RESULTS AND DISCUSSION

Key to the genera of the family Geoglossaceae studied.

1.	Ascospores turning brown at maturity ...	2
1.	Ascospores remained hyaline at maturity ...	3
2.	No setae in the hymenium ...	Geoglossum
2.	Brown setae present in the hymenium ...	Trichoglossum
3.	Ascospores one-celled ...	Neolecta
3.	Ascospores multicelled ...	4
4.	Ascospores producing conidia in the asci ...	Spathularia
4.	Ascospores not producing conidia in the asci ...	Thuemenidium

Statistical summary of the members of the family Geoglossaceae studied.

Order	Family	Genera	New generic record to India	New species	Sp. new to India	New varieties	Varieties New to India	Remark
Helotiales	Geoglossaceae	1 *Geoglossum* Pers. ex Fr. 2 *Trichoglossum* Boud. 3 *Thuemenidium* Kuntze 4 *Spathularia* Fries 5 *Neolecta* Speqz.	2 1 *Neolecta* 2 *Thuemenidium*	1	9	9	6	
	Total :	5	2	1	9	9	6 = 25 taxa	

Genus - Geoglossum Persoon ex Fries

Neues Mag.Bot. I : 116, 1794.

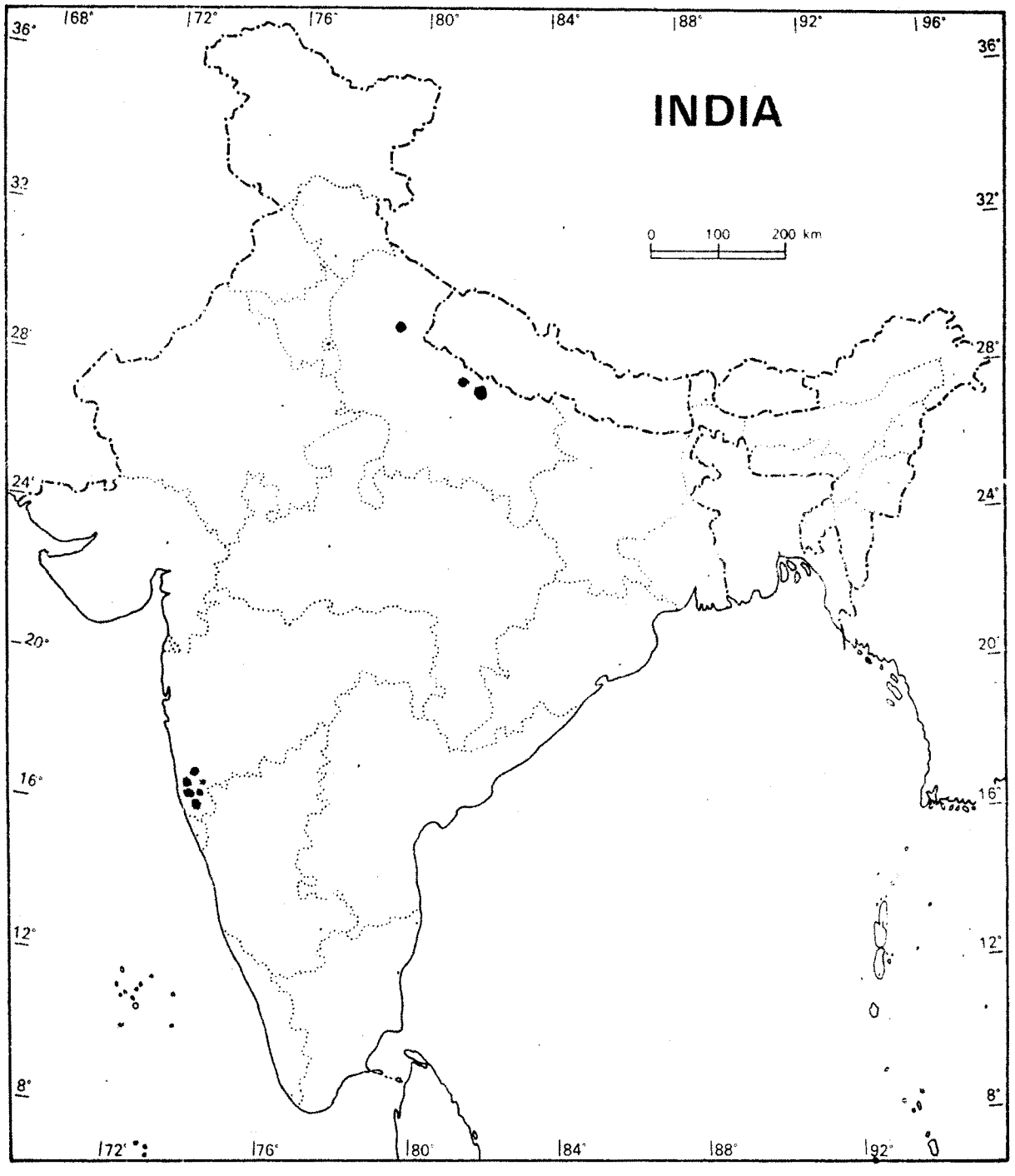
The genus Geoglossum was established by Persoon in 1794 with a type species G.glabrum Pers.ex Fries. It belongs to the family Geoglossaceae of the order Helotiales. It corresponds morphologically to the Morchellaceae and Helvellaceae and were formerly united with them until the fundamental distinction between operculate and inoperculate asci became appreciated. This is the largest genus in the family and is distinguished on the basis of the absence of setae in the hymenium. Important characters are the number of septa in the ascospores, the rapidity with which these become brown and the nature of the paraphyses, especially the shape of the apical cells and whether these are agglutinated or not. Fruit bodies solitary or gregarious to sub-cespitose, erect, consisting of a fertile portion born by a stipe, fleshy to some what waxy-fleshy, with or without black setae, dry to viscid. Clavula more or less gradually passing into the stipe, terete to compressed, cylindrical, clavate, ligulate, spathulate, lanceolate, more rarely capitate or flabellate, glabrus to felted, black, black-brown, (when fresh also) purplish-brown, olivaceous, green, yellow, and orange. Stipe usually well developed, terete, glabrous, and pubscent, squamulose, setose, more or less concolourous with the clavula. Asci cylindrical to cylindrical-clavate, inoperculate, (2-) 4-8 spored. Spores 1-2 seriate or fasciculate in

the ascus, acicular or cylindrical to cylindrical-clavate or ellipsoid to filliform, straight or curved, 1-16 celled, rarely with more cells, colourless to brown. Paraphyses discrete or agglutinate, septate, more or less branched, straight to curved, colourless or brownish above. All the species are terrestrial saprophytic growing on vegetable debris, decaying wood or on humus-rich soil under the shade of forest trees. An excellent work has been done on this family by different workers as Durand (1908, 1921), Lloyd (1916), Le Roy and Henry (1952), Seaver (1951), Mains (1954, 1956) from North America, Nannfeldt (1942) from Norway, Maas Geesteranus (1965) from Leiden. Studies in the family Geoglossaceae has been remained practically neglected in India so far. Thind et al. (1963, 1965) studied extensively the family from India. Batra and Batra (1963) have also studied Geoglossaceae from India. About 56 species of the genus have been recorded from the world, out of which 8 species are reported from India. The genus Geoglossum is reported recently from Maharashtra State (Patil and Patil, 1980-81).

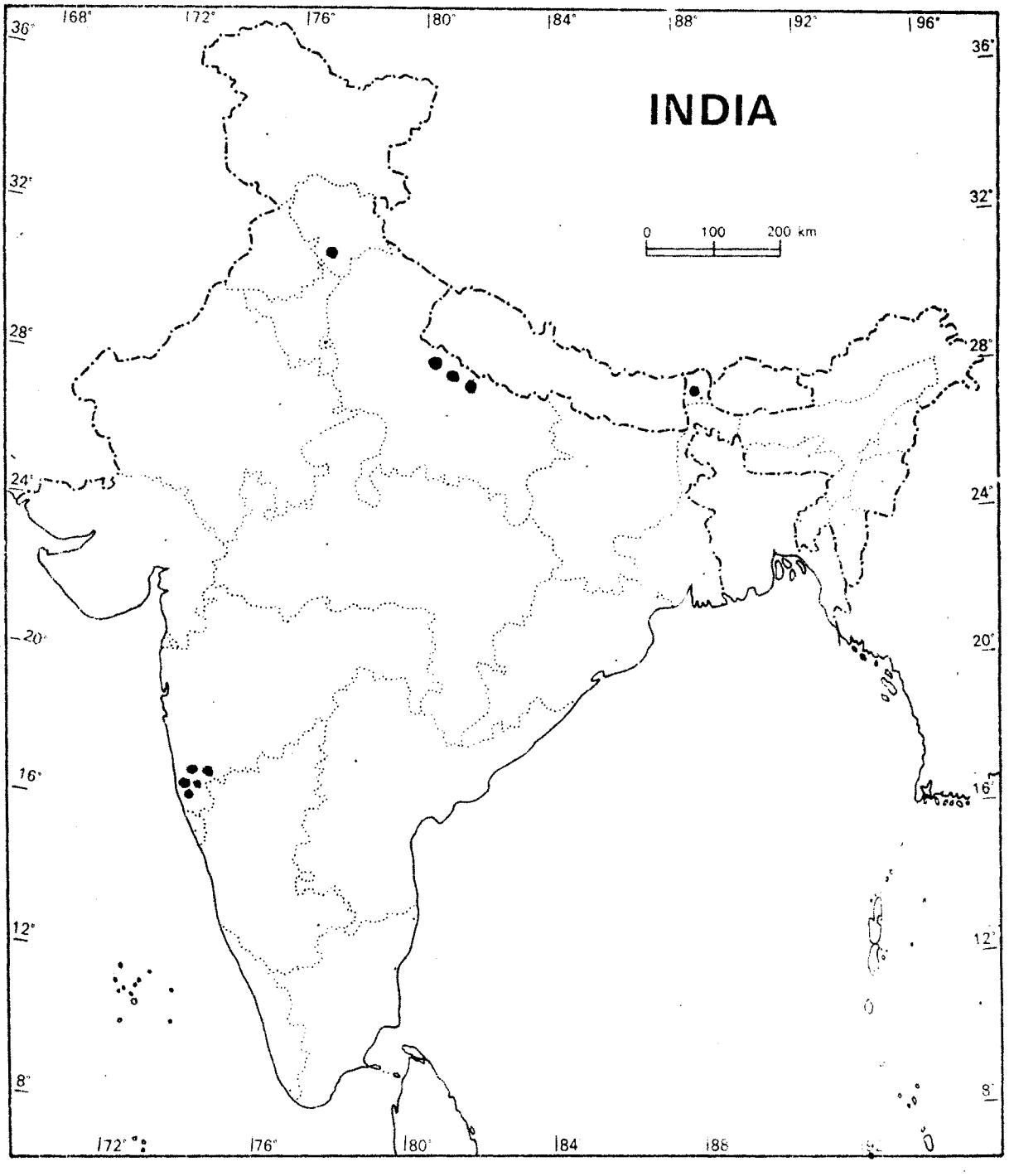
Key to the species of Geoglossum studied :

1	Matured ascospores brown	.. 2
1	Matured ascospores both hyaline and brown	.. G.fallax
2	Ascospores 15-septate (rarely more or less septate)	... 3
2	Ascospores 7-septate (rarely more or less septate)	.. 5

3	Paraphyses forming gelatinous layer down to the stipe	.. *G.difforme*
3	Paraphyses not forming gelatinous layer down to the stipe	.. 4
4	Ascospores 105-152 µm long	.. *G.pumilum*
4	Ascospores 152-175 µm long	.. *G.pygmaeum*
5	Paraphyses produced thick gelatinous matter to form an epithecium	.. 6
5	Paraphyses not producing thick gelatinous matter to form an epithecium	.. 7
6	Amorphus matter greenish-yellow, ascospores 7-septate	.. *G.nigritum*
6	Amorphus matter brownish-black; ascospores 0-7 septate	.. *G.glutinosum*
7	Stipe squamulose	.. *G.simile*
7	Stipe not squamulose	.. 8
8	Upper cells of paraphyses unequal sided	.. *G.japonicum*
8	Upper cells of paraphyses not unequal s..ded	.. 9
9	Paraphyses remotely septate	.. *G.umbritile*
9	Paraphyses regularly septate	.. 10
10	Ascospores less than 100 µm long	.. 11
10	Ascospores more than 100 µm long	.. *G.cookeianum*
11	Ascospores 35-50 (-55) µm long; mostly 3-4 septate	.. *G.cohaerens*
11	Ascospores 55-78 (-90) µm long; mostly 7-septate	.. *G.glabrum*



- Geoglossum cohaerenes Durand.
- G. glabrum Pers. ex. Fries.
- G. difforme Fries.
- G. glutinosum Pers. ex. Fries.
- G. pygmaeum Gerard ex. Durand.
- G. japonicum Imai.



- Geoglossum nigritum (Fr.) Cooke.
- G. umbratile Sacc.
- G. pumilum Wint.
- G. simile Peck.
- G. cookeianum Nannfeldt
- G. fallax Durand.

Geoglossum cohaerens Durand

Ann.Myc. 6 : 430, 1908.

Text Plate No.1, Fig.No.1-3, Plate No.2, Fig.No.1,7.

Ascocarps blackish-brown, clavate, 1.5-4.5 cm long; ascogenous portion about 1/3 of the length, 1-2 cm; fertile part clavate to narrowly ellipsoid, folded, ridged, morchalloid, slimy; sterile part 2-3 cm long; stipe terete, squamulose; asci clavate, 8-spored, inoperculate, narrow below into stem like base, apex obtuse, 133-171 (-200)x 12-17 µm; ascospores sub-fusoid to sub-cylindric, tapering to both the ends but more at lower end, light brown, thin-walled, 75-103 x 4-5 µm, 0-7 septate, mostly 1,3,4 and 7-septate; paraphyses straight or slightly curved, cylindric, longer than asci, thick-walled, brown, terminally enlarge, 5-7 µm broad, septate above, agglutinated with dark amorphus matter to form an epithecium.

Hab.: On damp humicolous soil under the forest shade, Panhala (Distt.-Kolhapur), Sept.7, 1984; Sept.30, 1988, Amba (Distt.-Kolhapur), Sept.15, 1988, R.S.Sawant, W.I.F.No.1a, 1b.

Variation in the septation of discharged ascospores of Geoglossum cohaerens Durand expressed as percentage.

Table 1 : Based on 300 ascospores observed and 22 matured ascocarps studied.

Collections	No.of septa in %							
	0	1	2	3	4	5	6	7
1 Panhala (Dist.-Kolhapur) 7.9.84	0%	7%	1%	47%	31%	0%	1%	13%
2 Amba (Distt.-Kolhapur) 15.9.88	0%	0%	0%	1%	0%	0%	4%	95%
3 Panhala 30.9.88	6%	38%	2%	36%	0%	0%	2%	18%

Durand (1908) has recorded this species from New York. Present collections collected from three different localities showed the uniform morphological characters viz. the presence of gelatinous amorphus matter and ascospores less than seven septate. On the basis of these two features the materials closely matched with G.cohaerens Durand and thus, referred to it. But the morphology of the paraphyses show somewhat different characters and showed the afinity with G.glabrum Pers.ex Fries.

The percentage of ascospore septation (Table No.1) is quite interesting. The first material from Panhala showing the septa from 1 to 7 except 5-septate spores. 3 and 4-septate spores show maximum percentage i.e. 47% and 31%. The third material from the same locality i.e. Panhala show quite

variation in the percentage of ascospore septation. Here one septate and three septate ascospore show maximum percentage i.e. 38% and 36% respectively. Non-septate ascospores also occured quite frequently (6%). The second material from Amba is somewhat uniform as far as septation is concerned where in seven septate ascospores are dominant (95%) while 3 and 6-septate ascospores are very less i.e. 1% and 4%. The more interesting feature is that all these collections were collected in the same month i.e. September and localities are situated also in the ranges of the Western Ghats. Therefore, such variation in the ascospore septation in these collections may be due to cytological or genetical disturbances rather than ecological one.

Geoglossum cookeianum Nannfeldt var. longispora var.nova

Text Plate No.1, Fig.No.4-6.

Ascomate clavate, atro 1-2 cm altro, clavata obovata, capitellata, nigricans, parces et irregulariter, compresso glaberrine, usque 13 mm longo, utridetur, viscoso, stipite sub-cylindraceo, saepa parum compresso et sulcato usque 3 mm longo, fasciculis pilorum; ascis cylindraceo-clavatis, sessilibus, 8-sporis, inopercuti, porus iodatus, apice obtusatis, 149-198 (-200) x 20-21 µm; ascosporidiis paraplellae, brunneis, clavati-cylindraceis, 7-septatis, 95-128 (-132) x 5-6 µm; paraphysibus filiformibus, surasum in clavulam crassum, septatis.

Hab. : Solum udum umbra silva, Radhanagari (Distt.-Kolhapur), Aug.15, 1984, D.N.Ghadge, W.I.F.No.2.

Ascocarps isolated or in small groups, clavula 1-3 mm wide, dull, blackish-brown, stipe 13-15 x 1 mm, somewhat flattened, smooth, somewhat shining, black; asci 8-spored, clavate-cylindrical, tapering below, inoperculate, pore blued with iodine solution, apices obtuse, 149-198(-200) x 20-21 µm; ascospores clavate to sub-cylindric, straight or somewhat curved, dark-brown, 95-128(-132) x 5-6 µm, 3-13 septate; paraphyses somewhat adhering in clusters in the upper part, not agglutinated by brown amorphus matter, 2-3 µm wide and brownish to brownish-black above, closely septate in the upper parts, straight to somewhat curved.

Ascogenous region textura porrecta, hyphae upto 4-6 µm wide, brown, hypothecium dark brown, densely textured intricata, stipe not differentiate into cortex and medulla, surface cells grow into small, septate, barrel shaped structures (hyphal hairs).

Hab.: On damp humicolous soil, Radhanagari (Distt.-Kolhapur), Aug.15, 1984, D.N.Ghadge, W.I.F.No.2.

Variation in the septation of ascospores of G.cookeianum Nannfeldt var. longispora var.nov.

Table No.2 : (Based on 100 ascospores observed and three matured ascocarps studied.

Collections	No.of Septa in %												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Radhanagari	0	0	4	0	0	4	16	0	0	0	4	20	52

Nannfeldt (1942) reported this species from Sweeden. This species characterised by its paraphyses with greenish-yellow amorphus matter, ascospores more than 100 µm long and paraphyses variously curved, regularly septate and cells not unequal sided and stipe not squamulose. Present collection collected from Radhanagari agrees in respects of morphology and dimensions of ascocarps, asci, paraphyses except the length of ascospores. The species in which ascospores are mostly 7-septate. The present collection in respect of the dimensions of ascospores and their septation is more variable and therefore, on the basis of its longer ascospores, a new variety has been proposed to accmodate the present material as Geoglossum cookeianum Nannfeldt var. longispora var. nova. As far as the septation of the ascospores is concerned which show the septation from 3-13. The ascospore are mostly 3,6,7,11,12 and 13-septate. The maximum percentage of the ascospores are 13-septate and 7-septate ascospore are 16%. Mains (1954) considered G.cookeianum Nannfeldt a synnoname of G.glabrum var. glabrum. This variety is characterised mostly by 7-septate ascospores or rarely less. Paraphyses having upper cells variously enlarged, globoid, ellipsoid, and obovoid, moderately constricted at the septa but Nannfeldt (1942) who distinguish this species G.cookeianum by its paraphyses as other species can be distinguish on this character. Present collection is referred to G.cookeianum Nannfeldt and a new variety has been

raised on the basis of its longer ascospores and ascospores not observed strictly 7-septate as a key character of G.glabrum var. glabrum Pers. ex. Fries.

Holotype : Geoglossum cookeianum Nannf. var. longispora Sawant and Patil

Etymology : longispora - long spored - the variety is named after its longer ascospores.

Type locality : Radhanagari (Distt.-Kolhapur)

Type specimen : in M.H.B.D., S.U.K., W.I.F.No.2.

Table No.3 : Comparison between G.cookeianum Nannfeldt and present material

Species	Ascocarp	Asci	ascospores	Locality
1. G.cookeianum	18-25 mm long	170-177 x 20-22 µm	75-83 x 5.5-7 µm	Europe, U.S.A., India.
2. Present material	15-20 mm long	149-198 (-200) x 20-21 µm	95-128 (-132) x 5-6 µm	Radhanagari, (Distt.-Kolhapur),M.S.

Geoglossum difforme Fries var. variable Mains

Mycologia, 46 : 604, 1954.

Text Plate No.1, Figs.7-9, Plate No.2, Fig.Nos.3,4.

Fructifications scattered to crowded, black, clavate, 2.5 to 10 cm long, viscid to gelatinous, especially in wet weather; Fertile part 0.5 to 1 cm long, compressed, centrally depressed (sutured), 4-6 mm wide; stipe terete, upto 5 mm thick, brown, cylindrical, straight to flexuosus, not enlarged

above into ascigerous region, covered by paraphyses forming gelatinous layer all around the stipe upto the base, stalk cylindrical, ridged (folded); ascigerous region textura intricata, light brown, hypothecium brown, densely textura intricata; stipe differentiated into cortex and medulla; cortex textura-porecta, enclosed by thin gelatinous sheath of paraphyses, medula textura intricata, composed of loose hyphae; asci clavate, 8-spored, tapering at base, inoperculate, tip blued in iodine solution, 190-250 x 17-20 µm; ascospores fusoid clavate, brown, closely septate 7-17 septate; 76-100(-120) x 4-6 µm; paraphyses brownish, longer than asci, 4-6 µm broad, slender, cylindric, septate, much twisted and coiled above forming a dense epithecium, continuing down the stipe.

Hab. : On damp humicolous soil under the shade of forest trees, Gawase and Salvan (Distt.-Kolhapur), Aug.17, 1986, D.N.Ghadge, W.I.F.No.3a, 3b.

Variation in the septation of discharged ascospores of Geoglossum difforme Fries var. variable Mains expressed as percentage.

Table No.4 : (Based on 200 ascospores observed and three matured ascocarps studied.

Collections	No.of septa in %												
	5	6	7	8	9	10	11	12	13	14	15	16	17
1 Gawase (Distt.Kolhapur) 17.8.86	0	0	8	0	12	2	6	10	10	18	28	4	2
2 Salvan (Distt.Kolhapur) 16.8.86	4	1	13	6	9	5	14	12	18	15	3	0	0

This variety has been reported from Michigan and other localities from U.S.A. (Mains, 1954). This variety is characterised by its variable septation of ascospores i.e. 5-15(-17) septate. The present collection in respects of morphology and dimensions agreed well and therefore, referred to it. The septation of ascospores was studied in two different collections collected from two different localities. In which the range of septation of ascospores has been observed from 7-17 and 5-15 respectively(Table No.4). In the first collection the percentage of 15-septate ascospore is maximum while in second collection 13 and 14-septate ascospore is maximum. This deviation from 15-septate condition as suggested by Mains (1954) due to irregular omission of septa. It makes a new variety record to the fungi of India.

Geoglossum fallax Durand

Annls.Mycol. 6 : 428, 1908.

Text Plate No.1, Fig.No.10-12.

