Agaricales of Indonesia. 4. *Mycena* sect. Longisetae with comments on allied species

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Mycena longiseta is redescribed based on representative material from Java. The taxon currently known as *M. longiseta* in Europe and North America is renamed *M. aciculata. Mycena brunneisetosa* is redescribed from Indonesian material and compared with *M. indica.* Comments are provided on Mycena breviseta, a species not recollected since first described in 1909. Mycena sect. Longisetae is redefined to accommodate additional species.

Keywords: Agaricales, Basidiomycetes, mycenoid fungi, setae, southeast Asia, taxonomy.

Mycena longiseta Höhn. was described originally from material collected on leaves and dead branches from Cibodas (Tiibodas). Java. Indonesia (Höhnel, 1909). The species has been reported from Europe and North America, growing on decaying vegetable matter, grass stems and fallen coniferous cones (Kühner, 1938; Smith, 1947; Maas Geesteranus, 1983, 1992). The current taxonomic circumscription of the species is based on data from temperate Northern Hemisphere specimens because of the lack of available fresh material from Java and because of the poor condition of the holotype specimen (FH!). Maas Geesteranus (1983) erected the monotypic Mycena sect. Longisetae A.H. Smith ex Maas G. (Type: *M. longiseta*) around this unusual species. Furthermore, Maas Geesteranus (1983: 420) was the first to suggest that the north temperate material determined as M. longiseta might actually be distinct from the southeast Asian taxon, and he noted several characters reported by von Höhnel (1909) that differed from north temperate material. Nonetheless, Maas Geesteranus accepted the southeast Asian and north temperate populations as conspecific until disproved otherwise. Recently, we collected material from Java that matches perfectly with the proto-

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logue of *M. longiseta* and with annotations by von Höhnel that accompany the holotype specimen (FH!). Analyses of the new Javan specimens indicate that the southeast Asian taxon, *M. longiseta*, is indeed distinct from the north temperate taxon currently determined as *M. longiseta*. These data warrant a redescription of *M. longiseta*, a redefinition of *Mycena* sect. Longisetae, and require a formal name for the north temperate taxon. In addition, there occur in Indonesia several additional setoid species, viz., *M. brunneisetosa* Corner and *M. breviseta* Höhn. A description of *M. brunneisetosa* based on recently collected specimens, and a commentary on *M. breviseta* are provided for comparison.

Color terms and notations in parentheses are those of Kornerup & Wanscher (1978). All measurements and colors reported for microscopic features were made from dried material rehydrated in 100% ethanol followed by distilled water, 3% KOH or Melzer's reagent. Spore statistics include: \bar{x} , the arithmetic mean of the spore length by spore width (\pm standard deviation) for n spores measured in a single specimen; $\bar{x}_{\rm p}$ the range of spore means and $\bar{x}_{\rm m}$, the mean of spore means (\pm SD) where more than one specimen is available; Q, the quotient of spore length and spore width in any one spore, indicated as a range of variation in n spores measured; \bar{Q} , the mean of Q-values in a single sample; $\bar{Q}_{\rm p}$, the range of \bar{Q} -values and $\bar{Q}_{\rm m}$, the mean of \bar{Q} -values where more than one specimen is available.

Mycena longiseta Höhn., Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 118: 282. 1909. – Figs. 1–7.

The holoype specimen (FH!) consists of several dicotyledonous leaf fragments and two capsule fragments. On one leaf fragment is a small, circular, flattened, white basal disc, and on one capsule fragment is a small portion of one pileus adhered by the pileus surface. The pileus fragment is pale greyish white and has subdistant, narrow, subfree, greyish white lamellae. The material was too scant to mount so no microscopic analysis was conducted. The holotype packet label includes illustrations of one primordium covered with long, erect setae; three elongate-ellipsoid basidiospores; the base of two pileosetae that are blunt or booted and very thick-walled; and one marginal cystidium that is cylindrical, densely spinulose and has a smooth, needle-like apical appendage. The description below is based on recently collected specimens.

