PERSOONIA
Published by the Rijksherbarium, Leiden
Volume 11, Part 1, pp. 1-37 (1980)

INOCYBE (AGARICALES) IN INDOMALAYA AND AUSTRALASIA

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Twenty-three species of *Inocybe* (Fr.) Fr. (1863; Agaricales) from Indomalaya and Australasia (except New Zealand; compare Horak, *1977*) are keyed out, described, and illustrated. Sixteen species and one form are new. Of the remaining six species the macroscopic and microscopic data (as observed on type material or topotypic collections) are reported and discussed.

This contribution on Indomalayan and Australasian species of *Inocybe* (Fr.) Fr. should be consulted in conjunction with my paper (Horak, *1979*) on species of *Astrosporina* Schroeter (*1889*) collected in the same geographical area.

As pointed out elsewhere, in my concept *Inocybe* and *Astrosporina* are regarded as two independent genera—knowing well, however, that the two units are here and there linked up by intermediate species (compare also *I. casuarinae* Corn. & Horak).

Typical representatives of *Inocybe* are characterised by brown spores of subglobose, ovoid, phaseoliform, amygdaliform, sublimoniform, or cylindrical shape. Under all circumstances the spore membrane is smooth and even, never gibbous or stellate as in *Astrosporina*. A germ pore is always absent but a callus-like pore can be observed in numerous species (Horak, *1968*).

The list of previous publications dealing with Indomalayan and Australian species of *Inocybe* is amazingly short, and not more than about two dozens of names can be found in the literature.

After completing the critical revision of available type material and authentic collections (except the New Zealand species; Horak, *1977*) the number of taxa actually representing *Inocybe* was drastically reduced to four, viz. *Inocybe cutifracta* Petch (Sri Lanka), *I. umbrina* Massee (Singapore), *I. subgeophylla* Hennings (Indonesia), and *I. australiensis* Cleland & Cheel (Australia).

In my opinion the 23 species of *Inocybe* referred to in this review must represent a fraction of the total number of taxa actually occuring in the vast ectotrophic Australasian and Indomalayan forests. Fully aware of the difficulties and the many sources of the already existing confusion concerning the taxonomy of *Inocybe*, only very well documented collections have accordingly been taken into account. With other words: only those species are reported which are distinctly defined by one or several unusual characters. Hence numerous specimens remain unpublished for the time being, despite of excellent field notes, drawings, paintings, and/or photographs. This is true in particular with Indomalayan and Australasian taxa that are closely related to polymorphic or insufficiently known species or sections of *Inocybe* (i.e. aff. *I. fastigiata*, aff. *I. obscura*, etc.). This material must wait until a thorough revision of all interrelated species is carried out.

Probably all species of *Inocybe* (and *Astrosporina*) enter mycorrhiza and therefore these fungi are also of considerable biological importance concerning regeneration, growth, health, and

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distribution of their hostplants. According to present knowledge the species of *Inocybe* described herewith are growing in close association with deciduous trees and shrubs. They belong either to the Fagaceae (*Nothofagus*, *Castanopsis*, *Lithocarpus*), Dipterocarpaceae (*Anisoptera*), Tiliaceae (*Althoffia*), Casuarinaceae (*Casuarina*), or Myrtaceae (*Eucalyptus*). Under these circumstances the study and the knowledge of inocybioid agarics are not only warranted from the scientific point of view but deserve high interest also due to their ecological role in silviculture (reforestation).

In the course of this study most of the Japanese representatives of *Inocybe* (Kobayasi, *1952*) have not been examined, since unfortunately the type material was unavailable. The bulk of information published below was collected by myself in Australasia (Papua New Guinea, 1971–3) and in Indomalaya (Indonesia, 1977). As at other occasions, Professor E. J. H. Corner (Cambridge, U.K.) permitted to make use of the numerous collections of *Inocybe* gathered in Malaysia, Singapore, Sabah, Papua New Guinea, and Solomon Isl. I am greatly indebted to his generous offer which brought welcomed mycological news from hitherto very little explored regions in Indomalaya and Australasia. In addition I wish to thank the curators in ADW, BO, and K for the loan of type specimens and Professor T. Hongo (Otsu, Japan) for exsiccata and literature concerning Japanese species of *Inocybe*. Finally I like to acknowledge both the facilities received at the Forest Research Centre, Bulolo (Papua New Guinea) and the travelling grant obtained from the Swiss Society of Natural Sciences (*1977*) which gave me the opportunity to carry out field work in the Far East.

Type material of the new species is kept in ZT and in the personal herbarium of Prof. Corner.

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

KEY TO THE INDOMALAYAN AND AUSTRALASIAN SPECIES OF INOCYBE

(The New Zealand species are keyed out in Horak, *1977*)

1. Cheilocystidia (pleuro- and caulocystidia if present) thin-walled, crystals absent (except *I. conicoalba*); stipe rarely pruinose (at apex only) 2
1*. Cheilocystidia and/or pleurocystidia and caulocystidia (if present) thick-walled, metuloid, crystals, or resinous incrustation present; stipe often pruinose, at least near apex 10
2. Spores cylindric to subfusoid 3
2* Spores amygdaliform, ovoid, or phaseoliform 4
3. Cheilocystidia clavate to vesiculose, 35–50 × 15–25 µm; spores 8.5–10 × 3.5–4 µ,; pileus −30 mm, argillaceous to pale brown, umbonate, innately fibrillose; stipe −30 × −4 mm, cylindric, whitish, minutely fibrillose; odour absent; on sand in coastal dunes under *Althoffia* (Tiliaceae). Papua New Guinea . . . . . 1. *I. althoffiae*, p. 5
3* Cheilocystidia cylindric to subclavate, 65–110 × 5–8 µm; spores 11.5–14 × 4–5 µm; pileus −45 mm, brown, convex, innately fibrillose; stipe −35 × −10 mm, cylindric, pale reddish brown, fibrillose; odour ?; on soil. Australia . . . . . 2. *I. arenacolens*, p. 6
4. Pileus lilac or white, surface smooth to innately fibrillose. 5
4*. Pileus neither lilac nor white, surface conspicuously scaly to squamulose or rimose (and splitting towards margin) 6

5. Pileus −15 mm, white, conic; stipe −45 × −2 mm, white, cylindric, base subbulbous, white fibrillose cortina when young; spores 9–10.5 × 5–6 μm, amygdaliform (to sublimoniform); cheilocystidia (and pleurocystidia) 35–50 × 11–18 μm, fusoid, encrusted with crystals; odour spermatic; on soil in forests (*Castanopsis*, *Lithocarpus*). Papua New Guinea . . . . 3. *I. conicoalba*, p. 7

5*. Pileus −40 mm, lilac turning brown, umbonate; stipe −50 × −5 mm, lilac, cylindric, base clavate, fibrillose; spores 7.5–9.5 × 4.5–5 μm, phaseoliform; cheilocystidia 25–50 × 9–16 μm, clavate; odour spermatic; on soil in (montane) forests. Sabah . . . . . 4. *I. ionides*, p. 8

6. Pileus scaly to conspicuously squamulose 7

6*. Pileus rimose to strongly fibrillose (splitting towards margin) 9

7. Context in stipe green-black; pileus −35 mm, brown, obtusely conic to umbonate; stipe −100 × −6 mm, cylindric, brown, green towards base, strongly fibrillose; spores 10–12.5 × 7–8.5 μm, ovoid; cheilocystidia cylindric to subclavate; odour fruity turning unpleasant with age; on soil in forests (*Nothofagus*). Papua New Guinea . . . . . 5. *I. umbrinovirens*, p. 9

7*. Context in stipe reddening (upon bruising or exposure) 8

8. Pileus −20 mm, brown, umbonate; stipe −45 × −2.5 mm, cylindric, brown to reddish brown, covered with concolorous recurved fibrils or squamules; spores 6.5–8 × 4–5 μm, ovoid; cheilocystidia cylindric to subfusoid; odour none; on soil in forests (*Castanopsis*, *Lithocarpus*). Indonesia (Java) . . . . . 6. *I. fuscospinulosa*, p. 11

8*. Pileus −40 mm, convex to campanulate, brown; stipe −60 × −6 mm, cylindric, brown, fibrillose-squamulose; spores 9–11.5 × 5–6.5 μm, phaseoliform; cheilocystidia clavate; odour absent or unpleasant; on soil in fagaceous forests (*Nothofagus*, *Castanopsis*, *Lithocarpus*). New Zealand (type), Papua New Guinea . . . . . 7. *I. latericia*, p. 12

9(6*). Lamellae rather distant; pileus −30 mm, umbonate to plane, red-brown at disc, brownish grey towards margin; stipe −40 × −3 mm, cylindric, base subbulbous, white, covered with concolorous fibrils; spores 8.5–11.5 × 5–5.5 μm, ellipsoid, occasionally subphaseoliform; cheilocystidia clavate; odour ?; on soil. Sri Lanka . . . . . 8. *I. cutifracta*, p. 13

9*. Lamellae densely crowded, very narrow; pileus −50(100) mm, conic becoming umbonate-plane, yellowish to ochraceous brown, darker or subferruginous at disc; stipe −110 × −12 mm, cylindric, base often abruptly ending, white to pale yellow-brown, fibrillose to scurfy; spores 6–9 × 4–6 μm, ovoid to subphaseoliform; cheilocystidia clavate to sublageniform; odour absent or unpleasant (like corn or burnt horn); on soil in low-land and montane forests. Singapore (type), Malaysia, Sabah, Papua New Guinea, Solomon Isl. . . . . 9. *I. umbrina*, p. 14

10(1*). Spores subglobose, 5.5–6.5 × 5–5.5 μm; pileus −50 mm, umbonate to plane, yellow or ochre, fibrillose-rimose, margin appendiculate; lamellae yellow to yellow-brown; stipe −60 × −8 mm, cylindric, base subclavate, yellow, fibrillose to silky; context yellow; odour none; on soil in lowland and montane forests. Japan (type), Singapore, Papua New Guinea . 10. *I. sphaerospora*, p. 16

10*. Spores and colour of carpophores different 11

11. Spores sublimoniform to amygdaliform-mucronate (compare also *I. violeipes*) 12

11*. Spores elliptic with few blunt but distinct angles or elliptic-amygdaliform, pip-shaped or subphaseoliform 13

12. Stipe with white, cortinate, persistent annulus, −50 × −2 mm, cylindric, base subbulbous, white to pale brown; pileus −20 mm, campanulate to umbonate, brown, fibrillose, disc subsquamulose; odour fruity or spermatic; spores 7.5–9.5 × 4.5–5.5 μm; cheilocystidia and pleurocystidia fusoid; on soil in forests (*Castanopsis*, *Lithocarpus*). Papua New Guinea . . . . 11. *I. cingulata*, p. 17

12*. Veil remnants on stipe absent, −45 × −2 mm, cylindric, dark brown, strongly fibrillose, base with yellow, strigose hairs; pileus −25 mm, conspicuously conic to papillate, dark brown, disc covered with coarse, recurved scales, fibrillose towards margin; odour absent; spores 8.5–10 × 6.5–7 μm; cheilocystidia and pleurocystidia subfusoid to lageniform; on soil in montane forests (*Nothofagus*). Papua New Guinea . . . . . 12. *I. procera*, p. 18

13. Spores ellipsoid with few, blunt angles, 6.5–9 × 4–5 μm; pileus −40 mm, campanulate to umbonate, ochre-brown, fibrillose to subsquamulose (at disc); stipe −80 × −6.5 mm, cylindric, base subclavate, pale ochraceous, scurfy; odour spermatic; cheilocystidia and pleurocystidia fusoid; on sandy soil under *Casuarina*. Malaysia . . . . . 13. *I. casuarinae*, p. 20

13*. Spores elliptic-amygdaliform to pip-shaped or subphaseoliform (compare *I. violaceovelata*) . 14

14. Carpophores white; pileus −25 mm, campanulate to umbonate-plane, fibrillose, rimose towards margin; stipe −50 × −3 mm, cylindric, base subbulbous, smooth (except pruinose apex); odour spermatic; spores 7–8.5 × 4–4.5 µm; cheilocystidia and pleurocystidia fusoid, less than 40 µm long; on soil in forests (*Castanopsis*, *Lithocarpus*). Indonesia (Java) . . . . 14. *I. olorinata*, p. 21

14*. Carpophores pale brown, brown, or red-brown 15

15. Margin of pileus conspicuously strigose, of stiff, white hairs (composed of long, cylindric, thick-walled hyphae); stipe reddish brown, pruinose all over, cylindric, equal; odour spermatic; cheilocystidia subfusoid, yellow membranes (KOH) up to 4 µm diam. 16

15*. Margin of pileus never strigose; stipe not pruinose over whole length but fibrillose to squamulose 17

16. Pileus −25 mm, convex, argillaceous-brown; stipe −40 × −2.5 mm; spores 6.5–8 × 4–5 µm; on soil in forests (*Nothofagus*). Papua New Guinea . . . . . 15. *I. strigiceps*, p. 22

16*. Pileus −12 mm, convex to plane, pale brown to fuscous; stipe −15 × −1 mm; spores 7–9 × 4.5–5.5 µm; on soil (rarely also on rotten wood) in forests (*Nothofagus*, *Lithocarpus*). Papua New Guinea 16. *I. strigiceps* f. *pygmaea*, p. 24

17. Stipe without conspicuous veil remnants at least in mature specimens 18

17*. Stipe covered with persistent, conspicuous remnants of veil (annulate girdles or coarse longitudinal fibrils); compare also *I. subgeophylla*. 19

18. Pileus −20 mm, conic to umbonate-expanded, brown, to red-brown, squamulose, fibrillose towards margin; stipe −45 × −3 mm, cylindric, base equal or subbulbous, pale brown or pale red-brown, with faint lilac tinge, covered with white appressed fibrils of veil; odour spermatic; spores 7.5–9 × 4–5 µm; cheilocystidia and caulocystidia with hyaline, thin-walled membrane; pleurocystidia fusoid, metuloid; on soil in mountain forest (*Castanopsis*, *Lithocarpus*). Indonesia (Java) 17. *I. subgeophylla*, p. 25

18*. Pileus −18 mm, convex to umbonate, brown to dark brown, fibrillose, disc scaly; stipe −35 mm, cylindric, base occasionally subbulbous, brown, apically pruinose, smooth or fibrillose below; odour spermatic; spores 6.5–8 × 4.5–5 µm; all cystidia fusoid, metuloid; on soil. Australia 18. *I. australiensis*, p. 26

19. Veil remnants white forming numerous, subannulate zones and squarrose scales on stipe; pileus −12 mm, convex to campanulate, dark brown, densely covered with erect, concolorous scales; lamellae mustard yellow at first; stipe −25 × −2 mm, cylindric, pale red-brown, apex pruinose; odour fruity; spores 6–6.5 × 3.5–4 µm; cheilocystidia and pleurocystidia fusoid, membrane yellow (KOH); pileocutis composed of ovoid to subglobose cells; on soil in forests (*Nothofagus*). Papua New Guinea . . . . . 19. *I. multicingulata*, p. 27

19*. Veil remnants brown, orange-brown, or lilac 20

20. Veil remnants brown or orange-brown; pileus viscid when moist; odour spermatic; cheilocystidia intermixed with clavate, hyaline and thin-walled cells 21

20*. Veil remnants lilac, forming appressed, persistent zones and belts on stipe 22

21. Pileus −35 mm, conic to papillate-plane, white to pale yellow, disc and margin covered with conspicuous, fuscous fibrils and patches of veil; stipe −70 × −3(−4) mm, cylindric, white, apex pruinose, towards base strongly covered with coarse, fuscous, fibrillose or floccose veil remnants (becoming viscid when moist); spores 7–8.5 × 4.5–5 µm; cheilocystidia clavate to broadly fusoid; on soil in fagaceous, mountain forests (*Nothofagus*, *Castanopsis*). Papua New Guinea (type), Sabah 20. *I. fuscoperonata*, p. 29

21*. Pileus −30 mm, convex to expanded with conic umbo, red-brown to orange, fibrillose, strongly squamulose with age; stipe −40 × −4 mm, cylindric, pale yellow, towards base with distinct, orange to ochre-brown, subannulate, persistent belts of veil; spores 7.5–8.5 × 4.5–5 µm; cheilocystidia and pleurocystidia lageniform; yellow-brown, plasmatic pigment in cuticular hyphae; on soil in forests (*Nothofagus*, *Lithocarpus*). Papua New Guinea . . . . . 21. *I. zonatipes*, p. 30

22. Pileus −25 mm, acuto-conic, pale ochre-brown, fibrillose, minutely squamulose over conic papilla; stipe −40 × −4 mm, cylindric, subbulbous base white, lilac above; context in stipe lilac; odour none; spores 8.5–11 × 4.5–5.5 µm, occasionally with distinct mucro; cheilocystidia and pleurocystidia

lageniform; on soil in forests (*Castanopsis*). Papua New Guinea . . . 22. *I. violeipes*, p. 31

22*. Pileus −40 mm, umbonate-campanulate, fuscous, minutely squarrose all over; stipe −55 × −5 mm, cylindric, base subbulbous, pale brown; odour spermatic; spores 8–9 × 4–4,5 μm; cheilocystidia and pleurocystidia fusoid; on soil in forests (*Lithocarpus*, *Castanopsis*). Papua New Guinea 23. *I. violaceovelata*, p. 32

Inocybe althoffiae Horak, *spec. nov.*—Fig. 1

Pileo −30 mm, e campanulato plano, umbonato vel subdepresso in centro, argillaceobrunneo, innate fibrilloso. Lamellis emarginatoadnatis, albidis dein argillaceis. Stipite −30 × −4 mm, cylindraceo vel subattenuato basim versus, albido, squamis minutis albidisque instructo. Odore nullo. Sporis 8.5–10 × 3.5–4 μm, cylindraceis vel subfusoideis, brunneis. Cheilocystidiis vesiculosis, haud metuloideis. In arena sub *Althoffia*. Nova Guinea. Typus: ZT 72/*495*.

