

---

## A new species of *Incrustocalyptella* from Thailand

---

Dennis E. Desjardin<sup>1</sup>, Thitya Boonpratuang<sup>2</sup>, Poramate Ruksawong<sup>2</sup> and Nigel Hywel-Jones<sup>2</sup>

<sup>1</sup>Department of Biology, San Francisco State University, 1600 Holloway Ave., San Francisco, CA 94132, U.S.A.; e-mail: ded@sfsu.edu

<sup>2</sup>National Center for Genetic Engineering and Biotechnology (BIOTEC), National Science and Technology Development Agency, 73/1 Rama VI Road, Rajdhevee, Bangkok 10400, Thailand

Desjardin, D.E., Boonpratuang, T., Ruksawong, P. and Hywel-Jones, N. (2000). A new species of *Incrustocalyptella* from Thailand. *Fungal Diversity* 4: 75-79.

*Incrustocalyptella orientalis*, a pseudostipitate cyphelloid agaric, is described as new from material collected in Khao Yai National Park in Thailand. This is the first report of the genus from continental southeast Asia. A key is provided to the known species of *Incrustocalyptella*.

**Key words:** Basidiomycetes, cyphelloid agaric, fungi, taxonomy.

### Introduction

During a recent collecting expedition to study the marasmioid fungi of Khao Yai National Park in Thailand, an interesting pseudostipitate cyphelloid species was encountered. In the field, the taxon is very reminiscent of the genus *Hispidocalyptella*, described recently from Australia (Horak and Desjardin, 1994), but its micromorphology clearly indicates placement in the genus *Incrustocalyptella*. Color terms and notations are from Kornerup and Wanscher (1978). Spore statistics include:  $\bar{x}$ , the arithmetic mean of the spore length by spore width ( $\pm$  SD) for n spores measured; Q, the quotient of spore length and spore width in any one spore, indicated as a range of variation in n spores measured;  $\bar{Q}$  see also following, the mean of Q-values ( $\pm$  SD).

### Taxonomy

***Incrustocalyptella orientalis* Desjardin, sp. nov.** (Figs. 1-5)

*Pileus* usque ad 0.6 mm latus, cyphelliformis vel inverso-cupuliformis, minutissime pruinosis, siccus, griseo-brunneus. *Lamellae* nullae, hymenium glabrum, pileo concolor. *Pseudostipes* usque ad  $7 \times 0.1$  mm, centralis vel eccentricus, cylindricus, tenax, minute pruinosis, siccus, apicaliter griseo-brunneus, basin versus ater. *Basidiosporae* (7.0-)8-10(-10.5)  $\times$  2.5-3.8  $\mu$ m, ellipticae vel subfusiformes, leves, hyalinae, inamyloideae. *Basidia* 19-25  $\times$  5-6  $\mu$ m, tetrasporica, fibulata. *Cystidia* hymeniales nulla. *Pileipellis* ex hyphis incrustatus;

pileocystidia conspicua, subuliformes vel helicales, basin diverticulatis. *Caulocystidia* numerosa, pileocystidia similia. Ad folia putrida, in silva tropicali angiospermarum. Thailand.

