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TWO NEW RECORDS OF THE GENUS *BOVISTA* PERS. : PERS. (GASTEROMYCETES) FROM INDIA

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The genus *Bovista* Pers.:Pers. belongs to Lycoperdaceae and is characterized by globose to subglobose basidiomata, absence of subgleba and capillitium varying from *Lycoperdon* via intermediate to *Bovista* type. Though the North-western Himalayan forests encompass a great variety of ecological habitats and climatic conditions suitable for the growth of rich macrofungal flora but only four species of this genus viz. *B. plumbea* Pers., *B. bovistoides* (Cke. & Mass.) Ahmad, *B. fulva* Mass. and *B. limosa* Rost. are known to occur in this region (Ahmad 1942, Thind & Thind 1982). During the macrofungal investigation in Western Himalaya, the authors came across some interesting specimens of this genus which after detailed study appeared as unrecorded from India.

MATERIALS AND METHODS

The present communication is based on the specimens collected during the extensive fungal forays undertaken by the authors to different localities of Western Himalaya. The shape, size and colour of fresh basidiomata were recorded in the field. Anatomical features were studied with the help of 5% KOH, lactophenol – cotton blue and lactic acid. Microscopic drawings of basidiospores (1500×), capillitial hyphae (500×), peridial structures (500×) were prepared with the help of camera lucida. Colour terminology follows Kelly and Judd (1955). The specimens have been deposited in the herbarium of Botanical Survey of India, Dehradun (BSD).

TAXONOMY

Bovista oblongispora (Lloyd) Bottomley Bothalia 4 :580, 1948; *Bovistella oblongispora* Lloyd in Mycol. Notes 45 : 632, 1917. (Fig. 1: a-e).

Basidiomata depressed globose to subglobose, 2.0-3.5 cm in diameter, growing free from substratum. Rhizomorphs poorly developed. Pseudostipe absent. Exoperidium whitish first, gradually dark brown at maturity, verrucose, verrucae start falling from the apical part of basidiomata. Endoperidium light yellowish to grey brown, papery, smooth, shining, wrinkled, opens by a torn apical aperture. Gleba whitish, compact first, gradually dark brown, pulverulent at maturity. Pseudocolumella absent. Subgleba absent.

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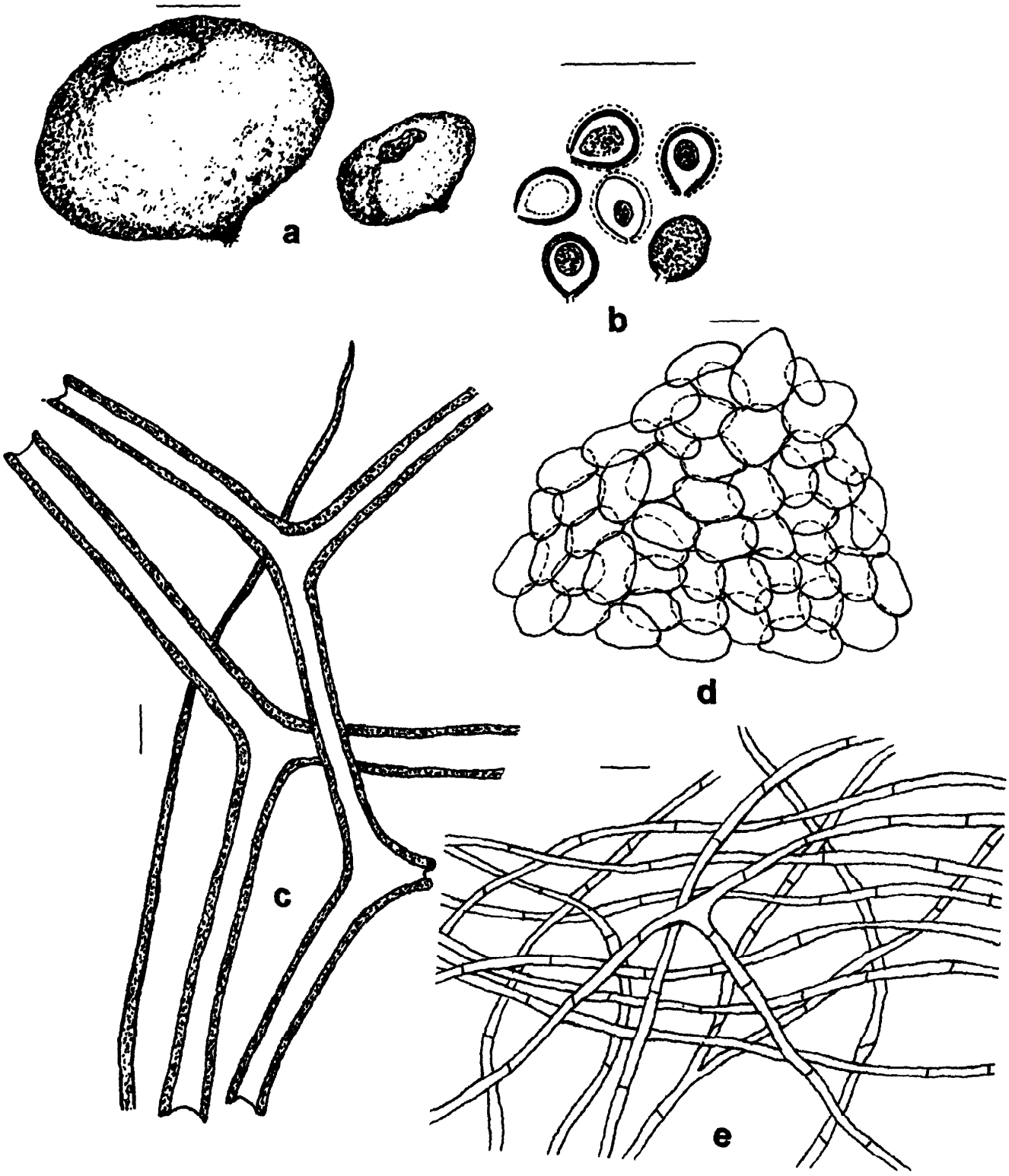


