Re-disposition of specimens filed under *Lachnea* in HMAS

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Collections of *Lachnea* deposited in HMAS were re-examined. Fourteen taxa belonging to 6 genera were found. Among them, *Melastiza daliensis*, *Scutellinia adamdiopsis*, *S. beijingensis*, and *S. kerguelensis* var. *microspora* are described as new taxa. *Scutellinia ahmadii* is recorded for the first from China.

Key words: *Geopora*, *Humaria*, *Melastiza*, *Scutellinia*, taxonomy, *Tricharina*, *Trichophaea*.

Introduction

The generic name *Lachnea* (Fr.) Gillet, a later homonym of a plant genus (Denison, 1958), was applied by earlier mycologists for some operculate cup-fungi possessing hairs or setae on the apothecial margin and receptacle surface and is now recognized as a synonym of *Scutellinia* (Cooke) Lambotte (Kirk *et al*., 2001). Specimens filed under *Lachnea* in the Herbarium of Mycology, Chinese Academy of Sciences (HMAS) have never been restudied nor compared with modern taxonomic treatments. Most of them were labeled as *Lachnea scutellata* (L.) Gill., *Lachnea fuscoatra* (Regent.) Rehm, and *Lachnea* sp. However, these identifications were carried out based mainly only on presence of the receptacle hairs. Many important features, such as hair origin in the ectal excipulum, shape and color of hairs, shape of apothecia, color of hymenium and ascospore surface morphology and guttulation were ignored by the earlier workers. Significant changes have been made in the classification system of the operculate cup-fungi after the 1960's (Eckblad, 1968; Rifai, 1968; Korf, 1972; Dennis, 1978; Yang and Korf, 1985; Schumacher, 1990; Eriksson and Hawksworth, 1998) and re-examinations of the herbarium material filed under *Lachnea* became necessary. Results of this study indicated that 14 species and varieties of 6 genera, *Geopora* Harkn., *Humaria* Fuckel, *Melastiza* Boud., *Scutellinia* (Cooke) Lambotte, *Tricharina* Eckblad, and

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Trichophaea Boud., are involved. Among them, 3 new species, a new variety, and a new Chinese record are found.

Materials and methods

Thirty-eight specimens deposited in HMAS, filed under *Lachnea*, collected between 1938 and 1961, and previously identified following the taxonomic treatments by Saccardo (1889), Seaver (1928) and some earlier mycologists of an older generation were re-examined. More recent collections of some of these species are also reported here. Apothecia were rehydrated and sectioned by a freezing microtome at the thickness of 25-30 μm. Measurements were taken from sections mounted in cotton blue-lactophenol solution and from squash mounts. For SEM studies of the spore surface morphology, either a portion of hymenium was cut and stuck directly on a stub, or free ascospores shut on the hymenium surface were picked up by a piece of adhesive tape then put on a stub with the spores exposed. The materials were coated with gold-palladium and observed with SEM (FEI Quanta 200).

Taxonomy

Geopora

Geopora is characterized by apothecia at first completely closed and subterranean, then splitting irregularly and becoming deep-cupulate and completely to partially immersed in soil; receptacle covered by dense, long, hyphoid, hyaline to brownish hairs with obtuse tips; and ascospores ellipsoid to elliptical-fusoid, smooth-walled, with one or two large guttules. Species of the genus are often found in soil. The genus in China has been reviewed by Zhang and Yu (1992) and illustrations were provided, but the old collections filed under *Lachnea* had not been studied at this time. Dennis (1978) used the generic name *Sepultaria* (Cooke) Lambotte for some members of *Geopora* with detailed descriptions and illustrations.

Geopora perprolata B.C. Zhang, Acta Mycol. Sin. 11: 12, 1992.

Specimen examined: CHINA, Yunnan, Dali, Zhonghesi, 28 VIII 1938, on soil, C.C. Cheo 121, HMAS 17116 (as *Lachnea ampezzana*).

Humaria

Species of the genus are characterized by deep-cupulate apothecia centrally attached to the substrates; hymenium light-colored, usually dirty white or whitish; receptacle covered with brown, setaceous, pointed hairs arising from superficial excipular cells; ascospores ellipsoid, ornamented, and

with two large guttules. *Humaria* distinguishes from *Trichophaea* by its centrally attached, cupulate and relative large apothecia. Eight names under *Humaria* appeared in *Sylloge Fungorum Sinicorum* (Tai, 1979) but most of belong to the genus *Octospora* Hedw., a terrestrial or moss-inhabiting genus with orange to red and relatively small apothecia, except for *H. hemisphaerica*, a very common and easily recognized fungus in the north temperate zone (Dennis, 1978; Breitenbach and Kränzlin, 1984; Hansen and Knudsen, 2000; Mao, 2000). *Humaria xylariicola* Henn. & E. Nyman turned out to be an inoperculate discomycete (Zhuang, 2004).

Humaria hemisphaerica (F.H. Wigg.) Fuckel, Jahrb. Nassauischen Vereins Naturk. 23-24: 322, 1870.

