

## Studies in the genus *Inocybe* (Fr.) Fr. (Agaricales) of the western Canary Islands

by

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### ABSTRACT

The following 14 species of *Inocybe* are reported from the western Canary Islands, Gran Canaria, Tenerife, La Palma, and Gomera: *Inocybe dulcamara*, *I. geophylla* var. *geophylla*, *I. geophylla* var. *lilacina*, *I. hirtella* f. *tetraspora*, *I. gausapata*, *I. tigrina*, *I. virgatula*, *I. carpta*, *I. lacera*, *I. peronatella*, *I. boltonii*, *I. acuta*, *I. praetervisa*, and *I. decipiens*. All species except *I. geophylla* are new to The Canary Islands. Nearly all species were collected in forests with *Pinus canariensis* which seems to be the most important mycorrhizal host for *Inocybe*.

### RESUMEN

Estudio sobre algunas especies del género *Inocybe* (Fr.) Fr. (Agaricales) presentes en las Canarias occidentales

Las 14 especies siguientes del género *Inocybe* se citan para las Canarias Occidentales: Gran Canaria, Tenerife, La Palma y Gomera: *Inocybe dulcamara*, *I. geophylla* var. *geophylla*, *I. geophylla* var. *lilacina*, *I. hirtella* f. *tetraspora*, *I. gausapata*, *I. tigrina*, *I. virgatula*, *I. carpta*, *I. lacera*, *I. peronatella*, *I. boltonii*, *I. acuta*, *I. praetervisa* e *I. decipiens*. Todas ellas, excepto *I. geophylla* son nuevas citas para las Islas Canarias. Casi todas las especies fueron recolectadas en bosque de *Pinus canariensis* que parece ser el huésped micorrizógeno más importante de las especies del género *Inocybe*.

Species of *Inocybe* (Fr.) Fr. are previously reported from The Canary Islands by WILDPRET et al. (1973) and BELTRÁN TEJERA & WILDPRET (1975).

In January 1974 there was a small mycological expedition from the University of Oslo (Norway) to the western islands Tenerife, La Palma, and Gomera. The participants were Mrs. A. - E. Torkelsen, Mr. L. Ryvar den, and myself. The season was fairly good for fungi even if we did not experience a single drop of rain during our stay from 7. - 20. January.

This paper reports the species of *Inocybe* found by the expedition. Besides my own collections also specimens collected by Mrs. G. Gulden on her expeditions to Gran Canaria, Tenerife, and Gomera in 1971 and 1973 are included.

Details on the collections are given in an abbreviated form with a number referring to the localities shown in the following list. The collection number follows in brackets after a locality number. Except for the well known *Inocybe geophylla* short descriptions of the species are given in the text. Drawings and descriptions were made from fresh fungi. The specimens are deposited in Botanical Museum, University of Oslo (O).

The following localities were visited:

1. Gran Canaria: Pinar de Tamadaba, 9. April 1971, G. Gulden.
2. Tenerife: La Florida Alta, 3 km south west of La Guancha, in *Pinus canariensis* forest, 17. Jan. 1974.
3. Tenerife: El Bardo, 3 km east of La Guancha, in an open forest of *Pinus canariensis*, 7. Jan. 1974.
4. Tenerife: Monte Verde near Aguamansa in Valle de la Orotava, in mixed forest with *Pinus canariensis*, *Erica arborea* and *Cistus vaginatus*, 6. Jan. 1973, G. Gulden. 8. and 17. Jan. 1974.
5. Tenerife: Cruce de las Rosas, 3 km south of La Esperanza, in *Pinus canariensis* forest, 8 Jan. 1974.
6. Tenerife: Monte de la Esperanza, Las Lagunetas, in *Pinus canariensis* forest, 6 Jan. 1973, G. Gulden.
7. Tenerife: Monte de la Esperanza, 9 km from Hogar la Esperanza, in *Pinus canariensis* forest, 9. April 1971, G. Gulden.
8. La Palma: Velhoco, 2 km of Santa Cruz de la Palma, in mixed forest, 10. Jan. 1974.
9. La Palma: Pino de la Virgen, near Fuencaliente, in *Pinus canariensis* forest, 11. Jan. 1974.
10. La Palma: Roque Grande, 5 km north east of El Paseo, in rather dry *Pinus canariensis* forest with *Cistus vaginatus*, 11. Jan. 1974.
11. Gomera: Above La Laja, in *Pinus canariensis* forest, 15. Jan. 1973, G. Gulden.
12. Gomera: Monte de la Zarza, in evergreen forest dominated by *Laurus azorica*, *Myrica faya* and *Erica arborea*, 1. Jan. 1973, G. Gulden.

