

Taxonomy and distribution of two little known, monotypic genera of Agaricales: *Amparoina*, *Cystoagaricus*

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Summary. — Type material and additional collections both of *Amparoina spinosissima* (SINGER) SINGER and *Cystoagaricus strobilomyces* (MURRILL) SINGER are critically revised and discussed. The two species are fully illustrated and their circumpacific geographic distribution is mapped.

Amparoina SINGER 1958

Mycologia 50: 103

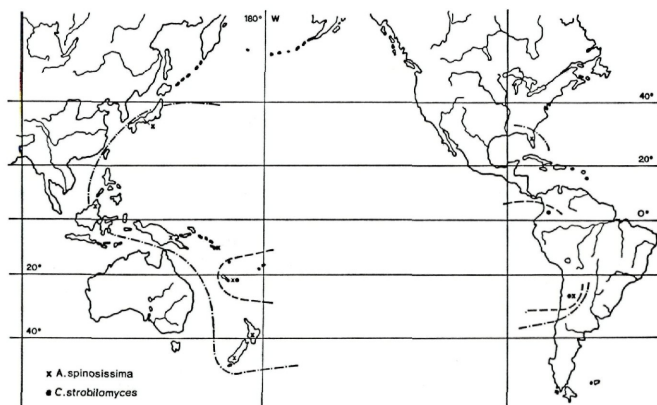
Type (and only species): *Amparoina spinosissima* (SINGER) SINGER 1958: l. c. — Fig. 1.

Bas.: *Marasmius spinosissimus* SINGER 1950: Schweiz. Zt. Pilzkunde 28: 193.

Syn.: *Amparoina heteracantha* SINGER 1976: Rev. Myc. 40: 58.

Pileus 3—10 mm, ovoid, hemispheric or convex, expanded in mature specimens; all over covered with conic to pyramidal spines (up to 2 mm long) from the universal veil, washed off in aged material and exposing smooth to subgranular cuticle; white, cream or pallid; dry, strongly striate or sulcate towards margin, thin, membranaceous, margin without veil remnants; spines concolorous, fragile and rapidly desintegrating. Lamellae (L 10—15, —3), free to adnexed, ventricose; white to concolorous with pileus, margin concolorous, even. Stipe 15—30 × 0.5—1 (—1.5 at base) mm, cylindric, equal or gradually attenuated towards apex; concolorous with pileus; pruinose at apex, becoming velutinous, hairy or even strigose towards base; dry, fragile, solid, single in groups, cortina absent. Context very thin in pileus and stipe, white. Odour and taste not distinctive. Chemical reactions on pileus: KOH — negative.

Spore print white. Spores 7—9.5 × 4.5—5.5 μm, ovoid, hyaline, inamyloid, smooth, thin-walled, germ pore absent, apiculus distinct. Basidia 14—22 × 10—13 μm, clavate to subglobose-clavate, no clamp connection on basal septum, 4-spored. Cheilocystidia 15—25 × 7—10 μm, clavate, densely covered with 0.5—1.5 μm long wart-like or cylindric projections (“en brosse”), membrane thin-walled, hyaline. Pleurocystidia absent. Cuticle a celluloderm composed of clavate to vesiculose cells (8—50 μm diam.), membrane thin-walled, all over minutely warted, hyaline; hyphae of subcutis cylindric,



Geographic distribution of *Amparoïna spinosissima* and *Cystoagaricus strobilomyces*

2—8 μm diam. Caulocystidia (on upper half of stipe) 50—160 \times 5—16 μm , terminal cell cylindrical or subclavate, densely and minutely warted over whole length, thin-walled, hyaline. Universal veil composed of globose, ovoid, fusoid or cylindrical, thick-walled (2—4 μm diam.) cells, irregularly beset with conspicuous, erect or curved, conic and pointed spines (up to 12 μm long), surface between spines rugulose to minutely warted, hyaline.

Habitat. — On rotting wood and bark of angiospermic trees. Argentina (type), Colombia, New Caledonia.

Material. — ARGENTINA: Prov. Tucuman, Sierra de San Javier, Ciudad Universitaria, 1. III. 1962, leg. HORAK & SINGER (ZT, 65/102, topotypic material). — COLOMBIA: Buenaventura, San Joaquín, 130 m, 19. IV. 1968, leg. SINGER, B 6250 (F; holotype of *A. heteracantha* SING.). — NEW CALEDONIA: Yaté, 30 m, 5. III. 1977, leg. HORAK (ZT, 77/74).

