



November 2013

## Hebeloma Notebook 4

L. R. Hesler

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HEBELOMA COLVINI (Pk.) Sacc.

Syll. Fung. 5:805. 1887

Agaricus colvini Pk., New York State Mus. Ann. Rept. 28:49.

1879.

Pileus 2.5-7.5 cm broad, convex or nearly plane, sometimes gibbous or broadly umbonate, rarely centrally depressed, grayish or alutaceous to pale ocher. Odor and taste not distinctive (House 1919:35).

Lamellae emarginate or rounded behind, whitish or pallid becoming brownish ochraceous, close, broad.

Stipe 2.5-8 cm long, 2-6 mm thick, whitish, equal, flexuous, silky-fibrillose, dry, stuffed or hollow above, solid toward the base. Veil none.

Spores 10-12 x 5-6  $\mu$ , subellipsoid.

Type from sand hills, West Albany, N.Y. (NYS), October, collected by Mr. V. Colvin; its habitat is peculiar (clear drifting sand). The mycelium binds the sand together in a mass.

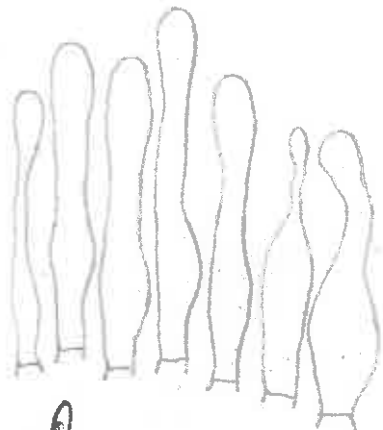
Notes on Type (Feb. 5, 1973)

Spores 10-~~15~~<sup>16</sup> x 6-8.5  $\mu$ , very slightly inequilateral in profile, broadly ellipsoid or more rarely subovoid in face view, apices rather broadly rounded, minutely rugulose to nearly smooth, wall 0.3-0.4  $\mu$  thick, yellowish in 2% KOH. Basidia 30-35 x 7-10  $\mu$ , 4-spored. Pleurocystidia none except

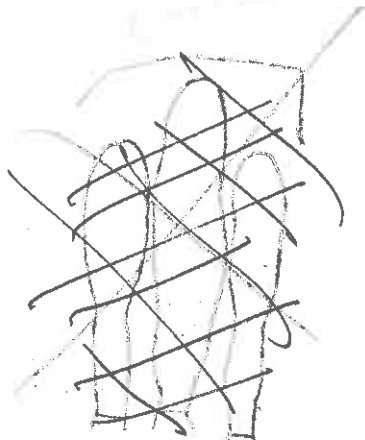
rarely as cheilocystidia extending up the gill-sides and then bottle-shaped with a neck; cheilocystidia 35-47 x 3-9  $\mu$ , more or less cylindrical, ventricose on one side toward the base, often subcapitate. Gill trama of subparallel hyphae, 3-7  $\mu$  broad. Pileus trama of radial hyphae. Pileus cuticle not greatly differentiated, the surface hyphae slightly gelatinous and at times more or less uplifted. Hypodermium hyphoid, the hyphae brown, and extending radially, at times the zone rather obscure. Stipe cuticle of dry, repent hyphae. Clamp connections not observed.

Peck places it in the Denudata. I found no traces of a veil on the basidiocarps of the Type.

Agaricus colvini PK.  
 (= Hebeloma colvini (PK) Sacc.)  
 Type



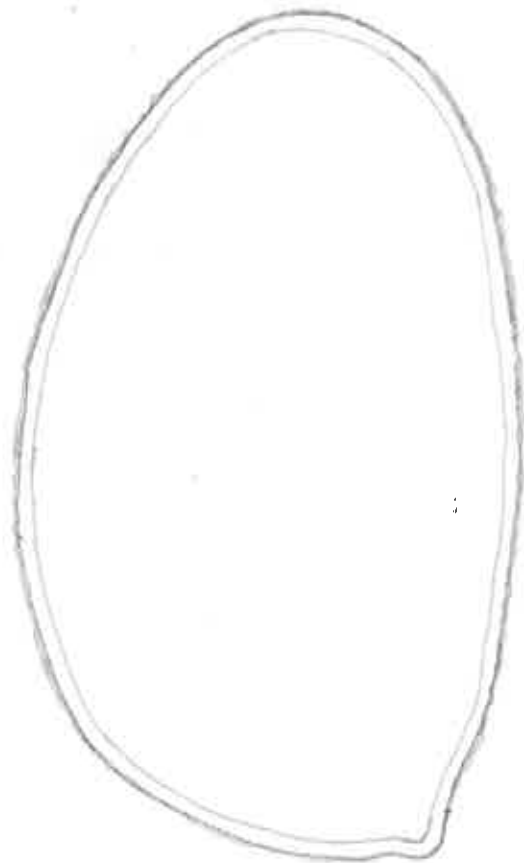
gh - x 1000 - a



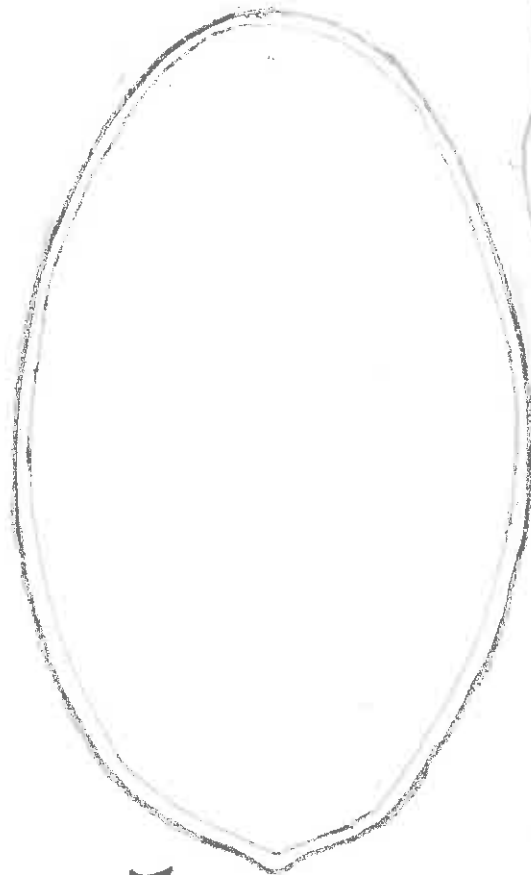
~~gh x 1000~~



Basidia  
 x 1000

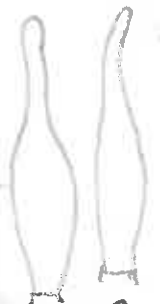


Profile



Face

Spores x 8000



Sp  
 x 1000  
 (rare)  
 (near  
 edges)

HEBELOMA COLVINI (Pk.) *Face*.

House (Rept. for 1917:35) adds following characters:

Pileus viscid. Odor and taste not distinctive. Flesh (context) of pileus whitish but brown next to the cuticle. Lamellae pallid to vinaceous-drab and tinged finally ochraceous by the spores. Pleurocystidia none; cheilocystidia 40-50 x 6-8 $\mu$ , cylindric or subclavate. Spores 12-16 x 7-10 $\mu$ , ochraceous-tawny in mass.

See also illustration (half-tone) in the Rept. cited above.

= Cortinarius

HEBELOMA COMMUNE (Pk.) Murrill

N. A. Flora 10:223. 1917

Cortinarius communis Pk., N.Y. State Cab. Ann. Rept. 23:106.  
1872.

Pileus 5-7.5 cm broad, broadly convex or expanded, whitish or gray, tinged red, disc deeper colored.

Lamellae emarginate and spuriously decurrent-toothed, whitish, then ochraceous-cinnamon, rather broad, not crowded.

Stipe 5-10 cm long, 6-10 mm thick, dingy-white, equal, not bulbous, solid or stuffed, apex white-mealy, fibrillose below.

Spores 7 x 4-5  $\mu$  (Murrill), 9-10.5 x 5-6  $\mu$  (Kauffman, Cortinarius, N.A.F. 10:312), ellipsoid, smooth.

Type from Center, New York, September and October (NYS).

This was described by Peck as a Cortinarius, and later more fully by Kauffman (1932), also as a Cortinarius, from Michigan. Kauffman adds: pileus subviscid, margin decorated at first by white fibrils of the white cortina. Murrill (1917) placed it in Hebeloma.

24608

HEBELOMA COMPRESSIPES sp. nov.

On soil, under pine, Woodson Drive, Knox County, December 20,  
1961

Pileus 3-6 cm broad, convex or hemispheric-convex, finally nearly plane, hygrophanous, "cinnamon" to "saya brown" when dry, "drab" to "cinnamon drab" when wet, viscid, innately fibrillose, drying in radial streaks. Context pallid to watery-brown; odor raphanoid, taste raphanoid-bitterish.

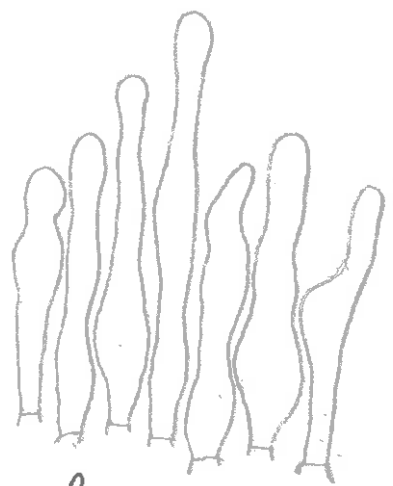
Lamellae adnexed, white then gradually becoming "snuff brown," close, broad, edges slightly fimbriate.

Stipe 3-5 cm long, 6-10 mm thick, often compressed, pallid-shining above, tapering and dingy brownish to blackish downward, appressed-fibrillose-rimose, hollow. Veil white-fibrillose, remnants sometimes on the pileus near the margin.

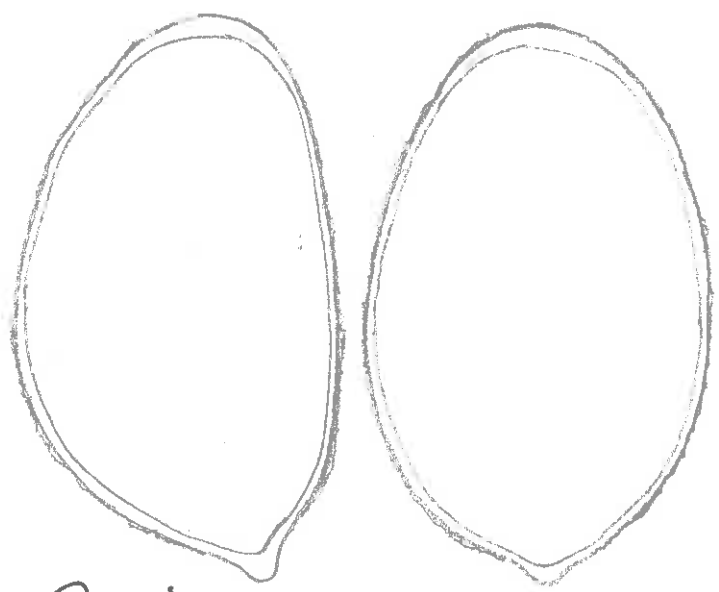
Spores in deposit: "buffy brown," pale yellow brown in 2% KOH, 7.5-9 x 5-6  $\mu$ , inequilateral in profile, ellipsoid to subovoid in face view, obscurely wrinkled to nearly smooth, wall 0.25  $\mu$  thick. Basidia 26-30 x 7-8  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 32-55 x 5-9  $\mu$ , sub-filamentous, sub-flask-shaped, at times the apex subcapitate. Gill trama of nearly parallel hyphae, 3-6  $\mu$  broad. Pileus trama of radial hyphae. Pileus cuticle an ixocutis. Hypodermium of brownish cells, the zone somewhat obscure. Stipe cuticle a zone of repent, dry colorless, slender hyphae. Clamp connections present.

*Hyalomma compressipes* sp. nov.

24608 - Fyp1



Ch x 1000



Profile

Face

Spores x 8000





24608 - *Hebdoma compressipes* sp. nov.

Exclude; a Pholiota

HEBELOMA CREMEUM Merrill

North American Flora 10:225. 1917

(This <sup>is a</sup> ~~should be:~~ Pholiota ~~cremeum~~ (Murr.) Sm. & Hes.)

Pileus solitary, 5-7 cm broad, convex to expanded, slightly gibbous, uniformly cream-colored, margin concolorous, viscid when young but soon dry, resembling dressed kid. Context pure white; odor and taste not distinctive.

Lamellae broadly sinuate, at maturity pale chocolate-brown, edges concolorous, crowded, ventricose, broad.

Stipe 8-9 cm long, 7-12 mm thick, dull cream-colored, apex white, glabrous, longitudinally striate, subequal, fleshy.

Spores 12-13 x 6-7  $\mu$ , ellipsoid, smooth, brown in deposit (rather dark for the genus), pale-ferruginous under the microscope.

Type collected in old pastures, near Palo Alto, California, by C. F. Baker, No. 379 (NY), March 11, 1902.

Notes on Type, by Hesler

Spores 10-13.5 x 7-9  $\mu$ , smooth, wall 0.4-0.5  $\mu$  thick, <sup>many or most with a distinct germ-pore,</sup> truncate, rather dark brown in 2% KOH. Basidia (unsuited for study). Pleurocystidia and cheilocystidia none found. Pileus cuticle a thin ixocutis. Stipe cuticle of dry, repent hyphae; caulocystidia none.

The spores are truncate <sup>with a germ-pore,</sup> a character which <sup>suggests</sup> ~~is~~ a Pholiota. In our Key, it appears to be somewhat distantly

But some Hebeloma are truncate!

related to P. malicola (Kauff.) Smith var. malicola, but in the latter the pileus is wax-yellow to zinc orange, or greenish; the lamellae narrow; veil of yellow remnants, forming an annulus or evanescent; spores 8.5-11(12) x 4.5-5.5(6)  $\mu$ ; caulocystidia clavate to subcylindric; pileus cuticle a well-defined pellicle; growing on wood.

Smith - 57695    HEBELOMA CRENULATUM sp. nov.    PHOTO

Gregarious under beech, Colonial Point Hardwoods, Burt Lake,  
Cheboygan County, Michigan, August 29, 1957

Notes by Smith

Pileus 2-3.5 cm broad, obtuse with an incurved margin, expanding to plane or obscurely umbonate, "tawny" when fresh, hygrophanous, "ferruginous" when faded (near "cinnamon rufous"), glabrous, viscid. Context watery brownish, whitish when faded; odor and taste none.

Lamellae adnate to adnexed, pallid brownish becoming pale cinnamon brown, close, broad, edges whitish-crenulate.

Stipe 3-4 cm long, 3-5 mm thick at apex, whitish at first but soon becoming dull rusty brown at the base and the color change progressing upward, apex pruinose-furfuraceous, tubular, equal or nearly so. Veil none.

Spores 9-11 x 5-6  $\mu$ , nearly smooth. Basidia 4-spored. Cheilocystidia present. Cuticle of ~~HYA~~ hyphae 2-4  $\mu$  diameter, hyaline. Hypodermium colored, no incrusting pigment.

Notes by Hesler

Spores 9-11 x (4.5)5-5.5(6)  $\mu$ , inequilateral in profile, subfusoid ~~to subovoid~~ in face view, wall 0.3  $\mu$  thick, minutely rugulose, pale yellowish in 2% KOH. Basidia 24-28 x 6-7  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 35-55 x 6-10  $\mu$ , ventricose on one or both sides below or at or near the middle. Gill trama of subparallel hyphae, 5-7  $\mu$  broad.

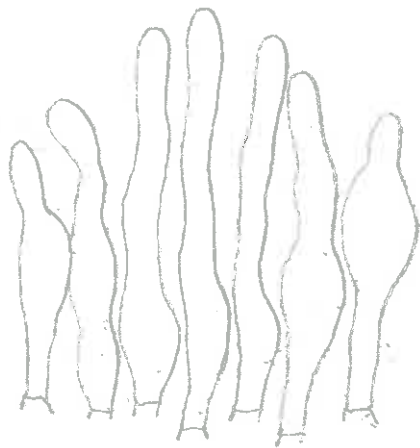
Smith - 57695

*H. crenulatum* - 2

Pileus trama of radial hyphae and vesiculose cells. Pileus cuticle an ixocutis. Hypodermium a zone of cells, those in the middle with a brown pigment, those on either side without pigment. Stipe cuticle of repent hyphae, surface bearing scattered caulocystidia similar to cheilocystidia. Clamp connections not observed.

*Hebeloma crenulatum* sp. nov.

Sm. 57695 - Type



ch x 1000



Profile

Face

Spores x 8000

H. crustuliniforme

Observations. This species was described in Europe nearly two centuries ago. It is now assumed to be generally distributed <sup>on</sup> that continent. In North America, an early report of it is by Peck <sup>that</sup> (Report 41:68. 1888), from the Catskill Mountains, New York. In 1910, Peck <sup>also</sup> included it in his treatise of New York species of Hebeloma. Since that time (1910), Murrill (1917) has <sup>also</sup> reported it from North America ~~(Greenland to~~ (North Carolina and west to Wisconsin); <sup>and</sup> ~~also Europe)~~ and Kauffman (1918) <sup>records</sup> reports it ~~from~~ Michigan. In the last half-century, it is listed in several miscellaneous reports from various regions of <sup>North America</sup> the continent. It has <sup>it has</sup> thus been assumed to be rather widely distributed throughout North America, and admittedly it may well be, ~~etc.~~ However, ~~there is~~ it <sup>is</sup> seems certain that, at times, the binomial has been misapplied, ~~not~~ both in North America and in Europe. For <sup>an</sup> example, in Peck's collection ~~from~~ from Carrolton, New York, <sup>Peck</sup> ~~was~~ identified ~~one~~ <sup>it</sup> as H. crustuliniforme, but the spores are <sup>warty-</sup> warty-rugose and calyptrate, a type of ornamentation which is wholly foreign to this species; <sup>it is near H. picicida.</sup> However, validly named ~~specimens~~ collections of it have come to my attention from the State of Washington (by A. H. Smith); <sup>from Colorado (Kauffman).</sup> and from New York (by Peck and <sup>by</sup> Murrill). To date, curiously enough, I have not <sup>yet</sup> found it in the Southeast, ~~as yet.~~ <sup>however,</sup> Surely, <sup>one day</sup> it may be discovered <sup>here.</sup> ~~one day.~~

There <sup>is, of course,</sup> ~~being~~ no holotype, <sup>but</sup> I have examined material from herbaria from Finland (named by Karsten); from Sweden (by Romell ~~X~~ and by Haglund & Lundell); from ~~France~~ France (Bruchet); all of <sup>these collections</sup> which agree in their essential characteristics, as described above. <sup>I have seen</sup> But, <sup>and these are</sup> some other collections from Europe, identified as H. crustuliniforme, ~~was~~ excluded from this species through the

*cheilocystidia*

character of the spore-wall ornamentation, spore size,  
 the ~~the~~ absence of ~~cheilocystidia~~ <sup>*cheilocystidia and*</sup> the structure of the  
 hypodermium, ~~xxxxxxxxxxxxxxxx~~ <sup>*of various*</sup> or combinations of these features.

The mis-identifications represented here are possibly to be explained on the grounds that the field (macroscopic) characters of this species are similar those of some other ~~species~~ <sup>*Hebelomas*</sup>; moreover, it ~~seems quite~~ <sup>*is*</sup> probable that often there ~~has~~ <sup>*may have*</sup> been a failure to determine the ~~characters~~ <sup>*microscopic*</sup> of the spores (size, ornamentation), the presence and form of ~~the cheilocystidia~~ <sup>*cheilocystidia*</sup>, and the structure of the hypodermium. ~~In~~ Without knowing the nature of these structures, it would be easy to misapply the epithet crustuliniforme, ~~as~~ <sup>*often*</sup> ~~evidently~~ been done in the past, ~~and rather often.~~



AGARICUS (HEBELOMA) CRUSTULINIFORME Fries

Hymen. Eur., p. 241. 1874

(Translation)

Pileus plano-convex, subexpanded, lateritious, gilvus-pallescent, becoming white, disc often darker, punctate under lens, ~~finely~~, glabrous, subviscid. Context fleshy; odor strong, foetid, raphanoid.

Lamellae adnexed, whitish; then watery-cinnamon, close, thin, narrow, edges beaded when moist, spotted when dry.

Stipe white, floccose-squamulose, subbulbous, stuffed hollow, with a pith.

With unusual variability, perhaps many forms distinguishable.

HEBELOMA CRUSTULINIFORME Pk.\* (sensu Kauffman)

ex-herb. Univ. Michigan, leg-det Mary S. Whetstone,  
Teal, Colorado, Aug. 13, 1917.

Notes by Hesler

Spores 9-12(13) x (5)5.5-7(7.5)  $\mu$ , inequilateral in profile, ellipsoid-ovoid in face view, minutely rugulose, pale yellowish brown in 2% KOH. Pleurocystidia none; cheilocystidia 46-88 x 6-10  $\mu$ , cylindrical, sometimes clavate, usually slightly ventricose below but at times not at all, rarely subcapitate, in clusters, abundant, conspicuous. Gill trama of subparallel hyphae, 3-7  $\mu$  broad. Pileus cuticle an ixocutis. Hypodermium of cells and hyphal fragments. Stipe cuticle of repent, dry hyphae. Caulocystidia in tufts, 70-133 x 7-14  $\mu$ , irregularly cylindrical, more rarely forked above.

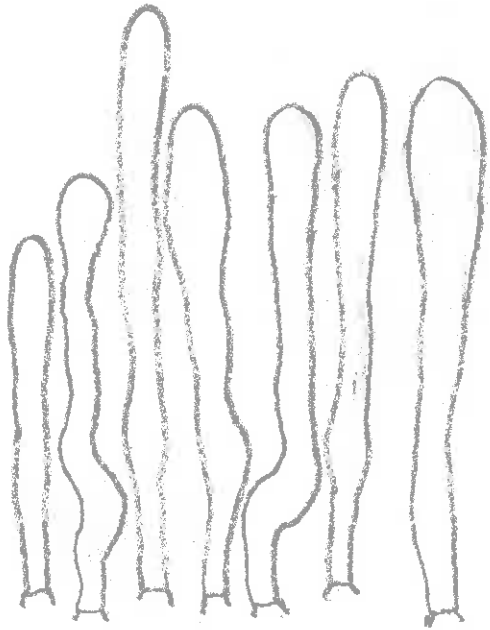
This agrees with European material I have seen.

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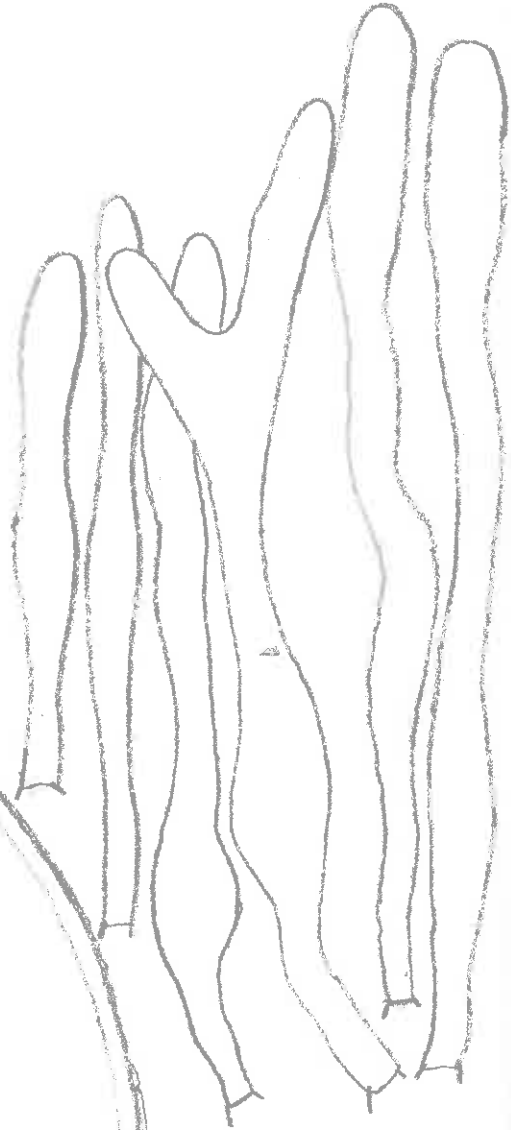
\* In citing Peck as the authority, Kauffman either made an error, or he might have meant that he was following Peck's concept of the species.

*Hubeloma crustuliniforme*

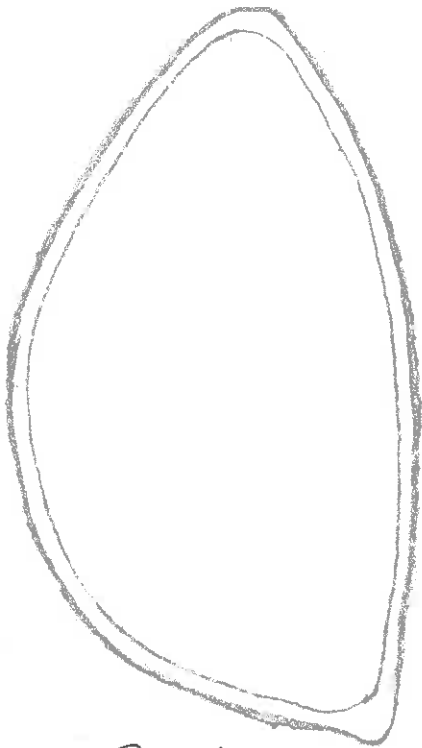
leg-det Mary S. Whetstone, Colorado, Aug 13, 1917  
(ex-herb. Kauffman, Mich.)



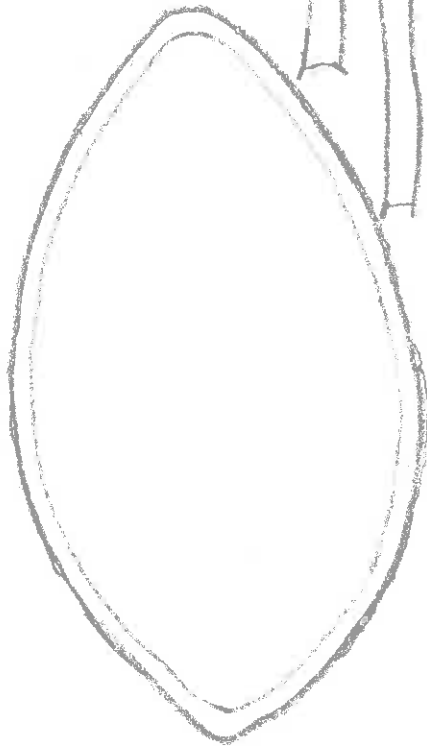
Ch x 1000



Caulo - x 1000



Profile



Face

Spores x 8000

HEBELOMA CRUSTULINIFORME Fr.

Illustration:

Kauffman, Agar. Mich., pl. XCVII.

(Kauffman [1918] description)

Pileus 4-8 cm broad, broadly convex, then planè, subrepand, slightly viscid, (moist), glabrous, pale whitish-tan, disc reddish or yellowish, zoneless, margin even, at first incurved. Context thickish, rather firm, white; odor strong of radish, taste disagreeable. Said to be poisonous.

Lamellae adnexed, whitish then watery cinnamon-brown, edges crenulate and beaded with drops when young or moist, crowded, narrow.

Stipe 4-8 cm long, 4-6 mm thick, white or whitish, somewhat <sup>▲</sup>floccose-squamulose, glabrous below, equal or subbulbous, pruinose at apex. Veil none.

Kauffman says it is infrequent in Michigan; in frondose, grassy woods.

He describes (briefly) two forms: (1) minor, which I have not seen; and (2) sphagnophilum, which I call sphagnophila (Kauff.) stat. nov.

States that the most striking characteristic of H. crustuliniforme and its varieties is their habit of distilling drops from the gills when fresh or moist. In this respect it imitates H. fastibile (and some others). In dry weather, it is easily confused with other species. Also, he says: "It does not seem to be as common here as in Europe" (p. 477).

Sm-2992

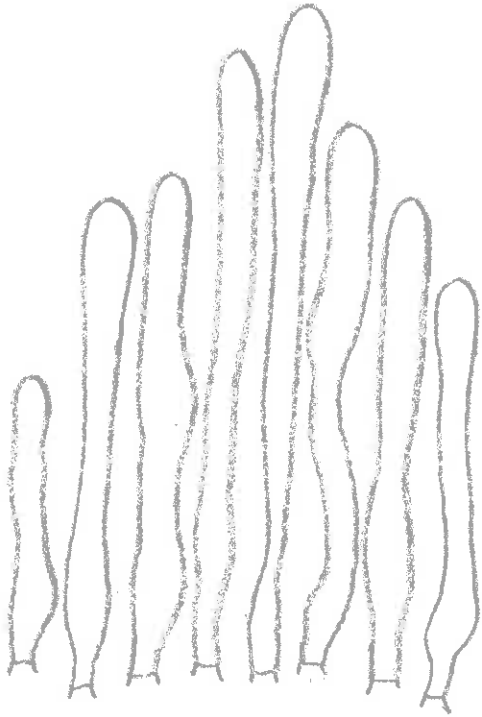
Term-19227 HEBELOMA CRUSTULINIFORME (St. Amans) Qué1.

Under conifers, Crescent Beach, Joyce, Washington, leg.  
Smith-2992, Oct. 5, 1935 (identified by Smith as  
crustuliniforme).

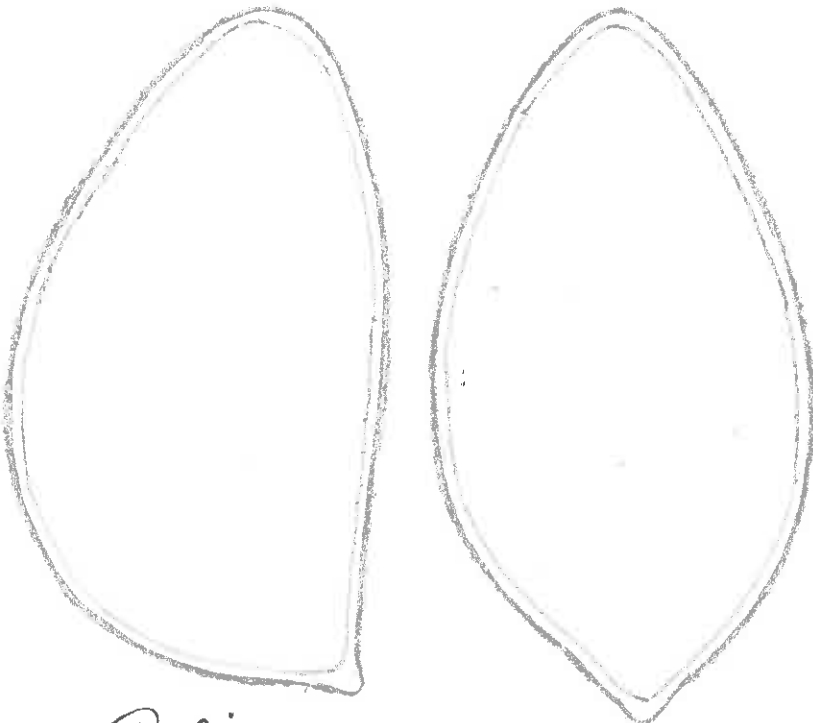
Notes by Hesler

Spores 9-11(12) x 5-6(7)  $\mu$ , inequilateral in profile, subvoid to subellipsoid or ellipsoid in face view, wall 0.25  $\mu$  thick, obscurely rugulose to nearly smooth (at 1100 magnifications), pale yellowish in 2% KOH. Pleurocystidia none; cheilocystidia 38-88 x 6-8  $\mu$ , cylindrical, somewhat capitate, often slightly ventricose near the base, abundant, conspicuous. Gill trama of slender, subparallel hyphae. Pileus cuticle an ixocutis, hyphae rather slender. Pileus trama of radial hyphae. Hypodermium of ~~anterior hyphae~~ <sup>cells + hyphal</sup> fragments. ~~Stipe cuticle~~ <sup>Stipe cuticle</sup> a zone of pallid grayish, somewhat angular, thick-walled hyphae. Caulocystidia as tufts, similar to cheilocystidia. Clamp connections on the pileus cuticular and stipe epicuticular hyphae.