Specimens examined: CHINA, Yunnan, Kunming, Xishan, 27 VII 1941, on soil, C.C. Cheo 193, HMAS 17117 (as *Lachnea fuscoatra*); *ibid*., 27 VII 1941, on duff, C.C. Cheo 197, HMAS 17121 (as *Lachnea fuscoatra*); *ibid*., 15 VII 1938, on soil, C.C. Cheo 43, HMAS 17122 (as *Lachnea*); *ibid*., 9 VIII 1938, on soil, F.L. Tai & H.S. Yao 85, HMAS 17123 (as *Lachnea*); *ibid*., 28 VIII 1938, on duff, F.L. Tai 126, HMAS 17126 (as *Lachnea*); *ibid*., 9-VIII-1938, on soil, C.C. Cheo 84, HMAS 17127 (as *Lachnea*); Yunnan, Kunming, Haiyuansi, 6 VIII 1938, on soil, C.C. Cheo 62, HMAS 17129 (as *Lachnea*); Gansu, Zhangye, 3 IX 1958, on soil, Q.M. Ma 798, HMAS 24254; Hebei, Weixian, Xiaowutaishan, 7 VIII 1957, on soil, L.W. Xu & J.H. Yu *et al*. 72, HAMS 30774; *ibid*., 19 VIII 1957, on soil, L.W. Xu & H.Y. Liu 315, HMAS 30775; *ibid*., 11 VIII 1957, on soil, L.W. Xu & J.H. Yu 170, HMAS 30776 (all as *Lachnea hemisphaerica* except for HMAS 17117, 17121, 17122, 17123, 17126, 17127, 17129).

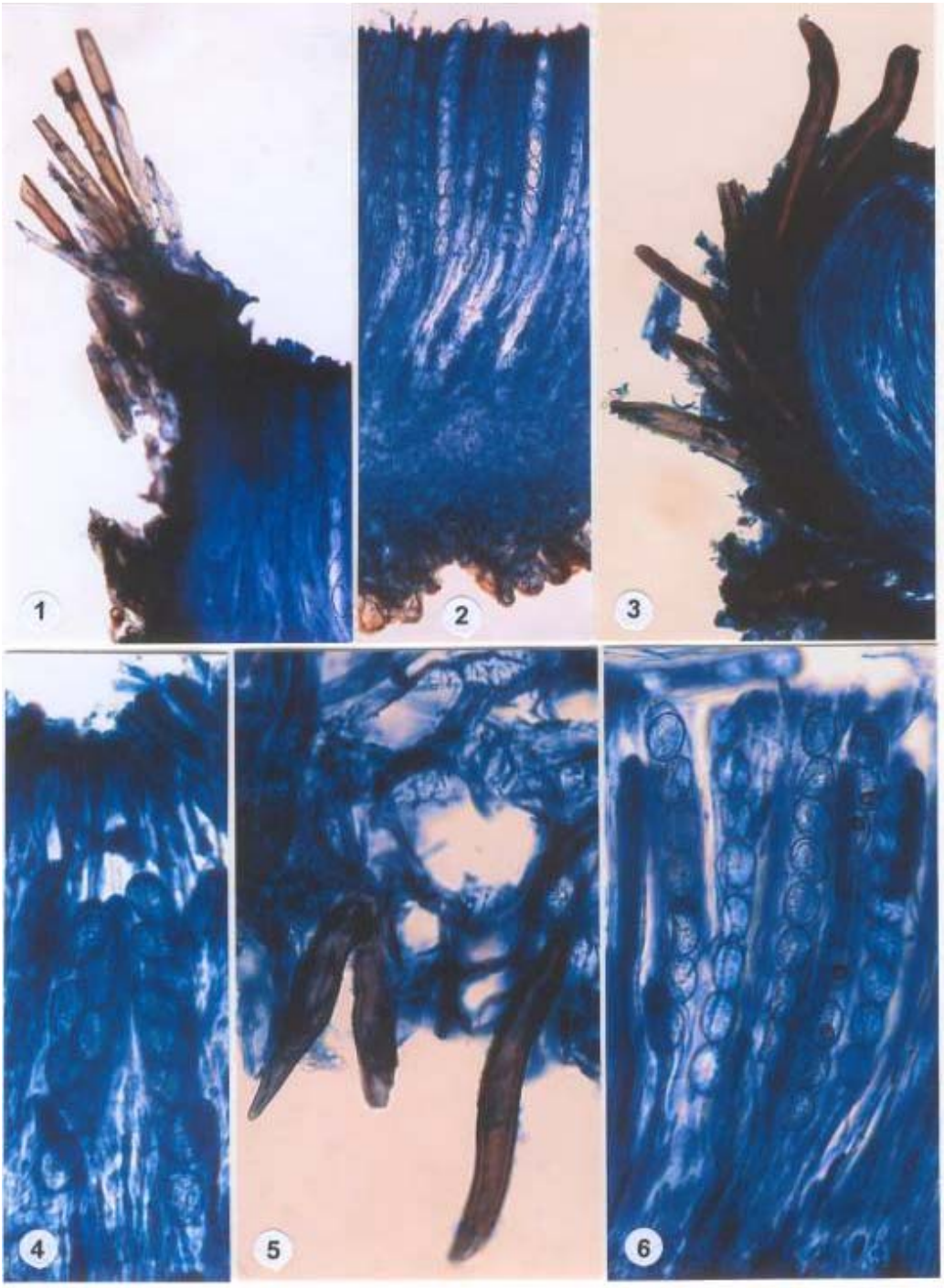
Melastiza

Melastiza is characterized by the discoid apothecia sessile, centrally attached and with red to orange-red hymenium; receptacle surface bearing short, obtuse, brown, and thin-walled hairs arising from superficial cells; ascospores ellipsoid, guttulate and ornamented. Receptacle hairs in the genus are easily overlooked (Rifai, 1968). Species of the genus are usually found on damp soil. Two species of the genus have been found in China (Tai, 1979; Korf and Zhuang, 1985). Fungi in this genus are well-illustrated by Rifai (1968), Dennis (1978) and Breitenbach and Kränzlin (1984).

