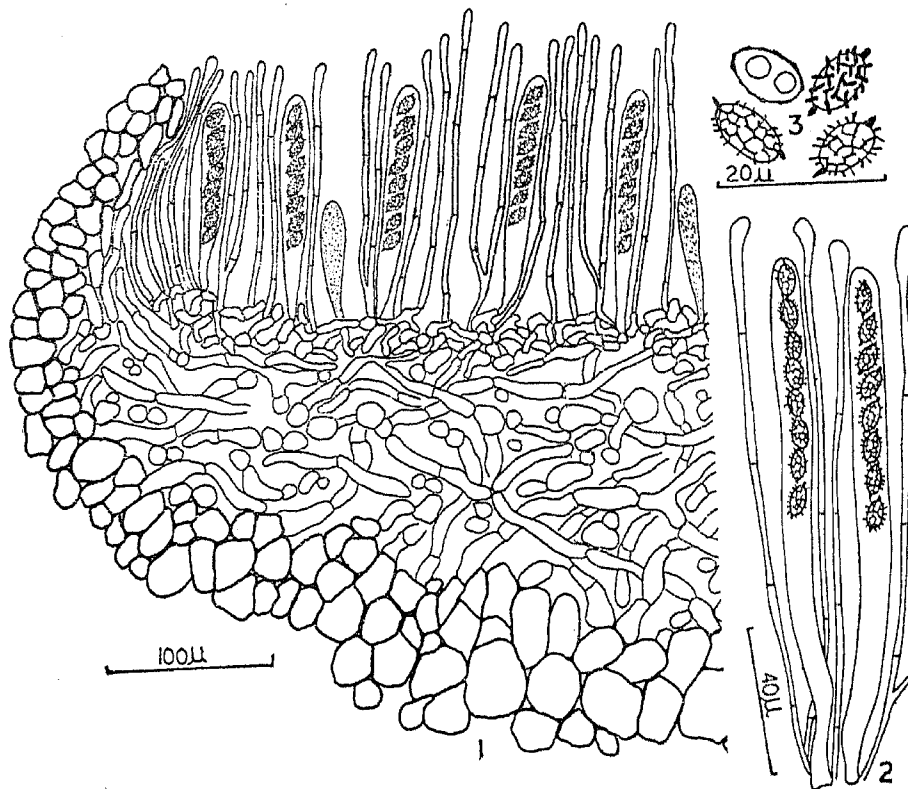
THIS paper records 3 new species of Pezizales collected from North-Western and Eastern Himalayas. These belong to the genera *Aleuria* Fuck., *Octospora* Hedw. ex S. F. Gray emend. Korf and *Plicaria* Fuck. emend. Boud. The numbers (89-91) of the species are the serial numbers of the pezizoid flora of India being described from this laboratory.

The fruit bodies have been described from fresh material supplemented with that preserved dry and in formalin-alcohol. The anatomical details are based on free hand and microtome sections. As mentioned under each species the collections have been deposited in the various herbaria [PUI—Herbarium of the Botany Department, Panjab University, Chandigarh; BPI—The National Fungus Collections, Beltsville, Maryland; L—Rijksherbarium, Leiden; BM—British Museum (Natural History), London; C—Institute of Thallophyta, Copenhagen].

89. *Aleuria dalhousiensis* Thind and Waraitch, sp. nov. (Figs. 1-3, 10)

Apothecia ad 11 mm diam., aurantiaca, sessilia vel subsessilia, non alte cupulata vel plana, interdum discoidea. Asci 122-144 × 7.5-8.5 μ, octospori, J —. *Ascosporae* 8.5-11 × 6-7.5 μ inclusis ornamentis, subhyalinae, ellipsoideae, biguttulatae, incomplete reticulatae, rarius complete, reticulationibus ad 2.5 μ diam. et 1.8 μ altis. *Paraphyses* ad 2 μ latae infra, ad 6 μ latae ad apicem. Excipuli externi textus angularis constans cellularum seriebus 2-4; medullaris vero intricatus, hyphis interdum tumescentibus in cellulas vesiculares.

Hab. in solo madido inter muscos in silva India (Banikhet, Dalhousie H.P.), July 23, 1966, n. 2090, Typus (PUI, BPI, C).



FIGS. 1-3. *Aleuria dalhousiensis*. Fig. 1. V.S. of apothecium showing ectal excipulum of textura angularis and medullary excipulum of textura intricata with vesicular cells. Fig. 2. Asci and paraphyses. Fig. 3. Ascospores ornamented with ridges forming incomplete reticulum.

