

FIVE NEW SPECIES OF AGARICALES FROM SOUTHERN AND SOUTHEASTERN YUNNAN, CHINA

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ABSTRACT

Five new species of Agaricales are described and illustrated from southern and southeastern Yunnan, China. Characters which separate the species from others are discussed. The new species are *Gerronema chrysocarpum*, *Phaeomarasmius neoaffinis*, *Pyrrhoglossum yunnanensis*, *Phaeocollybia sparsilamellae* and *Crepidotus neocystidiosus*. All specimens cited in this paper have been deposited in the Cryptogamic Herbarium, Kunming Institute of Botany, Academia Sinica (HKAS).

During a recent investigation of the higher fungi in southern and southeastern Yunnan, China, 1442 collections were obtained. A number of species of Agaricales have been identified by comparing descriptions written in published books and papers or comparing type specimens. Among them five higher fungi are reported as new species in this paper.

Gerronema chrysocarpum P. G. Liu sp. nov.

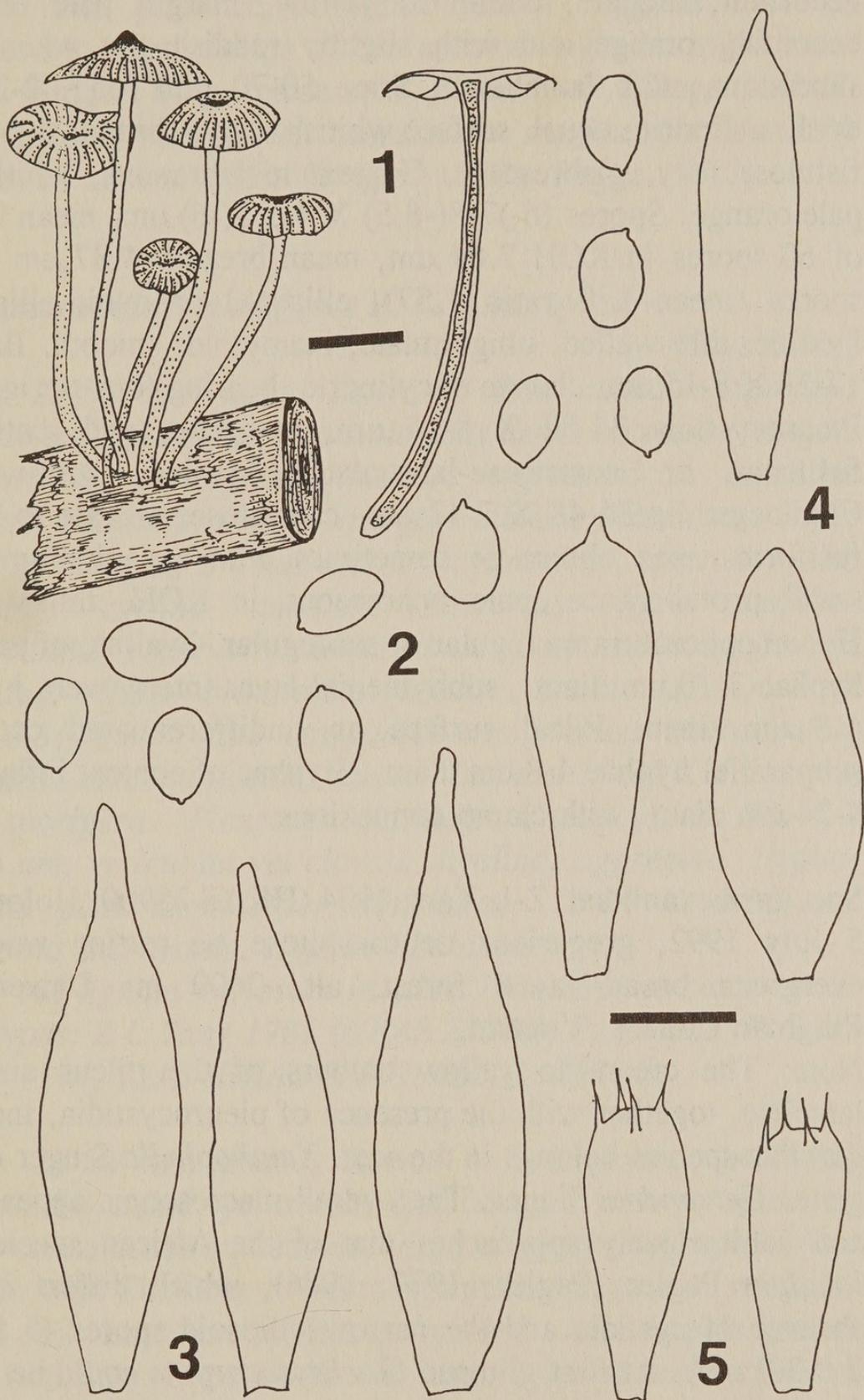
(Figs. 1-5.)

Pileus 10-20 mm *latus, convexus, interdum expansus, denique plus minusve umbilicatus, viscidus, glaber, cremeus usque luteolus, in sicco griseus, ad medium fuscus, striatis ad centrum fere attingens. Lamellae adnatae interdum parum concavae usque breviter decurrentes, arcuatae, cremeae vel flavae, margine luteae, in sicco aurantiacae, subdistantes, lamellulis. Stipes* 50-70 mm *longus, 2-3 mm crassus, cylindricus, aequalis, ad apicem albidus, ad basim brunneolus, fistulosus. Caro tenuissima. Sporae* (6-)7-8(-8.5) X 4-5.5(-6) μm , *ellipsoideae vel ovato-ellipsoideae, hyalinae, tenuitunicatae, uniguttulatae. inamyloideae, laeves. Basidia* 17-22 X 7-8 μm , *clavata vel cylindrica, 4-sporigera. Pleurocystidia* 34-52 X 8-15 μm , *dispersa, fusiformia vel ventricoso-lanceolata, hyalina, tenuitunicata. Cheilocystidia* 34-48 X 7-12 μm , *tenuitunicata, caespitosa, clavata usque late fusiformia, ad apicem obtusa interdum capitulatis vel minute protuerantis praedita, ochracea in KOH. Trama hymenophoralis regularis vel subregularis, hyphis* 3-10 μm *diam., hyalinis. Hyphae cuticulae pilei repentes, 4-8 μm latae. Hyphae carnis inflatae ad 4-24 μm diam., fibulatae.*

Hab.: Gregarius vel caespitosus ad lignum carisum in silvis lithocarpi et castanopsis. Holotypus: Z-L Yang 1904 (HKAS 25900, Yunnan).