Primordia 1 mm diam, hemispheric, white to pale greyish white, covered with erect, hyaline setae up to 1 mm long. – Pileus (Fig. 1) 1–3(–4) mm diam, convex to broadly convex, sometimes with a slight central depression in age; margin striate, ciliate; surface dull,

dry, covered with erect, hyaline setae up to 1 mm long; white to pale grevish white. - Context extremely thin, white, pliant. - Odor not distinctive; taste unknown. - Lamellae ascending, narrowly adnate, sometimes to a small pseudocollarium, or subfree, distant to subdistant (10-12) with one series of lamellulae, narrow (0.2-0.3 mm), white, non-marginate. $-Stipe 5-12(-16) \times 0.2$ mm, central, terete, hollow, + equal above a subbulbous base that arises from a basal disc; surface dull, dry, sparsely hispid overall, white overall or with a grey base; basal disc 0.5-1 mm diam, circular, white, sharply defined with an outer raised rim and a radially striate, flattened internal portion. – Basidiospores (Fig. 2) 6.5–8×3.2–4.2(–4.5) μm $[\bar{x}_{\rm r} = 7.3 - 7.4 \times 3.5 - 4.0 \ \mu {\rm m}, \ \bar{x}_{\rm m} = 7.31 \pm 0.07 \times 3.74 \pm 0.31 \ \mu {\rm m}, \ {\rm Q} = 1.6 - 0.01 \ \mu {\rm m}$ 2.5, $\bar{Q}_r = 1.84-2.11$, $\bar{Q}_m = 1.98\pm0.19$; n = 15-20 spores per 2 specimens], ellipsoid, smooth, hyaline, amyloid, thin-walled. - Basidia (Fig. 3) $12.5-18 \times 6.5-8$ µm, clavate, 4-spored, clamp connections not observed. – Basidioles (Fig. 3) clavate. – Pleurocystidia absent. - Cheilocystidia absent. - Pileipellis a cutis of repent hyphae plus erect pileosetae and marginal cystidia; hyphae (Fig. 4) 4–12 µm diam, cylindrical to inflated, densely spinulose, hyaline, inamyloid, non-gelatinous to subgelatinous; spinulae 0.5- $1.5 \times 0.5 \mu m$, cylindrical, obtuse; terminal cells of hyphae are clavate, densely spinulose acanthocysts; pileosetae (Fig. 5) scattered, 80-675(-1000) μ m long × 10-32 μ m diam. at the base × 8-17.5 μ m diam. in the middle \times 3–10 µm diam. near the acute apex, acicular with a swollen base, with hyaline to pale yellowish, refractive walls 1–8 µm thick, inamyloid; marginal cystidia (Fig. 6) abundant, $40-150 \times 8-$ 16 µm (at broadest), ranging from clavate to fusoid or fusoidventricose, lower 1/2 to 2/3 densely spinulose, upper 1/2 to 1/3smooth, seldom spinulose overall, smooth apical portion tapered, acute, 4–6 µm diam., hyaline, inamyloid, thin-walled; spinulae $0.5-2 \times 0.5 \mu m$, cylindrical. – Pileus trama of interwoven, cylindrical to inflated hyphae 6–20 µm diam, hyaline, strongly dextrinoid, non-gelatinous. – Lamellar trama of hyphae similar to those in pileus trama, dextrinoid. - Stipe tissue monomitic; cortical hyphae 4-8 µm diam, parallel, cylindrical, smooth, hyaline, dextrinoid, non-gelatinous, giving rise to caulocystidia; medullary hyphae 8–10 µm diam, strongly dextrinoid, otherwise similar to cortical hyphae. – Caulocystidia (Fig. 7) abundant, $40-160 \times 6.5-16 \mu$ m (at base), aculeate, gradually narrowed to an acute apex, base swollen and often geniculate, smooth, hyaline, inamyloid, thin-wal-

Figs. 1–7. Mycena longiseta (DED 6883). – 1. Basidiomes. – 2. Basidiospores. – 3. Basidia and basidiole. – 4. Pileipellis hyphae. – 5. Pileosetae. – 6. Pileus marginal cystidia. – 7. Caulocystidia. – Scale bar: Fig. 1 = 5 mm; 2 = 5 μ m; 3 = 10 μ m; 4, 6, 7 = 20 μ m; 5 = 40 μ m.



led, seldom slightly roughened from adherent debris. - Clamp connections not observed in any tissues.

