

Type Studies on Basidiomycetes VII*).

By Rolf Singer.

1. *Armillaria*-Types from the Instituto de Botánica "C. Spegazzini".

Armillaria puiggarii Speg., Bol. Acad. Nac. Cienc. Cordoba
11: 384. 1889.

Armillaria procera Speg., l. c. p. 385.

Armillaria mellea var. *chlorina* Rick, Broteria **5**: 24. 1906.

The type specimens of these three fungi are identical with each other and with the species I described as *Armillariella puiggarii* (Speg.) Sing., Lilloa **23**: 171. 1950 (1952). Spegazzini's material came from Apiaí (Apiahy), Sao Paulo coll. Puiggari, July 1888, no. 2901—2902.

Armillaria ameghinoi Speg., An. Mus. Nac. B. A. **6**: 97.
1899.

The type is preserved together with the original spore print which is now pale brownish; there is also an identical later collection (coll. E. Hirschhorn), both collections preserved at LPS, both from similar localities in the province of Buenos Aires, in March. The spores are ellipsoid, smooth, thin-walled, hyaline, amyloid $12.3-13 \times 8-9.5 \mu$ (from print); basidia tetrasporous; cheilocystidia saccate; hymenophoral trama bilateral of the *Amanita*-type; clamp connections present. A photograph of this species was published in Bol. Ac. Nac. Cienc. Cordoba **26**: 277. 1926. Ameghino, the collector of the species for whom it was named, was poisoned by it (see Rev. Arg. Bot. **1**: 231—233. 1926). There is also identical material from Uruguay (coll. & det. Spegazzini), no. 2847. Very similar material was repeatedly collected in the wet summer of 1951/52 by Singer in the provinces of Catamarca and Tucumán. Here, the spores were found to be somewhat smaller and the old lamellae had a slight greenish tone which makes one think of *Amanita vittadinii* (Mor.) Vitt., yet, we think that Spegazzini's material refers to a good species, close to *A. vittadinii*, and, consequently, propose the transfer to that genus as *Amanita ameghinoi* (Speg.) Sing. comb. nov.

*) Former contributions to this series of Type Studies have appeared in Mycologia **34**: 64—93. 1942; **35**: 142—163. 1943; **39**: 171—189. 1947; Lilloa **23**: 147—246. 1950 (1952); Lilloa **25**: (in print); Sydowia (in print).

Armillaria bruchii Speg., Bol. Acad. Nac. Cienc. Cordoba **28**: 276. 1926.

The type, collected by C. Bruch in February 1914 at Alto Penco, province of Mendoza, herb. no. 2853, consists merely of one fragment of the blackened pileus, and even this in rather poor condition. However, it is obvious enough that this fragment has nothing whatsoever to do with the photograph published with the original description or with the indications on the spores given by Spegazzini on p. 278—279. There is a drawing on the original envelope which refers to the holotype as preserved, and this looks quite different from the photo. The spores of the holotype are hyaline, smooth, ellipsoid, with thin walls, without truncate apex and without germ pore, $7-8.3 \times 4.8-5.5 \mu$. More data could not be obtained from the material in question. According to the description, this seems to be an *Amanita* near *A. chlorinosma* (in the wider sense as applied by Gilbert), and this species has also been observed by me in the province of Salta under climatic conditions comparable to those of the type locality. Yet, in view of the very specific habitat (on ant hills) and the bad condition of the holotype, I hesitate transferring or synonymizing this species, inasmuch as it should be easy for anyone to re-collect an *Amanita*-like agaric on ant hills near the type locality, knowing that the spores must be relatively small and amyloid, the fruiting bodies almost gigantic and the color white.

Armillaria platensis Speg., An. Mus. Nac. B. A. **6**: 98. 1899.

The type is in good condition (Herb. no. 2846); it has pseudo-amyloid (slow and comparatively weak but undoubtedly positive reaction), smooth, thick-walled, ellipsoid spores without a distinct germ pore, $7.5-8.8 \times (4.8)-5.2-5.7 \mu$, without suprahilar depression or applanation. Thus, this is certainly an agariceous species rather than an *Armillaria*, and belongs to „*Lepiota*“ in the wider sense, probably *Leucoagaricus*. Spegazzini's description of the spores is erroneous.

Armillaria saltensis Speg. l. c.

The type must have been lost. It could not be found at La Plata. Unless a topotype can be found at the type locality, corresponding to Spegazzini's macroscopical description, the species must be considered as a nomen dubium. It is not an *Armillaria*.

2. Material preserved at the Herbarium Kewense.

Crepidotus ralfsii (Berk. & Br.) Sacc., Sylloge Fung. **5**: 881. 1889.