Pileus 15–30 mm, umbonate to campanulate becoming convex or expanded, umbo in aged specimens absent and centre plane to depressed; argillaceous to pale brown; innately fibrillose, occasionally with small squamules over disc, veil remnants absent, dry. Lamellae crowded, emarginate to adnate; whitish at first, turning argillaceous or pale brown, edge concolorous, even. Stipe 20–30 × 3–4 mm, cylindric or attenuated towards base, rather stout; whitish to pallid; dry, densely covered with white fibrils or minute squamules (over whole length), cortina absent, hollow, single in groups. Context pale brown. Odour and taste not distinctive.

Spores 8.5–10 × 3.5–4 μm, cylindric to subfusoid, brown, smooth, membrane thin-walled, germ pore absent. Basidia 25–28 × 5–6 μm, 4-spored. Cheilocystidia 35–50 × 15–25 μm, clavate to vesiculose, sometimes subfusoid, hyaline, membrane thin-walled, occasionally encrusted with brown pigment, crystals absent. Pleuro- and caulocystidia none. Cuticle a cutis of cylindric hyphae (5–12 μm diam.), encrusted with yellow-brown (KOH) pigment. Clamp connections present.

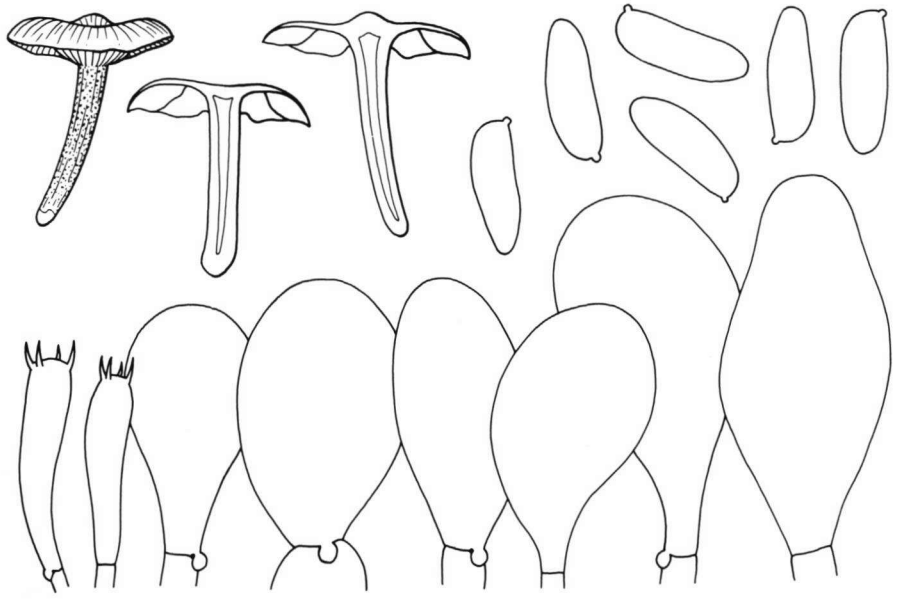

Fig. 1. *Inocybe althoffiae* Horak (type. — Carpophores, spores, basidia, cheilocystidia.

HABITAT.—On sand in coastal dunes under *Althoffia* sp. (Tiliaceae). Papua New Guinea.

MATERIAL.—PAPUA NEW GUINEA: Morobe district, Buso (SE. of Lae), 20.VI.1972, *Horak* (ZT 72/495, holotype).

As the specific epithet implies this *Inocybe* grows under *Althoffia* sp. (Tiliaceae) in coastal dunes of Papua New Guinea. It is well-defined by its particular microscopic characters (cylindrical spores and vesiculose, thin-walled cheilocystidia without crystals) which confirm its membership to sect. *Dulcamarae*.

Inocybe arenacolens (Cleland) Horak, *comb. nov.*—Fig. 2

Naucoria arenacolens Cleland *in* Trans. R. Soc. S. Australia **57**: 193. 1933 (basionym).

Nothing can be added to the macroscopic characters published in the original diagnosis. The type material is in good condition.

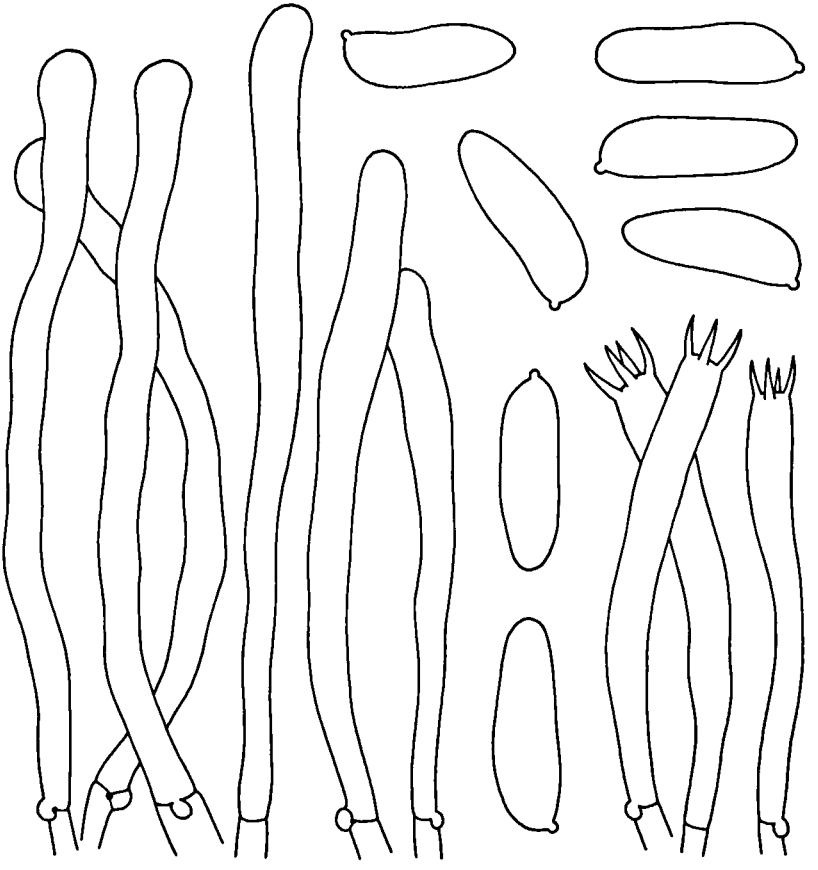

Fig. 2. *Inocybe arenacolens* (Clel.) Horak (type). — Spores, basidia, cheilocystidia.

Spores 11.5–14 × 4–5 μm, cylindric to subfusoid, brown, smooth, membrane thin-walled, germ pore none. Basidia 50–60 × 6–7 μm, 4-spored. Cheilocystidia 65–110 × 5–8 μm, cylindric to subclavate, slender, membrane thin-walled, yellow-brown (KOH) plasmatic pigment present, forming dense seam on edge, crystals absent. Pleuro- and caulocystidia absent. Cuticle a cutis or trichoderm of cylindric hyphae (6–12 μm diam.), both encrusting and plasmatic brown pigment present. Clamp connections numerous.

HABITAT.—On sandy soil. South Australia.

MATERIAL.—AUSTRALIA: South Australia, Encounter Bay, 22.V.1930, Cleland (ADW 12781, holotype of *N. arenacolens* Cleland).

In my opinion the microscopic characters, observed on the rather fragmentary type collection of this Australian agaric, leave no doubt about its generic position. As in the previous species, the spores are conspicuously cylindrical to subfusoid and bear no germ pore or callus. Brown pigment is observed dissolved both in the cylindrical cheilocystidia and in the majority of cuticular hyphae which commonly are also encrusted with a pigment of the same colour. It is assumed that *I. arenacolens* grows in mycorrhizal association with *Eucalyptus* sp.

Inocybe conicoalba Horak, *spec. nov.*—Fig. 3

Pileo −15 mm, conico vel convexo papilla conica instructo, albo dein pallido, fibrilloso. Lamellis adnexoadnatis, argillaceis. Stipite −45 × −2 mm, cylindraceo, ad basim subbulboso, albo, cortina alba et fibrillis albis subzonatis instructo. Odore spermatico. Sporis 9–10.5 × 5–6 μm, amygdaliformibus, brunneis. Cystidiis fusoideis, tenui-tunicatis, incrustatis. Ad terram in silvis fagineis. Nova Guinea. Typus: ZT 73/250.

Pileus 8–15 mm, conic becoming convex with conic or obtuse papilla, campanulate; white (turning pale cinnamon with age); dry, silky to innately fibrillose; margin not striate, covered with white fibrillose veil remnants. Lamellae (L 8–18, −5) crowded, adnate to adnexed, ventricose; pale argillaceous at first turning pale brown, edge white, fimbriate. Stipe 25–45 × 1–2 mm, cylindric, base equal or subbulbous to pestle-shaped; white; dry, glabrous to innately silky, below subpersistent, white, fibrillose cortina with several indistinct, appressed zones of the white veil, fistulose in age, single in groups. Context white. Odour and taste spermatic. Spore print brown.

Spores 9–10.5 × 5–6 μm, amygdaliform (to sublimoniform), apex distinctly mucronate, smooth, brown, membrane thin-walled, germ pore absent. Basidia 20–30 × 7–8 μm, 4-spored. Cheilo- and pleurocystidia 35–50 × 11–18 μm, fusoid to lageniform, membrane thin-walled, hyaline, apex encrusted with crystals. Caulocystidia scattered, cylindric to subfusoid, frequently with irregular, finger-like out-growth, membrane not metuloid, crystals absent. Cuticle a cutis of repent, cylindric hyphae (3–6 μm diam.), membranes not gelatinised, pigment lacking, terminal cells occasionally differentiated and then subcorallioid (cp. caulocystidia). Clamp connections present.

HABITAT.—On soil in forests under *Castanopsis* and *Lithocarpus* (Fagaceae). Papua New Guinea.

MATERIAL.—PAPUA NEW GUINEA: Morobe district, Bulolo, Manki, 1300 m, 21.V.1973, *Horak* (ZT 73/250, holotype); Bulolo, Manki, 1300 m, 14.X.1971, *Horak* (ZT 71/110).

Because of the white colour and the more or less persistent veil remnants on the stipe *Inocybe conicoalba* is reminiscent of a slender *I. geophylla* (Fr.). The species from Papua New Guinea, however, is well separated from the latter taxon, not only by its habitat (under *Castanopsis* and *Lithocarpus*) but also by the unusual, lageniform, thin-walled, and encrusted cheilo- and pleurocystidia.

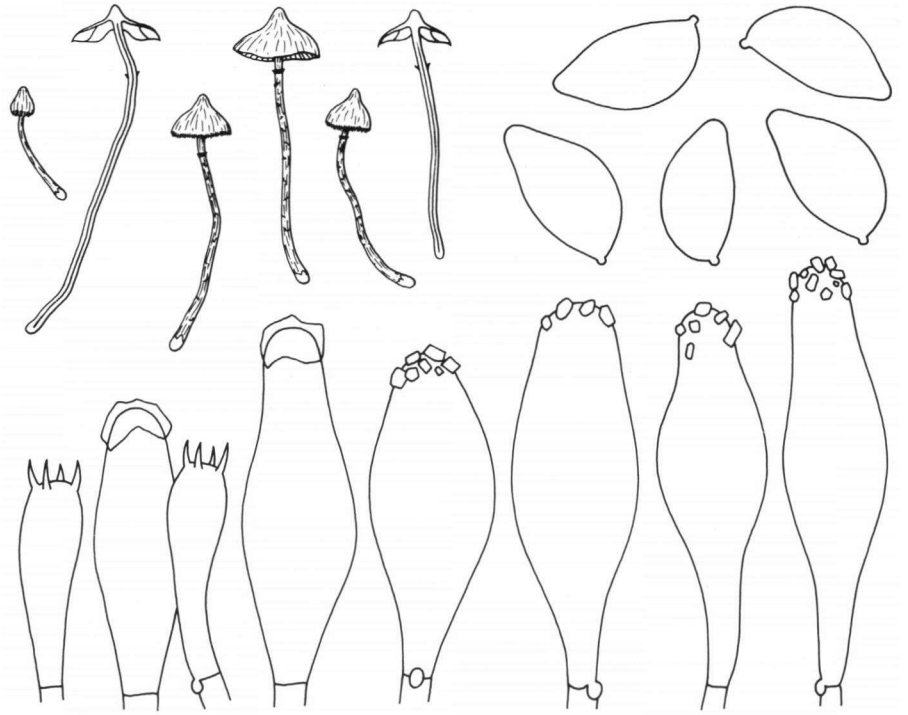

Fig. 3. *Inocybe conicoalba* Horak (type). — Carpophores, spores, basidia, cheilocystidia, pleurocystidia.

Inocybe ionides Corner & Horak, *spec. nov.*—Fig. 4

Pileo – 40 mm, umbonatoplano, primo violaceo dein fusco, fibrilloso. Lamellis adnexis, lilacinis. Stipite – 50 × – 4 mm, e cylindraceo subclavato, violaceo, glabro. Odore subspermatico. Sporis 7.5–9.5 × 4.5–5 μm, phaseoliformibus, brunneis. Cheilocystidiis clavato-vesiculosis, hyalinis. Ad terram in silvis. Sabah. Typus: ZT 80/175.

Pileus 10–40 mm, convex to plane with conic to umbonate disc; lilac at first turning fuscous with age; smooth at centre, fibrillose towards margin, veil remnants none. Lamellae crowded, adnexed, ventricose; lilac turning pale argillaceous or fawn, edge whitish, fimbriate. Stipe 20–50 × 2–5 mm, base up to 8 mm, cylindric, base clavate; lilac, changing to pale lilac or whitish with age, villous base white; dry, fibrillose, smooth in upper portion, cortina absent. Context lilac. Odour and taste slightly spermatic.

Spores 7.5–9.5 × 4.5–5 μm, phaseoliform, bean-shaped, ovoid in dorsal view, yellow-brown, smooth, membrane thin-walled, germ pore none. Basidia 22–35 × 6–8 μm, 4-spored. Cheilocystidia 25–50 × 9–16 μm, cylindric to clavate, membrane hyaline, thin-walled, crystals absent. Pleuro- and caulocystidia absent. Cuticle a cutis of cylindric hyphae (3–10 μm diam.), yellow (KOH) encrusting and plasmatic pigment present. Clamp connections numerous.

HABITAT.—On soil in forests. Sabah (Mt. Kinabalu).

MATERIAL.—SABAH: Mt. Kinabalu, Mesilau River, 1700 m, 21.IV.1964, *Corner* (ZT 80/175; RSNB 8386, holotype). — Mt. Kinabalu, Mesilau River, 1500 m, 4.IV.1964, *Corner* (ZT 80/174).

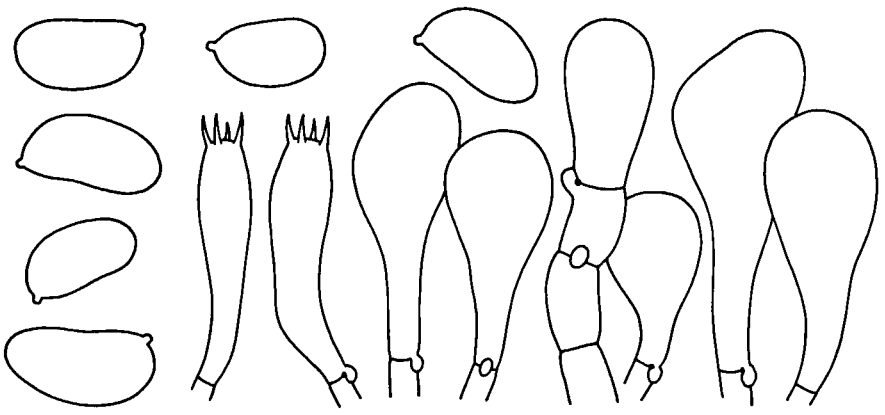

Fig. 4. *Inocybe ionides* Corner & Horak (type). — Spores, basidia, cheilocystidia.

When reading for the first time Prof. Corner's field notes on this lilac *Inocybe*, I never expected that *I. ionides* could belong to those taxa with thin-walled, not encrusted cheilocystidia and absent pleurocystidia ('*Inocybe* leiosporés acystidiés' sensu Kühner & Romagnesi, *1953*). Young carpophores of this species are lilac to violet all over but in aged specimens the colour of the pileus turns to dark brown. *I. ionides* was collected twice in montane forests on the slopes of Mt. Kinabalu, Sabah (Eastern Malaysia) where it probably grows under fagaceous trees.

Inocybe umbrinovirens Horak, *spec. nov.*—Fig. 5

Pileo −35 mm, conicoconvexo vel umbonatoplano, umbrino, grosse squamato. Lamellis adnexis, cinnamomeis vel umbrinis, albofimbriatis. Stipite −100 × −6 mm, cylindraceo, umbrino, basim versus viridi, fibrilloso. Caro viridinigra. Odore gratissimo. Sporis 10–12.5 × 7–8.5 μm, ovoideis, brunneis. Cheilocystidiis cylindraceis. Ad terram in silvis nothofagineis. Nova Guinea. Typus: ZT 72/164.