*Hebeloma crustuliniforme* (Fr. Amans) Quel.  
(Sm - 2992) - Tenn - 19227



Ch x 1000



Profile

Face

Spores x 8000

OK

HEBELOMA CRUSTULINIFORME [sensu Murrill]

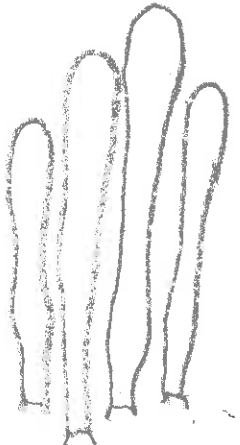
No. 2885, ex-Herb. New York Botanical Garden, label in Murrill's handwriting. No date given.

Notes by Hesler

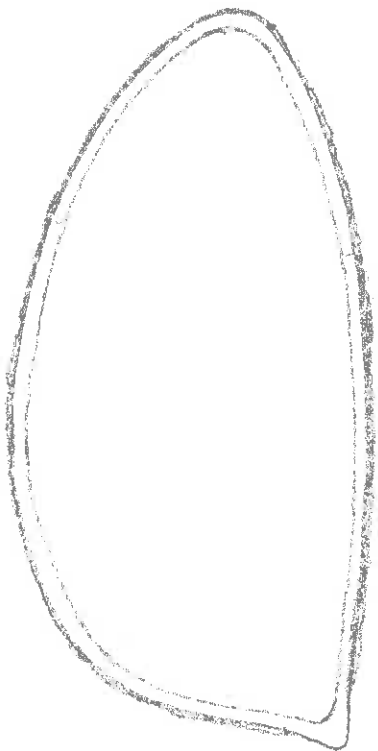
Spores 10-12(13.5) x 5.5-6.7  $\mu$ , somewhat inequilateral in profile, ellipsoid in face view, wall 0.3  $\mu$  thick, minutely rugulose, yellowish brown in 2% KOH. Pleurocystidia none; cheilocystidia 38-53 x 5-7  $\mu$ , in small tufts, clavate-ventricose, or merely clavate. Pileus trama of radial hyphae. Pileus cuticle an ixocutis. Hypodermium of cells and hyphal fragments (rather typical of this species). Stipe material not studied.

*Heloloma crustuliniforme* (sensu Murriell)

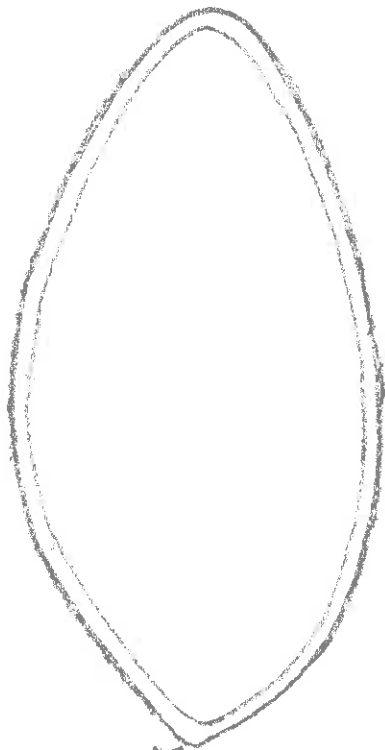
No. 2885, ex-Herb. N.Y. Bot. Garden, coll. at Garden, N.Y. (no date)  
(label in Murriell's hand-writing)



Ch X 1000



Profile



Face

Spore X 8000



HEBELOMA CRUSTULINIFORME Bull. [sensu Peck]

[see: N. Y. State Mus. Ann. Rept., 41: 68. 1888.]

ex-Herb. Peck, Albany, New York, leg-det Peck, Catskill Mts., Sept.

Notes by Hesler

Spores 7-10 x 4-5.5  $\mu$ , slightly inequilateral in profile, ellipsoid-pip-shaped in face view, relatively rather slender, wall rather thin, minutely rugulose, pale yellow to brown in 2% KOH. Pleurocystidia none; cheilocystidia 30-42 x 5-7  $\mu$ , in tufts or clusters, closely adhering to one another agglutinated and outline often difficult to distinguish, clavate to ventricose below or mid-way. Pileus cuticle a distinct but rather thin ixocutis. Hypodermium of brown cells and hyphal fragments. Stipe cuticle of dry, repent hyphae. Caulocystidia clavate to ventricose, in tufts, somewhat similar to cheilocystidia.

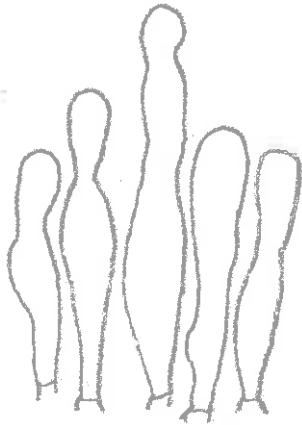
The spores of typical crustuliniforme of Europe (i.e., material I have studied) are larger than in the above Peck specimens. ~~Peck~~ Peck in his Bulletin 139:73, gives the spores 9-12 x 5-7  $\mu$ ; but those I measured were 7-9(10) x 4-5.5  $\mu$ . Otherwise, the Peck specimens agree rather well with European material.

In 1888, Peck (Rept 41: 68) ~~gives~~ <sup>in</sup> a published report, lists this species, and I have examined this collection (notes above). Except for <sup>very</sup> ~~slightly~~ slightly smaller spores, it appears to be a correct identification. This would appear to be the first (at least an early) report of this agaric for the U.S.

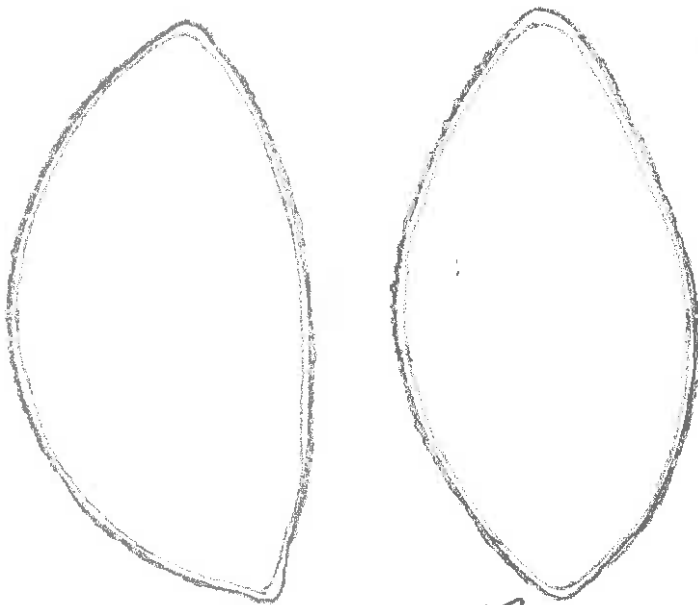
There is the possibility that the spores measured were not fully mature (mature were made from the gills).

*Hebeloma crustuliniforme* Bull.

ex-Heldt. Peck (Albany), Catskill Mts., Char. H. Peck, Sept.



Ch x 1000



Profile

Face

Spores x 8000

*Not this!*

HEBELOMA CRUSTULINIFORME Bull. [sensu Peck]

ex-Herb., Albany (Peck), leg-det Peck, Carrollton, New York, Sept.

Notes by Hesler

Spores 9-12 x 5.5-7  $\mu$ , a few very large: 14-21 x 7-9  $\mu$ , inequilateral in profile, ellipsoid to slightly subovoid-sublimoniform in face view, coarsely <sup>to warty-rugose,</sup> rugose, ~~many~~ most spores slightly calyptrate, many with more or less of a "nose", brown in 2% KOH. Pleurocystidia none; cheilocystidia 36-62 x 5-8  $\mu$ , in clusters, ventricose, apices obtuse to somewhat rounded-subcapitate. Pileus cuticle an ixocutis. Hypodermium hyphoid. Stipe cuticle of dry, repent hyphae. Caulocystidia not found.

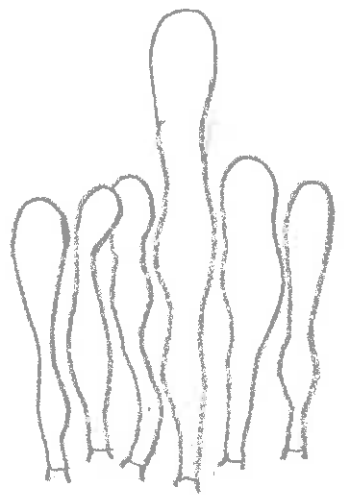
This is not H. crustuliniforme of Europe: the spores are mostly of the size agreeing with crustuliniforme but the ornamentation is distinctly different -- it is very coarsely <sup>or warty-rugose,</sup> rugose and slightly calyptrate; moreover, the hypodermium is hyphoid rather than of cells <sup>and</sup> ~~as~~ hyphal fragments.

Some of its characters suggest our H. piceicola sp. nov. It is altogether different from Peck's H. crustuliniforme described from the Catskill Mts., New York.

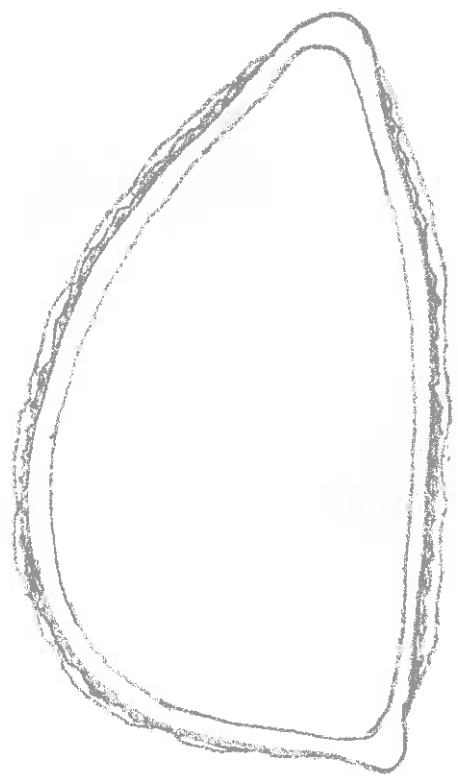
*Without notes by Peck on the fresh material I can not name it; perhaps near H. brunnerifolium.*

*Hebeloma crustuliniforme* [sensu Peck]

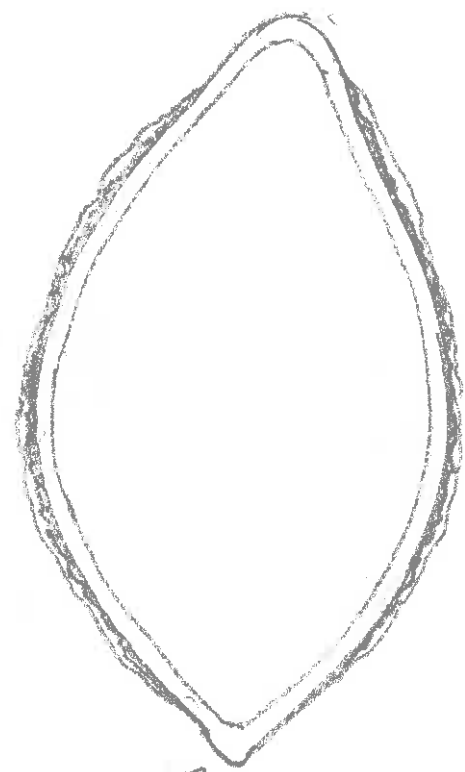
ex-Herb. Albany, N.Y. (Peck), leg. det Peck,  
Carrollton, N.Y., Sept.



Ch x 1000



Profile



Face

Spores x 8000

OK

HEBELOMA CRUSTULINEFORME (Bull. ex St. Amans) Qué1. sensu  
Qué1. var. crustuliniforme

Bruchet No. 63. BR. 6, from Samoens Region,  
France, under Corylus and Fraxinus, October 9, 1963,

Notes by Hesler

Spores ~~10.5-12~~<sup>9.5-12</sup> x 6-7.5  $\mu$ , slightly inequilateral in profile, subovoid in face view, wall 0.3  $\mu$  thick, rugulose, yellowish brown in 2% KOH. Basidia 28-37 x 7-8  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 40-76 x 6-7  $\mu$ , sub-cylindric-subcapitate, subventricose downward. Gill trama of slightly undulating subparallel hyphae. Pileus trama ~~of radial~~<sup>extending radially</sup>, and somewhat loosely interwoven hyphae. Pileus cuticle a rather thin ixocutis. Hypodermium a zone of ~~interwoven hyphae~~<sup>hyphal fragments and some cells</sup> ~~that have been fragments of hyphae and~~<sup>are seen in both radial and tangential sections</sup>. Stipe cuticle a zone of pallid, thick-walled hyphae, the surface bearing tufts, or at times a turf, of caulocystidia, similar to cheilocystidia but longer (52-115 x 4-7  $\mu$ ). Clamp connections at the base of cheilocystidia.

~~Microscopically, this differs somewhat from that of BAS-2375. In Bas' collection, the spores have a slight nose (snout), and the wall ornamentation is asperulate-rugulose, often calyptrate, the cheilocystidia slightly broader, the hypodermium obscure or absent.~~

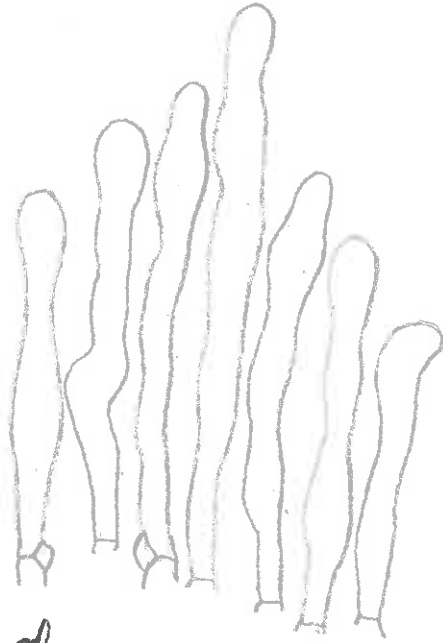
Pegler & Young (1971:97) electron micrograph:  
(Pl. 20, fig 6): the ecto-perisporium appears far more fragmented than in (next page) —

H. crustuliniforme - page 2  
(63. PAR 6)

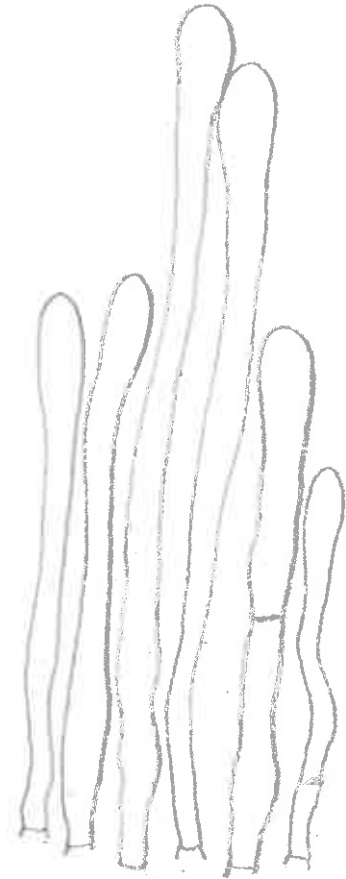
H. anthracophilum but showing a tendency to remain attached to the exosporial verrucae.

Bruchet (1970:76) says of the pileus cuticle: pileus cuticle usual, but the subcutis generally only slightly pigmented.

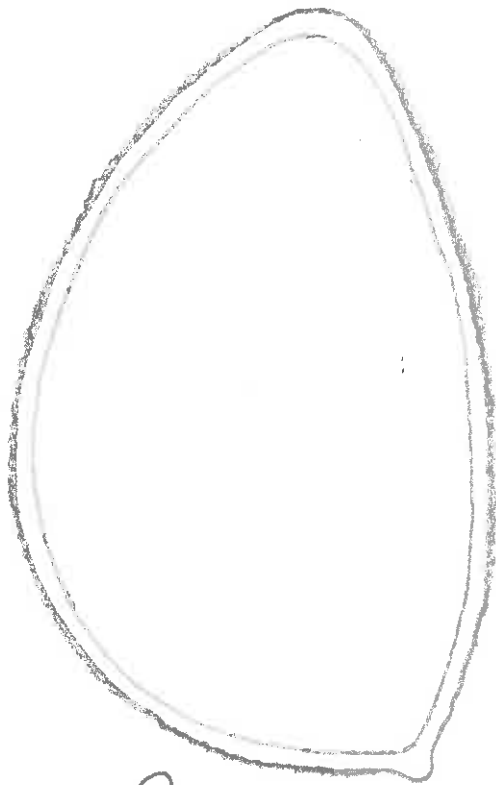
*Heloloma crustuliniforme* sensu QuéL.  
Bruchet No. 63. BR. 6.



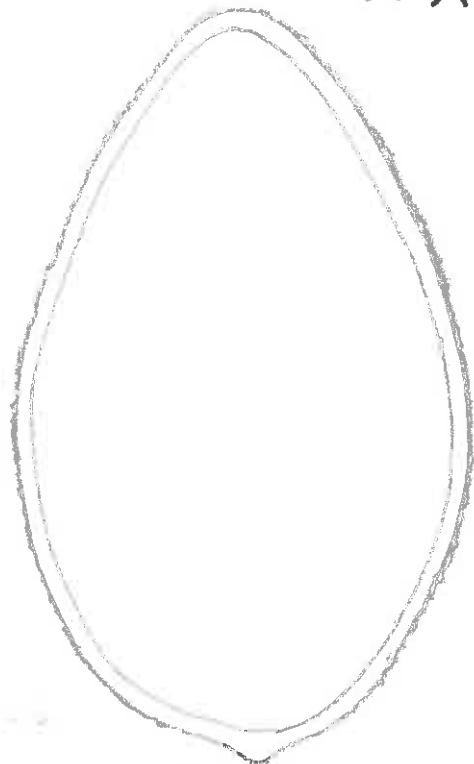
Ch  $\times 1000$



Cauls  $\times 1000$



Profile



Face

Spores  $\times 8000$

-OK

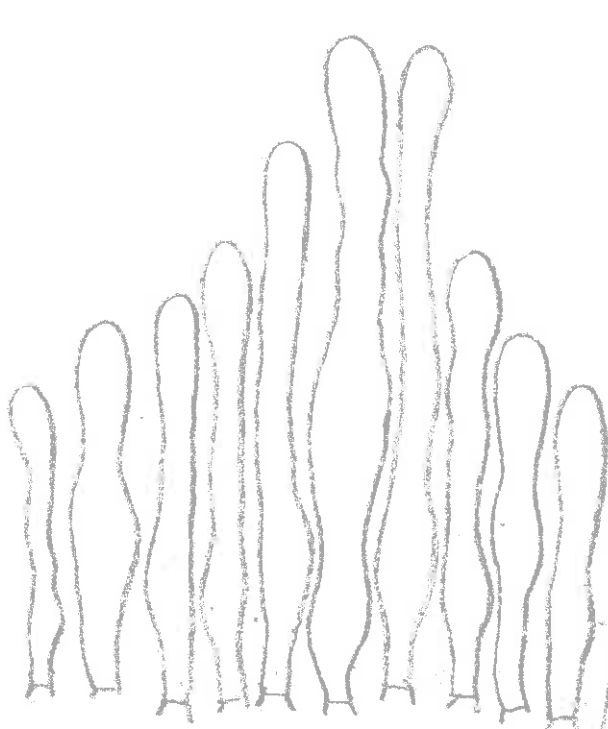
39734      HEBELOMA CRUSTULINIFORME (St. Amans) Qué1.

Ex-Bruchet, <sup>Savoie</sup>~~Canada~~, September 5, 1974

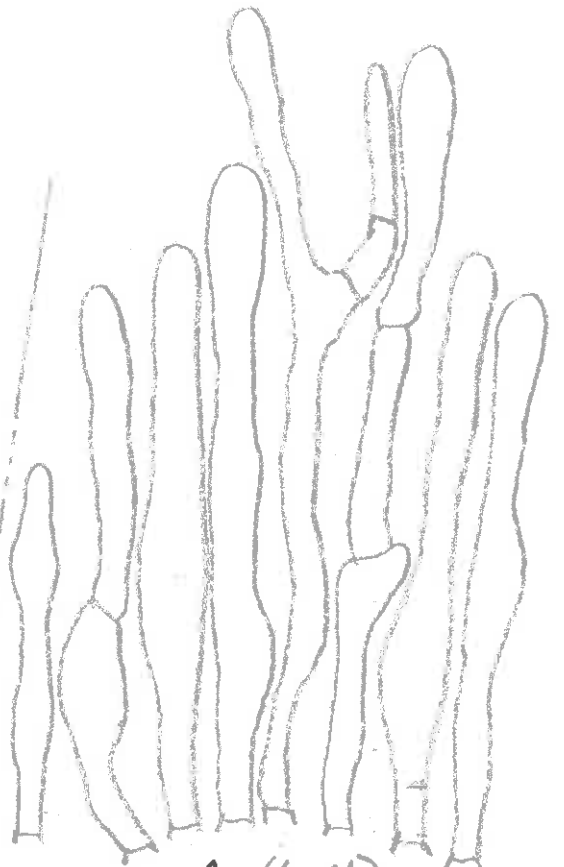
Spores 9.5-12 x 5.5-7  $\mu$ , inequilateral in profile, ellipsoid to subovoid in face view, at times slightly sublimoniform, <sup>a few</sup> and with a slight "nose," wall 0.3  $\mu$  thick, rugulose, pale brown in 2% KOH. Pleurocystidia none; cheilocystidia 40-88 x 5-11  $\mu$ , apices often subcapitate, ventricose below or toward the middle. Pileus trama radial. Pileus cuticle an ixocutis. Hypodermium of irregular cells ~~hyphae~~ and hyphal fragments. Stipe cuticle of repent hyphae. Caulocystidia in tufts, 48-106 x 5-8  $\mu$ , similar to cheilocystidia, at times septate. Clamp connections on the pileus cuticular hyphae.



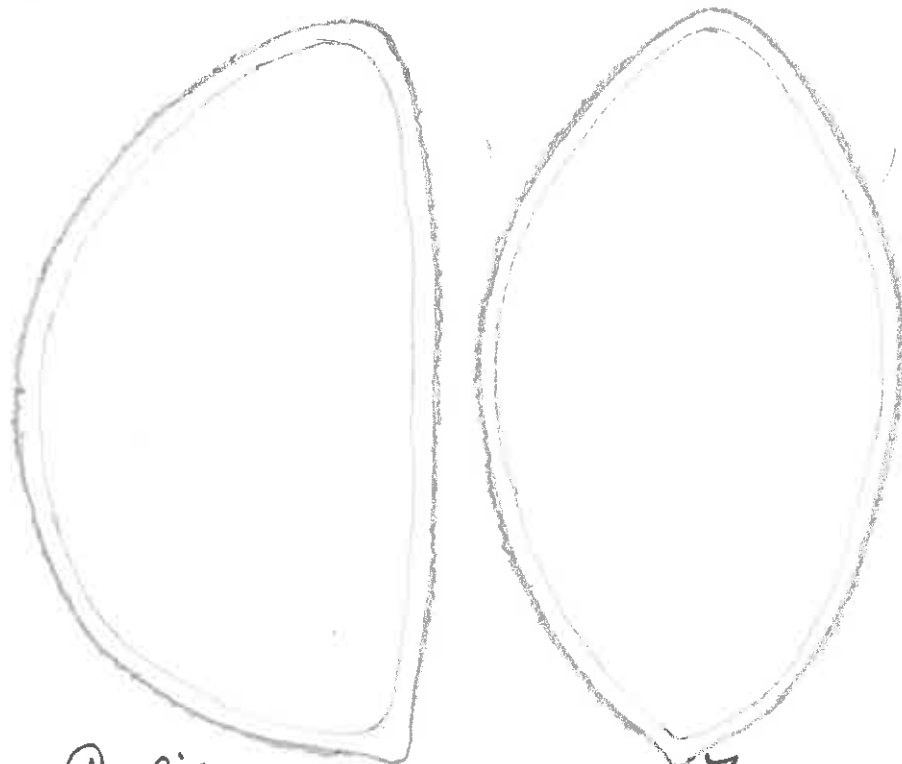
*Nebeloma crustuliniforme*  
Bruchet - ~~Barro Colorado~~ <sup>Savoie</sup> Sept 5, 1974



Ch x 1000



Caulo (tuft) x 1000



Profile

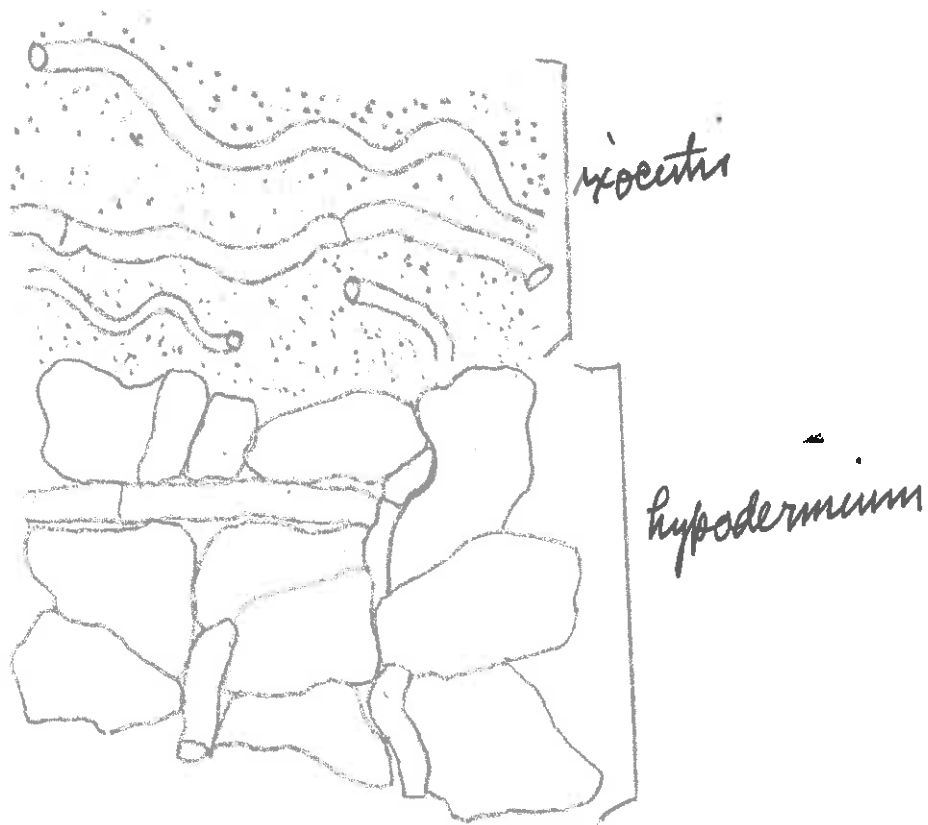
Spores x 8000

Face

more,  
next sheet

*Hebeloma crustuliniforme*

Savoie  
Bruchet - ~~Mamadà~~ Sept 5, 1974



Pileus cuticle and  
Hypodermium (of cells + hyphae)  
- X 1000

OK

39735      HEBELOMA CRUSTULINIFORME (St. Amans) Qué1.  
Leg. Bruchet, No. 64 BR 21, in forest. Savoie, France,  
Sept. 10, 1964.

Spores 10-12.5 x 5.5-7  $\mu$ , inequilateral in profile, ellipsoid to subvoid in face view, rarely with a slight "nose," rugulose, yellowish brown in 2% KOH. Pleurocystidia none; cheilocystidia 36-78 x 5-8  $\mu$ , cylindrical, subcapitate, often more or less ventricose below. Pileus cuticle an ixocutis. Hypodermium cellular ~~angular~~ mixed with hyphal fragments. Stipe cuticle repent. Caulocystidia in tufts, 63-107 x 4-8  $\mu$ , similar to cheilocystidia.

-OK

39736 HEBELOMA CRUSTULINIFORME (St. Amans) Qué1.

63. PR 3

Leg. G. Bruchet, Savoie, France, Bruchet-~~65~~3, Sept. 9, 1963

Spores 10-12 x 5.5-7  $\mu$ , inequilateral in profile, sub-ellipsoid, subovoid, to sub-limoniform in face view, ~~the~~ <sup>a few</sup> ~~with~~ with a slight "nose," yellowish brown in 2% KOH, wall 0.3  $\mu$  thick, rugulose. Pleurocystidia none; cheilocystidia 35-67 x 5-8  $\mu$ , cylindrical, subcapitate, often ventricose below. Pileus cuticle an ixocutis. Hypodermium cellular, with inter-mixed hyphal fragments. Stipe cuticle repent. Caulocystidia in tufts, 76-124 x 5-9  $\mu$ , similar to cheilocystidia.

HEBELOMA CRUSTULINIFORME

near aeonium, because of  
just slightly larger  
spores, and hyphoid  
hypodermium.

H1266175, leg.-det. D. A. Reid, Bedgebury Pinetum, Kent, England,  
October 17, 1971

Notes by Hesler

Spores 9-13.5(15) x 5.5-6.5(7)  $\mu$ , inequilateral in profile, ellipsoid in face view, wall 0.4  $\mu$  thick, rugose (at times conspicuously to coarsely so), yellowish brown in 2% KOH. Pleurocystidia none; cheilocystidia 40-62 x 7-12  $\mu$ , cylindrical-<sup>clavate (at apex)</sup>capitate, the stalk slender, the capitellum <sup>clavate</sup> large, and conspicuous, occasionally slightly ventricose near base, in clusters. Pileus cuticle an ixocutis, not always well-defined. Hypodermium hyphoid, ~~not well developed~~ Stipe cuticle of repent hyphae, dry, bearing a few clusters of caulocystidia, similar to cheilocystidia.

Although this is labelled H. crustuliniforme, there are notable differences between this collection and those of others: spores are slightly longer, slightly more coarsely rough; the cheilocystidia are quite different in shape, as are the caulocystidia.

Notes by D. A. Reid

In the packet, notes as follows in Reid's handwriting: Gills weeping with brown droplets. No very distinct smell (I found that after soaking in 90% alcohol and then water, the sections gave off a distinct raphanoid odor - Hesler). Cap uniformly pale. Keys <sup>strictly</sup> ~~similar~~ to H. ingratum (Bruchet's Monograph), except that the cystidia are not so clavate.

My (Hesler's) comments on H. ingratum: it has a pungent odor, taste raphanoid; moreover, in H. ingratum the spores are different, and

Ag. Reid, Oct 17-71

the cheilocystidia are much less capitate than in Reid's collection.