Pileus 10-20 mm *diam., convex, sometimes expanding, finally slightly umbilicate, surface viscid, glabrescent, cream to yellow, becoming grey when dry, dark brown in the umbilicus, translucent striate almost to the disc. Lamellae adnate to shortly*

Figs.1-5. *Gerronema chrysocarpum*: 1. Habit and section (HKAS 25900). bar scale = 10 mm. 2. basidiospores. 3. pleurocystidia. 4. cheilocystidia. 5. basidia. Bar scale for Figs.2,3,4,5 = 10 μm .



decurrent, arcuate, cream to yellow, margin pale orange, becoming orange and with slightly reddish tint when dry, subdistant, with lamellulae. Stipe 50-70 mm long, 2-3 mm thick, cylindrical, equal, surface whitish above, brownish below, fistulose, dry, glabrescent. Context membranous, whitish to pale orange. Spores (6-)7-8(-8.5) X 4-5.5(-6) μm , mean length of 60 spores in KOH 7.64 μm , mean breadth 4.87 μm of 60 spores (mean L/B ratio 1.57), ellipsoid or ovoid-ellipsoid, hyaline, thin-walled, uniguttulate, inamyloid, smooth. Basidia 17-22 X 8-15 μm , clavate to cylindrical, bearing four sterigmata. Pleurocystidia 34-52 X 8-15 μm , numerous and scattered, fusiform or ventricose-lanceolate, hyaline, thin-walled. Cheilocystidia 34-48 X 7-12 μm , caespitose, clavate to broad fusiform, apex obtuse or sometimes with a capitellum or a small protuberance, pale ochraceous in KOH, thin-walled. Hymenophoral trama regular or subregular, hyaline, of parallel hyphae 3-10 μm diam., subhymenial layer interwoven, hyphae 4-8 μm diam. Pileal surface an undifferentiated cutis of subparallel hyphae 4-8 μm diam.. Hyphae of context inflated to 4-24 μm diam. with clamp connexions.

Specimen examined: Z-L Yang 1904 (HKAS 25900, Holotype), 5 July 1992, gregarious or caespitose on rotting wood in evergreen broad-leaved forest, alt. 2400 m; Daweishan, Pingbian County, Yunnan.

Note: The cream to yellow colours of the pileus and the lamellae, together with the presence of pleurocystidia, indicate that this species belongs in the sect. *Xanthophylla* Singer of the genus *Gerronema* Singer. The overall macroscopic appearance and habit closely approaches that of the African species *G. longipes* Pegler (Pegler, 1977; 1986), which differs in the absence of cystidia and the narrow ellipsoid spores (5.5-8 X 2.8-3.7 μm). At first glimpse *G. chrysocarpum* could be taken for the neotropical species *G. cheilocystidiatum* Sing., but the latter's cheilocystidia (14- 18 X 7-8.8 μm) and spores (4.5-6 X 3-3.5 μm) are smaller and pleurocystidia are absent (Singer,

1970a). The presence of pleurocystidia suggests that the infrageneric relationships of this species might be in the sect. *Fibula* (Singer) Sing., close to *G. fibula* (Bull.) Singer, but *G. fibula* differs in the slender basidiocarp, smaller spores and the absence of cheilocystidia (Singer, 1970a; Pegler, 1983).

Phaeomarasmius neoaffinis P. G. Liu, sp. nov.

(Figs.6-10.)

Pileus 23-50 mm *latus*, *convexus dein concavo-expansus*, *brunneolus*, *squamellulis concoloribus dense obtectus*, *marginem brevistriatus*, *siccus*, *plus minusve hygrometricus*. *Lamellae adnatae*, *pallide brunneae*, *marginem albae fimbriatae*. *Stipes* 14-40 mm *longus*, 2-4 mm *crassus*, *cylindricus*, *centralis*, *pileo concolor*, *cortina annulata instructus*, *infra anulum squamellulis recurvatis densioribus*, *basi tomentis flavidis obductus*. *Caro brunneola*, *tenuis*. *Sporae* (5.5-)6-8 X (4-)5-6.5(-7) μm , *late amygdaliformes*, *leviter multangulae*, *brunneae*, *crassitunicatae*, *laeves*. *Basidia* 16-20 X 4.5-6 μm , (2-)4-*sporigera*. *Pleurocystidia nulla*. *Cheilocystidia* 28-44 X 10-16 μm , *vesiculata vel clavata*, *hyalina*, *aggregata*. *Hyphae epicutis pilei terminaliter abbreviatae*, 18-26 X 6-16 μm , *parietibus incrassatis*. *Hyphae fibulatae*.

Hab.: *Ad lignum cariosum in silvis lithocarpi et castanopsis*. *Holotypus*: Z-L Yang 1781 (HKAS 25570); *Paratypus*: P-G Liu 1148, 1194, 1212 (HKAS 25571, 25572, 25584).

