Preliminary Survey of *Bionectriaceae* and *Nectriaceae* (*Hypocreales*, *Ascomycetes*) from Jigongshan, China

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Species of the *Bionectriaceae* and *Nectriaceae* are reported for the first time from Jigongshan, Henan Province in the central area of China. Among them, three new species, *Cosmospora henanensis*, *Hydropisphaera jigongshanica* and *Lanatonectria oblongispora*, are described. Three species in *Albonectria* and *Cosmospora* are reported for the first time from China.

Key words: *Cosmospora henanensis*, *Hydropisphaera jigongshanica*, *Lanatonectria oblongispora*, taxonomy.

Introduction

Studies on the nectriaceous fungi in China began in the 1930's (Teng, 1934, 1935, 1936). Teng (1963, 1996) summarised work that had been carried out in China up to the middle of the last century. Recently, specimens of the *Bionectriaceae* and *Nectriaceae* deposited in the Mycological Herbarium, Institute of Microbiology, Chinese Academy of Sciences (HMAS) were re-examined (Zhuang and Zhang, 2002; Zhang and Zhuang, 2003a) and additional collections from tropical China were identified (Zhuang, 2000; Zhang and Zhuang, 2003b,c), whereas, those from central regions of China were seldom encountered. Field investigations were carried out in November 2003 in Jigongshan (Mt. Jigong), Henan Province. Eighty-nine collections of the *Bionectriaceae* and *Nectriaceae* were obtained. Jigongshan is located in the south of Henan (E114°05′, N31°50′). The altitudes range from 400 m to 800 m. The area has a subtropical humid climate. The mean annual precipitation is around 1329 mm. Forests there consist of deciduous and evergreen broad-leaved trees with the dominant species as *Cyclobalanopsis glauca*, *Quercus fabri*, and *Pistacia chinensis*.

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Twenty species belonging to 9 genera in the 2 families were identified, including 4 species of *Bionectria* Speg. and *Hydropisphaera* Dumort. in the *Bionectriaceae* and 16 species of *Albonectria* Rossman & Samuels, *Cosmospora* Rabenh., *Gibberella* Sacc., *Hamatonectria* Samuels & Nirenberg, *Lanatonectria* Rossman & Samuels, *Nectria* (Fr.) Fr., and *Neonectria* Wollenw. in the *Nectriaceae*. The most frequently occurred species are *Haematonectria haematococca* (Berk. & Broome) Samuels & Nirenberg, *Bionectria byssicola* (Berk. & Broome) Schroers & Samuels and *B. ochroleuca* (Schwein.) Schroers & Samuels. Three new species, *Cosmospora henanensis*, *Lanatonectria oblongispora* and *Hydropisphaera jigongshanica* are described, and 3 new records for China are reported.

Taxonomic treatments and methods by Rossman *et al*. (1999) and Schroers (2001) were generally followed. All collections studied are deposited in HMAS.

Taxonomy

New species

Cosmospora henanensis Y. Nong & W.Y. Zhuang, **sp. nov.**

(Figs. 1, 4-7, 14, 15)

Etymology: The specific epithet refers to the locality of the fungus.

Ab *Cosmospora nummulariae* ascis majoribus, (80-)88-100 × (6-)6.3-10(-13.6) µm; ascosporis majusculis, (10.7-)11.2-13.4 × 6.4-7.5 µm; ornamentis ascosporarum grandiusculis, 0.7–1.8 µm in latitudine differt.

Ascomata perithecial, densely gregarious, superficial, non-stromatic, pyriform, 162-219 µm diam. and 221-276 µm high, with an obtuse apex 110-123 µm wide, smooth, collapsing laterally when dry, rarely not collapsing, blood red when fresh, turning dark red in 3% KOH, reddish-orange in lactic acid. *Cells* on ascomatal surface forming a *textura epidermoidea*, adjacent cells joined by fine pores. *Ascomatal wall* 15-30 µm wide, of a single region, of angular to elongate cells with lumina 3-11 × 0.6-1.5 µm, cell walls 1.3-2.2 µm thick. *Asci* cylindrical, with a blunt apex and an apical ring, 8-spored, (80-)88-100 × (6-)6.3-10(-13.6) µm. *Ascospores* ellipsoid, uniseptate, slightly constricted at the septum, evenly two-celled, pale yellow brown, tuberculate, uniseriate, (10.7-)11.2-13.4 × 6.4-7.5 µm. Ascospore markings somewhat interconnected, not hemispherical but irregular in shape, 0.7-1.8 µm wide.

Anamorph: *Acremonium*-like.

Colony on PDA with sparse aerial mycelia. *Conidiophores* unbranched or rarely branched. *Conidiogenous cells* subcylindrical, slightly tapering towards the tip, hyaline. *Conidia* ellipsoid to allantoid, unicellular, colourless, smooth-walled, 3-5.5(-6) × 1.1-2.2(-3.3) µm.