Fig. 1. *Bovista oblongispora* (Lloyd) Bottomley; **a.** Basidiomata; **b.** Basidiospores; **c.** Capillitium; **d.** Exoperidial cells; **e.** Endoperidial hyphae. (Bars: **a** = 10 mm; **b-e** = 10 μm).

Basidiospores subglobose to oval, 4.9-5.8 × 3.7-3.9 µm, smooth, cyanophilic, guttulate, apedicellate, some with a stump of pedicel. Capillitium of intermediate type, greyish brown, aseptate, much branched, up to 7(-9) µm wide at centre, gradually tapering towards apices, tip acuminate, thick-walled, wall 1-1.5 µm thick, unpitted. Paracapillitium absent. Exoperidium up to 75 µm thick, pseudoparenchymatous, cells oval to cylindrical, 10-20 × 4-10 µm, hyaline, thin-walled. Endoperidium up to 50 µm thick, hyphal, hyphae hyaline to light blue, up to 4 µm wide, septate, occasionally branched, thin-walled.

Collections examined : Himachal Pradesh, Chamba, Kalatope forest (2121 m), Sept. 30, 2004, coll. *J.R. Sharma & K. Das*, 9003 (BSD); *ibid*, 9010 (BSD).

Ecology : This species grows scattered to gregariously on the moist soil, enriched with the leaf litter of *Cedrus* and *Abies* in the temperate Himalayan coniferous forests.

Remarks : Bovista oblongispora is characterized by depressed globose to subglobose basidiomata having apical torn mouth, smooth and oval spores and unpitted, intermediate capillitial hyphae. It is very close to *Lycoperdon oblongisporum* Berk. & Curt. in having similar spores but the latter has smaller subgleba and pitted capillitial hyphae (Coker & Couch 1928, Dennis 1953).

This species was first described by Lloyd as *Bovistella oblongispora* on the basis of collections made by A.V. Duthie from South Africa. Due to the absence of rooting base, Bottomley (1948) transferred this species to the genus *Bovista* during her studies on the South African Gasteromycetes. Known hitherto only from South Africa, *B. oblongispora* is recorded for the first time outside its type locality. Kreisel (Personal communication) after examining the Himalayan specimens has remarked 'This Himalayan collection fits very well the type except having basidiospores of short pedicel of up to 1 µm only which may be due to the ecological variations'.

Bovista cunninghamii Kreisel in Nova Hedwigia 25 : 225, 1967. (Fig. 2: a-e).

Basidiomata globose to subglobose, 10-19 mm in diameter, growing attached to soil. Rhizomorph consisting of a whitish, thick chord branching terminally. Pseudostipe absent. Exoperidium whitish first, greyish brown at maturity, holding soil particles in lower part, verrucose, verrucae present all over basidiomata, falling away in patches. Endoperidium white when young, gradually light greyish brown, smooth, papery, opens by an apical aperture. Gleba whitish and compact when young, turns yellowish brown to dark olive brown at maturity, persistent. Subgleba absent.

Basidiospores globose, 3.5-4.0 µm in diameter, smooth to punctate, acyanophilic, guttulate with a short stump of pedicel. Capillitium intermediate type, greyish brown, occasionally septate, much branched, up to 8 µm wide at centre, gradually tapering towards apices, tip blunt, thick-walled, wall 1.0-1.5 µm thick, pitted, pits very minute. Paracapillitium absent. Exoperidium up to 125 µm thick, pseudoparenchymatous, cells ellipsoid-cylindrical, 8-16 × 3-5 µm, hyaline, thin-walled. Endoperidium up to 100 µm thick, hyphal, hyphae narrow, up to 2 µm wide, thin-walled, occasionally septate.