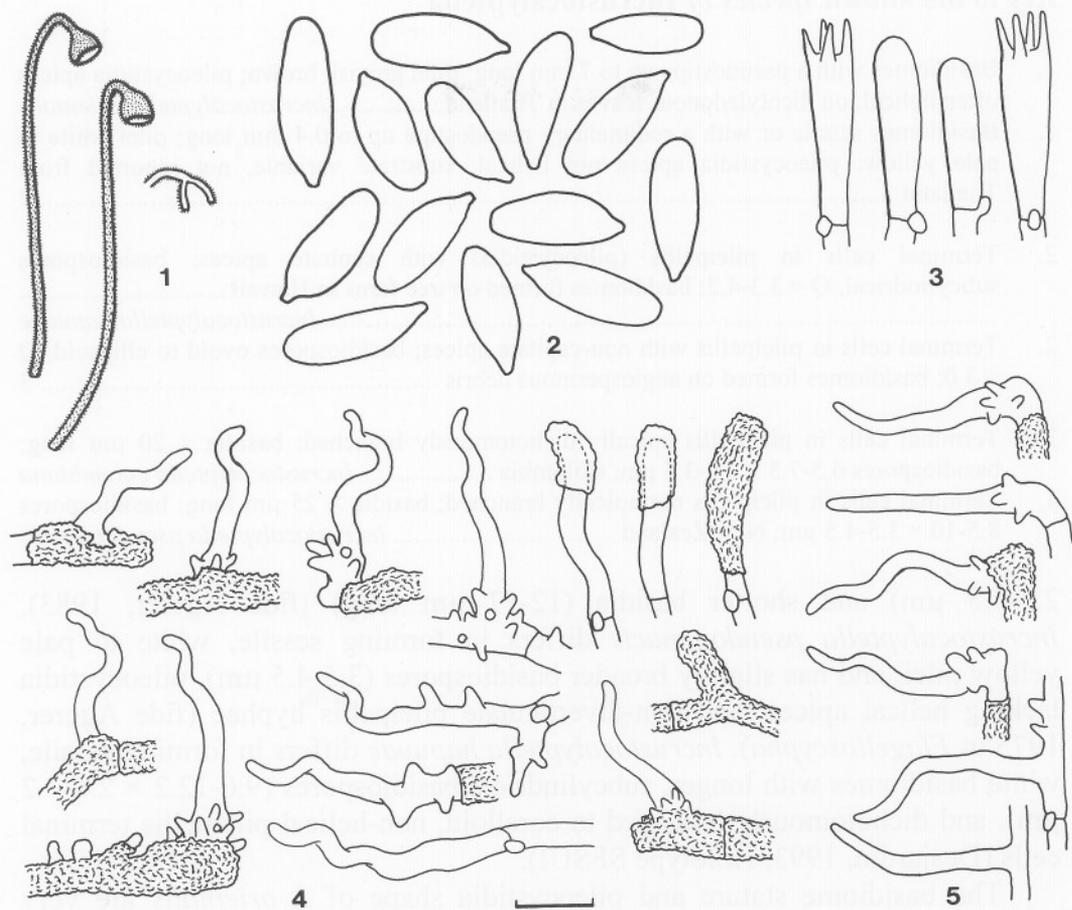
*Pileus* (Fig. 1) inverted-cupulate, nutant, 0.3-0.6 mm diam.; external surface felted to minutely pruinose, dry, opaque, greyish brown (6C-D3) with slightly paler ornamentation. *Context* extremely thin, pliant. *Hymenophore* smooth, greyish brown (6C3). *Pseudostipe* 5-7 × 0.05-0.1 mm, central to eccentric, wiry, tough, dull, dry, minutely pruinose overall, insititious; apex greyish brown (6C3) grading into black at the base. *Odor* not distinctive.