Pileus 15–35 mm, hemispheric when young soon becoming conico-convex or obtusely umbonate-expanded; cinnamon to umber brown; centre covered with very coarse, often recurved, concolorous scales, conspicuously fibrillose-rimose towards not striate margin, dry, veil remnants absent. Lamellae (L 20–25, −5) crowded, adnexed, subventricose, up to 7 mm wide; cinnamon to umber brown or chocolate brown, white edge fimbriate-dentate. Stipe 40–100 × 4–6 mm, cylindric, equal, slender; upper portion concolorous with pileus, green towards base; dry, strongly fibrillose, hollow, veil remnants none, single in groups. Context cinnamon or pale red-brown in pileus, green-black towards and at base. Odour strong, pleasant, sweet to fruity, in aged specimens changing to unpleasant, like burnt hair. Taste mild.

Spores 10–12.5 × 7–8.5 μm, ovoid, brown, smooth, membrane thin-walled, germ pore none. Basidia 40–50 × 10–13 μm, 4-spored. Cheilocystidia (terminal cells) 20–45 × 5–13 μm, cylindric to subclavate, forming dense seam on edge, membrane hyaline or yellowish (KOH), yellowish encrusting and/or plasmatic pigment present. Pleuro- and caulocystidia absent. Cuticle a cutis or trichoderm of cylindric hyphae (3–7 μm diam.), membrane encrusted with yellow (KOH) pigment, but yellow plasmatic pigment also represented. Clamp connections numerous.

HABITAT.—On soil in forests under *Nothofagus* (*N. carrii, N. grandis*). Papua New Guinea.

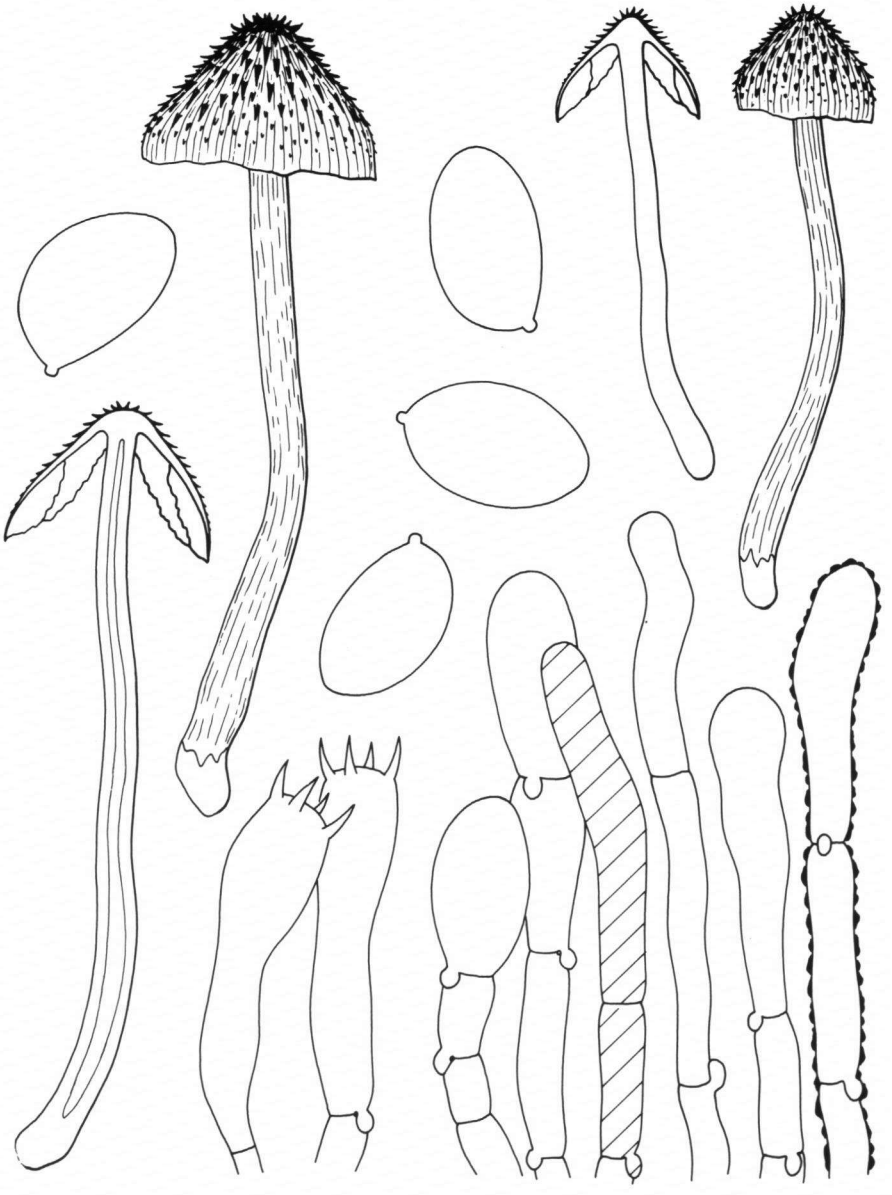

Fig. 5. *Inocybe umbrinovirens* Horak (type). — Carpophores, spores, basidia, cheilocystidia.

MATERIAL.—PAPUA NEW GUINEA: Morobe district, Wau, Mt. Kaindi, 2300 m, 1.III.1972, *Horak* (ZT 72/164, holotype).

The green to black-green colour at the base of the stipe is indicative for this conspicuous Papua New Guinean *Inocybe* which fructifies in montane rain forest under *Nothofagus* spp. Thus *I. umbrinovirens* is immediately recognized as a close ally of both *I. calamistrata* (Fr.)—a common agaric in the northern hemisphere—and *I. calamistratoides* Horak (*1977*) which occurs in association of New Zealand representatives of *Nothofagus* spp. The three taxa, however, are well separated by their distinct microscopical characters.

Inocybe fuscospinulosa Corner & Horak, *spec. nov.*—Fig. 6

Pileo −20 mm, e convexo campanulato, umbrino vel fusco, conspicue spinuloso. Lamellis adnexis, tabacinis. Stipite −45 × −2.5 mm, cylindraceo, pileo concolori vel rubrobrunneo, squamulis recurvatis concoloribus instructo, velo nullo. Caro rufescente. Odore nullo. Sporis 6.5–8 × 4–5 μm, ovatis, brunneis. Cheilocystidiis haud metuloideis, e cylindraceo subfusoideis, hyalinis. Ad terram in silvis fagineis. Indonesia. Typus: ZT 77/205.

Pileus 10–20 mm, convex becoming obtusely umbonate-expanded or campanulate; date brown, umber brown, or fuscous; densely covered with conspicuous (up to 1.5 mm high), spiny, erect squamules; margin not striate, without veil remnants. Lamellae (L 16–20, −7) rather crowded, adnexed, ventricose; umber brown to tobacco brown, lilac tints absent, fimbriate edge paler. Stipe 30–45 × 1.5–2.5 mm, cylindric, equal, slender; concolorous or paler, often with red-brown tinge; fibrillose, here and there with small, fibrillose, occasionally scaly, brown squamules; dry, solid, veil remnants absent, single in groups. Context brown in pileus, reddish brown in stipe, slightly reddening upon exposure or bruising, any green colours absent. Odour and taste not distinctive.

Spores 6.5–8 × 4–5 μm, ovoid, smooth, brown, membrane thin-walled, germ pore absent. Basidia 25–35 × 6–7 μm, 4-spored. Cheilocystidia 25–50 × 5–7 μm, cylindric to subfusoid, membrane thin-walled, hyaline, crystals absent. Pleuro- and caulocystidia none. Cuticle a trichoderm of bundled, cylindric hyphae (5–12 μm diam.), terminal cells often fusoid, encrusted with brown (KOH) pigment. Clamp connections present.

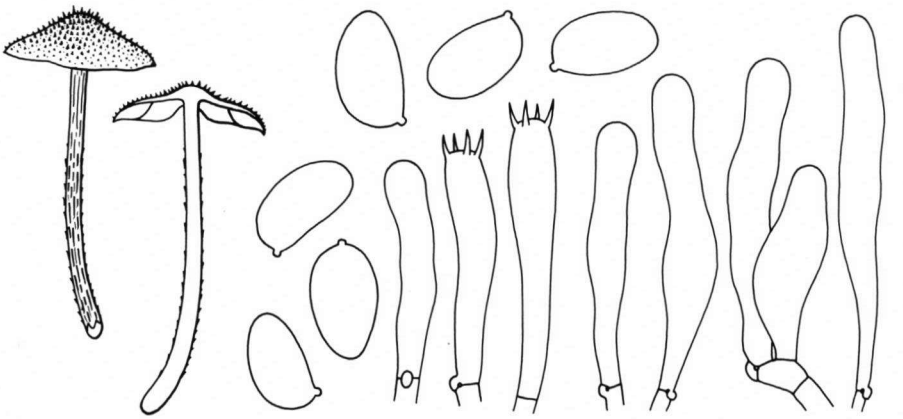

Fig. 6. *Inocybe fuscospinulosa* Corner & Horak (type). — Carpophores, spores, basidia, cheilocystidia.

HABITAT.—On soil in forests dominated by *Castanopsis* spp. and *Lithocarpus* spp. (Fagaceae) Indonesia.

MATERIAL.—INDONESIA: Java, Tjibodas, 1650 m, 16.III.1977, *Horak* (ZT 77/205, holotype); Tjibodas, 1800 m, 11.IV.1972, *Corner* (ZT 79/188; *J–4*).

The context of this brown species with hispid pileus reddens on exposure, and in combination with thin-walled and not encrusted cheilocystidia it is obviously related to *I. cervicolor* (Pers. ex Pers.) Quél. This Javanese species, however, is distinct from other members of sect. *Cervicolores* by its small spores and cheilocystidia of exceptional small size.

INOCYBE LATERICIA Horak—Fig. 7

Inocybe latericia Horak *in* N.Z. J. Bot. **15**: 716. 1977.

The specimens collected in Papua New Guinea (under *Castanopsis acuminatissima* and *Lithocarpus* spp.) agree in all details with the type from New Zealand which grows there in association with *Nothofagus* spp. (Horak, l.c.).

HABITAT.—On soil in forests (associated with Fagaceae). New Zealand (type), Papua New Guinea.

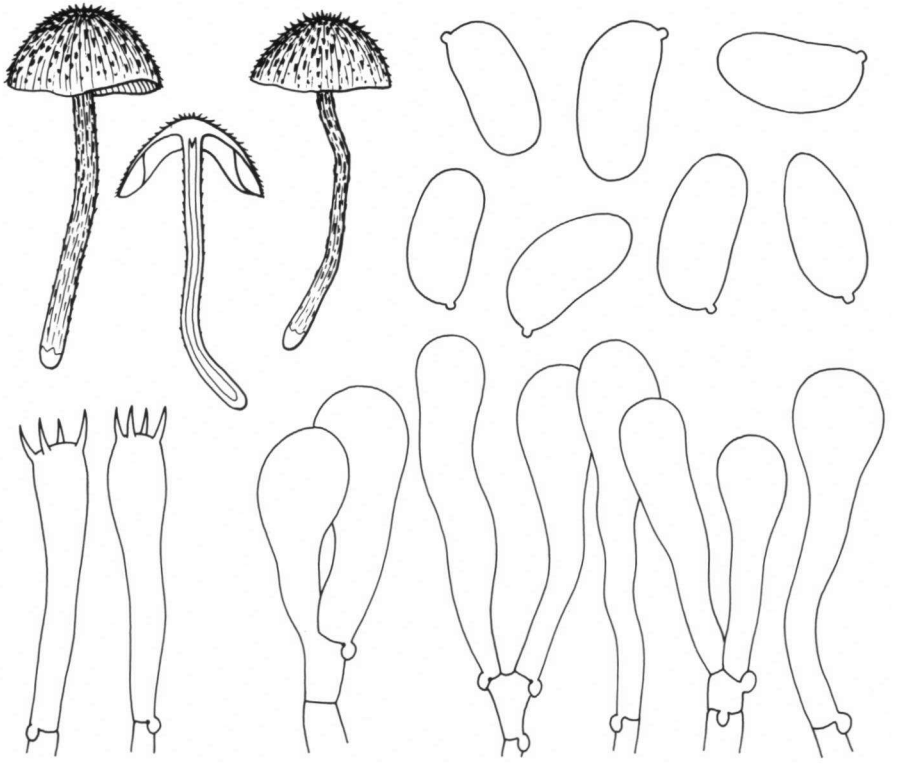

Fig. 7. *Inocybe latericia* Horak (ZT 73/162). — Carpophores, spores, basidia, cheilocystidia.

MATERIAL.—PAPUA NEW GUINEA: Morobe district, Bulolo, Manki, 1300 m, 29.III.1973, *Horak* (ZT 73/129); Bulolo, Manki, 1250 m, 12.IV.1973, *Horak* (ZT 73/162).

The reddening context is the most obvious macroscopic character of this *Inocybe* which also belongs to sect. *Cervicolores*. The base of the stipe becomes also reddish to red-brown in aged specimens. The type collection from New Zealand (under *Nothofagus* spp.; Horak, *1977*) agrees in all essential details with the material gathered in Papua New Guinea (under *Castanopsis* and *Lithocarpus*).

INOCYBE CUTIFRACTA Petch—Fig. 8

Inocybe cutifracta Petch *in* Ann. R. bot. Gdns Peradeniya **6**: 201. 1917.

The type material is in rather bad condition. Nothing can be added to the macroscopic characters (cp. Petch, l.c.).

Spores 8.5–11.5 × 5–5.5 μm, ellipsoid, rarely slightly phaseoliform, brown, smooth, membrane thin-walled, germ pore absent. Basidia not recovered. Cheilocystidia 45–70 × 13–20 μm, clavate, hyaline, membrane thin-walled, crystals none. Pleuro- and caulocystidia absent. Cuticle not recovered. Clamp connections present.

HABITAT.—Not reported.

MATERIAL.—SRI LANKA: Peradeniya, 15.X.1914, *Petch 4176* (K, holotype).

In the original diagnosis *I. cutifracta* Petch is described as an agaric with red-brown, sulcate pileus of about 30 mm in diameter. The stipe (−40 × −3 mm) is densely covered by white fibrils. These macroscopic data indicate that this Ceylonese species of *Inocybe* must be a close relative of the polymorphic *I. fastigiata* (Schaeff. ex Fr.) Quél. This opinion was confirmed by the

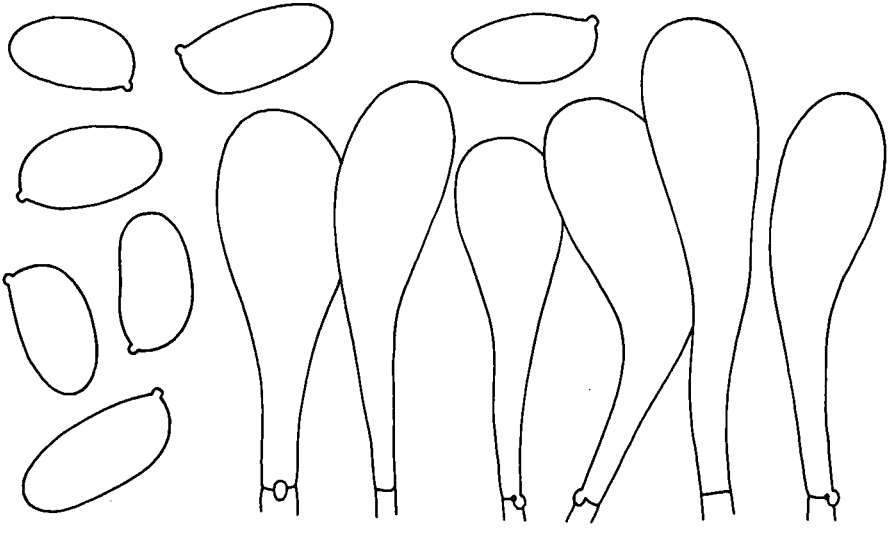

Fig. 8. *Inocybe cutifracta* Petch (type). — Spores, cheilocystidia.

microscopic examination of the fragmentary type material. Van Overeem (*1927*) reports *I. cutifracta* from Indonesia (Java) but this identification remains doubtful since no voucher specimens could be located in BO. Systematically *I. cutifracta* is closely allied to *I. umbrina* Massee. The area of the hitherto known distribution of the latter agaric stretches from Singapore eastwards to the Solomon Isl. It is likely that v. Overeem rather collected the similar *I. umbrina* than the actual *I. cutifracta*.

INOCYBE UMBRINA Massee—Fig. 9

Inocybe umbrina Massee *in* Kew Bull. 1914: 74. 1914; non *Inocybe umbrina* Bresadola, Fung. trident. **1**: 50, tab. 55. 1884 (basionym).[1]

Pileus 20–50(–100) mm, conico-convex becoming expanded-umbonate; at first fawn, pale yellow or ochre, covered with thin coat of white to grey, appressed fibrils (of veil), disc turning ochre-brown, hazel brown, or umber with age; strongly rimose to splitting towards sinuous margin (especially in aged carpophores) but umbo remaining smooth to innately fibrillose; dry, any persistent veil remnants on margin absent. Lamellae (L 18–40, –7) very crowded, narrow; adnexed to nearly free; at first whitish to pale grey-brown becoming cinnamon to brown, edge albo-fimbriate. Stipe –70(–110) × –6(–12) mm, cylindric, equal, occasionally attenuated towards base, often twisted; white or pale yellow, becoming brownish or concolorous with pileus in aged carpophores; dry, strongly fibrillose, apex subpruinose, sometimes with inconspicuous, appressed, fibrillose remnants of white veil, solid, tough, single or cespitose, in groups. Context white to dirty yellowish, firm. Odour strong, unpleasant, reminding of burnt horn.