Reid's collection (labelled H. crustuliniforme) is microscopically rather close to H. alpinum (Favre) Bruchet: both the spores (in size, shape, and ornamentation) and the cheilocystidia are similar. In H. alpinum, however, the odor is raphanoid or fruity, and the taste raphanoid becoming bitter. My study of Bruchet's material (BR 64-6) shows strongly capitate cheilocystidia; but Bruchet's illustration (Monogr., Pl. XVII, fig. 5) shows cheilocystidia cylindric (not capitate).

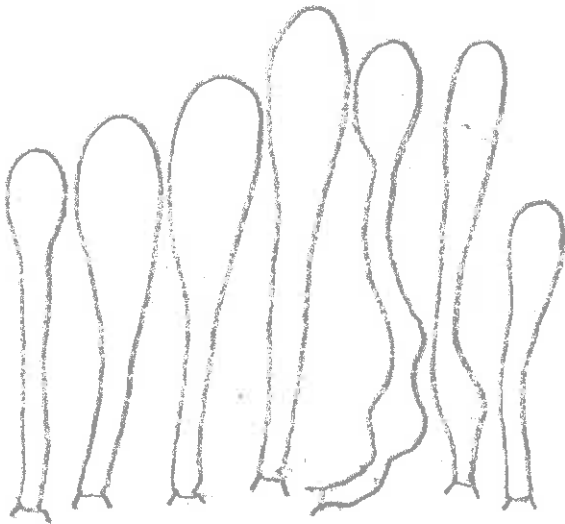
I guess that Reid's collection is ~~not~~ near H. alpinum ~~is near~~  
and, for now, I call it H. alpinum [or possibly  
H. crustuliniforme var. alpinum.]

*Hebeloma crustuliniforme*

Comin. D. A. Reid, Kew, leg. Reid, Beddington.

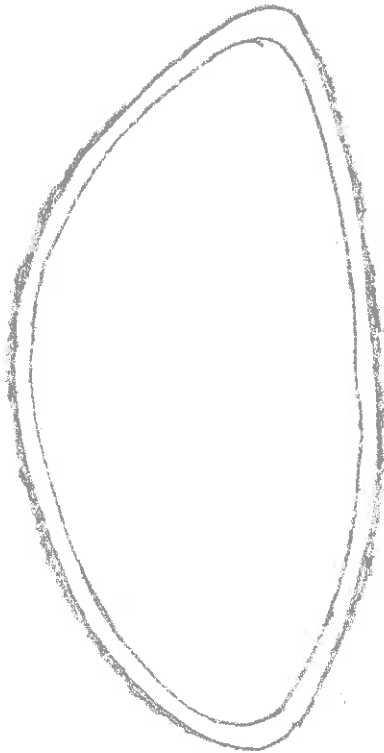
Pitstone, Kent, England, Oct. 17, 1971

No. H 1266175.

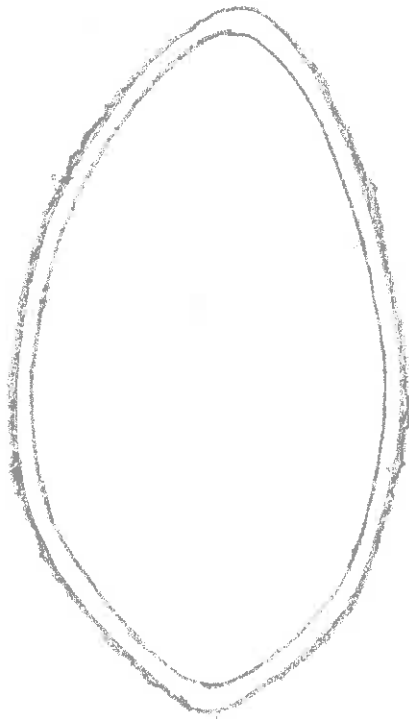


Ch - x 1000

[Cauls in tufts,  
similar to Ch.]



Profile



Face

Spores x 8000

*alpinum* (Favre) Bonchet!

HEBELOMA CRUSTULINIFORME (Bull. ex St. Amans) Quéf.

No. H 1266175; leg.-det. D. N. Pegler, Monks Woods,  
Huntingdonshire, England, September 7, 1974.

Notes by Hesler

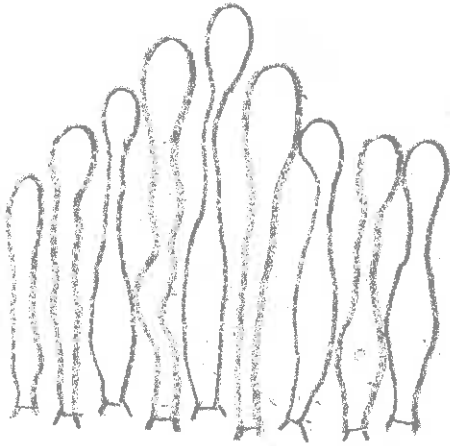
Spores 10-12(12.5) x (6.5)7-8.5(9)  $\mu$ , inequilateral in profile, broadly (or short) ellipsoid in face view, minutely rugulose to nearly smooth, yellowish brown in KOH, wall 0.4  $\mu$  thick. Pleurocystidia none; cheilocystidia 30-55 x 4-7  $\mu$ , subcylindric-capitate, stalk equal or ventricose below, at times ampullaceous, in clusters. Gill trama of narrow, subparallel hyphae. Pileus cuticle an ixocutis. Hypodermium of ~~radially arranged hyphae; which is not typical of crustuliniforme.~~ <sup>hyphae.</sup> Pileus trama of radially arranged hyphae. Stipe cuticle of repent, dry hyphae, with widely scattered tufts of caulocystidia, 62-78 x 3-7  $\mu$ , subcylindric or filamentous, apices more or less capitate. Clamps not seen.

This differs from H. crustuliniforme in its broader spores, and different cheilocystidia. Moreover, it is not the same taxon as that labelled H. crustuliniforme which was collected by Reid, ~~same number~~ but on October 17, 1971 (No. H. 1266175). This seems to be H. alpinum, or a form of it.



*Helveloma crustuliniforme*

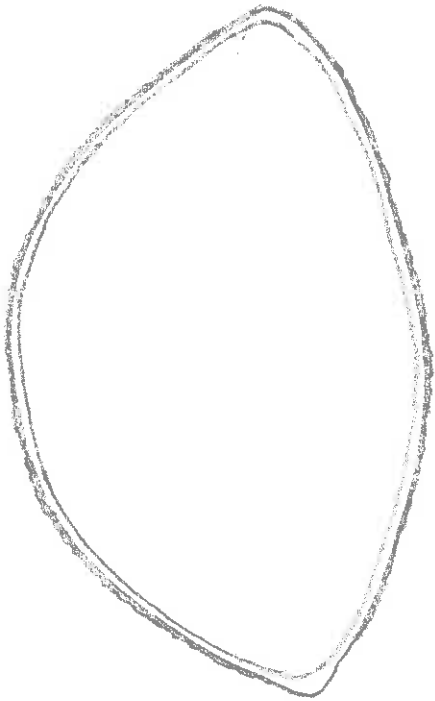
No. ~~#1266175~~, leg. det. R. N. Pegler, Monks Woods,  
Huntingdonshire, England, Sept. 7, 1974



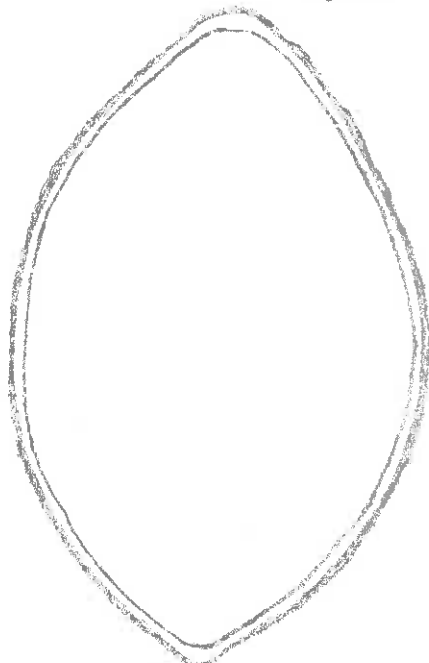
Bas - x 1000



Basidia x 1000



Profile



Face

Spores x 8000

-OK

HEBELOMA CRUSTULINIFORME

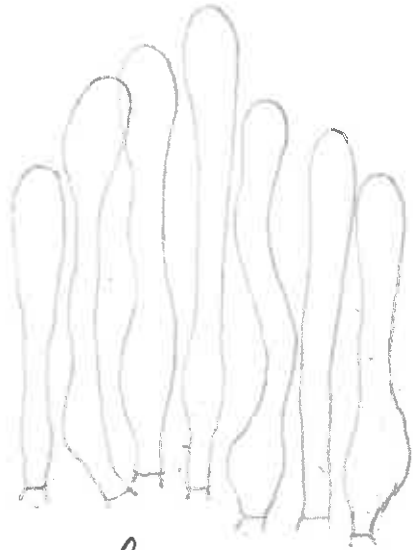
Leg. Romell No. 9913, Stockholm, August 30, 1896

Notes by Hesler

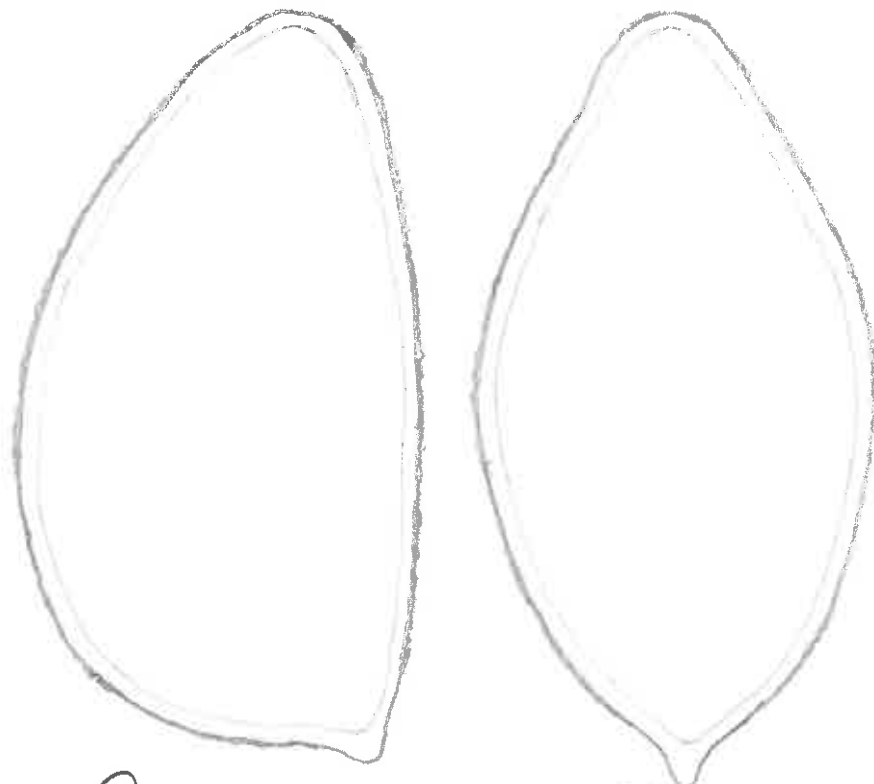
Spores 9-12 x 5.5-7  $\mu$ , inequilateral in profile, subfusoid to sublimoniform in face view, some with a slight "nose," wall 0.3  $\mu$  thick, minutely rugulose to nearly smooth, not calyptrate, pale yellowish brown in 2% KOH, pale pinkish brown in Melzer's reagent. Pleurocystidia none; cheilocystidia 42-63 x 6-8  $\mu$ , subcylindric, apices often subcapitate, base more or less ventricose. Gill trama of subparallel hyphae, 4-7  $\mu$  broad. Pileus trama of radial hyphae. Pileus cuticle an ixocutis. Hypodermium of ~~interwoven hyphae~~ <sup>cells + hyphal</sup> fragments ~~from cells swollen, and at times appears cellular,~~ because the hyphae are intertwined, the cut ends appear as "cells" in both radial and tangential sections. Stipe cuticle of dry, pallid, angular, thick-walled hyphae. Caulocystidia similar to cheilocystidia, in tufts or often as a turf.

Agrees very well with Bruchet 63.6.

*Abelona crustuliniforme*  
Romell No. 9913



Ch x 1000



Profile

Face

Spores x 8000

-OK

HEBELOMA CRUSTULINIFORME

ex-Herb. Karsten; leg.-det. P.A. Karsten, No. 1453,  
Finland, August, 1889.

Notes by Hesler

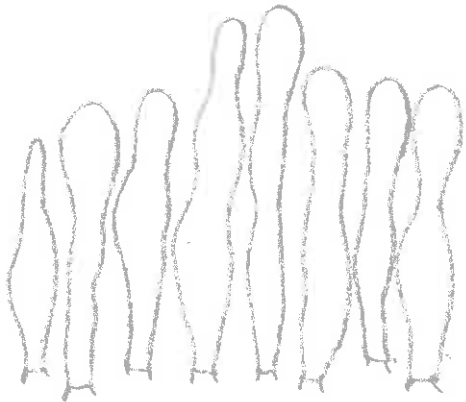
Spores 9.5-12 ~~microns~~ x (5.5)6 - 7(7.5) $\mu$ , inequilateral, <sup>some with an obscure "nose"</sup> in profile, ellipsoid to sub-pipshaped in face view, most individual spores with a slightly rugulose wall, yellowish brown in 2%KOH. Pleurocystidia none; cheilocystidia 30-48 x 5-8 $\mu$ , ventricose below or at middle, or subclavate, at times sub-capitate, abundant. Gill trama of narrow, subparallel ~~hyphae~~ <sup>trama of radial hyphae</sup>. Pileus cuticle an ixocutis. Stipe cuticle of dry repent hyphae, bearing scattered caulocystidia, similar to cheilocystidia, 36-54 x 7-9 $\mu$ .

Hypodermium of cells and hyphal fragments.

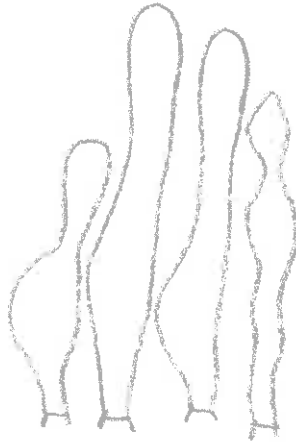
Quite similar to Karsten 1454.

*Helidoma crinituliforme*

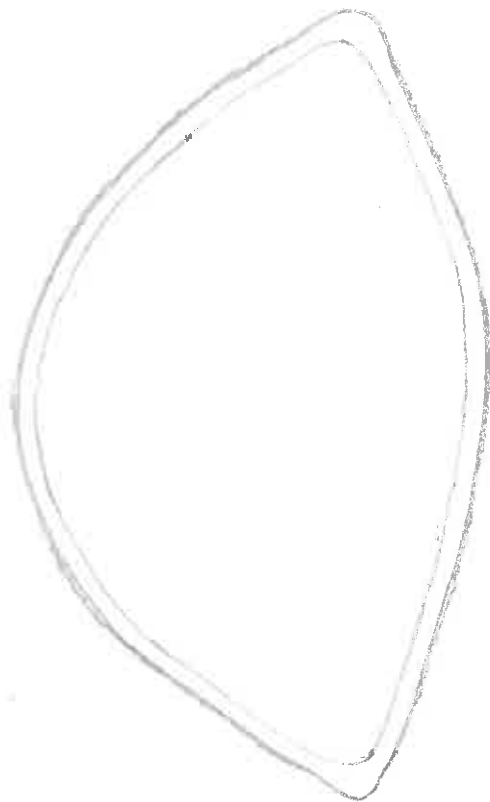
ex - Karsten Herb., Helsinki, Aug. 1889, leg. - det.  
Karsten No. 1453



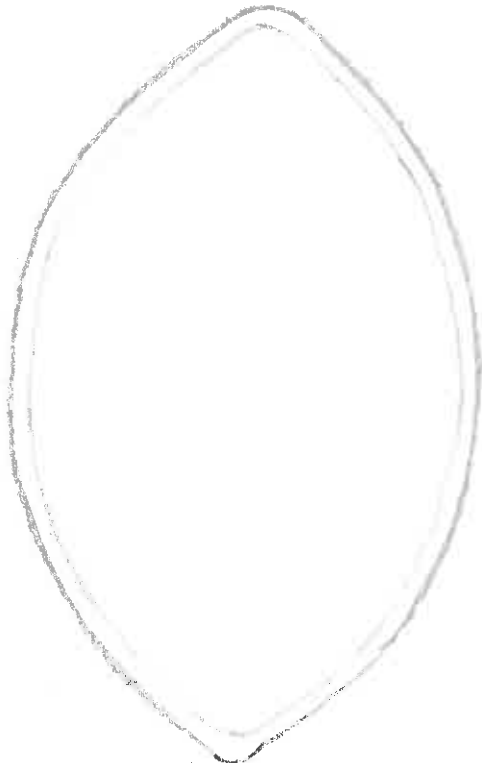
Ch - x 1000



Caules - x 1000



Profile



Face

Spores x 8000

-OK

HEBELOMA CRUSTULINIFORME

No. 1454, Herb. P. A. Karsten, Helsinki, leg.-det. Karsten,  
Finland, Aug. 31, 1865.

Notes by Hesler

Spores 9-12.5 x (5.5)6-7 $\mu$ , inequilateral in profile,  
 ellipsoid to subvoid in face view, wall minutely rugulose  
 with a few spores smooth or nearly so, yellowish-brown in  
 2% KOH. Pleurocystidia none; cheilocystidia in clusters,  
 32-50 x 5-7.5 $\mu$ , cylindric, often ventricose below or near  
 the middle. Pileus cuticle an ixocutis. ~~Hyphae~~ <sup>Pileus trama radial.</sup>  
 Caulocystidia in clusters (tufts), 46-104 x 6-9 $\mu$ , cylindric, often  
 subcapitate, and also at times slightly ventricose (similar to  
 cheilocystidia).

~~Very~~ Closely similar to Karsten No. 1453.

Hypodermium cellular with  
hyphal fragments.

Tenn - 36908

OK

HEBELOMA CRUSTULINIFORME (St. Amans) Qué1.

collected by Petersen, Belgium, Oct. 21, 1972,  
[identified by \_\_\_\_\_?]

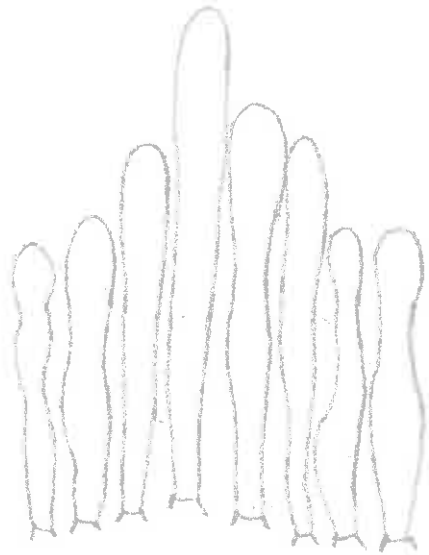
Notes by Hesler

Spores ~~(9)~~ (9) 10.5-12.5(13) x 5.5-7.5 $\mu$ , inequilateral in profile, ellipsoid in face view, rugulose to nearly smooth, yellowish brown on 2% KOH. Pleurocystidia none; cheilocystidia 37-65 x 5-8 $\mu$ , cylindric, usually ventricose below or midway, in tufts. Gill trama of subparallel hyphae, 5-9 $\mu$  broad. Pileus cuticle an ixocutis. Hypodermium of cells and hyphal fragments. Stipe cuticle dry, of repent hyphae. Caulocystidia 40-114 x 7-11 $\mu$ , in tufts, similar to cheilocystidia but much longer, and with some clamp connections at base.

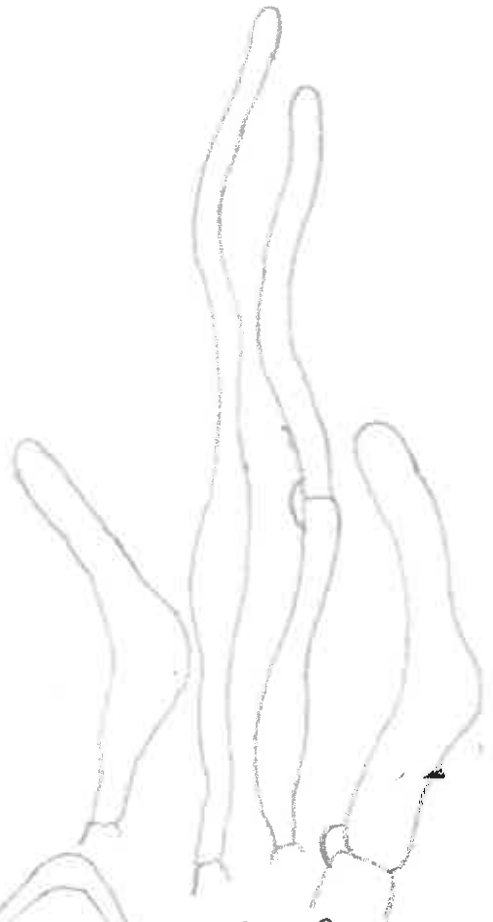
Agrees very well with Karsten 1453.

36908 *Hebelome crustuliniforme*

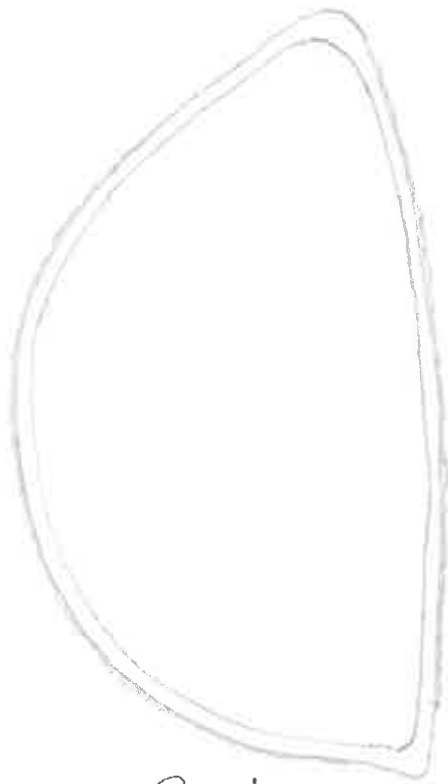
leg. Petersen, Belgium, Oct 21, 1972.



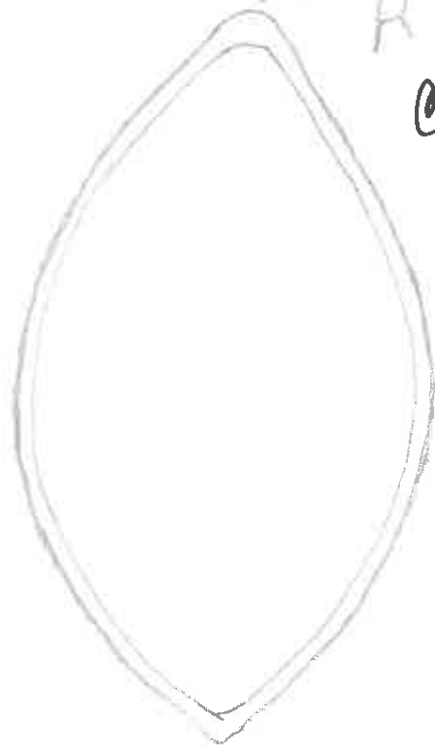
Ch x 1000



Canls x 1000



Profile



Face

Spores x 8000



Tamm-5264

HEBELOMA CRUSTULINIFORME

ex-Herb. Budapest, leg.-det. G. Bohus, Hungary, Mts. Bukk,  
July 9, 1956

Notes by Hesler

Spores 9.5 -12(13) x 5.5-7.5 $\mu$ , inequilateral in profile, ellipsoid in face view, minutely rugulose, yellowish brown in 2% KOH. Pleurocystidia and cheilocystidia not found. Pileus ixocutis distinct. Gill trama of subparallel hyphae, 6-9 $\mu$  broad.

The specimens were of thin slices, glued closely to cardboard; it was therefore difficult to ~~get~~ get satisfactory sections.

Notes by Bohus, which accompany the collection:  
"Pileus <sup>(dried)</sup> pallid (pale-yellow) to bread-colored. Lamellae brown. Stipe bright colored, granular (pruinose?). Odor of ~~radish~~ radish.

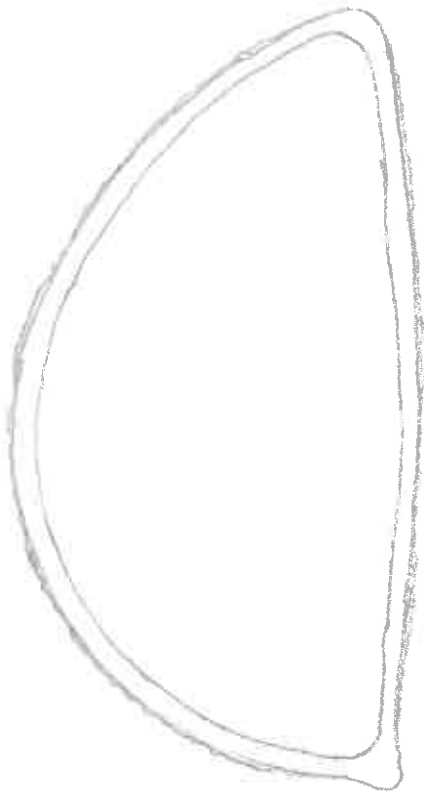
Spores (9.3) 11.7 <sup>14</sup>/~~14~~ x (4.7) 5.4 - 6.2  $\mu$ " (with drawings) \*

5264

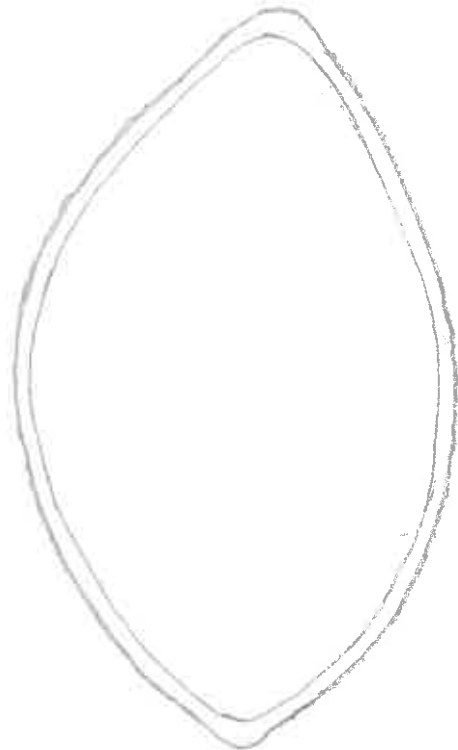
*Hebeloma crustuliniforme*

ex - Herb. Budapest, leg.-det. G. Bohus, Mt. Bükk,  
July 9, 1956.

[Ch. not found]



Profile



Face

Spores x 8000

2375

HEBELOMA CRUSTULINIFORME (St.-Amans) Quel.

No! Spore ornamentation wrong!!  
near pseudomagnificum but  
somewhat different

Leg-det Bas No. 2375, Holland, Rhijnhof, among grass, under  
Tilia, on black sandy clay, August 28, 1961

Notes by Bas

Perhaps closest to my  
H. asperulatum.

Pileus 4-6 cm broad, at first rounded conic with a broad rounded disc and inflexed margin, later spreading, with a broad low umbo, sometimes surrounded by a circular depression, with a deflected margin, rather fleshy and elastic, non-hygrophanous, very pale, center chamois or isabella, margin buffy whitish to white, glabrous except the young pileus margin (minutely downy and slightly radially rugulose), smooth, weakly shining except the margin (under strong hand-lens minutely felted with shiny patches, back-ground showing). Context white, somewhat brownish under the pileipellis, somewhat glassy marbled over the gills and in peripheral parts of stems, in old specimens ochraceous-stramineous yellow tinged in base. Odor very strong, sweetish-aromatic and raphanoid (spontaneously or when cut), after crushing strongly raphanoid; taste strongly bitter-raphanoid.

Lamellae adnate, when young pale beige with a weak flesh-pink tinge, later fairly dark clay brown, edges irregular, white, subgranular, beaded and with age dark brown spotted.

Stipe 4-6.5 cm long, 5-7.5 mm thick, white to sordidwhite, in older specimens the base somewhat tinged ochraceous-stramineous (not brown), with small scattered white granular dots to small fibrillose scales on a longitudinally fibrillose-striate shining background, with water-drops at apex when young, cylindrical with a [slightly clavate] to rounded bulbous base (up to

15 mm), solid.

Spores 10.2-11.7 x 5.4-6.3  $\mu$ , amygdaliform. Cheilocystidia 60-80 x 6-13  $\mu$ .

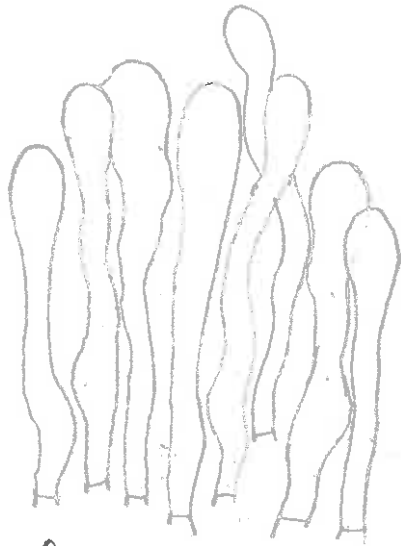
Notes by Hesler

Spores 10-12(-13-15) x 5.5-7(8)  $\mu$ , inequilateral in profile, subellipsoid to sublimoniform in face view, apex often with a more or less conspicuous snout, wall 0.4-0.5  $\mu$  thick, asperulate and rugulose (the wrinkles short), often calyptrate, the calyptra sometimes confined to the lower half of the spore, yellow brown in 2% KOH. Basidia 25-30 x 7-8  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 42-60 x 5-10  $\mu$ , more or less subcylindric-capitate, sometimes the base slender or again ventricose on one side. Gill trama of subparallel hyphae, 4-9  $\mu$  broad. Pileus trama of loosely interwoven broad hyphae. Pileus cuticle an ixocutis; ~~the~~ hypodermium of brownish ~~interwoven hyphae (this appears to be of cells and hyphal fragments)~~. Stipe cuticle dry, repent. Clamps on pileus cuticular hyphae.