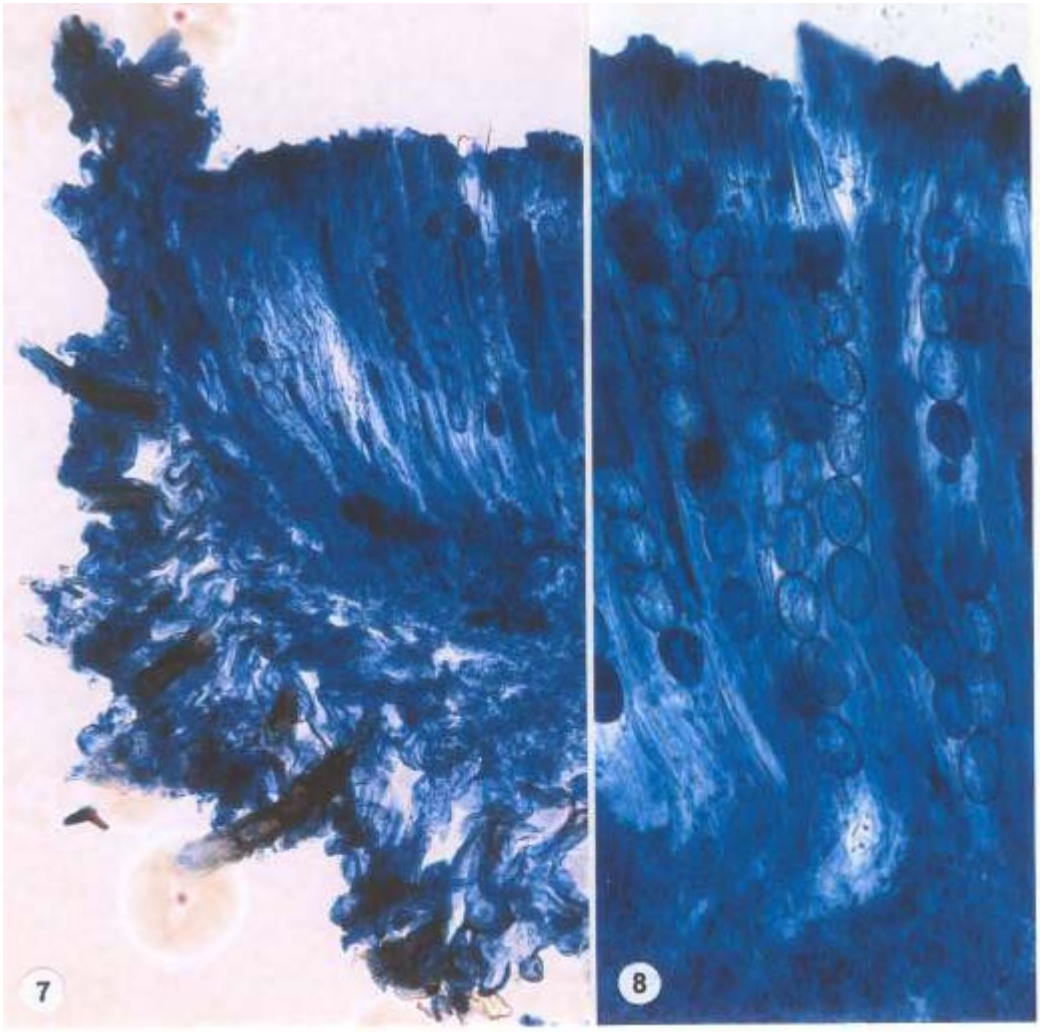
Melastiza daliensis W.Y. Zhuang, **sp. nov.** (Figs. 1, 2, 9)

Ab *Melastiza asperula* ascosporis 19-24 × 10-11.5 µm, ornamentis ascosporarum demissis differt.

Apothecia discoid, sessile, up to 10 mm in diam. when fresh and 1.5-5 mm in diam. when dry, depressed at center when dry, hymenium surface dirty orange when dry, margin with brown hairs; *hairs* arising from superficial cells of receptacle, distributed at margin and upper flanks, somewhat tapered towards apex and drawn out to a more or less blunt tip, septate, nearly smooth-walled, medium brown, 125-355 µm long, 10-15 µm wide at base, walls 1-3



Figs. 1-2. *Melastiza daliensis* (HMAS 27696). **1.** Structure at apothecial margin; **2.** Structure at flank. **Figs. 3-4.** *Scutellinia ahmadiopsis* (HMAS 30779). **3.** Structure at apothecial margin; **4.** Portion of hymenium. **Figs. 5-6.** *Scutellinia beijingensis* (HMAS 31073). **5.** Ectal excipulum with rooting hairs; **6.** Portion of hymenium. 1, 2, 3 × 235; 4, 5, 6 × 467.



Figs. 7-8. *Scutellinia kerguelensis* var. *microspora* (HMAS 23753). **7.** Section of apothecium at margin and flank, × 235; **8.** Portion of hymenium, × 467.

µm thick, hairs at lower flanks light brown, short-cylindrical to club-shaped, mostly unicellular, 35-65 × 10 µm; *ectal excipulum* of textura angularis, 40-80 µm thick, cells more or less isodiametric, 12-33 µm in diam., cell walls light brown to brownish and thickened in outer cells, subhyaline and thin-walled in inner cells; *medullary excipulum* of textura intricata, 40-80 µm thick, tissues below hymenium turning blue in Melzer's reagent; subhymenium not clear-distinguished; hymenium *ca.* 240-245 µm thick; *asci* 8-spored, broad-clavate, not dextronoid, with apex slightly thickened, J– in Melzer's reagent, 13-15 µm wide; *ascospores* ellipsoid to fusoid-ellipsoid, with fine warts on surface, with (1-)2 large guttules plus several small ones, uniseriate, 19-24 × 10-11.5 µm,

spore ornamentations 0.3-0.4 μm in diam. and 0.1 μm high; *paraphyses* filiform and slightly enlarged at apex, 4-6 μm wide at apex and 2.5-3 μm below.