Fructifications 2-3 cm in height, gregarious to somewhat scattered and solitary, entirely black; clavula 2.5-10 x 1-3.2 mm, clavate to ligulate, with median groove and obtuse apex, dull dark brown to blackish-brown, stipe 4.5-36 x 0.5-1 mm, minutely squamulose or hirsute; asci 150-180 x 18-20 µm, 8-spored, inoperculate, pore blued in iodine, narrowed below into stipe-like base, apices obtuse; ascospores 76-97(100) x 5-6 µm, cylindric-clavate to acicular, slowly maturing, hyaline to brown,

finally 8-13 celled; paraphyses agglutinate by greenish-yellow amorphus matter and some times firmly coherent, 2-3 µm wide and colourless below, 6-9 µm wide and colourless to browni above and closely septate, slightly constricted at the septa, apical cells clavate to barrel-shaped.

Hab. : On damp humicolous soil under the shade of forest, Radhanagari (Distt.-Kolhapur), Feb.10, 1984 and Sept.11, 1985, D.N.Ghadge, W.I.F.No.4.

Variation in the septation of discharged ascospores of Geoglossum fallax Durand as expressed in percentage.

Table No.5 : Based on 100 ascospores and 6 matured ascocarps studied.

Collections	No.of septa in %													
	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Radhanagari (Distt.-Kolhapur) 10.9.84	6	6	0	0	3	0	0	31	6	0	17	15	0	16

Durand (1908) reported this species from Ithaka, New York (U.S.A.). The same species has been also reported from Japan Imai (1941); Batra (1960) and Maas Geesteranus (1964) recorded from Jabbar Keth, Mussoorie hills (U.P.), Kar and Dewan (1975) reported from Darjeeling (W.B.). Nannfeldt (1942) stated that this species is one of the commonest species of Scandinavia and also reported it from China. The species are characterised by

the colour of the ascocarps which are usually brown, rarely black and stipe is squamulose due to scales by agglutunated hyphae and ascospores which are very variable in colour and septation i.e. hyaline and brown, 0-13 septate. The present collection agrees well in respect of its morphology and therefore, referred to it. Durand (1908) studied large no. of collections and stated that the spores are for a long time remain hyaline and continuous and multiguttulate then 3, and finally 7-12 septate. Both hyaline and coloured spores are discharged. The brown spores are generally 0-13 septate. There is a great variation in the proportion of the various kinds of spores in different collections. Among the septate spores, there is considerable irregularity. These differences are not stages in development but variation in matured spores. Imai (1941) consider 3 varieties of Geoglossum fallax which he previously had recognised as species and distinguished on colour and adherence of paraphyses and whether ascospore colour changes slowly or rapidly. The present collection differs only in the length of asci which are slightly longer and paraphyses with barrel-shape cells at the apex. The variation in ascospores septation in the present collection has been also observed i.e. from 0-13 septate. Maximum percentage of ascospore is 7-septate (Table No.5). This make a new record to the fungi of the Maharashtra State.

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Geoglossum glabrum Pers.ex Fr. var. glabrum Pers.ex Fries

Mycologia 46 : 600, 1954

Text Plate No.2, Fig.Nos.1-3, Plate No.7, Figs.No.2,6,11.

Ascocarps scattered or closely crowded, black, clavate; differentiated into fertile terminal part and slender stipe; total length upto 2 to 6.5 cm, fertile part 1 to 3 cm long, 2 to 6 mm wide, compressed, 1-2 mm thick, apex obtuse, stipe 2 x 30 mm, cylindrical, straight, covered by a layer of paraphysoid haris upto the base; asci clavate-cylindrical, sub-sessile, unitunicate, inoperculate, 8-spored, J+ve, apex obtuse (-140)150-221 x 14-22 µm; ascospores parallel or irregularly multiseriate, mostly 7-septate or 0-7 septate, clavate, tapering towards the lower end, smooth, smoky-brown, (60-)73-92 x 4-6 µm; paraphyses crowded, 250 µm long, simple or branched at the base, lower cells hyaline, upper cells dark-brown, terminal cells constricted at the septa, cylindrical, thick-walled, closely septate above, 4-8 µm thick, lower cells 2-3.5 µm thick.

Hab. : On damp humicolous soil amongst the leaf-litter under the shade, Ajara (Distt.-Kolhapur), Aug.25, 1984, Radhanagari (Distt.-Kolhapur), Aug.84, Manjarkhind (Distt.-Kolhapur), Aug.27, 1988, D.N.Ghadge and R.S.Sawant, W.I.F.No.5a, 5b, 5c.

Variation in the septation of discharged ascospores of G.glabrum Pers.ex Fr. var. glabrum Pers.ex Fr. expressed as percentage.

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Table No.6 : Based on 500 ascospores observed and Twenty five matured ascocarps studied.

Collections	No.of septa in %						
	1	2	3	4	5	6	7
1. Ajara (Distt.-Kolhapur) 25.8.84	0	0	12	4	0	8	76
2. Manjarkhind (Distt.-Kolhapur) 27.8.88	0	0	4	0	0	10	86
3. Radhanagari (Distt.-Kolhapur) Aug., 84.	4	2	22	4	5	7	54

Mains (1954) reported this variety from Michigan (N.America). The three collections collected in the month of August showed the dominance in 7-septate ascospore character. (Table No.6). But the two collections i.e. No.2 and 3 collected from two different localities not more than 5 km away from each other show the different percentage of 7-septate ascospores (i.e. 86% and 54%). The material No.2 is more contrasting as far as its % of ascospore septation as compared to No.2 and 3. No.3 material is more variable in ascospore septation than No.1. The reason for this is unknown. Present collection in respect of the ascospores and paraphyses resembles with this variety especially in its 7-septate ascospores and upper cells of the paraphyses which are variously enlarged, septate and constricted at the septa while the cells are mostly globoid, ellipsoid or

obovoid. Asci are comparatively larger in size and thus, referred to it. It makes a new record to the fungi of India.

Geoglossum glutinosum Pers.ex Fr.

Syst.Mycol. 1 : 489, 1821.

Text Plate No.2, Fig.No.5-6, Plate No.2, Fig.No.5.

Fructifications 3-5.5 cm in height; Ascigenous region 10-25 x 2-4 mm, 1 mm thick and black. Generally, the fertile part is club-shaped or not distinct from sterile stipe, sterile stipe is slightly thicker, club-shaped, round or compressed, slimy, dark brown; asci 180-220 x 10-15 µm, 8-spored, narrowly clavate, narrowed from the middle to the base, inoperculate, pore blued with iodine solution, apices narrow but obtuse; Ascospores (-61)75-95(-100) x 2.5-5 µm, cylindrical, tapering to both the ends but slightly more towards the base, 1-7 septate; paraphyses 4-7 µm wide above, dark brown, septate, longer than the asci and hyaline below.

Anatomy : Ascigerous region textura intricata, light brown, hyphae loose, 6-12 µ wide; hypothecium dark brown, densely textura intricata, stem differentiated into cortex and medulla; cortex textura porrecta, hyphae 3-10.5 µm wide, compecting towards the periphery, enclosed by a thin gelatinous sheath of paraphyses, medulla textura intricata, composed of loose hyphae 3-4.5 µ wide.

Hab.: Collected on damp hymicolous soil under the shade of forest, Salvan (Distt.-Kolhapur), Sept.17, 1985, D.N.Ghadge, W.I.F.No.6.

Variation in septation of discharged ascospores of Geoglossum glutinosum Pers.ex Fr. expressed as percentage.

Table No.7 : (Based on 200 ascospores observed and 13 matured ascocarps studied.)

Collections	No.of septa in %						
	1	2	3	4	5	6	7
1. Salvan (Distt.-Kolhapur) 17.9;85	0	0	0	0	0	0	100
2. Salvan (Distt.-Kolhapur) 8.9.85	24	0	28	0	0	0	44

This species has been reported by Thind and Singh (1964) from Jabbar Keth, Mussoorie (U.P.). This species has been also reported from Europe and Eastern Asia. Present materials collected from same locality twice and differs in ascospore septation. Collection No.1 shows strictly 7-septate ascospores, but collection No.2 shows 1,3 and 7-septate ascospore in maximum percentage (Table No.7). Durand (1942) stated that the ascospores of the type are mostly 1-3 septate but in the majority of the collections studied, they are 7-septate. The collections studied by various workers suggested that the septation is variable.

Mostly they appear as 1,3 and 7-septate in sequence. Which is also found in our own collections. This species appearantly is potentially 7-septate. Whether the predominantly 3 and 7-septate conditions showed be recognise as form or variety is doubtful. Present collection differs only in the length of asci and ascospores, which are slightly smaller. It makes a new record to the fungi of the Maharashtra State.

Geoglossum japonicum Imai

J.Fac.Agric.Hokkaido Imp.Univ. 45 : 210, 1941.

Text Plate No.2, Fig.No.7-9, Plate No.2, Fig.No.9.

Fructifications 1-5 cm in total height, scattered to gregarious, clavula 5-20 x 2-4 mm, ligulate, with median groove and with obtuse apex, dull, dark brown to black, stipe small, 10-20 x 5-1.5 mm, terete to flattened, minutely squamulose or glabrescent below; asci 175-225 x 16-20 µm, 8-spored, inoperculate, clavate-cylindrical, stout, tapering below into short stem-like base, pore blued with iodine solution, apices narrow but obtuse; ascospores thick-walled, smooth, tapering towards the both ends, 7-septate, 80-99 x 6-7 µm, cylindrical-clavate to somewhat fusiform, brown; paraphyses discrete, 2-4 µm wide and colourless below, 5-8 µm wide and pale to fairly dark brown above, moderately to closely septate in the upper part, usually much constricted at the septa, straight or more often variously curved to circinate, terminal cells generally clavata to pyriform.

Hab. : On damp soil under thick shade of the forest, mostly on rocky slopes at high altitude, Panhala (Distt.-Kolhapur), August 15, 1985, D.N.Ghadge, WIF No.7.

Variation in septation of discharged ascospores of Geoglossum japonicum Imai expressed as percentage.

Table No.8 : 150 ascospores observed and four matured ascocarps studied.

Collections	No.of Septa in %											
	0	1	2	3	4	5	6	7	8	9	10	11
Panhala (Distt.-Kolhapur) 15.8.85	17	3	0	4	0	0	0	74	1	0	1	

Imai (1965) has reported this species from Japan. The same species has also been recorded from Mussoorie (U.P.) by Maas Geesteranus (1964). In this species the ascospores are 7-septate but in the present collection studied the septation of the ascospore is from 0-10. The maximum percentage is of 7-septate ascospores (Table No.8). Less than 7-septate or more than 7-septate rarely occur as a result of omission or addition of the septa. Present collection in respect of the morphology of ascospores resembles with this species except the asci and ascospores are slightly longer and therefore, referred to it. It makes a new record to the fungi of the Maharashtra State.

Geoglossum japonicum Imai var. variable var. nova

Text Plate No.3, Fig.No.10-12, Plate No.2, Fig.No.10.

Var. variable - Paraphyses throughout (strongly) coiled.

Hab. : Collected on damp humicolous soil, Gawase (Distt.-Kolhapur), August 17, 1985, D.N.Ghadge, WIF No.8.

Variation in the septation of discharged ascospores of Geoglossum japonicum Imai var. variable var. nova expressed as percentage.

Table No.9 : (Based on 100 ascospores observed and one matured ascospore is studied.)

Collections	No.of septa in %						
	1	2	3	4	5	6	7
Gawase (Distt.-Kolhapur) 15.8.85	4	0	64	0	0	0	32

The present collection is identical in respect of morphology and dimensions with G.japonicum except the ascospore septation and nature of apical cells of the paraphyses. The apical cell of the paraphyses are coiled and not unequal sided and the ascospores not strictly 7-septate. The percentage of 3-septate ascospore is maximum (64%) while 7-septate ascospore percentage is 32%. On the basis of these two features a new variety has been proposed here to accomodate a present collection as Geoglossum japonicum var. variable var. nova.

Geoglossum nigritum (Fr.) Cke. var. heterosporum Mains

Mycologia 46 : 586-630, 1954.

Text Plate No.3, Fig.No.1-3, Plate No.3, Fig.No.5.

Ascocarps scattered or in small groups, clavate, variable in size, 3-7 cm long; fertile portion 1/3 or 1/4 the length, somewhat compressed with median groove, 1-6 mm wide, stipe slender, 1-2 mm thick, cylindrical, sometimes flat, mostly straight, sometimes bend; asci 2-8 spored, clavate-cylindrical, tapering below into short stem-like base, inoperculate, pore blued with iodine solution, 175-238 x 15-20 µm; ascospores clavate, fasciculate, cylindrical, tapering to both the ends, brown, mostly 7-septate, (-79) 98-103(-111) x 5-6 µm; paraphyses hyaline to brown, with greenish-yellow amorphus matter, longer than the asci, strongly curved above, cylindric, 2-4 µm wide, enlarged at the tipes, septate, slightly constricted at the septa.

Hab.: On damp humicolous soil amongst leaf litter, Panhala (Distt.-Kolhapur), Sept.30, 1988, R.S.Sawant, WIF No.9.

Variation in the septation of discharged ascospores of G.nigritum (Fr.) Cke. var.heterosporum Mains

Table No.10 : Based on 200 ascospores observed and three matured ascocarps were studied.

Collections	No.of septa in %							
	0	1	2	3	4	5	6	7
Panhala (Distt.Kolhapur) 30.9.88	6	8	0	12	0	0	0	74

Mains (1954) raised a new variety as Geoglossum nigritum var. heterosporum Mains on the basis of the asci which are 2-8 spored, ascospores measured (30-) 42-63 (-80) x 3-6 µm and 1-7 septate. This is reported from the woods of Mackinaw City, Michigan. Present collection collected from Panhala agrees well in respects of morphology and dimensions except the length of ascospores which are larger and ascospores mostly 1-7 septate (Table No.10). The ascospores are mostly showing 0,1,3 and 7-septate. The maximum percentage is of the 7-septate ascospores (74%) and therefore, the present collection is referred to this variety which is a new record to the fungi of India.

Geoglossum nigritum (Fr.) Cke. var. longispora var. nova

Text Plate No.3, Fig.No.4-6, Plate No.3, Fig.No.8.

Fructificato fasciculatum, bragil, nigrum, fistulosum; clavula subcompressa stipite gracili asquilonga; ascis cylindraceis, fusoides; octosporis, porus iodatus, apice obtusatis, 160-200 x 18-23; ascosporidiis cylindraceis, paraplellae brunneis, curvulis, 7-septatis, (90-)106-122(-138) x 5-7 µm; paraphysibus septatis apice incurvo - clavatis, brunneolis.

Habitato : Solum udum umbra silva, Panhala (Distt.-Kolhapur), Aug.8, 1985, D.N.Ghadge et positus WIF No.10.

Ascocarps in fascicles or in small groups, clavate, variable in size, 1-7 cm in total height, ascigerous region 1-2.5 x 2-7 mm, clavate to lanceolate, much compressed, stipe

5-4.5 x 1.5-3 mm, cylindrical, sometimes flat, straight or bent, tubercled at the base, tubercles composed of closely appressed, thin-walled hyphae; asci 8-spored, clavato-cylindrical, tapering below into short stem-like base, inoperculate, pore blued with iodine solution, 160-200 x 18-23 µm, apices narrow but obtuse; ascospores clavate, straight to somewhat curved, dark brown, (90-) 106 x 122 (-138) x 5-7 µm, mostly 1-7-septate; paraphyses hyaline to brown, with greenish-yellow amorphus matter, closely septate, banded, 3-6 µm broad at the apices, 2-3 µm broad below, straight or curved above, cylindric, terminal cells obovoid or clavate.

Hab. : On damp humicolous soil amongst leaf-litter in forest, Panhala (Distt.-Kolhapur), Aug.15, 1985 and Sept.6, 1988, D.N.Ghadge and R.S.Sawant, WIF No.11.

Variation in the septation of discharged ascospores of Geoglossum nigritum (Fr.) Cke. var. longispora var. nova.

Table No.11 : (Based on 200 ascospores observed and three matured ascocarps were studied.)

Collections	No.of septa in %								
	1	2	3	4	5	6	7	8	9
Panhala (Distt.-Kolhapur)									
1. 25.8.85	5	1	8	4	1	4	70	4	3
2. 6.9.88	2	6	2	2	0	0	88	0	0

This variety has been raised on the basis of its longer ascospores as to compare the existing varieties of G.nigritum (Fr.) Cooke. As far as the septation of the ascospores is concerned it shows the affinity with Geoglossum nigritum (Fr.) Cke. var. heterosporum Mains in its 1-7 septate ascospore character. The two collections collected from Panhala showing 1-9 septate ascospores but the percentage of the 7-septate ascospore is maximum i.e. 70% and 88% and therefore, this species shows its basic 7-septate ascospore character. The present collections found to be matched well (Table No.12) with G.nigritum (Fr.) Cke., G.nigritum var. nigritum(Fr.) Cke. and G.nigritum var. heterosporum Mains as far as the morphology and dimensions of fructifications and paraphyses are concerned but the asci and ascospores are larger and therefore, a new variety has been proposed here to accomodate the present collection as G.nigritum (Fr.) Cke. var. longispora var. nova.

Holotype : Geoglossum nigritum (Fr.) Cke. var. longispora Sawant and Patil

Etymology : longispora - long - spored, the variety is named after its longer ascospores.

Type locality : Panhala (Distt.-Kolhapur)

Type specimen : In M.H.B.D., S.U.K., WIF No.11.

Table No.12 : Comparison between G.nigritum var. nigritum (Fr.) Cke., G.nigritum var. heterosporum Mains and present material

Varieties	Ascocarp	Asci	Ascospores	Locality
1. G.nigritum var. nigritum	1-7 cm long	125-180 x 16-20 µm	(40-)60-78 (-90) x 4.5-6.5 µm	Michigan (U.S.A.)
2. G.nigritum var.heterosporum	1-7 cm long	125-180 x 16-20 µm	(30-)42-63 (-80) x 3-6 µm	Michigan (U.S.A.)
3. Present material	2-7 cm long	160-200 x 18-23 µm	(90-)106-122(-138) x 5-7 µm	Panhala (M.S.)

Key to the varieties of G.nitritum (Fr.) Cooke

1. Asci 8-spored 2
1. Asci 2-8 spored ..... G.nigritum var. heterosporum
2. Ascospores measured 60-78 µm long ..... G.nigritum var. nigritum
2. Ascospores measured 106-122 µm long .... G.nigritum var. longispora var. nov.

Geoglossum nigritum (Fr.) Cke. var. nigritum (Fr.) Cooke

Mycologia 46 : 596, 1954

Text Plate No.3, Fig.No.7-9, Plate No.3, Fig.No.1.

Ascocarps scattered or in small groups, clavate, very variable in size, 1-7 cm long, black and fleshy; ascogenous

portion 1/3 to 1/4th the length, somewhat compressed, 1-5 mm wide, stipe slender, 1-2.5 mm thick, cylindrical, sometime flat, mostly straight, sometimes bend, not enlarged at the base, somewhat viscid, glabrus, minutely pubescent (squamulose), hypothecium dark brown, densely textura intricata, stipe not differentiated into cortex and medulla, hyphae slightly compact towards the margin upto 6.5-7 µm wide, surface hyphae projecting into tubercles and hairs; asci clavate, 8-spored, clavate-cylindrical, tapering below into short base, inoperculate, pore blued with iodine solution, apices narrow but obtuse, 150-160 x 17-20 µm; ascospores clavate, fasciculate, cylindrical, tapering to both the ends but more towards the lower side, dark brown at maturity, mostly 7-septate, (78-)90-98(-104) x 5.5-6 µm; paraphyses moderately brown, longer than asci, straight or slightly curved above, cylindric, 2.5-5 µm wide, enlarged at tips, septate, constricted at the septa, terminal cell upto 9 µm in diameter, with prominent greenish-yellow amorphus matter, light brown above, hyaline toward the base.

Hab. : On damp humicolous soil among the leaf-litter under the forest shade, Radhanagari and Panhala (Distt.-Kolhapur) August 20, 82 and September 11, 88, D.N.Ghadge and R.S.Sawant, WIF Nos.12a, 12b.

Variation in the septation of discharged ascospores of G.nigritum (Fr.) Cke. var. nigritum (Fr.) Cke. expressed as percentage.

Table No.13 : (Based on 300 ascospores observed and ten matured ascocarps were studied.

Collections	No.of septa in %									
	0	1	2	3	4	5	6	7	8	9
1. Radhanagari (Distt.-Kolhapur) 20.9.82	0	0	0	6	4	2	2	80	0	0
2. Radhanagari (Distt.-Kolhapur) 20.9.82	0	2	0	4	0	0	4	90	0	0
3. Panhala (Distt.-Kolhapur) 11.9.88	8	24	4	32	0	0	0	32	0	0

This species was originally known as Clavaria nigrita Fries (Syst.Myc. 1 : 483, 1821) and reported from Uppsala (America). Later on Cooke (1879) identified it as a species of Geoglossum i.e. Geoglossum nigritum (Fr.) Cooke (Mycographica, 1 : 205, 1879). The same species has been also reported from Sweden. This variety has been reported by Sharma, Jandaik and Munjal (1977) from Chamba Ghat, Solan (H.P.). Mains (1954) has recorded it from the different parts of North America and raised a new variety as G.nigritum var. nigritum (Fr.) Cke. on the basis of its 8-spored asci, 7-septate ascospores and ascospores measured (40-)60-78(-90) x 4.5-6.5 µm. This species has been recorded by Thind and Singh (1965) from Mussoorie (U.P.). Present collections collected from two different

localities in 1982 and 1988 from Radhanagari and Panhala agreed in respects of morphology and dimensions of the asci and ascospores. But the ascospores which are not only 7-septate but less than 7-septate also observed (Table No.13). On an average, these collections agree to this variety and thus, referred to it. The comparison of these collections collected from two different localities showing somewhat different septation in the ascospores. But the maximum percentage is of the 7-septate ascospores, especially the materials collected from Radhanagari.

Geoglossum pumilum Wint. var. variable var. nova

Text Plate No.3, Fig.No.10-12, Plate No.3, Fig.No.3,9.

Ascomate ovato vel subdifformi, capitato distincto, parce et irregularites compresso glaberrimo, usque 3-7 mm longo, ut videtur, viscaso; stipite sub-cylindracea saepe parum compresso et silcato, usque 1.5-6.5 mm longo, fusciculis pilorum fuscidulis squarriosis obsito;ascis cylindraceo clavatis sessilibus, 8-sporis, stipitatis, 175-225 x 16-22 µm, apics obtusatis octosporiis, porus iodatus; asco sporadiis parapleilae, atrobrunneae, cylindraceis, utrinque parum anguatatis rotundatisque, subcurvatis, plerumque 0-7-12-13-14-15-septatis, ad septa perparum constrictis, fuscis, (-100)103-161 x 5-7 µm; paraphysibus filiformibus, sursum in clavulam crassum, fuscidulam, usque 10 µm, later incrassatis, interdum apicem versus articulatis, rectis.

Habitato : Solum udum umbra silva Radhanagari (Distt.-Kolhapur), Sept. 11, 1985, D.N.Ghadge, WIF No.13a, 13b.