Apothecia up to 11 mm in diameter, gregarious to crowded, sessile to subsessile, shallow cupulate to plane, or sometimes discoid, regular to irregular, soft, fleshy; external surface pallid to light orange to orange, lighter than the hymenium, smooth to slightly rough; margin entire to wavy, slightly inturned; hymenium light to deep orange, fading on drying, smooth, sometimes ridged and grooved. *Asci* 122-144 × 7.5-8.5 μ, 8-spored, cylindrical, apex obtuse, J—. *Ascospores* 8.5-11 × 6-7.5 μ including ornamentation, 6-9 × 5-6 μ without ornamentation, uniseriate, subhyaline, ellipsoid, biguttulate, guttules filling less than half of the spore cavity, at first smooth, at maturity ornamented with ridges which usually fuse to form incomplete reticulum, reticulum rarely complete with regular meshes which are up to 2.5 × 2.5 μ, ridges projecting up to 1.8 μ beyond the spore wall as blunt warts, usually one wart bigger (up to 2.5 μ long) at each end and simulates

apiculus. *Paraphyses* up to $2\ \mu$ wide below, clavate and up to $6\ \mu$ wide at the top, slender, thin-walled, septate, simple or branched below, straight, rarely slightly curved, orange due to the presence of granular contents which turn bluish with Melzer's reagent, projecting up to $18\ \mu$ beyond the ascus tips.

Anatomy.—Ectal excipulum light orange, up to $100\ \mu$ thick, textura angularis, composed of 2-4 layers of cells, cells up to $64 \times 58\ \mu$, smaller towards the margin, slightly thick-walled, arranged with their long axes at right angle to the surface; medullary excipulum faint orange, up to $320\ \mu$ thick, textura intricata, hyphae up to $12\ \mu$ wide, thin-walled, septate, branched and interwoven, often swollen at places into vesicular cells up to $20\ \mu$ in diameter; hypothecium light orange to orange, up to $30\ \mu$ thick, densely textura intricata, approaching textura subangularis, hyphae up to $6\ \mu$ wide.

Collected on moist soil amid mosses in angiospermic forest: India (Banikhet, Dalhousie, H.P.), July 23, 1966, n. 2090, Type (PUI, BPI, C); on moist soil amid mosses in angiospermic forest: India (Baloon, Dalhousie, H.P.), Aug. 18, 1966, n. 2133 (PUI, BPI).

It is somewhat close to *A. wisconsinensis* Rehm and *A. cestricea* (Ellis and Ev.) Seaver but differs from the former in having lighter coloured apothecia, and smaller asci and ascospores and from the latter in the ascospore ornamentation and apically broader paraphyses.

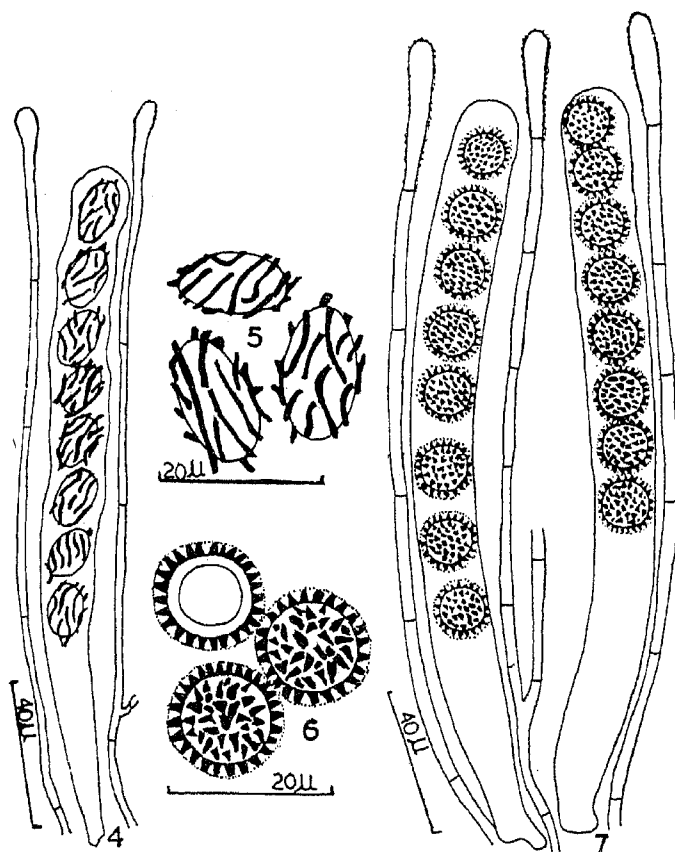
90. *Octospora gigantea* Thind and Waraitch, sp. nov. (Figs. 4, 5, 12, 13)