***Holotype* (*designated here*)**: CHINA, Yunnan, Dali, alt. 1800 m, 20 VIII 1959, on bare and mossy soil, Q.Z. Wang 1058, HMAS 27696 (as *Lachnea scutellata*).

Notes: Among the known species of the genus, *Melastiza asperula* Spooner is the closest taxon to *M. daliensis*. The former can be distinguished easily from the latter in smaller ascospores, 17-21 × 8-10 μm; higher spore ornamentations, 0.5-0.8 μm high; and occurrence on pine debris and needles instead of bare and mossy soil (Spooner, 1981). Shape of spore ornamentations and number of guttules have been considered as diagnostic features to separate *Melastiza* from its morphologically similar genus, *Hiemsia* Svrček (Korf, 1972). *Melastiza daliensis* as well as *M. asperula* is similar to *Hiemsia* in the non-reticulate and delicately marked ascospores, whereas, their spores are never uniguttulate but biguttulate.

Scutellinia

Scutellinia is characterized by the discoid apothecia broadly attached to the substrates; hymenium red to orange; hairs arising from inner cells of the ectal excipulum, brown, setaceous, and thick-walled; and ascospores ellipsoid to spherical, with various ornamentations on surface, and containing one to many guttules. Brown setae arising not from superficial cells but from inner excipular cells and with one to several rootlets at base are the most diagnostic. Species of the genus occur on damp, rotten wood and bare soil. Twenty-one species were reported from China (Cao and Moravec, 1988; Zhuang, 1994; Liu and Peng, 1996; Zhuang and Wang, 1998; Mao, 2000; Yu *et al*., 2000).

Scutellinia ahmadii (Cash) S.C. Kaushal, Bibl. Mycol. 91: 594, 1983.

Specimen examined: CHINA, Yunnan, Simao, alt. 1000 m, 24 IV 1957, on rotten bark, L.W. Xu & Q.Z. Wang 857, HMAS 24106 (as *Lachnea scutellata*).

Notes: This species was previously reported from India and Pakistan (Schumacher, 1990) and is characterized by its apothecia with paler anchoring hyphae at base and a fringe-like border at margin, and less than 5 mm in diam.; hairs at margin usually shorter than 150 μm long and 13-20 μm wide, those at base about 35-90 μm long, and with 1-2 rootlets; ascospores broadly ellipsoid, 17-22 × 12.4-14.7 μm. It is a new record for China.

Scutellinia ahmadiopsis W.Y. Zhuang, **sp. nov.** (Figs. 3, 4, 10)

Ab *Scutellinia ahmadii* apotheciis grandibus, marginis apotheciarum involutes pro fimbriatis, ascis 8-sporis, ascosporis (17.5-)19-20 × (11.5-)12.7-14 μm differt.

Apothecia discoid, sessile, 3-12 mm in diam. when fresh and 2-6 mm in diam. when dry, margin incurved when dry, hymenium surface red when fresh

and dull orange when dry, margin and flanks covered with brown hairs; *hairs* rooting, arising from inner excipular cells, setaceous, ventricose, with a simple base, thick-walled, septate, up to 205 µm long, 15-23 µm wide, walls 3.5-5 µm thick, club-shaped, light brown to subhyaline cell protrusions present in between the setaceous hairs, 8-23 µm wide; *ectal excipulum* of textura angularis, *ca.* 75 µm thick, cells 20-50 µm in diam.; *medullary excipulum* of textura intricata, *ca.* 70-130 µm thick, hyphae subhyaline; *subhymenium* 38-50 µm thick and stained dark in cotton blue lactophenol; *hymenium ca.* 250-280 µm thick; *asci* 8-spored, subcylindrical, J– in Melzer's reagent, 15-20 µm wide; *ascospores* ellipsoid to broadly ellipsoid, with irregular warts on surface, multiguttulate, uniseriate, mostly (17.5-)19-20 × (11.5-)12.7-14 µm, spore ornamentations 0.4-1.2 µm in diam. and 0.5-0.8 µm high, markings higher in young spores; *paraphyses* filiform and slightly enlarged at apex, 5-8 µm wide at apex and 2.5-3 µm below.