Figs. 1-3. Ascomata on nature substrates. **1.** *Cosmospora henanensis* (HMAS 86458). **2.** *Hydropisphaera jigongshanica* (HMAS 91740). **3.** *Lanatonectria oblongispora* (HMAS 91741). Scale: 1, 3: ×29; 2: ×35.

Holotype designated here: China. Henan, Jigongshan, alt. 400 m, on bark associated with a beaked ascomycete, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5143, HMAS 86458.

Notes: Among the existing species, *Cosmospora nummulariae* (Teng) W.Y. Zhuang & X.M. Zhang occurring on *Biscogniauxia* sp. from the Hainan Island is the most similar to our new species. The former differs from the latter in the slightly shorter perithecia [170-250 µm *vs*. 221-276 µm high], smaller asci [59-77 × 5.5-7.7 µm *vs*. (80-)88-100 × (6-)6.3-10(-13.6) µm] without a clear apical ring, and narrower ascospores [9-13.2 × 5–6.6 µm *vs*. (10.7-)11.2-13.4 × 6.4-7.5 µm] of smaller markings (0.6-1.2 µm *vs*. 0.7-1.8 µm wide) on surface (Zhuang and Zhang, 2002). *Cosmospora pseudepisphaeria* (Samuels) Rossman & Samuels and *C. meliopsicola* (Henn.) Rossman & Samuels are also close to *C. henanensis*, especially shape and size of ascospores. *Cosmospora meliopsicola* differs in the smooth-walled or minutely spinulose ascospores and shorter asci 70-85 × 7-11 µm (Samuels *et al*., 1991). *Cosmospora pseudepisphaeria* known from tropical America has larger ascomata 250-330 µm diam. and 330-420 µm high, broader ascomatal apexes 160–240 µm wide, asci without an apical ring, and ascomata solitary or gregarious in groups of ≤10 (Samuels *et al*., 1991) instead of densely gregarious. *Cosmospora rishbethi* (C. Booth) Rossman & Samuels, known only from the type locality in England, is also similar to our collection in perithecial size and ascospore markings, however, its ascospores are much narrower 8-12 × 3.5-5 µm (Booth, 1959). The Jigongshan collection is thus treated as a new species of *Cosmospora*.

HMAS 91747 (Jigongshan, Henan, alt. 400 m, on twig associated with a jelly fungus, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5140.) is similar to *C. henanensis* in size and markings of ascospore, and shape and size of asci but differs in having asci without an apical ring and ascomata which are solitary or gregarious in groups up to 7, not collapsing or rarely collapsing when dry. The fungus is treated tentatively as *Cosmospora* taxonomic sp.

Hydropisphaera jigongshanica W.Y. Zhuang & Y. Nong, **sp. nov.**

(Figs. 2, 8-10, 16)

Etymology: The specific epithet refers to the locality of the fungus.

Peritheciis subglobosis, subsordido-aurantiacis, cupulatis in sicco, 310-323 µm diam.; *ascis* 43-55 × 5.2-5.9(-6.3) µm; *ascosporis* ellipsoido-fusoideis, uniseptatis, 9.4-13.7 × 2.5-3.5 µm.

Ascomata perithecial, solitary or gregarious up to 18, superficial on a basal stroma, subglobose, 310-323 µm diam. and 267-348 µm high, smooth, cupulate when dry, light dirty orange when fresh, not changing colour in 3% KOH or lactic acid. *Ascomatal wall* 38-52 µm wide, of two regions. Cells of outer region angular, 5.5-18 × 4.2-8.6 µm, with uniformly thickened walls *ca*. 1.3 µm wide. *Asci* clavate, apex blunt, with an apical ring, 8-spored, 43-55 × 5.2-5.9(-6.3) µm. *Ascospores* ellipsoid-fusiform, uniseptate, pale yellow, spinulose when young and becoming smooth-walled as cytoplasm disappears at maturity, biseriate above and uniseriate below, 9.4-13.7 × 2.5-3.5 µm.

Holotype designated here: China. Henan, Jigongshan, alt. 250 m, on twig, 13 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5069, HMAS 91740.

Notes: The combination of the light dirty orange perithecia, 310-323 µm diam. and 267-348 µm high, reacting neither in 3% KOH aqueous solution nor in lactic acid, cupulate when dry, perithecial wall of two regions, and uniseptate ascospores 9.4-13.7 × 2.5-3.5 µm indicate that it is a new species of *Hydropisphaera* Dumort.