Apothecia ad $1.7\ \text{cm}$ diam., aggregata in masses congestas, aurantiaca, sessilia, non altae cupulata vel discoidea, extus levia vel pilis nonnullis hyalinis ornata. *Asci* $160\text{--}230 \times 13\text{--}16.5\ \mu$, J —. *Ascospores* $15\text{--}20 \times 10\text{--}13\ \mu$ verrucis inclusis, hyalinae vel subhyalinae, ellipsoidea, 1-2 guttulatae, ad maturitatem ornatae jugis crassis, brevibus longisque, praeter parietes ascosporae ut verrucis obtusis. *Paraphysis* ad $2.5\ \mu$ latae infra, $6.5\ \mu$ latae ad apicem. Excipuli externi textus angularis; medullaris vero intricatus versus margines, et angularis versus centrum.

Hab. in solo arenoso in silva arborum coniferarum: India (Lovers' Lane, Dalhousie, H.P.), Aug., 25, 1963, n. 2495, Typus (PUI, BM).

Apothecia up to $1.7\ \text{cm}$ in diameter, densely gregarious to crowded and forming congested masses, sessile, shallow cupulate to discoid, regular to irregular, soft, fleshy; external surface orange, concolorous or lighter than the hymenium, smooth or with scanty hyaline hairs; hairs more near margin,

club-shaped, up to $16\ \mu$ wide, thin-walled and septate, those on the external surface become flexuous and hypha-like; margin entire to wavy; hymenium orange to bright orange, smooth or becoming ridged and grooved. *Asci* $160\text{--}230 \times 13\text{--}16.5\ \mu$, 8 spored, cylindrical, apex obtuse, J—. *Ascospores* $15\text{--}20 \times 10\text{--}13\ \mu$ including the warts, $13\text{--}17.5 \times 8\text{--}10.5\ \mu$ without warts, uniseriate, hyaline to subhyaline, ellipsoid, 1–2 guttulate, guttules filling $\frac{1}{2}\text{--}\frac{3}{4}$ of the spore cavity, smooth at first, later sculptured with thick ridges, ridges short to long, almost uniform in breadth throughout, somewhat spiral and extending beyond the spore wall as blunt warts up to $3\ \mu$ long. *Paraphyses* up to $2.5\ \mu$ wide below and $6.5\ \mu$ at the top, slender, straight, sometimes very slightly bent, thin-walled, septate, simple or branched below, light orange to orange due to coloured contents which turn greenish-blue with Melzer's reagent, projecting up to $25\ \mu$ beyond the ascial tips.



FIGS. 4–7. Figs. 4, 5. *Octospora gigantea*. Fig. 4. An ascus and paraphyses. Fig. 5. Ascospores sculptured with thick ridges. Figs 6, 7. *Plicaria himalayensis*. Fig. 6. Ascospores ornamented with warts. Fig. 7. Asci and paraphyses.

Anatomy.—Ectal excipulum orange, up to $112\ \mu$ thick, textura angularis, cells up to $50 \times 37\ \mu$, decreasing in size towards margin, slightly thick-walled; medullary excipulum light orange, up to $630\ \mu$ thick, textura intricata towards margin and somewhat textura angularis towards centre, hyphae up to $13\ \mu$ wide, thin-walled, septate, branched and interwoven; hypothecium orange, up to $64\ \mu$ thick, densely textura intricata, hyphae up to $6\ \mu$ wide.

Collected on sandy soil on foot-path in coniferous forest: India (Lovers' Lane, Dalhousie, H.P.), Aug. 25, 1963, n. 2495, Type (PUI, BM); on sandy soil on foot path in coniferous forest: India (Lovers' Lane, Dalhousie, H.P.), Aug. 25, 1963, n. 2496 (PUI, BM); on moist and sandy soil on the foot-path in open place: India (Dunera, Dalhousie, H.P.), Aug. 8, 1966, n. 2112 (PUI, BPI).

It is marked by large-sized bright coloured apothecia, straight to slightly bent paraphyses and characteristic spore ornamentation. In spore ornamentation it is very similar to *O. pleurozii* Eckbl. (Eckblad, 1968) but differs from the latter in having much bigger apothecia, narrower asci, broader spores and a different substratum.