The type is, according to Pilát (Atl. Champ. Eur. **6**: 79. 1948) a young specimen of *Crepidotus mollis*. This may be true if C.

mollis is taken in the sense of Pilát, i. e. as a linnaeon covering the entire subsection *Defibulati* Sing., or perhaps more. In my opinion, *Crepidotus ralfsii* is well distinguishable as a species. Since I have re-collected this fungus in the United States, together with A. H. Smith, I am in a position to give a revised description:

Pileus "cinnamon buff" to "clay color" (Ridgway), paler in age, non-striate, squarrulose all over, slowly glabrescent, the extreme margin pubescent-pruinose and incurved, convex, conchate-subreniform, the rear portion slightly extended and laterally attached, without a true stipe, 15—17 mm. broad. — Lamellae "avellaneous" (Ridgway) with pallid edge, ventricose, 3 mm. broad, close, attenuate-concurrent. — Stipe none; basal tomentum well developed, white. — Context white when dry, unchanging, but partly glassy-gelatinous when soaked; odor none.

Spores (5.5)—6.8—8.2(9.6) \Rightarrow (4)4.7—6.2 μ , most frequently 7—8 \Rightarrow 4.7—5.7 μ , perfectly smooth with homogeneous wall, not, or more rarely in a small percentage slightly and indistinctly mucronate, ellipsoid, brownish, without germ pore; basidia clavate, 8—8.5 μ broad, tetrasporous; cheilocystidia 25—63 \Rightarrow 4—5.5 μ long, somewhat versiform, mostly either long-filamentous or filamentous but with a ventricose or slightly thickened portion (up to 8.3 μ broad) in the middle or near the base, hyaline, making the gill edge heteromorphous; cystidia on the sides of the lamellae none; trama of the pileus divided into two layers, the lower one consisting of mainly subparallel horizontal hyphae, and non-gelatinized, the upper one occupying about one sixth to one third of the diameter of the context and consisting of somewhat gelatinized tissue with irregularly and rather loosely arranged hyphae which are 2—2.5 μ broad (some, near the non-gelatinized zone, reaching 9 μ in diameter), gradually becoming more strongly gelatinized toward the cuticle; epicutis of the pileus consisting of thin-walled hyphae which form erect fascicles (therefore surface of pileus squarrulose), with a rusty brown or ochre brown incrusting pigment forming zebra-like stripes or spirals, with rounded tips, septate, the terminal members cylindrical, rarely mucronate or slightly subcapitatae, and narrower than the cells below them, i. e. 4—5.5 μ in the terminal members and 7—9.5 μ in the lower ones, the epicuticular elements becoming gradually more hyaline from the middle outward to the margin of the pileus; hypodermium — an indistinct layer differing from the epicutis in being horizontally arranged and forming a cutis but differing from the gelatinized zone of the trama of the pileus beneath it in being pigmented and somewhat denser; basal tomentum forming a patch behind the carpophores whitish to ochraceous whitish macroscopically but consisting mainly of hyaline hyphae, not or little incrustated

by pigment, most of the hyphae long- filamentous, without allocysts, without clamp connections; also all other hyphae without clamp connections.

On dead wood (in USA on *Fraxinus americana*), fruiting in spring (March, June).

Material studied: England: Pensance, type, K — USA, Michigan, near Cheboygan, June 14, 1948, A. H. Smith & R. Singer, LIL.

This species is very closely related to *C. calolepis* from which it differs in smaller spores and squarrulose surface. The latter reminds one of the tropical *Crepidotus calolepioides* Murr. which differs in larger spores, a larger number of very broad epicuticular elements and a broader gelatinized zone in the pileus. *Crepidotus tigrensis* (Speg.) Sacc. differs in the more rigid and appressed epicuticular elements, broader gelatinized zone in the pileus, different texture of the surface of the pileus surface, and slightly different spore measurements. *Crepidotus variisporus* Sing. differs in a less developed epicutis and spores reaching much larger size, also in the color, at least in dried material. The last two species seem to be restricted to the southern hemisphere.

Crepidotus rubi (Berk.) Sacc., Sylloge 5: 881. 1887.

The type is from Margate, England, and corresponds with Berkeley's first description (in Hooker, English Flora 5 (2): 102. 1836). The general impression is that of a species now generally known as *Naucoria effugiens* Quél. The spores are melleous ochraceous and rather well colored, smooth, some with a rather indistinct callus at the apex, with distinctly double but moderately thick wall, ellipsoid, $8.2-10.2 \approx 5.8-6.3 \mu$. There are cheilocystidia and dermatocystidia. The former are hyaline, up to 8.2μ broad above, apparently making the edge heteromorphous (now partially collapsed and indistinct); dermatocystidia forming a hymeniform covering on the pileus, also partly collapsed but some still well preserved, hyaline to yellowish, thickened above and some of them also below, in general as illustrated by Pilát (l. c.) for *Crepidotus haustellaris* (Fr.) Quél. p. 38, about 41μ long.