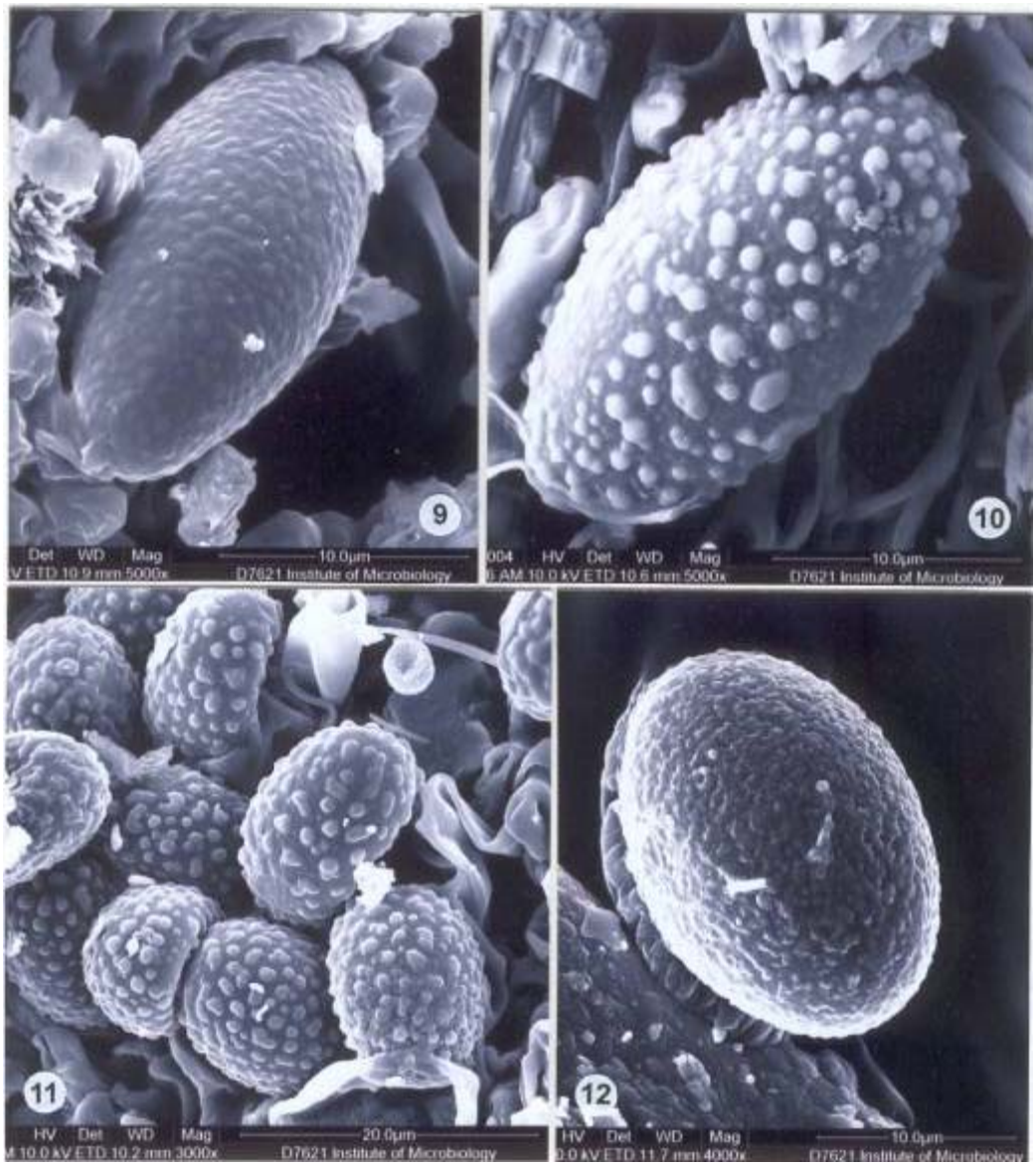
***Holotype* (*designated here*)**: CHINA, Sichuan, Miyaluo, alt. 2700 m, 15 IX 1960, on duff, C.M. Wang, Y.X. Han & Q.M. Ma 1014, HMAS 30779 (as *Lachnea scutellata*).

Notes: This species is similar to *Scutellinia ahmadii* in the short setae on receptacle surface, and broadly ellipsoid ascospores (in addition to the ellipsoid ones), and the separate spore ornamentations. It can easily be distinguished from the latter by the large apothecia 3-12 mm in diam. when fresh instead of 1-4 mm diam., lacking a fringe-like border of short brownish hairs at apothecial margin, absence of anchoring hyphae at the apothecial base attaching to the substrate, asci 8-spored instead of 2-8-spored and frequently 4-spored, ascospores multiguttulate instead of biguttulate, and smaller spore ornamentations (Schumacher, 1990).

Scutellinia beijingensis W.Y. Zhuang, **sp. nov.** (Figs. 5, 6, 11)

Ab *Scutellinia patagonica* apotheciis parvis; pilis ventricosis, 170-1000 × 15-40 µm; ascis angustis; ascosporis perparvis, 14.2-17.5 × 10-12.2 µm differt.

Apothecia discoid, sessile, 1-2 mm in diam. when dry, margin distinct, hymenium surface light dirty orange-brown when dry, margin and flanks covered with dark brown hairs; *hairs* rooting, arising from inner excipular cells, setaceous, ventricose, marginal hairs with 1-4 rootlets and basal ones with 1-2 rootlets, thick-walled, septate, 170-1000 µm long, 15-40 µm wide; *ectal excipulum* of textura angularis, 80-165 µm thick, cells up to 48 × 30 µm, 18-50 µm in diam. if isodiametric; *medullary excipulum* of textura intricata, 50-100 µm thick, hyphae subhyaline, 3-8 µm wide, *subhymenium* not clearly distinguishable; *hymenium* 230-250 µm thick; *asci* 8-spored, subcylindrical, J– in Melzer's reagent, 14-17 µm wide; *ascospores* broadly ellipsoid to ellipsoid, with separate warts on surface, multiguttulate, uniseriate, mostly 14.2-17.5 ×



Figs. 9-12. SEM ascospore surface morphology. **9.** *Melastiza daliensis* (HMAS 27696); **10.** *Scutellinia ahmadiopsis* (HMAS 30779); **11.** *Scutellinia beijingensis* (HMAS 31073); **12.** *Scutellinia kerguelensis* var. *microspora* (HMAS 61427).

10-12.2 µm, spore ornamentations 0.6-1.5 µm in diam. and mostly 0.5-0.6 µm high, some with a de Bary bubble; *paraphyses* filiform and slightly enlarged at apex, 3.5-7.5 µm wide at apex and 1.5-2.5 µm below.

***Holotype* (*designated here*)**: CHINA, Beijing, Xiangshan, 31 VIII 1961, on bare soil, R.Y. Zheng & H.Z. Li, HMAS 31073 (as *Lachnea scutellata*).