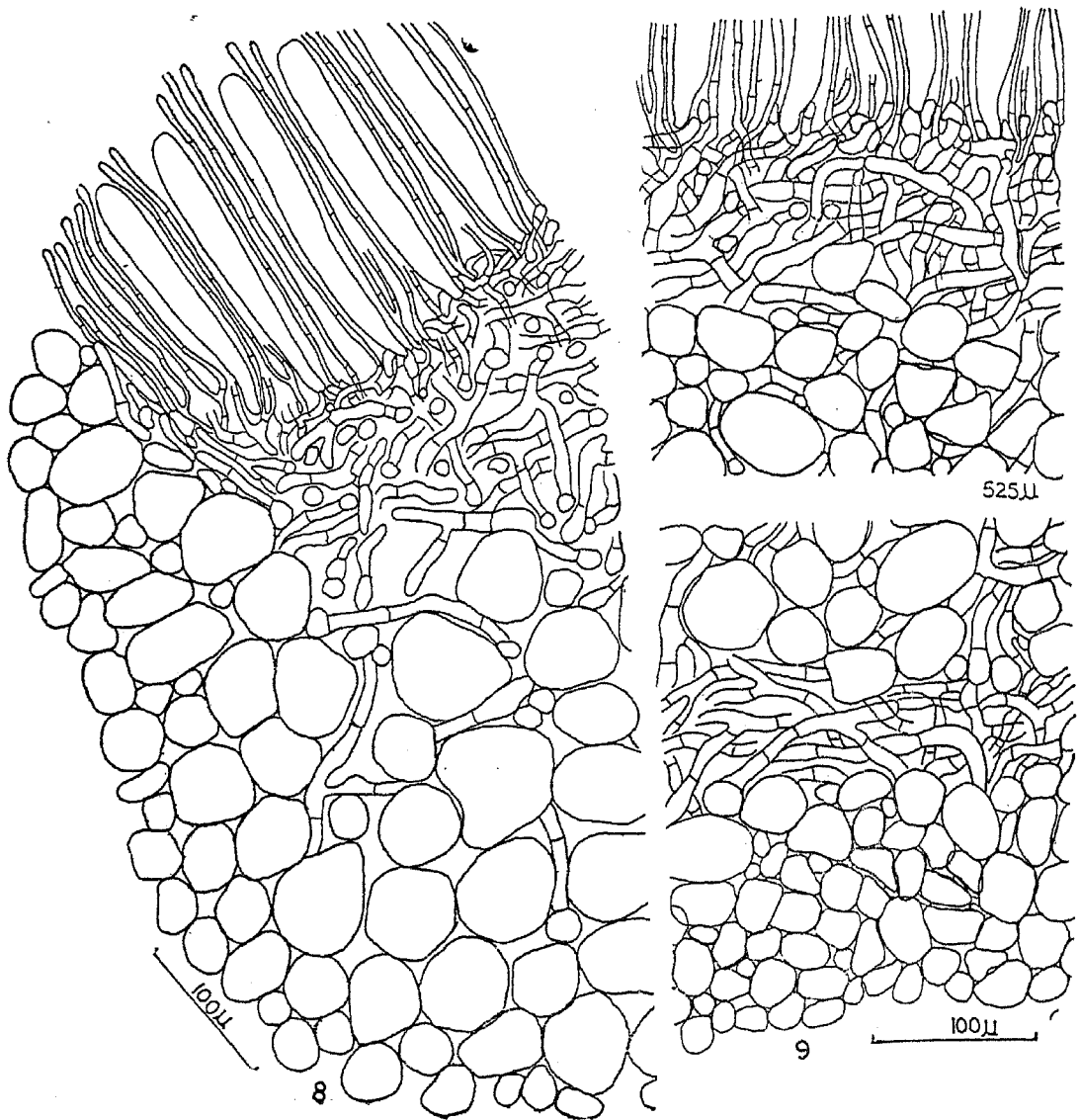
91. *Plicaria himalayensis* Thind and Waraitch, sp. nov. (Figs. 6–9, 11).