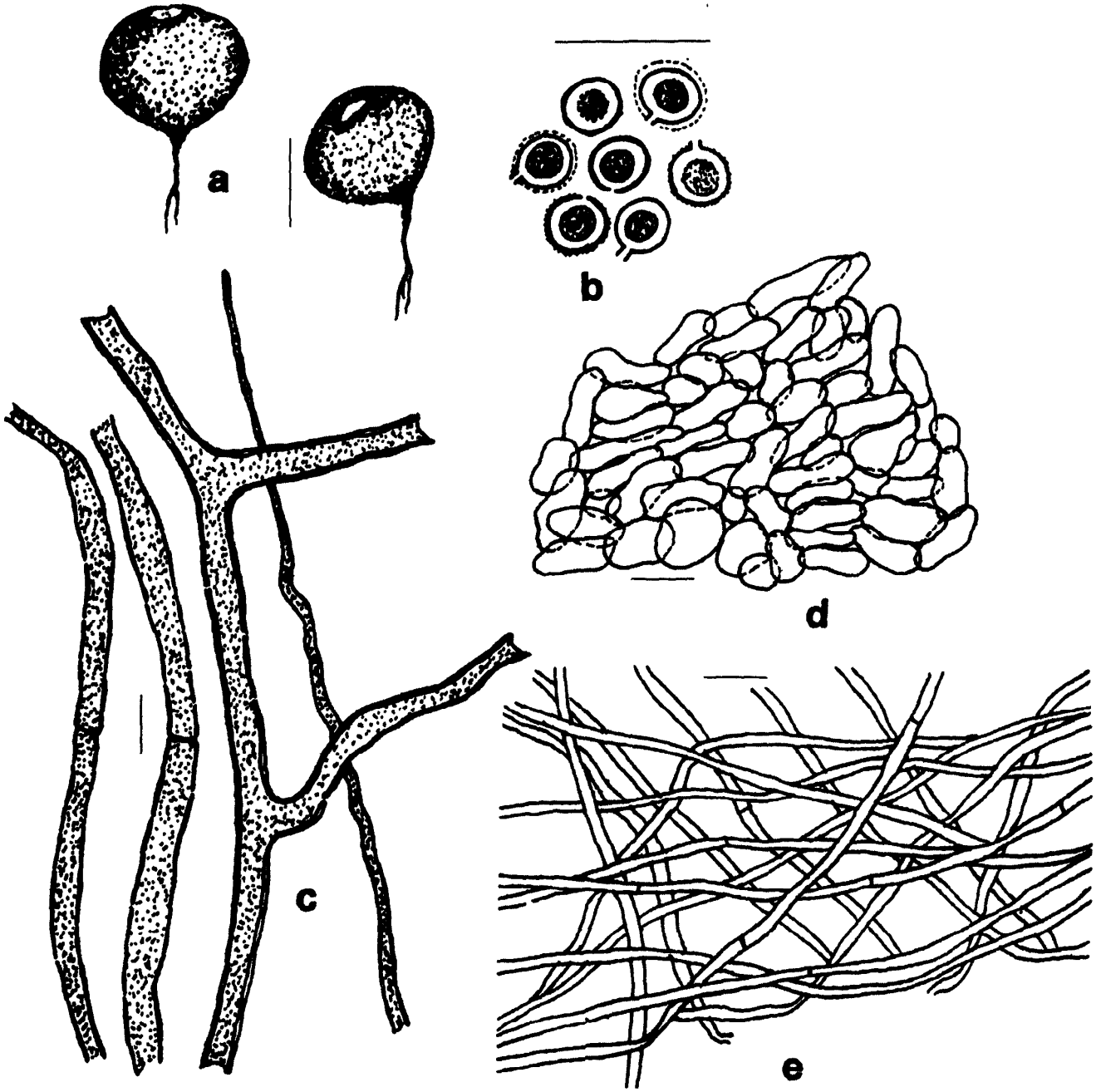


Fig. 2. *Bovista cunninghamii* Kreisel : **a.** Basidiomata; **b.** Basidiospores; **c.** Capillitium; **d.** Exoperidial cells; **e.** Endoperidial hyphae. (Bars: **a**= 10 mm; **b-e**= 10 μm).

Collections examined : Uttaranchal, Nainital, Sargakhet forest (2030 m), Aug. 21, 2004, coll. *Dipika Bisht*, DB 501 (BSD); *ibid.* Sheetla forest (1669 m), Aug. 23, 2004, coll. *Dipika Bisht*, DB 521 (BSD).

Ecology : Bovista cunninghamii grows gregariously on soil in shady slopes of rocks along the trekking routes in temperate Himalayan mixed forests.

Remarks : Earlier this species was known only from its type locality, Australia (Kreisel 1967), continental Spain and Baleares (Calonge & Zamora 2000) and Mauritius (Kreisel & Hausknecht 2002). The globose to subglobose basidiomata, verrucose exoperidium comprising ellipsoid to cylindrical cells, minutely pitted capillitial hyphae of intermediate type and absence of subgleba are the main identifying features of this species. Morphologically, it is very similar to *Bovista trachyspora* (Lloyd) Kreisel (= *Lycoperdon trachyspora* (Lloyd) Ahmad) and sometimes both may grow in close association. The latter however, differs in having pedicellate spores and unpitted capillitial hyphae (Ahmad 1942, Thind & Thind 1982).

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