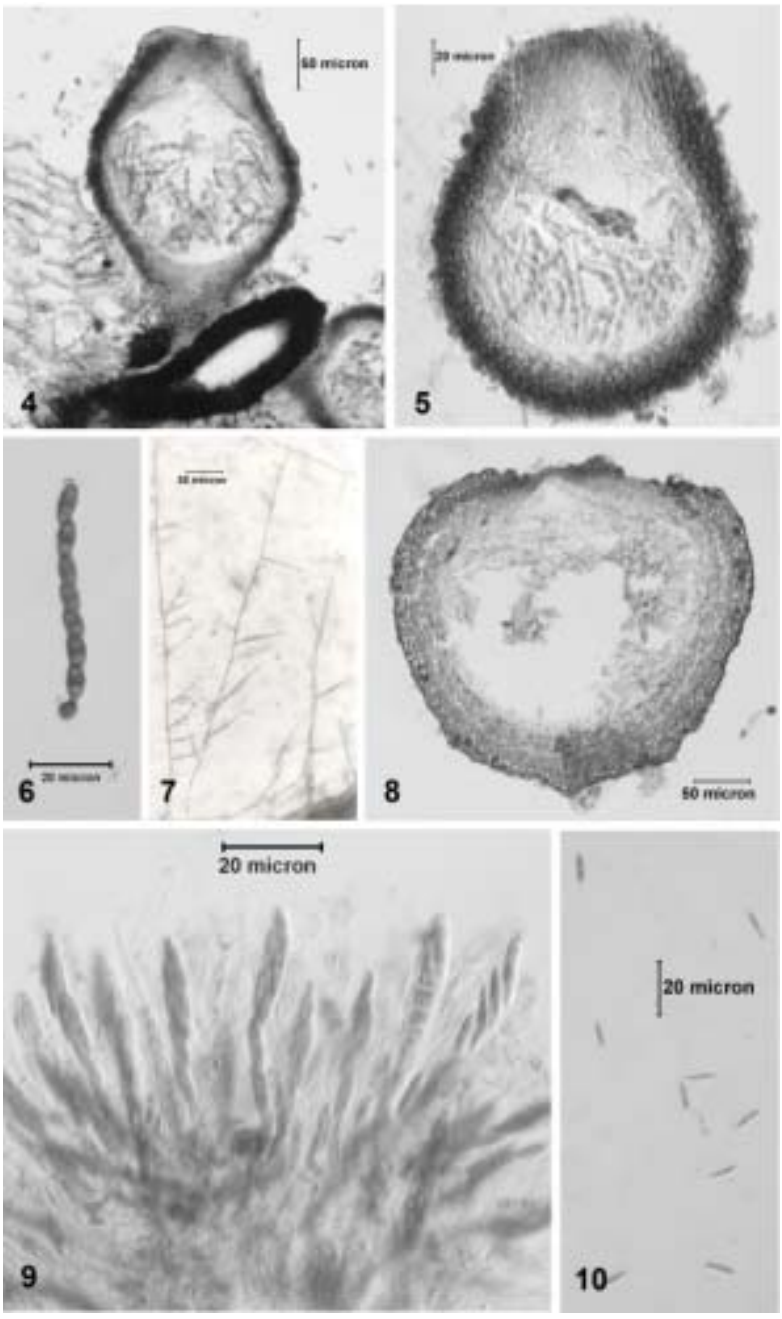
Among the known species of *Hydropisphaera*, *H. peziza* (Tode : Fr.) Dumort., *H. arenula* (Berk. & Broome) Rossman & Samuels, and *H. hypoxantha* (Penz. & Sacc.) Rossman & Samuels are similar to *H. jigongshanica* in having ascomata without hairs and uniseptate ascospores. *Hydropisphaera peziza* differs in possessing larger asci, (49-)60-75(-100) × (5-)8-10(-14) µm, and striate and larger ascospores (9-)11-14(-17) × (3-)5-7 µm (Samuels, 1976; Rossman *et al*., 1999). *Hydropisphaera hypoxantha* differs in asci lacking an apical ring, and coarsely striate and larger ascospores 11-14(-19) × 5-6 µm (Samuels *et al*., 1990). *Hydropisphaera arenula* is distinguished from the new species in ascomata becoming brown when dry, thinner perithecial wall 20-26 µm think, and larger ascospores 14-18 × 3.5-4 µm (Booth, 1959; Rossman *et al*., 1999).