Apothecia ad 5 cm diam., agregata in massas congestas, brunnea vel fusco-brunnea, sessilia, fixa ad basin vel per totam superficiem externam, non alte cupulata, vel irregulariter repanda, extus levia, hymenio inaequall. *Asci* $175\text{--}255 \times 13\text{--}17.5\ \mu$, J+. *Ascosporae* $11\text{--}15$ (-16) μ diam. ornamentis inclusis, uniguttulatae, ad maturitatem eminenter et profuse verrucosa, verrucis ad $2.2 \times 2.2\ \mu$, fusco-brunnea. *Paraphyses* ad $4\ \mu$ iatae infra, gradatim dilatatae sursum ad $8.5\ \mu$, robustae, brunneae, apicibus agglutinatis materia brunnea. Excipuli externi textus globuloso vel textus subangularis; medullaris vero bizonatus, zonae externae textus intricatus, internae vero globoso vel subangularis, hyphis conjungentibus intermixus.

Hab. in loco carbonario in silva arborum coniferarum: India (Glen, Simla, H.P.), Sept. 14, 1961, n. 2431, Typus (PUI, L).

Apothecia up to 5 cm in diameter, densely gregarious to crowded and forming up to 10 cm long patches, sessile or rarely reduced below into a short stem-like base, mostly attached by almost whole of the external surface. shallow cupulate to irregularly repand, soft, fleshy; external surface brown to blackish-brown, concolorous or slightly lighter than the hymenium, smooth; margin entire to wavy; hymenium dark brown to black, slightly dotted or

roughened due to the agglutinated projecting out tips of paraphyses, convolute. *Asci* 175–255 \times 13–17.5 μ , 8-spored, cylindric-clavate, subhyaline to faint brown, J+. *Ascospores* 11–15 (–16) μ in diameter including ornamentation, 10.5–12 (–13) μ without ornamentation, biseriate at first, uniseriate at maturity, globose, uniguttulate, guttule filling $\frac{1}{2}$ – $\frac{3}{4}$ of the spore cavity, smooth at first, later prominently and profusely ornamented with warts, warts up to 2.2 \times 2.2 μ , hyaline when young, becoming dark brown at maturity. *Paraphyses* up to 4 μ wide below, gradually enlarged apically up to 8.5 μ , stout, straight, thin-walled, septate, simple or branched, brown,



FIGS. 8–9. *Plicaria himalayensis*. Fig. 8. V. S. of apothecium (marginal portion) showing 2-layered excipulum. Fig. 9. V.S. of apothecium (through centre) showing 3-zoned excipulum,

tips agglutinated with brownish matrix, projecting up to $24\ \mu$ beyond the ascus tips.

Anatomy.—Ectal excipulum brown, up to $290\ \mu$ thick, textura globulosa to textura sub-angularis, cells brown, up to $80 \times 70\ \mu$, bigger towards margin and smaller towards centre, outer layers small-celled throughout, thin-walled, a few intermixed connecting hyphae up to $10\ \mu$ wide, thin-walled, septate, branched; medullary excipulum of 2 zones: (a) outer zone of textura intricata, narrow, up to $60\ \mu$ thick, not reaching the margin, hyphae up to $12\ \mu$ wide, thin-walled, septate, branched and interwoven; (b) inner zone of textura globulosa to textura subangularis, up to $725\ \mu$ thick, cells up to $70 \times 60\ \mu$, thin-walled, intermixed connecting hyphae similar to those of outer zone; hypothecium up to $115\ \mu$ thick, densely textura intricata, hyphae up to $12\ \mu$ wide and similar to those of medullary region.

Collected on recent charcoal preparation bed in coniferous forest: India (Glen, Simla, H.P.), Sept. 14, 1961, n. 2431, Type (PUI, L); on burnt wood and burnt soil: India (Tenzing Norkey Road, Darjeeling, West Bengal), July 27, 1964, n. 2533 (PUI); on burnt stump in *Abies* forest: India (Narkanda, Mahasu, H.P.), Aug. 6, 1965, n. 2020 (PUI, BPI); on burnt stump and burnt soil in coniferous forest: India (Soja, Kulu, H.P.), Sept. 19, 1965, n. 2053 (PUI, BPI); on burnt stump in coniferous forest: India (Gojra, Kulu, H.P.), Oct. 10, 1965, n. 2068 (PUI, BPI).

This species appears to be widely distributed in the Himalayas and is characterised by large-sized, shallow cupulate to repand, dark brown to black apothecia with perfectly smooth external surface, and somewhat apically agglutinated paraphyses.