Ascocarps 3-7 mm high, clavula 1.5-6 x 0.8-3.5 mm, lanceolate to ligulate or spathulate, flattened, with median groove and obtuse apex, sometimes deformed and globose, dark-brown, stipe 0.5-1.5 x 0.2-0.5 mm, terete, minutely squamulose or smooth below, black; asci cylindrical-clavate, 8-spored, inoperculate, sessile, 175-225 x 16-22 µm, apex obtuse, pore blued in iodine solution; Ascospores parallel, brown, cylindric-clavate, straight or slightly curved, (-100)103-161 x 5-7 µm, mostly 0-7-12-13-14-15-septate; paraphyses longer than the asci, straight or slightly curved above, moderately brown above, lighter brown to hyaline below, the lower cells cylindric and upper clavate, obovoid or ellipsoid, slightly constricted at the septa or non-constricted.

Variation in the septation of discharged ascospores of Geoglossum pumilum Wint. var. variable var.nova expressed as percentage.

Table No.14 : Observation based on 225 discharged ascospores from 5 matured ascocarps studied.

Collections	No.of septa in															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Radhanagari Sept.11, 1985	0	2	1	0	0	0	0	28	0	0	0	1	6	22	15	25
Panhala Sept.30,1988	1	1	1	2	1	1	2	58	0	0	0	0	3	3	6	31

Anatomy : Ascigerous region textura porrecta, light brown, hyphae upto 10-12 µm wide; hypothecium drak-brown, densely textura intricata, stipe not differentiated into cortex and medulla, wholey textura porrecta; hyphae upto 7.5 µm wide, surface hyphae projecting into tubercles.

Hab. : On damp humicolous soil amongst the leaf-litter under Shade, Radhanagari (Distt.-Kolhapur), Sept.11, 1985, Panhala (Distt.-Kolhapur), Sept.30, 1988, D.N.Ghadge and R.S. Sawant, WIF No.13.

The present collection has found to be matched well with G.pumilum Wint. as far as its morphology and dimensions of asci, ascospores and paraphyses are concerned. But fructifications are much larger and ascospores show great variations in septation and therefore, a new variety has been proposed here to accomodate the present collection as G.pumilum var. nova.

There is no constancy in the ascospore septation in the two collections collected from the two different localities viz. Radhanagari and Panhala. Here ascospores are 0 to 15-septate. The 7-septate ascospores showed the maximum percentage (Table No.14) i.e. 28% and 58% respectively. But more than 7- and less than 7-septate ascospores are also found in these collections. On the basis of this feature, a new variety has been raised. This variability may be either due to genetical or

cytological disturbances during their formation and maturation before their release. But it requires further study to confirm it. It is also found that the length of the ascospores is reduced as the reduction in the number of septa of the ascospores as to compare the length of the 15-septate ascospores found in these collections.

Holotype : Geoglossum pumilum Wint.var. variable var.nov.

Etymology : Variable - variable, the variety is named after the variable number of ascospore septa.

Type locality : Radhanagari (Distt.-Kolhapur)

Type specimen : In M.H.B.D., S.U.K., WIF No.13.

Key to the varieties of G.pumilum Wint.

1. Ascospores regularly 15-septate ..... G.pumium var. pumilum

1. Ascospores not regularly 15-septate .... G.pumium var. variable but 0,12 and 15-septate

Table No.15 : Comparison between G.pumium Wint.var. pumilum Wint. and present materials

Variety	Ascocarp	Asci	Ascospores	No.of septa	Locality
G.pumilum var. pumilum Wint.	Upto 3 mm long	175-200 x 20-22 µm	90-130(-145) x 5-6 µm	15	Virginia (U.S.A.) England
Present materials No.1-11.9.85	Upto 7 mm long	165-231 x 17-20	105-145 x 5-6 µm	0-12-13-14-15	Radhanagari & Amba
No.2-30.9.88	Upto 17 mm long	171-225 x 16-22 µm	103-161 x 5-7 µm	0-7-12-13-14-15	Panhala

Geoglossum pygmaeum Gerard ex. Durand

Ann.Mycol. 6 : 429, 1908.

Text Plate No.4, Fig.No.1-3, Plate No.2, Fig.No.8

Fruictifications gregarious to somewhat scattered, clavate, 1-7 cm long, brownish-black, sometimes which capitate head; ascogenous portion sub-cylindric to clavate, about 1/3rd of the length, 1-2 mm thick; stipe slender, about 0.5 mm thick, squamulose or minutely pubescent; asci clavate, 8-spored, inoperculate, pore blued in iodine solution, narrowed below into stem-like base, apices obtuse, 165-235 x 20-26 µm; ascospores parallel, brown, sub-fusoid or fusoid-clavate, 135-198 x 5.5-7 µm mostly 15-septate, sometimes 0-7-10-12-15-septate, rarely 16-18-septate; paraphyses slightly longer than the asci, upto 300 µm long, hyaline or pale-brown above, 5-8 µm broad, closely septate above, moderately constricted at the septa, hyaline below, the lower cell cylindric, upper cell pyriform, ellipsoid or sub-globoid, ascigerous region textura intricata, light brown, hypothecium brown, densely textura intricata, stipe not differentiated into cortex and medulla, superficial cells of stipe grow into multicellular hyphae filaments.

Hab. : On damp humicolous soil under the forest shade, Radhanagari (Distt.-Kolhapur), Sept.3, and 11, 1985; D.N.Ghadge, WIF No.14.

Variation in the septation of discharged ascospores of G.pygmaeum Gerard ex. Durand expressed as percentage.

Table No.16 : (Based on 100 ascospores observed and six matured ascocarps studied.)

Collection	No.of septa in %																		
	0	1	2	3	4	5,	6	7	8	9	10	11	12	13	14	15	16	17	18
Radhanagari 3.9.85 and 11.9.85	2	0	0	0	4	0	0	0	7	0	0	7	0	18	16	20	24	1	1

Mains (1954) reported this species from Michigan (N. America). The same species has also been reported from Java as G.hirsutum (Patuillord, 1909 and Luyk, 1919). But Patuillord considered it as a geographic variety as G.hirsutum var. leveillei Patuillord. But Mains (1954) considered it as G.pygmaeum. Ascospores in the present collections are mostly 13,14,15 and 16-septate and also the percentages (Table No.16). 15 and 16-septate spores are dominant (20% and 24%). Occassionally 0,4,8,11,17 and 18-septate spores occured but their frequency is very low. More than 15 and less than 15-septate ascospores may be produced either due to one more or less mitotic division of the ascospore nuclei during the division. The material has been collected only from one locality and a few ascocarps and therefore, it is unwise to comment on its variable septation character unless there is abundant material for study from various localities. It seems that this species is quite rare and also not occur abundantly. Present collection in respect of morphology of the ascospores, asci and paraphyses

resembles with this species especially in its 15-septate ascospores and upper cells of the paraphyses which are closely septate and variously enlarged and thus, referred to it. It makes a new record to the fungi of India.

Geoglossum pygmaeum Gerard ex Durand var. variable var.nova

Text Plate No.4, Fig.No.4-6, Plate No.3, Fig.No.7.

Var. variable ascosporiis 0,7,10,12-15-septati.

Hab. : On damp humicolous soil under the forest shade, Amba Ghat (Distt.-Kolhapur), Sept.20, 1988, R.S.Sawant, WIF No.15.

Variation in the septation of discharged ascospores of G.pygmaeum Gerard ex. Durand var. variable var. nova expressed as percentage.

Table No.17 : Based on 150 ascospores observed and four matured ascocarps studied.

Collection	No.of septa in %																		
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Amba (Kolhapur) 20.9.88	0	0	0	2	0	0	1	0	0	3	0	0	6	6	12	20	20	16	12

The present collection in respects of morphology and dimensions resembles with G.pygmaeum Gerard ex Durand but differs in respect of the ascospore septation. This species is

characterised by its 15-septate ascospores. The materials have been collected from two different localities viz. Radhanagari and Amba. The material ffom Radhanagari clearly matched well with G.pygmaeum Gerard ex. Durand in respect of 15-septate ascospores but the second material shows a lot of variation in ascospore septation (Table No.17). On the basis of this irregularity in septation of the ascospores, a new variety has been proposed here to accommodate this collection as G.pygmaeum Gerard ex. Durand var. variable var. nova (Table No.18).

Key to the varieties of G.pygmaeum Gerard ex.Durand

1. Ascospores 15-septate ..... G.pygmaeum var. pygmaeum Gerard ex Durand
2. Ascospores 0-18-septate ..... G.pygmaeum Gerard ex. Durand var. variable var. nov.

Table No.18 : Comparison of G.pygmaeum and present materials

Varieties	Ascocarp	Asci	Ascospores	No.of septa	Locality
G.pygmaeum var. Pygmaeum	1.5-2 cm long	180-220 x 18-20 µm	125-160 (-180) x 6.7 µm	15	New York
Present Materials :					
1. Radhanagari	1-7 cm long	165-287 x 20-26 µm	135-198 x 5.5-7 µm	15	Radhanagari (Distt.-Kolhapur)
2. Amba	3-7 cm long	197-260 x 19-27 µm	125-196 x 5-7.5 µm	0-18	Amba (Distt. -Kolhapur)

Geoglossum simile Peck.

Bull.Buffalo nat.Sci. I : 70, 1873.

Text Plate No.5, Fig.No.1-3, Plate No.3, Fig.No.6.

Ascocarps scattered or gregarious or solitary, sometimes caespitose, brownish-black, clavate, very variable in length, 5-6 mm long, clavula spoon shaped, ascogenous portion 2-3 mm in length, compressed; stipe terete, 0.5-1 mm thick, usually squamulose or smooth; asci clavate, 8-spored, tapering below into short stem like base, inoperculate, pore blued with iodine solution, apices narrow but obtuse, 160-196(-200) x 17-21.5 µm; ascospores in fascicles, smooth, straight or somewhat curved above, dark-brown, 89-99(-105) x 5 µm, 7-septate; paraphyses 4-6 µ wide above, longer than the asci, straight or somewhat curved above, upper cells enlarged, constricted at the septa to form a chain of 2-celled segments.

Hab. : on damp humicolous soil among the leaf-litter under the shade of forest trees, Radhanagari (Distt.-Kolhapur), October 2, 1984, D.N.Ghadge, WIF No.16.

Variation in the septation of discharged ascospores of G.simile Peck. expressed as percentage.

Table No.19 : (Based on 100 ascospores observed and 2 matured ascocarps studied.)

Collections	No.of septa in %						
	1	2	3	4	5	6	7
Radhanagari 2.10.84	0	0	0	0	0	3	97

Mains (1954) reported this species from Michigan (N. America). It has also been reported from Mussoorie Hills (U.P.) by L.R.Batra (1960) and K.S.Thind (1961). In this species the ascospores are mostly 7-septate (97%). Present collection in respect of the morphology of the ascocarps, ascospore and paraphyses resembles with this species especially in the clavate, 7-septate ascospores and upper cells of the paraphyses which are variously enlarged, septate and constricted at the septa, the cells are globoid, ellipsoid or obovoid in 2-celled segments and thus, referred to it. It makes a new record to the fungi of the Maharashtra State.

Geoglossum umbratile Sacc. var. longispora var.nova

Text Plate No.5, Fig.No.4-6; Plate No.3, Fig.No.4.

Fructificato seperata, sparsum v. gregarium, alangato-clavatum, hepatica 3-7 cm al tum, 3-5 mm crassum, glabrum, leve exsiceando longitudinaliter striatum, nigrum; ascis cylindraceis brevissime stipitatis, 205-230 x 16-20 µm, apice obtusatis, octosporis, porus iodatus, ascosporidiis paraplellqe, atrobrunneae, bacillari-fusoideis vd clavulatis, (-76)80-100 (-106) x 5-6 µm turvulis, 7-septatis, non-constrictis, fuligi-neis; paraphysibus bacillaribus, 4-5 µm, crass., apice vehementer circinatis, septatis.

Hab. : Solum udum umbra silva Salvan (Distt.-Kolhapur) Sept.9, 1985, D.N.Ghadge, WIF No.17.

Fructifications 1-7 cm in length, clavula 5-10 x 5 mm, cylindrical to ligulate, brownish-black, stipe 1-5.5 x 3-5 mm, terete, squamulose, black; asci cylindrical-clavate, subsessile, pore blued by iodine solution, 8-spored, 205-230 x 16-20 µm; ascospores parallel, dark-brown, cylindric-clavate, 7-15-septate, (-76)80 x 100(-106) x 5-6 µm, parephyses numerous, longer than the asci, 5-6 µm at above, upper cell brown, coiled or circinate, septate, colourless below.

Anatomy : Ascigerous region textura sub-porrecta to almost textura intricata, hyphae loose, hypothecium brown, densely textura intricata, stalk textura porrecta, hyphae more compact, medulla textura porrecta.

Hab. : On damp humicolous soil amongst the leaf-litter under the shade, Radhanagari (Distt.-Kolhapur), Sept.11, 1985, D.N.Ghadge, WIF No.17.

Variation in Septation of discharged ascospores of Geoglossum umbritile var. longispora var.nov. a/

Table No.20 : Based on 200 ascospores observed and 10 matured ascocarps were studied.

Collection	No.of septa in %								
	7	8	9	10	11	12	13	14	15
Radhanagari 11.9.85	88	0	2	0	1	0	2	2	5

Table No.21 : Comparison of the present collection with varieties of G.umbratile

	Varieties	Ascocarps	Asci	Ascospores	No.of septa	Locality
1	Geoglossum umbratile var. umbratile	14-31 mm long	148-197 x 14-20 µm	60-83(-96) x 4-6 µm	7	China a/
2	G.umbratile var. heterosporum	14-22 mm long	132-165 x 17-20 µm	(-70)77-90 x 5-6 µm	7	Mussoorie (U.P.) India
3	Present material	30-80 mm long	205-230 x 16-20 µm	(-76)80-100 (-106) x 5-6 µm	7	Salvan

The present collection has found to be matched well (Table No.21) with G.umbratile Sacc. as far as the morphology and paraphyses are concerned but the ascocarps, asci and ascospores are much larger and therefore, a new variety has been proposed here to accomodate the present collection as G.umbratile var. longispora var. nova.

The ascospores of the present collection are 7-15-septate, but the percentage of the 7-septate is 88% and 9,11,13, 14,15-septate ascospores are in very low percentages.

Holotype : Geoglossum umbratile Sacc. var. longispora Sawant and Patil

Etymology : longispora - long ascospores, the variety is named after longer ascospores.

Type locality : Salvan (Distt.-Kolhapur);

Type specimen : In M.H.B.D., S.U.K., WIF No.17.

Geoglossum umbratile Sacc. var. umbratile Maas Geesteranus

Personia 4 : 36, 1965.

Text Plate No;5, Fig.No.7-9, Plate No.3, Fig.No.2.

Fructifications 1.5-3 cm long, clavula 2-10 x 1-3 mm, lanceolate to ligulate with narrow median groove and obtuse to sub-acute apex, dull dark brown to black; stipe 8.5-22.5 x 1.5-0.5 mm, terete, minutely squamulose to glabrous, dark brown; ascigerous region textura porrecta, hyphae upto 3.5-6 µm wide, hypothecium brown, textura intricata, stipe without differentiation of cortex and medulla, surface hyphae projecting as hairs and scales; asci clavate, inoperculate, 8-spored, tapering below, tip blued with iodine solution; 149-165 x 17-20 µm; ascospores acicular to somewhat fusiform, strictly 8-celled, brown smooth, 66-83(-90) x 3-5 µm; paraphyses discrete, 1.5-4 µm wide and colourless below, upper cells elongated upto 3-10 µm thick and pigmented remotely to moderately septate in the upper part, more or less constricted at the septa, straight to curved or coiled, the terminal cell sometimes abruptly enlarged.

Hab. : On soil, Panhala, (Distt.-Kolhapur), Aug.8, 1986, M.S.Patil, WIF No.18.

Variation in septation of discharged ascospores of Geoglossum umbratile Sacc. var. umbratile Maas Geesteranus expressed as percentage.

Table No.22 : (100 ascospores observed and 2 matured ascocarps studied).

Collections	No.cf septa in %						
	1	2	3	4	5	6	7
Panhala 8.8.1986	0	0	0	0	0	2	98

This variety has been reported by Tai (1944) from China. It is also reported from India by Batra and Batra (1963) and Thind (1961) from Mussorie Hills (U.P.) and Ahmad (1956) from W. Pakistan.

Collection made from only one locality. It shows strictly 7-septate ascospores and maximum percentage is 98%, rarely 6-septate ascospores also occured (2%). Present collection agrees well in respects of dimensions and morphology of ascocarps, ascospores and paraphyses except the asci and ascospores which are slightly larger and therefore, referred to G.umbratie var. umbratile Tai. It makes a new record to the fungi of the Maharashtra State.

Genus : Trichoglossum Boudier

Bull.Soc.Mycol.Fr. 1 : 110, 1885.

This genus was established by Boudier in 1885 with its type species : Trichoglossum hirsutum (Pers. ex Fr.) Boudier. It belongs to the family Geoglossaceae of the order Helotiales.

This genus is characterised by black or very dark purplish fruiting bodies, which become black after drying and with conspicuous, dark brown, pointed setae in the hymenium. It is also a fairly large genus in the family and studied extensively as Geoglossum by several workers from the different parts of the world. Morphology of the setae, asci, ascospores and paraphyses are the key characters to distinguish the species. Tai (1940) has key out about 15 species of Trichoglossum from China. This genus is poorly studied in India. Thind (1961, 63) and his co-workers have studied it from North India especially from Dehra-Dun and Mussoorie Hills. About 33 species of Trichoglossum have been reported from all over the world. Out of which 10 species have been recorded from India. The genus Trichoglossum have been reported in Maharashtra State by Patil and Patil (1980). All species show saprophytic mode of occurrence and grow in humus-rich soil under the shade of the forest trees. The conidial state was reported in Trichoglossum hirsutum (Persoon ex Fr.) Boud. but that requires cultural studies for its confirmation. There is much greater variation in the septation of the ascospores in Trichoglossum Boudier. Sharma (1987) considers only 18 species of this genus.

Key to species of Trichoglossum Boudier

1 Ascoma clavate, yellowish-brown and highly bristley ... ... T.radhanagarensis

1 Ascoma non-clavate, black and not bristly 2

2	Asci 4-spored		T.tetrasporum
2	Asci 8-spored		3
3	Ascospores 16-celled		T.hirsutum
3	Ascospores less than 16-celled		4
4	Ascospores less than 100 µm long		T.walteri
4	Ascospores more than 100 µm long		5
5	Ascospores 10-14 celled		T.variable
5'	Ascospores 8-9 celled		T.rasum
5"	Ascospores 0-10 celled		T.octopartitum
5"'	Ascospores 5-10 celled		T.wrighti

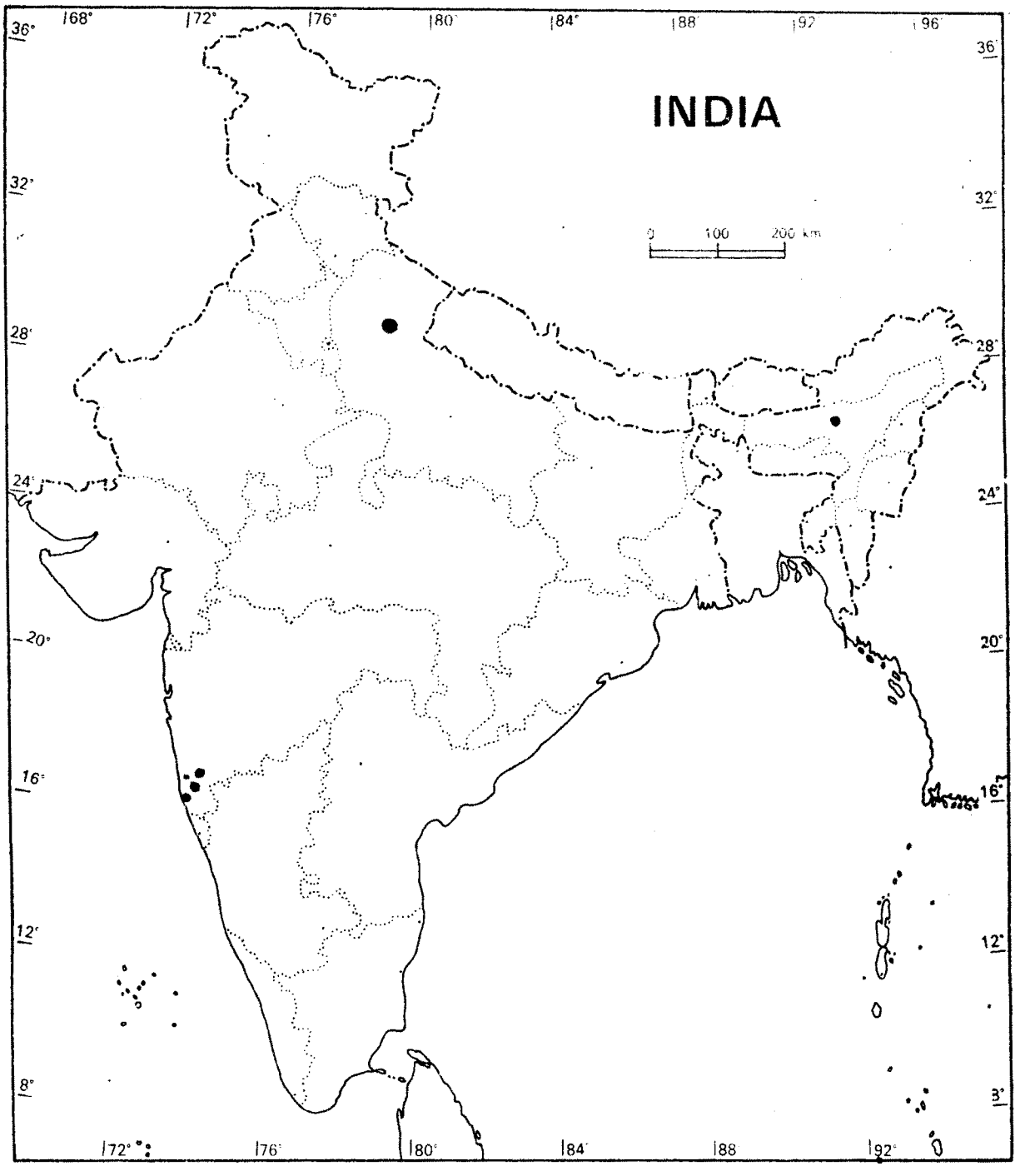
Key to the varieties of Trichoglossum hirsutum (Pers. ex. Fr.) Boudier

1	Ascospores strictly 15-septate ..	T.hirsutum var. hirsutum
1	Ascospores not strictly 15-septate ..	2
2	Ascospores mostly 15-septate and 168-198 µm long ..	T.hirsutum var. longisporum
2'	Ascospores 8-21 septate and 77-149 µm long ..	T.hirsutum var. heterosporum
2"	Ascospores 0-15 septate and 96-152 µm long ..	T.hirsutum var. irregulare

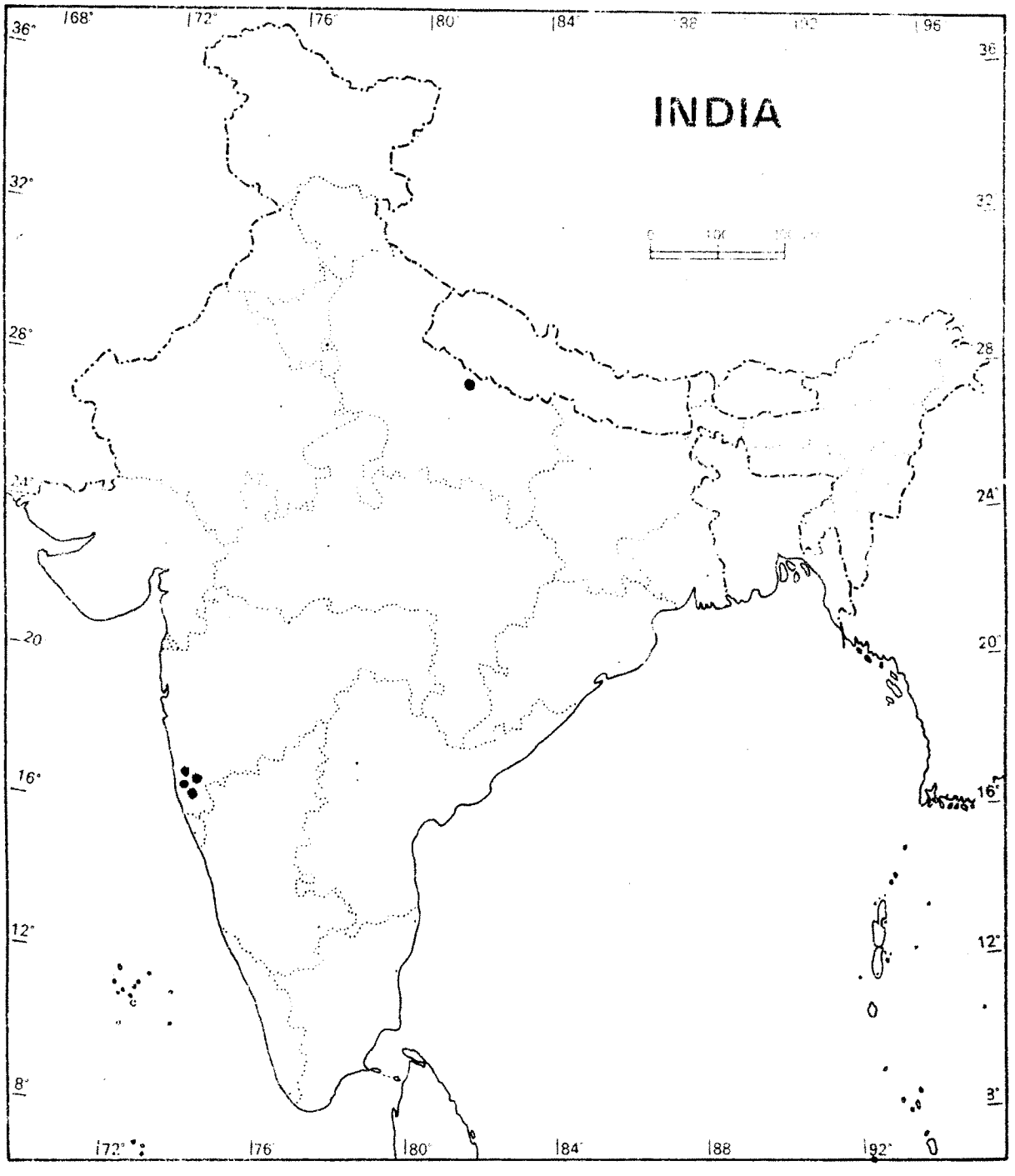
Trichoglossum hirsutum (Pers. ex Fr.) Boud.