Lanatonectria oblongispora Y. Nong & W.Y. Zhuang, **sp. nov.**

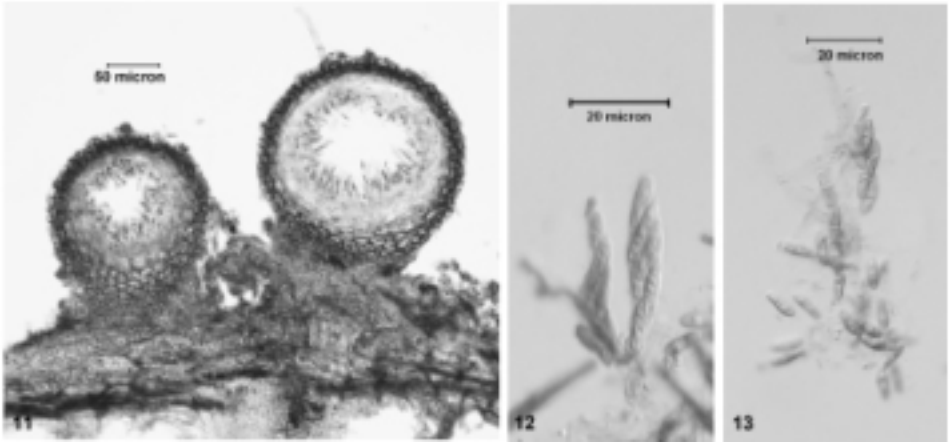
(Figs. 3, 11-13, 17)

Etymology: The specific epithet refers to the shape of ascospores.

Peritheciis globosis, papillatis, aurantio–rufis, 188-255 µm diam.; *pilis* raris, subcylindricis, glabro-tunicatis, 4-5-septatis, 30–78 × 7.5-9.7 µm; *ascis* clavatis, 43-59 × (5.3-)6-7.6 µm; *ascosporis* oblongo-ellipsoideis, uniseptatis, spinulosis, 9.5-12.2(-14) × 2.2-3.9 µm.



Figs. 4-7. *Cosmospora henanensis* (HMAS 86458). **4.** Perithecium associated with another fungus in section; **5.** Perithecium with ascus and ascospores; **6.** An ascus with ascospores; **7.** Conidiogenous cells and conidia. **Figs. 8-10.** *Hydropisphaera jigongshanica* (HMAS 91740). **8.** Perithecium in section; **9.** Asci with ascospores; **10.** Ascospores.

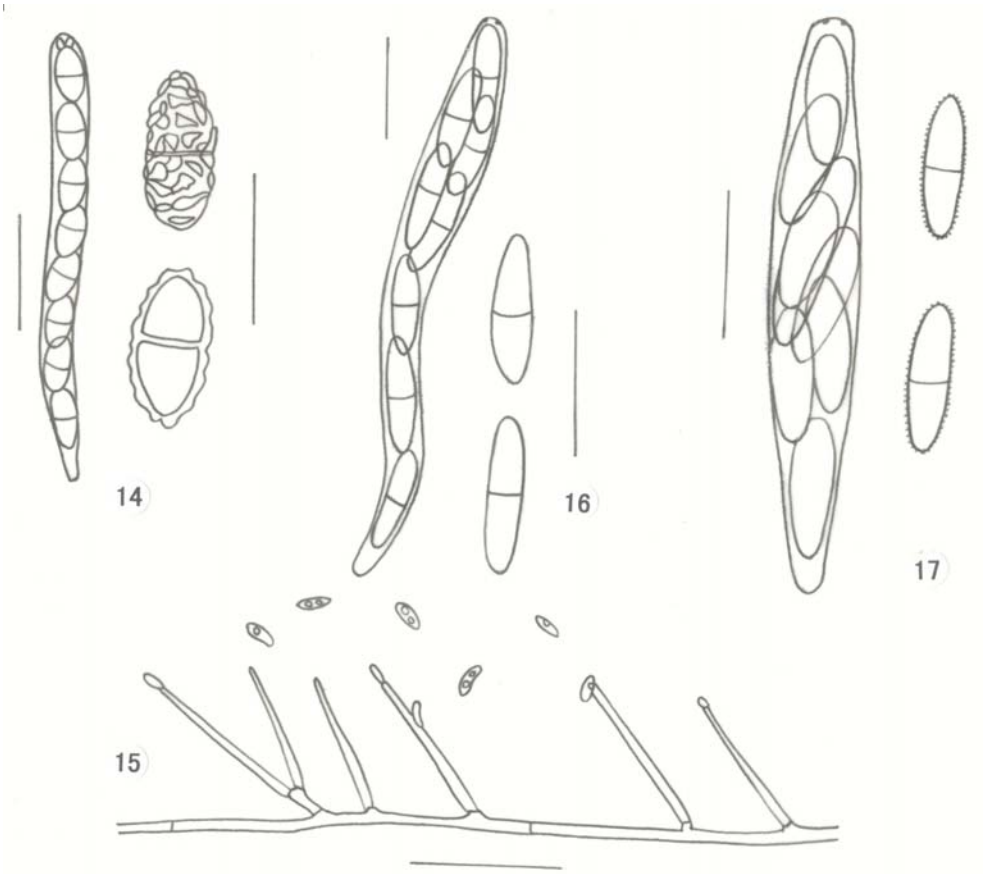


Figs. 11-13. *Lanatonectria oblongispora*. **11.** Perithecia on substrate in section, HMAS 91743; **12.** An ascus with ascospores, HMAS 91742; **13.** Ascospores, HMAS 91742.