Spores 6–9 × 4–6 μm, ovoid to subelliptic, brown, smooth, membrane thin-walled, germ pore none. Basidia 20–28 × 7–9 μm, 4- spored. Cheilocystidia 25–70 × 11–20 μm, clavate to vesiculose, membrane hyaline, thin-walled, sometimes with yellow-brown, plasmatic or encrusting pigment. Pleurocystidia none. Caulocystidia like cheilocystidia, scattered. Cuticle a cutis of repent, bundled, cylindric hyphae (4–10 μm diam.), encrusted with brown pigment. Clamp connections numerous.

HABITAT.—On soil in low-land and mountain forest (under *Castanopsis* and *Lithocarpus* in Papua New Guinea). Singapore (type), Malaysia, Sabah, Papua New Guinea, Solomon Isl.

MATERIAL.—SINGAPORE: Singapore, Havelock Road, 21.XI.1913, *Burkill 250* (K, holotype); Botanic Gardens, 29.III.1930, *Corner* (ZT 80/172); Reservoir Jungle, 2.IV.1941, *Corner* (no material preserved). — MALAYSIA: Johore, Sedili River, 3.VIII.1931, *Corner* (ZT 80/173. — SABAH: Mt. Kinabalu, Liwagu River, 1300 m, 29.VIII.1961, *Corner* (ZT 80/167, RSNB 2554); Mt. Kinabalu, Bembangan River, 1700 m, 21.II.1964, *Corner* (ZT 80/171, RSNB 5404); Mt. Kinabalu, Mesilau River, 1500 m, 2.V.1964, *Corner* (ZT 80/168, RSNB 8535 A); same locality, 1700 m, 4.V.1964, *Corner* (ZT 80/169, RSNB 8535 B); same locality, 1700 m, 17.IV.1964, *Corner* (ZT 80/166, RSNB 8321). — PAPUA NEW GUINEA: Morobe district, Lae, Botanic Garden, 25.IX.1960, *Corner* (ZT 79/186); Bulolo, Heads Hump, 1100 m, 18.X.1971, *Horak* (ZT 71/146); same locality, 18.X.1971, *Horak* (ZT 71/147); Madang, 3.X.1969, *Shepherd 406* (CANB 227265). — SOLOMON ISLANDS: Guadalcanal, Tsuva, 7.XI.1965, *Corner* (ZT 880/165, RSS 1744).

Among the species dealt with in this paper *Inocybe umbrina* Mass. has the most wide-spread area of distribution of all. This agaric enters ecto-mycorrhiza with fagaceous trees (predominantely *Castanopsis* and *Lithocarpus*) and to date it is reported both form Indomalaya (Singapore, Malaysia, Sabah) and Australasia (Papua New Guinea, Solomon Isl.). As pointed

[1] For Bresadola's fungus the new combination **Astrosporina umbrina** (Bres.) Horak is proposed.

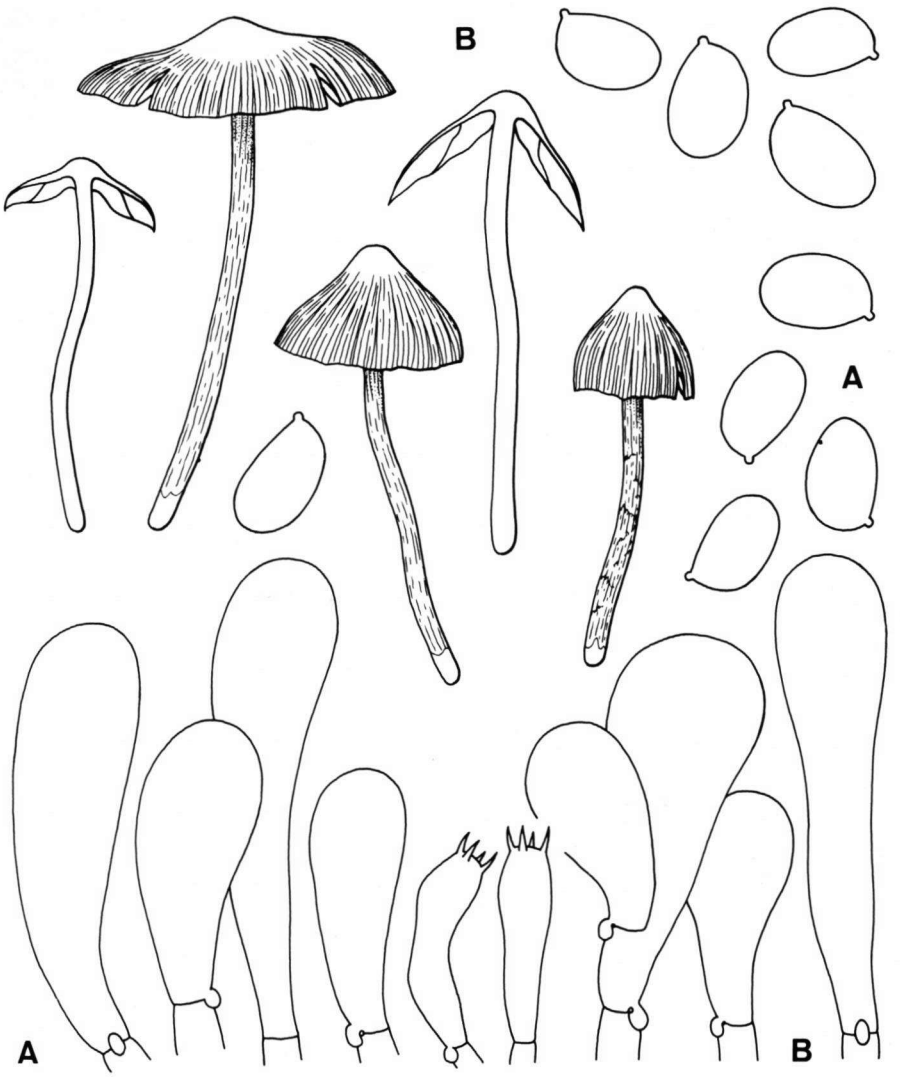

Fig. 9. *Inocybe umbrina* Mass. — A. (type) Spores, cheilocystidia, basidia. — B. (ZT 71/147) Carpophores, spores, cheilocystidia.

out above *I. cutifracta* Petch sensu v. Overeem (*1927*) is probably conspecific with *I. umbrina* adding thus another record (Java) within the present limits of its distribution.

Habit, size, and colour of *I. umbrina* are very similar of those of *Astrosporina angustifolia* Corn. & Horak (Horak, *1979*). In addition the two species occur in Papua New Guinea, Sabah, and Java together in the same biotop, so that microscopic examination is required to separate these closely resembling agarics.

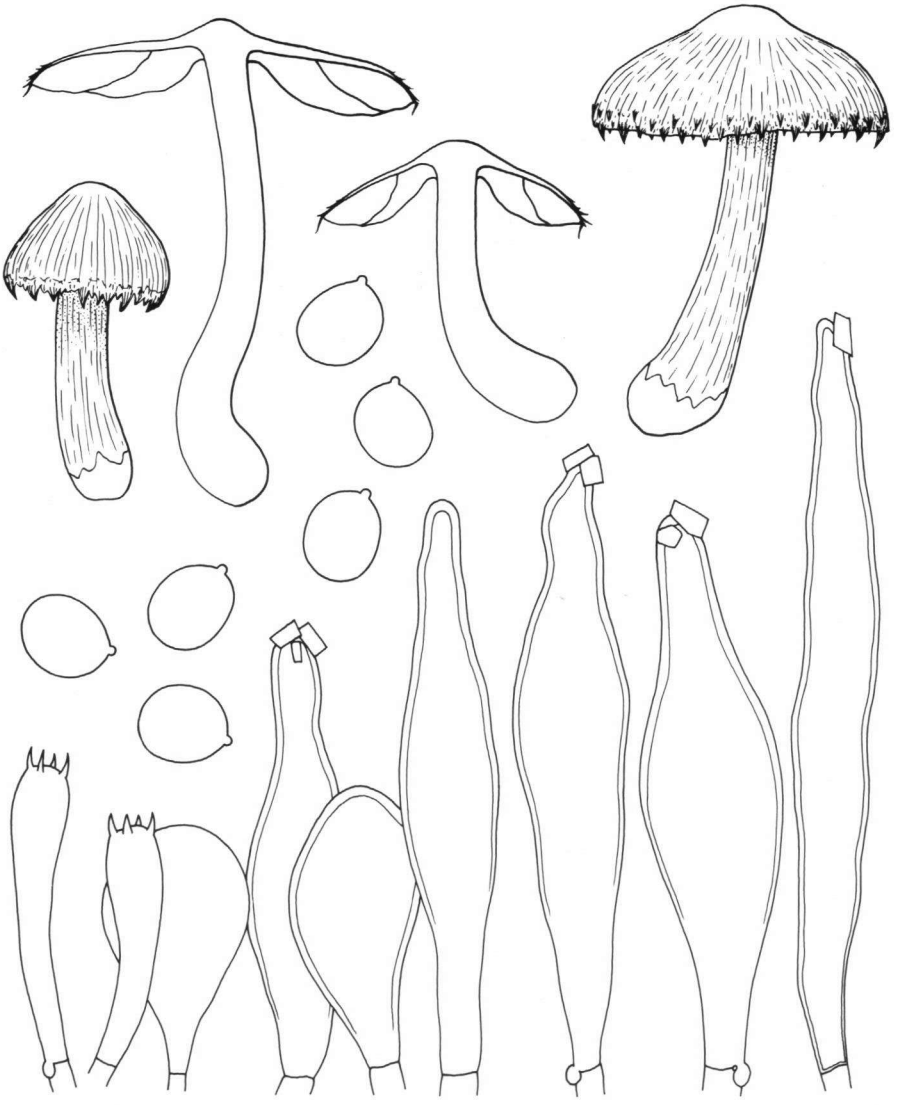

Fig. 10. *Inocybe sphaerospora* Kobayasi (ZT 72/333). — Carpophores, spores, basidia, cheilocystidia pleurocystidia.

INOCYBE SPHAEROSPORA Y. Kobay.—Fig. 10

Inocybe sphaerospora Y. Kobayasi *in* Nagaoa **2:** 80. 1952.

Pileus 20–50 mm, convex at first becoming obtusely umbonate or campanulate finally expanded and plane; straw yellow, yellow, or pale ochre, pale ochre-brown over disc; innately fibrillose, rimose or splitting towards margin, with concolorous, subpersistent, fibrillose patches

of veil along margin, dry. Lamellae (L 18–26, −5) crowded, adnexed to emarginate-adnate, ventricose, up to 8 mm wide; pale yellow to sulphur yellow when young turning pale yellow-brown, edge paler, fimbriate. Stipe 35–60 × 4–8 mm, cylindric to subclavate, base up to 13 mm diam., rather stout; straw yellow, orange towards base; dry, pruinose at apex, silky to fibrillose towards base, cortina absent, solid, single in groups. Context yellow, orange in cortex of stipe. Odour and taste not distinctive.

Spores 5.5–6.5 × 5–5.5 μm, globose to subglobose or ovoid, brown, smooth, membrane thin-walled. Basidia 27–40 × 7–8 μm, 4-spored. Cheilo- and pleurocystidia 40–95 × 15–20 μm, fusoid, often with long neck, membrane metuloid (up to 2 μm diam.), pale yellow-brown (KOH), encrusted with crystals, cystidia on the gill edge proper occasionally clavate to vesiculose. Caulocystidia absent, or not distinctive. Cuticle a cutis of cylindric hyphae (3–8 μm diam.), encrusted with yellowish (KOH) pigment. Clamp connections present.

HABITAT.—On soil in forests, under *Castanopsis* and/or *Lithocarpus* (Fagaceae) and *Aisoptera* (Dipterocarpaceae) in Papua New Guina. Japan (type), Singapore, Papua New Guinea.

ILLUSTRATION.—Kobayasi (*1952*: 81).

MATERIAL.—PAPUA NEW GUINEA: Morobe district, Bulolo, Manki, 1400 m, 28.III.1972, *Horak* (ZT 72/333); Markham Valley, Oomsis (W. of Lae), 100 m, 19.VII.1972, *Horak* (ZT 72/533). — SINGAPORE: Botanic Gardens, 17.I.1930, *Corner* (ZT 80/176).

The preceding description is based on specimens from Papua New Guinea. The material from Papua New Guinea and Singapore corresponds in all essential features with the type from Japan (Kobayasi, l.c.; Hongo, *1956*: 28).

Inocybe cingulata Horak, *spec. nov.*—Fig. 11

Pileo −20 mm, e conico campanulato, argillaceo vel avellano, fibrilloso dein subrimoso, saepe e velo albo marginem versus obtecto. Lamellis adnexis vel adnatis, argillaceis dein tabacinis. Stipite −50 × −2 mm, cylindraceo interdum subclavato, pileo concolori, cortina alba persistenter cingulato, infra fibrillis albis dense instructo. Odore ingrato. Sporis 7.5–9.5 × 4.5–5.5 μm, amygdaliformibus, brunneis. Cystidiis fusoideis, metuloideis, incrustatis. Ad terram in silvis fagineis. Nova Guinea. Typus: ZT 72/343.

Pileus 5–20 mm, conico-convex when young becoming campanulate or umbonate-expanded; pale brown to (hazel)brown, in aged specimens with pale ochre-brown tinge at disc; innately fibrillose, subrimose towards not striate margin, centre occasionally subsquamulose in aged carpophores, margin covered with white fibrils from the veil (sometimes with white, subpersistent, attached patches), dry. Lamellae (L 12–20, −5) crowded, adnexed to adnate, ventricose; greyish, pale argillaceous or cinnamon becoming (tobacco)brown, fimbriate edge white. Stipe 25–50 × 1.5–2 mm, cylindric, base sometimes swollen, slender; white or concolorous with pileus, base often white; dry, with persistent, white, fibrillose ring from cortina, below with conspicuous white, longitudinal, coarse fibrils from the veil; fistulose, single and cespitose, in groups. Context pale brown beneath cuticle of pileus, white in stipe. Odour and taste spermatic, occasionally with fruity or sourish component.

Spores 7.5–9.5 × 4.5–5.5 μm, amygdaliform, distinctly mucronate, in dorsal view often sublimoniform, smooth, brown, membrane thin-walled, germ pore absent. Basidia 20–28 × 7–8 μm, 4-spored. Cheilo-, pleuro- and (scattered) caulocystidia 35–70 × 11–18 μm, fusoid, metuloid (membrane up to 1.5 μm diam.), hyaline to pale brown, apex encrusted with crystals or capped with resinous remnants. Cuticle a cutis of cylindric hyphae (3–8 μm diam.), encrusted with brown (KOH) pigment. Clamp connections present.

HABITAT.—On soil in forests under *Castanopsis acuminatissima* and/or *Lithocarpus* spp (Fagaceae). Papua New Guinea.

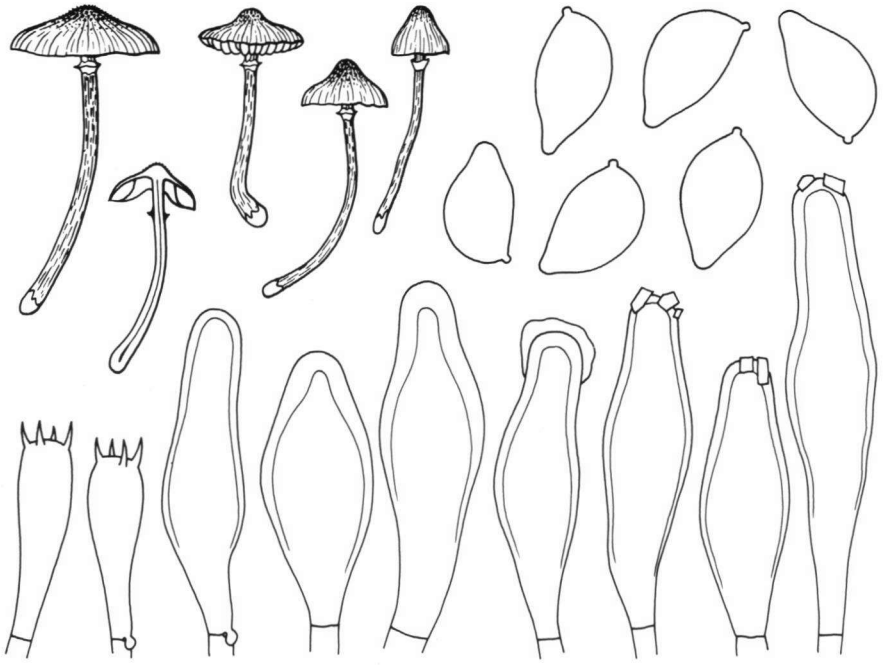

Fig. 11. *Inocybe cingulata* Horak (type). — Carpophores, spores, basidia, cheilocystidia, pleurocystidia.