Mycologia 46 :618, 1954.

Fructifications black or brownish-black, clavate to capitate, scattered to gregarious, solitary, entirely black and setose throughout, 1-7 cm long; ascigerous region pear-



- Trichoglossum hirsutum (Pers. ec Fr.) Durand.
- T. variable (Dur.) Nannfeldt.
- T. rasum Patuoillard.
- T. walteri (Berk) Durand.



- Trichoglossum octopartitum Mains.
- T. tetrasporum Sinden and Fitzp.
- T. wrighti Durand.
- T. radhanagerensis Patil and Patil.

shaped, head demarcated from stem, upto 2 cm long and 2-5 mm wide and compressed, apex, obtuse, hirsute; stipe slender, stout, clavato-cylindrical, narrowed below into stem-like base, inoperculate, pore blued with iodine solution, apices obtuse, 231-300 x 20-26 µm; ascospores parallel, fusoid-clavate, narrowing toward each end from the middle, smooth, thick-walled, dark-brown, 15-septate, 132-175 x 5.5-7 µm; paraphyses brown, cylindrical, moderately septate, somewhat enlarged and straight or curved to circinate above, hyaline and branched at the base; Ascigerous region textura intricata; light-brown, hyphae loose upto 6-7.5 µm wide, hypothecium brown, densely textura intricata, stipe not differentiated into cortex and medulla, wholly textura porrecta, surface hyphae projecting into black setae, hymenial setae 120-360 x 8-16(-24) µm, pointed at apex, swollen at the middle and at the base, opaque, black, thick-walled; a/ stipe setae 100-380 x 6-24 µm, black, opaque, thick-walled, a/ pointed at apex, longer than asci.

Hab. : On damp humicolous soil under the shade of forest trees, Radhanagari, Amba and Panhala (Distt.-Kolhapur) in Sept.1985 and 88, R.S.Sawant, WIF No.19.

This species has been reported by Mains (1954) from Michigan (N.America). Present collection agrees well in respects of morphology and dimensions of ascocarps, ascospores paraphyses and setae and thus, referred to it.

Trichoglossum hirsutum var. heterosporum Mains

Mycologia 46 : 620, 1954.

Text Plate No.6, Figs.1-5; Plate No.5 &6, Figs.No.2 & 5.

Ascocarps scattered to gregarious, black or brown, 2-6 cm long, clavate to capitate, ascogenous portion compressed, upto 1-2 cm long, 2-7 mm wide, spatuulate, 1-3 mm thick; asci clavate, 8-spored, inoperculate, pore blued by iodine solution, 196-258(-204) x 17-24 µm; ascospores fusoid-clavate, parallel, smooth, thick-walled, dark brown, with great range in variation of septation i.e. 7 to 21-septate, (98-)116-160(-170) x 5-7 µm, narrowing to the both ends from the middle; paraphyses cylindrical, straight or slightly curved, brown, 3-5 µm broad above, longer than the asci, colourless below, ascigenous region textura intricata, light brown, hypothecium brown, densely textura intricata, wholly textura porrecta, surface hyphae projecting into black setae; Hymenium setae 200-340 x 6-12 µm, pointed at apex, swollen at the base, opeque, thick-walled, black, straight or slightly curved, setae of the stipe longer, swollen at the base, weavy, 120-380 x 6-16 µm.

Hab. : On damp humicolous soil under the shade of forest trees, Radhanagari, Manjarkhind, Salvan and Panhala (Distt.-Kolhapur), , D.N.Ghadge and R.S.Sawant, WIF Nos.20a, 20b, 20c, 20d.

Variation in the septation of discharged ascospores of Trichoglossum hirsutum var. heterosporum Mains expressed as percentage.

Table No.23 : (Based on 750 ascospores observed and hundred matured ascocarps were studied).

Collections	No.of septa in %														
	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Salvan 8.9.85	5	0	1	10	15	2	6	16	32	4	2	2	2	2	1
Radhanagari 19.9.85	10	0	1	10	5	5	5	10	40	2	2	4	3	2	1
Manjarkhind 24.8.88	4	0	1	0	0	0	5	8	63	9	6	0	2	2	0
Amba 22.9.85	5	0	2	1	5	5	5	10	60	2	2	0	0	2	1
Panhala 11.9.88	2	0	0	0	2	0	0	15	66	5	6	2	0	2	0
Panhala 30.9.88	1	0	1	1	0	2	2	11	66	1	2	1	1	2	0

This variety has been reported from America (Mains, 1954). The present collections collected from four different localities agree well in respect of morphology and dimensions of ascoma, asci, ascospores and setae and therefore, referred to it. This variety is distinguish or characterised by its ascospore septation i.e. 8-21 septate. The species viz. T.hirsutum is based on its 15-septate ascospores, but no. of septa here vary from 7-21. The five collections collected from four different localities matching well in respect of septation of ascospore character (Table No.23). All these five collections showing maximum percentage of 15-septate ascospores but more than 15-septate and less than 15-septate ascospores also observed, but its percentage is ranging from 1-14 and 1-6. The collection from Manjarkhind, Amba and Panhala showing maximum percentage of 15-septate ascospores. It makes a new record to the fungi of India.

Trichoglossum hirsutum var. irregulare Mains

Mycologia 46 : 619, 1954.

Text Plate No.7, Fig.Nos.1-5, Plate No.4, Fig.No.2-5,7-9.

Fructifications 3-6 cm high, ascogenous portion 0.5-2 cm broad, 1-2.5 cm long, spatulate, flattened, folded, ligulate to lanceolate, with or without median groove, dull, brownish-black, stipe 9-30 x 0.5-1.5 mm, flattened, densely setose, black and cylindrical; asci 8-spored, inoperculate, clavate,

pore blued with iodine solution, narrowing towards base, (190-)200-240(250) x 16-24 µm; ascospores parallel, fusoid, clavate, smooth, brown, thick-walled, (83-)96-152(-164) x 5-7 µm, 8-15-septate; paraphyses colourless to brown above, longer than asci, straight or curved above, 2-5 µm broad, remotely septate; ascigerous region textura intricata, light brown, hyphae loose upto 5-6 µm wide, hypothecium brown, densely textura intricata; hymenial setae 120-340 x 8-24 µm, black, thick-walled, opeque, pointed at the apex, swollen at middle, numerous, projecting well beyond the surface of the hymenium; stipe setae 140-360 x 8-26 µm, black, thick-walled, opeque, pointed to both the ends, swollen at the middle and at the base, weavy, slightly longer than hymenial setae.

Hab. : On damp hymicolous soil amongst leaf litter under the shade of forest, Salvan, Radhanagari, Manjarkhind, Amba and Panhala (Distt.-Kolhapur), 8.9.85, 30.9.85, 27.8.88, 22.9.85 and 30.9.88, D.N.Ghadge and R.S.Sawant, WIF Nos.21a, 21b, 21c, 21d, 21e.

Variation in the septation of discharged ascospores of T.hirsutum var. irregulare Mains expressed as percentage.

...

Table No.24 : (Based on 5775 ascospores observed and five hundred matured ascocarps were studied).

Collections	No.of septa in %										
	7	8	9	10	11	12	13	14	15	16	17
Radhanagari, Sept.,1980.	0	0	0	0	0	0	0	10	90	00	0
Radhanagari 30.9.82	0	0	0	0	0	0	5	20	25	0	0
Radhanagari Sept. 1985	12	0	6	0	3	2	12	13	50	2	0
Radhanagari 3.9.85	5	0	0	0	0	0	5	20	70	0	0
Salvan 8.9.85	0	0	0	0	0	0	0	20	80	0	0
Radhanagari 19.9.85	11	0	0	0	0	0	0	10	70	4	5
Manjar Khind - 27.8.88 Collection Nos.											
1	3	0	0	3	0	2	13	10	76	3	0
2	0	0	0	0	0	0	0	9	83	8	0
3	4	0	0	0	0	6	0	10	80	0	0
4	7	0	0	3	2	0	7	20	61	0	0
5	0	2	0	0	0	0	0	8	90	0	0

Table No.24 (Contd..)

Collections	No.of septa in %										
	7	8	9	10	11	12	13	14	15	16	17
6	0	0	0	0	3	3	0	9	85	0	0
7	10	0	3	1	2	0	6	15	60	3	0
8	10	0	0	0	0	0	6	20	58	6	0
9	10	0	4	0	0	0	6	10	70	0	0
10	4	0	0	0	0	6	0	10	80	0	0
11	0	0	4	0	6	0	2	14	66	8	0
12	11	3	8	1	0	1	6	15	55	2	0
13	0	0	0	0	0	0	0	20	80	0	0
14	8	0	0	0	0	0	0	12	80	0	0
15	3	0	0	0	0	0	0	7	90	0	0
16	0	0	0	0	0	0	0	6	90	2	2
17	5	0	0	0	0	0	0	22	73	0	0
18	1	0	0	0	0	0	0	13	80	2	2
19	6	0	0	0	9	0	0	0	70	3	6
20	10	0	1	0	7	2	6	10	60	4	0
21.	0	2	0	0	0	1	0	15	80	2	0
22	0	0	0	0	2	2	6	12	75	3	0
23	3	0	0	0	0	0	0	15	80	0	2
24	8	0	0	0	0	0	1	21	70	0	0
25	10	0	0	0	0	0	0	20	70	0	0
26	7	0	3	0	2	0	5	10	65	7	4

Table No.24 : (Contd..)

Collections		No.of Septa in %										
		7	8	9	10	11	12	13	14	15	16	17
27		5	0	0	0	0	0	0	15	80	0	0
28		8	0	3	1	0	2	4	10	70	2	0
Amba 22.9.85 Ama	Collection Nos.	0	0	0	0	0	0	0	5	95	0	0
22.9.85 Ame'		6	0	0	0	0	4	0	0	90	0	0
22.9.85 Ams		3	0	0	2	0	0	2	5	88	0	0
22.9.85 Amt		6	0	2	0	0	0	5	3	90	0	0
22.9.85 Amw	1	5	0	0	0	0	5	0	0	90	0	0
	2	0	0	0	0	0	0	0	20	80	0	0
	3	10	0	0	0	4	8	12	12	50	4	0
	4	8	0	0	8	0	0	0	16	68	0	0
	5	0	0	0	0	0	0	0	10	90	0	0
	6	0	0	0	0	0	0	0	10	85	5	0
	7	2	0	0	0	0	0	0	8	90	0	0
	8	9	0	0	0	5	6	12	12	48	8	0
	9	7	0	2	3	7	4	9	15	53	3	0
	10	5	0	0	0	2	2	3	13	75	0	0
	11	6	0	2	0	0	8	0	18	64	0	0
Panhala 30.9.88	1	4	2	0	0	8	4	8	14	60	0	0
	2	0	0	2	4	10	2	4	10	68	0	0
	3	3	0	0	0	1	0	0	8	80	5	3
	4	2	2	2	0	0	0	5	10	72	7	0

Mains (1954) reported this variety from Washington (U.S.A.). This variety is characterised by its 0-15 septate ascospores. The variations in irregular septation due to irregulare failure of 1 or more septa. This variety is basically 15-septate. Less than 15-septate or more than 15-septate i.e. 16 or 17-septate spores also produced. The frequency of 0-6-septate is very less or all together absent except in 1 or 2 collections suggested by Mains. The same feature has been also recorded in more than fifty collections collected from four different localities (Table No.24). In all these collections maximum percentage of 15-septate ascospore is observed and 14-septate is the next. The frequency of 7-septate ascospores is next to 14-septate. The less than 7-septate ascospores are very meagre and therefore, not recorded in the table. Patil and Patil (1980) have reported T.durandii Teng from Maharashtra but the material of this species collected from Radhanagari in 1977 has been restudied and found that this material did not show the characteristic feature of T.durandii Teng especially on the basis of the characteristic of septation of the ascospores. The ascospores of this material showing 0-15 septate ascospores. The percentage of 15-septate ascospore is maximum (85%). On the basis of this feature this material matched well with T.hirsutum var. irregulare Mains and thus, transferred it to this variety.

Trichoglossum hirsutum var. longisporum (Tai) Mains

Mycologia 46 : 619, 1954.

Text Plate No.8, Figs.1-5; Plate No.4,5,6, Fig.Nos.1,6,9,4.

Ascocarps black to brown, scattered to gregarious, 4-8.2 cm long, clavate, fertile portion upto 0.5-2 cm long, about 0.4-0.8 cm broad and 1-2 mm thick, spatuulate, folded, sometimes with median groove, hirsute; stipe slender black, hirsute and 2-3 mm thick; asci clavate, 8-spored, inoperculate, pore blued by iodine solution, 190-250(-264) x 20-22 µm; ascospores acicular, parallel, narrowing towards both the ends from above the middle, smooth, dark brown, mostly 15-septate, 159-198(-200) x 5-7 µm; paraphyses cylindrical, straight or curved, 4-8 µm wide above, moderately septate, brown above, colourless below; Ascigerous region textura intricata, light brown, hypothecium brown, stipe not differentiated into cortex and medulla; hymenial setae projecting beyond the hymenium, 120-420 x 10-16, numerous, thick-walled, almost black and opaque, sometimes septate, pointed at both the ends, swollen in the middle, stipe setae numerous, black, thick-walled swollen at the base, 95-304 x 6-10 µm, smaller than hymerial setae, opeque and pointed at the apex.

Hab. : On damp humicolous soil under the shade of forest, Radhanagari, Salvan, Manjarkhind, Amba and Panhala, 3.9.85, 23.9.85, 24.8.88, 20.9.88, and 6.9.88; D.N.Ghadge and R.S. Sawant, WIF Nos.22a, 22b, 22c, 22d, 22e.

Variation in the septation of discharged ascospores of T.hirsutum var. longisporum (Tai) Mains expressed as percentage.

Tai (1944) describe this variety as a species of T.longisporum Tai on the basis of measurement of asci (237-281 x 19-25 µm) and ascospores (156-190 x 6-7 µm). But Mains considered this species as a variety of Trichoglossum hirsutum and proposed a new combination as Trichoglossum hirsutum var. longisporum (Tai) Mains Comb. nova. It is characterised by longer and 15-septate ascospores. This variety has been recorded from China and America. Present collections collected from five different localities agreed well in respect of morphology and dimension of ascospores and therefore, referred to it. In this variety spores are mostly 15-septate while less than 15-septate and more than 15-septate ascospores have been also observed in the presentccollections. The number of septa of the ascospores being observed from 7-17, but 13,14 and 15-septate ascospores are dominant (Table No.25). The formation of more than 15-septate ascospores may be due to 1 or 2 additional septa. Chinese and American collections do not show such variations. Agnihothrudu and Baruo (1962) have recorded this variety from Cinnamara (Assam). It is a new record to the fungi of the Maharashtra State.

Trichoglossum octopartitum Mains var. heteroseptata var.nova

Text Plate No.9, Fig.No.1-4, Plate No.5, Fig.No.1,5.

Ascomatibus gregariis, atris clavato, brunneisnigra, hirsutis, 2-8.5 cm longa, clavula ovata plus minus branchis,

Table No.25 : (Based on 1325 ascospores observed and two hundred matured ascocarps were studied).

Collections	No.of septa in %										
	7	8	9	10	11	12	13	14	15	16	17
Salvan - 23.9.83	8	0	4	1	1	2	7	16	53	6	2
Salvan - 8.9.85	0	0	0	0	0	10	10	15	50	10	5
Radhanagari - 30.9.82	7	0	0	0	0	2	13	13	51	10	4
Radhanagari - 3.9.85	0	0	0	0	0	10	10	15	50	10	5
Manjarkhind - 24.8.88-a	10	0	1	0	0	0	5	13	60	9	3
24.8.88-b	12	0	0	0	0	0	6	10	68	4	0
27.8.88	0	0	0	0	0	0	0	10	85	5	0
Amba - 22.9.85	0	0	0	0	0	0	0	20	80	0	0
- 22.9.85 S	0	0	0	0	0	0	0	5	95	0	0
- 22.9.85 W	5	0	0	0	0	0	5	0	90	0	0
- 20.9.88 a	8	0	0	0	0	0	13	16	58	5	0
- 20.9.88 b	2	0	0	0	6	2	12	20	58	0	0
Panhala - 6.9.88	0	8	0	0	0	0	0	12	80	0	0
- 20.9.88	2	0	0	1	1	1	3	14	82	0	0

obtusa, compressa, 5 mm-3 cm long, setalis, brunneis, rigidis, acutis, asci octospori, cylindrical clavati, sub-sessiles, porus iodatus, inoperculate, 160-220 x 16-22 µm, ascosporidis paraplellae, atrobrunneae, cylindraceae, leaves (102-)120-150 (-157) x 5-7 µm; 7-10 septatae, subfusiformis-clavatis vel attemuatis ambo extremis, septa non-constrictus, rectus vel letiver curvatus; paraphysibus numerosisilmus 160-230 x 3.5 µm, ɜemues, septatis, levitersursus amplificati, apex brunneus, plus minusve curvatus, setae numerosae, crussiseptatae, nigri opacae, rigidae, acutae ambo extremis, ultra poginam hymenii projectanes.

Habitato : Solum udum umbra silva, Panhala (Distt.-Kolhapur), D.N.Ghadge, WIF No.23.

Ascocarp gregarious or scattered, clavate, brownish-black, hirsute, 2-8.5 cm long, ascogenous portion ovate, sometimes branched, 0.5-3 cm long, spathulate, compressed, obtuse and setose; asci 8-spored, cylindric-clavate, sub-sessile, pore blued by iodine solution, inoperculate, 160-220 x 16-22 µm; ascospores parallel, dark brown, cylindrical, smooth, (102-) 120-150(-157) x 5-7 µm, 7-10 septate, sub-fusiform-clavate or attenuated to both ends, straight or slightly curved, paraphyses numerous, straight, cylindrical, septate, 3-7 µm broad above, apex brown, plus or mimus curved; hymenial setae numerous, thick-walled, black, stiff, acute to both ends, projecting beyond the asci, swollen at the middle and the base, pointed at apex,

160-360 x 4-14 µm; stipe setae 120-280 x 6-8 µm, swollen at middle, pointed at apex, opeque, thick-walled, black, shorter than hymenial setae.

Hab.: On damp humcolous soil under the shade of forest, Panhala, D.N.Ghadge, and R.S.Sawant, Aug. and Sept. 1985 and 88 respectively, WIF Nos.23.

Variation in the septation of discharged ascospores of T.octopartitum Mains var. heteroseptata var. nova

Table No.26 : (Based on 655 ascospores observed and seventy five matured ascocarps were studied.)

Collections	No.of septa in %			
	7	8	9	10
Panhala :				
15.8.85	42	45	13	0
9.9.85	65	20	15	0
6.9.88-a	22	26	42	10
6.9.88-b	14	14	52	21
11.9.88	28	34	32	6
30.9.88-a	14	26	52	8
30.9.88-b	16	48	32	4

The present collections on the basis of morphology and dimensions agreed well to Trichoglossum octopartitum Mains but

differ in respect of ascospore septation. This species shows strictly 7-septate ascospores but in the present collections collected from Panhala many a times showing strictly 7-9 septate ascospores. On the basis of this septation of ascospores which do not match to the two previously studied varieties of this species and therefore, a new variety has been proposed here to accommodate the present collection as Trichoglossum octopartitum var. heteroseptata var. nova. The percentage of 7-8 and 9-septate ascospores observed in some what equal percentage (Table No.26). In some collections 10-septate ascospores have been also observed but the frequency in terms of percentage is quite low except in two cases.

Table No.27 : Comparison between Trichoglossum octopartitum and present material.