Habit, habitat and distribution. - Solitary, scattered on undetermined dicotyledonous leaves in primary forest. Java and Thailand.

Specimens examined. – INDONESIA. Java: Cibodas (Tjibodas), 1907– 1908, F. von Höhnel, 2225 (Holotype: FH ex 4386). Java: Mt. Halimun National Park, loop trail from Cikaniki, elev. ca 1000 m, 7 Jan. 1999, D. E. Desjardin #6883 (SFSU). THAILAND. Khao Yai National Park: Phakrajai, elev. ca 650 m, 26 Jun. 2001, T. Boopratuang #262 (BBH 1974). Khao Yai National Park: Tatapu site, 5 Jul. 2000, T. Boonpratuang #90 (BBH 264).

Mycena longiseta is circumscribed by the following suite of characters: small (1–3 mm diam), white to grey pilei with a ciliate margin and long, erect, hyaline setae; white, subdistant lamellae sometimes attached to a pseudocollarium; a relatively short (up to 16 mm long), hispid, white stipe that arises from a circular, striate basal disc; relatively narrow (3.2–4.2 μ m), amyloid basidiospores; no hymenial cystidia; dextrinoid pileus, lamellae, and stipe tramal tissues; a subgelatinous pileipellis formed from repent, cylindrical, spinulose hyphae that give rise to fusoid marginal cystidia with spinulose base and smooth attenuated apices, and through which arise thick-walled, hyaline pileosetae up to 1000 μ m long; smooth, nongelatinous stipe cortical hyphae; and thin-walled, smooth caulocystidia that are aculeate with a swollen base.

Maas Geesteranus (1983) was the first investigator since von Höhnel to suggest that the temperate Northern Hemisphere taxon determined as *M. longiseta* was distinct from the Javanese taxon redescribed above. Three components of the protologue aroused doubt in Maas Geesteranus' mind. First, the cilia at the pileus margin were described by von Höhnel (1909) as being densely spinulose with a smooth, apical appendage, although such structures were never mentioned in descriptions of north temperate populations (Kühner, 1938; Smith, 1947), and were only rarely observed by Maas Geesteranus on one British specimen. Such marginal cystidia are common and easily observed on our recent Java and Thailand specimens, and they are indeed absent from north temperate populations. Second, von Höhnel (1909) described the stipe as beset with fluffy hairs ("mit Flaumhaaren besetzt"), whereas in north temperate material the stipe is covered with stiff, thick-walled setae which are difficult to interpret as fluffy. Our southeast Asian material shows long, flexible, thin-walled caulocystidia identical in microanatomy to those described by von Höhnel. Third, von Höhnel (1909) reported that cystidia were absent, whereas in north temperate populations cheilocystidia are present. An intensive search for cheilocystidia in our recent Java and Thailand specimens resulted in confirmation that cheilocystidia are indeed absent. Collectively, these three anatomical anomalies indicate that the southeast Asian taxon is distinct from the north temperate taxon.

Temperate Northern Hemisphere taxon

The temperate Northern Hemisphere taxon, currently misidentified as *M. longiseta*, was originally called *M. codoniceps* (Cooke) Sacc. by Kühner (1926), who provided a good description and several illustrations. Mycena codoniceps was originally described from a specimen collected on tree fern stems in a nursery in Britain (Cooke, 1888). The protologue described a species with minute, campanulate, sulcate, umber pileus with short erect hairs, adnate lamellae, and a short stem attenuated downwards with an umber base. There was no mention of a basal disc, and none was illustrated by Cooke (1886-1888: Illus. #1149, t. 952, fig. B). Moreover, whether M. codoniceps represented a native north temperate taxon or a tropical taxon introduced into the nursery remains uncertain. Subsequently, Kühner (1938) recognized that he had misapplied the epithet *M. codoniceps* (primarily because of the lack of a basal disc in Cooke's protologue) and he chose the epithet M. longiseta to represent the north temperate taxon. Clearly Cooke's illustrations (ibid.) represent a taxon different from that described by Kühner (1926, 1938). Because of the lack of a type specimen or representative material of *M. codoniceps*, and because of unknown provenance of the taxon, we accept M. codoniceps as an insufficiently known taxon and as an epithet unavailable for the north temperate taxon. There is a possibility that *M. brevisetosa* Corner (1994; non Mycena breviseta Höhn.), described recently from corticolous material collected in Singapore, is conspecific with M. codoniceps.