*Inocybe dulcamara* (A. & S. ex Pers.) Kummer (Figs. 1, 10, and 23)  
1 (G. G. 213 - 71), 2 (K. H. 289 - 74 and K. H. 434 - 74), 8 (K. H. 174 - 74).  
The collections from Tenerife and La Palma were all made on burnt ground.

CAP convex to plane, densely radially fibrillose or fibrillose scaly, ochraceous to yellow brown. STIPE fibrillose, striate, often, with distinct cortical rests, concolourous with the cap. CORTINA whitish to pale ochraceous, very prominent on young specimens. GILLS ochraceous brown. SPORES  $8.4 - 12.2 \times 5.3 - 6.8 \mu\text{m}$ , ovate to ellipsoid. BASIDIA with 4 sterigmata. CYSTIDIA, only cheilocystidia which are thin-walled and clavate to napiform.

*Inocybe geophylla* (Sow. ex Fr.) Kummer var. *geophylla*.

2 (K. H. 421 - 74 and K. H. 437 - 74), 3 (K. H. 5 - 74 - H), 5 (K. H. 62 - 74), 6 (G. G. 20 - 73), 9 (K. H. 221 - 74 and K. H. 226 - 74), 10 (K. H. 255 - 74, K. H. 256 - 74, and K. H. 257 - 74).

Recorded from La Palma by WILDPRET et al. (1973).

*Inocybe geophylla* (Sow. ex Fr.) Kummer var. *lilacina* Fr.

5 (K. H. 62 - 74), 10 (K. H. 258 - 74).

Recorded from La Palma by WILDPRET et al. (1973) and from Tenerife and La Palma by BELTRÁN TEJERA & WILDPRET (1975).

*Inocybe geophylla* s. l. is possibly the most common *Inocybe* species in the Canary Islands. The fungus was usually found with several fruit bodies on the localities, and it occurred often on rather dry places.

*Inocybe hirtella* Bres. f. *tetraspora* Kühn. (Figs. 2, 11, and 24).

9 (K. H. 228 / 74).

CAP convex, smooth, radially fibrillose, somewhat silky, pale yellowish ochraceous. STIPE nearly smooth, pruinose on the top, pale ochraceous to cream coloured. GILLS pale grey ochraceous. SMELL of bitter almonds. SPORES  $7.6 - 10.6 \times 5.3 - 6.1$  (— 6.8)  $\mu\text{m}$ , ovate to amygdaliform, with a distinct hilar appendix. BASIDIA with 4 sterigmata. CYSTIDIA  $46 - 57 \times 11 - 19 \mu\text{m}$ , thick-walled metuloids, often with crystals on the top, caulocystidia on the top of the stipe.

*Inocybe gausapata* Kühn. (Figs. 4, 12, and 25).

2 (K. H. 424 - 74), 4 (K. H. 373 - 74), 5 (K. H. 52 - 74), 11 (G. G. 312 - 73).

CAP conical or somewhat umbonate, radially fibrillose with small, appressed, greyish scales, somewhat felty and rimose, grey brown to ochraceous brown. STIPE nearly smooth or fibrillose, pruinose on the top, pale grey brown to reddish brown. GILLS pale grey brown. SPORES  $7.6 - 12.2 \times 5.3 - 6.1$  (— 6.8)  $\mu\text{m}$ , ovate, ellipsoid or amygdaliform, with a distinct hilar appendix. CYSTIDIA  $42 - 58 \times 11 - 21 \mu\text{m}$ , more or less thick-walled

metuloids, often with crystals on the top, caulocystidia on the top of the stipe.

*Inocybe tigrina* Heim (Figs. 3, 13, and 26).

4 (K. H. 89 - 74).

CAP conical or umbonate, with dark grey brown appressed fibrils and scales on a whitish to pale ochraceous ground. STIPE nearly smooth, pruinose on the top, whitish to pale grey brown. GILLS brown. SPORES  $9.4 - 13.7 \times 5.3 - 6 - 8 \mu\text{m}$ , ovate, ellipsoid or amygdaliform, often with a distinct hilar appendix. CYSTIDIA  $48 - 51 \times 13 - 17 \mu\text{m}$ , more or less thick-walled metuloids, mostly with a distinct neck and crystals on the top, caulocystidia on the top of the stipe.