Ascomata perithecial, gregarious, superficial on a well-developed stroma, globose, 188-255 µm diam. and 174-230 µm high, with a small and acute papilla, not collapsing when dry, orange red to red when fresh and warm brown when dry, turning dark red in 3% KOH, reddish orange in lactic acid; hairs arising from ascomatal surface, sparse, subcylindrical, tapering towards the apex, hyaline, straight, mostly 4-5-septate, smooth-walled, 30-78 µm long and 7.5-9.7 µm wide at base, walls 1–2.3 µm thick. *Ascomatal wall* 15-28 µm wide, of 1-2 regions; outer region 6-28 µm thick, of angular or elongated cells, with narrow lumina 4-16 × 1.8-6 µm, walls 1-2.5 µm thick; inner region 5-10 µm thick, of flattened cells. *Asci* clavate-fusiform, apex round with an apical ring, (6-)8-spored, 43-59 × (5.3-)6-7.6 µm. *Ascospores* oblong-ellipsoid, uniseptate, not constricted at the septum, hyaline, spinulose, biseriate, 9.5-12.2(-14) × 2.2-3.9 µm.

Holotype designated here: CHINA, Henan, Jigongshan, alt. 400 m, on twig, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5110-1, HMAS 91741; paratypes: Henan, Jigongshan, alt. 400 m, on twig, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5132-1, HMAS 91742; *ibid*., alt. 250 m, on twig, 13 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 4352, HMAS 91743; Hainan, Qiongzhong County, Limushan, alt. 700 m, on bark, 18 XII 2000, W.Y. Zhuang & X.M. Zhang H113-1, HMAS 83378.

Notes: According to Rossman *et al*. (1999), all known species of *Lanatonectria* possess striate ascospores. Our new species fits the generic concept except for the spinulose ascospores. It is obviously not necessary to establish a new genus based on a single character. The combination of the size and shape of ascomata, thickness of the ascomatal wall, shape of ascomatal wall cells, and presence of hairs on ascomatal surface suggests its position in *Lanatonectria* Samuels & Rossman.



Figs. 14-15. *Cosmospora henanensis* (HMAS 86458). **14.** Ascus and ascospores. **15.** Conidiogenous cells and conidia. **Fig. 16.** *Hydropisphaera jigongshanica* (HMAS 91740). Ascus and ascospores. **Fig. 17.** *Lanatonectria oblongispora* (HMAS 91742). Ascus and ascospores. Bars: 14 left = 20 μm; 14 right, 16, 17 = 10 μm; 15 = 50 μm.

Among the existing species of the genus, *Lanatonectria raripila* (Penz. & Sacc.) Rossman & Samuels is the most similar to our fungus in possessing smooth-walled hairs, whereas, the former differs in the clavate asci 60-87 × 13-17 μm and without an apical ring, and fusiform, coarsely striate ascospores and (24-)27.5-32(-33) × (6-)6.5-8 μm (Rossman *et al*., 1999). Our collections are also close to *L. flocculenta* which is distinguishable by broader asci (32-)42-63(-75) × (6.5-)7.5-10(-12) μm, striate ascospores, and densely distributed, prominently spinulose, golden hairs (Rossman *et al*., 1999). HMAS 83378 previously treated as "*Lanatonectria* taxonomic sp." (Zhang and Zhuang, 2003c) from Hainan Province is almost the same as the Jigongshan collections except for the solitary and non-stromatic ascomata.

New records for China

Albonectria rigidiuscula (Berk. & Broome) Rossman & Samuels, Stud. Mycol. 42: 105, 1999.

≡ *Nectria rigidiuscula* Berk. & Broome, J. Linn. Soc., Bot. 14: 116, 1873.

Material examined: CHINA, Henan, Jigongshan, alt. 250 m, on twig, 13 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 4367, 5076, HMAS 91744, 86459; *ibid*., alt. 400 m, on twig, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5134, 5156–1, HMAS 86460-91745; *ibid*., alt. 400 m, on bark, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5098-1, 5153, HMAS 91746, 91748.

Notes: Although *Albonectria* Rossman & Samuels has light-coloured and KOH negative ascomata, the genus is placed in the *Nectriaceae* for its *Fusarium* anamorph and close–relationship to *Gibberella* Sacc. *Albonectria rigidiuscula* is a common species in the tropics but has never been reported from China (Rossman *et al*., 1999). In our recent excursion to Jigongshan, six collections of the fungus were found. It frequently grows together with *Haematonectria haematococca* (Berk. & Broome) Samuels & Nirenberg. *Albonectria rigidiuscula* is easily recognised by its ascomata not changing colour in KOH solution and having conspicuous warts up to 76 µm high on the ascomatal surface. The ascospores are 3-septate and the colony on PDA produces a rose pigmentation and falciform macroconidia (Rossman *et al*., 1999).