Prior to Kühner's acceptance of *M. codoniceps* as an inappropriate name, Smith (1937) described *M. codoniceps* var. aciculata A. H. Smith based on North American specimens. Smith reported the species from cones, bark and twigs of redwood in California, from alder leaves in Michigan, and from pine debris in New York. Subsequently, Smith (1947), following Kühner's lead, accepted *M. codoniceps* var. aciculata as a synonym of *M. longiseta*. We have studied numerous specimens of North American material that matches Smith's (1947) and Kühner's (1938) descriptions of *M. longiseta*, and our concept of the species is based on these analyses and published descriptions. Accepting that the southeast Asian species, *M. longiseta*, is distinct from the north temperate taxon, the least problematical and yet available epithet for the north temperate taxon is as follows:

Mycena aciculata (A. H. Smith) Desjardin & E. Horak, comb. & stat. nov.

Bas.: Mycena codoniceps var. aciculata A.H. Smith, Mycologia 29: 344. 1937. Holotype: A.H. Smith # 3704, Orick, California, USA, 2 Dec. 1935 (MICH).

Misapplied names: Mycena codoniceps (Cooke) Sacc. sensu Kühner, Botaniste 17: 86. 1926. Mycena longiseta Höhn. sensu Kühner, Encycl. Mycol. 10: 173. 1938; sensu A.H. Smith, Univ. Michigan Stud. Sci. Ser. 17: 57. 1947; sensu Maas G., Proc. K. Ned. Akad. Wet. (Ser. C) 86: 419. 1983.

Available descriptions. – As *Mycena codoniceps*: Kühner (1926). As *Mycena longiseta*: Kühner (1938), Smith (1947), and Maas Geesteranus (1983, 1992).

Specimens examined. – CANADA. British Columbia: Glacier National Park, Hwy 1 near bridge over Beaver River, 11 Sep. 1980, S. A. Redhead #3611 (DAOM 178093); Vancouver Island, Pacific Rim National Park, Pachena Bay, 6 Oct. 1979, S. A. Redhead #3388 (DAOM 175384). New Brunswick: Kouchibouguac National Park, cedar swamp by Information Center, 19 Sep. 1977, S. A. Redhead #2435 (DAOM 182553); Kouchibouguac National Park, between Kelly Beach and Callander Beach, 8 Jul. 1977, S. A. Redhead #2314 (DAOM 182552). – UNITED STATES. California: Humboldt Co., Orick, 2 Dec. 1935, A. H. Smith #3704 (Holotype: MICH); Mendocino Co., Navarro Redwoods State Park, 22 Nov. 1997, D. E. Desjardin #6704 (SFSU); Monterey Co., Fort Ord, 9 Feb. 1997, B. A. Perry #116 (SFSU). – Additional data provided by B. A. Perry (Harvard Univ.) on the following specimens: – Washington: Clallam Co., Olympic National Park, Mt. Angeles, 28 Jun. 1939, A. H. Smith #14650 (MICH); Pierce Co., Mt. Rainier National Park, Green Lake, 18 Sep. 1952, A. H. Smith #40013 (MICH).