*Inocybe friesii* Heim (Figs. 5, 14, and 27).

1 (G. G. 183 - 71, G. G. 192 - 71, and G. G. 200 - 71), 2 (K. H. 392 - 74 and K. H. 429 - 74), 3 (K. H. 3 - 74 - H), 4 (K. H. 367 - 74 and K. H. 372 - 74), 5 (K. H. 67 - 74 and K. H. 86 b 74), 9 (K. H. 227 - 74), 10 (K. H. 253 - 74), 11 (G. G. 311 - 73).

CAP convex, conical or umbonate, radially fibrillose, but not scaly, brown, grey brown or ochraceous brown. STIPE often rather slender, nearly smooth or somewhat striate, pruinose on the top, whitish to pale grey brown, often with a rose tinge. GILLS whitish to pale grey brown. SPORES  $(7.6 -) 9.1 - 12.2 (-14.4) \times (4.6 -) 5.3 - 6.8 \mu\text{m}$ , ovate ellipsoid or amygdaliform, with a distinct hilar appendix. CYSTIDIA  $38 - 76 \times 10 - 23 \mu\text{m}$ , more or less thick-walled metuloids, often with crystals on the top, caulocystidia on the top of the stipe.

Some of the specimens collected have grey ochraceous gills and a browner and more robust stipe than normal to the species. They may possibly be f. *laricina* Heim (see STANGL 1971).

*I. friesii* seems to be one of the most common *Inocybe* species on the investigated islands.

*Inocybe virgatula* Kühn. (Figs. 7, 15, and 28).

2 (K. H. 406 / 74).

CAP convex or conical, with a distant umbo, radially fibrillose or striate, grey brown. STIPE fibrillose, pruinose on the top, with weak cortina rests, nearly white to pale grey brown. GILLS pale grey brown. SPORES  $9.1 - 10.6 \times 5.3 - 6.1 \mu\text{m}$ , ovate, ellipsoid or amygdaliform, with a distinct hilar appendix. CYSTIDIA  $38 - 65 \times 11 - 23 \mu\text{m}$ , rather thick-walled metu-

loids, mostly with a distinct neck and crystals on the top, caulocystidia on the top of the stipe.

Gross-morphologically the material comes close to *I. hypophaea* Furrer-Ziogas, but this has smaller spores, only  $8.9 \times 4.5-5.5 \mu\text{m}$  (STANGL 1973). The cystidia in the material have a thicker wall than recorded by KÜHNER (1955).

*Inocybe carpta* (Scop. ex. Fr.) Quél. sensu Heim (Figs. 16 and 29).  
6 (G. G. 22/73).

CAP convex, densely radially fibrillose or fibrillose scaly, ochraceous to yellow brown. STIPE fibrillose, striate, with cortina rests. GILLS ochraceous brown. SPORES  $8.4-12.9 \times 5.3-6.8 \mu\text{m}$ , ovate to ellipsoid. CYSTIDIA  $57-65 \times 11-15 \mu\text{m}$ , rather thick-walled metuloids, mostly long and slender and with crystals on the top, no caulocystidia.

This difficult taxon is here accepted in the sense of HEIM (1931).

*Inocybe lacera* (Fr.) Kummer (Fig. 17).  
4 (G. G. 37/73), 7 (G. G. 75/71).

CAP convex or umbonate, scaly or strongly fibrillose, dark grey brown. STIPE striate, densely covered with fibrils, pale grey brown. GILLS grey brown. SPORES  $9.1-15.2 \times 4.6-7.6 \mu\text{m}$ , cylindrical or ellipsoid. Cystidia  $42-80 \times 8-19 \mu\text{m}$ , rather thick-walled metuloids, often with crystals on the top, no or very few caulocystidia.

*Inocybe peronatella* Favre (Figs. 6, 18, and 30).  
9 (K. H. 230/74).

CAP convex or umbonate, densely radially fibrillose, pale ochraceous brown. STIPE densely covered with fibrils, whitish to pale ochraceous brown. GILLS grey brown. SPORES  $8.4-12.2 \times 5.3-6.8 \mu\text{m}$ , ovate, ellipsoid or amygdaliform, with a distinct hilar appendix. CYSTIDIA  $36-41 \times 11-21 \mu\text{m}$ , rather thickwalled metuloids densely covered by small crystals on the top, no caulocystidia.