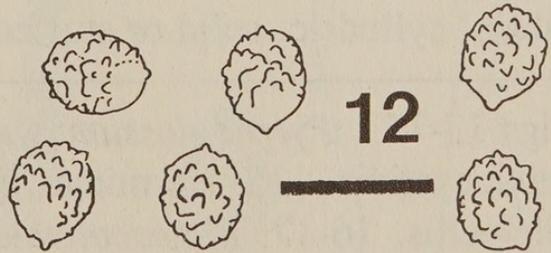
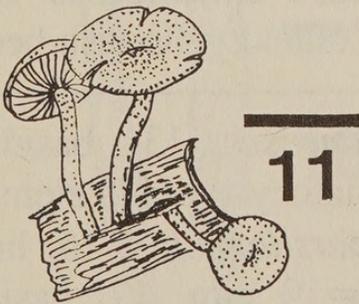
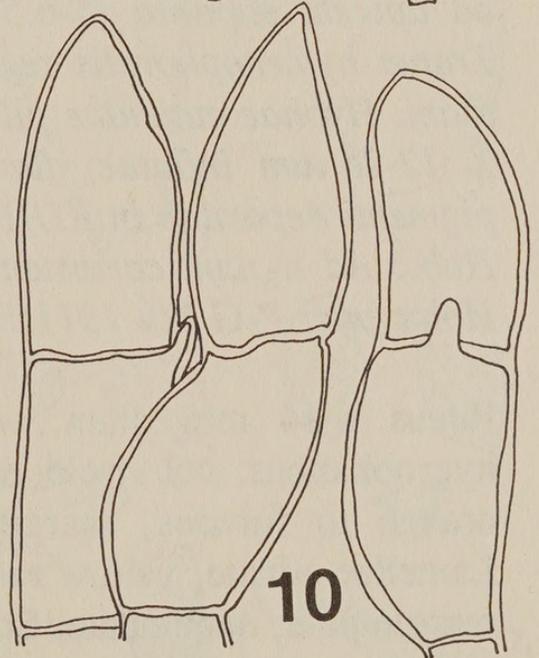
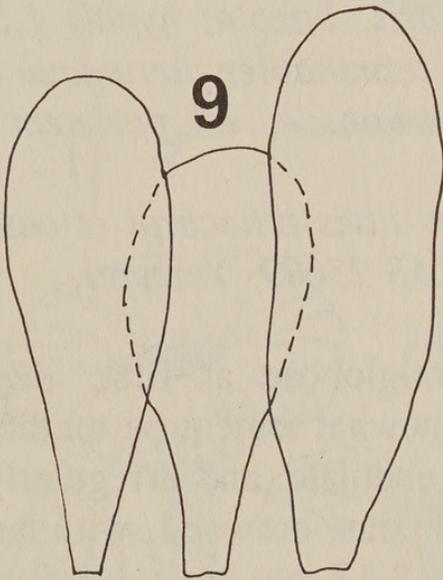
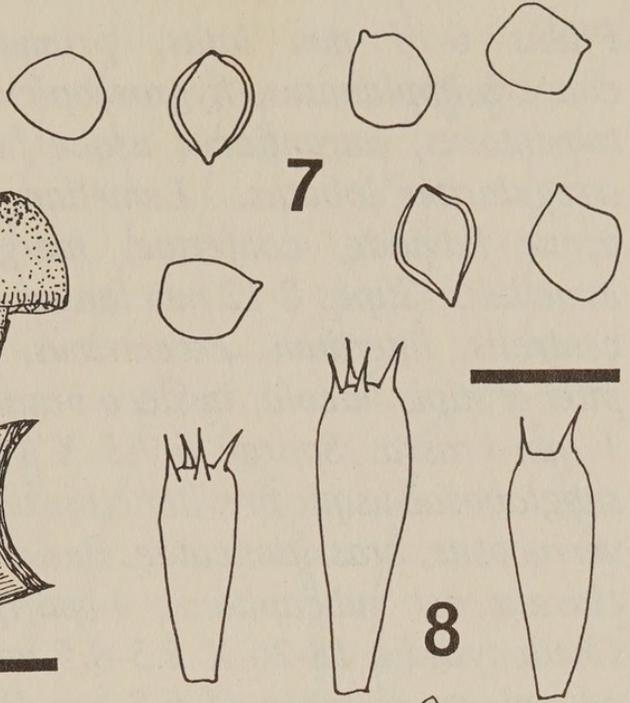
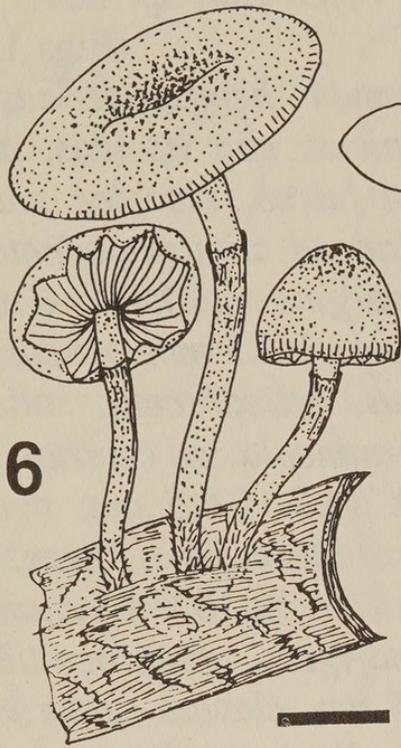
Pileus 23-50 mm *diam.*, *convex to semiglobose becoming concave-expanded*, *yellowish*, *disc covered with conspicuous*, *conic concolorous squamules*, *dry*, *slightly hygrophorous*, *margin with fibrillose to submembranous*, *fugacious remnants of the veil*. *Lamellae moderate crowded*, *adnate*, *pale brown*, *edge fimbriate*. *Stipe* 14-40 mm *long*, 2-4 mm *thick*, *cylindric to clavate*, *central*, *concolorous with pileus*, *fibrillose or covered with recurved squamules below persistent*, *membranous ring-like cortina*, *the base with white-yellowish tomentum*, *dry*,

stuffed. Context brownish, thin, odour and taste indistinct. Spores (5.5-)6-8 X (4-)5-6.5(-7) μm , mean length of 60 spores in KOH 6.56 μm , mean breadth of 60 spores 5.42 μm (mean L/B ratio 1.21), broadly amygdaliform, slightly multiangular, mucro present but indistinct, germ pore absent to indistinct, conspicuously thick-walled (about 0.3 μm thick), smooth, brown. Basidia 16-20 X 4.5 -6 μm , mostly 4-spored, occasionally 2 or 3-spored. Pleurocystidia none. Cheilocystidia 28-44 X 10-16 μm , vesiculose to clavate, slightly thick-walled, hyaline, numerous and crowded. Epicutis a trichodermial palisade, the terminal members of the hyphal chains usually shortened, thick-walled, 18-26 X 6-16 μm , mostly incrustated by yellow-brown pigments in KOH. Hyphae with clamp connexions.