It is unnecessary to repeat the excellent descriptions reported above, although a few pertinent details obtained from analyses of the specimens cited above are provided here. Diagnostic features of M. aciculata include: 1) a small (1-7 mm diam), convex to conicalcampanulate, striate, grey pileus covered with short hyaline setae and with a non-ciliate margin; 2) narrowly adnate to free, subdistant, narrow, pale grey or greyish white lamellae with paler edge; 3) a relatively long (10–30 mm), filiform, setose, grey to white stipe arising from a setose basal disc; 4) inamyloid basidiospores measuring $6-9 \times 3-5 \mu m$; 5) clavate to ventricose cheilocystidia with one or few needle-like apical appendages; 6) a cutis-type pileipellis of gelatinized, densely spinulose hyphae with clavate acanthocyst terminal cells (but lacking distinctive marginal cystidia), through which arise pileosetae; 7) aculeate pileosetae $100-200 \times 8-20 \mu m$ (at base) with hyaline walls up to 6 μ m thick; 8) aculeate caulosetae and basal disc setae $30-300 \times 8-14$ µm with hyaline walls up to 3 µm thick; and 9) clamp connections present only on hymenial cells, absent in all other tissues.

Mycena aciculata differs from M. longiseta primarily in the former species having inamyloid basidiospores, distinctive cheilocystidia, more strongly gelatinized pileipellis tissue, shorter pileosetae, thick-walled caulocystidia and basal disc cystidia (i.e., setae), and in lacking pileus marginal cystidia.

Additional Indonesian species

Von Höhnel (1909) described a second species from Cibodas, viz., *Mycena breviseta* Höhn., that he considered closely related to *M. longiseta*. We have not recollected this species and the minimal description provided below is taken directly from the protologue.

Mycena breviseta Höhn., Sitzungsber. Kaiserl. Akad. Wiss., Math.-Naturwiss. Cl., Abt. 1, 118: 283. 1909.

The holotype specimen (FH!) consists of a few dicotyledonous leaf fragments and no intact basidiomes. On one leaf fragment is a pale brownish orange, subtranslucent, nearly glabrous stipe that arises from a circular, white, strigose, somewhat flattened basal disc. No pilei are present. No microscopic analysis was conducted on the scant material. The holotype packet label includes illustrations of one marginal cystidium that is subclavate and densely covered overall with spinulae; and the base of two very thick-walled pileosetae, one that is rooting, and one that is blunt and slightly booted.

Translated from the protologue. – Similar to *M. longiseta*, but differing in the following features: Pileus umbilicate, striate-sulcate towards the margin, snow white; margin ciliate, with cilia fragile, $60-70 \times 10 \ \mu\text{m}$, lacking an apical flagellum, with minutely granular to roughened walls; pileus with white, stiff setae that are short, $70 \times 8 \ \mu\text{m}$, or up to $500 \times 12-16 \ \mu\text{m}$, with an almost always rooting, not blunt, base. Stipe attached to a conical, radially striate basal disc with ciliate margin, as in *M. stylobates* (Pers. : Fr.) Kummer. Basidiomes scattered on dry leaves in the forest at Tjibodas, Java.

Specimen examined. - INDONESIA. Java: Cibodas (Tjibodas), 1907-1908, F. von Höhnel, # 2225 (Holotype: FH ex 4375).

The protologue clearly reports the differences between *M. breviseta* and *M. longiseta*, however, it would be pertinent to know whether the pileipellis is a cutis or a hymeniform layer of acanthocysts, and whether the spores are amyloid. Because there are no pilei in the holotype specimen and no available fresh material that matches the protologue, these details remain unknown. When compared with *M. aciculata*, *M. breviseta* differs in forming snow white, umbilicate pilei with ciliate margin and corresponding marginal cystidia, and in forming thin-walled, non-setoid caulocystidia and basal disc cystidia. There may be also differences in pileipellis gelatinization and

basidiospore amyloidity, but until fresh material is collected of M. breviseta, a comprehensive comparison is impossible.

Corner (1994) described three new species from Malaysia that could be placed into a redefined *Mycena* sect. Longisetae, viz., *M. brevisetosa* Corner, *M. brunneisetosa* Corner, and *M. tenuisetosa* Corner. Of these three, *M. brunneisetosa* has been collected a number of times from Java and Bali, and a description of and commentary on the species are provided below. We have not yet encountered *M. brevisetosa* and *M. tenuisetosa* in Indonesia, but we suspect that they occur there.