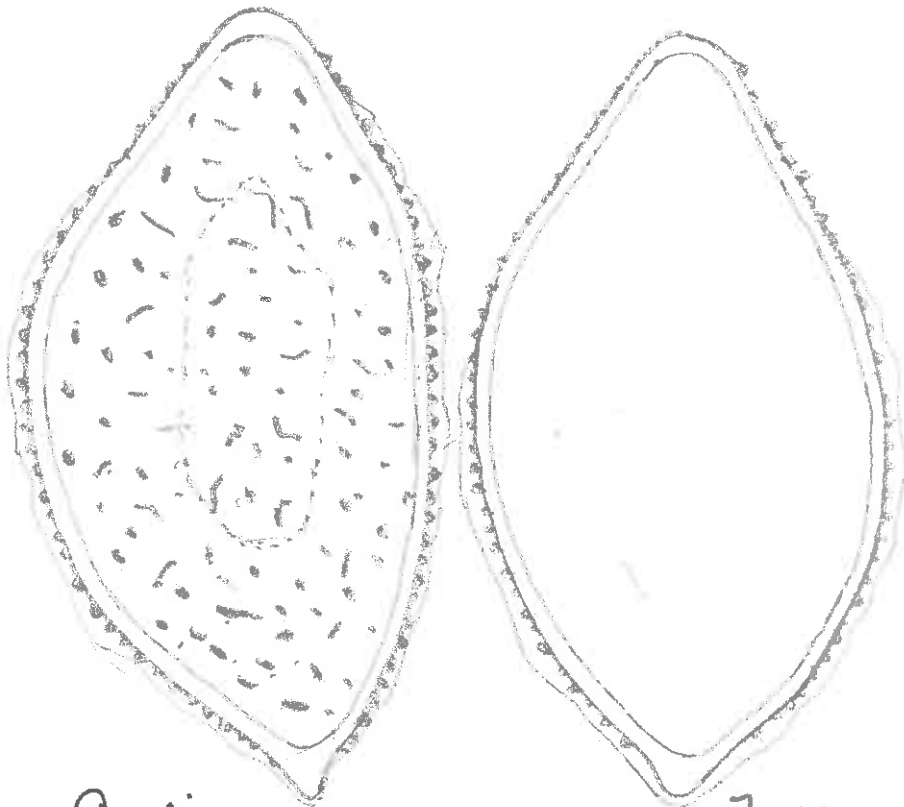
This is different from crustuliniforme of Briichet, & Romell, especially in spore-ornamentation. In my key it goes rather easily to ochraceodiscum, but in the latter the pileus trama is radial, and the hypodermium is cellular. It is also <sup>very</sup> near asperulatum, in which the spores are slightly but distinctly more narrow.

*Helvella crustuliniforme* (St. Amant) Quel. (?)

Bas - 2375



ch x 1000



Profile

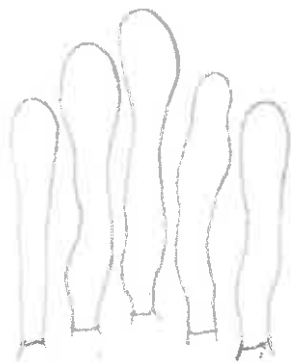
Face

Spores x 8000

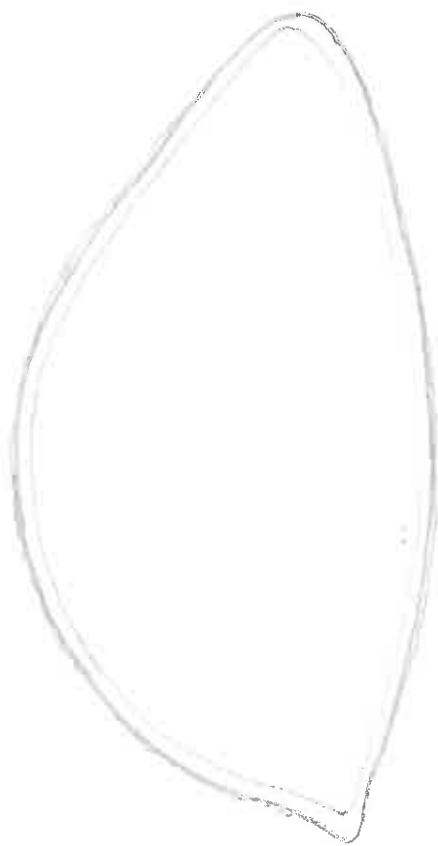
*Helvonia crustuliforme* Quel.

Baldom (N.C. 82), Oct. 1938

Fig. Rupert Smith (ex. Edinburgh Herb.)



Ch x 1000



Profile



Face

Spores x 8000

calyptrate - asperulate spores

HEBELOMA CRUSTULINIFORME agg.

ex-Herb. Edinburgh, under Betula, leg. H. Hertice, No.

429C, August 25, 1962. (Note on packet: "cf. Leucosarx,  
R. W.")

Notes by Hesler

Spores 8.5-10(11) x (4.5)5-5.5  $\mu$ , inequilateral in profile, subellipsoid to subfusoid in face view, wall 0.25  $\mu$  thick, nearly asperulate, many spores slightly calyptrate; yellowish brown in 2% KOH, reddish brown in Melzer's reagent. Basidia 27-30 x 6-7  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 30-56 x 5-7  $\mu$ , subcylindric, apices equal or subcapitate, base more or less ventricose. Gill trama of slender subparallel hyphae. Pileus trama of loosely interwoven hyphae. Pileus cuticle an ixocutis. Hypodermium cellular. Stipe cuticle of dry, pallid, slightly angular hyphae; surface bearing aerial epicuticular hyphae, the terminal elements often as caulocystidia, similar to cheilocystidia but longer. Clamp connections on stipe epicuticular hyphae.

Spore-ornamentation distinguishes this collection from other "crustuliniforme" collections from Edinburgh.

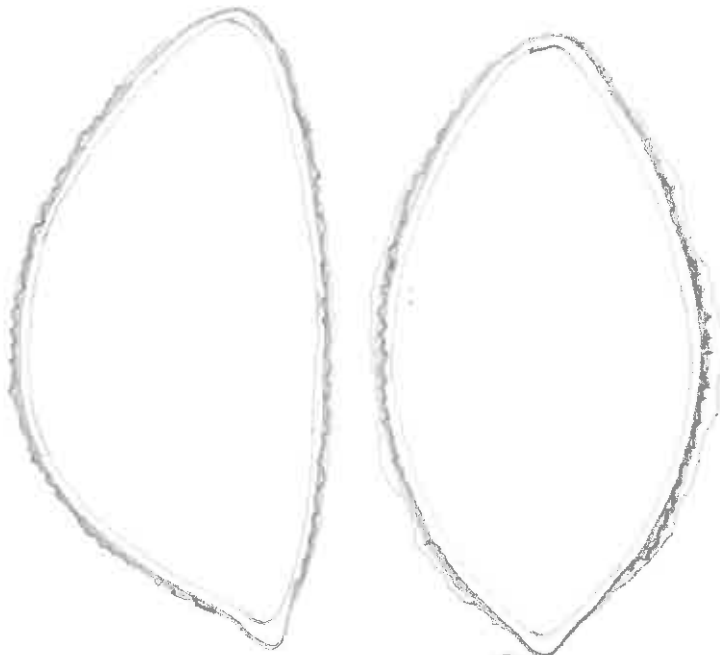
Near H. leucosarx, but spores too small, and are asperulate.

*Hebeloma crustuliniforme* agg.

ex-Herb. Edinburgh, Rock Garden, under Petula, Leg.  
H. Nectice, Aug. 25, 1962



@h x 1000



Profile

Face

Spores x 8000



leucosarx

HEBELOMA CRUSTULINIFORME (St. Amans) Qué1. sensu J. Lange

Leg. P. D. Orton, Stoke Row, Oxon., No. 599, November 7, 1955

(Borrowed and studied by Hesler, September, 1973)

Notes by Hesler

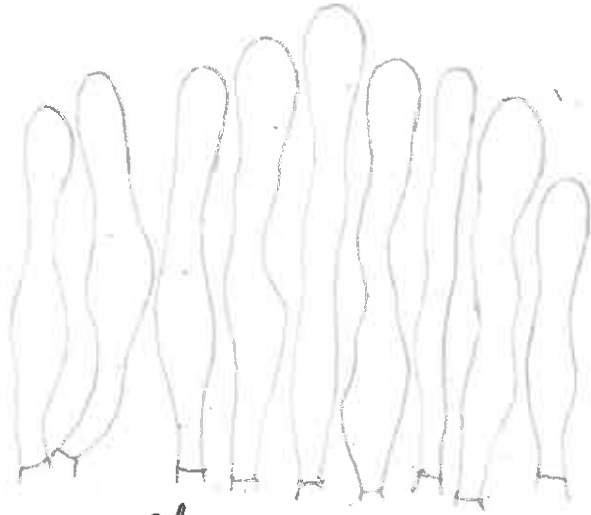
Spores 11-14.5 x 6-7.5  $\mu$ , inequilateral in profile, subvoid-subfusoid in face view, wall 0.3  $\mu$  thick, minutely rugulose to nearly smooth, yellowish brown in 2% KOH. Basidia 28-35 x 6-8  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 40-63 x 5-9  $\mu$ , subclavate to subcylindric, apex subcapitate, ventricose below in most, conspicuous. Gill trama of slender (3-5  $\mu$ ) hyphae. Pileus trama of loosely interwoven hyphae. Pileus cuticle an ixocutis. Hypodermium a brownish cell-zone. Stipe cuticle of dry pale-gray, thick-walled, more or less angular hyphae, overlaid with a distinct brown, dry hyphoid zone. Clamp connections not observed.

Spores: reddish-brown in Melzer's; blue in botton blue.

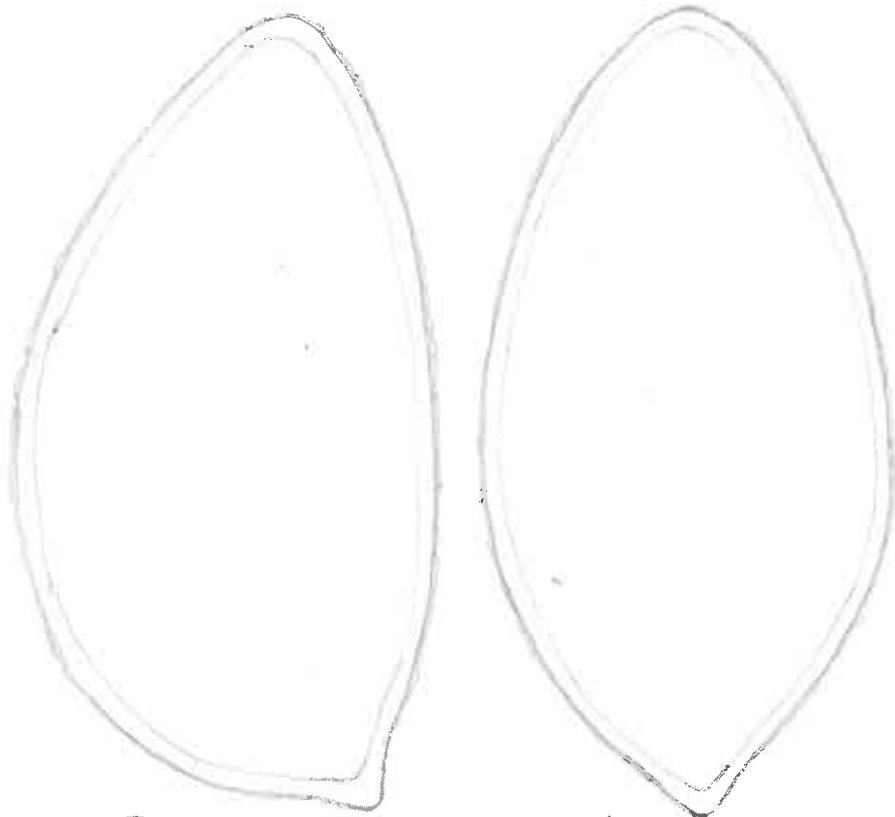
Spores a bit too large, and the pileus trama and hypodermium are different from Bruchet's collection.

cf. H. leucosarx, assuming it has the correct macroscopic features.

*Heloma crustuliniforme* (St. Aman) Quel.  
P. D. Dixon No. 599  
Genus J. Fänge



Ch x 1000



Profile

Face

Spores x 8000

No!

HEBELOMA CRUSTULINIFORME

Watling No. 3984, ex-Herb. Edinburgh, Elgin, August 14, 1966

Notes by Hesler

Spores 9-12 x 5.5-7  $\mu$ , inequilateral in profile, subvoid in face view, yellowish brown in 2% KOH, wall minutely rugulose, 0.3  $\mu$  thick. Pleurocystidia none; cheilocystidia 47-78 x 6-9  $\mu$ , subcylindric, subcapitate, often somewhat ventricose below. Gill trama of subparallel hyphae, 3-6  $\mu$  broad. Pileus trama of radial hyphae. Pileus cuticle an ixocutis. Hypodermium cellular. Stipe cuticle of pallid, dry, angular, thick-walled hyphae. Caulocystidia similar to cheilocystidia. Clamp connections not observed.

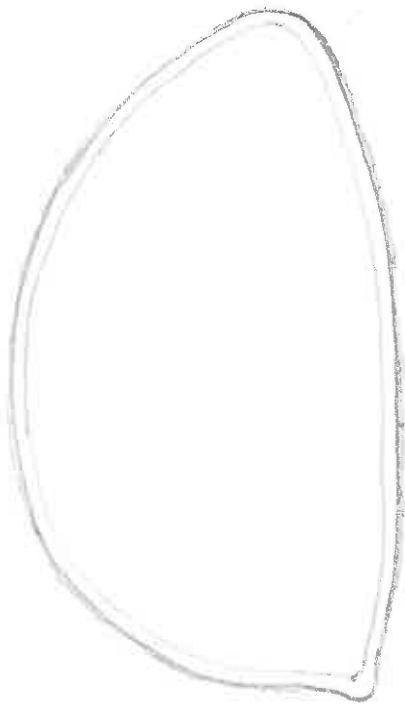
Differs from Bruchet's crustuliniforme in its cellular  
hypodermium. Near H. avellaneomarginatum.

*Hebeloma crustuliniforme* ?

Watling No. 3984, Edinburgh, Aug 14, 1966



ch x 1000



Profile



Face

Spores x 8000

No! asperulate spores!

HEBELOMA CRUSTULINIFORME

leg. Watling, No. 6035, ex-herb. Edinburgh, September 8, 1968

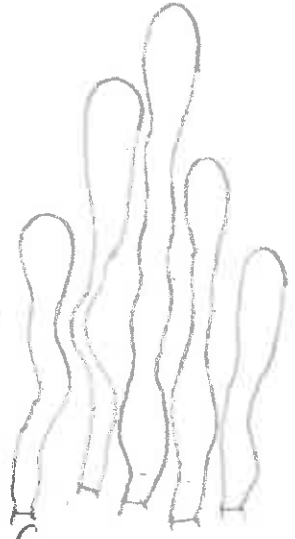
Notes by Hesler

Spores 9.5-12(13) x 5.5-6.5(7)  $\mu$ , inequilateral in profile, subfusoid in face view, wall 0.3  $\mu$  thick, asperulate (at times a bit obscurely so), yellowish brown in 2% KOH. Pleurocystidia none; cheilocystidia clavate, often the middle-portion narrow, 35-66 x 5-8  $\mu$ , usually more or less capitate. Gill trama of slender subparallel hyphae. Pileus trama radial. Pileus cuticle an ixocutis. Hypodermium of hyphae. Stipe cuticle of pallid, angular, thick-walled hyphae, with a turf of caulocystidia, 60-114 x 6-10  $\mu$ , similar to cheilocystidia. Clamp connections not observed.

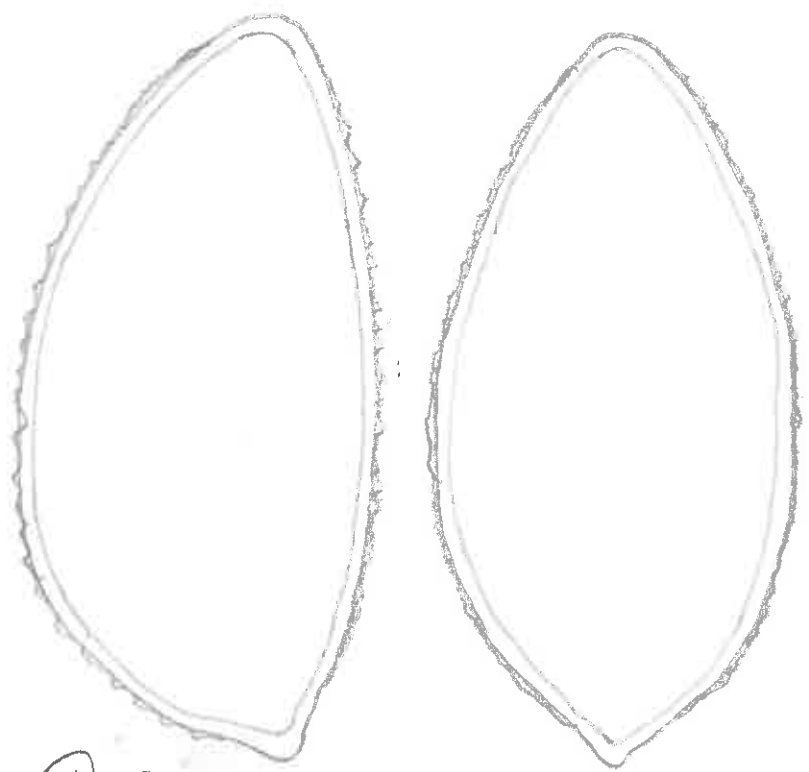
The asperulate spores exclude it from H. crustuliniforme sensu Bruchet. In that species the wall is rugulose, and the spores appear slightly broader and darker brownish than in this collection (Watling No. 6035).

*Tricheloma crustuliniforme*

ex-herb. Edinburgh, Watling No. 6035, in Picea woods,  
Sept 8, 1968



ch x 1000



Profile

Face

Spores x 8000

2

HEBELOMA CRUSTULINIFORME

on soil, under birch, leg. D. H. McKeen, Watling No. 7631,  
ex-Herb. Edinburgh, September 16, 1970

Notes by Hesler

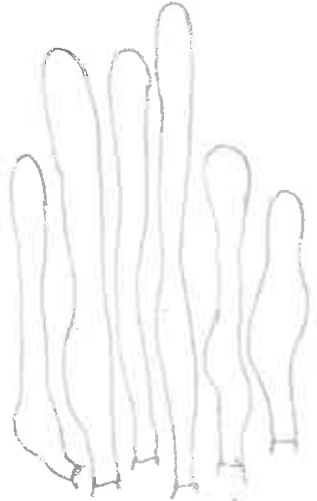
Spores 9.5-12 x (5)5.5-7  $\mu$ , inequilateral in profile, subfusoid in face view, wall 0.3  $\mu$  thick, rugulose to nearly smooth, yellowish brown in 2% KOH. Pleurocystidia none; cheilocystidia 40-58 x 4-7  $\mu$ , cylindrical, more or less subcapitate, somewhat ventricose below. Gill trama of subparallel, slender (3-7  $\mu$ ) hyphae. Pileus trama of loosely interwoven hyphae, 5-12  $\mu$  broad. Stipe cuticle of pallid, angular, thick-walled, dry hyphae; surface bearing tufts of long, slender caulocystidia, similar to cheilocystidia. Clamp connections at the base of caulocystidia.

This differs from Bruchet's crustuliniforme in its loosely interwoven pileus trama, more slender cheilocystidia. Spores reddish brown in Melzer's.

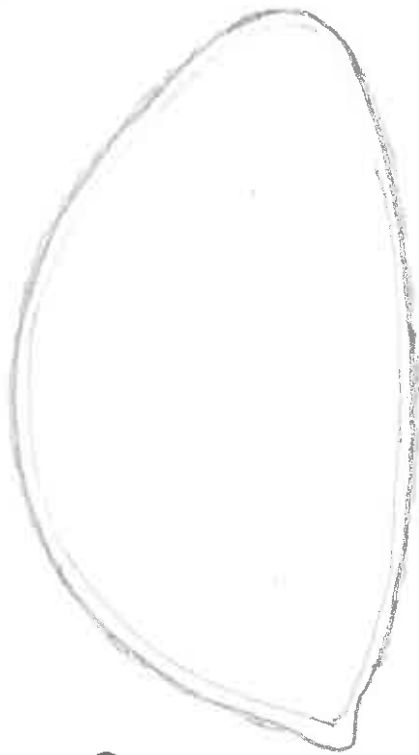
Near albomarginatum, but spore-ornamentation wrong!

[For some reason, I failed to record a description of the hypodermium.]

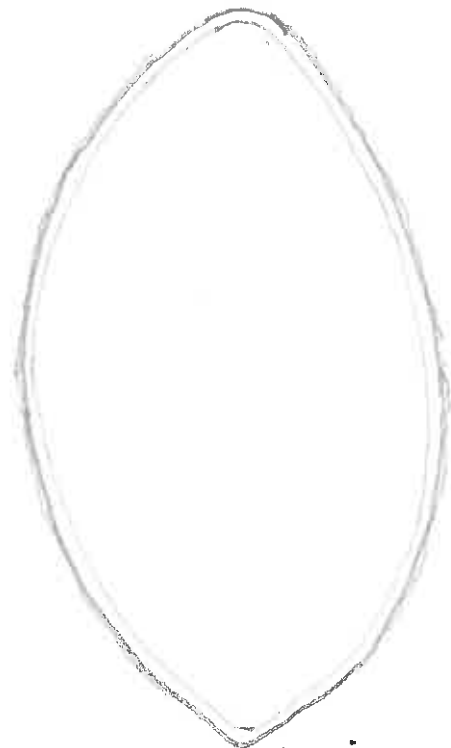
*Helvonia crustuliniforme*  
Watling, No. 7631, ex-herb. Edinburgh



Ch x 1000



Profile



Face View

Spores x 8000



no!

HEBELOMA CRUSTULINIFORME

Leg. Watling, No. 8676, Uppsala, Sweden, August 12, 1971

(borrowed and studied by Hesler, September 15, 1973)

Notes by Hesler

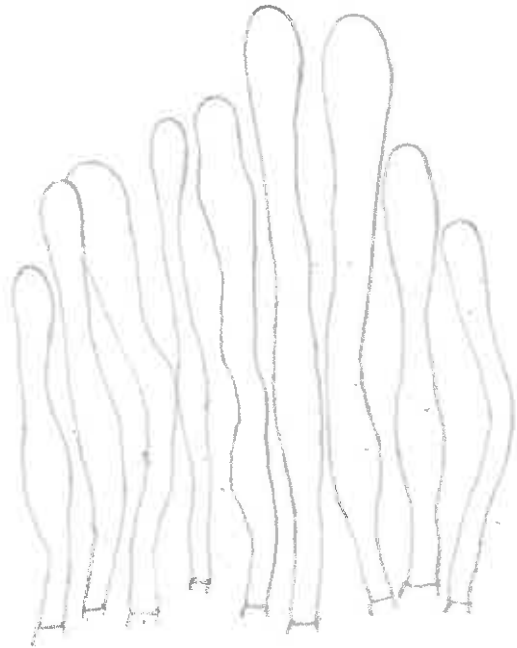
Spores 8-10 x 4.5-6  $\mu$ , inequilateral in profile, subelliptic-subfusoid in face view, wall 0.3  $\mu$  thick, minutely rugulose to nearly smooth, pale yellowish brown in 2% KOH. Basidia not studied. Pleurocystidia none; cheilocystidia 47-82 x 4-9  $\mu$ , filamentous-subclavate or clavate, often more or less ventricose below, conspicuous. Gill trama of subparallel, rather closely septate hyphae. Pileus trama of broad (5-14  $\mu$ ), loosely interwoven hyphae. Pileus cuticle an ixocutis. Hypodermium a distinct zone of brown cells. Stipe cuticle of dry, pallid-grayish, angular, thick-walled hyphae. Clamp connections on the pileus cuticular hyphae.

Spores smaller than in Bruchet's material; and both the hypodermium and pileus trama are also different.

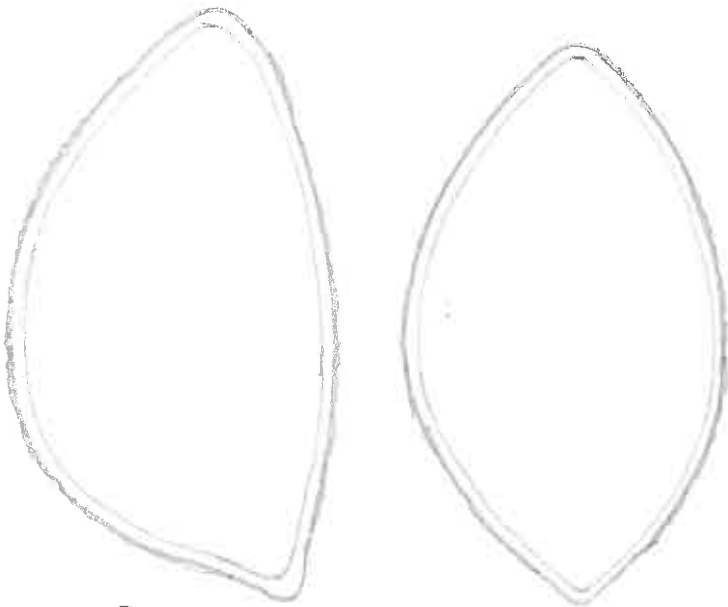
Somewhat ~~possibly~~ related to *H. ~~crustuliniforme~~ <sup>alpinum</sup>* (which was ~~crustuliniforme~~ <sup>alpinum</sup> Favre), in which the spores are ~~the~~ larger, & the pileus trama ~~different~~ <sup>different</sup>.

*Hebdoma crustuliniforme*

Watling No. 8676 (Uppsala, Sweden), Aug 12, '71



Ch x 1000



Profile

Face

Spores x 8000

OK

HEBELOMA CRUSTULINIFORME Bull.

ex-Herb. Stockholm, Smaland, 400 m.S. Uddeberg, Haglund &  
Lundell, October 14, 1947

Notes by Hesler

Spores 9.5-12(13.5) x 5.5-7.5  $\mu$ , inequilateral in profile, subfusoid to sublimoniform, some with a slight "nose," wall 0.3  $\mu$  thick, rugulose, not calyptrate, yellowish brown in 2% KOH, reddish brown in Melzer's reagent. Pleurocystidia none; cheilocystidia 50-77 x 7-9  $\mu$ , irregularly subcylindric, apices often subcapitate, often ventricose below or near middle. Gill trama of slender, subparallel hyphae. Pileus trama radial. Pileus cuticle an ixocutis. Hypodermium of ~~interwoven~~ <sup>fragments and cells,</sup> ~~with some~~ ~~macro~~ ~~tracheoid~~, as in Romell-9913. Stipe as in Romell-9913.

This ~~varies from~~ <sup>essentially agrees with</sup> Romell-9913, ~~in its~~ <sup>altho - faintly</sup> ~~macro~~ larger spores, which are reddish brown in Melzer's reagent.

This is the same <sup>as</sup>, or very close to, Bruchet's H. crustuliniforme, but no notes on macro characters!

*Helvoma crustuliniforme*  
Haglund & Fündell "Fungi suecici", Oct. 14, 1947



Ch x 1000

[Spores as in Romell-9913,  
but slightly larger,  
& pseudo-amyloid]

material old!  
not crustuliniforme!

HEBELOMA CRUSTULINIFORME

Leg. Diettrich, October 1909, ex-Herb. Stockholm

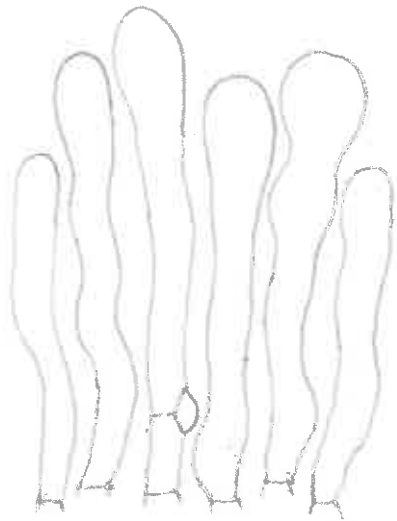
Notes by Hesler

Spores 9.5-13.5 x 6-8  $\mu$ , inequilateral in profile, subfusoid in face view, asperulate, some of them very obscurely calyptrate, wall 0.4  $\mu$  thick, yellowish brown in 2% KOH, reddish brown in Melzer's reagent. Pleurocystidia none found; cheilocystidia 36-48 x 6-8  $\mu$ , subcylindric, apex subcapitate or not, ventricose below. Gill trama subparallel. Pileus trama radial. Pileus cuticle an ixocutis. Hypodermium ~~incompleteness~~ of hyphal fragments and ~~cells~~. Stipe cuticle usual. Caulocystidia similar to cheilocystidia, but longer.

This has asperulate spores--which excludes it from H. crustuliniforme. It is close to H. sinapizans, but I found no pleurocystidia.

The material is rather old!

*Hebeloma crustuliniforme* (?)  
ex- Herb. Edinburgh, Sept 16, 1967, Cross Woods,  
Notes?



Ch x 1000

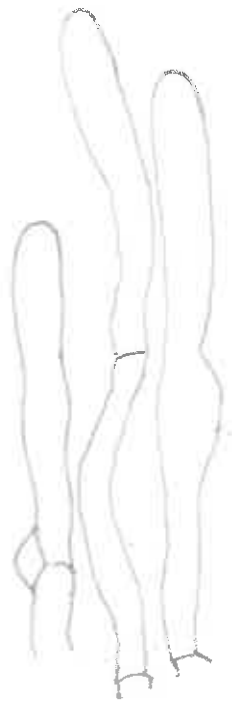


Profile



Face

Spores x 8000



Cauls x 1000

Leucosary!

HEBELOMA CRUSTULINIFORME Qué1.

ex-Herb. Edinburgh, Saltom (N.C. '82), October 1938, leg.

Rupert Smith. (Borrowed and studied by Hesler,  
September, 1973)

Notes by Hesler

Spores 9.5-14.5 x (5)5.5-7(8)  $\mu$ , inequilateral in profile, subfusoid to sublimoniform in face view, often with a "nose," wall 0.3  $\mu$  thick, minutely rugulose, pale yellowish brown in 2% KOH. Pleurocystidia none; cheilocystidia 32-40 x 6-8  $\mu$ , subclavate to irregularly cylindrical, often subcapitate, slightly ventricose below. Gill trama of narrow, subparallel hyphae. Pileus trama of radial hyphae. Pileus cuticle an ixocutis. Hypodermium ~~of cells, not studied~~ (Stipe not studied).

This collection is distinguishing<sup>ed</sup> by its large spores which are somewhat variable in size—many are long and slender (12 x 5.5  $\mu$ ), subfusoid to sublimoniform, often with a nose. They are not stained by Melzer's reagent. The cheilocystidia are short and scattered. This is hardly the same as Bruchet's collection.

Microscopically, agrees rather well with H. leucosary. ~~It differs from H. crustuliniforme, it would probably be a large-spored variety.~~ However, it is rather near H. hiemale, in which the odor may be faint, aromatic, or none (when fresh), spores (?!?) 10-13(14)  $\mu$ , some sublimoniform with a nose  
↑ 13(18-21)  $\mu$ .

40426

HEBELOMA

*crustuliniforme* var. *cystocapitatum*  
var. nov.

under dwarf birch, Independence, Colorado,  
leg. Scates & Smith-87042, August 4, 1976

Notes by Smith

Pileus 2-4.5 cm broad, obtusely umbonate to plane-convex, disc pinkish buff to cinnamon buff, margin pale pinkish buff, viscid, margin incurved, irregularly rimose. Context white, very brittle and soft, thickish; odor faintly raphanoid, taste weakly bitterish.  $FeSO_4$  &  $KOH$  - 0.

Lamellae adnexed, pallid, becoming pale verona brown, close, moderately broad, edges even, not beaded, not <sup>a</sup>atining.

Stipe 1-2.5 (3) cm long, 8-12mm thick, whitish within, surface white, unchanging, <sup>equal or slightly clavate shallow</sup>naked to faintly pruinose, Veil none.