Notes: Among the existing species of the genus (Cao and Moravec, 1988; Moravec, 1989, 1996; Schumacher, 1990; Liu and Peng, 1996; Yao and Spooner, 1995; Zhuang and Wang, 1998; Yu *et al*., 2000), this fungus is similar to *Scutellinia patagonica* (Rehm) Gamundí in ascospore shape and spore guttulation, as well as hair shape and size; but differs significantly in the smaller apothecia, narrower asci (14-17 µm *vs*. 20-27 µm wide), and smaller ascospores (14.2-17.5 × 10-12.2 µm *vs*. 18-23.1 × 13.4-18.5 µm), and narrower paraphyses (3.5-7.5 µm *vs*. 7-11 µm wide at apex) (Schumacher, 1990).

SEM study of the ascospore surface morphology indicated that spore shape and ornamentations of *S. beijingensis* are also similar to those of *S. ahmadii*, whereas, the spore size, hair size, and hair shape at base of *S. beijingensis* are quite different (Schumacher, 1990). The Beijing collection is distinguishable from any other existing taxa of the genus and represents a new species.

Scutellinia jilinensis Z.H. Yu & W.Y. Zhuang, Mycotaxon 75: 404, 2000.

Specimens examined: CHINA, Yunnan, Simao, alt. 1000 m, 13 IV 1957, on rotten wood, L.W. Xu & Q.Z. Wang 648, HMAS 30781; Hebei, Weixian, Xiaowutaishan, 8 VIII 1957, on rotten wood, L.W. Xu & J.H. Yu 88, HMAS 30783 (all as *Lachnea scutellata*).

Notes: This species was reported previously only from the Changbai Mountains, Jilin Province (northeastern China) (Yu *et al*., 2000). The above two collections extend its distribution to Hebei (northern China) and Yunnan (southwestern China). They are wood-inhabiting and have similar apothecial size and spores morphology. Diversity has been discovered in length of the apothecial hairs and number of the rootlets. Setae of HMAS 30781 are up to 2000 µm long and of 2-4 rootlets at base and those in HMAS 30783 are up to 1400 µm long and with 1-3 rootlets.

Distinctions between *S. jilinensis* and its closely related species, *S. chiangmaiensis* T. Schum., was already discussed by Yu *et al*. (2000). *Scutellinia pennsylvanica* Denison occurring frequently in different regions of China (Zhuang, 1994) shares also common features with *S. jilinensis*, such as the relatively large apothecia, very long hairs, ellipsoid ascospores, and the somewhat interconnected spore ornamentations. They can easily be distinguished by the spore size, color of hairs, and height of the spore markings.

HMAS 23905 (Zhejiang, Tianmushan, 1957 IX 9, on wood, S.C. Teng 5430), is tentatively identified as *Scutellinia* cf. *jilinensis*. Compared with the other materials of *S. jilinensis* (Yu *et al*., 2000), its hairs at apothecial margin are ventricose, up to 1000 µm long, and of 1-2 rootlets; ascospores are broader (16.5-20 × 10.5-14 µm *vs*. 15-19.7 × 10-12.7 µm); and spore markings are less interconnected, 1-2 µm in diam. and less than 1 µm high.

Scutellinia kerguelensis (Berk. in Hook. f.) Kuntze var. ***microspora*** W.Y. Zhuang, **var. nov.** (Figs. 7, 8, 12)

Ab *Scutellinia kerguelensi* var. *kerguelensi* ascosporis parvis, 18.5-24.2 × 12-16.5 μm differt.

Apothecia discoid broadly attached or cupulate, sunk in substrates, *ca.* 2-8 mm in diam. when dry, hymenium surface bright red or becoming orange-yellow when fresh, pale dirty orange when dry, margin and flanks covered with brown hairs; *hairs* rooting, arising from inner excipular cells, setaceous, ventricose, with 1(-2) rootlet(s), brown to golden brown, thick-walled, septate, 180-330 μm long, 13-28 μm wide; *ectal excipulum* of textura angularis, 100-150 μm thick, cells subhyaline, up to 50 × 37 μm; *medullary excipulum* of textura intricata, *ca.* 150 μm thick, hyphae subhyaline; *subhymenium* not well-developed, less than 30 μm thick; *hymenium* 230-280 μm thick; *asci* 8-spored, subcylindrical, J– in Melzer's reagent, 18-25 μm wide; *ascospores* broadly ellipsoid, or ellipsoid with blunt ends, some with a de Bary bubble, surface finely ornamented or sometimes nearly smooth, multiguttulate or with 2 obvious guttules, uniseriate, mostly 18.5-24.2 × 12-16.5 μm, spore ornamentations very low and 0.3-0.6 μm in diam.; *paraphyses* filiform and slightly enlarged at apex, 5-8 μm wide at apex and 1.5-3 μm below.

***Holotype* (*designated here*)**: CHINA, Sichuan, Jiuzhaigou, on wet wood, 18 IX 1992, W.Y. Zhuang 1046, HMAS 61427. *Paratypes*: CHINA, Sichuan, Miyaluo, 28 VII 1958, on charcoal associated with bryophytes, Q.L. Hu 92, HMAS 23753 (as *Lachnea scutellata*); Sichuan, Miyaluo, alt. 3000 m, 19-IX-1960, on bare soil, C.M. Wang, Y.X. Han *et al*. 1157, HMAS 30777 (as *Lachnea scutellata*); Xizang, Medog, 19 VIII 1983, on trunk covered with soil, J.Y. Zhuang 28, HMAS 57697; Gansu, Zhouqu, Shatan Forestry Station, alt. 3100 m, 4 IX 1992, on wet wood, W.Y. Zhuang 979, 980, 983, HMAS 61424, 61425, 61426.