Remarks. — Originally *A. spinosissima* was considered a species of *Marasmius* (SINGER, 1950) but subsequently became the type of *Amparoïna* (HORAK, 1968: 84) whose area of distribution appeared to be restricted to the montane *Alnus* forests of northern, subtropical Argentina. In 1976 SINGER again reported about a second, Colombian species pertinent to *Amparoïna*; the critical revision of the type material revealed, however, that *A. heteracantha* SINGER is conspecific to *A. spinosissima*. Hence *Amparoïna* is still a monotypic genus.

SINGER (1975: 787; 1976: 58) excluded *Amparoïna* from the Agaricales proper and regarded the genus as first "secotiaceous"

link towards marasmiod-mycenoid agarics. In addition *Amparoina* become the type genus of the new family Amparoinaceae.

At two occasions perfect carpophores of *A. spinosissima* have been collected by the author both near the type locality in Argentina and in coastal rain-forests in New Caledonia. Based upon my observations there is no doubt that the spores of this species are firstly borne on 4-spored basidia (fig. 1) and secondly they are released as ballistopores to produce a regular spore print. The carpophores of *Amparoina* are reviving like those of *Marasmius* s. l. and during eclog spells the margin of the pileus is curling in. Under such ecologic conditions the fruitingbodies of *Amparoina* have a secotiaceous aspect indeed. There is no bulbilosis but many spores have been observed to germinate already on the lamellae of the tough and long-lasting pilei.

To my opinion there is no convincing reason to consider *Amparoina* as "secotiaceous". All characters indicate its close affiliation to the Agaricales s. str. among which, admittedly, it holds a taxonomically isolated position.

To date *Amparoina spinosissima* has been gathered only in three tropical-subtropical localities East and West of the South Pacific. It is expected that with further records the distributional pattern of this species will roughly coincide with the one of *Cystoagaricus strobilomyces* (see below).

Cystoagaricus SINGER 1947

Mycologia 39: 85

Type (and only species): *Cystoagaricus strobilomyces* (MURRILL) SINGER 1947: l. c. — Fig. 2.

Bas.: *Nolanea strobilomyces* MURRILL 1914: Proc. Flor. Acad. Scienc. 7: 107.

Pileus 4—20(—30) mm, hemispheric, convex or umbonate-campanulate, becoming expanded with age; grey, dark brown or fuliginous; densely covered with minute, pointed, erect or recurved, concolorous spines, squarrose in centre, floccose to coarsely velutinous towards striate margin (in mature specimens), dry, veil remnants appendiculate in young carpophores along margin, soon vanishing. Lamellae (L 8—18, —3) adnate, adnexed or almost free, ventricose; grey at first changing to pale blue or bluish-pinkish, finally turning dark brown or black; margin denticulate-fimbriate, concolorous or dark brown. Stipe 5—40 × 1—2(3.5) mm, cylindric, central, equal or gradually tapering towards apex; grey to concolorous with pileus, whitish pruinose at apex, towards base covered with dark brown or black, scurfy scales or floccose-velutinous over whole length; dry, persistent cortina remnants absent, hollow, subcartilaginous,

single in groups. Odour and taste not distinctive. Context: grey, turning black with age and on exposure. Chemical reactions on pileus: KOH — negative.

Spore print dark brown with purplish tint. Spores $(5.5)6-7.5 \times (4)4.5-6 \mu\text{m}$, conspicuously mitriform (in dorso-ventral view), phaseoliform (in lateral view), grey to brown, opaque, smooth, membrane thin-walled, apical germ pore distinct. Basidia $18-28 \times 5-7 \mu\text{m}$, 4-spored. Cheilocystidia $20-50(-75) \times 12-25 \mu\text{m}$, forming sterile seam on edge, clavate to vesiculose, usually thin-