*Basidiospores* (Fig. 2) (7.0-)8-10(-10.5) × 2.5-3.8 μm ( $\bar{x}$  = 8.7 ± 0.8 × 3.2 ± 0.3 μm, Q = 2.1-3.2,  $\bar{Q}$  = 2.7 ± 0.3, n = 20 spores), elongate-ellipsoid to subfusoid, inequilateral, often broadest near hilar appendage, smooth, hyaline, inamyloid. *Basidia* (Fig. 3) 19-25 × 5-6 μm, clavate, 4-spored, with nearly straight sterigmata 3-5 μm long, clamped. *Basidioles* (Fig. 3) clavate (not fusoid). *Hymenial cystidia* absent. *Pileipellis* a cutis composed of repent to erect, irregular or filamentous hyphae with numerous pileocystidia; hyphae 3-6 μm diam., non-diverticulate or with few diverticula, heavily incrustated with thick, plaque-like or granulose, hyaline to pale yellowish grey material, inamyloid, non-gelatinous, incrustations not soluble in 3% KOH; terminal cells (*pileocystidia*; Fig. 4) of two types: (i) awl-shaped to sinuose or helical cells, gradually narrowed towards the apex with a swollen, diverticulate base, 12-30 × 3-5 μm (at base) × 1.5-2.5 μm (at apex), often geniculate at the base, erect portion smooth, hyaline, thin-walled; diverticulate basal portion smooth or heavily incrustated, hyaline to pale yellowish grey (in KOH); diverticula 3-6 × 0.5-1.5 μm, cylindrical to obtusely conical, hyaline, smooth or incrustated like the hyphae; (ii) narrowly clavate to subcylindrical cells 19-30 × 3-5 μm, covered with thick, hyaline incrustations, sometimes with scattered, broad diverticula, not bifurcated. *Tramal hyphae* 3-11 μm diam., cylindrical or slightly inflated, hyaline, inamyloid, thin-walled, non-gelatinous, non-incrustated. *Subhymenial hyphae* ramose. *Stipe tissue* monomitic; stipitipellis composed of numerous *caulocystidia* (Fig. 5) similar to the pileocystidia, 16-30 × 2.5-5 μm; cortical hyphae 3-5 μm diam., smooth or with scattered diverticula, non-incrustated or incrustated like the pileipellis, with walls ranging from hyaline (apex) to brown (base), non-gelatinous, dextrinoid; medullary hyphae similar, strongly dextrinoid. *Clamp connections* common in all tissues.

*Habit, habitat and distribution:* Scattered on leaves of undetermined dicotyledonous tree in primary forest. June. Thailand.

*Material examined:* THAILAND, Khao Yai National Park, Tad Tha Phu site, 25 June, 1999, collected by T. Boonpratuang, P. Ruksawong and D.E. Desjardin, Desjardin #7020 (BIOTEC, HOLOTYPE; SFSU, isotype).

*Notes:* The new species, *Incrustocalyptella orientalis*, represents the first report of the genus from continental southeast Asia. Until the recent discovery of this species, the genus was known from only three species, viz., *I.*



**Figs. 1-5.** Features of *Incrustocalyptella orientalis* (from holotype: DED 7020). **1.** Basidiomes ( $\times 8$ ). **2.** Basidiospores. **3.** Basidia and basidioles. **4.** Pileocystidia. **5.** Caulocystidia. Bars: 1 = 1.25 mm; 2 = 5  $\mu\text{m}$ ; 3-5 = 10  $\mu\text{m}$ .

*columbiana* Agerer from Colombia, *I. pseudopanacis* (Agerer) Agerer from New Zealand [mistakenly reported from Papua New Guinea in the protologue (Agerer, 1975: 244)], and *I. hapuuae* Desjardin from the Hawaiian Islands. *Incrustocalyptella orientalis* is characterized by a tiny, inverted-cupulate, nutant pileus colored greyish brown, a relatively long, pruinose, insititious pseudostipe colored like the pileus, basidiospores  $8-10 \times 2.5-3.8 \mu\text{m}$ , and by thickly incrustated pileipellis hyphae and helical, basally diverticulate pileocystidia. It differs significantly from the primarily sessile *I. columbiana*, *I. pseudopanacis* and *I. hapuuae* in forming a long pseudostipe. In addition, *I. columbiana* differs in forming basidiomes with white to pale yellow pilei, a pseudostipe only up to 0.4 mm long, and has smaller basidiospores ( $6.5-7.5 \times$