It resembles *P. carbonaria* (Fuck.) Fuck. and *P. trachycarpa* (Curr.) Boud. in the ascospore characters but differs in having bigger apothecia with perfectly smooth external surface. Moreover, its apothecia are not deeply cupulate and are mostly attached to the substratum by whole of the external surface. *P. pseudoplanchonis* Batra differs from *P. himalayensis* in the colour and size of the apothecia, breadth of paraphyses and type of substratum.

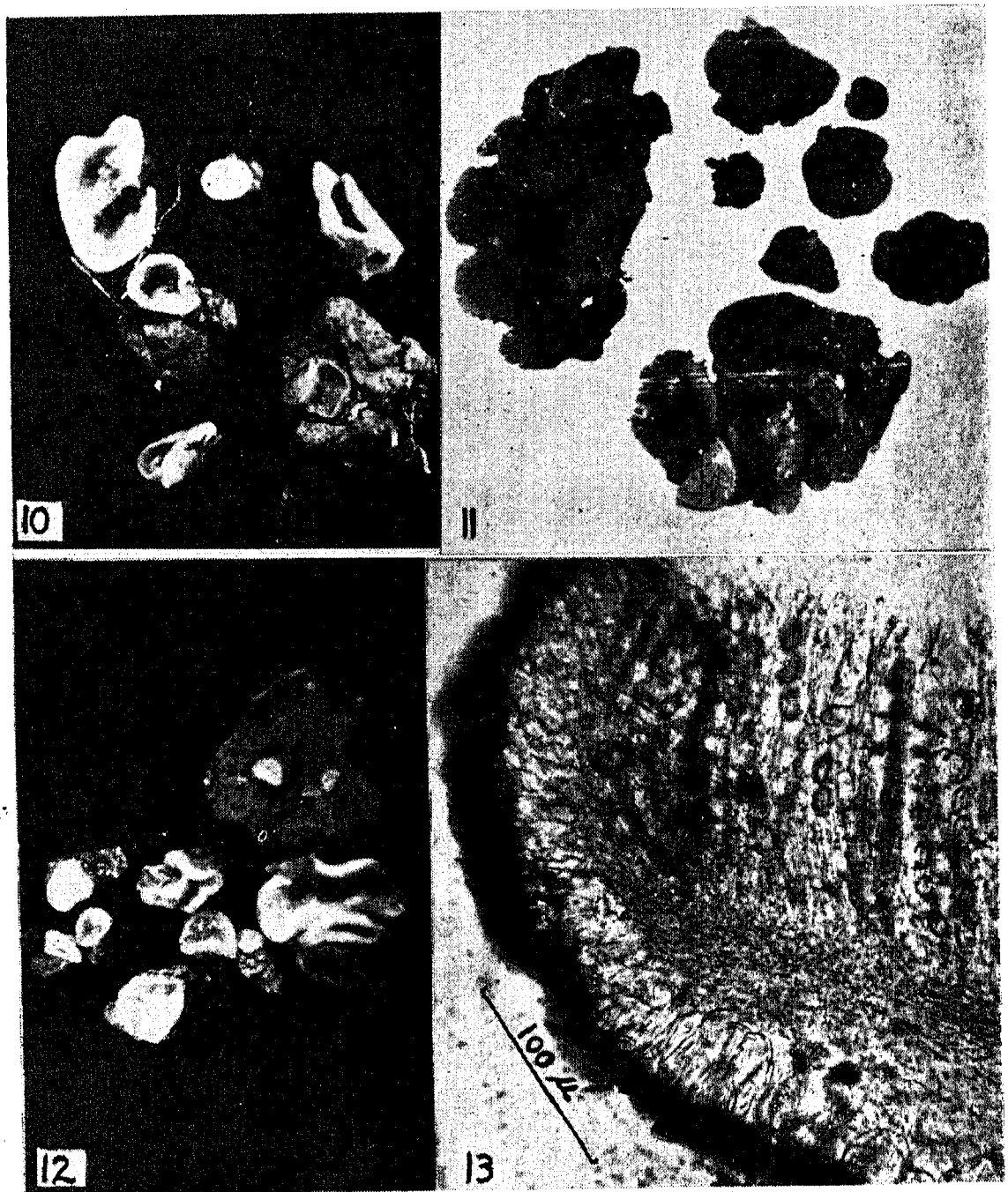
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REFERENCE

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FIGS. 10-13. Fig. 10. *Aleuria dalhousiensis*. Fig. 11. *Plicaria himalayensis*. Fig. 12. *Octospora gigantea*. Fig. 13. *Octospora gigantea*. V.S. of apothecium showing 2 layered excipulum.