Cosmospora diminuta (Berk.) Rossman & Samuels, Stud. Mycol. 42: 120, 1999.

≡ *Nectria diploa* Berk. & M.A. Curtis var. *diminuta* Berk., Grevillea 4: 46, 1875.

≡ *Nectria diminuta* (Berk.) Sacc., Syll. Fung. 2: 498, 1883.

Material examined: CHINA, Henan, Jigongshan, alt. 400 m, on other fungi on twig, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5110–2, HMAS 91749; *ibid*., alt. 700 m, on a pyrenomycete on *Rubus*, 15 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5174, 5189, HMAS 86461, 86462; *ibid*., alt. 700m, on a pyrenomycete on twig, 15 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5196, HMAS 86463.

Diagnostic features: *Ascomata* perithecial, solitary or gregarious in group of up to 10, superficial on a black pyrenomycete, pyriform, 126-232 µm diam. and 118-167 µm high, smooth to rough, collapsing laterally or not collapsing when dry, orange red when fresh, turning dark red in 3% KOH, orange in lactic acid. Ascomatal wall 14-22 µm wide, of single region, of elongate or angular cells with lumina 3.5-10.5(-14) × 1.5-4.3 µm and walls 1.6-2.3 µm thick. *Asci* clavate, apex round and simple, 2–8-spored, (70–)76–94 × (9.7-)11.7-15.7(-16.7) µm. *Ascospores* fusiform-ellipsoid, 1- or 3-septate, constricted at the septum, hyaline to pale yellow, multiguttulate, with obvious striations composed of spines, biseriate, (24.6-)26.5-38 × (6.6-)7.7-13(-14) µm.

Notes: The fungus is characterised by the very small perithecia and 1- or 3-septate ascospores with obvious striations composed of spines. As recorded by Rossman *et al*. (1999), young ascospores of the fungus are uniseptate and additional septa often develop after discharge. Asci often deliquesce in the centrum.

Cosmospora rishbethii (C. Booth) Rossman & Samuels, Stud. Mycol. 42: 120, 1999.

≡ *Nectria rishbethii* C. Booth, Mycol. Pap 73: 92, 1959.

Material examined: CHINA, Henan, Jigongshan, alt. 400 m, on rotten twig, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5129, HMAS 91750.

Diagnostic features: *Ascomata* perithecial, solitary or gregarious, superficial, non-stromatic, subglobose, 172-240 μm diam. and 144-221 μm high, surface smooth to rough, irregularly collapsing or not collapsing when dry, blood red when fresh, turning dark red in 3% KOH, orange red in lactic acid. Ascomatal wall 17-25 μm thick, of a single region, with angular to subglobose cells 4-9.6(-11.5) × 2.8-4.8 μm. Asci cylindrical, apex blunt, with an apical ring, 8-spored, 65-80 × 5-6.4 μm. Ascospores ovoid to ellipsoid, 1-septate, slightly constricted at the septum, yellow brown, tuberculate, uniseriate, (8-)8.6-10.5 × 4.2-5.3(-6.2) μm.

Previously recorded species from China new to Jigongshan

Bionectria byssicola (Berk. & Broome) Schroers & Samuels, Z. Mykol. 63: 152, 1997.

≡ *Nectria byssicola* Berk. & Broome, J. Linn. Soc., Bot. 14: 116, 1873.

Material examined: CHINA, Henan, Jigongshan, alt. 250 m, on twig, 13 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 4365, 5068, 5072, HMAS 86464, 91751, 91752; *ibid.*, alt. 250m, on twig and leaf, 13 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 4363, HMAS 91753; *ibid.*, alt. 400 m, on twig, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5101, 5122, 5147, 5148, 5150-1, 5155, HMAS 91754, 86465, 86466, 86467, 86468, 91755; *ibid.*, alt. 400 m, on bark, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5152, HMAS 86469; *ibid.*, alt. 700 m, on rotten twig, 15 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5184, HMAS 86470; *ibid.*, alt. 700 m, on rotten bark, 15 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5185, HMAS 91756.

Bionectria ochroleuca (Schwein.) Schroers & Samuels, Z. Mykol. 63: 151, 1997.

≡ *Sphaeria ochroleuca* Schwein., Trans. Amer. Philos. Soc., N.S. 4: 204, 1834.

≡ *Nectria ochroleuca* (Schwein.) Berk., Grevillea 4: 16, 1875.