MATERIAL.—PAPUA NEW GUINEA: Morobe district, Wau, McAdam Memorial Park, 1300 m, 30.III.1972, *Horak* (ZT 72/343, holotype); Bulolo, Manki, 1400 m, 25.X.1971, *Horak* (ZT 71/210); Bulolo, Manki, 1300 m, 31.I.1973, *Horak* (ZT 73/29); Bulolo, Manki, 1300 m, 16.V.1973, *Horak* (ZT 73/229).

This delicate species is well characterised by the white and persistent cortina at the upper portion of the stipe. Its habit and colour are reminiscent of another Papua New Guinean *Inocybe*, viz. *I. conicoalba*. Both species enter ectotrophic mycorrhiza with *Castanopsis-Lithocarpus* and occur side by side in the same habitats. Therefore, having aged carpophores only, the separation between *I. conicoalba* and *I. cingulata* can be difficult in the field. Microscopically, however, these two species are well defined (see key).

Inocybe procera Horak, *spec. nov.*—Fig. 12

Pileo −25 mm, convexo vel subplano, papilla conica conspicuaque instructo, brunneo, subsquarroso, marginem versus rimoso. Lamellis adnexis, argillaceis. Stipite −45 × −2 mm, cylindraceo, pileo concolori, fibrillis concoloribus obtecto. Odore nullo. Sporis 8.5–10 × 6.5–7 μm, amygdaliformibus vel sublimoniformibus. Ad terram in silvis nothofagineis. Nova Guinea. Typus: ZT 73/75.

Pileus 10–25 mm, convex to expanded, always with conspicuous (up to 6 mm high), conic papilla; pale brown to fuscous; papilla covered with coarse but small, brown scales and squamules, fibrillose-rimose towards not striate margin; dry, veil remnants absent. Lamellae (L

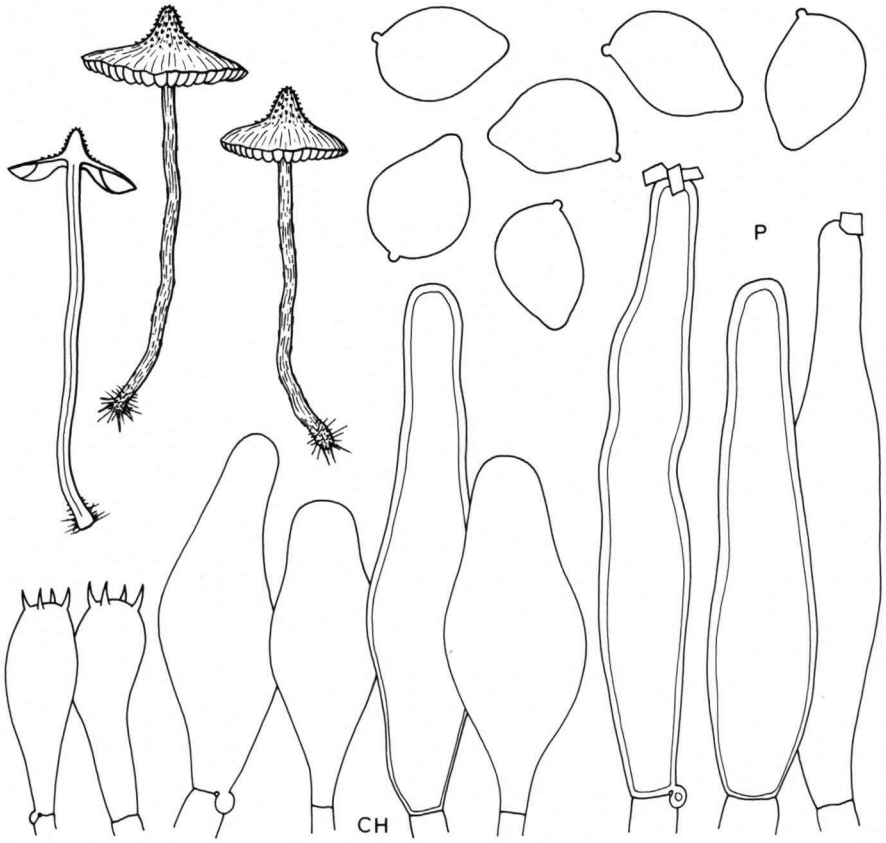

Fig. 12. *Inocybe procera* Horak (type). — Carpophores, spores, basidia, cheilocystidia (CH), pleurocystidia (P).

8–12, – 3) adnexed to emarginate-adnexed, ventricose; cinnamon, argillaceous or pale brown, edge white, fimbriate. Stipe 30–45 × – 2 mm, cylindric, equal, slender; concolorous with pileus; densely covered with coarse, brown fibrils especially towards apex, yellow, strigose hairs at base, cortina remnants absent; dry, fistulose, single in groups. Context brown. Odour and taste not distinctive.

Spores 8.5–10 × 6.5–7 μm, lemon-shaped to amygdaliform, distinctly mucronate, smooth, brown, membrane thin-walled. Basidia 25–30 × 6–7 μm, 4-spored. Cheilo- and pleurocystidia 40–80 × 12–18 μm, cylindric to subfusoid or lageniform, membrane rather thin-walled (up to 1 μm diam.), hyaline, rarely encrusted with crystals. Caulocystidia absent. Cuticle a cutis or trichoderm of bundled, cylindric hyphae (4–8 μm diam.), membrane up to 1 μm diam., encrusted with brown pigment. Clamp connection present on septa.

HABITAT.—On soil in *Nothofagus*-forest (*N. carrii*, *N. grandis*). Papua New Guinea.

MATERIAL.—PAPUA NEW GUINEA: Morobe district, Wau, Mt. Kaindi 2300 m, 18.III.1973, *Horak* (ZT 73/75, holotype).

This species was collected once only in montane rain forests (under *Nothofagus* spp.). It is characterised by several distinct features, viz. prominent, conic and squarrose papilla, yellow strigose hairs at the base of stipe and sublimoniform spores.

Inocybe casuarinae Corner & Horak, *spec. nov.*—Fig. 13

Pileo −40 mm, convexo dein umbonato, ochraceobrunneo, fibrilloso, subsquamuloso ad apicem. Lamellis adnexis, argillaceis. Stipite −80 × −6.5 mm, cylindraceo vel subclavato, cremeo vel subochraceo, apicaliter pruinoso. Odore ingrato. Sporis 6.5–9 × 4–5 μm, ellipsoideo-angulatis, brunneis. Cystidiis metuloideis, fusoideis, incrustatis. In arena sub *Casuarina*. Malaya. Typus: ZT 79/185.

Pileus 15–40 mm, convex becoming campanulate or broadly umbonate and expanded; pale ochraceous, fawn or pale brown; innately fibrillose (especially towards not striate margin), disc smooth in young specimens, becoming subsquamulose with age, dry, veil remnants absent. Lamellae (L 14–21, −5) crowded, adnexed, ventricose; white to pale yellow at first turning fawn or pale brown, white edge fimbriate. Stipe 30–80 × 3–6.5 mm, cylindric or subclavate, stout, firm;

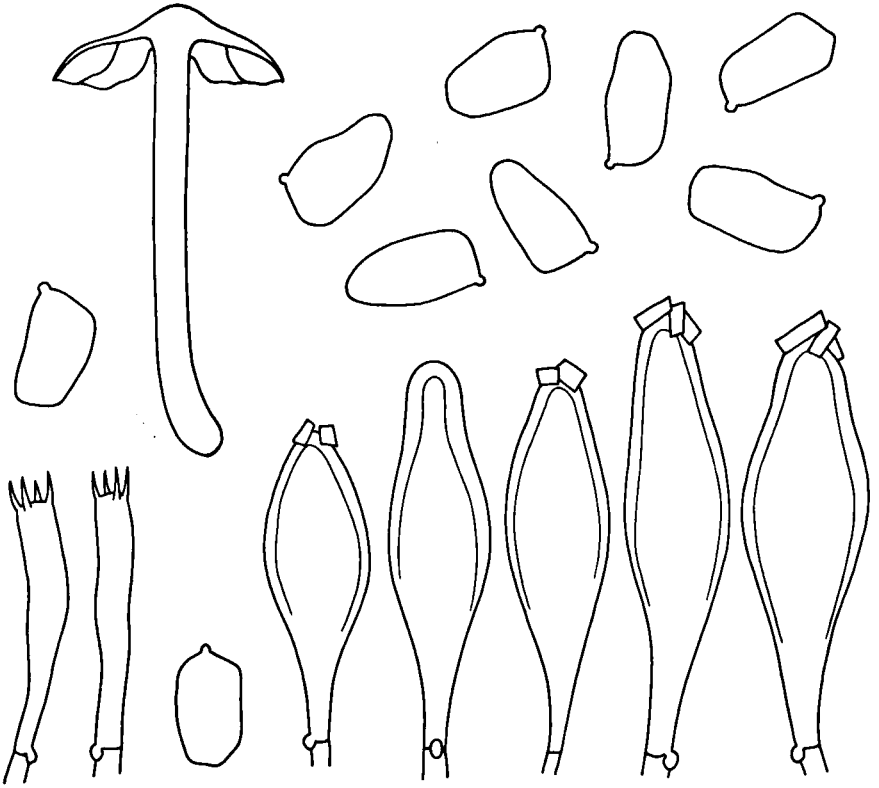

Fig. 13. *Inocybe casuarinae* Corner & Horak (type). — Carpophores, spores, basidia, cheilocystidia pleurocystidia.

cream to pale ochraceous; pruinose or scurfy near apex, glabrous towards base, dry, solid, thin fibrillose veil remnants are recognized in very young specimens only, single or subcespitose, in groups. Context white to pale yellow. Odour and taste unpleasant, spermatic or like corn.

Spores 6.5–9 × 4–5 μm, in profile with few obtuse angles, subnodulose, occasionally ellipsoid, smooth, brown, membrane thin-walled, germ pore none. Basidia 30–35 × 5–6 μm, 4-spored. Cheilo- and pleurocystidia 40–60 × 15–18 μm, fusoid, metuloid (membrane up to 2 μm diam.), yellow-brown plasmatic pigment present, encrusted with crystals. Caulocystidia 40–70 × 10–18 μm, subclavate, to fusoid, mostly thin-walled, yellow-brown (KOH) pigment present, scattered. Cuticle a cutis of cylindric hyphae (3–10 μm diam.), membranes of subcuticular hyphae with yellow-brown (KOH), encrusting pigment. Clamp connections present.

HABITAT.—On sandy soil (along the coast) under *Casuarina equisetifolia* (Casuarinaceae). Malaysia.

MATERIAL.—MALAYSIA: Johore, Jason Bay, Sedili River, 17.VII.1972, *Corner* (ZT 79/185, holotype); same locality, 15.VI.1934, *Corner* (ZT 80/177).

This striking Malaysian species obviously forms ectotrophic mycorrhiza with *Casuarina equisetifolia*. To date it was unknown that members of the Casuarinaceae enter symbiosis with agarics. In addition *I. casuarinae* is particularely distinguished by its subangular spores. Among all species of *Inocybe* hitherto described from the Far East there is only another taxon having similar spores (*I. ammophila* Matsuda & Hongo, *1956*). Both species grow in sandy soils.

Inocybe olorinata Horak, *spec. nov.*—Fig. 14

Pileo −25 mm, ex hemisphaerico campanulato, albo, fibrilloso-rimoso marginem versus. Lamellis adnato-emarginatis, isabellinis. Stipite −50 × −3 mm, cylindraceo, usque ad 5 mm ad basim, subbulboso, albo, apicaliter pruinoso. Caro alba. Odore ingrato. Sporis 7–8.5 × 4–4.5 μm, subamygdaliformibus, brunneis. Cystidiis fusoideis, metuloideis, incrustatis. Ad terram in silvis fagineis. Indonesia. Typus: ZT 77/98.

Pileus 15–25 mm, hemispheric when young becoming obtusely umbonate-expanded or campanulate; white, centre pale yellowish in aged carpophores; dry, disc smooth, fibrillose-rimose towards splitting margin, veil remnants absent. Lamellae (L 20–26, −5(−7)) crowded, adnexed to emarginate-adnate, ventricose; whitish at first becoming pale cinnamon and finally argillaceous-grey, edge paler, even. Stipe 25–50 × 2–3 mm, upper portion cylindric, base subbulbous (up to 5 mm diam.), slender; white; pruinose at apex, smooth towards base, dry, solid, veil remnants none, single in groups. Context white. Odour and taste strongly spermatic.

Spores 7–8.5 × 4–4.5 μm, subamygdaliform, smooth, brown, membrane thin-walled, germ pore none. Basidia 18–25 × 6–7 μm, 4-spored. Cheilo-, pleuro-, and caulocystidia 25–50 × 9–16 μm, fusoid, metuloid (membrane up to 1.5 μm diam.), hyaline, encrusted with crystals. Cuticle a cutis of cylindric hyphae (4–8 μm diam.), membrane not gelatinised, pigment absent. Clamp connections present.

HABITAT.—On soil in forests under *Castanopsis* spp. and *Lithocarpus* spp. (Fagaceae). Indonesia.

MATERIAL.—INDONESIA: Java, Tjibodas, 1650 m, 14.III.1977, *Horak* (ZT 77/98, holotype).

Young carpophores of *Inocybe olorinata* are completely white and remind therefore *I. geophylla* (Sow. ex Fr.) Kummer or one of its close allies (*I. sambucina* (Fr.) Qúel., *I. pudica* Kühn.). The Javanese species of *Inocybe*, however, differs in significantly smaller spores and

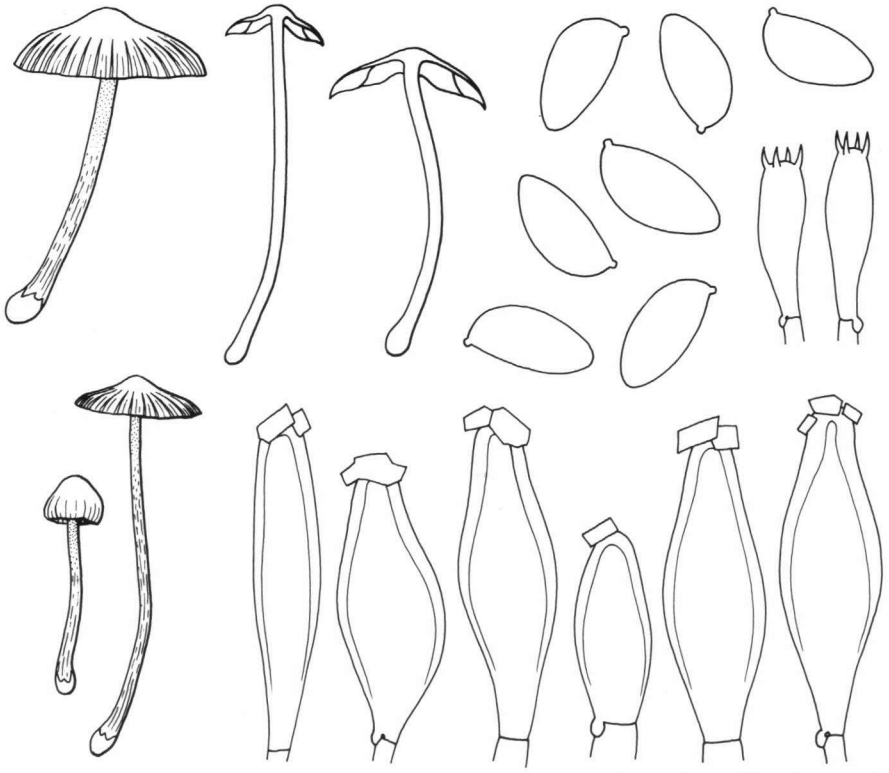

Fig. 14. *Inocybe olorinata* Horak (type). — Carpophores, spores, basidia, cheilocystidia, pleurocystidia.

cystidia. Macroscopically, *I. olorinata* is similar to *Astrosporina alboviscida* Horak (*1979*), firstly described from Papua New Guinea, whose occurrence in Java were feasible.

Inocybe strigiceps Horak, *spec. nov.*—Fig. 15

Pileo – 25 mm, ex hemisphaerico convexo, centro glabro et argillaceo-brunneo, marginem versus crinibus albis strigosissimis persistenter instructo. Lamellis adnexis, ochraceis dein rufo-brunneis. Stipite – 40 × – 2.5 mm, cylindraceo, rufobrunneo, pruinoso. Odore grato. Sporis 6.5–8 × 4–5 μm, amygdaliformibus, brunneis. Cystidiis fusoideis, metuloideis, luteis. Ad terram in silvis nothofagineis. Nova Guinea. Typus: ZT 7½/400.

Pileus 10–25 mm, hemispheric to convex later becoming plane; disc argillaceous to pale brown, smooth, towards margin with conspicuous, white, strigose hairs (up to 3 mm long), exceeding margin even in degraded specimens; dry, margin not striate. Lamellae (L 20–26, – 3) crowded, adnate to adnexed, ventricose; ochre to yellow when young turning pale red-brown with age, edge white, fimbriate. Stipe 30–40 × 2–2.5 mm, cylindric, equal, stiff, slender; red-brown; entirely pruinose, veil remnants none; dry, fistulose, often with strigose, white hairs at base, single in groups. Context red-brown especially in stipe. Odour and taste pleasant, not spermatic.