Notes by Hesler

Spores <sup>12 (13)</sup>10-~~13~~ x 6-7.5 $\mu$ , inequilateral in profile, ellipsoid in face view, rugulose, yellowish brown in 2%  $KOH$ , wall rather thin. Pleurocystidia none; cheilocystidia of two types: (a) clavate to cylindric, often more or less ventricose midway or below, 43-62 x 4-8 $\mu$ ; (b) cylindric with <sup>to subglobose</sup>a globose/capitellum, 56-68 x 10-17 $\mu$ . Gill trama of subparallel hyphae. Pileus trama of interwoven hyphae. Pileus cuticle an ixotrichodermium. Hypodermium hyphoid, ~~was~~ accompanied by ~~some~~ large cells, generally poorly developed. Stipe cuticle of dry, repent hyphae. Caulocystidia of two types, as in ~~the~~ cheilocystidia: (a) cylindric, slightly ventricose, 50-68 x 7-9 $\mu$ ; (b) cylindric with a globose capitellum, 56-65 x 10-15 $\mu$ .

over



This variety <sup>is</sup> ~~seems~~ close to H. crustuliniforme  
var. pungens, but in var. cystocapitatum, the odor is  
faintly raphanoid, and the taste bitterish; moreover, the cheilo-  
cystidia ~~xxxxxx~~ and caulocystidia exhibit two  
~~xxxx~~ morphological types, *one of which is capitate. The*  
*hypodermium is much like that of the type-variety.*

Habit, Habitat, and Distribution. On soil, under  
dwarf birch, leg. Scates and Smith, August 4, 1976,  
Smith-87042 (TENN-40426), type.

Observations. ↗

40426

HEBELOMA CRUSTULINIFORME VAR. CYSTOCAPITATUM / var. nov.

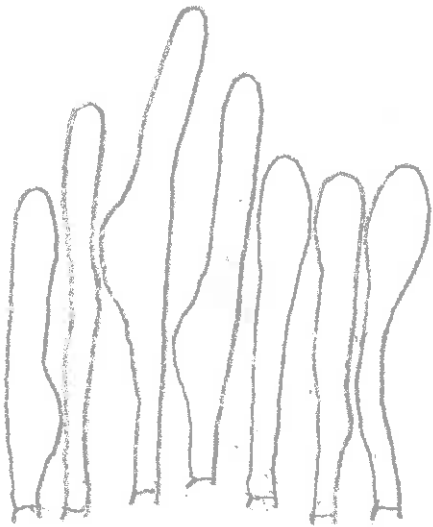
(Sm-87042) under dwarf birch, Independence Pass,  
Colorado, leg. Scates & Smith, Aug. 4, 1976

Notes by Hesler

Spores 10-13 x 6-7.5 $\mu$ , inequilateral in profile,  
ellipsoid<sup>5</sup> in face view, rugulose, yellowish brown in 2%  
KOH, wall rather thin. Pl none; ch of two types: (a)  
clavate to cylindrical, often more or less ventricose  
midway or below, 43-62 x 4-8 $\mu$ ; (b) cylindrical with a  
globose or subglobose capitellum, 56-68 x 10-17 $\mu$ . Gill  
trama nearly parallel. Pileus trama interwoven. Pileus  
cuticle an ixotrichodermium. Hypodermium hyphoid ~~massive~~  
~~diverticulate~~ with some large cells, poorly developed. Stipe  
cuticle of repent dry hyphae. Caulocystidia of two types  
(as in cheilocystidia): (a) cylindrical, at times slightly  
50-68 x 7-9 $\mu$ ;  
ventricose below (b) cylindrical with a globose head  
56-65 x 10-15 $\mu$ .

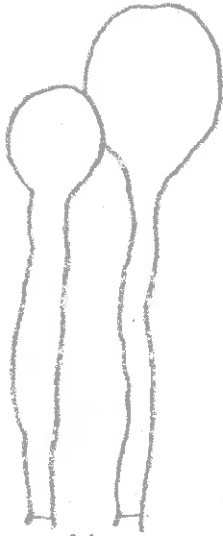
Nebeloma

40426 (Sm-87042)

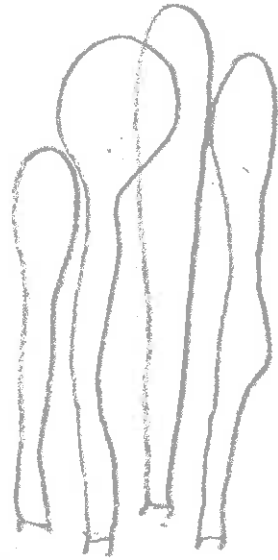


(a)

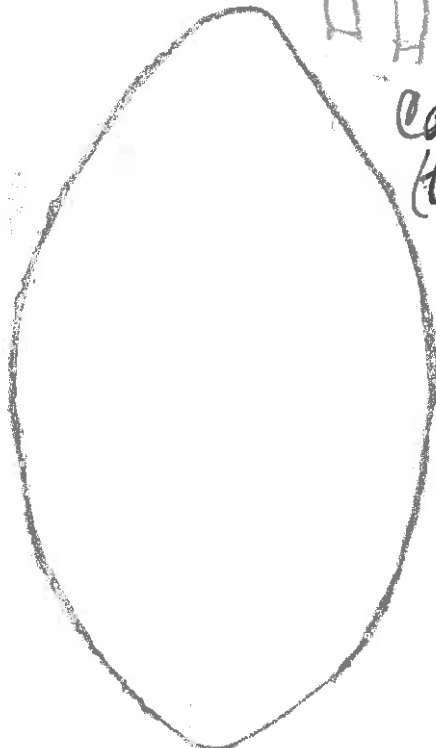
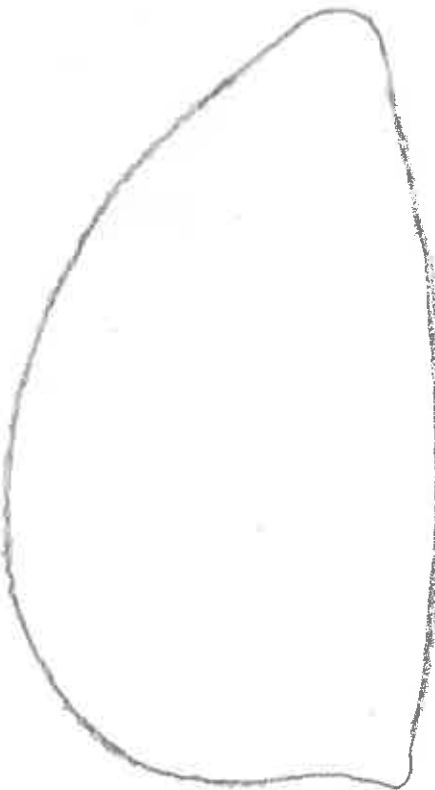
Ch x 1000



(b)



Caudo - x 1000  
(terminal  
elements)



40431

HEBELOMA *crustuliforme* var. *incanum*  
1947

gregarious under conifers, Independence Pass,  
Colorado, leg Smith-87047, Aug 4, 1976

Notes by Smith

Pileus 3-6 cm broad, broadly convex, becoming nearly  
plane, margin incurved, more or less hoary at first, pinkish  
cinnamon beneath hoariness with a zone line near margin,  
glabrous, viscid. Context white, thick, soft; odor and  
taste slightly pungent. ~~(odor raphanoid in alcohol)~~ FeSO<sub>4</sub> and KOH - no reaction.

Lamellae adnexed, more or less verona brown, net  
spotting, broad, subdistant, edges crenulate.

Stipe 5 cm long, 8-15mm <sup>thick</sup> at apex, white overall  
and unchanging, no browning around worm holes, soft and  
brittle, naked to minutely pruinose, <sup>equal</sup> solid. Veil none.

Notes by Hesler

Spores 9 - 13 x (5.5) <sup>6.5</sup> ~~6.5~~ - 8μ, inequilateral in  
profile, ~~naviculate~~ <sup>apex</sup> sublimiform in ~~profile~~ <sup>slight</sup> face  
view, rugulose, <sup>apex</sup> often with a "nose", brown in 2% KOH.  
Pleurocystidia none; cheilocystidia 42 ~~10~~ <sup>10</sup> x 4-7μ, cylindric  
to subclavate, ~~at times subcapitate~~, often slightly ~~ventricose~~  
ventricose, occasionally septate and a clamp connection,  
abundant. Gill trama of subparallel hyphae. Pileus cuticle  
an ixecutis. Hypodermium of cells and hyphae fragments,  
but not always well developed. Stipe cuticle of dry, repent  
hyphae. Caulocystidia similar to cheilocystidia, in tufts.

over

Habit, Habitat, and Distribution. On soil,  
gregarious under conifers, Independence Pass, Colorado,  
August 4, 1976, Smith-87047 (TENN-40431), type.

Observations. This ~~taxon~~<sup>Y</sup> (var. incanum) differs from  
other varieties of the species~~x~~ in that its stipe, which is  
white, does not ~~undergo a~~ darkening when bruised <sup>not</sup> or in age.  
~~ixdas~~ The hypodermium, however, does have the <sup>structural</sup> ~~main~~  
feature of being composed of both cells and hyphal fragments.

40431

HEBELOMA CRUSTULINIFORME VAR. INCANUM var. nov.

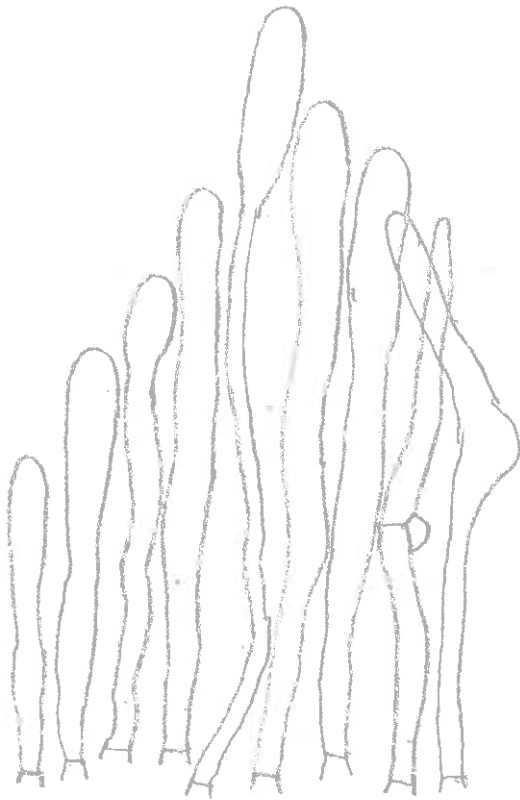
(Sm-87047) gregarious under conifers, Independence Pass,  
Colorado, August 4, 1976

Notes by Hesler

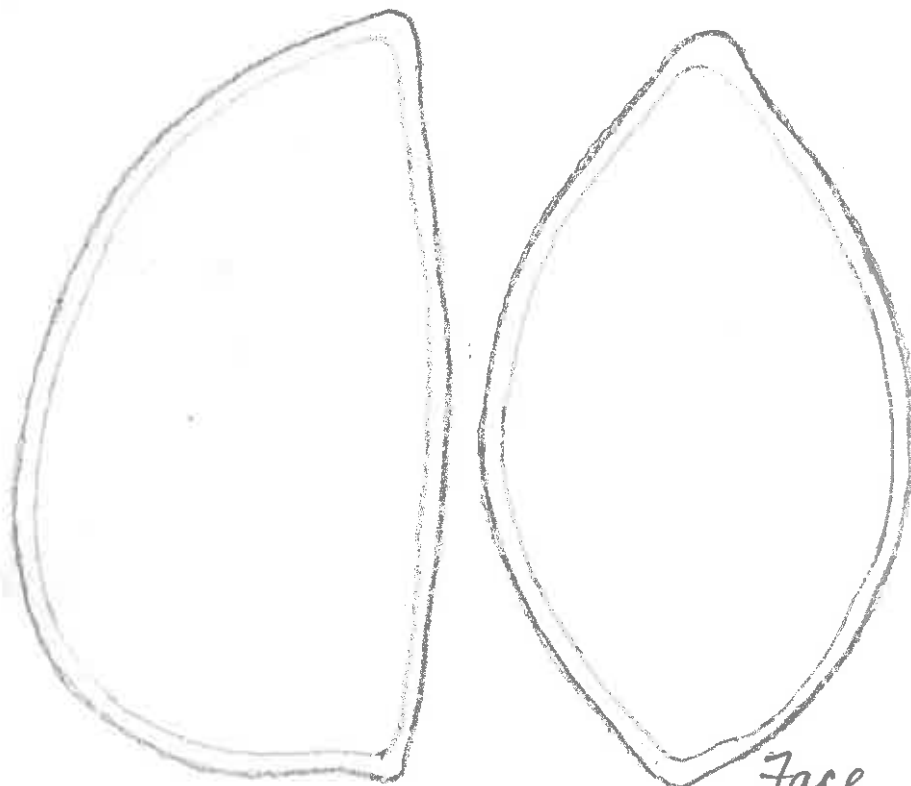
Spores <sup>13</sup>9-~~11~~ x (5.5)6.5-8 $\mu$ , inequilateral in profile,  
naviculiform to sublimoniform in face view, often with more or  
less of a "nose", rugulose, brown in 2% KOH. Pl none; ch  
at times  
42-104 x 4-7 $\mu$ , long cylindrical to subclavate, /nearly capitate,  
often slightly ventricose, occasionally with a septum and  
a clamp connection, abundant. Gill trama of subparallel  
hyphae. Pileus cuticle an ixocutis. Hypodermium of cells  
and hyphal fragments, <sup>not always well-developed.</sup> Stipe cuticle of dry repent hyphae.  
Caulocystidia quite similar to cheilocystidia, in ~~xx~~ tufts.

Nebeloma

40431 (Sm-87047)



Ch - x 1000



Profile

Spores x 8000

Face

*crustuliniforme* var.

Sm-86676

HEBELOMA MICHIGANENSE <sup>var.</sup> nov.

Under beech-maple, Haven Hill, Oak County, Michigan, Sept. 25, 1975.

Notes by Smith

Pileus 3-5 cm broad, plano-convex, becoming plane, disc cinnamon, margin fading out to pinkish buff or pale pinkish buff, slightly viscid, glabrous. Context pallid, soft, fragile; odor and taste more or less pungent, and taste becoming bitter.

Lamellae adnate to adnexed, pale verona brown, or at maturity darker, close, broad, thin, not spotting.

Stipe 3-5 cm long, 8-10 mm thick, in age whitish and appressed-fibrillose, equal above the . . . . (word?) bulb, solid, naked to faintly pruinose. Veil none.

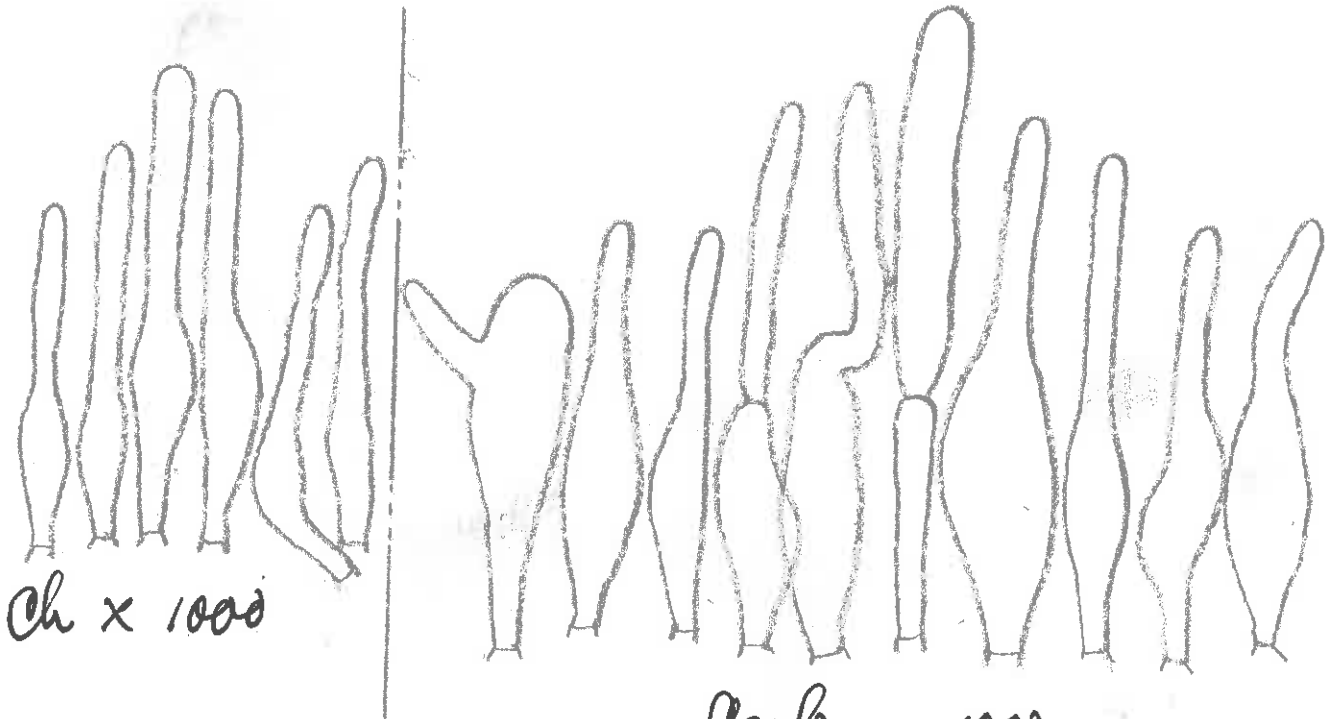
Notes by Hesler

Spores 10-12.5 x 6-7.5(8)  $\mu$ , inequilateral in profile, ellipsoid-subfusoid in face view, rugulose, wall 0.4  $\mu$  thick, yellowish brown in 2% KOH. Pleurocystidia none; cheilocystidia 45-62 x 6-8  $\mu$ , ventricose with a long neck, below, conspicuous. Pileus cuticle an ixocutis. Hypodermium cellular. Pileus trama of radial hyphae. Stipe cuticle of dry repent hyphae. Caulocystidia 48-84 x 7-15  $\mu$ , in tufts, variable, ventricose to flask-shaped, or clavate to subcylindric.



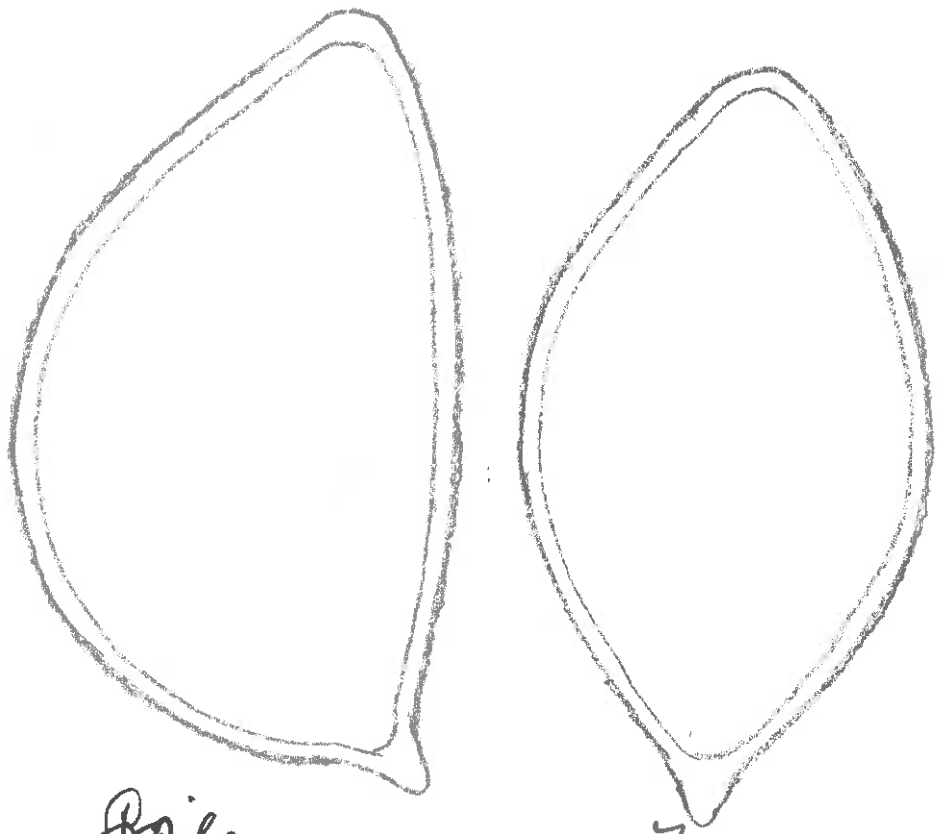
<sup>Crustuliforme var.</sup>  
*Hebeloma michiganense* var. ~~sp.~~ nov.

Sm- 86676



Ch x 1000

Conulo x 1000



Profile

Face

Spores x 8000

HEBELOMA CRUSTULINIFORME (near var. microspermum Hongo)

ex-Herb. Edinburgh, Aros Woods, under Betula, P.W.G.,  
September 16, 1967. (Note by Watling: this is not  
the true crustuliniforme, differing in spore size and  
stature.)

Notes by Hesler

Spores 8.5-10 x 5-5.5  $\mu$ , inequilateral in profile,  
subfusoid in face view, wall 0.25  $\mu$  thick, minutely rugulose,  
occasionally slightly calyptrate, yellowish brown in 2% KOH.  
Basidia 30-30 x 7-8  $\mu$ , 4-spored. Pleurocystidia none;  
cheilocystidia 44-63 x 6-12  $\mu$ , cylindrical-capitate, slightly  
ventricose below. Gill trama of slender, subparallel hyphae.  
Pileus trama radial. Pileus cuticle an ixocutis. Hypodermium  
of hyphae. Stipe cuticle of dry, pallid, angular hyphae.  
Caulocystidia more or less similar to cheilocystidia. Clamp  
connections at the base of both the cheilocystidia and  
caulocystidia.

Spores reddish-brown in Melzer's reagent; and too small  
for Bruchet's crustuliniforme. It suggests f. microspermum  
Hongo, but the spores are calyptrate; and the taste (not  
recorded!) should be mild.

HEBELOMA CRUSTULINIFORME F. MICROSPERMUM Hongo f. nov.

Jour. Jap. Bot. 41:169. 1966

(Copy of Original Description)

Pileus 2.5-5.5 cm broad, convex, at first with inrolled margin, then expanding to broadly convex or nearly plane, glabrous, at first viscid, pale tan, often tinged brownish-alutaceous, especially on the disc, sometimes irregularly cracked. Context thick, whitish; odor of radish, taste mild.

Lamellae sinuate, close to crowded, 3-6 mm broad, whitish then clay color, edges somewhat eroded.

Stipe 3-6 cm long, 7-18 mm thick, equal or thickened at the base, whitish, often becoming sordid alutaceous below, more or less fibrillose, covered with minute flocculose granules from above downward, solid or hollow.

Spores pale fulvous under the microscope, subamygdaliform, very minutely punctate or nearly smooth,  $7.5-9 \times 4.5-5 \mu$ , (or  $8.5-10.5 \times 4.5-5.5 \mu$ ). Basidia  $21-30 \times 6.5-8 \mu$ , 4-spored. Cheilocystidia  $20-39 \times 4-6.5 \mu$ , abundant, subclavate to subcylindric, hyaline, thin-walled; pleurocystidia none. Clamp connections present.

Habitat solitary or gregarious on the ground, in pine forests, Akiba-yama, Nŭtsu-city, October 24, 1961 (No. 2385-type); Terabe, Otsu-city, April 14, 1964 (no. 2848) and November 10, 1965 (no. 3190).

Distr. Endemic (Nŭgata, Shigo)

*f. microsporum*

H. crustuliniforme<sub>1</sub> - page 2

Rather common from spring to autumn. Distinguished from the typical form by the somewhat smaller spores. For H. crustuliniforme, the following measurements of spores have been given: 10-12 x 5-6  $\mu$  (Rea, 1922); 11.5-12 x 6.5  $\mu$  (Lange, 1938); 10-13.5 x 6-7.5  $\mu$  (Ima, 1938); 10-12 x 6-7  $\mu$  (Wakefield and Dennis, 1950); 10-12 x 5.5-6.5  $\mu$  (Moser, 1955).

HEBELOMA CRUSTULINIFORME F. MICROSPERMUM Hongo f. nov.

Jour. Jap. Bot. 41:169. 1966

(Copy of Original Description)

Pileus 2.5-5.5 cm broad, convex, at first with inrolled margin, then expanding to broadly convex or nearly plane, glabrous, at first viscid, pale tan, often tinged brownish-alutaceous, especially on the disc, sometimes irregularly cracked. Context thick, whitish; odor of radish, taste mild.

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Spores pale fulvous under the microscope, subamygdaliform, very minutely punctate or nearly smooth,  $7.5-9 \times 4.5-5 \mu$ , (or  $8.5-10.5 \times 4.5-5.5 \mu$ ). Basidia  $21-30 \times 6.5-8 \mu$ , 4-spored. Cheilocystidia  $20-39 \times 4-6.5 \mu$ , abundant, subclavate to subcylindric, hyaline, thin-walled; pleurocystidia none. Clamp connections present.

Habitat solitary or gregarious on the ground, in pine forests, Akiba-yama, Nütsu-city, October 24, 1961 (No. 2385-type); Terabe, Otsu-city, April 14, 1964 (no. 2848) and November 10, 1965 (no. 3190).

Distr. Endemic (Nügata, Shigo)

37586 HEBELOMA CRUSTULINIFORME f. MICROSPERMUM Hongo

On soil, in woods of Pinus densiflora, Kokobu, Otsu, Japan,  
3587  
leg.-det. T. Hongo, No. ~~3587~~, November 16, 1967

Spores pale yellowish brown in 2% KOH, 7.5-9 x 4-5  $\mu$ ,  
inequilateral in profile, subvoid in face view, wall 0.25  $\mu$   
thick, minutely rugulose, no germ pore. Basidia 22-26 x 6-7  $\mu$ ,  
4-spored. Pleurocystidia none; cheilocystidia 22-38 x 3-6  $\mu$ ,  
subventricose, subclavate, at times enlarged on one side near  
the middle or below, sparse and insignificant. Gill trama of  
slender subparallel hyphae. Pileus trama of radial hyphae.  
Pileus cuticle a very thin ixocutis (15-25  $\mu$  thick)\*  
~~H~~ypodermium hyphoid, at times obscure. Stipe cuticle of  
repent, dry hyphae.

Originally descr.: Jour. Jap. Bot. 40:169. 1966.

37586 HEBELOMA CRUSTULINIFORME f. MICROSPERMUM Hongo

On soil, in woods of Pinus densiflora, Kokobu, Otsu, Japan,

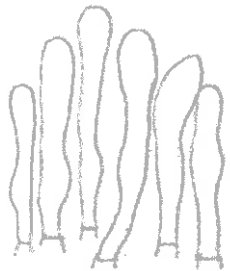
3587

leg.-det. T. Hongo, No. ~~3587~~7, November 16, 1967

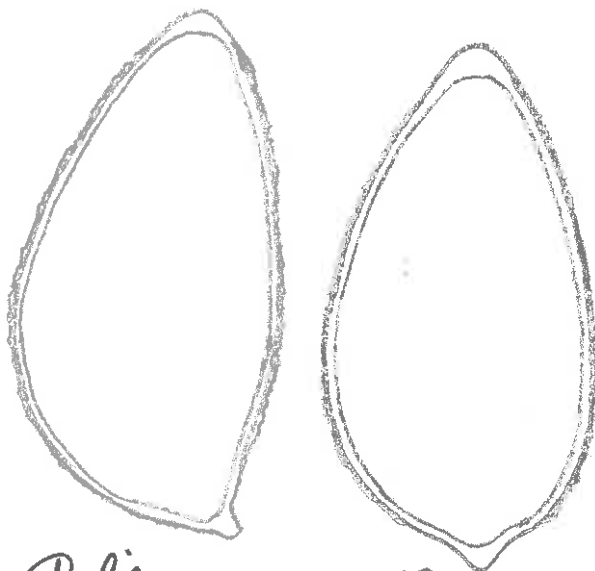
Spores pale yellowish brown in 2% KOH, 7.5-9 x 4-5  $\mu$ , inequilateral in profile, subvoid in face view, wall 0.25  $\mu$  thick, minutely rugulose, no germ pore. Basidia 22-26 x 6-7  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 22-38 x 3-6  $\mu$ , subventricose, subclavate, at times enlarged on one side near the middle or below, sparse and insignificant. Gill trama of slender subparallel hyphae. Pileus trama of radial hyphae. Pileus cuticle a very thin ixocutis (15-25  $\mu$  thick); hypodermium hyphoid, at times obscure. Stipe cuticle of repent, dry hyphae.

Originally descr.: Jour. Jap. Bot. 40:169. 1966.

*Helobma crustuliniforme* f. *microspermum*  
#3587  
37586 (from Hongo; Japan)



Ch x 1000



Profile

Face

Spores x 8000



HEBELOMA CRUSTULINIFORME VAR. MINOR

Atkinson No. 2713, leg.-det. Atkinson, Cornell Campus, Oct. 1897  
ex - Herb. Pl. Path., Cornell. [cf. Gruell No. 14346]

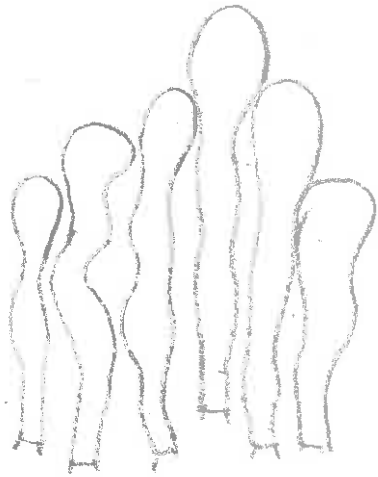
Spores 9-12 x 5.5-7.5 $\mu$ , inequilateral in profile, ellipsoid in face view, at times with an obscure "nose", wall minutely rugulose to nearly smooth (appearing smooth in some individuals), yellowish brown in 2% KOH. Pleurocystidia none; cheilocystidia in clusters, 36-48 x 5-8(11) $\mu$ , cylindrical, many more or less capitate, some ventricose below. Gill trama of ~~HEBELOMA~~ narrow, subparallel hyphae. Pileus cuticle an ixocutis. Hypodermium hyphoid. Stipe cuticle bearing caulocystidia similar to cheilocystidia, but somewhat larger.

This appears to be much the same as the type variety, except perhaps most of the spores appear to be just slightly more narrow, and its hypodermium is hyphoid.