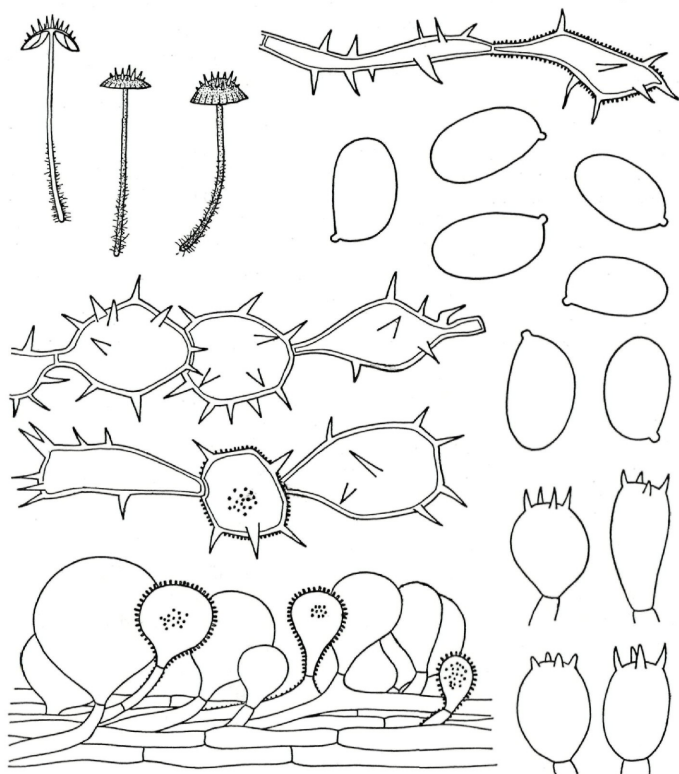


Fig. 1. *Amparoina spinosissima* (SINGER) SINGER (ZT, 77/74): carpophores, spores, basidia, cuticle, cells of universal veil forming spines on pileus

walled, but membrane also thickened ($-2 \mu\text{m}$ diam.), hyaline or encrusted with brown membranous or encrusting pigment. Pleurocystidia $20-50 \times 16-24 \mu\text{m}$, scattered, clavate to lageniform, hyaline, thin-walled. Cuticle a trichoderm of fasciculate hyphae, cells cylindrical or subfusoid ($6-18 \mu\text{m}$ diam.), terminal cell conic, membrane not gelatinised, strongly encrusted with dark brown (exsiccata) or lilac (fresh material; KOH) pigment. Clamp connections numerous on septa.

Habitat. — On well rotten or decayed wood and bark of trees. — USA (Florida; type), Argentina, New Zealand, New Caledonia, Solomon Is., Papua New Guinea, Sabah (N. Borneo), Japan.

Material. — USA: Florida, Alachua Co., Kelley's Hammock, S. X. 1938, leg. MURRILL, F-16520 (FLAS, holotype). — NEW ZEALAND: North Island, Weraroa, 24. IX. 1919, leg. ATKINSON (PDD, 683, sub "*Inocybe*", det. CUNNINGHAM). — South Island, Fjordland National Park, track to Mt. Luxmore, 26. III. 1969, leg. HORAK (ZT, 69/176). — NEW CALEDONIA: Paita, Mt. Mou, 1200 m, 22. II. 1977, leg. HORAK (ZT, 77/35). — PAPUA NEW GUINEA: Morobe district, Bulolo, Middle Creek, 1200 m, 23. XI. 1971, leg. HORAK (ZT, 71/334). — SOLOMON ISLANDS: Guadalcanal, Tsuva, 8. XI. 1965, leg. CORNER (RSS, 5756, ZT, 40). — SABAH (N. Borneo): Mt. Kinabalu, Bembangan River, 1700 m, 16. VIII. 1961, leg. CORNER (RSNB, 1768, ZT, 39). — Mt. Kinabalu, Mesilau, 1600 m, 13. III. 1964, leg. CORNER (RSNB, 1779, ZT, 38). — JAPAN: Kyoto, Inari-taisha Shrine, 15. IX. 1978, leg. HONGO (Herb. HONGO, 5804, ZT, 37). — ARGENTINA: Tucuman, Sierra San Javier (fide SINGER, 1959: 9).

Remarks: Recently SINGER (1973: 65) described a second species for the genus *Cystoagaricus*, *C. jujuyensis* (Argentina: Jujuy, Laguna de Yala, 10. II. 1966, leg. SINGER, T-5012, 21 (F)). The examination of the type material, however, proves that *C. jujuyensis* is not a representative of *Cystoagaricus* but a species which belongs either to *Cystolepiota* or *Melanophyllum*. Hence *Cystoagaricus* remains a monotypic genus within the Agaricales.