Mycena brunneisetosa Corner, Beih. Nova Hedwigia 109: 172. 1994. – Figs. 8–13.

Primordia 1 mm diam, hemispherical to ovoid, pale orangish white, covered with erect, stiff, hyaline to orange hairs (setae) up to 2 mm long. – Pileus (Fig. 8) 2–6 mm diam, convex to broadly convex, becoming plano-convex, with a shallow central depression or umbilicate; margin striate, incurved, becoming decurved, short-ciliate at maturity; surface dull, dry, covered especially on the disc with erect, orange to orangish brown setae up to 2 mm long; disc yellowish white (4A2) to orangish white (5A3) or greyish orange (5B5-8), margin white to pale yellowish white (4A2), cream (4A3) or pale orangish white (5A2). - Context very thin, white. - Odor not distinctive. - Taste not recorded. - Lamellae ascending, shallowly adnate to subfree, seldom attached to a thin pseudocollarium, close to subdistant (13-20) with 1-2 series of lamellulae, narrow, white, non-marginate. – Stipe $6-20(-35) \times 0.2-0.5$ mm, central, terete, \pm equal above a subbulbous base, fragile, dull, dry, pruinose to hispid or puberulous, apex white, base white to pale orangish white (5A2-3) or orange (5A6); arising from a poorly- to well-developed, yellow (4A2-4) to orange (5A4) basal disc with a hispid margin, on occasion basal disc absent and base of stipe merely subbulbous. - Basidiospores (Fig. 9) (6.5-)7-9(-9.5) \times 4-5(-5.5) μ m [\bar{x}_r = 7.5- $8 \times 4.7 - 5 \ \mu m, \ \bar{x}_m = 7.8 \pm 0.3 \times 4.83 \pm 0.1 \ \mu m, \ Q = 1.4 - 1.9, \ \bar{Q}_r = 1.6 - 1.7,$ $\bar{Q}_{\rm m} = 1.62 \pm 0.04$, n = 20 spores per 4 specimens], broadly ellipsoid, smooth, hyaline, amyloid, thin-walled. – Basidia $12-20 \times 8-12 \mu m$, clavate, 4-spored. - Basidioles clavate. - Pleurocystidia absent. - Cheilocystidia absent. - Pileipellis initially a hymeni-

Figs. 8–13. Mycena brunneisetosa (DED 7112). – 8. Basidiomes and primordium. – 9. Basidiospores. – 10. Pileipellis acanthocysts. – 11. Pileosetae. – 12. Pileus marginal cystidia (three on left from DED 6813; two on right from DED 7112; one with pigmented, globular contents). – 13. Caulocystidia. – Scale bar: Fig. 7 = 5 mm; 9 = $5 \ \mu m$; 10, 12–13 = 20 μm ; 11 = 40 μm .



form layer of acanthocysts with some interspersed repent spinulose hyphae, plus pileosetae and marginal cystidia, at maturity acanthocysts spread out over pileus and pileipellis appearing to be a cutis of repent, spinulose, non-gelatinized hyphae with scattered acanthocyst terminal cells; acanthocysts (Fig. 10) $16-25 \times 8-20$ µm, clavate to broadly clavate, seldom lobed, covered with evenly spaced spinulae (as in Mycena sect. Sacchariferae), thin-walled to slightly thickwalled, hyaline, inamyloid, non-gelatinous; spinulae $1-3 \times 0.5 \mu m$, cylindrical; pileosetae (Fig. 11) scattered, $150-2000 \times 16-40$ µm (at the base), acicular, gradually tapering to a sharply acute apex, with hvaline to orange or pale brownish orange, inamyloid walls up to 14 µm thick; marginal cystidia (Fig. 12) abundant, $80-150 \times 10-20$ µm (at broadest), fusoid to fusoid-ventricose or irregularly clavate, densely spinulose over lower 1/2 to 2/3 with upper 1/2 to 1/3 smooth and tapered to an obtuse apex, sometimes entirely spinulose, smooth apical portion $20-50 \times 6.5-16 \mu m$, hyaline or with orange, refractive contents (exudative), inamyloid; spinulae $1-3 \times 0.5 \mu m$, cylindrical. – Pileus trama of short-celled hyphae up to 32 µm diam, hyaline, strongly dextrinoid, non-gelatinous. - Lamellar trama of similar, dextrinoid hyphae. - Stipe tissue monomitic; cortical hyphae 4–12 μm diam, parallel, cylindrical, smooth, non-gelatinous, hyaline, dextrinoid, mostly unclamped, giving rise to caulocystidia; medullary hyphae 12–24 μm diam, strongly dextrinoid, otherwise similar to cortical hyphae. – Caulocystidia (Fig. 13) abundant, $65-120 \times 16-$ 30 μm (at the base) \times 8–14 μm (centrally), aculeate with a swollen and often geniculate base, hyaline, inamyloid, thin-walled (not setae). -Clamp connections infrequent.