Specimens examined: Z-L Yang 1781 (HKAS 25570, Holotype), 23 Jun. 1992; On rotten wood under forest of broad-leaved trees, alt. 1500-1950 m, Laojunshan, Malipo County, Yunnan; P-G Liu 1148, 1194 (HKAS 25571, 25572, Paratypes), 22, 24 Jun. 1992, same locality; P-G Liu 1212 (HKAS 25584, Paratype), 29 Jun. 1992, on rotten wood under forest of *Lithocarpus* spp. and *Castanopsis* spp., Gulingqing, Maguan County, Yunnan.

Note: The macroscopic characters of this species indicate a relationship to *P. affinis* E. Horak from Papua New Guinea (Horak, 1979). *P. neoaffinis* is well distinguished by thick-walled, somewhat multiangular spores and cuticular terminal hyphae with thick-walled, shortened elements.

Figs 6-10. *Phaeomarasmius neoaffinis*: 6. habit (HKAS 25570), bar scale = 10 mm. 7 basidiospores. 8. basidia. 9. cheilocystidia. 10. terminal elements of pileipellis. Bar scale for Figs. 7,8,9 = 10 μm . 11-12, *Pyrrhoglossum yunnannensis*: 11. habit (HKAS 25609), bar scale = 10 mm. 12. basidiospores, bar scale = 10 μm .



Pyrrhoglossum yunnanensis P. G. Liu, sp. nov.

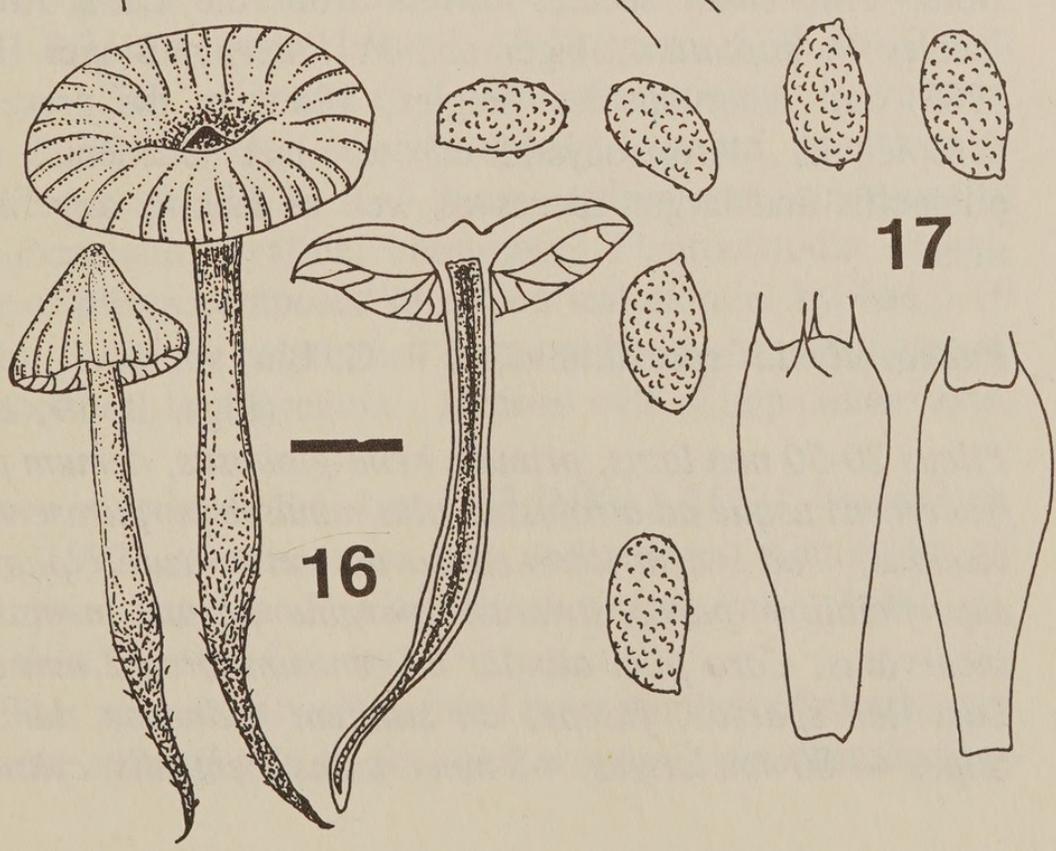
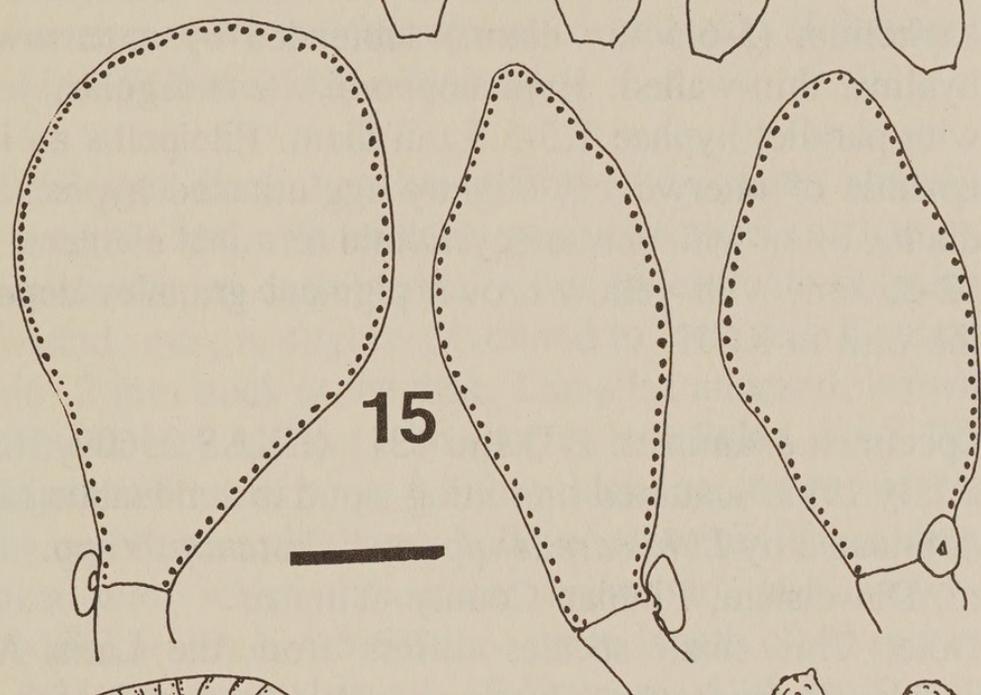
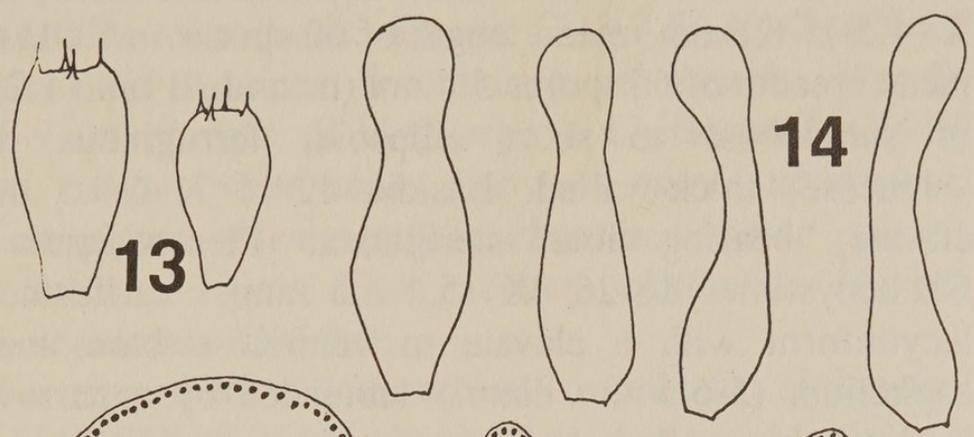
(Figs 11-15, 24.)