Notes: Both collections filed under *Lachnea scutellata* (L.) Gill. from Miyaluo, Sichuan Province possess smaller ascospores (19-24.2 × 15-16.5 μm in HMAS 23753, 18.5-22 × 12-14.3 μm in HMAS 30777) than that of *Scutellinia kerguelensis* (21.8-28.2 × 14.4-21.8 μm) described by Schumacher (1990), which are unique with the previously recorded Chinese collections of the so-called '*Scutellinia kerguelensis*' from Gansu, Sichuan and Xizang and of a similar spore size (19-24 × 12-15 μm) (Zhuang, 1994). Since all the known Chinese specimens are stable in spore size and smaller than those from other regions of the world (Schumacher, 1990), a new variety of *S. kerguelensis* is thus proposed.

Scutellinia pennsylvanica (Seaver) Denison, Mycologia 51: 619, 1961.

Specimens examined: CHINA, Yunnan, Jizushan, 16 IX 1938, on duff, H.S. Yao 161, HMAS 17128 (as *Lachnea*); Yunnan, Baoshan, Gaoligongshan, alt. 2100 m, 22 IX 1959, on rotten wood, Q.Z. Wang 1277, HMAS 26041 (as *Lachnea scutellata*).

Notes: The ascospores are 17-20 × 10.5-12 μm in HMAS 17128 and 19-22 × 11-12.7 μm in HMAS 26041, which are similar to those from other areas of China (Zhuang, 1994). The fungus is common in China and characterized by the very long and blackish brown setae at apothecial margin and irregularly shaped, interconnected spore ornamentations.

Scutellinia scutellata (L. : Fr.) Lambotte, Fl. Mycol. Belge, Suppl. 1: 299, 1887.

Specimens examined: CHINA, Anhui, Huangshan, 24 VIII 1957, on rotten wood of broad leaf tree or on the ground, S.C. Teng 5039, HMAS 20326; Guangxi, Lingle, Laoshan, 18 XII 1957, on rotten wood, L.W. Xu 574, HMAS 23752; Jilin, Huadian, 3 VII 1960, on bark of a fallen tree, S.C. Teng 6177, HMAS 29548 (all as *Lachnea scutellata*).

Scutellinia sinosetosa W.Y. Zhuang & Zheng Wang, Mycotaxon 69: 352, 1998.

Specimen examined: CHINA, Hebei, Xiaowutaishan, 30 VIII 1935, on rotten wood, X.K. Teng 12582, HMAS 30784 (as *Lachnea scutellata*).

Notes: The ascospores are 18-23 × 10.5-14 μm and slightly larger than those collected from southern China (Zhuang and Wang, 1998).

Scutellinia subhirtella Svrček, Česká Mykol. 25: 85, 1971.

Specimens examined: CHINA, Henan, Luoning, 18 VI 1958, on very rotten wood, H.Y. Liu 242, HMAS 30780; Qinghai, Qilian, 22 VIII 1958, on soil, Q.M. Ma 619, HAMS 30782 (all as *Lachnea scutellata*).

Tricharina

Tricharina is characterized by the its small apothecia discoid to cupulate, sessile and often broadly attached to the substrates; hymenium white to grayish; receptacle surface covered with flexuous, subhyaline to pale brown, thin-walled hairs arising from the superficial cells; ascospores ellipsoid, lack of guttules, and smooth-walled or rough. Soil and duff are the common substrates. The genus was monographed by Yang and Korf (1985). One species, *Tricharina gilva*, is known in China.

Tricharina gilva (Boud. in Cooke) Eckblad, Nytt Mag. Bot. 15: 60, 1968.

Specimen examined: CHINA, Beijing, Zhongguancun, greenhouse, 27 IV 1961, on soil, X.L. Kong, HMAS 30773 (as *Lachnea ascoboloides*).

Trichophaea

Trichophaea is similar to *Tricharina* in apothecial shape and habitat but different significantly in the stiff, pointed, brown to dark brown, relatively thick-walled hairs and presence of large guttules in ascospores. The hymenium

of the genus is white, dirty white or pale gray. Six species have been recorded from the country (Tai, 1979; Korf and Zhuang, 1985; Zhuang and Korf, 1989; Zhuang, 2001). Dennis (1978) and Mao (2000) provided illustrations and color photographs of menbers of the genus.

Tricharina gregaria (Rehm) Boud., Hist. Class. Discom. Eu. p. 60, 1907.

? = *Trichophaea fuscoatra* (Rebent.) Sacc. var. *punctata* Malencon, in Malencon and Llimona, Anales de Biologia, Universidad de Murcia 34(1-4): 58, 1980 [1975].

Specimens examined: CHINA, Yunnan, Kunming, Xishan, 12 VII 1938, on soil, C.C. Cheo 21, HMAS 17118 (as *Lachnea fuscoatra*); *ibid*., 15 VII 1938, on soil, C.C. Cheo 42, HMAS 17119 (as *Lachnea fuscoatra*); *ibid*., 29 VI 1938, on soil, C.C. Cheo 9, HMAS 17120 (as *Lachnea fuscoatra*); *ibid*., 27 VII 1941, on soil, C.C. Cheo 198, HMAS 17124 (as *Lachnea*); *ibid*., 14 VII 1938, on soil, C.C. Cheo 33, HMAS 17125 (as *Lachnea*).

Notes: The examinations of the above Chinese collections showed that the fungus is characterized by its small apothecia less than 5 mm in diam. and fusoid-ellipsoid ascospores nearly smooth or with very fine markings (*ca.* 0.15-0.3 μm in diam. or width). The markings on spore surface do not dissolve in KOH aqueous solution. Morphologically, the ascospores of the Chinese collections are somewhat larger [20-27 × 10-13 μm *vs*. 20-22(-24) × 10-12.4 μm] than those recorded by Denison (1958) based on specimens from the US. This species can easily be distinguished from *Trichophaea pseudogregaria* by the much smaller spore ornamentations which do not react with KOH. The spore markings of the latter species are 0.6-1.5 μm in diam. and dissolved in KOH solution.