The cystidia in the material are shorter than recorded by FAVRE (1960),  $50-84 (-87) \times 14-20 (-22) \mu\text{m}$ .

*Inocybe boltonii* Heim (Figs. 9, 19, and 31).  
6 (G. G. 25/73), 9 (K. H. 222/74).

CAP convex, radially fibrillose or scaly with appressed scales, grey brown. STIPE fibrillose striate, grey brown. GILLS pale grey brown. SPORES ( $7.6-$ )  $8.4-13.7 \times 6.1-7.6 \mu\text{m}$ , angular, often with a trapezoid outline.

CYSTIDIA 68-76  $\times$  23-25  $\mu\text{m}$ , rather thick-walled metuloids, in 25/73 usually densely covered with crystals on the top, in 222/74 without or with very few crystals; without or with very few caulocystidia which are narrower than the cystidia in the hymenium.

According to STANGL & VESELSKY (1974) *I. boltonii* is a very polymorph species. The CANARIAN collections consist of relatively robust fruit bodies like Stangl & Veselsky's collection nr. 395. However, none of their specimens have so large spores as the CANARIAN specimens.

*Inocybe acuta* Boud. (Figs. 20 and 32).

12 (G. G. 185/73).

CAP conical or umbonate, radially fibrillose or with small, appressed scales, yellowish brown. STIPE somewhat fibrillose, with a small bulb, pale yellow to yellowish brown. SPORES 7.6-12.9  $\times$  7.6-6.8  $\mu\text{m}$ , angular or nodulose, often with distinct, conical nodules. CYSTIDIA 53-64  $\times$  13-19  $\mu\text{m}$ , rather thick-walled metuloids, often with crystals on the top, no caulocystidia.

*Inocybe praetervisa* Quél. (Figs. 8, 21, and 33).

3 (K. H. 1/74-H).

CAP conical, umbonate or convex, radially fibrillose, somewhat silky, yellow brown. STIPE thin, pruinose in the whole length, with a marginale bulb, ochraceous to yellow brown. GILLS pale grey brown, then with an olivaceous tinge. SMELL spermiatic. SPORES 6.8-8.4 (-12.2)  $\times$  4.5-7.6  $\mu\text{m}$ , distinctly nodulose, with rounded nodules. CYSTIDIA 46-61  $\times$  11-24  $\mu\text{m}$ , rather thick-walled metuloids, mostly with a distinct neck and crystals on the top, caulocystidia on the whole stipe.

*Inocybe decipiens* Bres. (Figs. 22 and 34)

1 (G. G. 190/71 and G. G. 193/71), (G. G. 19|73).

CAP conical or convex, radially fibrillose or somewhat scaly with appressed scales, pale yellowish brown to grey brown. STIPE smooth or somewhat fibrillose, more or less pruinose on the top, with a distinct bulb, nearly white to pale reddish brown or grey brown. GILLS pale grey brown, then browner. SPORES (8.4-) 9.1-14.4  $\times$  (4.6-) 5.3-9.1  $\mu\text{m}$ , angular, but not with distinct nodules. CYSTIDIA 46-76  $\times$  11-23  $\mu\text{m}$ , more or less thick-walled metuloids, often with crystals on the top, caulocystidia on the top of the stipe.

HEIM'S (1931) description of this species covers the CANARIAN material pretty well.

## ECOLOGY

Most *Inocybe* - species are recorded as obligate ectomycorrhizal fungi (SINGER 1975). In The Canary Islands the most important host for *Inocybe* must be *Pinus canariensis*. Nearly all collections were made in *P. canariensis* forests, often on open places with scarce bottom vegetation (e. g. along tracks, on dry slopes or dry meadows). The evergreen laurel forests and the *Erica arborea* scrubs were almost free of *Inocybe*.