Habit, habitat and distribution. – Solitary, scattered on undetermined dicotyledonous twigs, on dead branchs of *Diospyros*, or rarely on *Castanopsis* leaves, in montane primary forests. Indonesia, Singapore. Possibly also in Borneo and the Soloman Islands (*fide* Corner 1994: 174).

Specimens examined. – INDONESIA. Bali: Bedugul, Bali Botanical Garden, trail to Mt. Pohen, 17 Jan. 1998, D. E. Desjardin #6813 (SFSU); same location, 14 Jan. 2000, D. E. Desjardin #7112 (SFSU); Bedugul, Lake Tamblingan area near the temple, 15 Jan. 1999, K. P. Collins #99-48 (SFSU). Java: Mt. Halimun National Park, loop trail from Cikaniki, elev. ca 1000 m, 13 Jan. 1998, D. E. Desjardin #6757 (BO, SFSU); same location, 6 Jan. 1999, D. E. Desjardin #6868 (SFSU).

Mycena brunneisetosa is characterized by the following diagnostic features: a small, plano-convex, umbilicate pileus colored white with orangish white disc and covered with orange to brownish orange, stiff, erect setae up to 2 mm long; white, subfree lamellae; a filiform, hispid stipe that is white at the apex, and orangish white at

the subbulbous base which often arises from a hispid basal disc; relatively broad (4-5 μ m), amyloid basidiospores; absence of hymenial cystidia; a hymeniform pileipellis of acanthocysts, pileosetae and marginal cystidia; very long (up to 2,000 μ m), orange to brownish orange pileosetae with walls up to 14 μ m thick; fusoid-ventricose marginal cystidia with densely spinulose lower portions and smooth upper portions; smooth stipe cortical hyphae from which arise thinwalled, aculeate caulocystidia.

Mycena brunneisetosa differs from M. longiseta in forming a hymeniform pileipellis of acanthocysts with pigmented pileosetae up to 2,000 µm long, forms basidiospores with mean width 4.8 µm, a white to orangish white, umbilicate pileus, and relatively broad caulocystidia (16-30 µm at the base). In contrast, M. longiseta forms a cutis-type pileipellis, has unpigmented pileosetae rarely up to 1,000 µm long, narrower basidiospores with mean width 3.7 µm, a grey, non-umbilicate pileus, and has narrower caulocystidia (6.5-16 µm at the base). Mycena brunneisetosa is more closely allied with M. indica Manimohan & Leelavathy (1988), described from India (Isotype: NY!). Both latter species form pilei initially composed of a hymeniform layer of acanthocysts with similar exudative marginal cystidia. Mycena indica differs from M. brunneisetosa in forming basidiomes with a pileus diam to stipe length ratio of approximately one, has ciliate lamellar edges formed from fusoid, centrally spinulose and exudative cheilocystidia, and forms shorter pileosetae (only up to 500 µm long).