Trichophaea fuscoatra (Rebent.) Sacc. var. *punctata* Malencon reported from Granada by Malencon and Llimona (1980) might be a synonym.

Key to the genera previously filed under *Lachnea* in HMAS

1. Ascospores eguttulate..... ***Tricharina***
1. Ascospores guttulate 2

2. Apothecia deep-cupulate 3
2. Apothecia discoid to shallow-cupulate..... 4

3. Hairs flexuous and thin-walled; apothecia completely or partially immersed in soil at maturity ..... ***Geopora***
3. Hairs rigid and thick-walled; apothecia superficial..... ***Humaria***

4. Hairs rooting and arising from inner cells of ectal excipulum .....***Scutellinia***
4. Hairs never rooting and arising from superficial cells of ectal excipulum..... 5

5. Hymenium red to orange red; hairs easily overlooked and with an obtuse apex .....***Melastiza***
5. Hymenium white to pale gray; hairs obvious and with a pointed apex..... ***Trichophaea***

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References

Breitenbach, J. and Kränzlin, F. (1984). *Fungi of Switzerland*. Vol. 1. *Ascomycetes*. Luzern.

Cao, J.Z. and Moravec, J. (1988). *Scutellinia fujianensis* sp. nov., a new species from China, with notes on related species. Mycologia Helvetica 3: 183-190.

Denison, B.K. (1958). Some species of the genus *Trichophaea*. Mycologia 50: 121-140.

Dennis, R.W.G. (1978). *British Ascomycetes*. ed. 2. Cramer, Vaduz.

Eckblad, F.-E. (1968). The genera of the operculate discomycetes. A re-evaluation of their taxonomy, phylogeny and nomenclature. Nytt Magasin for Botanikk 15: 1-191.

Eriksson, O.E. and Hawksworth, D.L. (1998). Outline of the Ascomycetes – 1998. Systema Ascomycetum 16: 83-301.

Hansen, L. and Knudsen, H. (2000). *Nordic Macromycetes*. Vol. 1. *Ascomycetes*. Nordsvamp, Copenhagen.

Kirk, P.M., Cannon, P.F., David, J.C. and Stalpers, J.A. (2001). *Ainsworth & Bisby's Dictionary of the Fungi*. CAB International, Wallingford.

Korf, R.P. (1972). Synoptic key to the genera of the Pezizales. Mycologia 64: 937-994.

Korf, R.P. and Zhuang, W.Y. (1985). Some new species and new records of discomycetes in China. Mycotaxon 22: 483-514.

Liu, M.H. and Peng, H.W. (1996). *Scutellinia sinensis*, a new spherical-spored species of *Scutellinia*. Acta Mycologica Sinica 15: 98-100. (Chinese)

Malencon, G. and Llimona, X. (1980). Champignons de la Péninsule Ibérique. Anales de Biologia, Universidad de Murcia 34: 47-58.

Mao, X.L. (2000). *The Macrofungi in China*. Henan Science & Technology Press, Zhengzhou. (Chinese)

Moravec, J. (1989). A taxonomic revision of the genus *Cheilymenia* – 1. Species close to *Cheilymenia rubra*. Mycotaxon 36: 169-186.

Moravec, J. (1996). *Scutellinia totaranuiensis* spec. nov., a new species from New Zealand (Discomycetes, Pezizales). Mycotaxon 58: 233-241.

Rifai, M.A. (1968). The Australasian Pezizales in the herbarium of the Royal Botanic Gardens Kew. Verhandelingen der Koninklijke Nederlandse Akademie van Wetenschappen, Afd. Natuurkunde, Tweede Sect. 57: 1-295.

Saccardo, P.A. (1889). *Sylloge Fungorum*. Vol. 8. Saccardo, Padova.

Schumacher, T. (1990). The genus *Scutellinia* (Pyronemataceae). Opera Botanica 101: 1-107.

Seaver, F.J. (1928). *North American Cup-fungi* (*Operculates*). Seaver, New York.

Spooner, B.M. (1981). New records and species of British microfungi. Transactions of the British Mycological Society 76: 265-301.

Tai, F.L. (A1979). *Sylloge Fungorum Sinicorum*. Science Press, Beijing. (Chinese)

Yang, C.S. and Korf, R.P. (1985). A monograph of the genus *Tricharina* and of a new, segregate genus, *Wilcoxina* (Pezizales). Mycotaxon 24: 467-531.

Yao, Y.J. and Spooner B.M. (1995). New combinations in *Melastiza* and *Scutellinia* (Pezizales). Mycotaxon 53: 467-477.

Yu, Z.H., Zhuang, W.Y., Chen, S.L. and Decock, C. (2000). Preliminary survey of discomycetes from the Changbai Mountains, China. Mycotaxon 75: 395-408.
Zhang, B.C. and Yu, N.Y. (1992). Revision of Chinese species of *Geopora* (Pezizales). Acta Mycologica Sinica 11: 8-14. (Chinese)
Zhuang, W.Y. (1994). Current understanding of the genus *Scutellinia* (Pezizales, Otideaceae) in China. Mycosystema 6: 13-24.
Zhuang, W.Y. (2001). *Higher Fungi of Tropical China*. Mycotaxon Ltd., Ithaca.
Zhuang, W.Y. (2004). Notes on *Humarina xylariicola*. Mycosystema 23: 434-436.
Zhuang, W.Y. and Krof, R.P. (1989). Some new species and new records of discomycetes in China. III. Mycotaxon 35: 297-312.
Zhuang, W.Y. and Wang, Z. (1998). Discomycetes of tropical China. II. Collections from Yunnan. Mycotaxon 69: 339-358.

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