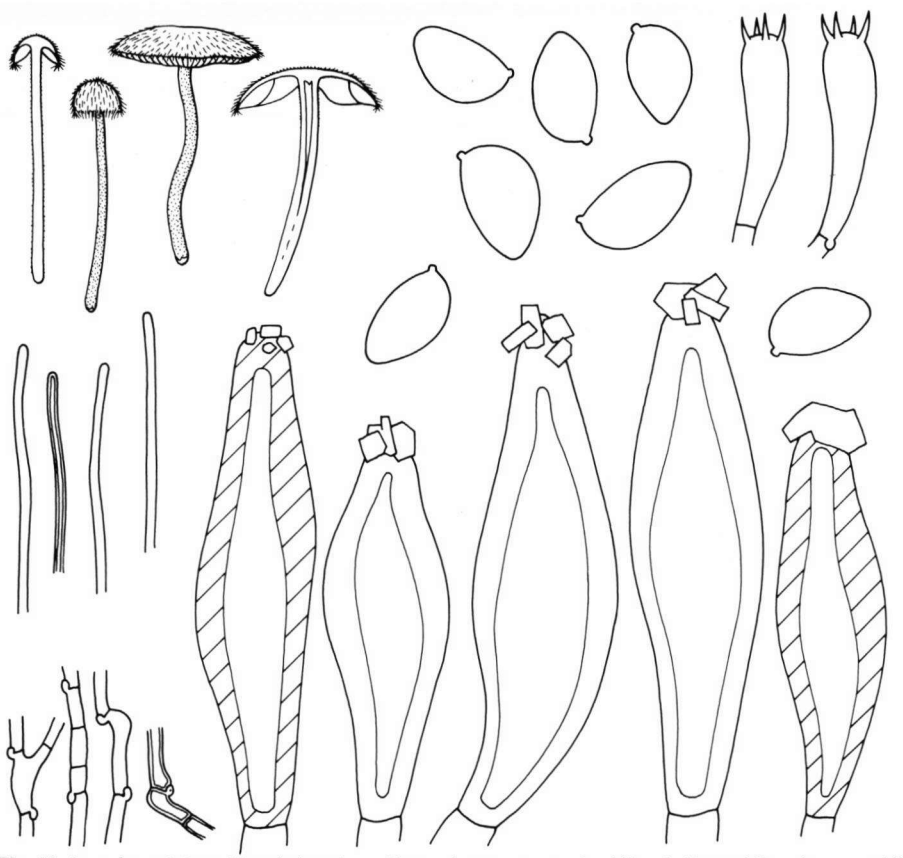

Fig. 15. *Inocybe strigiceps* Horak (type). — Carpophores, spores, basidia, cheilocystidia, pleurocystidia, cuticular hyphae.

Spores 6.5–8 × 4–5 μm, amygdaliform to pip-shaped, smooth, brown, membrane thin-walled, germ pore none. Basidia 24–27 × 5–6 μm, 4-spored. Cheilo-, pleuro-, and caulocystidia 50–90(–100) × 10–20 μm, fusoid, occasionally clavate at gill edge proper, membrane thick-walled (up to 5 μm diam.), yellow (KOH), encrusted with crystals. Cuticle consisting of long, cylindric hyphae (2–4 μm diam.) with slightly thickened membrane, apex obtusely rounded, septa found near base only, pigment absent. Clamp connections present.

HABITAT.—On soil in forests (*Nothofagus*). Papua New Guinea.

MATERIAL.—PAPUA NEW GUINEA: Eastern Highlands, Mt. Michael, Frigano, Hut Track, 2400 m, 8.XII.1971, *Horak* (ZT 71/400, holotype); Mt. Michael, Frigano, Hut Track, 2350 m, 31.XII.1971, *Horak* (ZT 71/480).

The comparison with *A. pusillima* Corn. & Horak (*1979*), described from Papua New Guinea and Singapore, demonstrates that this species and *I. strigiceps* are morphologically identical in all features except for the shape of the spores. The latter species seems to have an isolated position within the genus *Inocybe* since no closely related species can be found in the current literature (compare also Stangl & Veselský, *1979*).

Inocybe strigiceps forma **pygmaea** Horak, *f. nov.*—Fig. 16

Differt a typo statura et cystidiis minoribus. Ad terram in silvis fagineis. Nova Guinea. Typus formae: ZT 71/410.

Pileus 7–12 mm, convex to plane and expanded, occasionally with low umbo; pale brown to fuscous, margin with white, persistent, strigose hairs; dry, margin not striate. Lamellae (L 8–16, – 5) crowded, adnate to adnexed; cinnamon turning pale brown with reddish tint, edge white, fimbriate. Stipe 10–15 × 1 mm, cylindric, equal, fragile; reddish brown; pruinose over whole length, base often with white, strigose hairs, veil remnants absent; dry, solid, single in groups. Context pale brown. Odour and taste pleasant, fruity.

Spores 7–9 × 4.5–5 μm, amygdaliform to pip-shaped, smooth, brown, membrane thin-walled, occasionally with indistinct callus. Basidia 21–28 × 6–7 μm, 4-spored. Cheilo-, pleuro-, and caulocystidia 30–50(–60) × 12–18(–25) μm, fusoid, metuloid (membranes up to 3 μm diam.), yellow (KOH), encrusted with crystals. Cuticle composed of long, cylindric, hyaline, mostly thin-walled hyphae (3–4 μm diam.), membrane not gelatinised. Clamp connections present.

HABITAT.—On soil under *Nothofagus* spp. and *Lithocarpus* spp., rarely also on rotten wood. Papua New Guinea.

MATERIAL.—PAPUA NEW GUINEA: Eastern Highlands, Mt. Michael, Frigano, Okapa Track, 2400 m, 9.XII.1971, *Horak* (ZT 71/410, holotype of form); Mt. Michael, Frigano, Hut Track, 2350 m, 31.XII.1971, *Horak* (ZT 71/477); Northern district, Mt. Lamington, near Kaudata, 13.IV.1972, *Horak* (ZT 72/382; under *Lithocarpus* spp.).

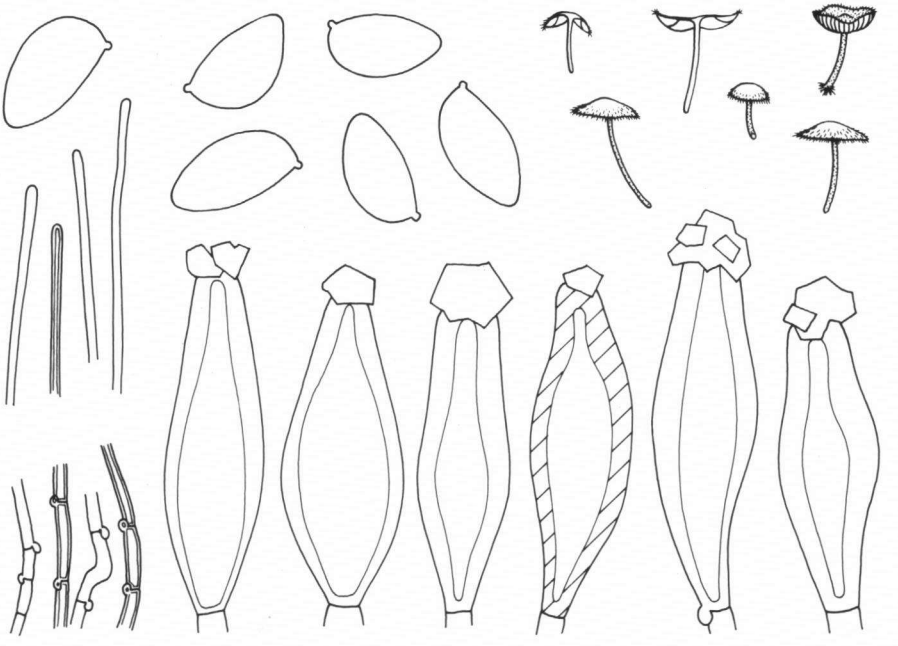

Fig. 16. *Inocybe strigiceps* Horak f. *pygmaea* Horak (type). — Carpophores, spores, cheilocystidia, pleurocystidia, cuticular hyphae.

INOCYBE SUBGEOPHYLLA Hennings apud Warburg—Fig. 17

Inocybe subgeophylla Hennings apud Warburg *in* Monsunia **1**: 154. 1900.

Pileus 15–30 mm, convex to expanded, always with distinct, conic or obtuse umbo at disc; pale red-brown, chestnut brown, or hazel brown; umbo smooth when young becoming squamulose-squarrose, fibrillose to rimose towards the not striate but (with age often) splitting margin; dry, veil remnants none. Lamellae (L 14–18, −5), crowded, adnexed, rather narrow (up to 3 mm wide); grey to argillaceous-grey or cinnamon, edge concolorous or white, fimbriate. Stipe 25–45 × 1.5–3 mm, cylindric, terete, equal or with subbulbous base; pale brown, cinnamon or pale red-brown, occasionally with faint lilac tint at pruinose apex, towards base covered with appressed, white fibrils, distinct cortina absent; solid, fistulose with age, dry, single or cespitose in groups. Context white in pileus, pale brown in stipe. Odour and taste spermatic.

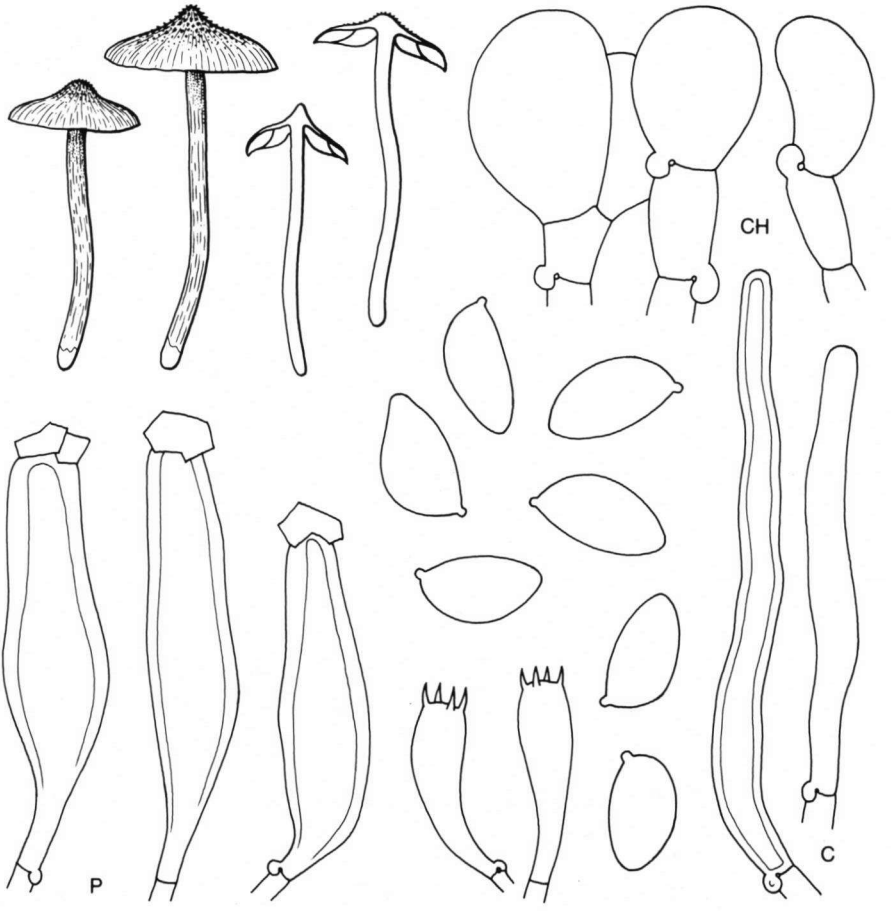

Fig. 17. *Inocybe subgeophylla* P. Henn. (ZT 77/189). — Carpophores, spores, basidia, cheilocystidia (CH), pleurocystidia (P), caulocystidia (C).

Spores 7.5–9 × 4–5 μm, amygdaliform, smooth, brown, membrane thin-walled. Basidia 20–26 × 6–7 μm, 4-spored. Cheilocystidia 35–60 × 10–15 μm, clavate, hyaline, thin-walled, scattered on gill edge. Pleurocystidia 45–70 × 10–18 μm, fusoid, metuloid (membrane up to 2.5 μm diam.), hyaline, encrusted with crystals. Caulocystidia not differentiated. Cuticle a cutis of cylindric hyphae (4–10 μm diam.), membrane occasionally thickend, smooth or encrusted with brown (KOH) pigment. Clamp connections present.

HABITAT.—On soil in forests under *Castanopsis* spp. and *Lithocarpus* spp. Indonesia (Java).

MATERIAL.—INDONESIA: Java, Tjibodas, 1500 m, 14.III.1977, *Horak* (ZT 77/189); Tjibodas, 1600 m, 16.III.1977, *Horak* (ZT 77/201); Tjibodas, VII.1898, *Fleischer* (B, holotype, material lost).

This redescription of *I. subgeophylla* is based upon fresh topotypical material from Java (Indonesia). In the original diagnosis all distinctive characters are well described by Hennings (*1900*) so that this *Inocybe* is readily recognized, although the specific epithet '*subgeophylla*' is misleading. In fact this name would much better apply to the white-coloured Javanese *Inocybe olorinata* Horak (see above) which also occurs in the same habitat (*Castanopsis-Lithocarpus* forests).

INOCYBE AUSTRALIENSIS Cleland & Cheel—Fig. 18A, B, C

Inocybe australiensis Cleland & Cheel *in* Trans. R. Soc. S. Australia **42:** 109. 1918.
Inocybe serrata Cleland *in* Trans. R. Soc. S. Australia **57:** 192. 1933.
Inocybe granulosipes Cleland *in* Trans. R. Soc. S. Australia **57:** 192. 1933.

Nothing can be added to the macroscopic description (cp. Cleland & Cheel, *1918*: l.c.). Odour unknown.

Spores 6.5–8 × 4.5–5 μm, ovoid to subamygdaliform, pip-shaped, brown, smooth, membrane thin-walled, germ pore none. Basidia 22–28 × 6–7 μm, 4-spored. Cheilo-, pleuro-, and caulocystidia 45–60 × 12–18 μm, fusoid to lageniform, membrane hyaline to pale yellow (KOH), metuloid (up to 2 μm diam.), encrusted with crystals, numerous. Cuticle a cutis or trichoderm of short, cylindric hyphae (8–16 μm diam.), strongly encrusted with brown (KOH) pigment. Clamp connections present.

HABITAT.—Ecology unknown. Australia.

ILLUSTRATION.—Cleland & Cheel, *1918*.

MATERIAL.—AUSTRALIA: New South Wales, Sydney, Neutral Bay, 19.V.1915, *Cleland* (ADW 12707, holotype of *Inocybe australiensis*, in good condition); Sydney, Chatswood, 21.V.1916, *Cleland* (ADW 12709); Sydney, *Cleland* (ADW 12708). South Australia: Mt. Lofty, 7.IV.1917, *Cleland* (ADW 12668, holotype of *I. serrata*); Stirling West, 23.VII.1927, *Cleland*, (ADW 12719, holotype of *I. granulosipes*).

All data observed both on *I. serrata* Clel. and *I. granulosipes* Clel. indicate that these taxa are synonymous to *I. australiensis*. Using European literature *I. australiensis* Clel. keys out near *I. gausapata* Kühn. The Australian species, however, differs from all other taxa in this difficult group (Stangl & Veselsky, *1977*) with *I. flocculosa* Berk. (compare remarks on doubtful species) as its most typical representative.

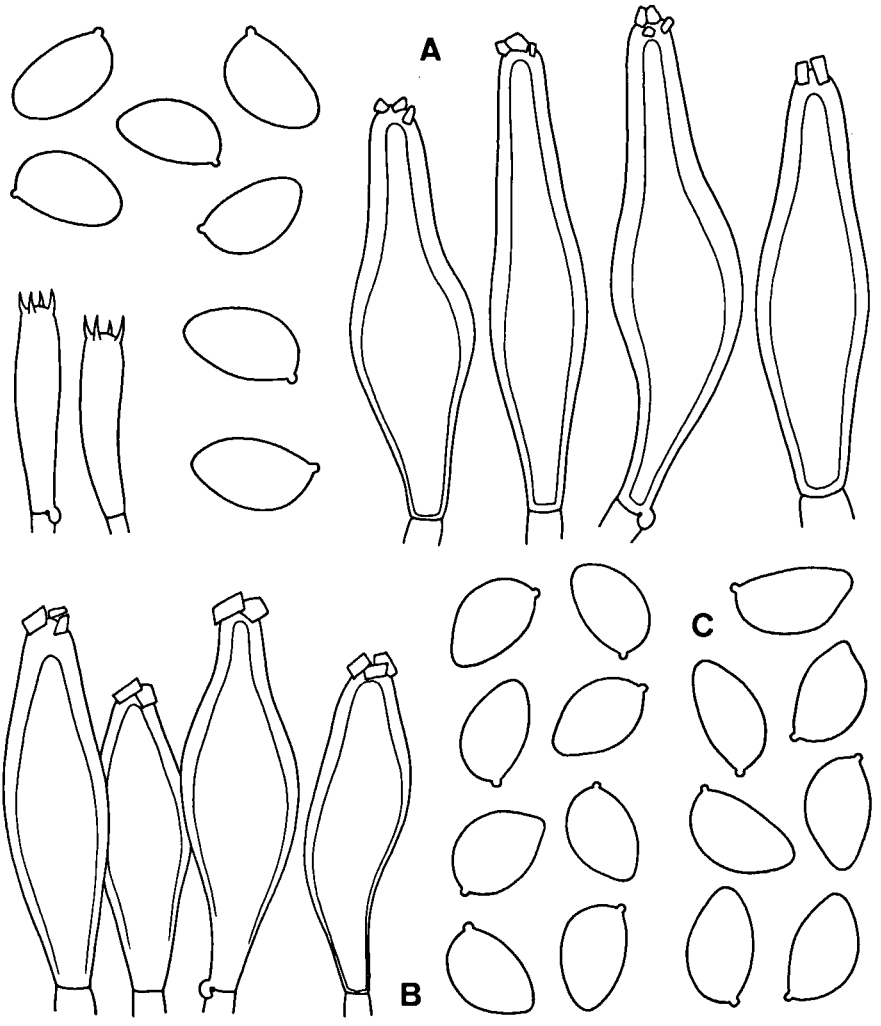

Fig. 18A. *Inocybe australiensis* Clel. & Cheel (type). — Spores, basidia, cheilocystidia, pleurocystidia. — Fig. 18B. *Inocybe serrata* Clel. (type). — Spores, cheilocystidia, pleurocystidia. — Fig. 18C. *Inocybe granulosipes* Clel. (type). — Spores.