Smith (1947) segregated *M. longiseta* into a monotypic stirps Longiseta within *Mycena* sect. Basipedes (Fr.) Quél. Maas Geesteranus (1983) established the monotypic sect. Longisetae to accommodate this unusual species, and queried "It may be asked whether *Mycena longiseta* is not sufficiently distinct to warrant being segregated from *Mycena* and placed in a genus of its own." Smith and Maas Geesteranus were, of course, referring to the taxon herein determined as *M. aciculata*, not to the real *M. longiseta* of Java. Nonetheless, we consider both species to belong to the same infrageneric group. In addition, Corner (1994) described three species (indicated above), Manimohan and Leelavathy (1988) described *M. indica*, and von Höhnel (1909) described *M. breviseta* that can be accommodated in sect. Longisetae. To allow for inclusion of all seven species, *Mycena* sect. Longisetae is redefined as follows:

Mycena sect. Longisetae A. H. Smith ex Maas G., Proc. K. Ned. Akad. Wet. (Ser. C) 86: 418. 1983. – Type: Mycena longiseta Höhn.

Basidiomes small. – Pilei less than 10 mm diam, convex to plano-convex, sometimes umbilicate, pilose from erect setae, white

to orangish white or grey. - Lamellae ascending, narrowly adnate to free, sometimes attached to a pseudocollarium, narrow, white to greyish white. - Stipe filiform, variously pruinose, hispid, hispidulous or puberulous, typically arising from a circular, hispid basal disc, but sometimes merely subbulbous. - Basidiospores ellipsoid, smooth, amyloid or rarely inamyloid. - Basidia clavate, 4-spored. – Pleurocystidia absent. – Cheilocystidia present or absent, sometimes exudative (gloeocystidia). - Pileipellis ranging from a hymeniform layer of acanthocysts to a cutis of spinulose hyphae with acanthocyst terminal cells, gelatinous or non-gelatinous, through which arise numerous thick-walled, hyaline or pigmented pileosetae; pileus margin often beset with densely spinulose marginal cystidia that may or may not have a smooth apical projection. - Pileus and lamellar trama dextrinoid. - Stipe cortical and medullary hyphae smooth, non-gelatinous, dextrinoid. - Caulocystidia aculeate to acicular, smooth, thin-walled to thick-walled (setoid). - Clamp connections present or absent.

Included species. – M. aciculata, M. breviseta, M. brevisetosa, M. brunneisetosa, M. indica, M. longiseta, M. tenuisetosa.

Discussion

Based on overall morphological similarities, we hypothesize that Mycena sect. Longisetae is a sister taxon to Mycena sect. Sacchariferae. Both groups of taxa share a number of taxonomically significant features. 1) Densely spinulose pileipellis cells are formed by both groups of species. Although the pileipellis of M. longiseta (and a number of other members of the section) is a cutis of gelatinized spinulose hyphae with acanthocyst terminal cells, the pileipellis of *M. brunneisetosa* (and several other species) is a hymeniform layer of non-gelatinous spinulose acanthocysts, indistinguishable from the pileipellis anatomy of members of sect. Sacchariferae. 2) The setae present in sect. Longisetae are not anatomically very different from the pileipellis cherocytes with a single, thick-walled apical spine reported in M. trichocephala Singer (1973) or from the basal disc cherocytes in M. araujae Singer (1983). Both latter species were accepted in sect. Sacchariferae by Singer (1986) and Desjardin (1995). 3) The presence of a stipe basal disc in combination with smooth stipe cortical hyphae from which arise aculeate, non-spinulose, thin-walled caulocystidia occur in sect. Longisetae and in stirps Adscendens Desjardin (1995) of sect. Sacchariferae. 4) Both groups form basidiomes with dextrinoid, inflated, pileus tramal hyphae and with dextrinoid lamellar and stipe tissues.

The center of diversity for *Mycena* sect. Longisetae appears to be southeast Asia. Besides the six Asian species reported above, *M. clavulifera* (Berk. & Broome) Sacc., described from Sri Lanka and recently collected in Thailand, and two undescribed Thai species belong to the section. Only *M. aciculata* occurs in the temperate zone of the Northern Hemisphere. An account of the worldwide members of *Mycena* sect. Longisetae, plus a key to aid in their determination, will be published elsewhere.

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