Material examined: CHINA, Henan, Jigongshan, alt. 400 m, on twig, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5110-3, 5111, 5121-1, HMAS 91757, 86471, 91758; *ibid.* alt. 400 m, on rotten bamboo, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5128, HMAS 91759; *ibid.*, alt. 50 m, on twig, 13 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 4354-1, HMAS

86472; *ibid.*, alt. 250 m, on twig, 13 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 4359, 5066, HMAS 91760, 91761; *ibid.*, alt. 700 m, on twig, 15 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5182, HMAS 91762.

Cosmospora episphaeria (Tode : Fr.) Rossman & Samuels, Stud. Mycol. 42: 121, 1999.

≡ *Nectria episphaeria* (Tode : Fr.) Fr., Summa Veg. Scand. p. 388, 1849.

Material examined: CHINA, Henan, Jigongshan, alt. 700m, on a pyrenomycete on twig, 15 XI 2003, W.Y. Zhuang, Y. Liu & Y. Nong 5194, HMAS 91763.

Cosmospora meliopsicola (Henn.) Rossman & Samuels, Stud. Mycol. 42: 123, 1999.

≡ *Nectria meliopsicola* Henn., in Engler, Pflanzenw. Ost-Afrikas. p. 32, 1895

Material examined: CHINA, Henan, Jigongshan, alt. 250 m, on other fungi on twig, 13 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 4345, 4348, HMAS 91764, 91765; *ibid.*, alt. 250 m, on other fungi on bark, 13 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5067, HMAS 91766; *ibid.*, alt. 700 m, on other fungi on twig, 15 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5183, HMAS 91767.

Cosmospora cf. ***meliopsicola***

Ascomata perithecial, solitary, superficial, non-stromatic, pyriform, 175-226 µm diam. and 188-224 µm high, collapsing laterally or cupulate when dry, red when fresh and brownish red when dry, turning dark red in 3% KOH, reddish orange in lactic acid. *Ascomatal wall* 17-27 µm thick, of two regions, outer region 9-17 µm thick, of angular or subglobose cells with lumina 4.3-13.5 × 4.3-6.5 µm, walls 1.3-2.7 µm thick; inner region 4-10 µm thick, of flattened cells, 5.3-19 × 1.8-5 µm. *Asci* subcylindrical, apex blunt with an conspicuous apical ring, 8-spored, 53-68 × 5.3-7.6 µm. *Ascospores* ellipsoid, uniseptate, not constricted at the septum, pale yellow, nearly smooth to spinulose, uniseriate, (9-)9.5-12(-13.4) × 4.3-5.5(-5.8) µm.

Anamorph: *Acremonium*-like.

Colony on PDA with few aerial mycelia. *Conidiophores* unbranched or rarely branched. *Conidiogenous cells* subcylindrical, slightly tapering towards the tip. *Conidia* ellipsoid, 2.2–3.7 × 1.1–2.2 µm, unicellular, colourless, smooth-walled.

Material examined: CHINA, Henan, Jigongshan, alt. 700 m, on fruitbody of *Hypoxylon* sp., 15 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5186, HMAS 86473.

Notes: According to Samuels *et al*. (1991), *Cosmospora meliopsicola* possesses gregarious ascomata, larger asci 70-85 × 7-11 µm, and larger ascospores (10-)11.7-14.3(-16) × (5-)5.4-7.4(-10) µm than HMAS 86473. We treat tentatively this collection as *Cosmospora* cf. *meliopsicola.*

Cosmospora vilior (Starbäck) Rossman & Samuels, Stud. Mycol. 42: 126, 1999.

≡ *Nectria vilior* Starbäck, Bih. Kongl. Svenska Vetensk.-Akad. Handl. 25(3, 1): 28, 1899.

= *Nectria ustulinae* Teng, Sinensia 4: 275, 1934.

Material examined: CHINA, Henan, Jigongshan, alt. 700 m, on a pyrenomycete on rotten twig, 15 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5192, HMAS 91768. *ibid*., alt. 700 m, on a beaked pyrenomycete on rotten wood, 15 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5188, HMAS 86474; *ibid*., alt. 700 m, on a beaked pyrenomycete, 15 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5191, HMAS 86475.

Gibberella bambusae (Teng) W.Y. Zhuang & X.M. Zhang, Nova Hedwigia 76: 195, 2003.

≡ *Lisea australis* Speg. var. *bambusae* Teng, Sinensia 4(10): 278, 1934.

Material examined: CHINA, Henan, Jigongshan, alt. 400 m, on rotten bamboo, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5137, HMAS 86476.

Haematonectria haematococca (Berk. & Broome) Samuels & Nirenberg, Stud. Mycol. 42: 135, 1999.

≡ *Nectria haematococca* Berk. & Broome, J. Linn. Soc., Bot. 14: 116, 1873.