Since we cannot recognize the identity of *Agaricus haustellaris* Fr. with *Naucoria effugiens* Quél. (Fries compares this species not with *A. rubi* but with *A. calolepis*, emphasizing the almost conical stipe — which is white — and the almost free lamellae), inasmuch as there are no specimens in existence invalidating the differences in the descriptions of *C. rubi* and *C. haustellaris*, we have to admit that *C. rubi* is the legal name for what was hitherto best known as *Naucoria effugiens* Quél. There can be no doubt about the identity of the two species, and our data corroborate earlier state-

ments made by R. Maire and A. Pilát. While the generic name chosen by Quélet is preferable, Berkeley's species has priority, and it becomes necessary to transfer *Crepidotus rubi* to *Naucoria*. The combination ***Naucoria rubi*** (Berk. in Hooker) Sing. comb. nov. is proposed.

Crepidotus cheimonophilus (Berk. & Br.) Sacc., Sylloge Fung. 5: 882. 1887.

The type is preserved but it is in very bad condition, evidently immature at that. It is full of conidia of various (foreign) origin, and cannot be determined at all. It is proposed to consider it as a nomen dubium.

Crepidotus cassiaeicolor (Berk.) Sacc. l. c.

The type (Archer, on indetermined wood in Tasmania) is about 1 cm. broad, or smaller, with eccentric curved stipe and conchate pileus. It is well pigmented. The spores are light fuscous, smooth, with germ pore, rather broad, with double but not extremely thick wall, not or only slightly laterally compressed (lentiform) and if so, tending to be beans shaped, $8.2-10.3 \Rightarrow 6-6.2 \mu$; basidia short, apparently all tetrasporous; pleurocystidia none; cheilocystidia mostly collapsed, apparently mostly short and ampullaceous; epicutis of the pileus subhyaline, thin, half-destroyed but probably of the cutis-type; hypodermium very thick, lower portion consisting of parallel strands of hyphae interwoven with single non-parallel hyphae, farther above more parallel or subparallel and horizontal, forming a cutis, all these hyphal elements strongly incrustated by a chestnut brown pigment and up to 5.5μ in diameter; all hyphae with clamp connections.

These data prove that this species belongs in the genus *Melanotus*. The combination ***Melanotus cassiaeicolor*** (Berk.) Sing. comb. nov. is proposed.

Crepidotus insidiosus (Berk.) Sacc., Sylloge Fung., l. c.

The type comes likewise from Tasmania and is very similar to that of the preceding species, but differs in having much smaller spores ($6.2-7(8.2) \Rightarrow 4-5.5 \mu$). The fragments darken strongly in alkali when moistened for sectioning. This is undoubtedly another *Melanotus* but no transfer is proposed because it appears extremely likely that *Melanotus haematochrous* (Berk.) Sing. is the same species.

Crepidotus flavomarginatus (Berk. & Br.) Sacc., l. c. p. 884.

The type from Peradeniya, Ceylon, is in good condition. The spores are $7-8.3 \Rightarrow 6-7 \mu$, with very firm, smooth, walls which are entirely homogeneous though composed by a double layer, a distinct endosporium, a ferruginous line dividing the latter from the very

thick episporium which is extremely deeply pigmented in NH_4OH and even more so in KOH , the hilar appendage scarcely protruding; basidia tetrasporous, $8.3\ \mu$ broad; cheilocystidia about $43\ \mu$ long and $5\text{--}7.5\ \mu$ broad, clavate, not or hardly noticeably capitate, often incrustated brown, smooth, with broadly rounded tip, rarely with a small mucro, connivent in bunches and making the edge of the lamellae heteromorphous; the entire hymenophore is colored bright lemon yellow in preparations because the pigment is soluble in alkalis of the usual mounts and dyes all the elements of the hymenophore; the same is true for the other portions of the carpophore. If a drop of NH_4OH or KOH is deposited on the surface of either the lamellae or the pileus and then, after a few seconds removed by filter paper the latter becomes bright lemon yellow from the dissolved pigment; the regular hymenophoral trama has some hyphae with brown pigment incrustation; the surface of the pileus is made up by an epicutis whose structure is not quite clear in these specimens but seems to consist of repent filamentous hyphae, some of which are (now?) almost diverticulate and strongly ferruginous-fulvous with broad pigment plaques (not with zebra like rings and spirally punctate as in the epicuticular elements of *Phaeomarasmium*); hyphae of the trama of the pileus thinwalled, lemon yellow, with clamp connections. The lamellae are not so distant as indicated in the description. Chemical reaction of the dried carpophore: KOH on surface of pileus: black. — NH_4OH on surface of pileus slightly darker (weak reaction), same reaction on hymenophore.