Species/ material	Ascocarps	Setae	Asci	Ascospores	Septa	Remark
T.octopartitum	1.5-4 cm long	throughout	170-200x 18-20 µm	(80-)100-120(-150) x 4-5.5	7 rarely less	T.octopartitum Mains
Present collection						
1 Panhala	1.5-3.5 cm long	,,	(160-) 180-200x 16-23 µm	98-125 (-150) x 5-7 µm	7-8	T.octopartitum var.octopartitum Mains
2 Radhanagari Panhala	1.5-8 cm long	,,	(150-)175-225x16-22 µm	(96-)110-140(-150) x 5-7 µm	0-9	T.octopartitum var. irregulare
3 Panhala	2.8-5 cm long	,,	160-220 x 16-23 µm	(100-) 120-150 x 5-7 µm	7-10	T.octopartitum var.heteroseptata

Variety typica	: T.octopartitum Mains var. heteroseptata var.nova Sawant and Patil
Etymology	: heteroseptata - different septate - the variety is named after the variation in septation of the ascospores.
Type locality	: Panhala (Maharashtra State)
Type specimen	: Deposited in M.H.B.D., S.U.K., WIF No.23.

Trichoglossum octopartitum Mains var. irregulare var.nov.

Text Plate No.9, Figs.5-8, Plate No.5 & 6, Fig.No.4,& 3.

Ascomatibus gregariis, altris, clavata, brunneis-nigra, hirsutis, 1.5-8 cm longa, clavula ovata, obtusa, compressa, 2-10 mm long; setalis bruneis, rigidis, acutis, asci octospori, cylindraci-clavati, sub-sessile, porus iodatus, cyanens, inoperculati, (150-)170-225(-250) x 16-22(-24) µm; ascosporidis paraplellae, atrobrunnese, cylindraceae 0-9 septatae, leaves, fusiformibus-clavalis, attemuatis (-96)110-140(-150) x 5-7 µm, rectus vel letiver, curvatus, paraphysibus mumer osissimus, tenues, septati levitersursum amplificata, apex bruneus plus minusve curvatus, setae numerose crossiseplatae, nigri, rigidae, acutae, ambo extremis utra paginam hymenii projectanes, 200-342 x 6-10 µm.

Hab. : Solum udum umbra silva, Radhanagari, Aug.,1975, M.S.Patil, WIF No.24.

Ascocarps gregarious or clustered, clavate, black, hirsute, clavula much flattened and sometimes branched, 1.5-8 cm long, ovate, obtuse, compressed 2-10 mm wide; asci 8-spored, cylindrical-clavate, sub-sessile, pore blued by iodine solution, inoperculate (150-)170-225(-250) x 16-22(-24) µm; ascospores parallel, dark-brown, cylindrical, sub-fusiform, clavate, attuneated to both the ends, (96-)110-140(-150) x 5-7 µm, 0-9 septate, straight or slightly curved; paraphyses numerous, slender septate, longer than asci, 2-5 µm broad above, apex brown, more or less curved; hymenial setae thick-walled, black, opeque, acute to both the ends, 170-342 x 6-10 µm, swollen at middle, stipe setae black, thick-walled, opeque, swollen at middle, pointed at the apex, 190-380 x 6-14 µm, longer than hymenial setae.

Hab. : On damp humicolous soil under the shade of forest, Radhanagari (Distt.-Kolhapur), M.S.Patil, Aug.1975, WIF No.24. a.

The same variety has been also recorded from Manjar-khind and Panhala. 24b, 24c.

Variation in the septation of discharged ascospores of T.octopartitum Mains var.irregulare var. nova

Table No.28 : (Based on 900 ascospores observed and fifty matured ascocarps were studied).

Collections	No.of septa in %									
	0	1	2	3	4	5	6	7	8	9
1. Radhanagari 1975	10	11	2	12	4	3	6	40	9	3
2. Radhanagari 30.9.82	3	0	2	5	12	7	12	13	16	30
3. Radhanagari 11.9.85	0	0	4	4	8	12	24	44	4	0
4. Manjarkhind 9.10.88	4	4	4	12	8	0	20	48	0	0
5. Panhala 7.9.84	4	14	12	26	8	6	6	6	8	8
6. Panhala 30.9.84	2	0	2	9	2	3	8	23	33	18

Trichoglossum octopartitum Mains. is characterised by mostly 7-septate and fusoid to fusoid-clavate ascospores but the present collections collected from four different localities from 1975-1988 showing variations in ascospore septation while the basic character of these collections matched well to T.octopartitum. On the basis of variation in ascospore septation which observed from 0-9-septate and therefore, a new variety has been proposed here to accommodate these collections as T.octopartitum Mains var. irregulare var.nova. The maximum percentage of the ascospore is found to be 7-septate (13-48%) while less than 7-septate ascospore percentage is low; more than 7-septate i.e. 8-9 septate ascospores have been also observed.

Variety typica : T.octopartitum Mains var. irregulare var. nova Sawant and Patil

Etymology : The variety is named after the irregulare septation in ascospores.

Type locality : Radhanagari (Maharashtra State).

Type specimen : Deposited in M.H.B.D., S.U.K., WIF No.24.

Trichoglossum octopartitum Mains var. octopartitum Mains

American J.Bot. 27 : 325, 1940.

Text Plate No.10, Fig.Nos.1-4, Plate No.5, Fig.No.8.

Ascocarp clavate 1.5-3.5 cm long, black, hirsute, ascogenous portion 1/4th to 1/3rd of the length, 3-6 mm wide, much compressed; setae dull, black, rigid and acute; asci clavate, 8-spored, pore blued in iodine solution, inoperculate, tapering below into short stem-like base, (160-)180-200(-225) x 16-23 µm; ascospores fusiform, clavate, parallel, attenuated to both ends, 98-125(-150) x 5-7 µm, strictly 7-septate; paraphyses straight to coiled, septate, enlarged above, 2-4 µm broad, brown, septate, longer than asci; hymenial setae 100-270 x 4-10 µm, broad at base, thick-walled, black, opaque, pointed at the apex, stipe setae, longer than the hymenial setae.

Hab. : On damp humicolous soil under the shade of forest, Radhanagari (Distt.-Kolhapur), Oct.9, 88, R.S.Sawant, WIF No.25a.

The same variety has been repeatedly collected from Amba and Panhala. 25b, 25c.

Variation in the septation of discharged ascospores of T.octopartitum var. octopartitum Mains expressed as percentage.

Table No.29 : (Based on 1000 ascospores observed and seventy five matured ascocarps were studied).

Collections	No.of septa in %	
	7	8
Radhanagari :		
3.9.85	98	2
7.9.85	100	0
9.10.88	100	0
Amba - 20.9.85	93	7
Panhala :		
7.9.84	100	0
8.8.85 - A	97	3
8.8.85 - B	100	0
15.8.85	100	0
30.9.88	100	0

Mains (1954) reported this species from America. This species is distinguished from T.walteri (Berk.) Durand and T.confusum Durand which have also regularly 7-septate ascospores, by its fusoid to fusoid-clavate and longer ascospores. On the basis of morphology and dimensions of ascospores the present collections collected from two different

localities agreed well to this species and thus referred to it. In the present investigation, large no.of collections were made and studied in respects of morphology and dimensions they matched well with T.octopartitum Mains except the septation of the ascospores. These are as follows :

One group of collections showing strictly 7-septate ascospore; second group shows the 6-9-septate ascospores and in third group 7-10-septate ascospores. On the basis of these features these collections were accommodated into three new varieties viz. T.octopartitum var. octopartitum Mains (7-8-septate), T.octopartitum var. irregulare var. nov. (0-9-septate) and T.octopartitum var. heteroseptata var. nova.

Trichoglossum radhanagarensis Patil and Patil

Journal of Shivaji University (Sci.) 20 : 70-71, 1980.

Text Plate No.10, Figs.5-8, Plate No.5, Fig.No.3.

Fruiting bodies separate, sub-sessile, slender and club-shaped, yellowish-brown, highly bristly, 1-1.5 cm long, fertile portion thicker and not sharply delimited from the short stalk; fertile part circular in cross section and 900-1000 µm in diameter; asci cylindrical-clavate, sub-sessile, pore blued with iodine, 8-spored, 92-180 x 12-16 µm; ascospores lying parallel in the ascus or tetraseriate, dark-brown, cylindrical, 6-8-septate, smooth, upper apex obtuse and lower acute, non-constricted at the septa, straight or slightly curved,

56-92 x 4-6 µm; paraphyses numerous, slender, septate, slightly enlarged above, 3-4 µm broad, apex brown and more or less curved; setae numerous, thick-walled, almost black and opeque, stiff, pointed on the both end, projecting well beyond the surface of the hymenium, 375-825 x 10-24 µm.

Hab. : Collected on the damp soil under the shade in the forest of Radhanagari (Kolhapur), 12.9.76, M.S.Patil, HCIO-33163.

Variation in the septation of discharged ascospores of Trichoglossum radhanagarensis sp.nov. expressed as percentage.

Table No.30 : (Based on 100 ascospores observed and three matured ascocarps were studied).

Collections	No.of septa in %								
	1	2	3	4	5	6	7	8	9
Radhanagari, 12.9.76	0	0	0	0	0	35	40	25	0

The present collection is quite interesting and did not give in first sight the impression of the genus Trichoglossum because of its size, shape, colour and nature of setae. The ascocarps are clavate, cylindrical and no demarkation of fertile hymenium and stalk. Colour is yellow or yellowish brown and highly bristly even with naked eye we

can recognise long brown setae. Such characters in combination did not known to occure in any species of the genus Trichoglossum Boud., on the basis of these features the authors have proposed a new species viz. Trichoglossum radhanagarensis sp.nova. It can only matched in respect of its 7-septate ascospore character to the species of Trichoglossum Boudier. But differs in other respects. The ascospore show 6-8 septate character in which the percentage of 6 and 7-septate ascospores is approximately identical. Rarely 8-septate ascospores were also observed (Table No.30).

Trichoglossum rasum Patouillard

Bull.Soc.Mycol. 25 : 130, 1909.

Text Plate No.11, Fig.Nos.3-4; Plate No.5, Fig.No.7.

Ascocarps brownish-black, clavate to broadly spathulate, 2-5 cm long, fertile portion 10 x 1 mm, ligulate, with obtuse apex, finely setose, stipe 4 x 0.5-0.8 mm, terete, setose and black; asci clavate, (165-)208-231(-250) x 16-20 µm, 8-spored, inoperculate, narrowing toward the base, pore blued by iodine solution; ascospores mostly fusoid-clavate to fusoid, sometimes very variable and abnormal in shape, (70-) 119-145(-190) x 5-6 µm, 3-5-9-septate, rarely more, mostly 6-9-septate and brown; paraphyses 3-6 µm wide and fairly dark brown about, 2-3 µm wide and colourless below, curved to coiled, remotely septate and adhering, longer than asci; hymenial setae abundent, dark-brown, thick-walled, projecting

beyond the hymenium, swollen at middle, sometimes at base, sometimes broader at apex, 230-300 x 4-8 µm; stipe setae 220-270 x 6-8 µm, swollen at the base, black, thick-walled, opaque, shorter than hymenial setae.

Hab. : On damp humicolous soil, amongst leaf-litter under the shade of forest trees, Radhanagari (Distt.-Kolhapur), Aug.84 and Sept.17, 85, D.N.Ghadge, WIF No.26.

Variation in the septation of discharged ascospores of Trichoglossum rasum Patouillard expressed as percentage.

Table No.31 : (Based on 200 ascospores observed and six matured ascocarps were studied).

Collections	No.of septa in %								
	1	2	3	4	5	6	7	8	9
1. Radhanagari Sept., 84	0	0	2	0	2	7	40	20	29
2. 17.10.85	0	0	5	0	1	12	24	22	36

This species has been reported from America, Cuba and Panama (Mains, 1954). This species in most of the respects resembles to T.wrightii as and T.velutipes and created a lot of confusion to distinguish it. It is characterised by its 6-9-septate ascospores and asci having 8-spored. The septation of ascospores show a great variation especially also in size, number and shape and therefore, considered it genetically

unstable. The present collection collected from Radhanagari twice agreed well in respects of morphology and dimensions of ascocarps, asci, setae, paraphyses and number of septation of ascospores, which are 3-9-septate; but the percentage of 7,8 and 9-septate ascospores is maximum (Table No.33) and therefore, the present collection has been referred to T.rasum Patouillard. Patil and Patil (1980) have reported T.pumilum Wint. from Maharashtra. The restudy of their collection suggested that the material has been erroniously identified as T.pumilum Wint. but it matched well in respect of ascospore septation where in ascospores are 7-9-septate. On the basis of this feature it has been transferred to T.rasum Patuillard.

Trichoglossum tetrasporum Sinden and Fitzp.

Mycol., 22 : 60, 1930.

Text Plate No.12, Fig.Nos.1-4; Plate No.6, Fig.No.7.

Ascocarps scattered to crowded, black or brownish-black, clavate, 2-5 cm long; ascogenous portion 1/4th of the length of ascocarps, compressed, 2-10 mm wide, hirsute; stipes slender, terete, 1-2.5 mm thick, hirsute; asci 4-spored, clavate, narrowing at the base forming stalk inoperculate, pore blued by iodine solution, 231-274 x 20-23 µm; ascospores fasciculate, tapering both ways but more on the lower sides, cylindrical, smooth, brown, thick-walled, 130-160 x 5-7 µm and 7-15 septate; paraphyses brown, moderately septate, cylindrical, 3-4 µm broad above, slightly longer than asci, curved to

circinate; hymenial setae dark brown, projecting above the hymenium, 100-300 x 8-12 µm, broad at the base; stipe setae black, thick-walled, opeque, swollen at the base, pointed at apex, 200-250 x 8-10 µm; ascigerous region textura intricata, light brown, hyphae loose, hypothecium brown, densely textura intricata, stem not differentiated into cortex and medulla, wholly textura porrecta, surface hyphae projecting into black setae of the stipe.

Hab. : On damp hymicolous soil under Bamboo forest, Radhanagari (Distt.-Kolhapur), July 18, 1980, M.S.Patil, WIF No.27.

Variation in the septation of discharged ascospores of T.tetrasporum Sinden and Fitzp. expressed as percentage.

Table No.32 : (Based on 150 discharged ascospores and four matured ascocarps were studied).

Collections	No.of septa in %								
	7	8	9	10	11	12	13	14	15
Radhanagari 18.7.80	31	9	11	0	0	3	2	8	36

This species has been reported from America, Great Britain and China (Mains, 1954). Tai (1944) has described a 4-spored species viz. T.yunnanense Tai which is closed to T.longisporum and differs from it in having longer and narrower

asci, larger ascospores and by the shape of the ascospores. T.yunnanense Tai appears to be a longer, more variable septate spore variant of T.tetrasporum for which the name T.tetrasporum var. yunnanense (Tai) Mains has proposed. This is the most common species and characterised by its 4-spored asci but there are two more species of Trichoglossum Boud. viz. T.velutipes (Peck.) Durand and T.tetrasporum Sinden and Fitzp. in which asci are 4-spored. These two species can be distinguish on the basis of the septation of ascospores. The ascospores in T.tetrasporum Sinden and Fitzp. are 15-septate or variable in septation but many 15-septate, the ascospores in T.velutipes (Peck.) Durand are very variable in septation few or 15-septate. On the basis of this character the present name collection in which the ascospores showing 7-15-septate character, but the maximum percentage is of 15-septate ascospores (Table No.32) and therefore, referred to it.

The North American collection shows 0-17-septate ascospores in which 15-septate ascospores are most abundent, secondly the young ascus contains 8-spores of which only 4 develop in some asci, it was also noted that of these 4,only two become septate and other two remain non-septate and usually much lighter brown. It makes a new record to the fungi of India.

Trichoglossum variable (Dur.) Nannfeldt

Ark.Bot.(A) 30(4) : 64, 1942.

Text Plate No.11, Fig.No.5-7; Plate No.6, Fig.No.1,8.

Ascocarps dark brown to black, clavate, 4-6.5 cm long, fertile part ellipsoid to cordate, 10 x 2-5 mm, compressed hirsute; stipes terete, slender, 1-2 mm thick and hirsute; asci 8-spored, clavate, inoperculate, narrowing towards the base, pore blued with iodine solution, (170-)185-200(225) x 15-20 µm; ascospores sub-fusoid or fusoid-clavate, narrowing to base end from above the middle, (90-)135-150 x 5-7 µm, 1-9-15-septate, brown; paraphyses brown, highly septate at upper part, cylindrical below, 2-4 µm wide and colourless below, 5-6 µm wide and colourless to fairly brown above, curved; hymenial setae 200-500 x 12-18 µm, thick-walled, black, opeque, swollen at base and at middle; stipe setae 200-250 x 6-8 µm, swollen at the base, black, opeque, thick-walled, shorter than hymenial setae; ascigerous region textura intricata, hypothecium dark brown, densely textura intricata, stipe not differentiated into cortex and medulla, wholly textura porrecta, surface hyphae projecting into setae with light brown hairs.

Hab. : On damp humicolous soil among leaf litter under forest shade, Shelap, Radhanagari and Manjarkhind (Distt.-Kolhapur), 22.8.83, 17.8.86, 2.10.84 and 3.9.85, 11.9.85,D.N. Ghadge, WIF No.28a, 28b, 28c.

Variation in the septation of discharged ascospores of Trichoglossum variable (Dur.) Nannfeldt expressed as percentage.

Table No.33 : (Based on 750 ascospores observed and thirty matured ascocarps were studied).

Collections	No.of Septa in %																
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Shelap :																	
22.8.83	1	0	0	1	1	0	0	9	0	6	7	19	20	19	12	3	2
17.8.86	4	4	0	0	4	0	4	6	0	0	0	14	26	4	20	10	4
Radhanagari 2.10.84	0	0	0	0	0	0	0	0	0	20	20	40	10	8	2	0	0
Manjarkhind 3.9.85	0	0	0	0	0	1	0	0	0	10	30	40	15	2	2	0	0
Manjarkhind 11.9.85	0	0	0	0	0	0	1	1	0	18	20	40	10	8	2	0	0

This species was originally described by Durand (1908) as a form of T.hirsutum f. variable Durand differing in having 8-14-septate ascospores. Nannfeldt (1942) has raised this form to the status of a species as T.variable (Durand) Nannfeldt. On the basis as suggested by Nannfeldt that the method of septation is different from that in T.hirsulam (Pers.ex Fr.) Boud. and he has recognised as a separate species. He studied the discharged ascospores of eleven collections including the type for variation in septation. The overall variation in septation was found to be 4-16, as shown the collections differs some what in their variability with the maximum varying from 10-13. Trichoglossum variable is basically 11-septate and that variation from this is due to 1 or more septa failing to form or 1 or more super numerary septa being form. The pattern of variation is distinctly different from that shown by variable forms of T.hirsutum justyfying the recognition of a separate species. This species has reported from Sweden, China, Japan and India. The present collections collected from three different localities showing the same pattern of ascospore septation as suggest by Nannfeldt in which 11-septate ascospores are in maximum percentage while more than 11 and less than 11-septate ascospores have been frequently recorded. The maximum septation of ascospores are 16. Therefore, in these collections we observed from 0-16-septate ascospores but 11-septate ascospore is dominant and basic number. It makes a new record to the fungi of the Maharashtra State.

Trichoglossum walteri (Berk.) Durand

Ann.Mycol. 6 : 440, 1908.

Text Plate No.12, Figs.5-8; Plate No.6, Fig.No.6.

Ascocarps scattered to crowded, black to brownish-black, clavate, 3.5-5 cm long, fertile portion 10-15 x 3-5 mm, compressed, hirsute, ligulate, with median groove and obtuse apex, stipe terete, setose and black; asci 8-spored, inoperculate, narrowing towards the base, obtuse at apices, pore blued by iodine solution, (150-)160-210(-220) x 17-20 µm; ascospores cylindrical clavate to acicular, narrowing below, 71-107(-125) x 5-6 µm, light brown, mostly 7-9-septate; paraphyses light brown, cylindric, moderately septate, curved to circinate at the apices, brown, 2-3 µm wide and colourless below, 4-6 µm wide and fairly dark brown above, remotely septate; hymenial setae abundent, thick-walled, opeque, 200-300 x 8-12 µm, swollen at base, weavy, black, pointed at the apex, apex slightly curved; stipe setae 180-250 x 6-10 µm, swollen at the base, black, thick-walled opeque, shorter than hymenial setae; ascigerous region textura intricata, light brown, hyphae loose, hypothecium brown, wholly textura porrecta surface hyphae projecting into black setae.

Hab. : On damp, mossy soil in mixed deciduous forest, amongst leaf litter, Salvan (Distt.-Kolhapur), Sept.8, 85, D.N.Ghadge, WIF No.29.

Variation in the septation of discharged ascospores of Trichoglossum walteri (Berk.) Durand expressed as percentage.

Table No.34 : (Based on 100 discharged ascospores observed and five ascocarps were studied).

Collections	No.of septa in %									
	1	2	3	4	5	6	7	8	9	10
Salvan Distt.-Kolhapur 8.9.85	0	0	0	2	0	0	70	10	16	2

This species has been reported from America, Jamaica, Brazil, Europe, Australia, and Eastern Asia. It is characterised by the ascospores which are sub-cylindric or clavate-cylindric and less than 100 µm long. The present collection agreed well in respects of morphology and dimensions of ascospores except the ascospores sometimes slightly longer and therefore, referred to it. Its ascospores showing regularly 7-septate character. It resembles to T.octopartitum and T.kunmingense from China (Tai, 1944), but its spores are larger than these two species and considered it as intermediate species of T.octopartitum and T.walteri (Berk.) Durand. It has been also further suggested that T.walteri, T.octopartitum, T.kunmingense and T.confusum are closely related and suggested to unite them in one species (Mains, 1954). The

present collection as far as its ascospore septation is concern shows 4-10-septate ascospores but the percentage of 7-septate ascospore is maximum (Table No.34).

Trichoglossum wrighti Durand

Mycologia 13 : 187, 1921.

Text Plate 13, Fig.1-4, Plate No.5, Fig.No.6.

Fruit body separate, stalked, simple or terminally dichotomous, black, setose, 2-3 cm long; fertile part short-stalked, thicker and shortly delimited, spathulate, compressed, velvety, 2.5 x 5-7 µm, stalk slender, angular in cross section; asci cylindrical-clavate, 8-spored, pore blued by iodine solution, sessile, 165-200 x 15-20 µm; ascospores lying parallel in the ascus, brown, cylindrical, not constricted at septa, straight or curved, pointing towards the base, apex obtuse, 95-135 x 5-7 µm, 5-9-septate; paraphyses very numerous, slender, septate, brown, curved to coiled, longer than asci, 3-7 µm broad above, 2-3 µm broad below; hymenial setae projecting beyond and the hymenium, 140-280 x 8-12 µm, septate, opaque, black, thick-walled, swollen at both apex and at base; stipe setae black, opaque, thick-walled, 100-160 x 4-8 µm, swollen at base and at middle, shorter than hymenial setae.

Hab. : On damp soil under the shade of forest trees, Radhanagari (Kolhapur), Aug.18, 1977, M.S.Patil, HCIO-33164.

Variation in the septation of discharged ascospores of Trichoglossum wrighti Durand expressed as percentage.

Table No.35 : (Based on 100 discharged ascospores observed and one matured ascocarp studied).