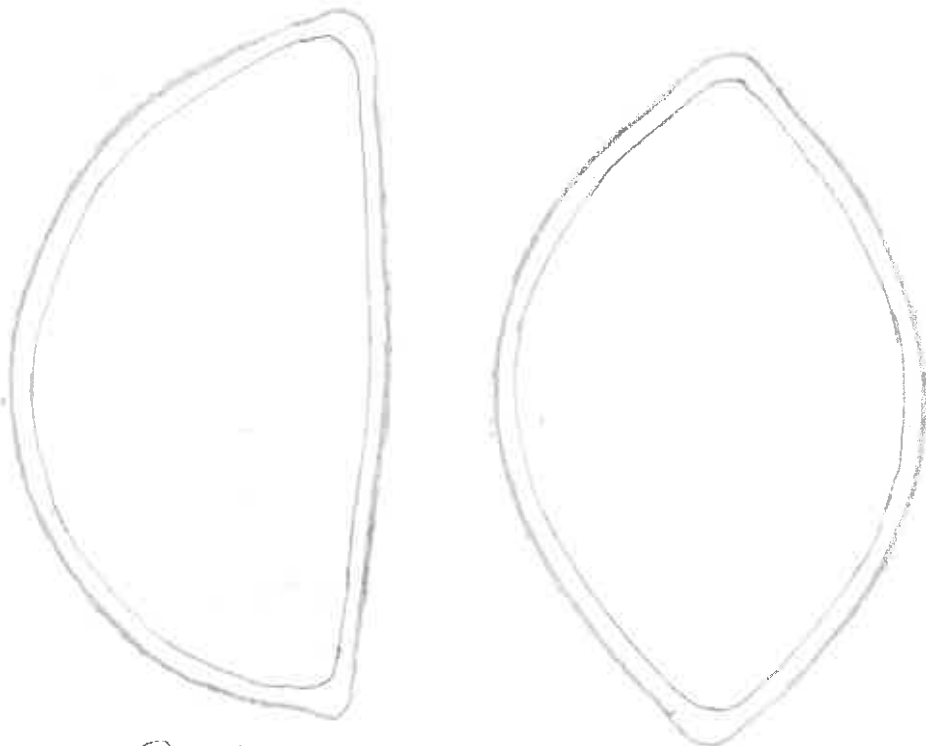
Kauffman described (1918) f. minor, but it has smaller spores. I do not know whether Atkinson published var. minor or not. He may have meant to use Cooke's var. minor.

Note: that H. crustuliniforme var. minus Cke is described by Rea (p. 257); he says it is smaller than the type-variety, has floccose gill-edges + the odor is faint.

*Helveloma crustuliniforme* var. *minus*  
No. 2713, leg.-det. Atkinson, Cornell Campus, Oct. 1897.



Ch x 1000



Profile

Face

Spores x 8000

Cornell:  
No. 14346

HEBELOMA HIEMALE Bres.

[ = H. crustuliniforme var. minor Cke.]

leg. Whetzel, on hard ground, Northern Beebe Lake, Ithaca,  
New York, Oct. 15, 1902; det. G. F. Atkinson

Notes by Hesler

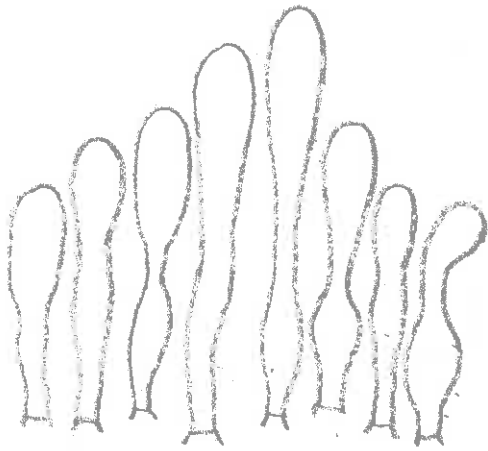
Spores 9-11(12) x 5-6 $\mu$ , inequilateral in profile, ellipsoid in face view, wall 0.3 $\mu$  thick, minutely rugulose, often nearly smooth, yellowish brown in 2% KOH. Pl none; ch 30-54 x 5-8 $\mu$ , more or less cylindrical, but often ventricose near middle or below, apex often or usually clavate-enlarged, in clusters. Pileus trama of radially arranged, slender hyphae. Pileus cuticle a distinct ixocutis. Hypodermium of brownish hyphae. Stipe cuticle of repent, dry hyphae, bearing tufts of caulocystidia similar to cheilocystidia, or slightly more irregular, 46-68 x 5-8 $\mu$ . Clamp connections not observed.

[cf. also Cornell 2713, det. Atkinson]

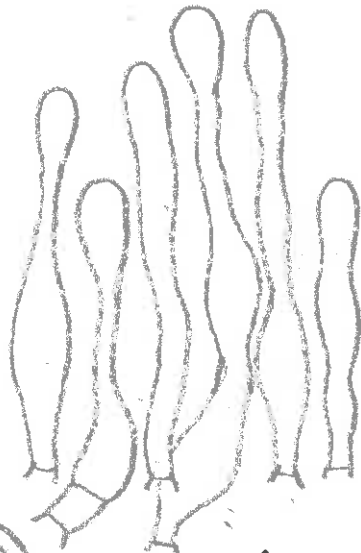
*Hebeloma trionale* Bres

[= *H. crustuliniforme* <sup>var.</sup> ~~to~~ *minor* Cke.]

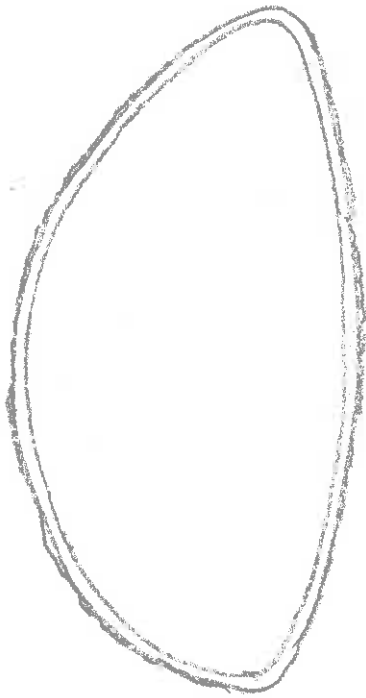
Cornell 14346, leg. Whetzel, det. Atkinson, Oct 15, 1902.



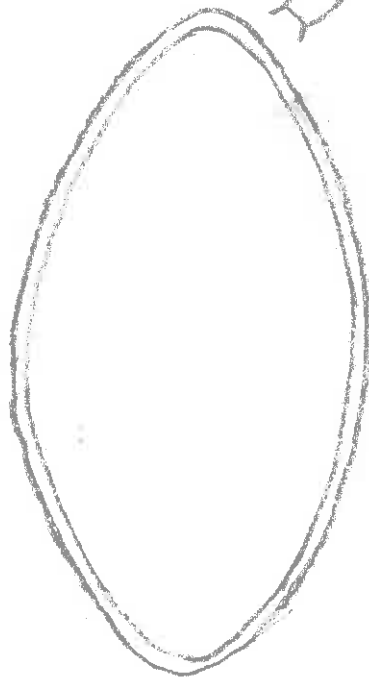
Ch  $\times 1000$



Caulo  $\times 1000$



Profile



Face

Spores  $\times 8000$

HEBELOMA CRUSTULINIFORME f. minor Kauff.

Agar. Mich., p. 476. 1918

Pileus 2-3 cm broad. Spores 8-10 x 5-7 $\mu$ ,  
Pl none; ch clavate at apex. Gill edges exude  
drops.

Found in same woods as the type variety  
(Washtenaw County, Michigan, October).

See: Elliott, Jessie S. Bayliss, 1926. Ann.  
Applied Biol. 13: 277-288. "Says this var. (f.?)  
observed in a "fairy ring."

Note: var. minus Cke., described in Rea (p. 257).

Type

Sm - 86751

HEBELOMA CRUSTULINIFORME var. ~~86751~~

*pingens* var. nov.

In roadway, in hardwoods, Island Lake Area, Washtenaw County, Michigan,  
Sept. 30, 1975 (near crustuliniforme).

Notes by Smith

Pileus 4-7 cm broad, broadly convex, disc "cinnamon buff" to light pinkish cinnamon, margin whitish, incurved at first, glabrous, viscid, soon dry and dull. Context white, soft; odor sharp, taste more or less mild.  $\text{FeSO}_4$  olive in stipe, KOH none in cuticle, merely brownish on context.

Lamellae depressed-adnate, pallid when young, "verona brown" when mature, more or less subdistant, broad, edges soon very eroded.

Stipe 4-6 cm long, 10-16 mm thick, whitish, equal, solid, at first scurfy above, longitudinally striate but not scaly, no distinctive discoloration, but generally brownish but base remaining whitish. Veil none.

Notes by Hesler

Spores 9-12 x 5.5-7  $\mu$ , inequilateral in profile, ellipsoid to faintly subfusoid in face view, wall 0.3  $\mu$  thick, rugulose, yellowish brown in 2% KOH. Pleurocystidia none; cheilocystidia 44-68 x 6-10  $\mu$ , usually capitate, ventricose, often slightly constricted, occasionally clavate

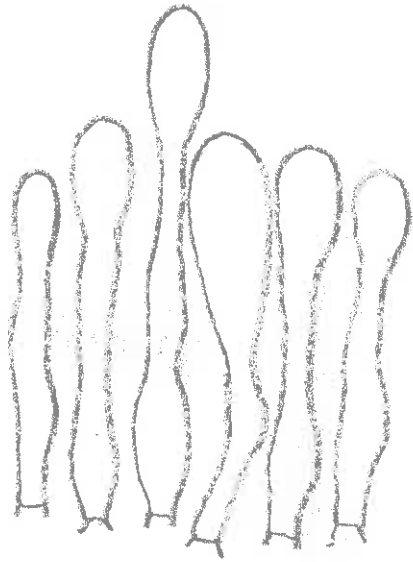
Sm - 86751, Hebeloma crustuliniforme var. <sup>pungens</sup> ~~86751~~, page 2

with a slight ventricose base, in tufts, abundant. Gill trama sub-parallel. Pileus cuticle an ixocutis. Hypodermium of cells and hyphal fragments. Stipe cuticle of dry, repent hyphae. Caulocystidia in tufts, 52-94 x 5-8  $\mu$ , somewhat similar to cheilocystidia.

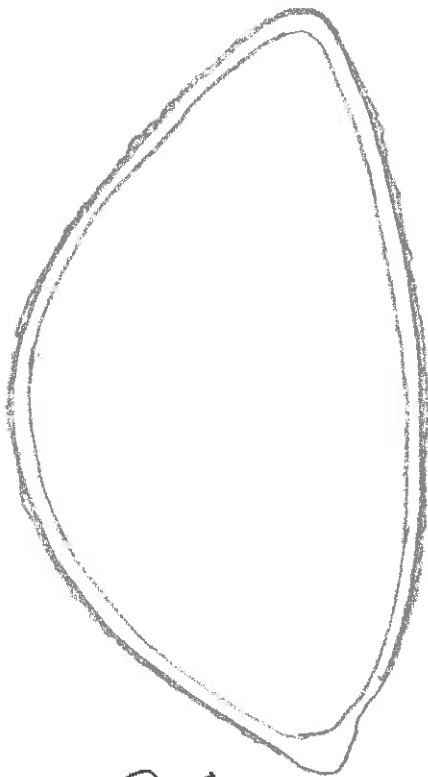
This seems to be a variant of H. crustuliniforme. Very close to Sm-86777, especially since the hypodermium is of cells + hyphal fragments; the odor sharp (pungent), the taste mild. The cheilocystidia, however, are clavate-enlarged as in H. leucosarx.

*Nebeloma crustuliniforme* var. *pungens* var. nov.

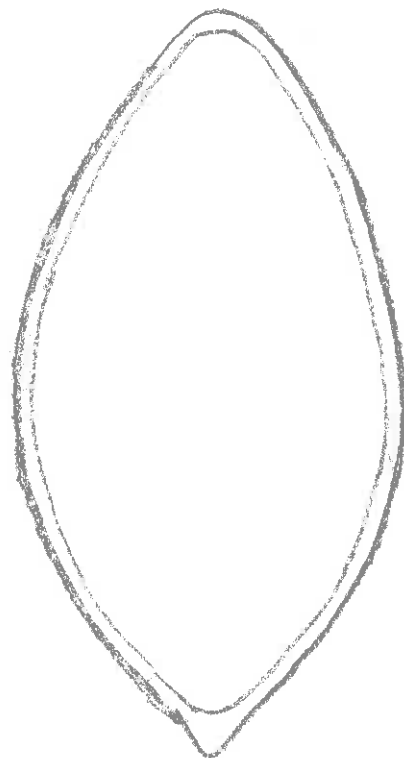
Sm - 86751



Ch x 1000



Back



Face

Spores x 8000



Sm - 86777

HEBELOMA CRUSTULINIFORME var. ~~86777~~

*pungens* var. nov.

Scattered under oak-vaccinium, Island Lake, Washtenaw County, Michigan,  
October 1, 1975 (H. crustuliniforme-group).

Notes by Smith

Pileus 3-4 cm broad, plano-umbonate, margin incurved, disc pale "verona brown", margin pallid, ("pale pinkish buff" but dull), glabrous, viscid, opaque. Context watery-pallid when moist, fading to whitish; odor and taste more or less sharp;  $\text{FeSO}_4$  in stipe quickly dark olive, KOH on cap and stipe apex 0.

Lamellae depressed-adnate, pallid brownish becoming verona brown, close, more or less broad, not spotting.

Stipe 2-3.5 cm long, 4-6 mm thick, pallid, solid, pallid within, equal, minutely scurfy, finally more or less naked, discoloring brown around base where handled. Veil none.

Notes by Hesler

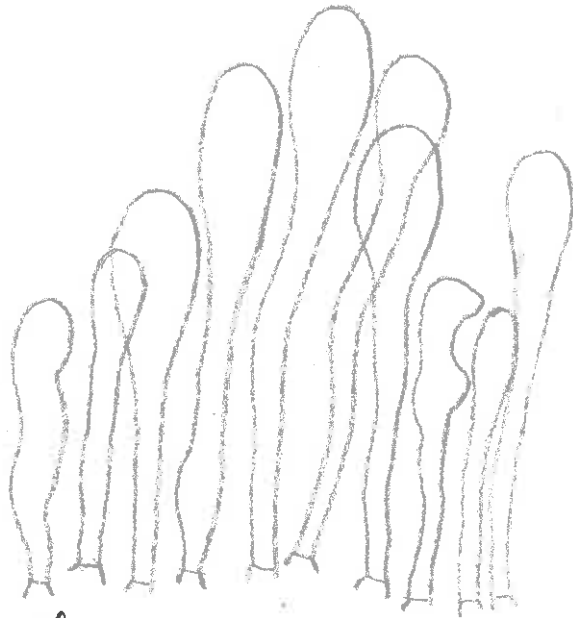
Spores 9.5-12.5(15) x 5.5-7.5  $\mu$ , inequilateral in profile, sub-ellipsoid-subfusoid in face view, rugulose, wall 0.3  $\mu$  thick, yellowish brown in 2% KOH. Pleurocystidia none; cheilocystidia 38-73 x 5-12  $\mu$ , cylindrical-capitate, more rarely ventricose below. Pileus cuticle an ixocutis. Hypodermium of cells and hyphal fragments. Stipe cuticle of

Sm - 86777, Hebeloma crustuliniforme var. <sup>purpureo</sup> ~~86777~~, page 2

dry, repent hyphae. Caulocystidia in tufts, 30-86 x 4-12  $\mu$ , subcylindric, clavate, at times ventricose, often capitate or subcapitate.

A ~~probable~~ variant of H. crustuliniforme; the deviant features are the taste and odor and the distinctly capitate cheilocystidia. Near to or same as Sm - 86751.

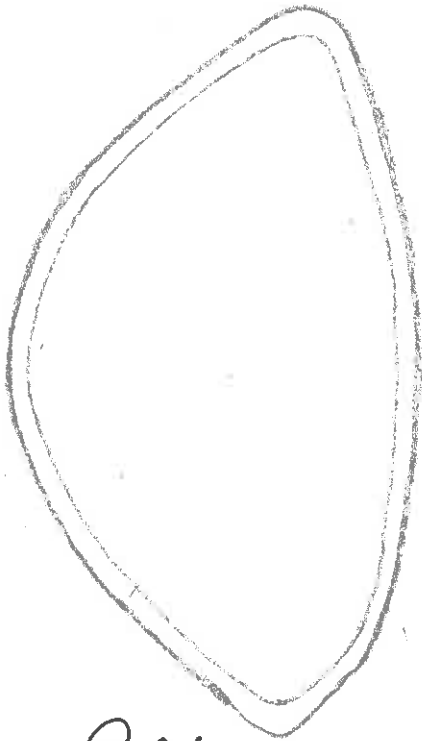
*Hedera cratuliniforme* var. *pungens* var. nov.  
Sm - 86777



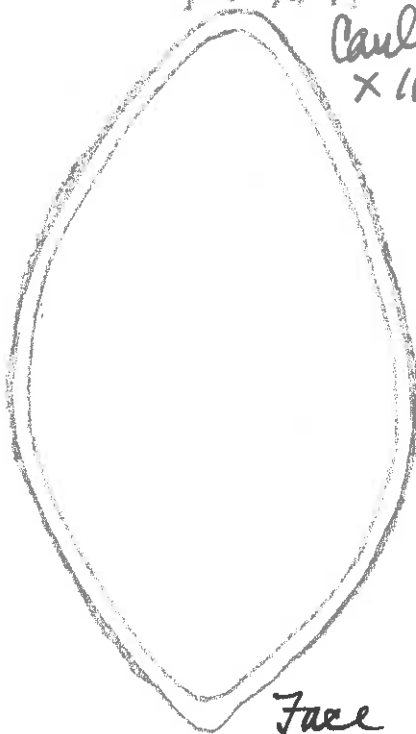
Ch x 1000



Caulo  
x 1000



Profile



Face

Spores x 8000

HEBELOMA CYLINDROSPORUM Romagn. sp. nov.

Bull. Soc. Myc. de France 81:328. 1965

(Latin Description on p. 330)

Pileus 2.5-5.5 cm or a little more, firm, rather thick, convex, then entirely expanded-plane, truncate or slightly depressed, the margin at first rounded, regular, then unrolled and uplifted, occasionally striate and (see J. Beller) not overlapping the lamellae, near brownish red ("Auburn"), and brownish red alutaceous or dingy ochraceous to brownish fawn on the margin, but in general the two indistinct zones, viscid, glossy. Context rather thick, dingy white or slightly brownish, then moderately brown, reddish in tone, in the interior of the stipe, especially in the cortex. Odor rather agreeable, herbaceous; taste herbaceous, then bitter.

Lamellae deeply emarginate or rounded free, varying a little serrate, usually lamellulae of two lengths (the longer ones sometimes rare), broad (4-6 and up to 10 mm), subventricose, brownish argillaceous or with a tint of chocolate, then rather somber reddish brown, the edges paler.

Stipe 4.3-9 cm long, 3-10 mm thick, sometimes cylindric, but more often gradually attenuated at the base, or somewhat crooked or twisted, the base rarely bulbous, solid, then more or less fistulose, pale at first and the remainder bright (colored), then tinged brown bordering on red (varying to clear and deeper), but not blackening, longitudinally

fibrillose-striate, the surface rather abundantly floccose-farinose especially at the apex, white, but browning from spores. Veil probably present, but not positively observed (some traces observed under a lens) on the margin of Ermenonville specimens and on the stipe of those of M. Beller).

Spores (in deposit) deep umber brownish chocolate ("cinnamon brown" or a little darker).

Spores 7.7-9(11) x 4.2-4.7  $\mu$ , slender cylindro-elliptic, apex obtuse (rarely 13 x 6  $\mu$ ), perispore distinctly calyptrate, distinctly verrucose, colored bright yellowish brown s.m. Basidia 26 x 5-6  $\mu$ , 4-spored (J. Beller). Cheilocystidia small, 18-30 x 4-7  $\mu$ , filamentous or lageniform, the neck obtuse.

Epicutis of filamentous hyphae, clear straw yellowish, 2-2.5  $\mu$  broad, appearing gelatinous, the cutis of tangled filamentous hyphae, 217-4.2  $\mu$ , the membrane colored; subcutis rather distinct, except on old specimens, the elements short and broad (x 7-19  $\mu$ ), interwoven, pigmented, but not distinctly appearing pseudoparenchymatous as in many other Hebelomas. Hyphae clamped.

HABITAT: among moss and pine needles in siliceous soil (Pinus silvestris and pinaster), October to December. Ermenonville Forest (Oise), not far from Bosquet du Prince, October 27, 1961 (type).

OBSERVATIONS: This species sometimes is rather common, but entirely remarkable by its microscopic characters, especially of the spores, at this time we know of no similar (one) in the genus.

37576

HEBELOMA CYLINDROSPORUM Romagn.

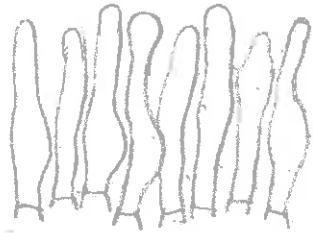
Holotype - communicated to Hesler by Romagnesi, Fall, 1972

Bull. Soc. Myc. de France 81:328. 1965

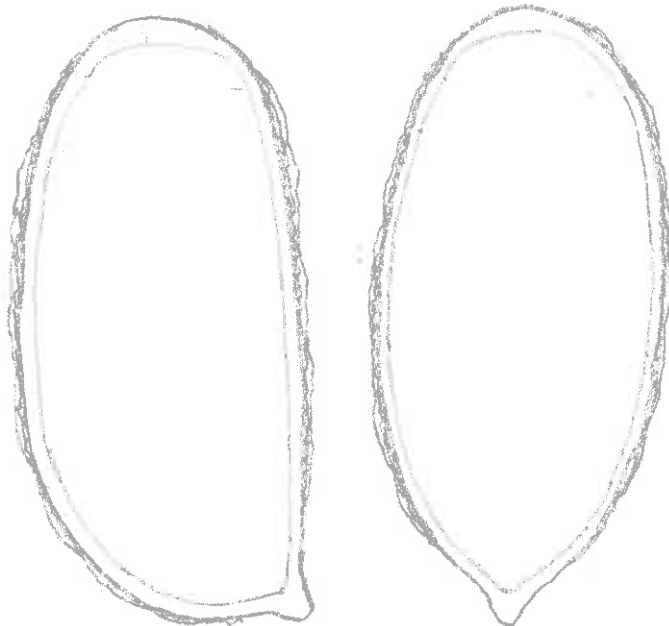
Spores 7.5-10 x 4-4.5  $\mu$ , cylindric-ellipsoid in both profile and face views, wall 0.3  $\mu$  thick, minutely rugulose, some slightly calyptrate, yellowish brown in 2% KOH. Basidia 22-27 x 5-6  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 23-28 x 3-6  $\mu$ , small and inconspicuous, subcylindric, often slightly enlarged downward on one side (rarely both sides), occasionally subcapitate. Gill trama of subparallel hyphae, 4-7  $\mu$  broad. Pileus trama of loosely interwoven, broad to medium broad hyphae. Pileus cuticle an ixocutis. Hypodermium hyphoid, the hyphae of brown relatively short cells (not a cell-zone). Stipe cuticle a thick grayish zone of colorless, slender (2-4  $\mu$ ), dry hyphae. Clamp connections present on the epicuticular hyphae.

Latin diagnosis on p. 330.

*Hebeloma cylindrosporum* Romagn.  
37576 - Holotype



Ch x 1000



Profile

Face

Spores x 8000



HEBELOMA CYLINDROSPORUM Romagnesi

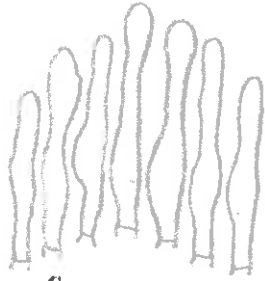
Bruchet No. Ly 70. BR 60.

Notes by Hesler

Spores 8-9.5<sup>(10)</sup> x 4-4.5  $\mu$ , slightly inequilateral in profile, oblong-ellipsoid in face view, wall 0.4  $\mu$  thick, rugulose, some calyptrate, yellowish brown in 2% KOH. Basidia 20-25 x 5-6  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 23-30 x 3-5(6)  $\mu$ , subcylindric, subventricose,  $\phi$  inconspicuous and not abundant. Gill trama of subparallel hyphae, 5-7  $\mu$  broad. Pileus trama slightly radial but distinctly and loosely interwoven, the hyphae 5-12  $\mu$  broad. Pileus cuticle a distinct ixocutis. Hypodermium hyphoid. Stipe cuticle a distinct brown hyphoid zone, more or less 25  $\mu$  thick, all "tissue" beneath of pallid, thick-walled, angular hyphae. Clamps not seen.

*Helvoma cylindrosporum* Romagn.

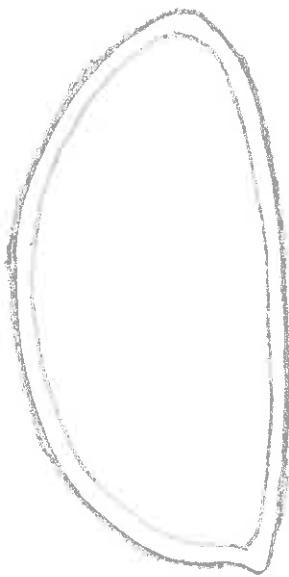
Bruchet No. 70. BR. 60.



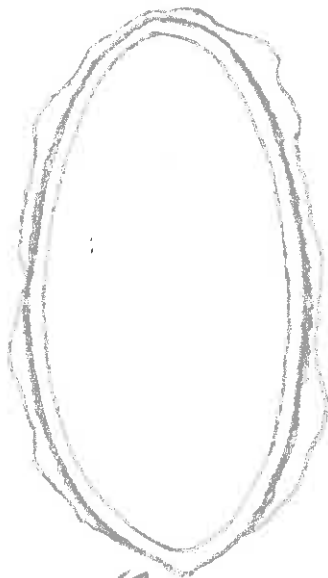
Ch x 1000



Caule x 1000



Profile



Face

Spore x 800

16642

HEBELOMA CYSTIDIFERUM sp. nov.

On soil, woods road, Oliver Springs, Tenn., October 29, 1944

Pileus 4-6 cm broad, "pale pinkish buff," disc slightly darker, shining, viscid, glabrous except the fibrillose margin. Context white, medium thick, firm; odor slightly fungoid, taste bitter.

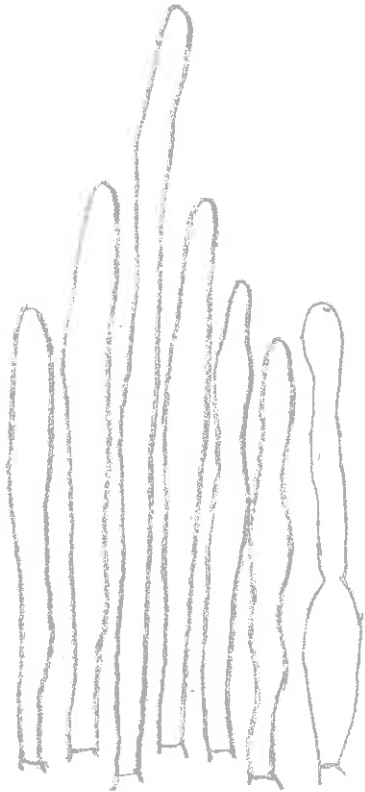
Lamellae adnexed or emarginate, "pale ochraceous salmon," crowded, medium broad, edges fimbriate.

Stipe 3-5 cm long, 8-12 mm thick, white, apex mealy-squamulose, elsewhere fibrillose, dry, tapering downward, sub-bulbous, hollow-stuffed.

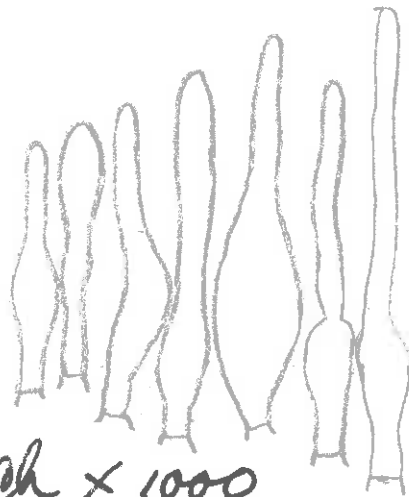
Spores 9-12 x 5.5-7  $\mu$ , ~~inequilateral~~ inequilateral in profile, sublimoniform to subfusoid in face view, wall 0.5-0.4  $\mu$  thick, minutely rugulose, yellowish in 2% KOH. Basidia 22-30 x 6-7  $\mu$ , 4-spored. Pleurocystidia 58-102 x 4-6  $\mu$ , filamentous, often slightly ventricose to slightly constricted, conspicuously projecting; cheilocystidia 32-62 x 5-12  $\mu$ , bottle-shaped or flask-shaped, more rarely cylindrical-clavate. Gill trama subparallel, hyphae 4-8  $\mu$  broad. Pileus trama of broad, loosely interwoven hyphae. Pileus cuticle an ixocutis. Hypodermium none. Stipe cuticle of dry repent hyphae; caulocystidia often present, similar to cheilocystidia. Clamp connections not observed.

*Hebeloma cyrtidiferum* sp. nov.

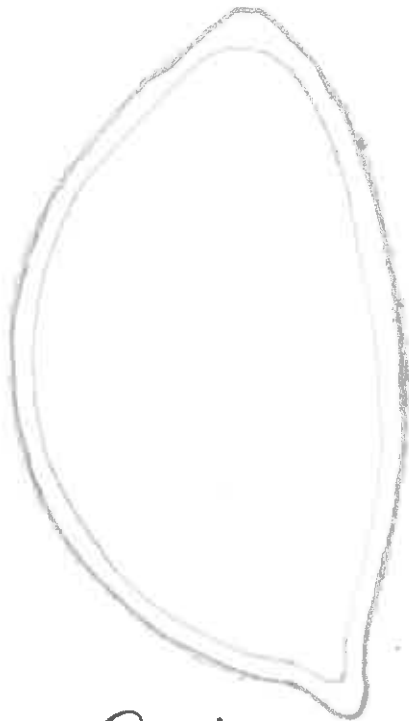
16642



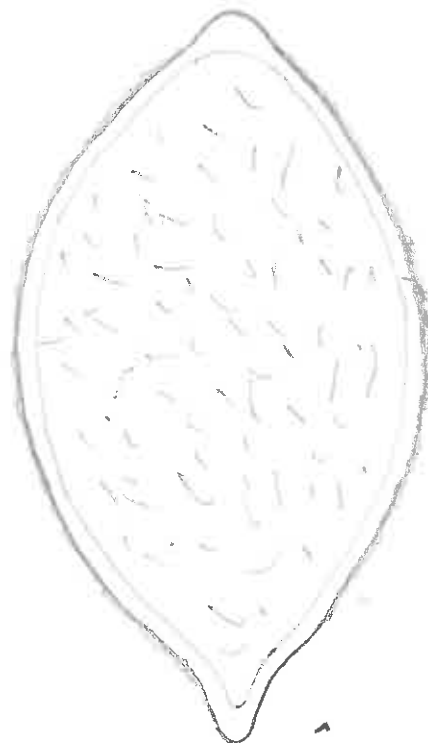
PE x 1000



Ch x 1000



Profile



Face View

Spores x 8000

from Switzerland

Smith - 80437 HEBELOMA CYSTOCAPITATUM sp. nov.

Scattered in mountain meadow, near snow-line, Duncan Valley,  
near Sertig, Switzerland, leg. Smith, September 2, 1972

Notes by Smith

Pileus 3-5 cm broad, broadly convex with an inrolled margin, pale dingy pinkish buff to grayish cinnamon buff, margin whitish and minutely pubescent, glabrous, viscid. Context pallid, soft; odor of radish.

Lamellae adnate, pallid becoming dull brown and finally snuff brown, becoming darker spotted, close, narrow.

Stipe 2-2.5 cm long, 10 mm thick or less, white, base not darkening appreciably, scurfy-whitish above. Veil none.