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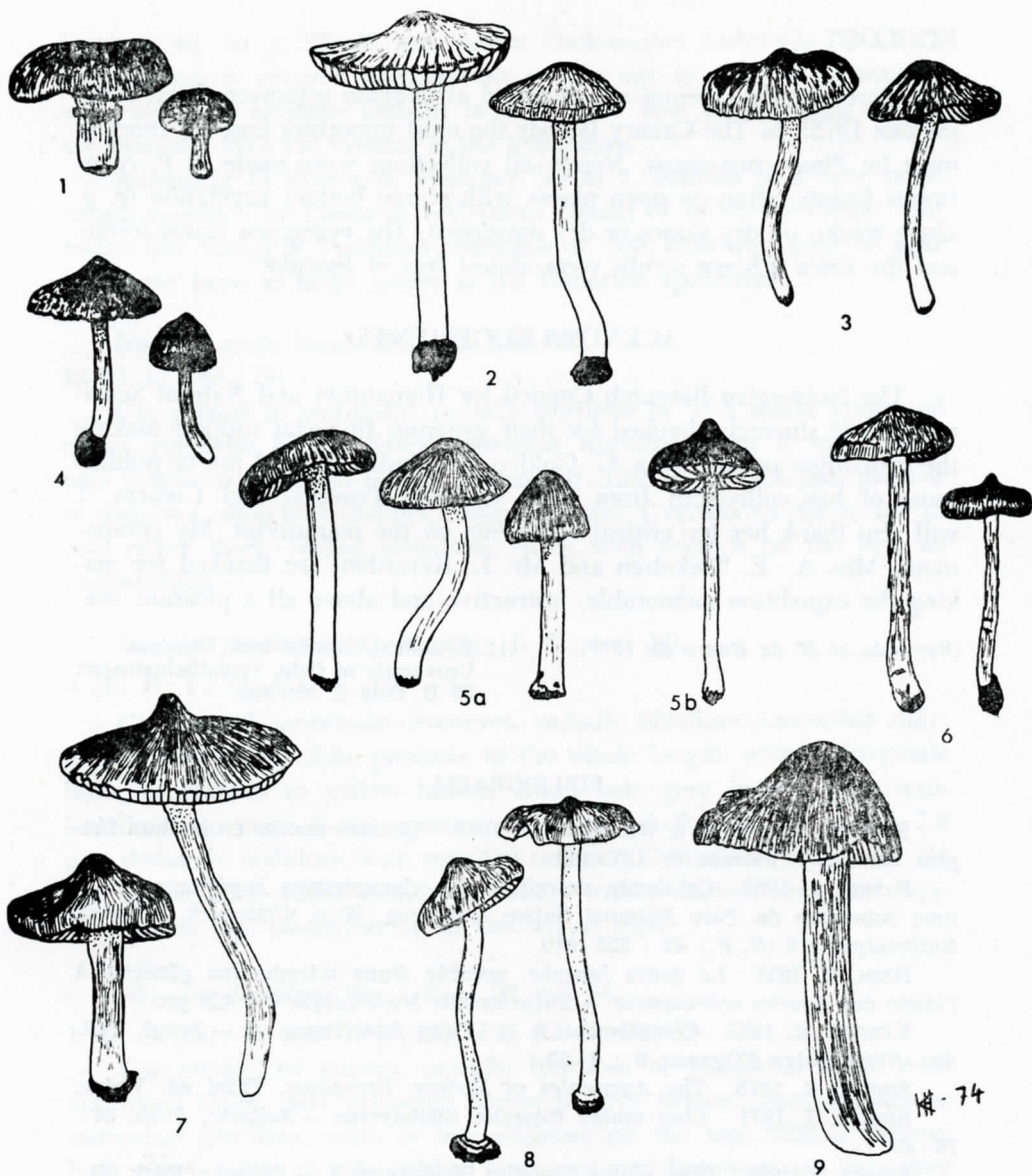
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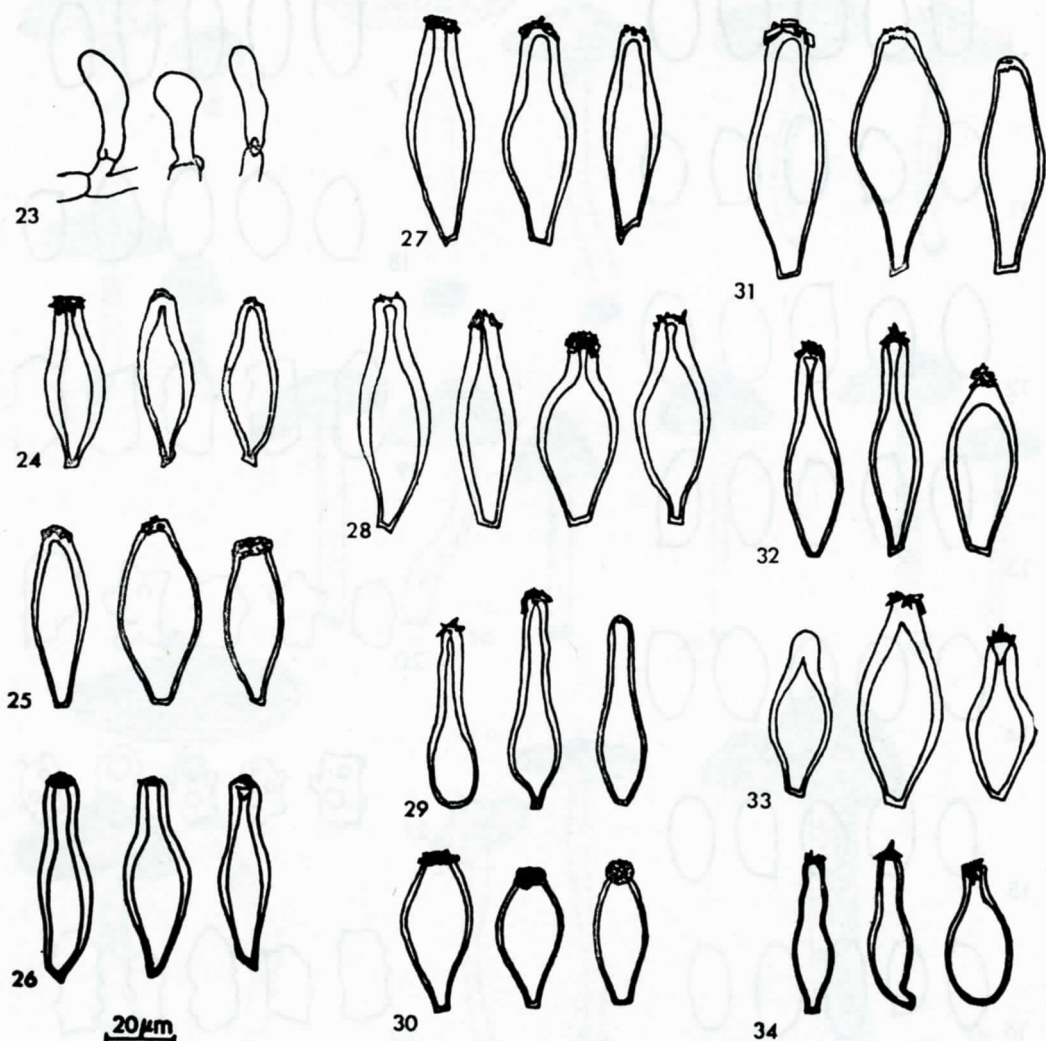