Collections	No.of septa in %									
	1	2	3	4	5	6	7	8	9	10
Radhanagari 18.8.85	0	0	0	0	2	4	6	45	40	3

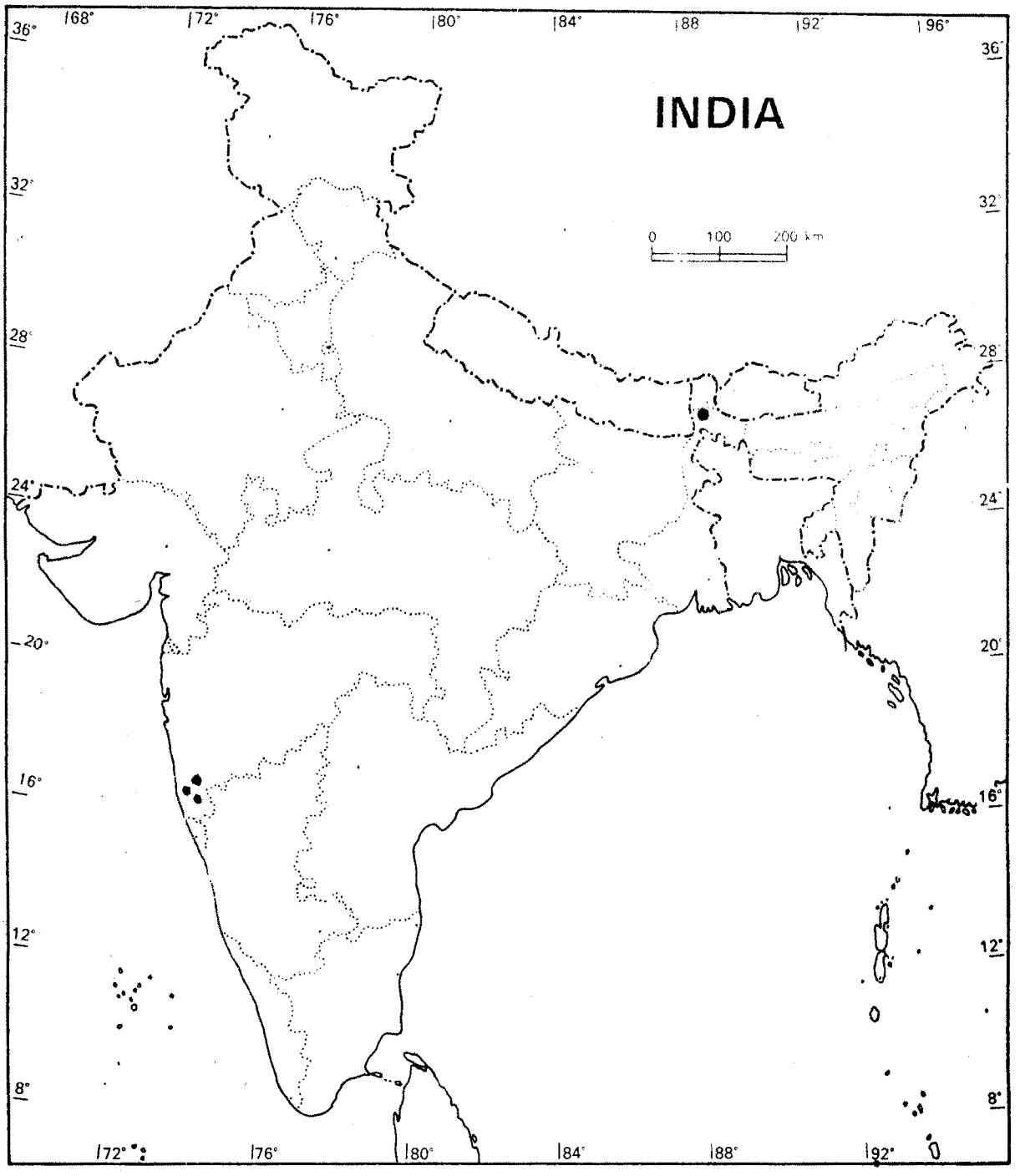
This species is characterised by its 8-9 and rarely 5,6 and 7-septate ascospores according to Tai (1944), who key out the species of the genus Trichoglossum Boud. from China. Present collection agrees in respect of dimensions of asci and ascospores, except that it shows occasionaly dichotomy of fruiting bodies and therefore, referred to it. The percentage of 8-septate and 9-septate ascospore is maximum i.e. 45% and 40%. Some of the spores also show 5,6 and 7-septate but its percentage is very low (Table No.35). This species have been recorded from Radhanagari (Patil and Patil, 1980).

Genus - Neolecta Spegazzini

Annal.Soc.Ci.Argent. 12 : 208-277, 1881.

The genus Neolecta was established by Spegazzini in 1881 with a type species N.flavoviresens Spegazzini. It is

the member of the family Geoglossaceae of the order Helotiales. It is characterised by its very irregular or deformed ascoma which are clavate, club-shaped, simple, fleshy, yellowish or golden yellow and frequently mystaken as Clavaria. Its ascospores are one-celled, hyaline, globose or ovoid. Hymenium without paraphyses and setae. Asci inoperculate and blued by iodine solution. There are, so far three species are known of this genus (Redhead, 1977). These three species can be distinguished on the basis of the shape of the ascospores, length of asci and ascospore and ascospores produced the conidia in one species. The type species is known from S.America while remaining two species recorded from N.Hemisphere. The genus has been recorded for the first time in India. There is a lot of contraversy regarding its systematic position in the class Discomycetes. Korf (1973) has classified it as a member of the family Geoglossaceae of the order Helotiales on the basis of its inoperculate asci. Redhead (1977) erected a new family for this genus viz. Neolectaceae of the order Lecanorales because of the anomaly of this genus which have no paraphyses, no croziers and presence of amyloid ascus wall except the genus Nothomitra Maas Geesteramus. The combination of amyloid ascus walls and an apical 'nasse' indicates that Neolecta Speg. is related to Lecanorales. But he further suggested that there are many differences between the genus Neolecta and the genera of the families of the order Lecanorales. Therefore, he tentatively placed it in the family Neolectaceae of the order Lecanorales and suggested to know its biology for better



- Neolecta vitellina (Bres.) Korf and Rogers.
- Spathularia flavida var. ramosa Mains.
- Thuemenidium macrospora Sp. nova

understanding. Because the members of this order are lichenized or closely related to lichenized genera. Eriksson (1984) placed this family in the order Pezizales as the doubtful family. He included in this order because the absence of paraphyses and lack of croziers also found in the genera of the family Morchellaceae (Boudier, 1905, 1910). Therefore, the genus shows a lot of contraversy as far as its systmatic position. In the present study for time being, this genus is considered as a member of the family Geoglossaceae as an anomalous member.

Neolecta vitellina (Bres.) Korf and Rogers

Phytologia 21 : 204, 1971.

Text Plate No.13, Figs.Nos.5,6; Plate No.7, Fig.1.

≡ Geoglossum vitellinum Bresadola, Rev.Mycol. 4 : 212, 1882;

≡ Mitrula vitellina (Bres.) Sacc., in Sacc. et Berl, 1885;

≡ Microglossum vitellinum (Bres.) Boud., 1885;

≡ Ascocoryneum vitellinum (Bres.) Ito et Imai, 1934;

≡ Spragueola vitellina (Bres.) Nannfeldt, 1942;

= ? Mitrula luteola Ellis, 1880.

Ascocarps scattered to crowded, clavate, 1-2.5 cm long; ascogenous portion obovoid, cylindric or clavate, cream yellow or bright yellow or ochraceous, drying light ochraceous salmon, stipe terete, 1-2.5 mm thick, white, translascent and fleshy; asci 8-spored, clavate to cylindrical, pore blued by iodine solution, inoperculate, apically papillate cytoplasmic body present, 68-78 x 5-6.2 μm; Paraphyses absent, ascospores

uniseriate below occasionally, obliquely biseriate above, one-celled, hyaline, thin-walled, ellipsoid or ovoid, smooth, non-septate, inmyloid, 3.5-4.5 x 2.5-4.2 µm; asci not produced by crozier and conidia were not observed.

Hab. : Among the decaying leaves under the shade in forest soil, Radhanagari (Distt.-Kolhapur), Sept.16, 1979, M.S.Patil, WIF No.30.

Korf and Rogers (1971) have reported this species from Canada. Present collection matched well in respect of morphology and dimensions of ascocarp, asci lacking croziers and asci showing apically papillate cytoplasmic body except the ascospores which are slightly smaller and not producing conidia. This is a new generic record to the fungi of India.

Genus - Spathularia Fries

Sys.Myc. 1 : 490, 1821.

The genus Spathularia was established by Fries in 1821 with a type species Spathularia flavida Fries. It belongs to the family Geoglossaceae of the order Helotiales. The genus is characterised by its fleshy or fleshy - leathery, spathulate or rarely compressed, stipitate ascocarps with an irregular pileus; ascigerous portion flattened and decurrent an opposite sides of the stipe, stipe terete; asci clavate, J-ve; ascospores acicular, usually one-celled or less frequently several septate, producing conidia on short sterigmata inside the asci; conidia sub-globoid to obovoid, hyaline, 1-celled, sometimes

replacing the ascospores and filling the asci; paraphyses filiform, simple or branched below and hyaline. The genus Spathularia Fr. shows close relationship with Cudonia Fries and Spathulariopsis Maas Geesteranus. The stipes of the ascocarps of the species of Spathularia Fr. consist of more or less longitudinal hyphae which in the centre are loosely interwoven and toward the perifery become more compact.

The genus is known by about half a dozen species and a few varieties (Mains, 1955). Only one species is reported from India (Bilgrami et al. 1979, 1981).

Spathularia flavida var. ramosa Mains

Mycologia, 47 : 865-866, 1955.

Text Plate No.14, Fig.1-5, Plate No.7, Fig.No.2.

Ascocarps caespitose, gregarious to scattered, compressed, no differentiation of fertile and sterile portion, folded, clavate, 3-5 cm long, arising from a whitish or pale yellow mycelium; ascogenous portion usually much compressed or clavate, sometimes folded, 5-7 mm wide, more or less decurrent on opposite sides of the stipe, smooth, undulate, rugose, flesh or light yellowish-brown to cinnamon-buff; stipe terete or somewhat compressed above, flesh to faint brown, glabrus, the stipe tisaues with thin-walled hyphae (pseudoparenchymatous cortex layer and thick walled medullary hyphae); asci 8-spored, clavate, J-ve, inoperculate, (90-)100-126 x 10-24 µm; ascospores acicular, rounded above, hyaline, usually 1-celled or

less frequently several-septate, very variable in size (-45) 80-93 x 1.5-5 µm; conidia ellipsoid or obovoid 1-3 x 1-1.5 µm, 1-celled hyaline, produced by the ascospore cells on sterigmata, replacing the ascospores and filling the asci; paraphyses filiform, simple or branched below, strongly curved, straight, enlarged above, hyaline and septate.

Hab. : On damp humus rich soil under the shade of forest trees, Shelap and Amba (Distt.-Kolhapur), Aug.8, 1986, Sept.15, 88, D.N.Ghadge and R.S.Sawant, WIF Nos.31a, 31b.

Variation in the septation of discharged ascospores of Spathularia flavida var. ramosa Mains expressed as percentage.

Table No.36 : (Based on 200 ascospores observed and three matured ascocarps were studied).

	Collections	No.of septa in %														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Shelap 8.8.86	30	6	10	6	3	6	25	3	6	0	0	0	3	0	2
2	Amba 15.9.88	45	5	25	0	0	0	20	0	5	0	0	0	0	0	0

Table No.37 : Comparison between Spathularia flavida var. ramosa and the present collection

	Spathularia flavida var. ramosa Mains	Present collections
1	Ascocarp stalked upto 6 cm in length, ascogenous portion much compressed and clavate, yellowish or flesh coloured.	Ascocarp stalked, 3-5 cm in length, ascogenous portion much compressed and clavate, flesh coloured.

Table No.37 : (Contd..)

Spathularia flavida var. ramosa Mains	Present collections
2. Asci clavate, 85-125 x 8-12 µm	Clavate, 100-125 x 10-14 µm
3. Ascospores acicular, 1-celled to several septate, 30-95 x 1.5-3 µm	Several septate, (45-)80-93 x 1.5-4.5 µm
4. Conidia produced on sterigmata of ascospores	Conidia produced on sterigmata of ascospores
5. Paraphyses filiform, simple to irregularly branched, strongly curved, coiled continuing from hymenium to stipe.	Paraphyses filiform, simple, not irregularly branched, slightly curved coiled, continuing from hymenium to stipe.

Mains (1955) reported this variety from Michigan (N.America). Present collection found to be matched well in respect of morphology and dimensions of ascocarps, asci and ascospores except paraphyses, which are not irregularly much branched and therefore, referred to it. It makes a new record to the fungi of India.

Genus - Thuemenidium O.Kuntze

Rev.Gen.Pl. 2 : 873, 1891.

The genus Thuemenidium O.Kuntze was established by O.Kuntze in 1891 with a type species Microglossum atropurpureum (Pers.ex Fr.) P.Karsten. It belongs to the family Geoglossaceae of the order Helotiales. The genus is characterised by its dark,

purplish-brown to black ascocarps with smooth, narrowly clavate, fertile portion. It differs from species of the genus Geoglossum only in the ascospores which remain permanently hyaline. Paraphyses with their apices brown-walled or united into an epithecium by an amorphus, brown matrix. The genus is known by its three species (Maas Geesteranus, 1964). There is no any information regarding the report of this genus in India. The name Corynetes (Hazslinszky) Durand commonly used is a later homonym of Corynetes Berkeley and Curtis (1853). Maas Geesteranus synonimized Corynetes to Thuemenidium on the basis of the colour of the spores and ascocarps. It is a new generic record to the fungi of India.

Thuemenidium macrospora sp.nova

Text Plate No.14, Figs.6-10; Plate No.7, Fig.3.

Fructificatio fasciculatum, fragil, gregarium, elangato clavatum, 2-3 cm obtum 2-3 cm crassum, glabrum, nigrum, clavula clavata, compressa; asci cylindraci clavati, sub-sessiles, porus iodatus, cyanens, octospori, 172-218 x 17-20 µm; sporidiis paraplellae, hyalinis, cylindraceae, letiver curvatis, 6-7 septatis, 50-83 x 5-7 µm; paraphysibus numerosisimus, tenues, non-septatii levitersursum amplificati, apex brunneus, plus minure curvatus.

Hab. : Solum udum umbra silva, Radhanagari (Distt.-Kolhapur), Sept.3, 1985, D.N.Ghadge, WIF No.32.

Fructifications fasciculate, gregarious or scattered, soft, fleshy, upto 2-3 cm long; ascigerous region upto 2-3 mm wide, glabrum, dark purplish-brown or black, clavate to lanceolate, sometimes compressed with obtuse apex; stipe cylindrical, straight or slightly bent, lighter, concolourous, viscid-gelatinous; asci cylindrical, clavate, sub-sessile, J-ve, 8-spored, 172-218 x 17-20 µm; ascospores parallel, permanently hyaline, cylindrical, slightly curved, 6-7 septate, rarely less septate, 50-83 x 5.5-7 µm; paraphyses numerous, slender septate, slightly enlarged at the apices, pale-brown above, more or less curved, agglutinated together by brown amorphus matter.

Anatomy : Ascigerous region : flesh to light brown, textura porrecta with hyphae slightly loose, hypothecium with densely textura intricata, stipe differentiated into gelatinous cortex and inner non-gelatinous medulla which are composed of a dense network of narrow hyphae of the cortex and entuining more or less inflated longitudinal hyphae in the medulla.

Hab. : On humus rich soil under the shade of thick forest, Radhanagari (Distt.-Kolhapur), Sept.3, 1985, D.N.Ghadge, WIF No.32.

Variation in the septation of discharged ascospores of Thumenidium macrospora sp. nova expressed as percentage.

Table No.38 : (Based on 100 ascospores observed and fifteen matured ascocarps were studied).

Collections	No.of septa in %						
	1	2	3	4	5	6	7
Radhanagari 3.9.85	4	0	16	0	0	0	74

Table No.39 : Comparison between Thuemenidium atropurpureum (Batsch ex. Fries) O.Kuntze and present collection.

T.atropurpureum	Present collection
1. Ascocarp : upto 6 cm tall, very dark purplish-brown to black	2-3 cm tall, very dark purplish-brown to black
2. Asci : 100-120 x 10-12 µm	172-218 x 117-20 µm
3. Ascospores : 20-35 x 5-6 µm	50-83 x 5.5-7 µm
4. Paraphyses : Brown at the apices, agglutinated by brown amorphus matter.	Brown at the apices, agglutinated by brown amorphus matter.

Holotype : Thuemenidium macrospora Sawant and Patil

Etymology : Macrospora-large spored, the species is named after the large ascospore character.

Type locality : Radhanagari (Distt. - Kolhapur)

Type specimen : In M.H.B.D., S.U.K., WIF No.32

On the basis of the comparative morphology and dimensions of ascospores of present material (Table No.39) which are larger and does not match with ascospores of type species Thuemenidium atropurpureum (Batsch ex. Fries) O.Kuntze and therefore, a new species has been raised here to accommodate the present collection as Thuemenidium macrospora sp.nova.

Text Plate No. 1

Explaination of Figures : 1-12

Fig.Nos.1-3 : *Geoglossum coharenes* Durand

1 : Asci with ascospores and paraphyses;
2 : Paraphyses;
3 : Ascospores.

Fig.Nos.4-6 : *Geoglossum cookeianum* Nannfeldt. var. *longispora* var. nova

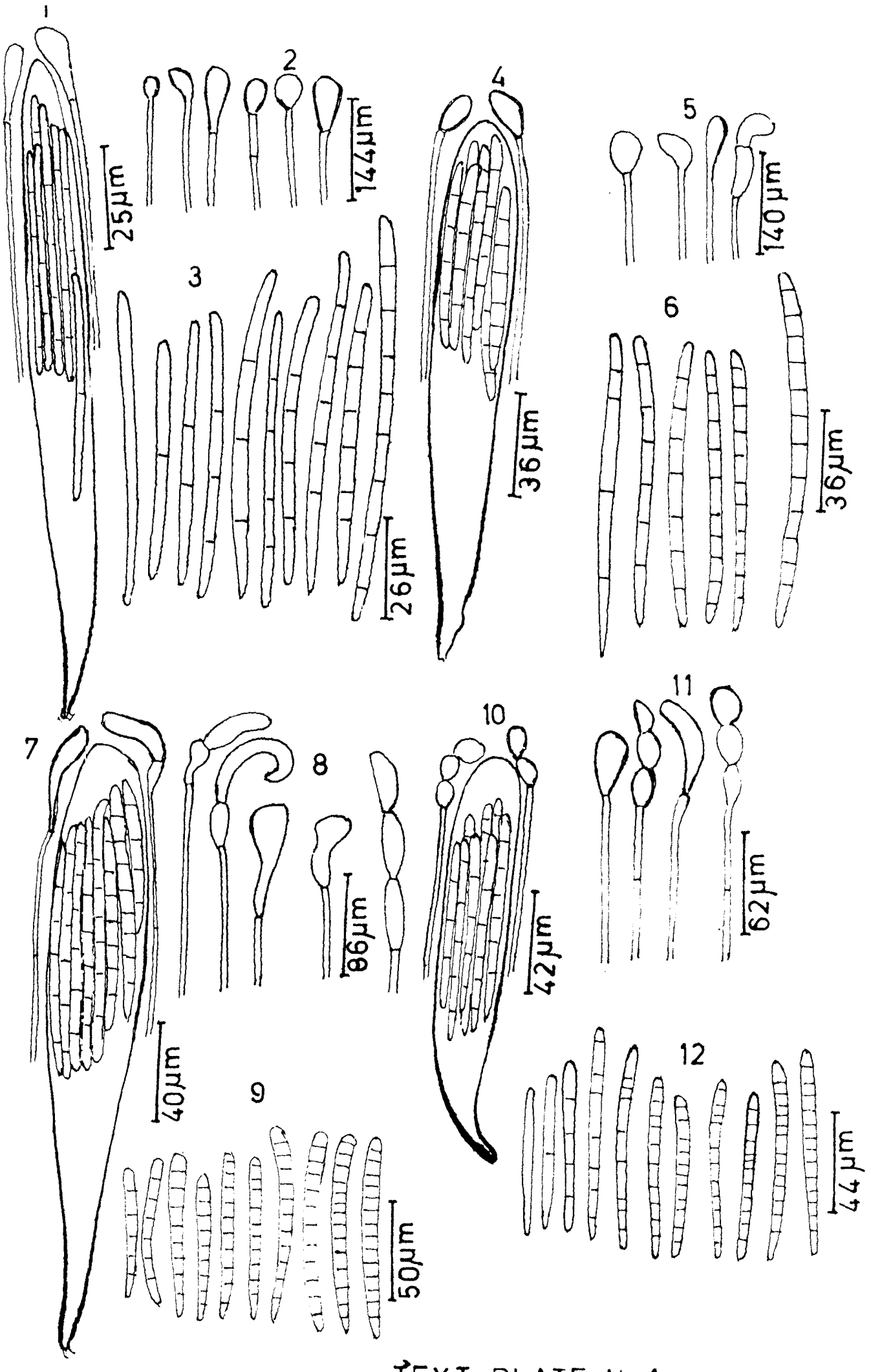
4 : Asci with ascospores and paraphyses;
5 : Paraphyses;
6 : Ascospores.

Fig.Nos.7-9 : *Geoglossum difformae* Fries var. *variable* Mains

7 : Asci with ascospores and paraphyses;
8 : Paraphyses;
9 : Ascospores.

Fig.Nos.10-12 : *Geoglossum fallax* Durand

10 : Asci with ascospores and paraphyses;
11 : Paraphyses;
12 : Ascospores.



TEXT PLATE No.1

Text Plate No.2

Explanation of Figures : 1-12

Fig.Nos. 1- 3 : Geoglossum glabrum Pers.ex Fr. var. glabrum Pers.ex Fries

1 : Asci with ascospores and paraphyses;
2 : Paraphyses;
3 : Ascospores.

Fig.Nos. 4- 6 : Geoglossum glutinosum Pers.ex Fr.