Notes by Hesler

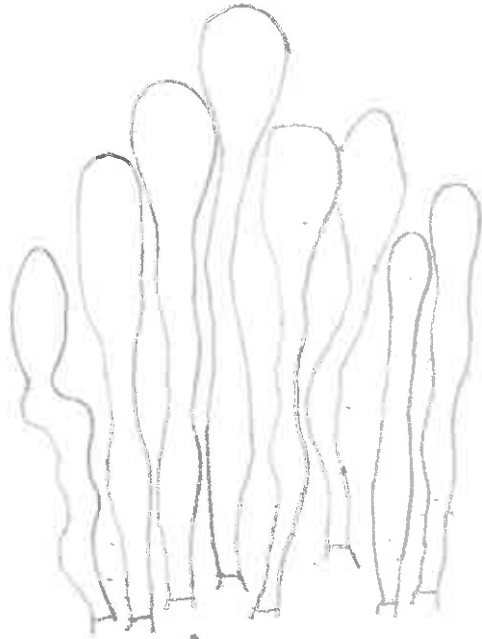
Spores 10.5-15(16) x 6.5-7.5(8)  $\mu$ , inequilateral in profile, subvoid to subfusoid in face view, wall 0.4  $\mu$  thick, rugose to rugulose, yellowish brown in 2% KOH. Basidia 30-36 x 8-10  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 47-74 x 6-12  $\mu$ , capitate, usually strikingly so, stalk rather slender and often subventricose below, in dense tufts. Gill trama of undulating slender subparallel hyphae, 3-6  $\mu$  broad. Pileus trama of radial hyphae. Pileus cuticle an ixocutis. Hypodermium hyphoid. Stipe cuticle a

pallid zone of thick-walled hyphae, surface bearing scattered tufts of caulocystidia similar to cheilocystidia. Clamp connections not found.

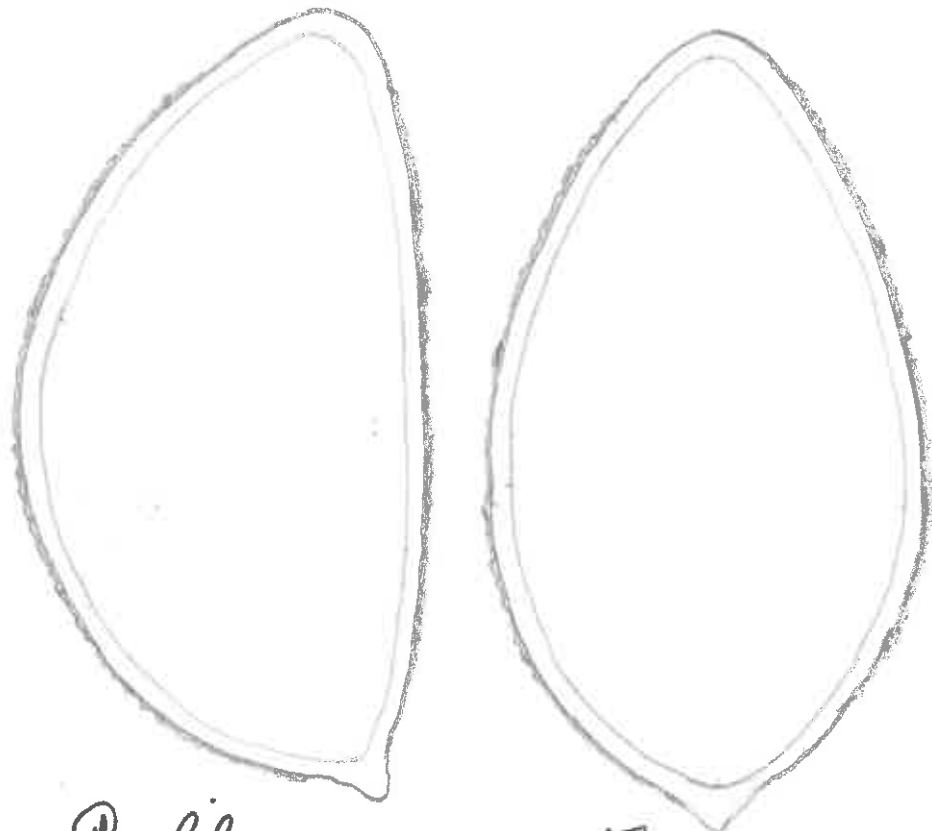
The large spores, moderately large basidia, the remarkably capitate cheilocystidia, and the apparent absence of a veil are distinguishing characters.

*Nebeloma cytopitatum* sp. nov.

Sm. 80437 - Type  
(from Switzerland)



ch x 1000



Profile

Face

Spores x 8000

Smith - 65757 HEBELOMA DECOLORANS sp. nov.

Under pine, Iron Creek, Stanley, K Idaho, August 6, 1962

Notes by Smith

(near crustuliniforme but more highly colored and no odor or taste)

Pileus 6-8 cm broad, broadly convex, margin wavy, hygrophanous, "verona brown" when moist, fading to pinkish tawny, glabrous, viscid at first but soon dry. Context white, pale olive in  $\text{FeSO}_4$  (darker in the stipe base); odor and taste not distinctive.

Lamellae adnexed, pinkish tawny, close, rather narrow.

Stipe 7-8 cm long, 12-13 mm thick, whitish, brownish in the base in oldest, minutely more or less appressed squamulose, solid and white within, equal. Veil none.

Spores 8-10 x 5-6  $\mu$ ; inequilateral, rough, pale yellowish in KOH. Cheilocystidia present.

Notes by Hesler

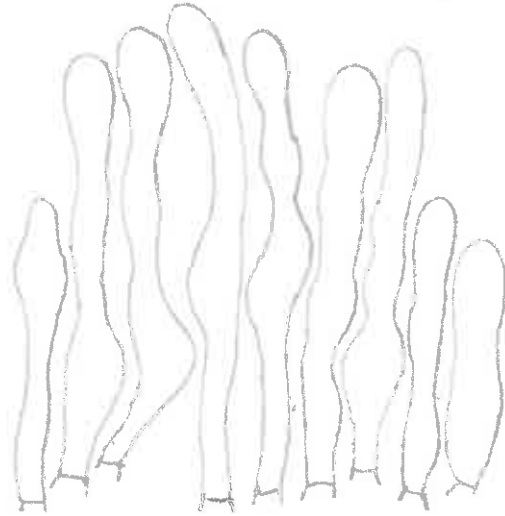
Spores 8-9.5(10) x 4.5-5(5.5)  $\mu$ , inequilateral in profile, <sup>dendro</sup>subfusoid in face view, wall 0.25  $\mu$  thick, minutely rugulose, pale yellowish brown in 2% KOH. Basidia 24-27 x 5-6  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 40-64 x 5-8  $\mu$ , subcylindric, apices subclavate or subcapitate, ventricose near the base or middle, usually on one side.



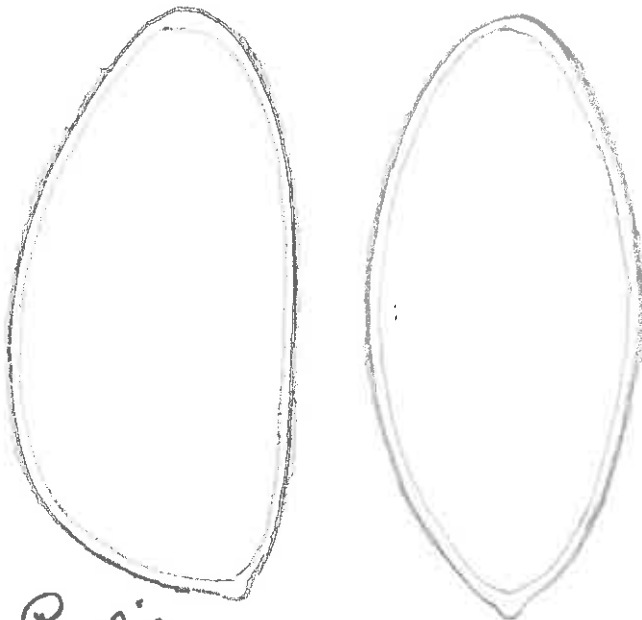
Gill trama slightly interwoven, hyphae 6-11  $\mu$  broad. Pileus trama of radial hyphae. Pileus cuticle an ixocutis, hyphae slender. Hypodermium a zone of brown cells, some moderately large and longer in the radial direction. Stipe cuticle a dry, pallid-grayish zone of thick-walled hyphae. Caulocystidia scattered, similar to cheilocystidia. Clamp connections on stipe epicuticular hyphae.

*Hebeloma decolorans* sp. nov.

Sm-65757 - Fyp1



ch. x 1000



Profile

Face

Spores x 8000

HEBELOMA DEFLECTENS Karst.

(=Alnicola)

Leg.-Det. P. A. Karsten, No. 4000, ex-Herb. Petter Adolph  
Karsten (1834-1917), Univ. Helsinki, August 23, 1878  
(Originally described in Hattsv. 1:475. 1879.)

Notes by Hesler

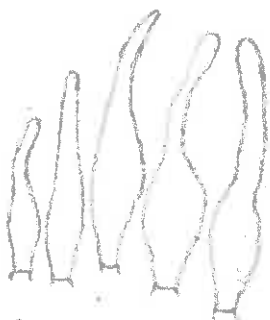
Spores 8.5-11 x 4.5-5.5(6)  $\mu$ , inequilateral in profile, subfusoid to sublimoniform in face view (the ends more or less pointed), wall 0.3  $\mu$  thick, punctate, pale yellowish brown in 2% KOH, not stained in Melzer's reagent. Basidia 28-30 x 7-8  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 20-36 x 4-9  $\mu$ , urtica hair-like (flask-shaped with a conspicuous, slender neck). Gill trama of slender, sub-parallel hyphae. Pileus trama hyphoid. Pileus cuticle dry, hyphoid, bearing brown epicuticular hyphae, often in bundles (as fibrillose scales), composed of rather long cells which are sometimes more or less inflated.

This seems to be an Alnicola, perhaps near A. escharoides (Naucoria escharoides, which is listed by Singer as a synonym of A. melinoides (Fr. sensu Ricken, Singer) Kühner (1926).

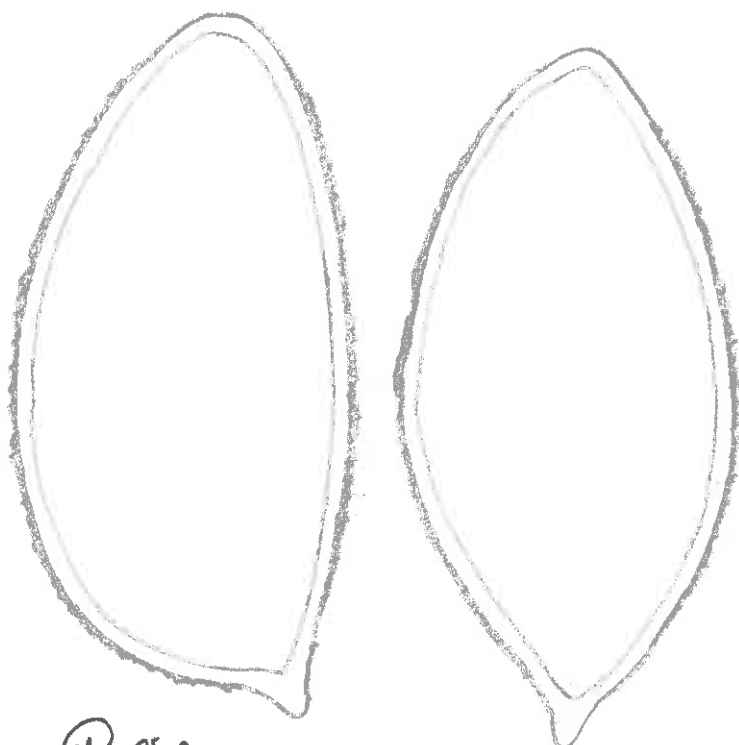
*Hebeloma deflectens* Karst. ?

Fig-Det. Karsten, No. 4000, Helsinki, Aug. 23, 1878

this is an Alnicola



Ch x 1000



Profile

Face

Spores X 8000

*Alnicola?*

INOCYBE DEFLECTENS Karst.

ex-Herb. Karsten, No. 4001, leg-det Karsten, Helsinki,  
Finland, September 1879. Labelled "pars spec. orig."

Notes by Hesler

This seems to be the same species as Karsten's No. 4000, which is an Alnicola.

Spores 8-10(11) x (3.5)4-5  $\mu$ , slightly inequilateral in profile, subfusoid in face view (a few sublimoniform), minutely rugulose, pale yellowish in 2% KOH, scarcely stained in Melzer's. Pleurocystidia none; cheilocystidia (15)25-40 x 4-7  $\mu$ , urtica-like (hair-like), or flask-shaped with a conspicuous slender neck. Pileus cuticle of dry repent hyphae, bearing epicuticular strands of brownish hyphae, of medium long cells.

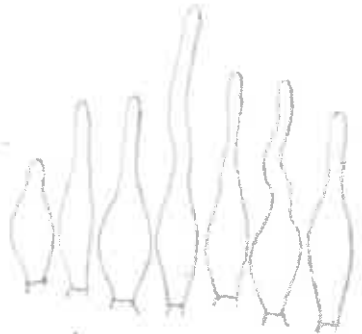
On a slip of paper in the packet, it is marked "Hebeloma."

*Inocybe deflexens* Karst.

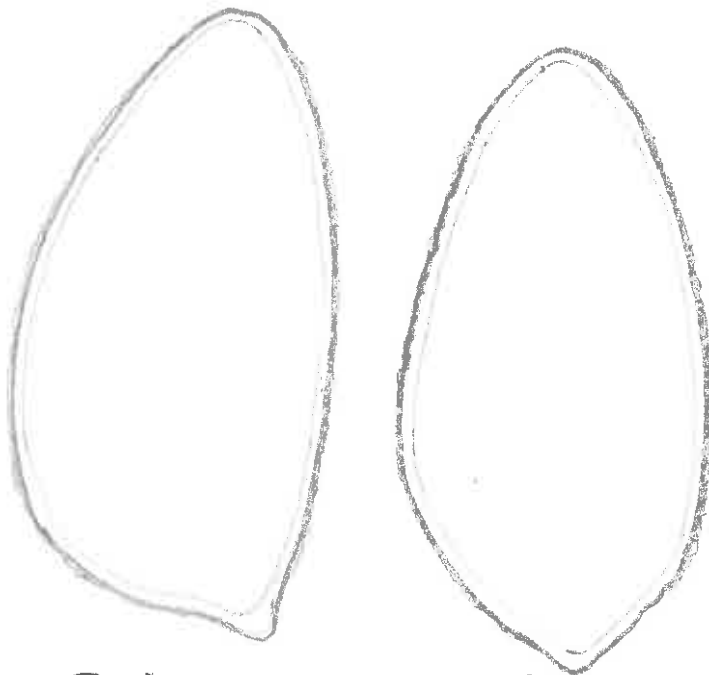
ex-Herb. P.A. Karsten, Helsinki, Finland, Sept. 1879.

Labelled: "pars, spec. orig." Reg-Net. Karsten, #4001

This is an Amisola



Ch. x 1000



Profile

Face

Spores x 8000

HEBELOMA DISCOMORBIDUM (Pk.) Pk.

New York State Mus. Bull. 139:75. 1910

Agaricus (Naucoria) discomorbidus Pk., Buffalo Soc. Nat. Sci. Bull.: (No. 2):52. 1873.

Naucoria discomorbida (Pk.) Sacc., Syll. Fung. 5:842. 1887.

(This is apparently a good Hebeloma. Note that Murrill (N. A. Flora 10, 1917) treated it both as Naucoria discomorbida (Pk.) Sacc. (on p. 173), and later as Hebeloma discomorbidum (Pk.) Pk. (on page 222). Also, Smith, in his notes, calls it an Alnicola.)

Pileus 2.5-4 cm broad, convex or nearly plane, glabrous, reddish-brown or dull chestnut becoming brown in the center with age or in drying; viscid. Context thin.

Lamellae adnate to adnexed, white or pallid, becoming brownish ferruginous, close, narrow, the edges white crenulate, or minutely serrulate.

Stipe 4-6 cm long, 2-4 mm thick, white, apex mealy, elsewhere glabrous, dry, equal, stuffed or hollow.

Notes on Type (Feb. 1973)

Spores (9.5)10-13 x (5)5.5-7  $\mu$ , slightly inequilateral in profile, subvoid to ellipsoid in face view, wall 0.3  $\mu$  thick, minutely rugulose to nearly smooth, yellowish with a faint brownish tint in 2% KOH, apex somewhat truncate in many. Basidia 30-35 x 6-7  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 38-50 x 5-9  $\mu$ , bottle-shaped to cylindrical and ventricose on one side near the base, at times subcapitate.

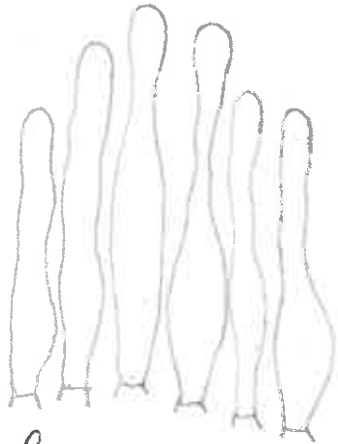
Gill trama of slender, subparallel to slightly interwoven hyphae. Pileus trama of radial hyphae. Pileus cuticle an ixocutis; hypodermium a brown cell-zone. Stipe cuticle of repent dry hyphae. Clamp connections present on the epicuticular hyphae of the stipe.

This is a good Hebeloma; the spores, cheilocystidia, and the pileus cuticle are typical.

The type collected by Peck on soil in woods, Croghan and Copake, New York, September and October.



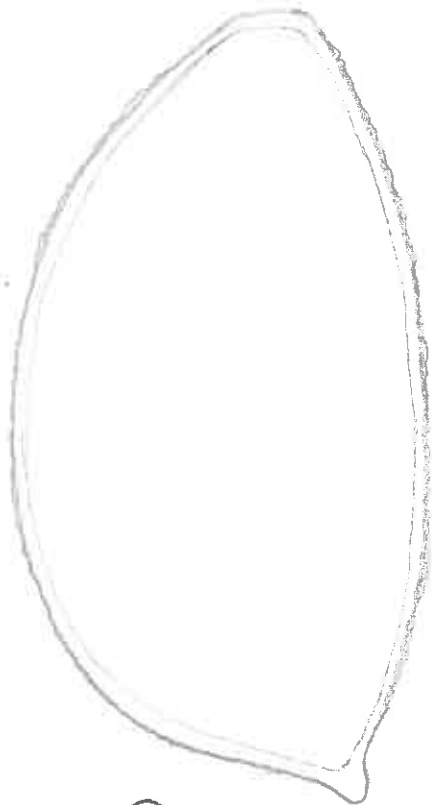
*Agaricus discoverbidum* (Pk)  
(Hebeloma)  
Zyze



Ch x 1000



Basidium  
x 1000



Profile



Face

Spores x 8000

Exclude

HEBELOMA DRYOPHILUM Mu<sup>r</sup>rill

North American Flora 10 225. 1917

(This is an Inocybe)

Pileus solitary, 1.5-2.5 cm broad, convex to expanded, somewhat umbonate or gibbous, cream colored, disc darker, glabrous, viscid, margin entire and concolorous. Context white; odor and taste not distinctive.

Lamellae sinuate, dark cream-colored to subfulvous, broad, rather crowded.

Stipe 4-5.5 cm long, 4-6 mm thick, white, slightly enlarged at the base, finely fibrillose below, fleshy.

Spores 8-9 x 5-6  $\mu$ , ellipsoid, smooth, melleous under the microscope.

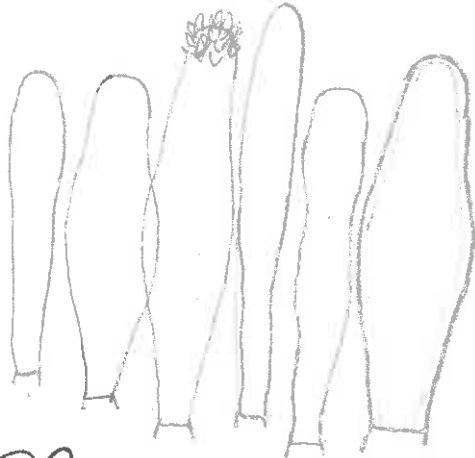
Type among dead oak leaves, Stanford University, California, leg. C. F. Baker No. 140 (NY), December 14, 1901.

Notes on Type, by Hesler

Spores 8.5-10 x 4.5-5  $\mu$ , inequilateral in profile, ovoid to subellipsoid in face view, rarely subreniform, smooth, wall 0.25-0.3  $\mu$  thick. Basidia 22-26 x 6-8  $\mu$ , 4-spored. Pleurocystidia 40-54 x 7-15  $\mu$ , subcylindric to ventricose (more or less 9-pin), apex obtuse and often crested, projecting conspicuously, some thick-walled; cheilocystidia 28-36 x 6-8  $\mu$ , clavate. Pileus cuticle of

dry repent hyphae, bearing a trichodermium. Stipe cuticle of repent, dry hyphae, bearing more or less erect, colorless fibrils; clamp connections none.

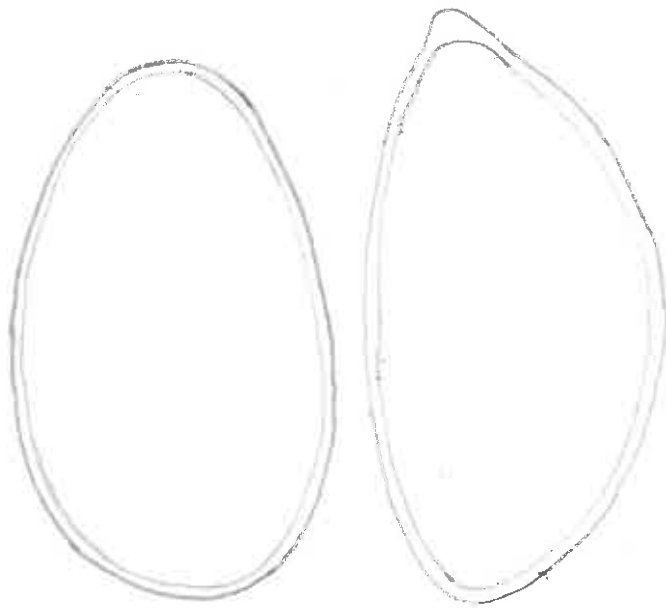
*Helvella dryophilum* Murr.  
Type (An inocybe)



gP x 1000



Ch x 1000



Face View

Profile

Spores x 8000

*Print*

HEBELOMA DUNENSE Corbiere et Heim

Mem. Soc. Nation. Sci. Natur. et Math. de Cherbourg 4-:166.  
1929

Notes by Hesler (March 5, 1973)

On specimen sent to Hesler, on loan, leg. R. Heim, det.  
E. Perez, Dunes: Veillon.

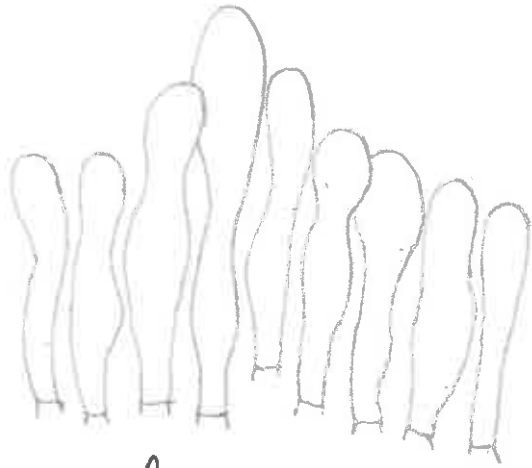
Spores 9-11 x 5-6  $\mu$ , inequilateral in profile, subovoid in face view, wall 0.4-0.5  $\mu$  thick, rugulose, yellowish brown in 2% KOH. Pleurocystidia none; cheilocystidia 32-53 x 6-9  $\mu$ , subclavate, ventricose or at times ventricose on one side below. Gill trama of narrow subparallel hyphae. Pileus trama of radial hyphae. Pileus cuticle an ixocutis. Hypodermium not differentiated. Stipe cuticle of dry repent hyphae, some hyphae incrustated. Caulocystidia in tufts, similar to cheilocystidia.

The specimens were preserved in formaldehyde, and were not in the best condition for study.

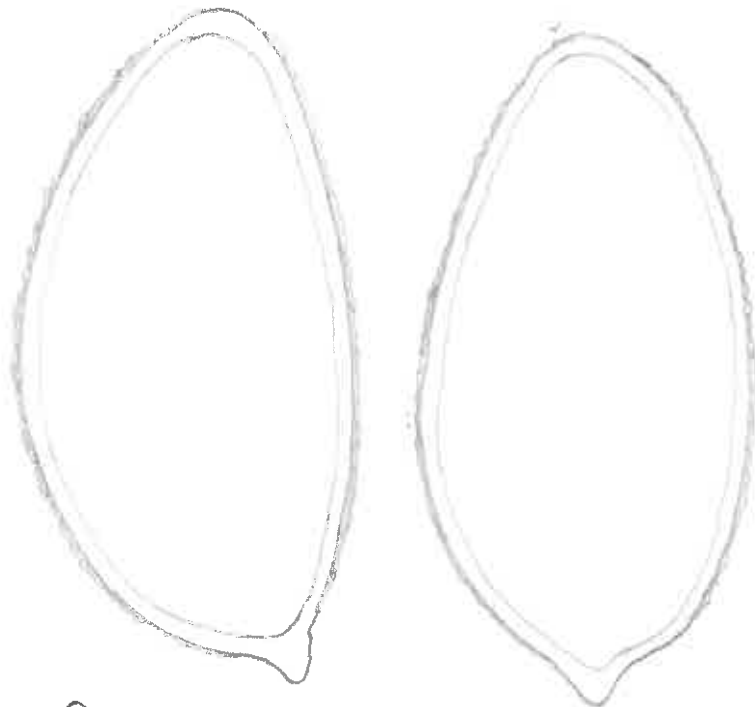
I have not seen the original (nor any) description, but K & R (1953) and Moser (1967, Key) place it in the group with a fugaceous veil; on dry sand dunes; the pileus purple reddish to ocher reddish, the margin paler; spores 10-12.5 x 6-7.5  $\mu$ .

*Hebeloma durum* Corbiere & Heim

ex-*Herb. Heim*; *Dunes: Veillon*  
(Recit Mch. 2, 1970)



ch x 1000



Profile

Face

Spores x 8000

HEBELOMA EARLEI Murrill

North American Flora 10:219. 1917

Pileus 3-4 cm broad, convex to plane, rosy-isabelline, disc somewhat darker, margin pallid, slightly viscid, smooth, glabrous, margin silky, not striate. Context thin, whitish; odor pleasant, taste mild.

Lamellae deeply sinuate, pallid to subfulvous, close, rather broad, lamellulae present.

Stipe 3-4 cm long, 3-5 mm thick, white, equal, glabrous, shining, apex minutely floccose, solid.

Spores 9-10 x 6  $\mu$ , ovoid, obliquely apiculate at base, pale melleous (under the microscope).

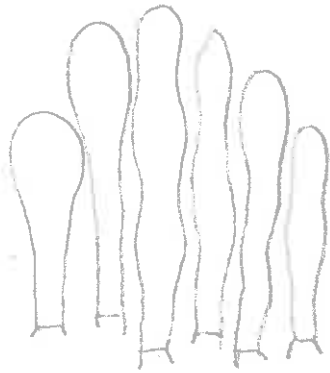
Type collected by F. S. Earle 51 (NY), on soil, under beech, New York City, November 12, 1901

Notes on Type, by Hesler

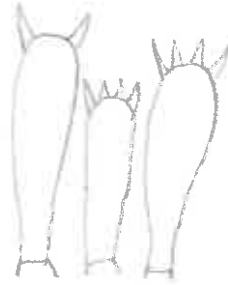
Spores 9-12 x 5.5-7  $\mu$ , inequilateral in profile, fusoid in face view, minutely rugulose, wall 0.2-0.4  $\mu$  thick, pale yellowish in 2% KOH. Basidia 22-30 x 6-8  $\mu$ , 2-4-spored. Pleurocystidia none; cheilocystidia 28-46 x 5-9  $\mu$ , clavate to irregularly subcylindric and capitate, in tufts. Gill trama of parallel to subparallel hyphae. Pileus trama of radial hyphae. Pileus cuticle an ixocutis; hypodermium of brown radial hyphae. Stipe cuticle of repent, dry hyphae.

*Hebeloma earlei* Murr.

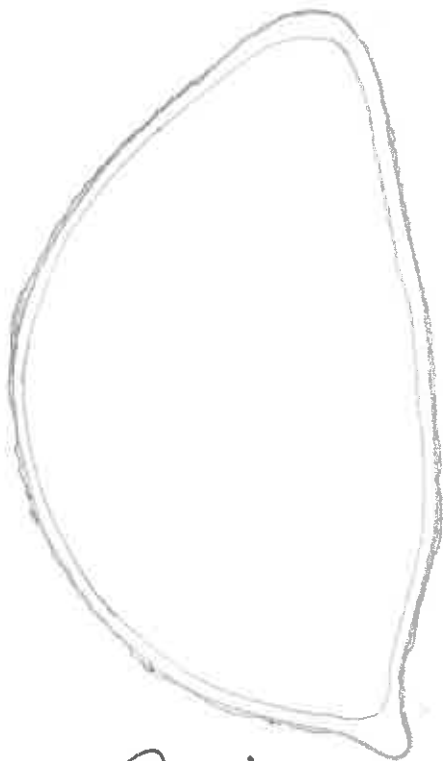
Type



Ch x 1000



Ba x 1000



Profile



Face

Spores x 8000



HEBELOMA EDU RUM Metrod

Bruchet No. Ly 63. Br 35.

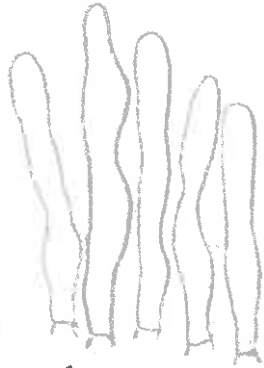
Notes by Hesler

Spores 9-12 ~~µ~~ x (5)6-7 µ, slightly inequilateral in profile, subvoid in face view, wall 0.3 µ thick, rugulose, yellowish brown in 2% KOH. Basidia 27-32 x 6-7 µ, 4-spored. Pleurocystidia none; cheilocystidia 32-44 x 4-5 µ, subcylindric, subventricose below or upward, not always conspicuous. Gill trama of subparallel hyphae, 3-8 µ broad. Pileus trama of broad (6-24 µ), loosely interwoven hyphae throughout. Pileus cuticle an ixocutis. Hypodermium a cell-zone. Stipe cuticle a brown zone, the remainder of pallid, angular, thick-walled hyphae, the surface bearing tufts of caulocystidia, 50-83 x 5-10 µ, subcylindric, apices subcapitate, occasionally septate. Clamp connections at the base of caulocystidia.

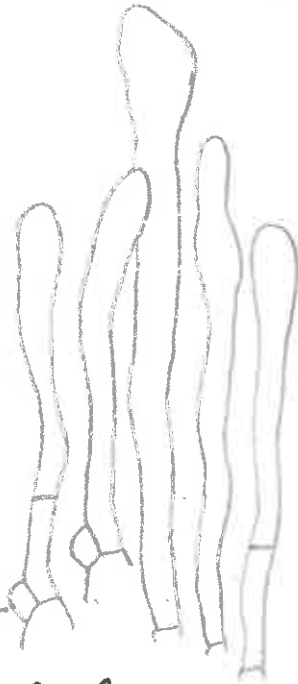
Bruchet (1970) does not give spore dimensions, nor pileus cuticle structure.