Figs. 1-9. Fruits bodies of the *Inocybe*-species. 1. *I. dulcamara* (K. H. 434/74), 2. *I. hirtella* f. *tetraspora* (K. H. 228/74). 3. *I. tigrina* (K. H. 89/74), 4. *I. gausapata* (K. H. 424/74). 5. *I. friesii*, a, (K, H, 253/74), b, b, (K, H, 8/74-H), 6. *I. peronatella* (K. H. 230/74). 7. *I. virgatula* (K, H, 406/74), 8. *I. praetervisa* (K. H. 1/74-H). 9. *I. boltonii* (K. H. 222/74),





Figs. 10-22 Spores. 10. *Inocybe dulcamara* (K. H. 434/74), 12. *I. gausapata* (K. H. 424/74). 13. *I. tigrina* (K. H. 89/74), 14. *I. friesii* (K. H. 253/74), 15. *I. virgatula* (K. H. 406/74). 16. *I. carpta* (G. G. 22/73), 17. *I. lacera* (G. G. 37/73). 18. *I. personatella* (K. H. 230/74). 19. *I. boltonii* (K. H. 222/74), 20. *I. acuta* (G. G. 185/74). 21. *I. praetervisa* (K. H. 1/74-H); 22. *I. descipiens* (G. G. 193/71).



Figs. 23-34. Hymenophoral cystidia of the specimens in Figs. 10-22, 23. *Inocybe dulcamara*. 24. *I. hirtella* f. *tetraspora*. 25. *I. gausapata*, 26. *I. tigrina*, 27. *I. friesii*. 28. *I. virgatula*. 29. *I. carpta*, 30. *I. peronatella*, 31. *I. boltonii*, 32. *I. acuta*. 33. *I. praetervisa*. 34. *I. decipiens*,