Material examined: CHINA, Henan, Jigongshan, alt. 250 m, on *Rubus* sp., 13 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 4361, HMAS 91769; *ibid*., alt. 250 m, on twig, 13 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 4362, HMAS 86477; *ibid*., alt. 400 m, on bark, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5098-2, 5138, 5150-2, HMAS 91770, 86478, 86479; *ibid*., alt. 400 m, on twig, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5121-2, 5131, 5133, 5139, 5154, HMAS 86480, 86481, 91771, 91772, 86482.

Notes: *Haematonectria haematococca* is a common species in the tropics and frequently occurs with other fungi of the *Nectriaceae* and *Bionectriaceae*, *Albonectria*, *Bionectria, Lanatonectria* etc. Ten collections have been found in Jigongshan. The fungus was previously recorded from Hong Kong and Hainan. The Henan collections extend its distribution to subtropical region of the country.

Haematonectria illudens (Berk.) Samuels & Nirenberg, Stud. Mycol. 42: 136, 1999.

≡ *Nectria illudens* Berk., in Hooker, Botany of the Antarctic Voyage. II. Flora of New Zealand 7: 203, 1855.

Material examined: CHINA, Henan, Jigongshan, alt. 400 m, on twig, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5099, 5142, HMAS 91773, 91774.

Notes: Compared with the description of *Haematonectria illudens* by Booth (1971), Samuels and Brayford (1994), and Rossman *et al*. (1999), the Henan collections, together with those from Hainan Province (Zhang and Zhuang, 2003c), have shorter asci [(65-)71-93 × (8.2-)9.5-16 μm *vs*. (100-)120–160(-180) × 12-17 μm] and shorter and narrower ascospores [(15.7-)17-

21 × 6.2-8.3(-9.5) µm *vs*. (17-)22-28(-33) × 8.5-11.5(-15) µm]. Some asci contain 4 ascospores which are coarsely striate.

Haematonectria illudens was previously known only from New Zealand. The Chinese collections extend its distribution to the north subtropical and tropical regions.

Haematonectria ipomoeae (Halst.) Samuels & Nirenberg, Stud. Mycol. 42: 136, 1999.

≡ *Nectria ipomoeae* Halst., New Jersey Agric. Coll. Exp. Sta. Annual Rep. 12: 281, 1891.

Material examined: CHINA, Henan, Jigongshan, alt. 250 m, on twig, 13 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 4354-2, 4360, HMAS 91775, 91776; *ibid*., alt. 400 m, on twig, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5132–2, 5156–2, HMAS 91777, 91778; *ibid*., alt. 400 m, on bark, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5151, HMAS 86483.

Hydropisphaera erubescens (Desm.) Rossman & Samuels, Stud. Mycol. 42: 30, 1999.

≡ *Sphaeria erubescens* Desm., Ann. Soc. Nat., Bot., Sér. 3, 6: 72, 1846.

Material examined: CHINA, Henan, Jigongshan, alt. 400 m, on twig, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5141, HMAS 91779.

Notes: The fungus has small and superficial perithecia. Ascomata are cupulate when dry and do not change colour in KOH and lactic acid. The collection is almost the same as *H. erubescens* recorded by Rossman (1983) except that the ascospores are narrower [21-26 × 3.1-3.5 µm *vs.* 18-29 × 4-6 µm].

Lanatonectria flocculenta (Henn. & E. Nyman) Rossman & Samuels, Stud. Mycol. 42: 138, 1999.

≡ *Nectriella flocculenta* Henn. & E. Nyman, in Warburg, Monsunia 1: 160, 1899.

Material examined: CHINA, Henan, Jigongshan, alt. 400 m, on twig, 14 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5110-4, 5132-3, HMAS 91780, 91781.

Nectria cinnabarina (Tode : Fr.) Fr., Summa Veg. Scand. 2: 388, 1849.

≡ *Sphaeria cinnabarina* Tode : Fr., Tode, Fungi mecklenb. Sel. 2: 9, 1791.

Material examined: CHINA, Henan, Jigongshan, alt. 700 m, on *Rubus* associated with a pyrenomycete, 15 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5175, 5193, HMAS 91782, 86484; *ibid*., alt. 700 m, on rotten twig, 15 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5179, HMAS 91783.

Neonectria coccinea (Pers.: Fr.) Rossman & Samuels, Stud. Mycol. 42: 158, 1999.

≡ *Sphaeria coccinea* Pers.: Fr., Persoon, Icon. Descr. Fung. 2: 47, 1800.

≡ *Nectria coccinea* (Pers.: Fr.) Fr., Summa Veg. Scand. 2: 388, 1849.

Material examined: CHINA, Henan, Jigongshan, alt. 700 m, on twig, 15 XI 2003, W.Y. Zhuang, C.Y. Liu & Y. Nong 5170, HMAS 91784.

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