*Hebeloma edvrum* Metrod

Bruchet No. 63. BR. 35

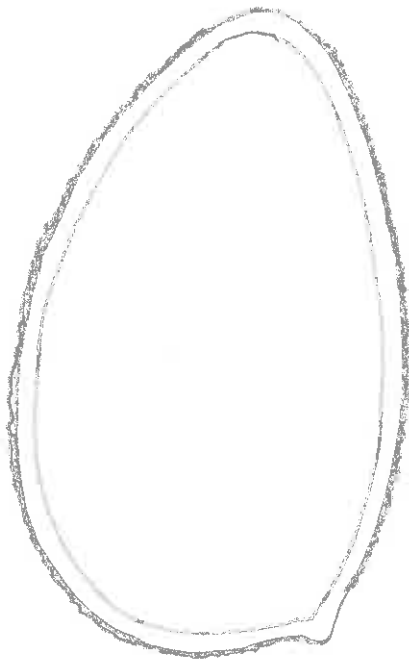


Ch x 1000

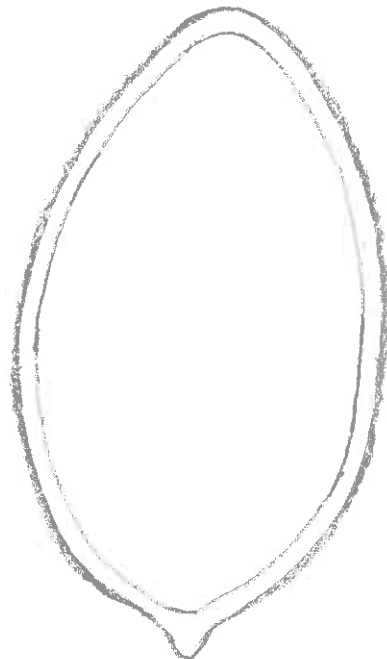


Clamp

Cauls - x 1000



Profile



Face

Spores x 8000

HEBELOMA ELATUM (Fr.) Gill.

(Following from Smith: Mich. Acad. Sci. Arts & Letters  
20:176-177. 1935) (see: Pl. XXXI)

Pleus 3-5 cm broad, broadly convex, slightly umbonate, or expanded-plane to repand, "fawn color" at first, then "pinkish cinnamon", margin paler, viscid, pellicle separable, margin even. Context white, then on the margin, thick on the disc; odor somewhat of radish, taste slightly bitter.

Lamellae adnate with a decurrent tooth, avellaneous with a tint of cinnamon, edges white-flocculose, narrow, crowded.

Stipe 5-9cm long, 5-10(12)mm thick, equal above the somewhat bulbous base, white to pallid, apex mealy, longitudinally striate, undulate, stuffed. *Veil absent.*

Spores 8-10 x 5-5.5 $\mu$ , ventricose, slightly inequilateral. Basidia 28-30 x 5-6 $\mu$ . Pleurocystidia none; cheilocystidia 65-85 x 4-6 $\mu$ , filamentose.

Collected on sphagnum, Mud Lake Bog, Whitmore Lake, Aug. 19, 1929, Michigan.

Smith - 33-1129 HEBELOMA ELATUM (Fr.) Gillet

On sphagnum, Mud Lake Bog, Whitmore Lake, Michigan, leg.-det.

Smith, October 14, 1933

Notes by Smith

Pileus 3-5 cm broad, broadly convex, slightly umbonate or expanded plane, margin recurved in some, at first "fawn color" or vinaceous brown, becoming paler to "pinkish cinnamon," margin often paler, viscid, pellicle separable, margin even. Context white, thick in the disc, thin over the marginal area; odor raphanoid, taste bitterish.

Lamellae adnate with a decurrent tooth, narrow, crowded, avellaneous with a tint of cinnamon, edges white-floccose.

Stipe 5-9 cm long, 5-10(12) mm thick, equal above the somewhat clavate-bulbous base, white to pallid, apex mealy, longitudinally striate. Veil none.

Spores 9-12 x 5.5-7  $\mu$ , inequilateral in profile, ovate in face view, very minutely marbled (smooth under high dry), pallid clay color in KOH, reddish tawny in Melzer's solution. Basidia 4-spored, 22-25 x 7-8  $\mu$ , hyaline in KOH. Pleurocystidia none; cheilocystidia abundant, 60-88 x 5-7  $\mu$ , filamentous, or when young narrowly fusoid ventricose, apices obtuse and in some slightly enlarged, hyaline, smooth, walls thin and often flexuous. Gill trama parallel or nearly so, brownish in KOH, subhymenium not distinctive. Pileus trama of floccose interwoven hyphae, dingy pallid in KOH up to the dull rusty brown hypoderm of enlarged cells. Pileus cuticle

a thin gelatinous pellicle of appressed narrow (3-4  $\mu$ ) hyaline hyphae above this. Clamp connections present.

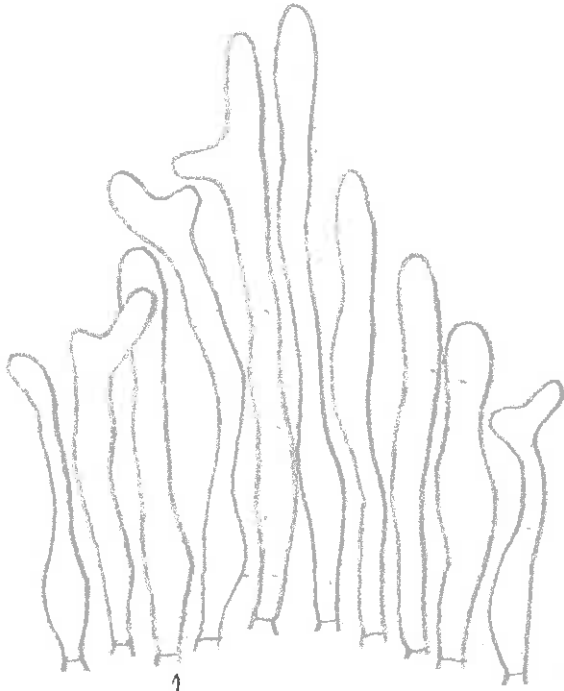
The vinaceous brown pileus, long white stipe with its bulbous base, lack of veil, and medium-sized nearly smooth spores are distinctive.

Notes by Hesler

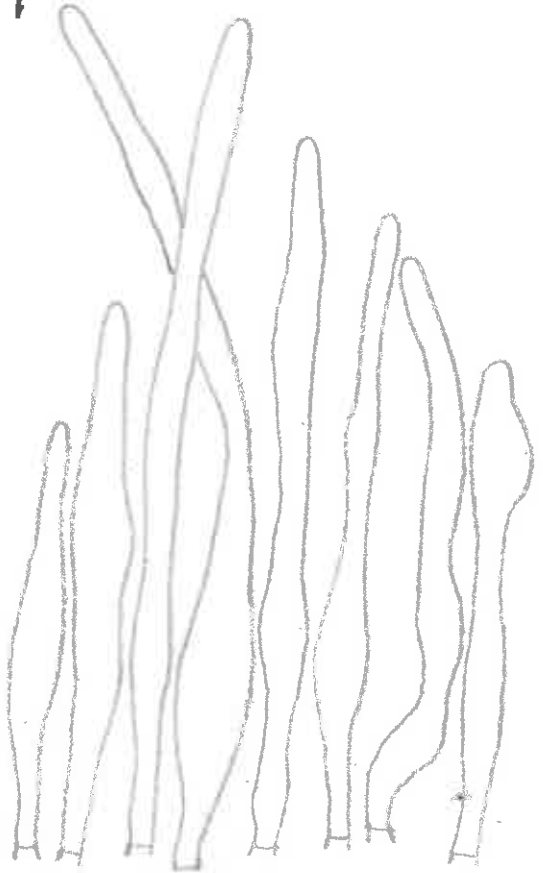
Spores 9.5-12(13.5) x 5.5-7  $\mu$ , inequilateral in profile, subvoid to subfusoid in face view, wall 0.4  $\mu$  thick, minutely rugulose, pale yellowish brown in 2% KOH. Basidia 28-32 x 7-8  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 38-82 x 5-7  $\mu$ , filamentous or subcylindric, often more or less ventricose below on one side, or sometimes both, in some the apical region slightly forked or branched. Gill trama of subparallel hyphae, 3-6  $\mu$  broad. Pileus trama of broad (5-16  $\mu$ ), interwoven hyphae. Pileus cuticle an ixocutis. Hypodermium a zone of brown cells. Stipe cuticle of slender thick-walled, pallid to grayish hyphae, the surface bearing a turf or tufts of caulocystidia, 57-114 x 4-10  $\mu$ , filamentous, often ventricose below or midway. Clamp connections on the pileus cuticular hyphae.

*Hebeloma elatum* (Fr.) Gill.

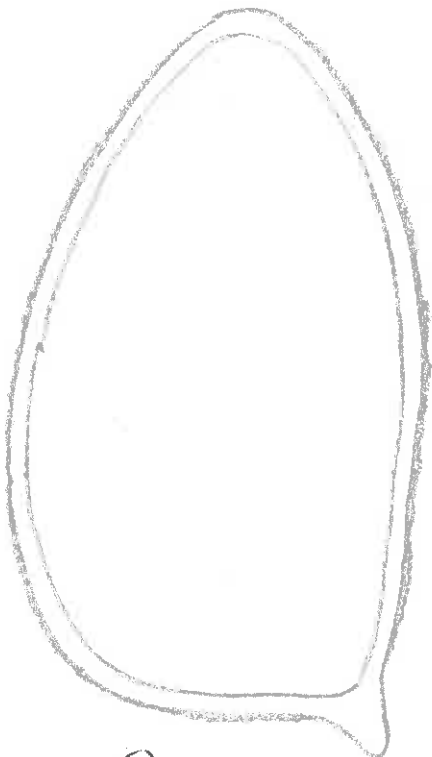
Sm - 33-1129



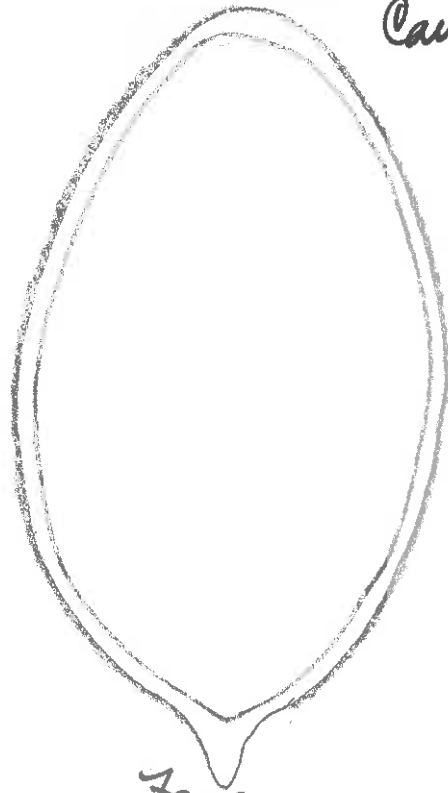
Ch x 1000



Caulo x 1000



Profile



Face

Spores x 8000

Smith-27367 HEBELOMA ELATUM sensu Smith (?)

Gregarious under conifers, Little Crater Lake, Mt. Hood

National Forest, Oregon, October 6, 1947

Notes by Smith

Pileus 4-7 cm broad, convex with an inrolled margin, surface glabrous and viscid, "Verona brown" over disc, near "wood brown" in age along margin or over all. Context thin, concolorous with surface moist, pallid when faded; odor and taste of radish.

Lamellae bluntly adnate with a slight tooth, "avellaneous" at first, soon near "wood brown" and finally dark dull clay-color, close, narrow, becoming moderately broad, edges even to faintly crenulate.

Stipe 5-8 cm long, 8-10 mm at apex, soon hollow, equal above an abrupt bulb, whitish at first throughout, in age "snuff brown" from base upward, apical region pruinose. Veil none.

Notes by Hesler

Spores 9-12 x 5.5-7(7.5)  $\mu$ , inequilateral in profile, subovoid in face view, wall 0.3  $\mu$  thick, rugulose to nearly smooth, yellow brown in 2% KOH, reddish brown in Melzer's reagent. Basidia 26-33 x 6-8  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 36-65(75) x 4-7  $\mu$ , cylindrical, in some ventricose below or at middle, apices not enlarged. Gill trama of slender subparallel hyphae. Pileus trama of radial

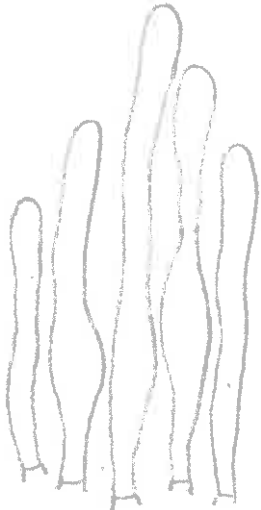
hyphae and some floccose cells. Pileus cuticle an ixocutis. Hypodermium cellular. Stipe cuticle a zone of pallid, angular hyphae.

This agrees well with H. elatum sensu Smith, except in 27367 the stipe becomes snuff brown from the base upward.

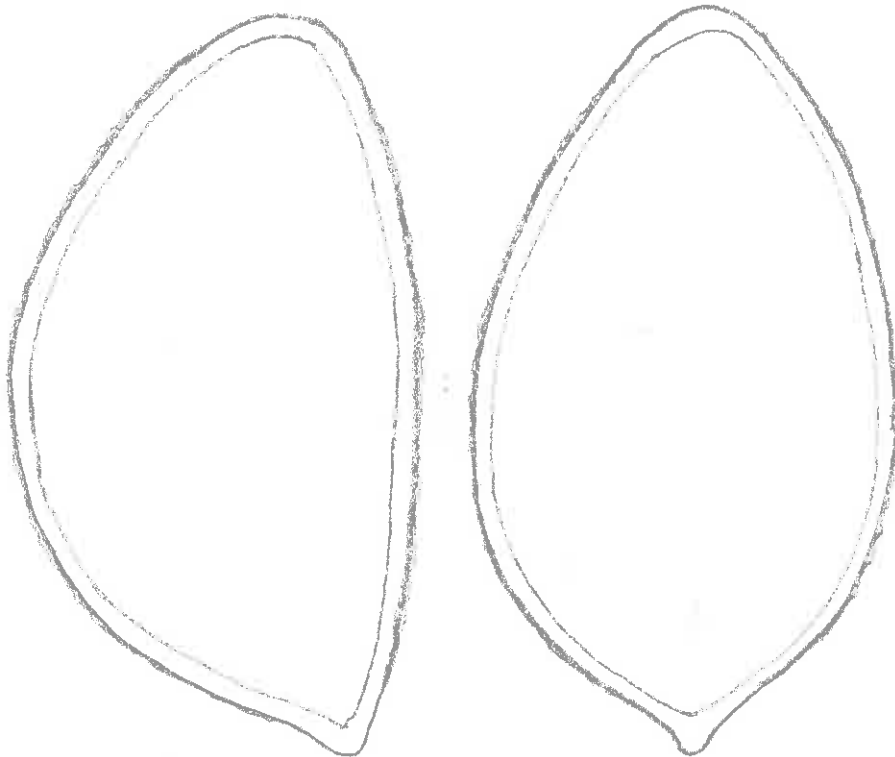


*Hebeloma elatum* ?

Sm - 27367



ch x 1000



Profile

Face

Spores x 8000

10359

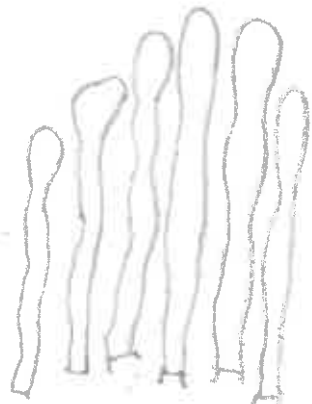
HEBELOMA ELATUM (Fr.) *Gill.*

Agaricus elatus Fr., Syst. Myc. 1:248. 1821 in sphagnum,  
Bear Island, Canada, leg.-det. H. S. Jackson,  
September 7, 1936.

Spores 8-10 x 5-5.5  $\mu$ , inequilateral in profile, sub-fusoid in face view, wall 0.3-0.4  $\mu$  thick, rugulose, yellowish, no germ pore. Basidia 24-30 x 6-8  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 35-48 x 4-7  $\mu$ , cylindrical, more or less capitate, clustered. Gill trama of subparallel hyphae. Pileus cuticle an ixocutis; hypodermium brown. Stipe cuticle of repent hyphae. Clamp connections none.

*Neeloma elatum*

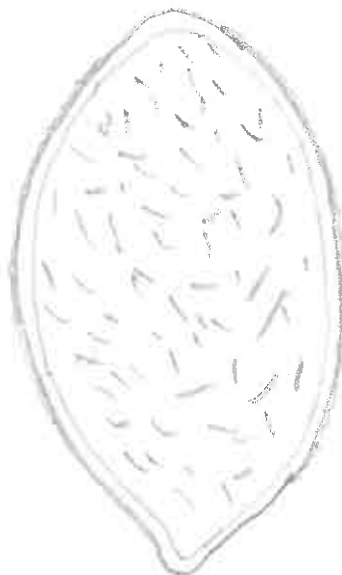
Teru 10359 (Canada)



ch x 1000



Profile



Face View

Spores x 8000

Romell-9921

Cortinarius

HEBELOMA ELATUM

ex-Herb. Stockholm, in Herb. Romell, No. 9921, leg. C. G.  
Lloyd (493) September 6, 1905

Notes by Hesler

This is a Cortinarius: The pileus are dark brown, dry (the cuticle is of dry hyphae, no ixocutis); spores 10-12.5 x 6.5-7.5  $\mu$ , scarcely inequilateral in profile, tuberculate, not calyptrate, rusty brown in 2% KOH, no color reaction in Melzer's, no germ pore. Stipe dry.

18853 <sup>1111</sup>HEBELOMA ELLIPSOIDEOSPORUM sp. nov. - Type  
Solitary or scattered, on grassy soil, under pines, Knox  
County, Tenn., November 25, 1948

Pileus 2.5-4 cm broad, convex, expanded, somewhat wavy-upturned at maturity, slightly viscid, pellicle separable half-way to disc, hygrophanous, "honey yellow" to "chamois" when dry, "isabella color" when wet, disc darker, at times slightly rugose, obscurely matted-fibrillose, margin even. Context rather thin, white; odor and taste mild, not distinctive.

Lamellae emarginate and uncinatae, at first white, finally near "buffy brown," crowded, medium broad, edges fimbriate.

Stipe 2.5-5 cm long, 4-6(10) mm thick, dingy with a greenish tint, apex nearly white and mealy, fibrillose-rimose downward, dry, shining, tapering downward, tubular. Veil webby, evanescent, leaving a slight, fugaceous ring.

Spores in thin deposit "tawny olive," (7)8-10.5 x 5-6  $\mu$ , only slightly inequilateral in profile, rather broadly, ellipsoid to subvoid in face view, obscurely rugulose, wall 0.25  $\mu$  thick. Basidia 24-32 x 6-7  $\mu$ , (2)4-spored. Pleurocystidia none; cheilocystidia 30-48(60) x 5-9  $\mu$ , cylindrical-subcapitate, or subventricose to more or less irregularly flask-shaped. Gill trama of subparallel hyphae, 6-14  $\mu$  broad. Subhymenium of narrow short-celled hyphae. Pileus trama of radial hyphae.

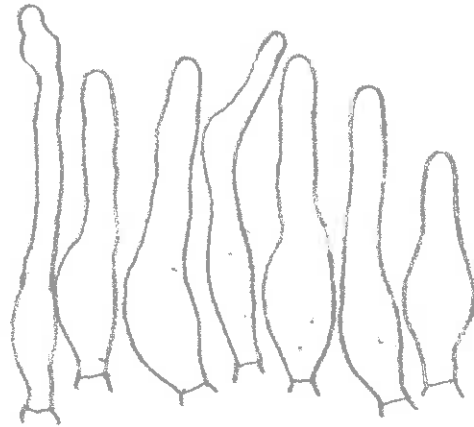
Pileus cuticle an ixocutis, often thin. Hypodermium a thin cell-zone. Clamp connections present. Caulocystidia 30-70 x 4-10  $\mu$ , similar to cheilocystidia, more or less in tufts.

The spores are distinctive in shape: they are rounded at the apex and are less inequilateral than in other species of Hebeloma. Caulocystidia are also present at apex.

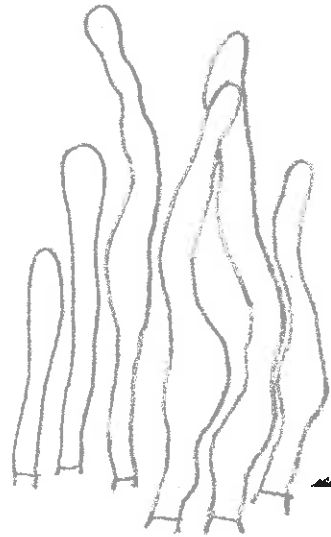
Murrill examined a portion of this collection, and suggested that it is near H. earlei, or perhaps a new species. But H. earlei, seems to belong in Denudata (no veil).

*Hebeloma ellipsoideosporum* sp. nov.

18853 - Type



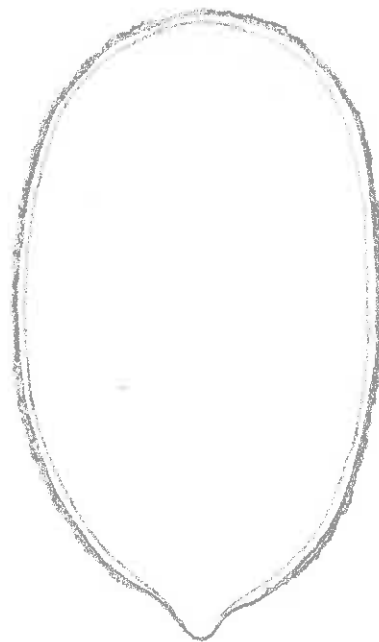
x Ch x 1000



Cantho - x 1000



x Profile



x Face

Spores x 8000

HEBELOMA EXCEDENS (Pk.) Sacc.

Syll. Fung. 5:806. 1887

Agaricus (Hebeloma) excedens Pk., N. Y. State Mus. Ann.

Rept. 24:68. 1872

Pileus 1.5-2.5 cm broad, convex, obtuse or broadly umbonate, pale alutaceous to russet, glabrous, margin extending beyond the lamellae. Context thin odor and taste of radishes.

Lamellae deeply sinuate, adnexed, pallid then brownish, ferruginous, close, moderately broad, minutely eroded on the edges.

Stipe 3-5 cm long, 2-4 mm thick, concolorous with the pileus, equal, silky-fibrillose, solid. Veil presence uncertain.

Type on soil, under or near pine trees, Saratoga, New York, October.

Type (Feb. 1973)

Spores (8)8.5-10 x (4.5)5-6.5(7)  $\mu$ , inequilateral in profile, ellipsoid to subovoid in face view, wall 0.25  $\mu$  thick, minutely rugulose to nearly smooth, pale yellowish in 2% KOH. Pleurocystidia none; cheilocystidia 36-42 x 6-7  $\mu$ , bottle-shaped to subcylindric and ventricose on one side near the base or the middle. Gill trama of slender, undulating, subparallel hyphae. Pileus trama of radial hyphae. Pileus

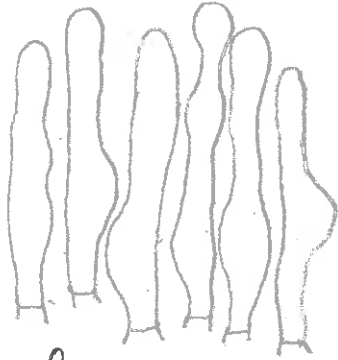


cuticle an ixocutis; hypodermium a dark brown zone of hyphae. Stipe cuticle of repent, dry hyphae; caulocystidia in tufts at the apex similar to cheilocystidia. Clamp connections not found.

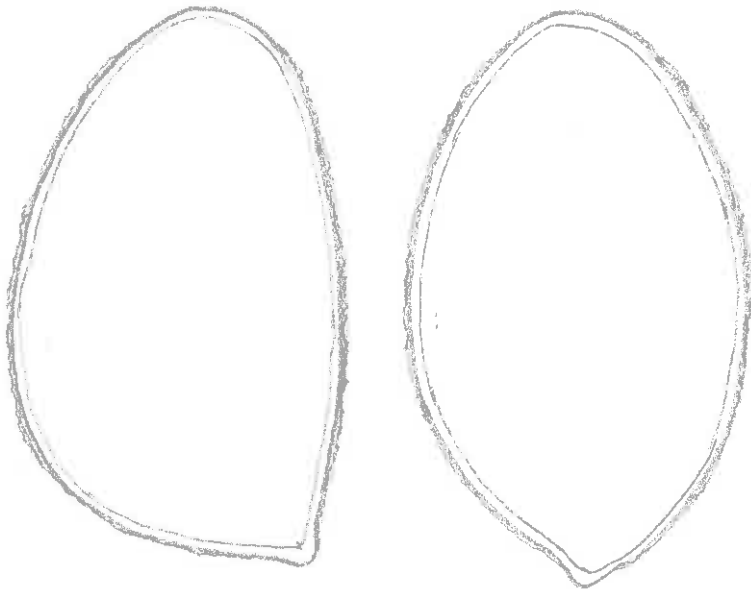
No evidence of a veil observed.

*Helidoma excedens* (Pk.) Sacc.

Type



Ch x 1000



Profile

Face

Spores x 8000

24976

HEBELOMA EXIGUICUTICULUM sp. nov.

On soil, Lake Waldensia, Ozone, Tennessee, leg. Sharp,  
October 13, 1962

Pileus 2-4 cm broad, convex, expanding, slightly hygrophanous, "ochraceous buff" when wet, "pale ochraceous buff" when dry, viscid, pellicle separable half way, margin even. Context white; odor raphanoid, taste bitter.

Lamellae emarginate, at first white, finally pallid brown, broad, close, edges fimbriate.

Stipe 1.5-4 cm long, 4-8 mm thick, white, apex white mealy, elsewhere scattered-fibrillose, equal, solid. Veil webby, white, sparse, fugaceous.

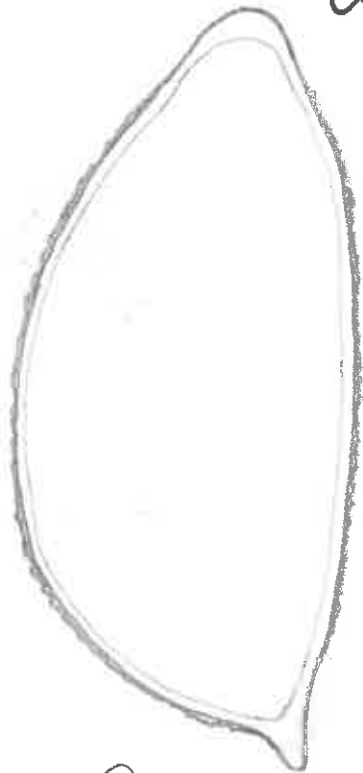
Spores in deposit "buffy brown," 10.5-13(15) x 5-6  $\mu$ , inequilateral in profile, fusoid to limoniform in face view, with a "nose," wall 0.3  $\mu$  thick, rugulose, yellowish brown in KOH. Basidia 24-28 x 6-7  $\mu$ , 4-spored. Pleurocystidia none; cheilocystidia 37-62 x 4-7  $\mu$ , cylindrical-clavate, base flask-shaped or ventricose, at times subcapitate. Gill trama of subparallel hyphae, 3-7  $\mu$  broad. Pileus trama of radially-disposed, somewhat interwoven hyphae. Pileus cuticle not greatly differentiated, the outer hyphae gelatinous. Hypodermium none, or poorly developed, and then hyphoid. Stipe cuticle of dry, repent hyphae. Clamp connections present on stipe epicuticular hyphae.

*Hebeloma exiguiticum*<sup>lum</sup> sp. nov.

24976 - Type



Ch x 1000



Profile



Face

Spores x 8000

HEBELOMA EXIGUIFOLIUM Murrill

North American Flora 10:221. 1917

Pileus gregarious to subcespitate, 3-5 cm broad, convex to expanded, or slightly depressed, broadly umbonate, isabelline to fulvous, umbo usually darker, margin pallid, glabrous, viscid. Context thick on the disc, very thin on the margin, white; taste becoming somewhat bitterish.

Lamellae sinuate, isabelline to fulvous, edges whitish-pruinose, crowded, extremely narrow.

Stipe 5 cm long, about 8 mm thick, white or pale-yellowish, subequal, usually abruptly enlarged at the base, fibrillose, solid, flesh white. Veil none.

Spores 8-9 x 6  $\mu$ , ovoid, smooth, melleous under the microscope, obliquely apiculate at the base.

Type collected in woods by Fres S. Boughton (NY), Pittsford, New York, September 28, 1915.

Notes on Type, by Hesler

Spores 8-11 x 5.5-7  $\mu$ , inequilateral in profile, fusoid in face view, yellowish to pale yellow brown in 2% KOH, wall slightly rugulose, 0.2-0.3  $\mu$  thick. Pleurocystidia none; cheilocystidia  $\nearrow$  42-70 x 6-8  $\mu$ , cylindrical and more or less capitate, or cylindrical-clavate, in tufts. Gill trama of subparallel hyphae. Pileus trama of radial hyphae. Pileus cuticle an ixocutis, the hyphae more or less digested.

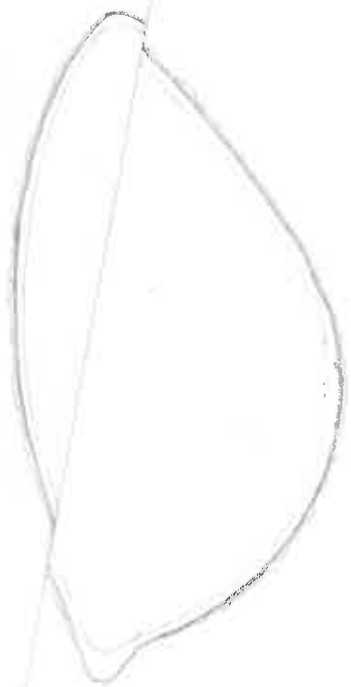
Hypodermium a zone of cells, brownish in 2% KOH. Stipe cuticle of repent, dry hyphae, forming a colorless cuticular zone. Clamp connections on pileus and stipe surface, aerial hyphae.

*Hebeloma rigidifolium* Murr.

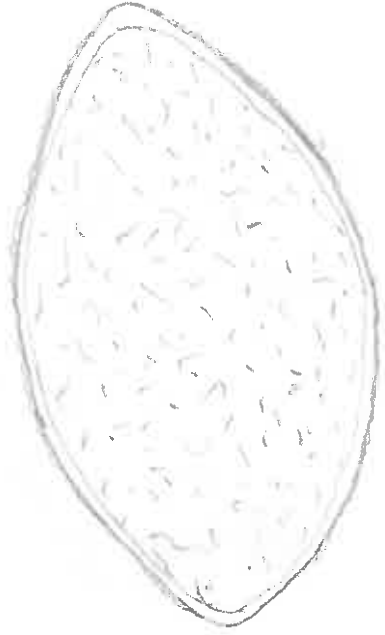
Type



Ch x 1000



Profile



Face View

Spore x 8000