The above data make it absolutely clear that this species is extremely close to *Pleuroflammula flammea* (Murr.) Sing. from North America. It would indeed be identical with it were it not for the different shape of the cheilocystidia. The new combination ***Pleuroflammula flavomarginata*** (Berk. & Br.) Sing. is proposed. This is the first species of this genus known from Asia.

Crepidotus pezicula (Berk. & Br.) Sacc. l. c.

The type was collected by Thwaites, no. 359, and consists of several carpophores on twigs. The carpophores are small and cyphelloid but with distinct lamellae. The spores are extremely faintly punctulate but certainly not quite smooth as can be seen when they are studied under a good oil immersion lens; they are melleous to ochraceous brown, rather light colored, ellipsoid and often mucronate, with or without a suprahilar depression, $7\text{--}9 \Rightarrow 4.8\text{--}6.2\ \mu$. The basidia are comparatively short. Cheilocystidia are certainly present but all collapsed. The epicutis of the pileus contains numerous but not crowded thin filaments with rusty pigment incrustation; all hyphae with clamp connections.

These data prove that this species is a good species of *Crepidotus* near *C. luteolus* and *C. submollis*.

Crepidotus epicrocinus (Berk. & Br.) Sacc. l. c.

The type is undoubtedly Archer no. 954 from Peradeniya, Ceylon, not the variety mentioned in the original description and represented at Kew by another specimen, no. 954 a. The holotype (954) grows on indetermined wood and closely corresponds to Berkeley & Broom's descriptive data, except for the fact that the characteristic color is not visible in the dried material. It must, however, have been visible in fresher specimens, and it is here assumed that it has gradually faded. Otherwise it would not be understandable why the original authors emphasized this feature. This circumstance is important because *C. epicrocinus* is otherwise extremely close to *C. nephrodes* from which the dried material studied differs merely in the somewhat less contrasting punctation of the spores, but since there is a certain variability in this regard even in North American material from different locations and in different stages of development, this character would not be sufficient to separate the Asiatic species from the American one. We find the spores of *C. epicrocinus* imbedded-spinulose-punctate, unicolorously ochraceous melleous, practically smooth in outline, globose, $6.2-7 \approx 5.7-6.7 \mu$, mostly about 6.2μ in diameter. The cheilocystidia were not clearly seen and seemed to be versiform. The surface of the pileus is marked by filamentous repent hyphae forming a cutis, with a distinct lemon colored sheen but basically hyaline. All hyphae with clamp connections.

The variety (no. 954 a) is said to differ in color and in broader lamellae. Both characters seem rather problematic but it is possible that no. 954 a is a distinguishable form of the type, or else a form of *C. nephrodes*. I do not believe that it deserves, at least at the present stage of our knowledge regarding its macroscopical characters — a new specific epithet as proposed by Pilát in a recent paper (Trans. Brit. Mycol. Soc. **33**: 220. 1950).

Crepidotus grumosopilosus (Berk. & Br.) Sacc., l. c.

This is a mixed collection, and since the description is a mixture of the characters of carpophores of both species composing the type collection, there is no need to try to separate a holotype. The largest carpophore is an older specimen of what we have described as the type variety of *C. epicrocinus* (Berk. & Br.) Sacc. (spores with the same ornamentation and shape, $6-7 \mu$ in diameter when quite mature, few spores somewhat smaller). The other specimens on the same sheet are representatives of the difficult Mollis-complex. With the macroscopical characters of both species mixed up in the original description, and Berkeley's spore measurements embrac-

cing (with surprising accuracy!) the measurements of the spores of both components of this mixture, there is no sense in trying to determine the smaller specimens with the larger smooth spores; *C. grumosopilosus* is a typical example of a nomen confusum in *Basidiomycetes*.

Pilát, in a recent paper (l. c.) came to a different conclusion. He considered the specimens with the larger, smooth spores as the holotype and identified the other specimen with *Crepidotus truncatus* Petch. I do not know the latter, and therefore cannot judge whether or not this is the same as *C. epicrocinus* (Berk. & Br.) Sacc. The way the "type" of *C. grumosopilosus* (Berk. & Br.) Sacc. sensu Pilát is described, it would turn out to be a nomen dubium.

3. *Leccinum duriusculum* (Schulzer) Sing.

Boletus duriusculus Schulzer in Fries, Hymen. Europ. p. 515. 1874.

Dr. Gabriel Bohus, Budapest, was kind enough to search for a type specimen of this species in the Museum Nationale Hungaricum. He writes (August 1, 1948) "the type specimen of *Boletus duriusculus* does not exist. The specimen was originally described in the work Kalchbrenner, Icones Selectae Hymenomycetum Hungariae, p. 51, 1877—77" (which, together with the original plate constitutes the type of the species). Consequently, my interpretation of Schulzer's species remains unchanged as represented in The American Midland Naturalist **37**: 122. 1947.

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