Pileus 6-14 mm *latus*, *primum hemisphaericus*, *demum convexo-applanatus*, *hygroscopicus*, *non viscidus*, *aliquantum tomentosus*, *aurantiacus usque fulvus*, *marginē undulatus et irregulariter lobatus*. *Lamellae ad stipitem adnatae*, *luteae usque fulvidae*, *confertae*, *marginē pallidae*, *denticulatae*, *lamellulis*. *Stipes* 8-12 mm *longus*, 1-1.5 mm *crassus*, *fulvidus*, *centralis*, *interdum excentricus*, *cylindraceus*, *solidus*. *Caro pilei et stipis luteola*, *in sicco brunneola*, *ad centrum pilei circa 1 mm crassa*. *Sporae* 6-7.3 X (4.5-)5-6.5 μm , *ovoideae vel subglobosae usque breviter ellipsoideae*, *ferrugineae*, *conspicue verrucosae*, *crassitunicatae*. *Basidia* 12-16 X 6-9.5 μm , *breviter clavata vel subcapitata*, *4-sporigera*. *Pleurocystidia nulla*. *Cheilocystidia* 18-26 X 5.5-8.5 μm , *clavata usque ventricosa*, *ad apicem capitata* (5-6.5 μm *lata*), *hyalina*, *tenuitunicata*. *Trama hymenophoralis regularis*, *luteola*, *hyphis 1.5-5.5 μm diam.* *Hyphae cuticulae pilei terminaliter plerumque ad 36-62 X 12-25 μm inflatae*, *flavobrunneae*, *ad parietem granulis pigmenti depositae in KOH*.

Hab.: *Ad lignum cariosum in silvis lithocarpi et castanopsis*.
Holotypus: P-G Liu 1311 (HKAS 25609, Yunnan).

Pileus 6-14 mm *diam.*, *semiglobose at first*, *then plane*, *hygrophanous*, *not viscid*, *somewhat tomentose on the surface*, *orange to fulvous*, *margin undulate and irregularly lobed*. *Lamellae adnate*, *yellow to fulvous*, *crowded*, *with lamellulae*, *margin pale*, *denticulate*. *Stipe* 8-12 mm *long*, 1-1.5 mm *thick*, *slightly excentric to central*, *surface concolorous with the pileus*, *cylindric*, *solid or stuffed*. *Context yellowish becoming*

Figs. 13-15. *Pyrrhoglossum yunnanensis*: 13. basidia. 14. cheilocystidia. 15. terminal dermatocystidioid elements of pileipellis. 16-17, *Phaeocollybia sparsilamellae*: 16. habit and section (HKAS 25531), bar scale = 10 mm. 17. basidia and basidiospores. Bar scale for Figs. 13, 14, 15, 17 = 10 μm .



brownish when dried, about 1 mm thick at disk. Spores 6-7.3 X (4.5-)5-6.5 μm , mean length of 60 spores in KOH 6.61 μm , mean breadth of 60 spores 5.4 μm (mean L/B ratio 1.22), ovoid or subglobose to short ellipsoid, ferruginous, distinctly verrucose, thick-walled. Basidia 12-16 X 6-9.5 μm , short clavate, bearing four sterigmata. Pleurocystidia absent. Cheilocystidia 18-26 X 5.5-8.5 μm , variform, mostly lecythiform with a clavate to ventricose base and with a capitellum (5-6.5 μm diam.) subtended by a narrow neck, hyaline, thin-walled. Hymenophoral trama regular, yellowish, with parallel hyphae 1.5-5.5 μm diam. Pileipellis an indistinct epicutis of interwoven, slightly agglutinated hyphae 3-10 μm diam., often with dermatocystidioid terminal elements 36-64 X 12-25 μm , with yellow-brown pigment granules deposited on the wall in KOH.

Specimen examined: P-G Liu 1311 (HKAS 25609, Holotype), 5 July 1992, scattered on rotting wood in a mountain rain forest dominated by *Lithocarpus* spp. and *Castanopsis* spp., alt. 1850 m, Daweishan, Pinbian County, Yunnan.

Note: This small species differs from the Latin American species *P. stiptatum* Singer and *P. lilacepes* Singer (Pegler, 1983) and other species (Pegler, 1986) in the presence of conspicuous dermatocystidioid terminal elements in the pileipellis and larger spores as well as lacking any lilaceous tints.