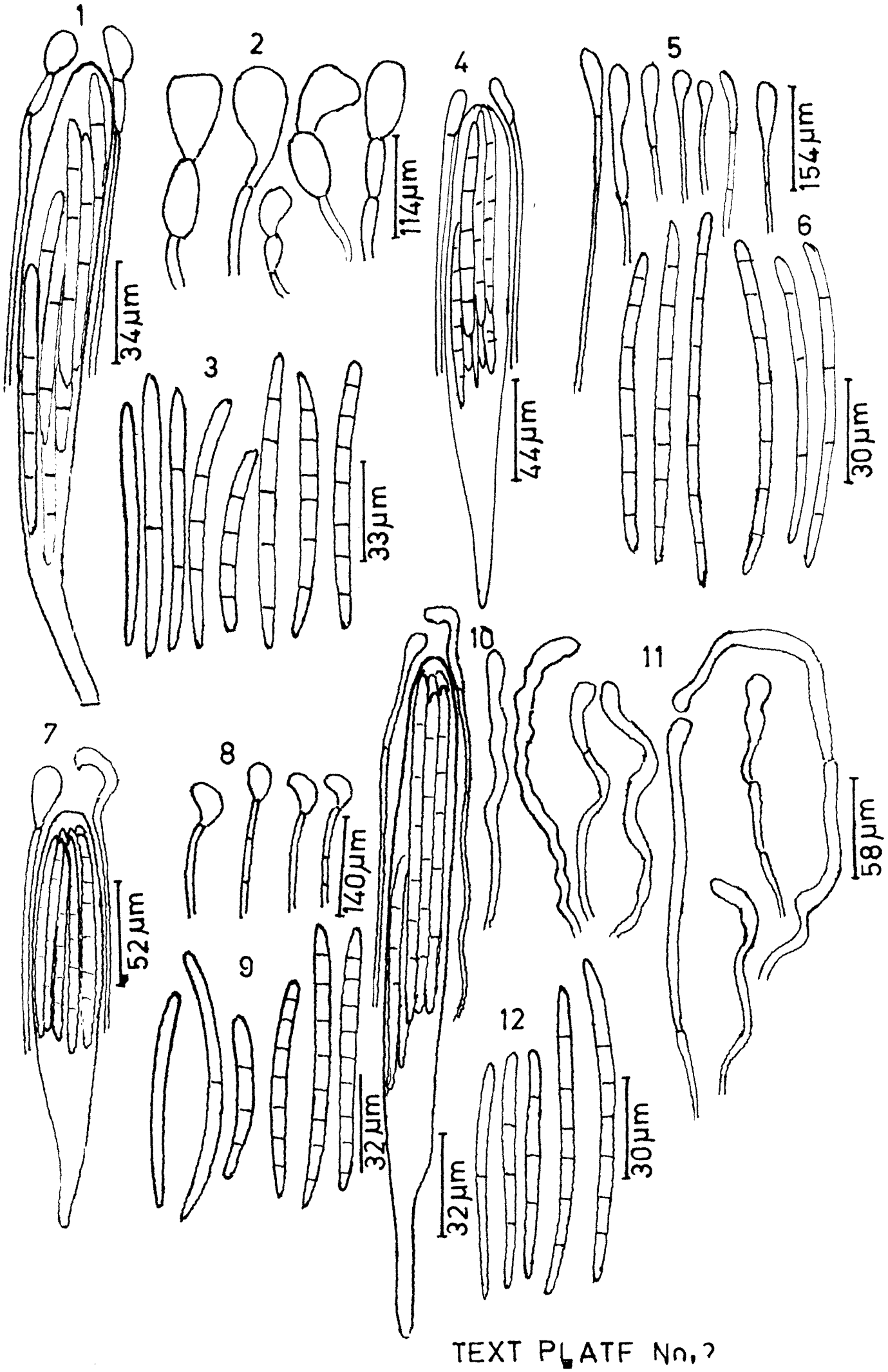
4 : Asci with ascocarps and paraphyses;
5 : Paraphyses;
6 : Ascospores.

Fig.Nos. 7- 9 : Geoglossum japonicum Imai.

7 : Asci with ascospores and paraphyses;
8 : Paraphyses;
9 : Ascospores.

Fig.Nos.10-12 : Geoglossum japonicum Imai var. variable var.nova

10 : Asci with ascospores and paraphyses;
11 : Paraphyses;
12 : Ascospores.



TEXT PLATE No. 2

Text Plate No.3

Explaination of Figures : 1-12

Fig.Nos. 1- 3 : Geoglossum nigritum (Fr.) Cke.var. heterosporum Mains

1 : Asci with ascospores and paraphyses;
2 : Paraphyses;
3 : Ascospores.

Fig.Nos. 4- 6 : Geoglossum nigritum (Fr.) Cooke var. longisporum var.nova

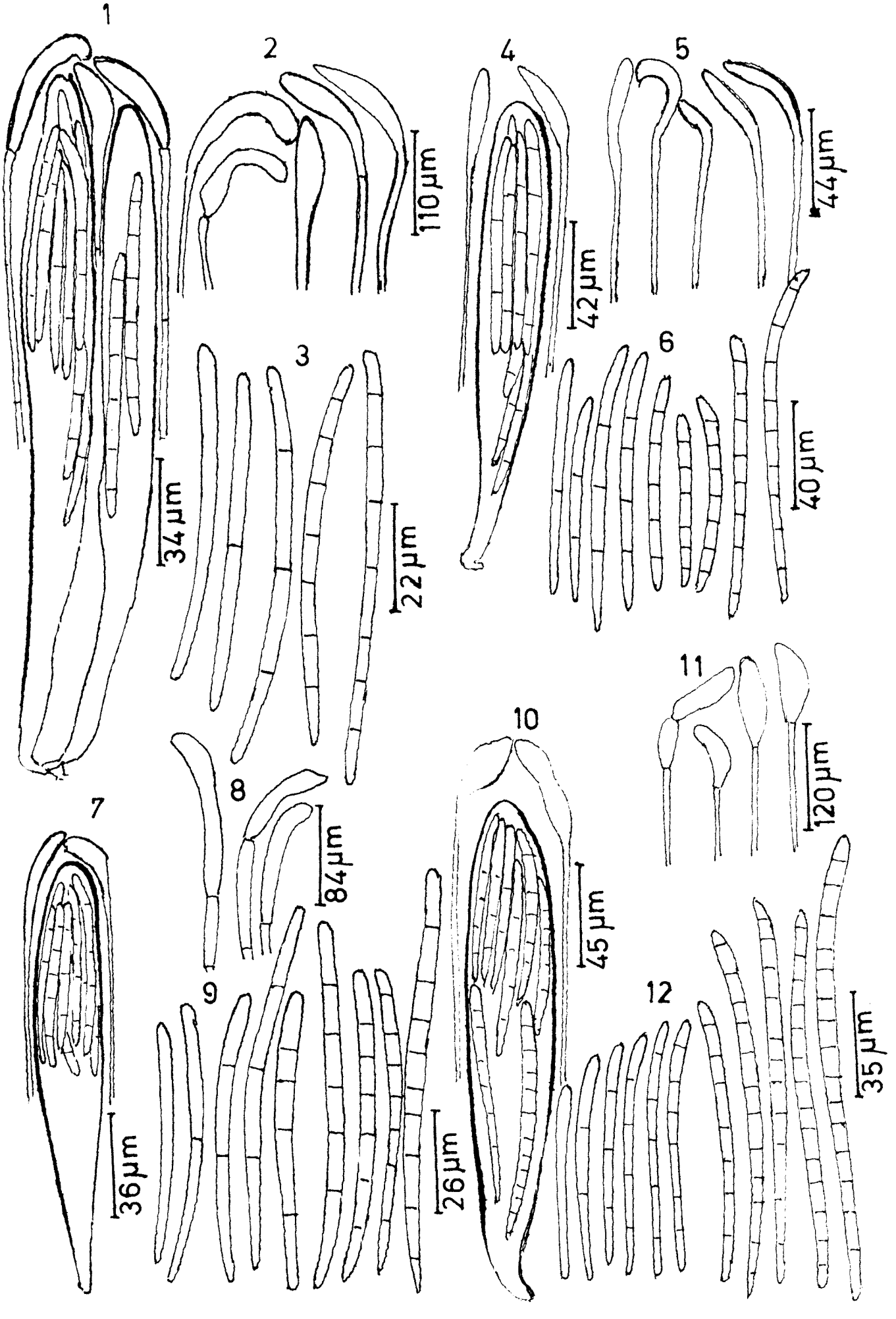
4 : Asci with ascospores and paraphyses;
5 : Paraphyses;
6 : Ascospores.

Fig.Nos. 7- 9 : Geoglossum nigritum (Fr.) Cke. var. nigritum (Fr.) Cke.

7 : Asci with ascospores and paraphyses;
8 : Paraphyses;
9 : Ascospores.

Fig.Nos.10-12 : Geoglossum pumilum Wint. var. variable var.nova

10 : Asci with ascospores and paraphyses;
11 : Paraphyses;
12 : Ascospores.



TEXT PLATE No.3

Text Plate No.4

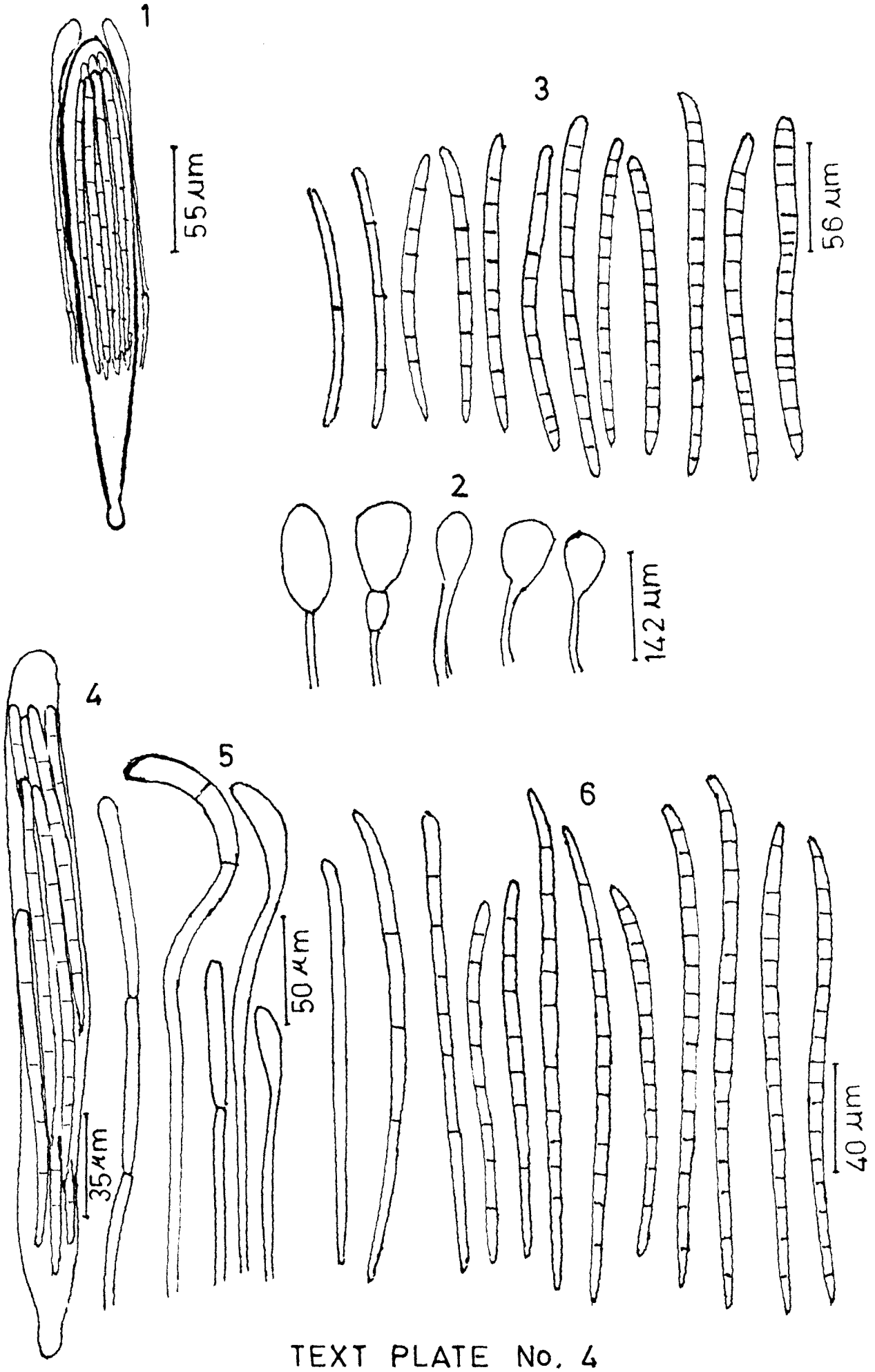
Explaination of Figures : 1-6

Fig.Nos.1-3 : Geoglossum pygmaeum Gerard ex.Durand

1 : Asci with ascospores and paraphyses;
2 : Paraphyses;
3 : Ascospores.

Fig.Nos.4-6 : Geoglossum pygmaeum Gerard ex. Durand var. variable var.nova

4 : Asci with ascospores and paraphyses;
5 : Paraphyses;
6 : Ascospores.



TEXT PLATE No. 4

Text Plate No.5

Explaination of Figures : 1-9

Fig.Nos.1-3 : Geoglossum simile Peck.

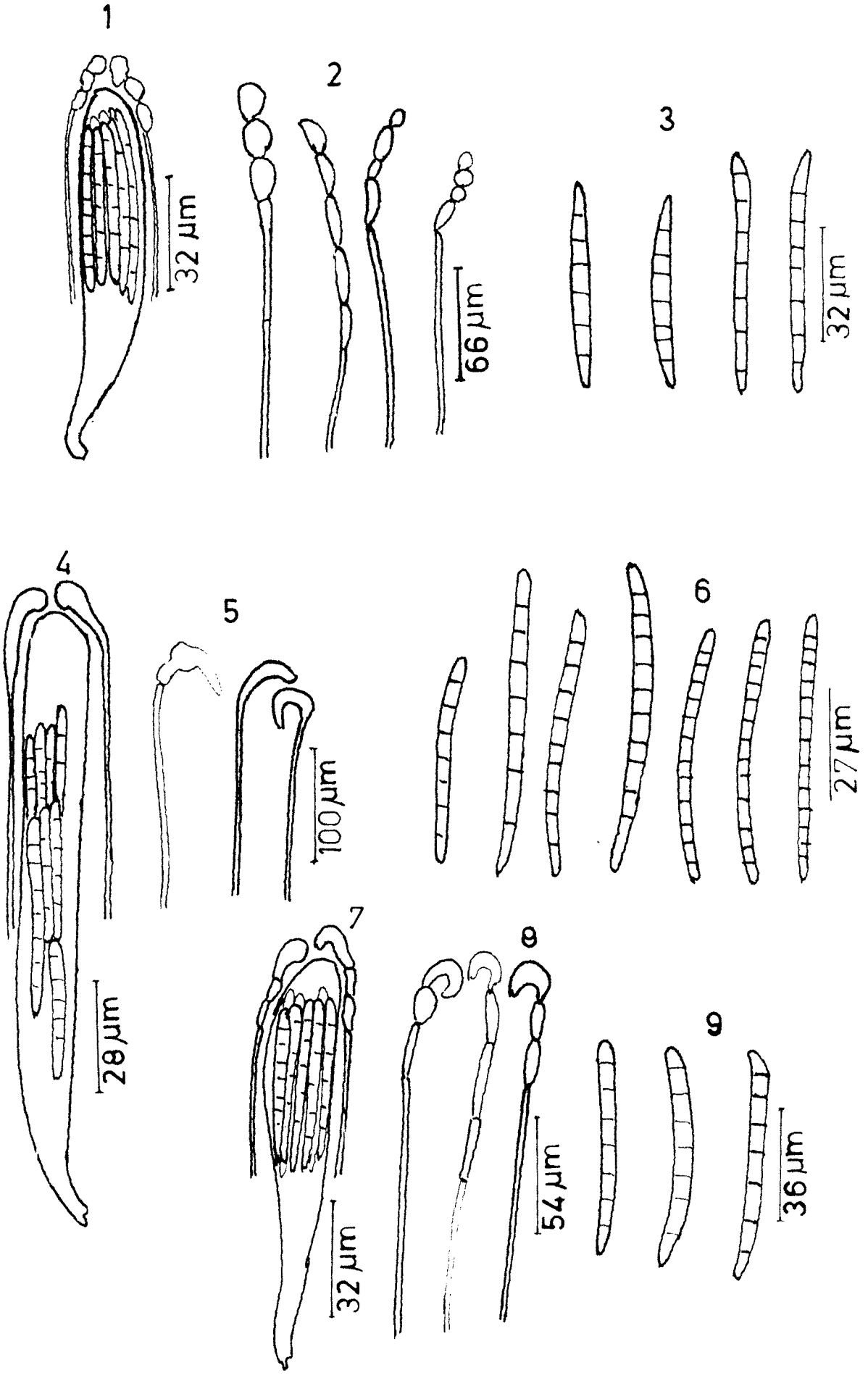
1 : Asci with ascospcres and paraphyses;
2 : Paraphyses;
3 : Ascospores.

Fig.Nos.4-6 : Geoglossum umbratile Sacc.var. longispora var.nova

4 : Asci with ascospores and paraphyses;
5 : Paraphyses;
6 : Ascospores.

Fig.Nos.7-9 : Geoglossum umbratile Sacc.var. umbratile Maas Geesteranus.

7 : Asci with ascospores and paraphyses;
8 : Paraphyses;
9 : Ascospores.



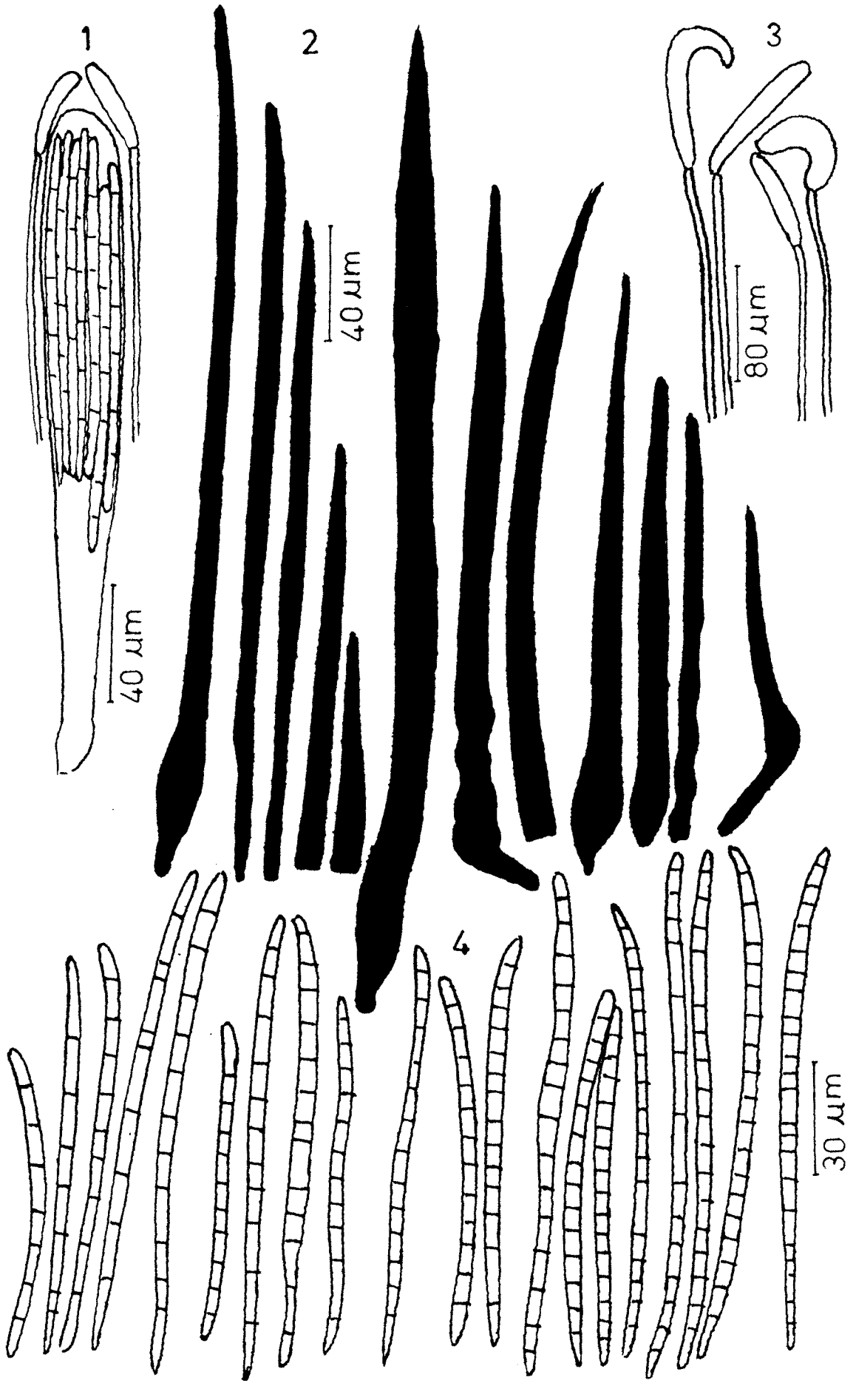
TEXT PLATE No. 5

Text Plate No.6

Explaination of Figures : 1-4

Fig.Nos.1-4 : *Trichoglossum hirsutum* var. *heterosporum* Mains

1 : Asci with ascospores and paraphyses;
2 : Setae from hymenium and stipe;
3 : Paraphyses;
4 : Ascospores.



TEXT PLATE No. 6

Text Plate No.7

Explaination of Figures : 1-4

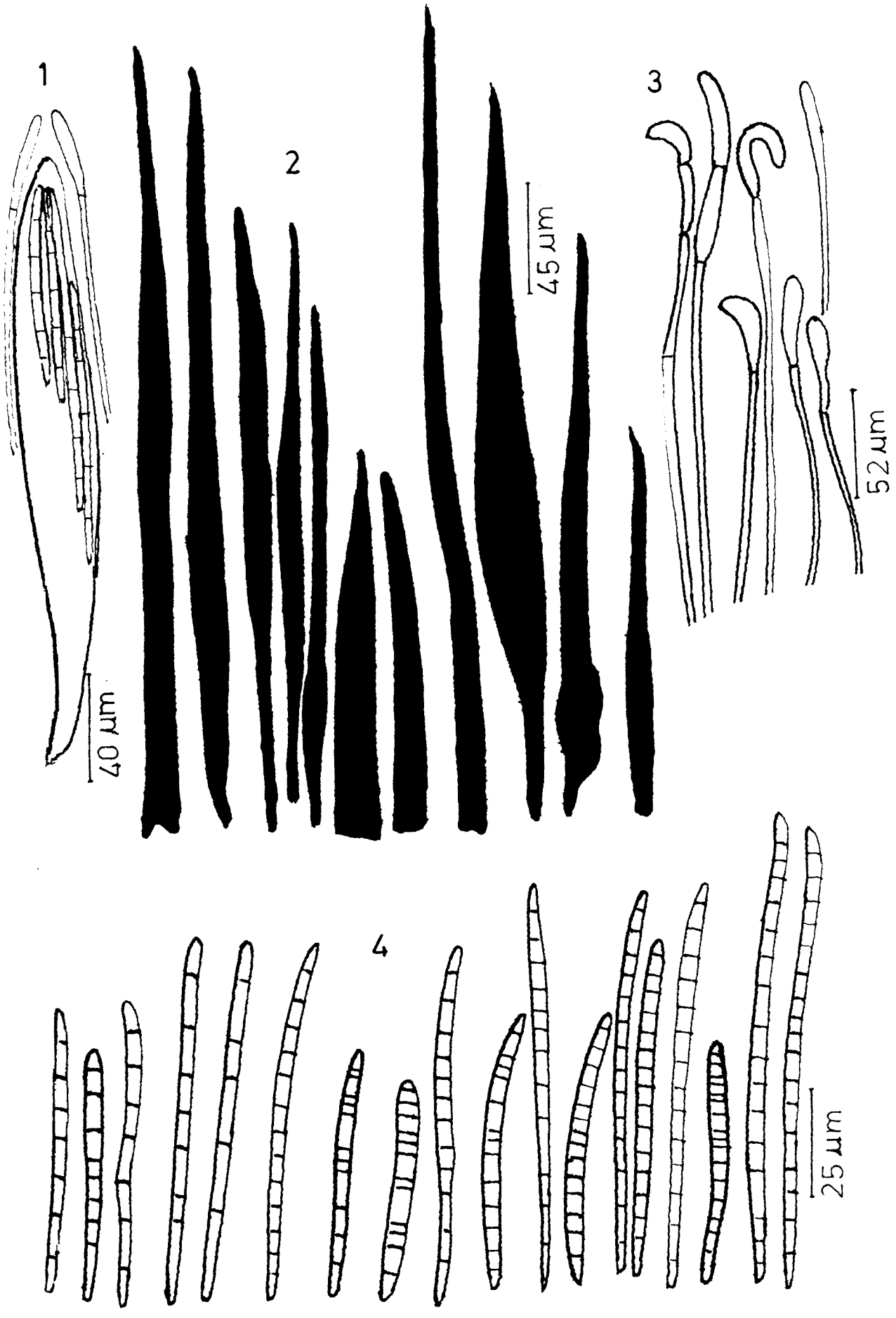
Fig.Nos.1-4 : Trichoglossum hirsutum var. irregularae Mains

1 : Asci with ascospores and paraphyses;

2 : Setae from hymenium and stipe;

3 : Paraphyses;

4 : Ascospores.