Inocybe multicingulata Horak, *spec. nov.*—Fig. 19

Pileo −12 mm, conico vel campanulato, umbrino, squamulis concoloribus erectisque dense obtecto. Lamellis adnexis, ochraceis dein argillaceo-olivaceis. Stipite −25 × −2 mm, cylindraceo, pallide rufo, squamis et zonis albis e velo conspicue instructo. Odore grato. Sporis 6–6.5 × 3.5–4 μm, subamygdaliformibus. Cystidiis metuloideis, luteis, incrustatis. Ad terram in silvis nothofagineis. Nova Guinea. Typus: ZT 71/369.

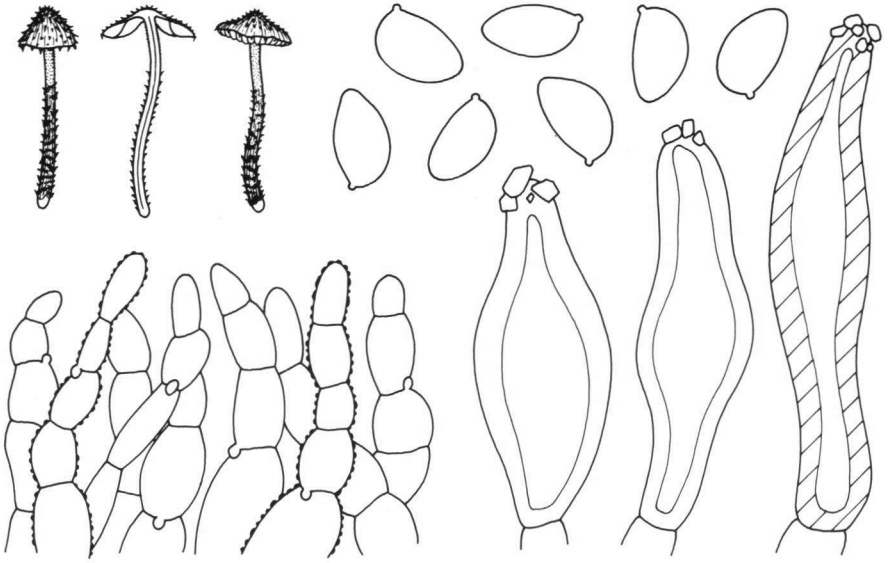

Fig. 19. *Inocybe multicingulata* Horak (type). — Carpophores, spores, cheilocystidia, pleurocystidia, cuticle.

Pileus 6–12 mm, hemispheric or convex becoming umbonate-expanded; dark brown; densely covered with small, erect (pyramidal at disc), concolorous, fibrillose scales, margin rather appressed-fibrillose in aged carpophores, white, triangular, persistent squamules from veil along margin, dry. Lamellae (L 14–20, −3) crowded, adnexed, ventricose; yellow-brown (mustard yellow) turning olive-brown, edge concolorous or white, fimbriate. Stipe 15–25 × 1.5–2 mm, cylindric, equal; pale red-brown, pruinose near apex, towards base with conspicuous, persistent, white, fibrillose zones and squamules from veil, occasionally forming complete girdles around stipe; dry, fistulose with age, single in groups. Context brown in pileus, pale red-brown in stipe. Odour pleasant, like fresh fruit.

Spores 6–6.5 × 3.5–4 μm, subamygdaliform, pip-shaped or ovoid, smooth, brown, membrane thin-walled. Basidia 22–26 × 6 μm, 4-spored. Cheilo-, pleuro-, and caulocystidia 40–70(−90) × 14–18(−20) μm, subfusoid, metuloid (membrane up to 3 μm diam.), yellow (KOH), encrusted with crystals. Cuticle a trichoderm of erect and densely packed chains of short, ovoid cells, membranes encrusted with brownish pigment. Clamp connections present.

HABITAT.—On soil under *Nothofagus* sp. Papua New Guinea.

MATERIAL.—PAPUA NEW GUINEA: Eastern Highlands, Mt. Michael, Frigano, Okapa Track, 2300 m, 5.XII.1971, *Horak* (ZT 71/369, holotype).

Macroscopically this small, dark brown *Inocybe* (associated with *Nothofagus* spp. in the Papua New Guinean highlands) is immediately recognized by the numerous white belts of veil on the stipe. Size, colour, and general habit of *I. multicingulata* resemble those of *I. phaeosquarrosa* Horak (*1979*), a native species in *Nothofagus* forests of New Zealand. Both taxa share also the small-sized spores but are microscopically definitely distinguished concerning the morphology of the cystidia and the structure of the pileocutis.

Inocybe fuscoperonata Corner & Horak, *spec. nov.*—Fig. 20

Pileo −35 mm, e conico convexopapillato, alboluteolo fibrillis fuscis dense obtecto, subviscido, zonis fuscis e velo marginem versus ornato. Lamellis adnexis vel subliberis, pallidis dein argillaceis. Stipite −70 × −3 mm, cylindraceo, tereti, albido, apicaliter pruinoso, basim versus zonis vel fibrillis fuscis agglutinatis e velo dense obtecto. Odore subspermatico. Sporis 7–8.5 × 4.5–5 μm, ovoideis, brunneis. Cheilocystidiis clavatis vel vesiculosis, metuloideis. Pleuro- et caulocystidiis fusoideis, metuloideis, incrustatis. Ad terram in silvis fagineis. Nova Guinea. Typus: ZT 72/75.

Pileus 15–35 mm, distinctly conic when young becoming convex with acute, conic, conspicuous papilla, even in mature specimens with fully expanded pileus; white to pale yellow, densely covered with delicate, fuscous, innate fibrils, subrimose towards not striate margin; viscid when moist, with dark brown, fibrillose, agglutinate, persistent patches and zones (along the margin) from the veil. Lamellae (L 12–18, −3) crowded, subfree to adnexed, ventricose; whitish at first turning pale argillaceous, white edge fimbriate. Stipe 30–70 × 2–3 mm, cylindric, equal or slightly attenuated above, slender; white, pruinose near apex, towards base covered with

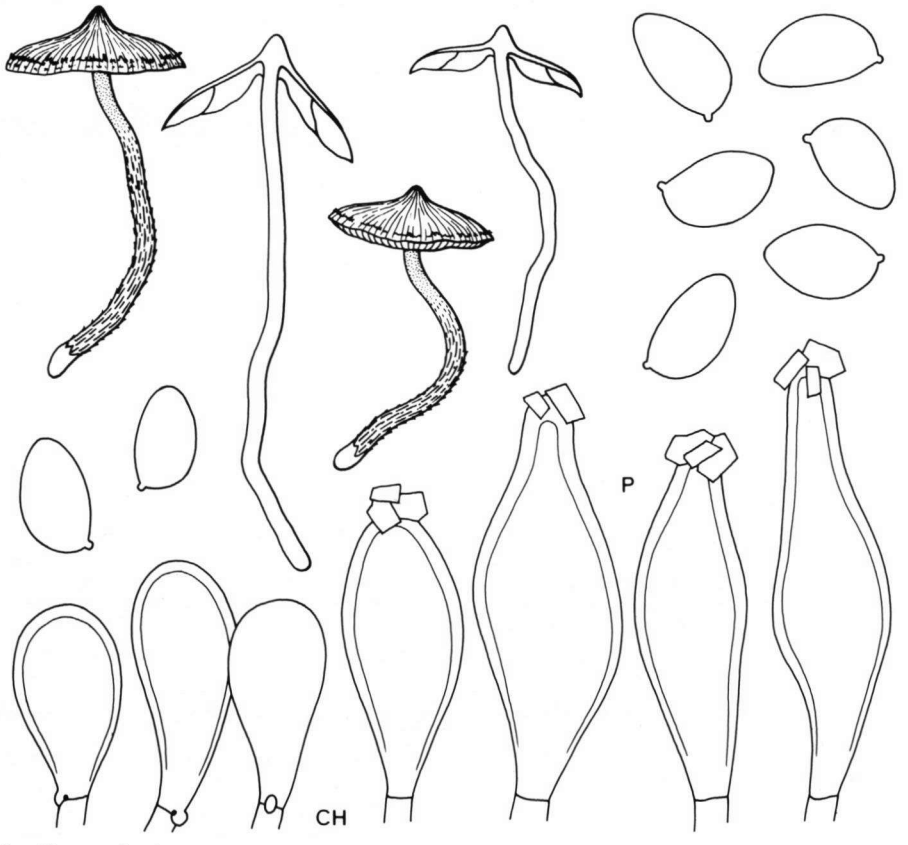

Fig. 20. *Inocybe fuscoperonata* Corner & Horak (type). — Carpophores, spores, cheilocystidia (CH), pleurocystidia (P).

persistent, conspicuous, fuscous, agglutinated (if moist) zones and coarse fibrils from the veil, distinct cortina absent; veil remnants viscid when moist, solid, fistulose with age, single and cespitose in groups. Context pale brown. Odour and taste slightly spermatic.

Spores 7–8.5 × 4.5–5 μm, ovoid (pip-shaped), rarely subamygdaliform, brown, smooth, membrane thin-walled, germ pore none. Basidia 22–27 × 7–8 μm, 4-spored. Cheilocystidia 25–40 × 15–20 μm, clavate to vesiculose, membrane metuloid at apex, hyaline, not encrusted. Pleuro- and caulocystidia 40–70 × 12–20 μm, fusoid, membrane metuloid (up to 2.5 μm diam.), hyaline, encrusted with crystals. Cuticle a cutis of short, cylindric hyphae (3–8 μm diam.), membranes gelatinised, with conspicuous, brown, plasmatic (!) pigment. Clamp connections numerous.

HABITAT.—On soil in montane, fagaceous forests (under *Nothofagus grandis*, *N. carrii*, and *Castanopsis acuminatissima* in Papua New Guinea). Papua New Guinea (type), Sabah.

MATERIAL.—PAPUA NEW GUINEA: Eastern Highlands, Goroka, Mt. Otto, 2300 m, 13.I.1972, *Horak* (ZT 72/75, holotype); Morobe District, Wau, Mt. Kaindi, 2300 m, 4.V.1972, *Horak* (ZT 72/437). – SABAH: Mt. Kinabalu, Bembangan River, 1700 m, 19.VIII.1961, *Corner* (ZT 80/178; RSNB 1876); same locality, 26.II.1964, *Corner* (ZT 80/179; RSNB 5476); same locality, 28.II.1964, *Corner* (ZT 80/180).

The dark brown, fibrillose pileus with conic papilla, the fuscous coarsely fibrillose and gelatinized (if moist) veil remnants on the stipe and the conspicuous, brown plasmatic pigment in the cuticular hyphae are the most distinctive features of this species. In Papua New Guinea *I. fuscoperonata* is found under both *Nothofagus* and *Castanopsis-Lithocarpus*, and it is assumed that the collections from Sabah (Mt. Kinabalu) are also associated with fagaceous trees as hostplants.

Inocybe zonatipes Horak, *spec. nov.*—Fig. 21

Pileo −30 mm, papillato-convexo vel umbonato-explanato, castaneo, minute squamuloso, viscido. Lamellis adnatis, argillaceis. Stipite −40 × −4 mm, cylindraceo, albo-luteolo, basim versus e velo ochraceo-brunneo zonato. Odore subspermatico. Sporis 7.5–8.5 × 4.5–5 μm, subamygdaliformibus. Cystidiis fusoideis, metuloideis, incrustatis. Ad terram in silvis fagineis. Nova Guinea. Typus: ZT 72/378.

Pileus 15–30 mm, convex to expanded with distinct, conic papilla or obtuse umbo; chestnut brown, red-brown with orange tinge; viscid when moist, disc smooth, fibrillose-rimose towards margin, becoming densely covered by minute, concolorous squamules with age, veil remnants none. Lamellae (L 16–25, −3) crowded, adnate to adnexed, ventricose; argillaceous with grey tinge, edge white, fimbriate. Stipe 25–40 × 2–4 mm, cylindric, equal; whitish to pale yellow, pruinose at apex, towards base with several, orange to ochraceous brown, fibrillose, mostly incomplete belts and squamules from the veil, cortina absent; dry, solid, single in groups. Context whitish in stipe. Odour and taste slightly spermatic.

Spores 7.5–8.5 × 4.5–5 μm, amygdaliform, smooth, brownish, membrane thin-walled, occasionally with distinct callus. Basidia 22–28 × 5–6 μm, 4-spored. Cheilo- and pleurocystidia 45–55 × 15–18 μm, fusoid, membrane thick-walled (up to 1.5 μm diam.), yellowish (KOH), encrusted with crystals. Caulocystidia present but not distinctive. Cuticle a cutis or a trichoderm of cylindric, slightly gelatinised hyphae (3–6 μm diam.), with yellow-brown, plasmatic pigment. Clamp connections present.

HABITAT.—On soil under *Castanopsis* and *Lithocarpus* (Fagaceae). Papua New Guinea.

MATERIAL.—PAPUA NEW GUINEA: Morobe district, Bulolo, Manki, 1400 m, 7.IV.1972, *Horak* (ZT 72/378, holotype).

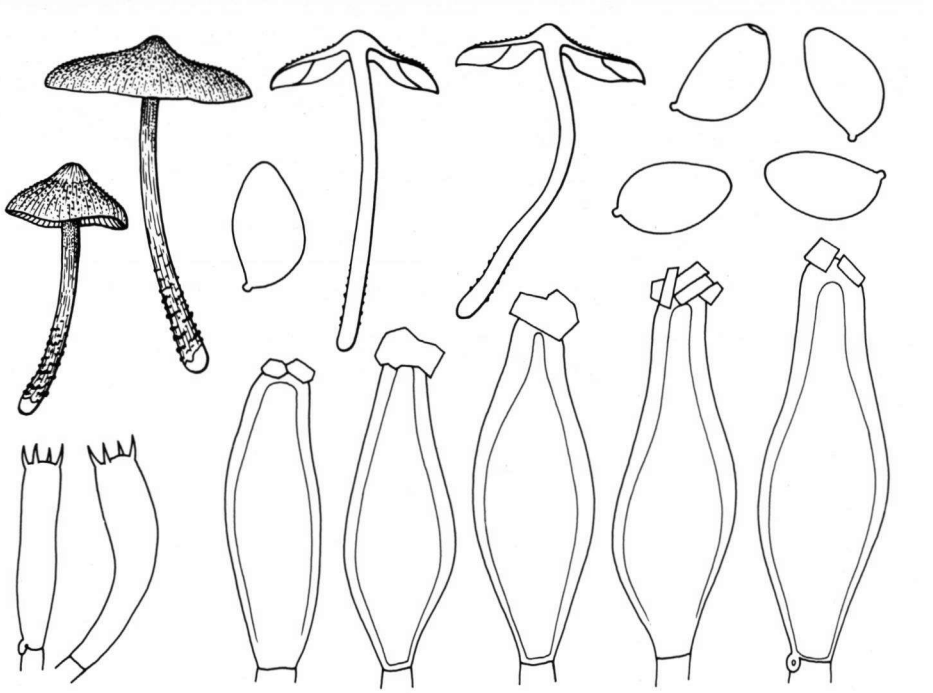

Fig. 21. *Inocybe zonatipes* Horak (type). — Carpophores, spores, basidia, cheilocystidia, pleurocystidia.

The most oustanding characters of *I. zonatipes* are the orange belts (from the persistent veil remnants) near the base of the stipe, the viscid pileus and the amygdaliform spores with often distinct callus. As in the preceding species, the yellow-brown pigment in the cuticular hyphae is dissolved in their cell sap.

Inocybe violeipes Horak, *spec. nov.*—Fig. 22

Pileo −25 mm, acuto-conico dein convexo papilla acuta instructo, ochraceo-brunneo, minute squamuloso, marginem versus e velo lilaceo obtecto. Lamellis adnatis, violaceis dein argillaceis. Stipite −40 × −4 mm, cylindrico vel subclavato, violaceo, luteolo ad basim, fibrillis violaceis e velo instructo. Odore nullo. Sporis 8.5−11 × 4.5–5.5 µm, amygdaliformibus, brunneis. Cheilocystidiis clavatis. Pleurocystidiis fusoideis, metuloideis, incrustatis. Ad terram in silvis fagineis. Nova Guinea. Typus: ZT 71/156.