Phaeocollybia sparsilamellae P. G. Liu, sp. nov.

(Figs. 16-19, 25-28.)

Pileus 20-50 mm latus, primum hemi-globosus, demum planus, fuscescens usque ad atrofuscus plus minusve purpurascens, non viscidus, ad centrum concavus et acute papillatus, superficialiter parce striatus, margine parum involutus vel incurvatus. Caro pilei albida, ad centrum circa 2 mm crassa. Lamellae sparsae, fuscae, ad stipitem adnexae, lamellulis. Stipes 40-80 mm longus, 4-5 mm crassus, centralis, cylindricus,

fuscus, intus fistulosus, basi in pseudoradicatum gradatim decrescens, alba tomentosus. Sporae (7-)8-9.5(-10) X 4.5-6.5 μ m, ellipticae vel ovoideae, ferrugineae, verrucosae. Basidia 24-30 X 8-9 μ m, clavata, (2-)4-sporigera. Cheilocystidia 24-38 X 5-9 μ m, saepe cylindracea, interdum apice subcapitata, hyalina, caespitosa. Pleurocystidia absentia. Hyphae epicutis pilei parallelae, 3-10 μ m diam., leviter gelatinosae. Hyphae tramarum regulares, fibulatae.

Hab.: Ad terram in silvis lithocarpi et castanopsis. Holotypus: P-G Liu 1163 (HKAS 25531, Yunnan).

Pileus 20-50 mm diam. convex at first, then plane, slightly concave at center and with an acute papilla, sparsely striate on the surface, brown to dark brown, more or less with purplish tint, not viscid, margin slightly involuted to incurved. Context white, thin, 2 mm thick at the disk. Lamellae adnexed, brown to dark brown, very sparse, with shorter lamellulae, L=8-10, l=6-8. Stipe 40-80 mm long, 4-5 mm thick, central, cylindrical or slightly swollen at the base, hollow, tapering into a deep pseudorhiza with white tomentum, brown to dark brown. Spores (7-)8-9.5(-10) X 4.5-6.5 μ m, mean length of 40 spores in KOH 8.25 μ m, mean breadth of 40 spores 5.28 μ m (mean L/B ratio 1.56), elliptical to ovoid, ferruginous, verrucose. Basidia 24-30 X 8-9 μ m, clavate, mostly 4-spored, occasionally 2. Cheilocystidia 24-38 X 5-9 μ m, cylindrical, occasionally apex subcapitate, hyaline, caespitose. Pleurocystidia absent. Cuticle of pileus composed of cylindrical parallel hyphae 3-10 μ m diam., slightly gelatinous, encrusted with brown pigment. Hymenophoral trama regular. Hyphae with clamp connexions.

Specimen examined: P-G Liu 1163 (HKAS 25531, Holotype), 22 July 1992, caespitose on soil under forest dominated by *Lithocarpus* spp. and *Castanopsis* spp., alt. 1600 m, Laojunshan, Malipo County, Yunnan.

Note: This species is well defined by a number of characters: the sparse striated pileus, few and scattered lamellae, hyphae

with clamp connexions, and large spores. These characters distinguish it from other species of the genus (Smith, 1957; Singer, 1970b; Smith and Trappe, 1972; Horak, 1974, 1976/1977; Guzmán, Bandala-Muñoz and Montoya-Bello, 1987).

Crepidotus neocystidiosus P. G. Liu, sp. nov.