TEXT PLATE No. 7

Text Plate No.8

Explaination of Figures : 1-4

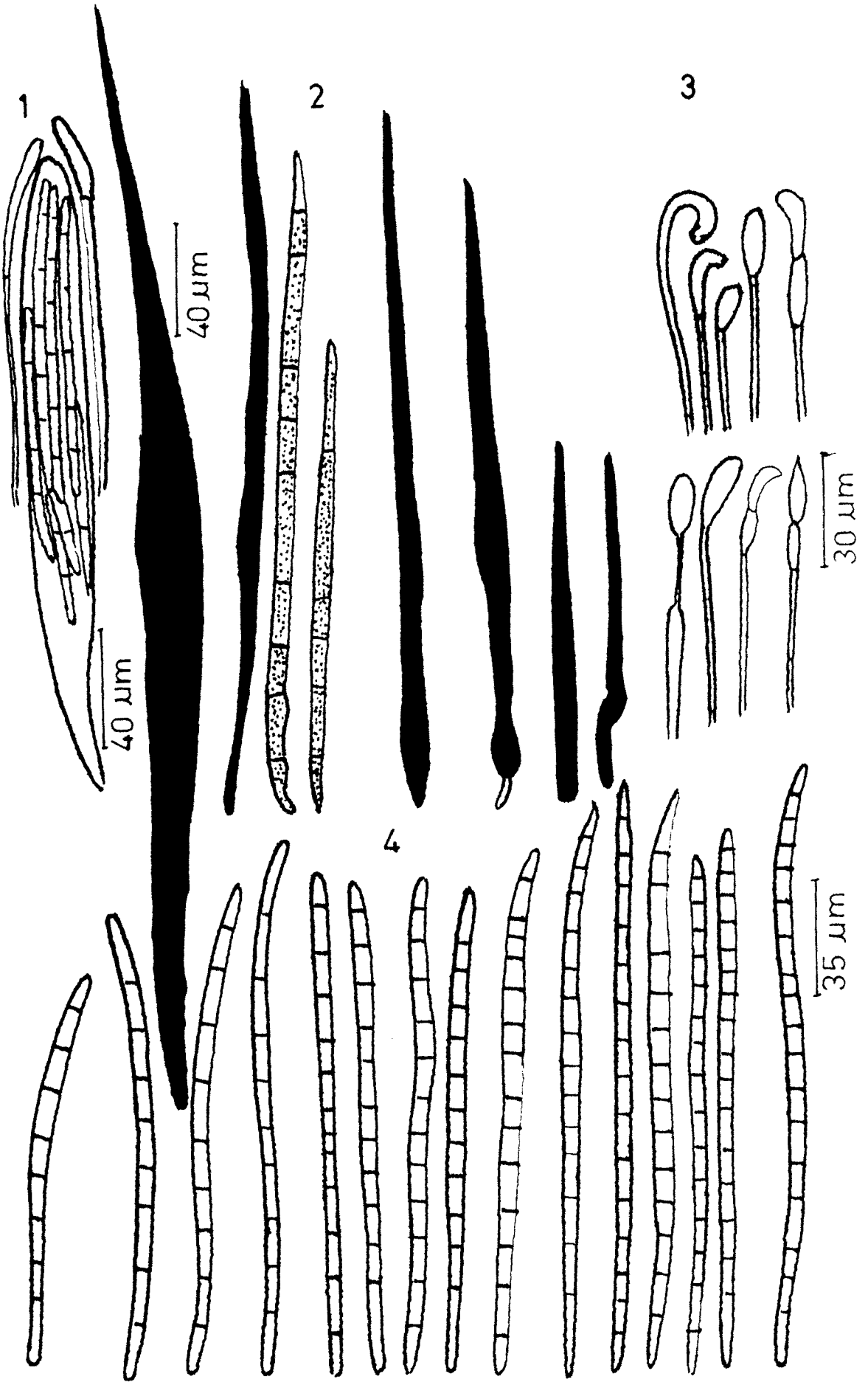
Fig.Nos.1-4 : *Trichoglossum hirsutum* var. *longispora* (Tai) Mains

1 : Asci with ascospores and paraphyses;

2 : Setae from hymenium and stipe;

3 : Paraphyses;

4 : Ascospores.



TEXT PLATE No. 8

Text Plate No.9

Explaination of Figures : 1-8

Fig.Nos.1-4 : *Trichoglossum octopartitum* Mains var. *heteroseptata* var. nova

1 : Asci with ascospores and paraphyses;

2 : Setae from hymenium and stipe;

3 : Paraphyses;

4 : Ascospores.

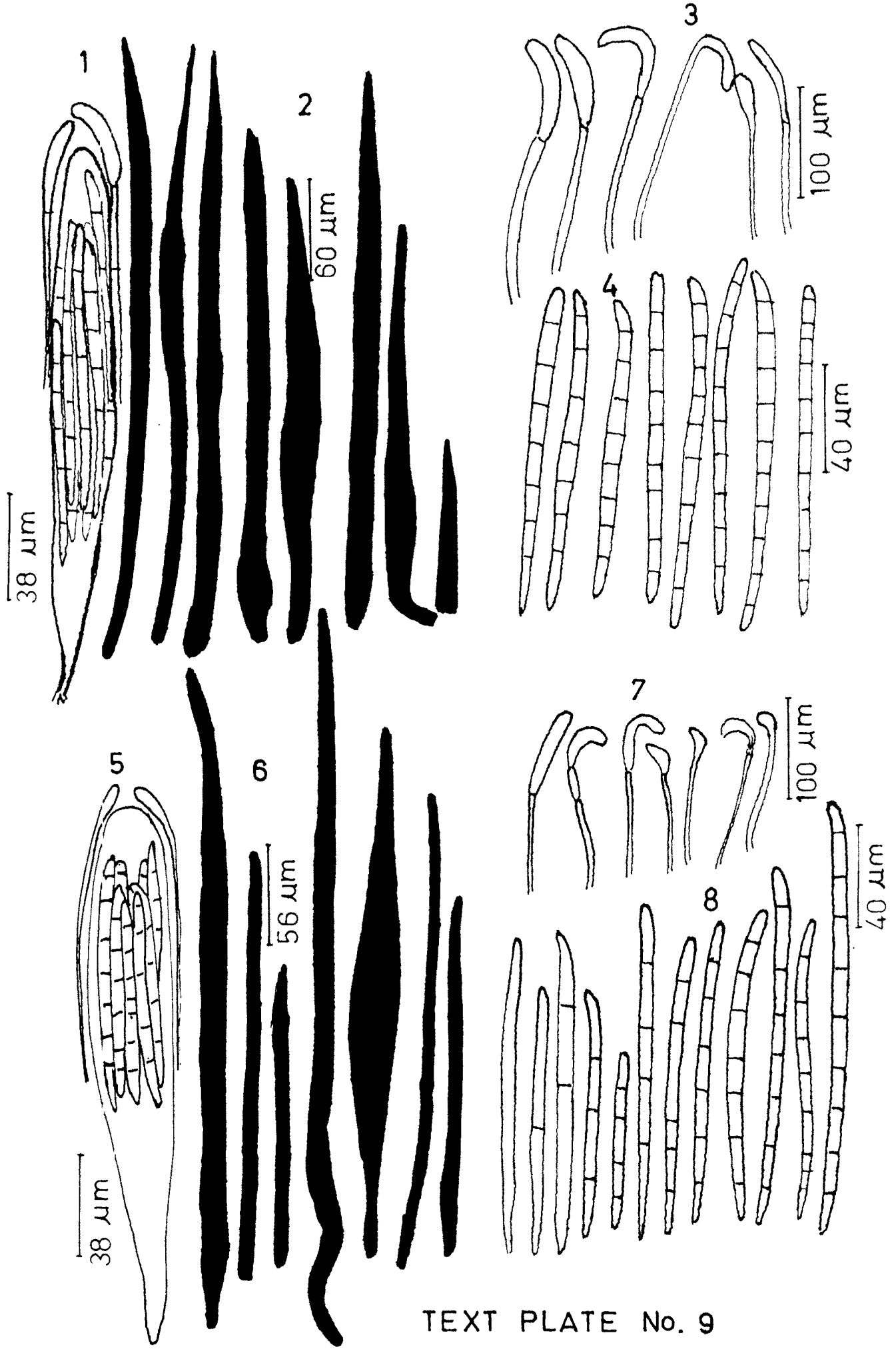
Fig.Nos.5-8 : *Trichoglossum octopartitum* Mains var. *irregulare* var. nova

5 : Asci with ascospores and paraphyses;

6 : Setae from hymenium and stipe;

7 : Paraphyses;

8 : Ascospores.



TEXT PLATE No. 9

Text Plate No.10

Explaination of Figures : 1-8

Fig.Nos.1-4 : *Trichoglossum octopartitum* var. *octopartitum* Mains

1 : Asci with ascospores and paraphyses;

2 : Setae from hymenium and stipe;

3 : Paraphyses;

4 : Ascospores.

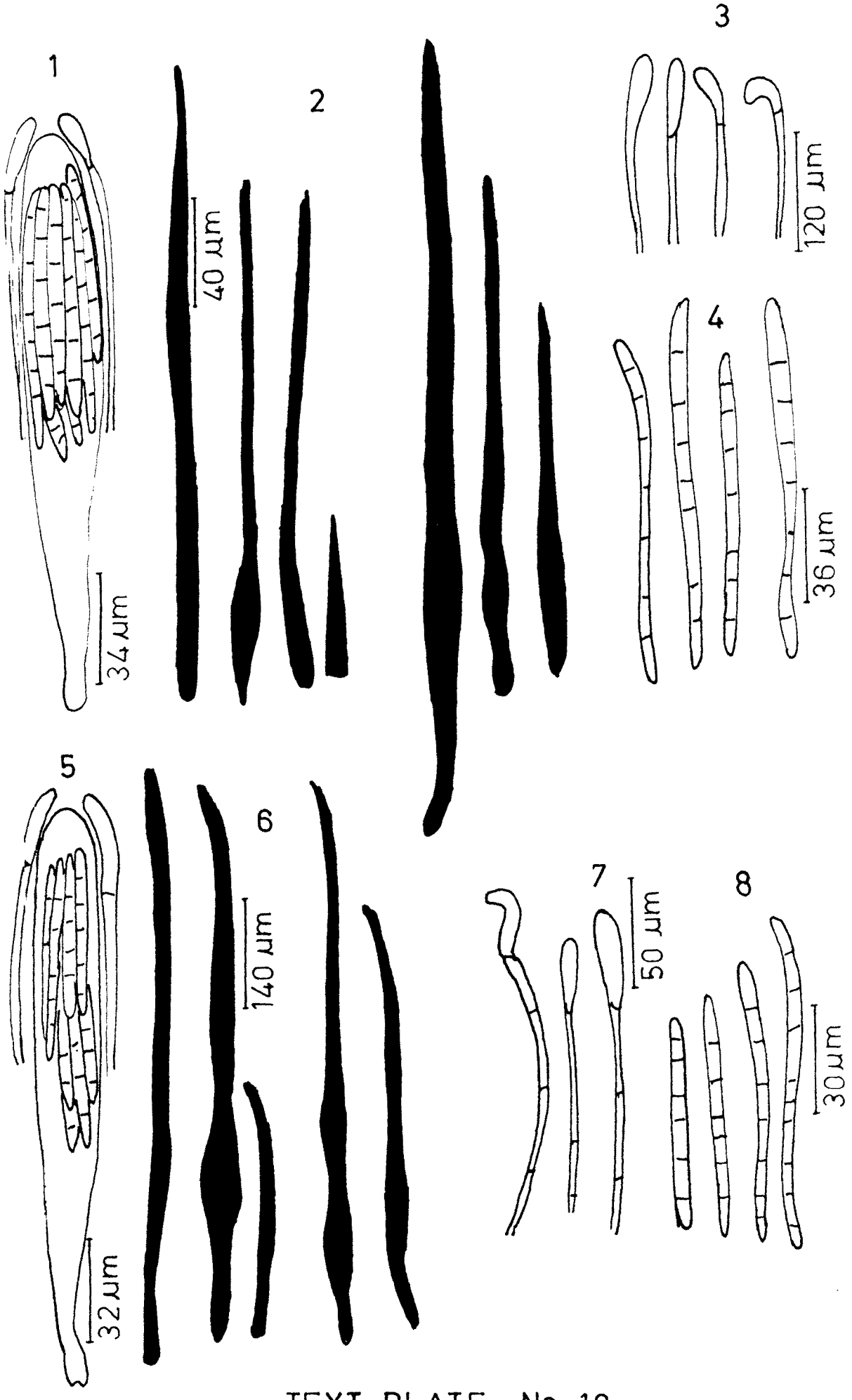
Fig.Nos.5-8 : *Trichoglossum radhanagarensis* Patil and Patil

5 : Asci with ascospores and paraphyses;

6 : Setae from hymenium and stipe;

7 : Paraphyses;

8 : Ascospores.



TEXT PLATE No. 10

Text Plage No.11

Explaination of Figures : 1-7

Fig.Nos.1-4 : Trichoglossum rasum Patouillard

1 : Asci with ascospores and paraphyses;

2 : Setae from hymenium and stipe;

3 : Paraphyses;

4 : Ascospores.

Fig.Nos.5-7 : Trichoglossum variable (Dur.) Nannfeldt.

5 : Asci with ascospores and paraphyses;

6 : Setae from hymenium and stipe;

7 : Ascospores.

TEXT PLATE No. 11

Text Plate No.12

Explaination of Figures : 1-8

Fig.Nos.1-4 : Trichoglossum tetrasporum Sinden and Fitzp.

1 : Asci with ascospores and paraphyses;

2 : Setae from hymenium and stipe;

3 : Paraphyses;

4 : Ascospores.

Fig.Nos.5-8 : Trichoglossum walteri (Berk.) Durand

5 : Asci with ascospores and paraphyses;

6 : Setae from hymenium and stipe;

7 : Paraphyses;

8 : Ascospores.

TEXT PLATE

Text Plate No.13

Explaination of Figures : 1-6

Fig.Nos.1-4 : *Trichoglossum wrighti* Durand

1 : Asci with ascospores and paraphyses;

2 : Setae from hymenium and stipe;

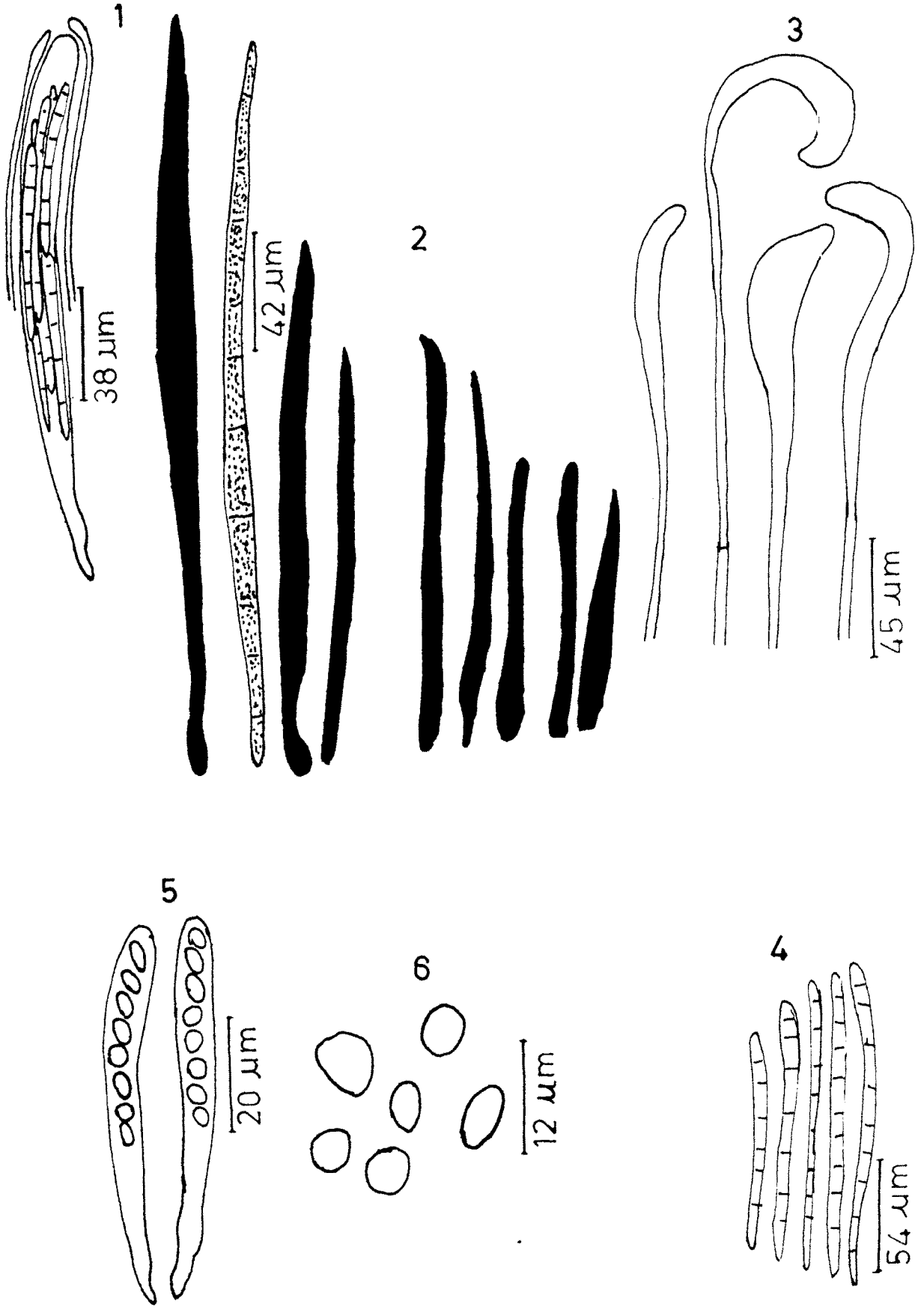
3 : Paraphyses;

4 : Ascospores.

Fig.Nos.5-6 : *Neolecta vitellina* (Bres.) Korf and Rogers

5 : Asci with ascospores;

6 : Ascospores.



TEXT PLATE No. 13

Text Plate No.14

Explaination of Figures : 1-11

Fig.Nos. 1-6 : *Spathularia flavida* var. *ramosa* Mains

1 : Asci with ascospores and paraphyses;

2 : Asci with two ascospores and conidia;

3 : Asci with two ascospores;

4 : Paraphyses;

5 : Conidia;

6 : T.S. of stipe.

Fig.Nos.7-11 : *Thuemenidium macrospora* sp.nova

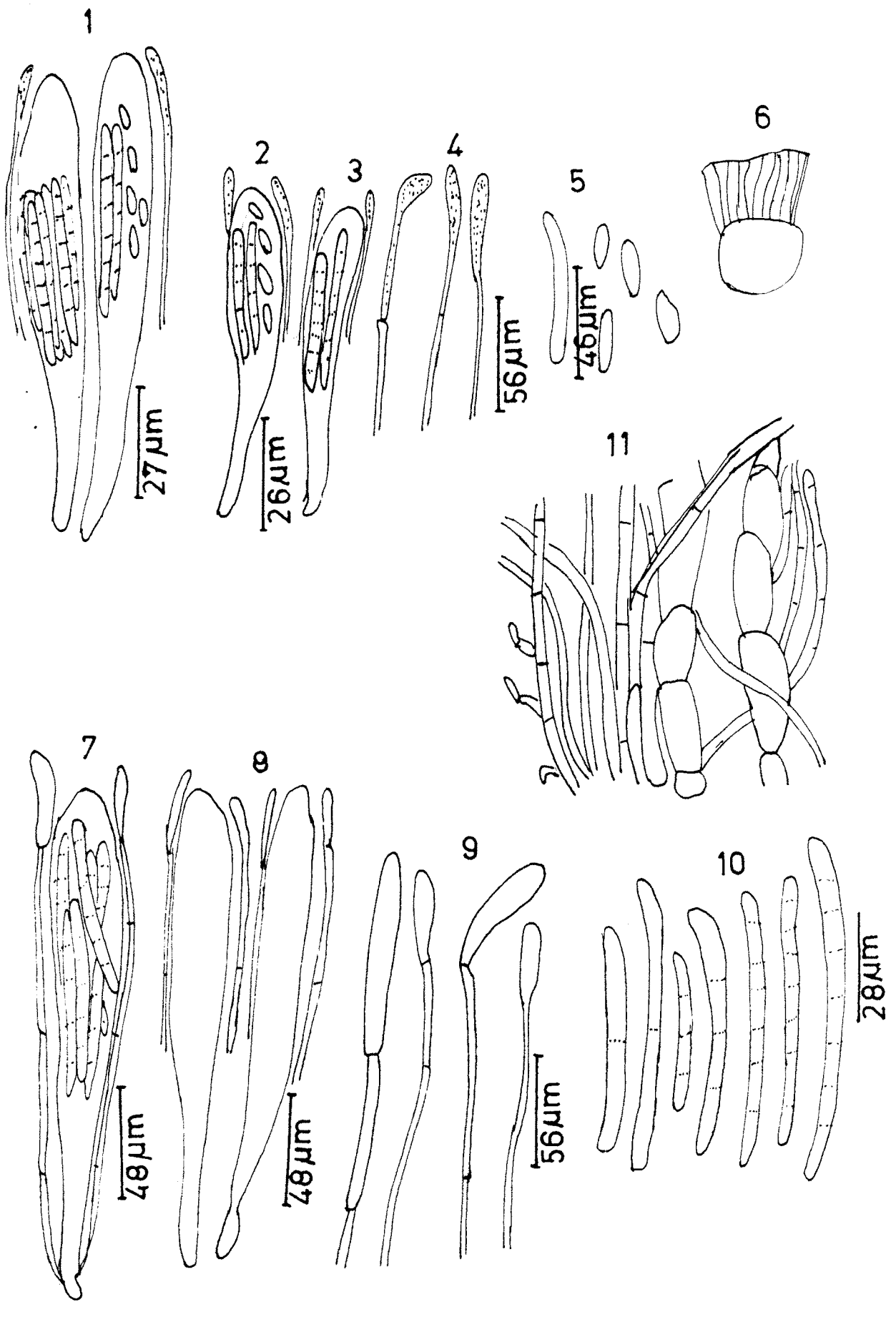
7 : Asci with ascospores and paraphyses;

8 : Asci and paraphyses;

9 : Paraphyses;

10 : Ascospores;

11 : Tissue of the stipe.



TEXT PLATE No.14