One of the most distinctive characters of *C. strobilomyces* are the mitriform, dark brown spores. It is of interest to point out that the first known collection of this agaric has been identified as "*Inocybe*" (New Zealand, 1919). The angular spores (in profile) also could be mistaken for those of *Entoloma* especially if microscopically checked with a low powered microscope. The usually distinct germ pore at the mucronate apex of the spores, however, immediately excludes both *Inocybe* and *Entoloma*.

Another remarkable feature of *C. strobilomyces* is the blue colour of the lamellae. The blue tint fades out rapidly with the ageing or drying of the material and therefore this character often goes unno-

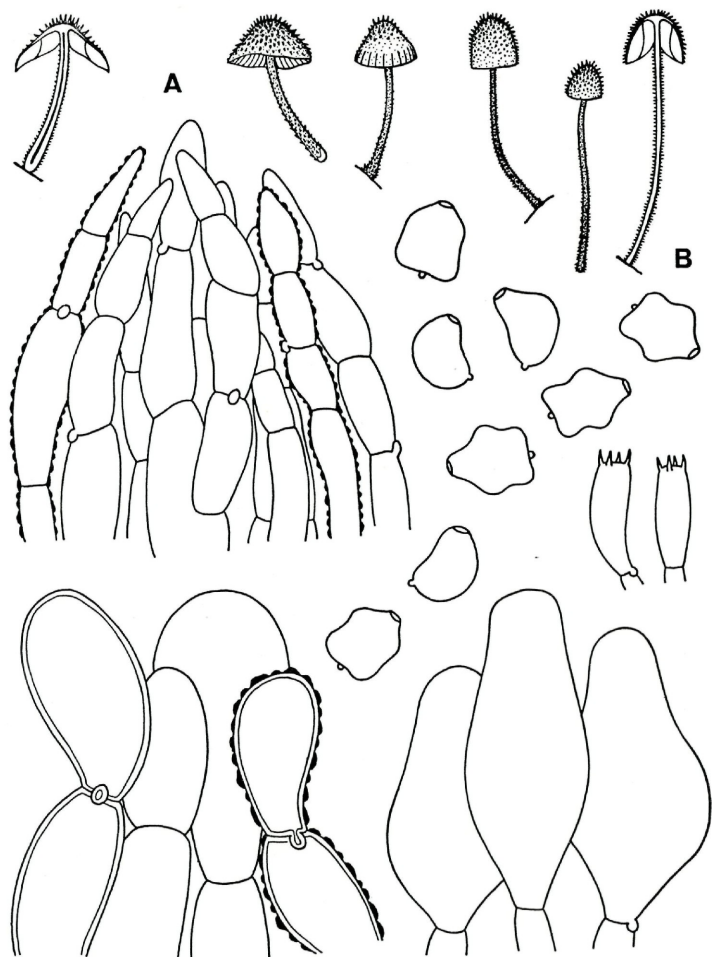


Fig. 2. *Cystoagaricus strobilomyces* (MURRILL) SINGER: A. carpophores, spores, basidia, cheilocystidia, pleurocystidia, cutile (ZT, 71/334). — B. carpophores (ZT, 77/35)

ticed. Finally old or dried specimens completely turn black and exsiccata are reminiscent of *Hydropus* spp.

To present knowledge *C. strobilomyces* has a tropical-subtropical circumpacific distribution but the species occurs also in localities with more temperate climate both in the northern (Japan) and southern hemisphere (New Zealand).

According to the ecologic data reported for *C. strobilomyces* this fungus prefers as habitat rotten wood and bark of dicotyledonous trees (*Nothofagus* spp., *Castanopsis* sp., *Piptadenia* sp.). Thus far there is only one collection (ZT, 69/179, New Zealand) where this agaric formed fructifications on rotten wood of a conifer, viz. *Dacrydium cupressinum* (Podocarpaceae).

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If not otherwise stated the magnifications of the figures are: carpophores (nat. size), spores ($\times 2000$), basidia and cystidia ($\times 1000$), cuticle (vertical section, $\times 500$).

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