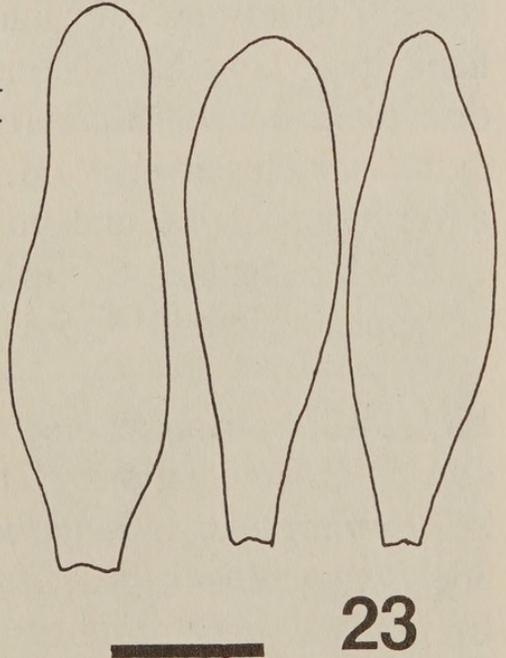
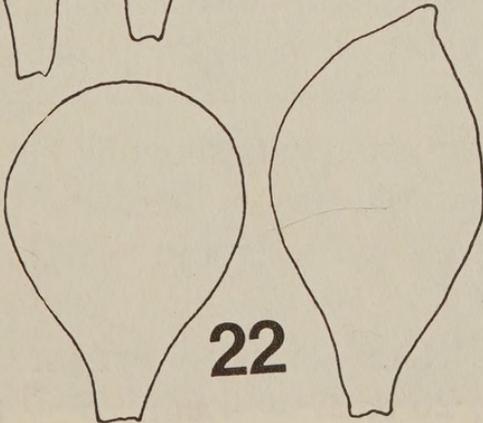
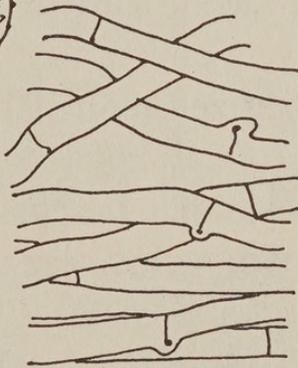
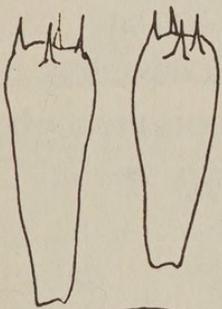
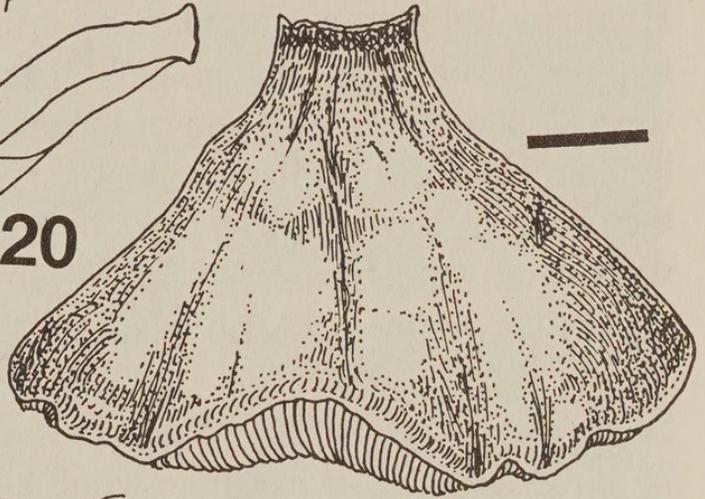
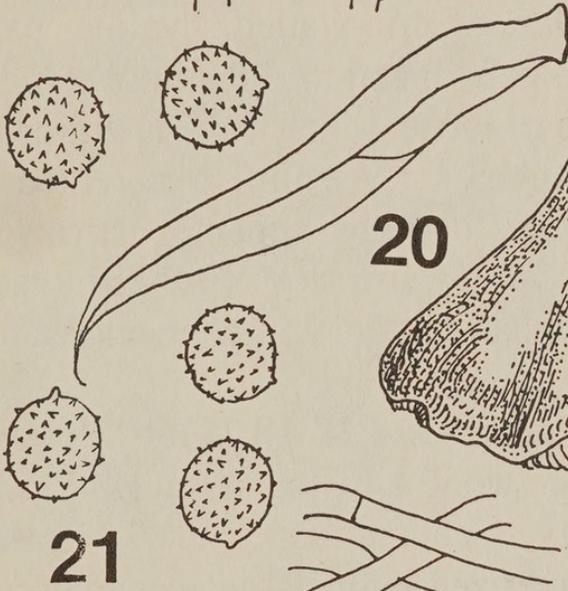
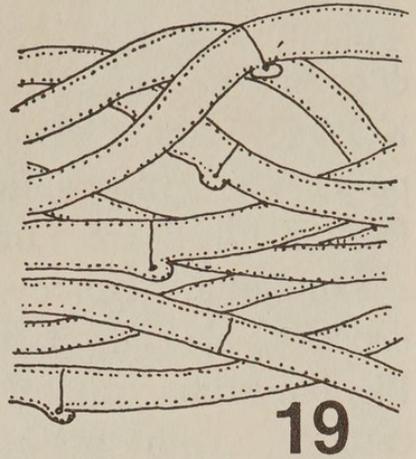
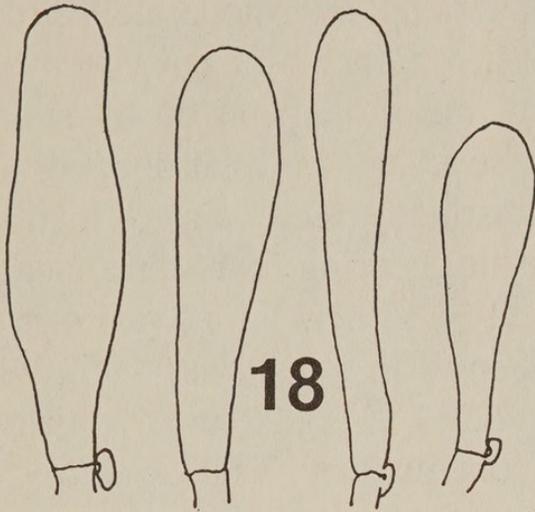
(Figs. 20-23, 29-30.)

Pileus 21-80 X 52-104 mm diam., *siccus*, *lateralis*, *flabellatus*, *cremeus*, *postea* *griseo-ochraceus*, *marginem* *leviter* *striatus*, *ad* *basim* *tomentosus*. *Stipe* *nullus*. *Lamellae* *moderate* *confertae*, *albidae*, *postea* *ochracea*, *lamellulis* *intermixtae*. *Sporae* 5.5-7 μ m diam., *globosae*, *spinulosae*, *pallide* *argillaceae*, *inamyloideae*. *Basidia* 14-18 X 6.5 μ m, *clavata*, *4-sporigera*. *Cheilocystidia* 22-36 X 10-14 μ m, *late* *clavata* *vel* *sublageniformia*, *hyalina*, *tenuitunicata*. *Pleurocystidia* *rarissima*, 22-34 X 12-22 μ m, *napiformia* *vel* *capitata*, *brunneola*, *tenuitunicata*. *Trama* *hymenophoralis* *regularis*, *hyalina*, *haud* *gelatinosa*. *Hyphae* *carnis* *laxe* *intertextae*, *hyalinae*, 5-17 μ m diam. *Tomenta* *pilei* *ex* *hyphis* *laxe* *intertextis* 2.5-6.5 μ m diam. *constantia*. *Cuticula* *pilei* *ex* *hyphis* 2.5-6 μ m diam., *hyalinis*, *dense* *reptantibus* *constantia*. *Hyphae* *omnes* *fibulatae*.

Hab.: *Ad* *lignum* *cariosum* *in* *silvis*. *Holotypus*: Z-L Yang 1812 (HKAS 25566, Yunnan).

Pileus 21-80 X 52-104 mm diam., flabelliform, surface creamy to greyish ochre, margin straight, wavy, faintly striate, fibrillose, smooth and glabrescent except for a fibrillose tomentose region towards the base, lateral. *Stipe* absent.

Figs. 18-19. *Phaeocollybia sparsilamellae*: 18. cheilocystidia. 19. cuticle, bar scale = 10 μ m. 20-23. *Crepidotus neocystidiosus*: 20. habit and section (HKAS 25566), bar scale = 10 mm. 21. basidiospores, basidia and cuticle; 22. pleurocystidia. 23. cheilocystidia. Bar scale for Figs. 21, 22, 23 = 10 μ m.