Pileus 5–25 mm, acuto-conic when young becoming convex or expanded but always with distinct acute papilla; pale ochre-brown, margin covered with lilac fibrils from the veil; innately fibrillose or subrimose towards not striate margin, minutely squamulose, especially over disc, dry. Lamellae (L 10–14, −5) crowded, adnate to emerginate; lilac when young turning argillaceous in ageing carpophores, edge white, fimbriate. Stipe 20–40 × 1.5–4 mm, cylindric or subclavate at base; deep lilac, but white to yellowish at base; entirely appressed-fibrillose, below fibrillose lilac subpersistent cortina with several deshiscent zones of the veil (distinct in young carpophores only); dry, solid, single in groups. Context lilac, (especially in upper portion of stipe). Odour and taste not distinctive.

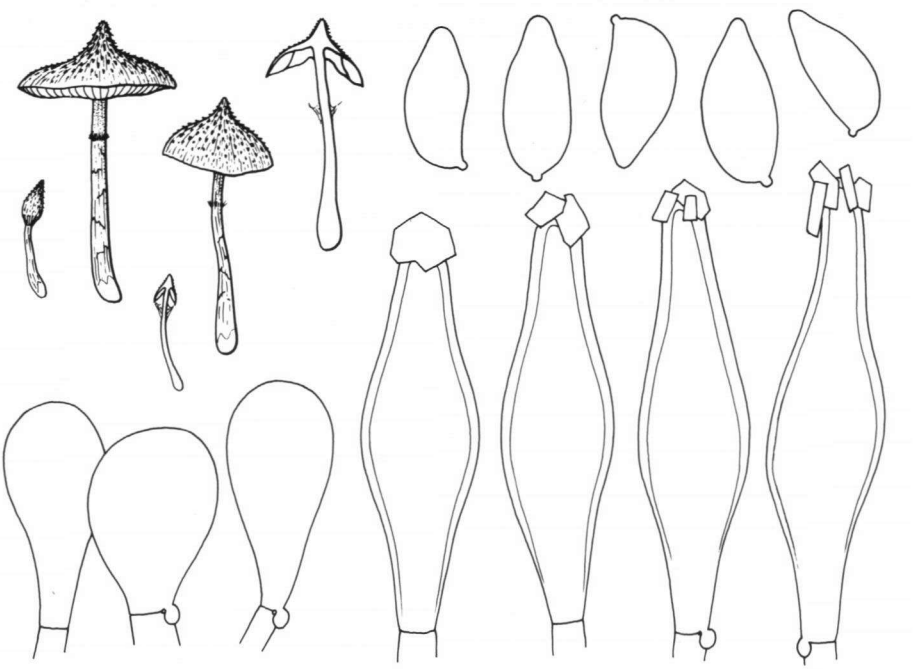

Fig. 22. *Inocybe violeipes* Horak (type). — Carpophores, spores, cheilocystidia, pleurocystidia.

Spores 8.5–11 × 4.5–5.5 μm, amygdaliform (to subfusoid), smooth, brown, membrane thin-walled. Basidia 22–28 × 7–8 μm, 4-spored. Cheilocystidia 15–35 × 9–18 μm, clavate to vesiculose, membrane thin-walled, hyaline. Pleurocystidia 50–65 × 14–20 μm, fusoid to lageniform, membrane metuloid (up to 1 μm diam.), hyaline, encrusted with crystals. Caulocystidia absent. Cuticle a cutis or trichoderm of cylindric hyphae (5–8 μm diam.), encrusted with brown pigment. Clamp connections present.
HABITAT.—On soil in forests under *Castanopsis acuminatissima* (Fagaceae). Papua New Guinea.

MATERIAL.—PAPUA NEW GUINEA: Morobe district, Bulolo, Manki, 1250 m, 19.X.1971, *Horak* (ZT 71/156, holotype); Bulolo, Manki, 1400 m, 19.III.1973, *Horak* (ZT 73/82).

On young carpophores of *I. violeipes* lilac colours are most obvious on lamellae and in the context of the stipe. In addition the lilac coloured hyphae of the veil are visible as distinct fibrils on the margin of the pileus and as cortina (and occasionally also further appressed zones below) on the stipe. To present knowledge this species forms in Papua New Guinea ectotrophic mycorrhiza exclusively with *Castanopsis acuminatissima*.

Inocybe violaceovelata Horak, *spec. nov.*—Fig. 23

Pileo −40 mm, umbonato vel campanulato, fusco, minute squarroso. Lamellis emarginatis adnatisve, ex albo argillaceis. Stipite −55 × −5 mm, cylindrico, ad basim subclavato, pallide brunneo, zonis lilacinis e

velo cingulato. Odore spermatico. Sporis 8–9 x 4–4.5 μm, ellipsoideis vel subphaseoliformibus. Cheilo- et pleurocystidiis metuloideis, incrustatis. Ad terram in silvis fagineis. Nova Guinea. Typus: ZT 73/182.

Pileus 15–40 mm, umbonate-convex to broadly campanulate; brown to fuscous; disc densely covered with small, squarrose or erect, concolorous scales, coarsely fibrillose towards estriate margin, in young specimens subpersistent, fibrillose or membranaceous remnants of the lilac veil especially near margin, dry. Lamellae adnate to broadly emarginate, ventricose, crowded; whitish to pale brown when young turning argillaceous, edge albo-fimbriate. Stipe 20–55 x 2–5 mm, cylindric, base subbulbous or swollen, not marginate; pale brown, towards base covered with numerous, persistent, fibrillose squamules and belts of the lilac veil, distinct cortina absent; dry, fibrillose, solid becoming hollow with age, single in groups. Context whitish to pale brown. Odour spermatic.

Spores 8–9 x 4–4.5 μm, ellipsoid to subphaseoliform, smooth, brown, membrane thin-walled, germ pore none. Basidia 18–26 x 7–8 μm, 4-spored. Cheilo- and pleurocystidia 35–55 x 15–22 μm, fusoid, hyaline, metuloid (−3 μm diam.), encrusted with crystals. Caulocystidia not differentiated. Gill edge also beset with short, clavate, thin-walled, hyaline cells. Cuticle a trichoderm of cylindric hyphae (4–8 μm diam.), with yellow-brown (KOH), plasmatic pigment. Clamp connections numerous.

HABITAT.—On soil in forests (under *Castanopsis* spp. and *Lithocarpus* spp.). Papua New Guinea.

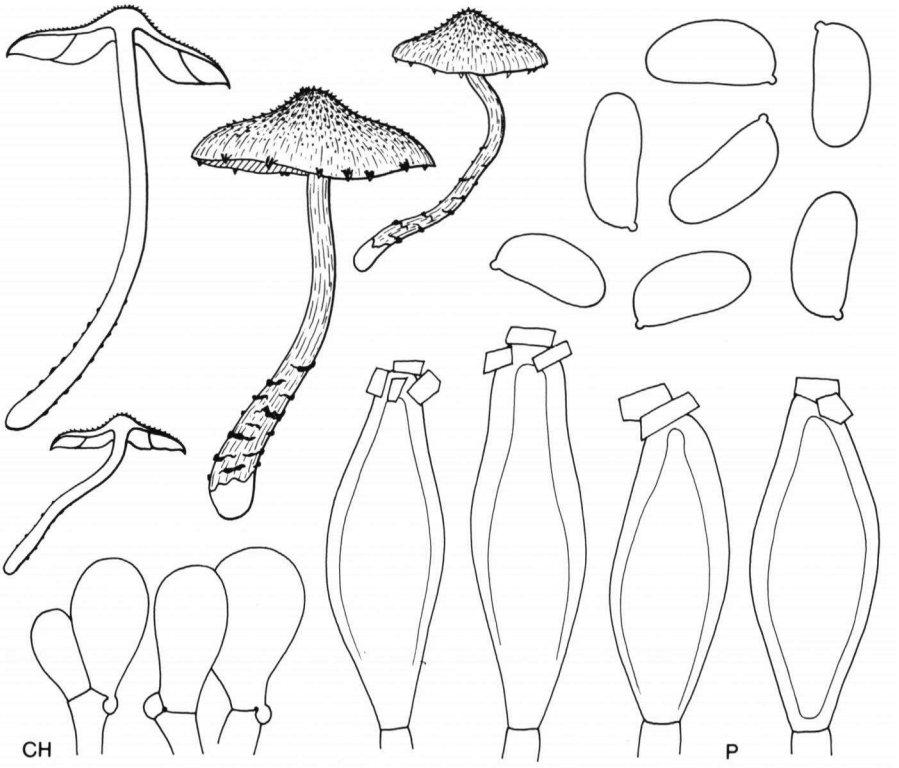

Fig. 23. *Inocybe violaceovelata* Horak (type). — Carpophores, spores, cheilocystidia (CH), pleurocystidia (P).

MATERIAL.—PAPUA NEW GUINEA: Morobe district, Bulolo, Manki, 24.IV.1973, *Horak* (ZT 73/182, holotype); Bulolo, Manki, 19.III.1973, *Horak* (ZT 73/102).

As in *I. violeipes* Horak (see above) the lilac veil remnants are the most conspicuous characters of *I. violaceovelata*, also occurring in Papua New Guinea's *Castanopsis-Lithocarpus* forests. The two species are separated by the different size, shape, and colour of the pileus and the shape of the spores which are elliptic-subphaseoliform in *I. violaceovelata*.

DOUBTFUL RECORDS AND INCOMPLETELY KNOWN SPECIES

cincinnatus. — *Agaricus (Inocybe) cincinnatus* Fr. – Cooke, Handb. Austr. Fungi 46. 1892.

Described from Victoria (Australia). No authentic material located in K.

flocculosus. – *Agaricus (Inocybe) flocculosus* Berk. – Cooke, Handb. Austr. Fungi, 47. 1892.

Reported from Victoria (Australia). Authentic collections are not kept in K. Cleland & Cheel (*1918*: 108) mention several collections of *I. flocculosa* (Berk.) Sacc. from South Australia and New South Wales. According to both authors the spores of these specimens are 'rather triangular'. The spores of the type collection—originally described from England—are, however, distinctly amdaliform.

fulvo-olivacea. — *Inocybe fulvo-olivacea* Clel. *in* Trans. R. Soc. S. Australia **57:** 192. 1933.

This small-spored species is described from South Australia. Unfortunately no type material could be located to establish its taxonomic position.

obscura. — *Inocybe obscura* (Pers. ex Pers.) Gillet. – Clel. & Cheel *in* Trans. R. Soc. S. Australia **42:** 107. 1918.

There is no material in Cleland's herbarium (ADW). According to the descriptive data this *Inocybe* is related to *I. flocculosa* (Berk.) Sacc. sensu Cooke. The two Australian collections represent probably an undescribed species yet which is closely allied to the European *I. obscura*.

EXCLUDED SPECIES

echinata. — *Inocybe echinata* (Roth) Cooke.

Reported from India by Hennings (*1901*: 332). Neither in K nor in B authentic material is deposited. This species probably is conspecific with *Lepiota* (*Melanophyllum*) *haematosperma* (Bull. ex Fr.) Quél.

gigaspora. — *Agaricus (Inocybe) gigaspora* Cooke & Mass. *in* Grevillea **18:** 3. 1889. — *Hebeloma gigasporum* (Cooke & Mass.) Sacc. *in* Syll. Fung. **9:** 102. 1892. — *Phaeomarasmius gigasporus* (Cooke & Mass.) Pegler *in* Austr. J. Bot. **13:** 333. 1965.

gomphodes. — *Agaricus gomphodes* Kalchbr. *in* Grevillea **8:** 152. 1880. — *Inocybe gomphodes* (Kalchbr.) Sacc. *in* Syll. Fung. **5:** 786. 1887.

In Kalchbrenner's original description there is no reference to the morphology of the spores and the presence or absence of cystidia. The type material (K) is in very poor condition (compare also Pegler *1965*: 334) and nothing else than the spores could be examined. These spores are: 10–13 × 5–6.5 μm, elliptic, smooth, thick-walled, dextrinoid, with conspicuous germ pore at the apical end. The combination of these characters definitely excludes the possibility that the material belongs to *Inocybe* (Fr.) Fr. Prior to Saccardo (1887) this species is also uncritically listed as '*Inocybe*' in Cooke (1892) and later again in Cleland & Cheel (*1918*: 106).

holophlebia. — *Inocybe holophlebia* Berk. apud Cooke *in* Grevillea **19:** 104. 1891 (basionym). — **Agrocybe holophlebia** (Berk. apud Cooke) Horak, *comb. nov.*

Spores 7–11 × 6.5–9 μm, ellipsoid, membrane brown, thick-walled, smooth, with broad apical germ pore. Basidia 20–28 × 10–11 μm, 4-spored. Cheilocystidia 35–50 × 15–24 μm, clavate to vesiculose, thin-walled, hyaline, often with yellow-brown plasmatic pigment or inclusion. Cuticle composed of clavate to vesiculose cells (20–35 × 12–25 μm) forming an hymeniderm. Clamp connections present.

MATERIAL EXAMINED.—INDIA: Masulipatan, XI. 1866, *E. S. Berkeley* (holotype, K).

lanuginosus. — *Agaricus (Inocybe) lanuginosus* Bull. ex Fries. — Cooke, Handb. Austr. Fungi, 46. 1892.

The spores of the authentic specimens (K, 'W.-Australia, Swan River, Nr. 229') have amygdaliform to sublimoniform spores (8–11 × 4.5–5.5 μm). Since the spores of the European *I. lanuginosa* are different in size and shape, this Australian material is misidentified.

longipes. — *Inocybe longipes* Mass. *in* Kew Bull. 1908: 4. 1908; non *Inocybe longipes* C. H. Kauffm. *in* N. Am. Fl. **10:** 248. 1924. — *Entoloma longipes* (Mass.) Horak *in* Beih. Nova Hedwigia **65:** 259. 1980.

murrayana. — *Inocybe murrayana* Clel. *in* Trans. R. Soc. S. Austr. **57:** 192. 1933. — *Astrosporina imbricata* Clel. *in* Trans. R. Soc. S. Austr. **57:** 192. 1933.

For further information see Horak (*1979*: 190).

ozes. — *Agaricus ozes* var. *crassipes* Cooke & Mass. *in* Grevillea **15:** 93. 1887. — *Collybia ozes* (Fr.) Quél. var. *crassipes* (Cooke & Mass.) Sacc. *in* Syll. Fung. **9:** 34. 1891. — *Inocybe crassipes* (Cooke & Mass.) Pegler *in* Austr. J. Bot. **13:** 342. 1965.

This Australian species ('Lake Bonney, Wehl, 22') is documented by poor type material including an illustration. There is no question that the specimens do not belong to *Collybia*. The very large, ellipsoid and yellow-brown spores are indicative for *Inocybe*; but since the fragmentary condition does not allow a thorough microscopic examination I consider Pegler's identification as doubtful.

plumosus. — *Agaricus (Inocybe) plumosus* Fries. — Cooke, Handb. Austr. Fungi, 46. 1892.

This species is reported from 'moist pine woods' (Victoria, Australia) and therefore it is in fact an introduced agaric. Unfortunately no authentic material could be found to ascertain its taxonomic position.

umbonata. — *Inocybe umbonata* Petch *in* Ann. R. bot. Gdns Peradeniya **6:** 202. 1917 (non Quél. 1876). —*Astrosporina petchii* (Boedijn) Horak *in* Persoonia **10:** 164. 1979.

A full description and illustrations of this species of *Astrosporina*, wide-spread in SE.-Asia, are published by Horak (l.c.).

victoriae. — *Agaricus (Inocybe) victoriae* Cooke & Mass. *in* Grevillea **16:** 72. 1888. — *Inocybe victoriae* (Cooke & Mass.) Sacc. *in* Syll. Fung. **9:** 101. 1891. — *Hebeloma victoriae* (Cooke & Mass.) Pegler *in* Austr. J. Bot. **13:** 347. 1965.

Little information can be extracted from the poor type material (K, 'Victoria, Australia, *F. Reader* Nr. *26*', 28.V.1887). The spores have been found to be smooth, pale yellow, slightly dextrinoid, ovoid and measure about 9–11 × 5–6.5 μm. According to these characters of the spores the specimens represent rather a taxon belonging to *Lepiota* than *Inocybe* or *Hebeloma*.

violacea. — *Inocybe violacea* Mass. *in* Kew Bull. 1899: 169. 1899.

The exsiccata preserved under this name in the Kew Herbarium ('Perak, *Ridley 2*') do not correspond with the original description of this Malaysian agaric (nom. conf.). In addition *I. violacea* Mass. (1889) is later synonym of *I. violacea* Pat. (Tab. anal. Fung. **2:** 20. 1887).

ADDENDUM TO AUSTRALASIAN SPECIES OF ASTROSPORINA
(compare Horak, *1979*)

albidipes. — *Inocybe albidipes* Clel. & Cheel *in* Trans. R. Soc. S. Austr. **42:** 107. 1918.

There is no type material in ADW. The original drawings, however, clearly indicate that this species is a representative of the genus *Astrosporina* Schroeter (*1889*).

Zusammenfassung

Aus Indomalaya und Australasien werden 23 Arten der Gattung *Inocybe* (Fr.) Fr. (1863; Agaricales) ausgeschlüsselt, ausführlich beschrieben und abgebildet. Sechzehn durch besonders auffällige morphologische Merkmale definierte Species und eine Form werden als neu vorgestellt. Die mikroskopischen (und zum Teil auch makroskopischen) Daten der restlichen sechs Taxa werden sowohl an Hand von Typus-Material als auch authentischen bzw. topotypischen Kollektionen ermittelt und diskutiert. Die neuseeländischen Arten von *Inocybe* sind schon früher (Horak, *1977*) ausfürlich beschrieben worden.

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