### Key to the known species of *Incrustocalyptella*

1. Basidiomes with a pseudostipe up to 7 mm long; pilei greyish brown; pileocystidia apices often helical; on dicotyledonous leaves in Thailand.....*Incrustocalyptella orientalis*
1. Basidiomes sessile or with a rudimentary pseudostipe up to 0.4 mm long; pilei white to pale yellow; pileocystidia apices not helical; substrate variable, not reported from Thailand ..... 2
2. Terminal cells in pileipellis (pileocystidia) with capitate apices; basidiospores subcylindrical,  $Q = 3.3-4.2$ ; basidiomes formed on tree ferns in Hawaii .....  
.....*Incrustocalyptella hapuuae*
2. Terminal cells in pileipellis with non-capitate apices; basidiospores ovoid to ellipsoid,  $Q < 3.0$ ; basidiomes formed on angiospermous debris ..... 3
3. Terminal cells in pileipellis apically dichotomously branched; basidia  $< 20 \mu\text{m}$  long; basidiospores  $6.5-7.5 \times 2.5-3.5 \mu\text{m}$ ; Colombia .....*Incrustocalyptella columbiana*
3. Terminal cells in pileipellis not apically branched; basidia  $> 25 \mu\text{m}$  long; basidiospores  $8.5-10 \times 3.5-4.5 \mu\text{m}$ ; New Zealand ..... *Incrustocalyptella pseudopanacis*

2.5-3.5  $\mu\text{m}$ ) and shorter basidia (12-17  $\mu\text{m}$  long) (fide Agerer, 1983). *Incrustocalyptella pseudopanacis* differs in forming sessile, white to pale yellow pilei, and has slightly broader basidiospores (3.5-4.5  $\mu\text{m}$ ), pileocystidia lacking helical apices, and non-diverticulate pileipellis hyphae (fide Agerer, 1975 ut *Flagelloscypha*). *Incrustocalyptella hapuuae* differs in forming sessile, white basidiomes with longer, subcylindrical basidiospores (9.6-12.2  $\times$  2.6-3.2  $\mu\text{m}$ ), and dichotomously branched to coralloid, non-helical pileipellis terminal cells (Desjardin, 1993; Holotype SFSU!).

The basidiome stature and pileocystidia shape of *I. orientalis* are very reminiscent of *Hispidocalyptella australis* Horak and Desjardin (1994) described from Australia, but the latter species differs in forming larger basidiomes (pilei up to 6 mm broad; stipes up to 15 mm long) with shorter and broader basidiospores (6-8  $\times$  4-4.5  $\mu\text{m}$ ), and more significantly it differs in lacking incrustated pileipellis and stipitipellis hyphae (ZT, isotype). The genera *Incrustocalyptella* and *Hispidocalyptella* represent reduced agarics belonging to the *Tricholomataceae* where they are allied with the genera *Marasmius* and *Marasmiellus*.

### Acknowledgements

We thank the Royal Forest Department and Khun Amnoy Intharuk, Director of the Khao Yai National Park Training Center for providing housing and guidance while conducting fieldwork at Khao Yai National Park. We thank Peter Buchanan, Landcare Research, Auckland, New Zealand for his critical comments on the manuscript, and for pointing out that the holotype specimen of *I. pseudopanacis* was actually from New Zealand, not Papua New Guinea as mistakenly reported in the protologue. NHJ was supported in part by the

TRF/BIOTEC Special Programme for Biodiversity Research and Training grant BRT141022, while TB and PR were supported in part by grant BRT442006. DED received partial funding from the Office of Research and Sponsored Programs at San Francisco State University.

## References

- Agerer, R. (1975). *Flagelloscypha*. Studien an cyphelloiden Basidiomyceten. Sydowia 27: 131-265.
- Agerer, R. (1983). Beitrag zur Flora cyphelloider Pilzer aus der Neotropis – V. Zwei neue Gattungen: *Metulocyphella* und *Incrustocalyptella*. Zeitschrift für Mykologie 49: 155-164.
- Desjardin, D.E. (1993). *Incrustocalyptella hapuuae* sp. nov. and *Favolaschia minima* from native forests of Hawaii. Mycologia 85: 1017-1019.
- Horak, E. and Desjardin, D.E. (1994). Reduced marasmioid and mycenoid agarics from Australia. Australian Journal of Systematic Botany 7: 153-170.
- Kornerup, A. and Wanscher, J.H. (1978). Methuen handbook of colour. 3rd edn. Eyre Methuen, London, U.K.

(Received 13 Nov. 1999, accepted 18 Feb. 2000)