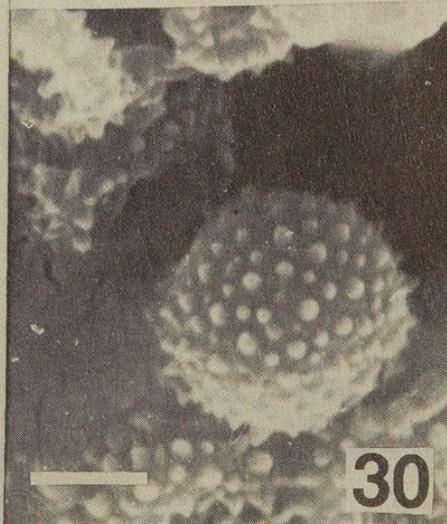
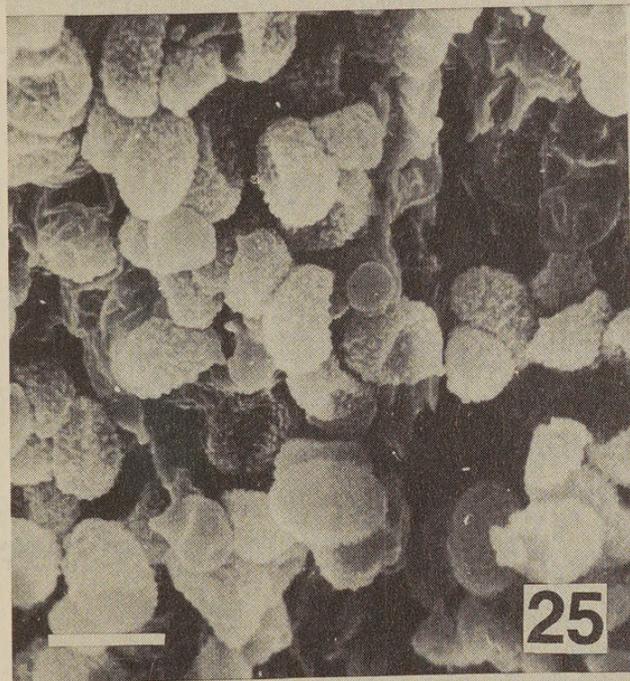
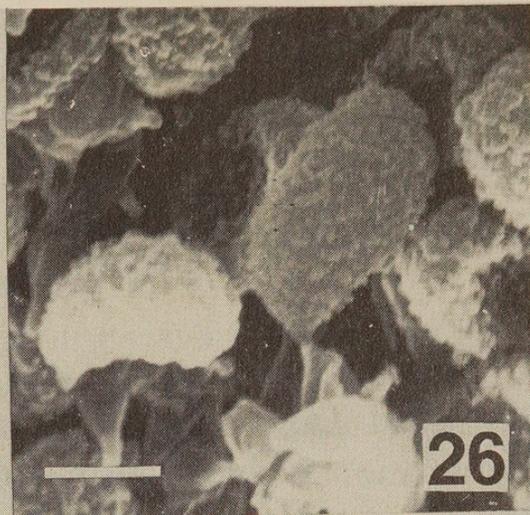


Lamellae radiating from a lateral point, moderately crowded with lamellulae, at first whitish, finally ochraceous, ventricose, edge entire. Spores 5.5-7 μm , mean diameter of 40 spores in KOH 6.15 μm in KOH, globose except for hilar appendix, with pallid clay-colored wall, distinctly echinulate, inamyloid. Basidia 14-18 X 6.5 μm , clavate, bearing four sterigmata up to 3.5 μm long. Cheilocystidia 22-36 X 12-22 μm , variform from broadly clavate to sublageniform, hyaline, thin-walled. Pleurocystidia usually rare, 22-34 X 12-22 μm , napiform or capitate, with brownish contents in KOH, thin-walled. Hymenophoral trama regular, of thin-walled, hyaline, parallel hyphae 3.5-9 μm diam., no gelatinization. Fibrillose tomentum towards the base consisting of loosely interwoven, thin-walled, hyphae 2.5-6.5 μm diam. Pileal surface little differentiated from the underlying context, of densely repent, narrow and subparallel hyphae 2.5-6 μm diam., not inflated, lacking encrusting pigment. All hyphae with clamp connexions.

Specimen examined: Z-L Yang 1812 (HKAS 25566, Holotype), 23 Jun 1992, on rotting wood in forest, alt. 1550 m, Laojunshan, Malipo County, Yunnan.

Note: This species is characterized by its large size and solitary habit, pale lamellae, distinctly echinulate spores and napiform or capitate brownish pleurocystidia. It approaches closest to *C. cystidosus* Hesler et A. H. Sm. which lacks pigments but has a very short stipe and no pleurocystidia (Hesler and Smith, 1965). It resembles *C. nephrodes* (Berk. et M. A. Curtis) Sacc. in appearance and spores, yet differs in the pileal surface

Figs.24-30. Scanning electron micrographs showing the shape, size or ornamentations of basidiospores of three new species: 24. *Pyrrhoglossum yunnanensis* (HKAS 25609). 25, 26, 27 & 28. *Phaeocollybia sparsilamellae* (HKAS 25531). 29 & 30. *Crepidotus neocystidiosus* (HKAS 25566). Bar scale for Figs.24, 28, 29 & 30 = 3 μm ; 26 & 27 = 4 μm ; 25 = 10 μm .



anatomical characters, particularly the fibrillose tomentum consisting of fasciculate chains of short, ferruginous brown, thick-walled elements (Pegler, 1977; Natarajan and Raman, 1983).

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汉 文 摘 要

本文报道了产于中国滇南、滇东南伞菌目的五个新种,并讨论了相似种的区别特征.新种是金果老伞 *Gerronema chrysocarpum*, 新拟暗小皮伞 *Phaeomarasmius neoaffinis*, 云南火舌菌 *Pyrrhoglossum yunnanensis*, 疏褶暗金钱菌 *Phaeocollybia sparsilamellae*, 新囊靴耳 *Crepidotus neocystidiosus*. 文中引证标本存放于中国科学院昆明植物研究所隐花植物标本馆 (HKAS).



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