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Wood-inhabiting fungi of the Białowieża virgin forest in Poland. XVIII. *Amylocystis lapponica* (Romell)Bond. & Sing.

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Abstract

The author examined the microstructure of the fruitbody and culture of polypore *Amylocystis lapponica* (Romell) Bond. & Sing., common in the Białowieża virgin forest on lying logs of *Picea excelsa* with symptoms of advanced brown rot produced by *Fomitopsis rosea* (Alb. & Schw. ex Fr.) P. Karst. In the fruitbody a monomitic hyphal system was revealed consisting for the most part of thick-walled nodose-septate hyphae 4–10,5 μm thick. Moreover, by examination of four cultures obtained from basidiospores, it was found (1) that the diploid mycelium gives nearly always a negative reaction, whereas the haploid mycelia give positive reactions in tests for extracellular oxidase, and (2) that the fungus is tetrapolar.

INTRODUCTION

The fungus *Amylocystis lapponica* (Romell) Bond. & Sing.* of the family *Polyporaceae* here described is a saprophyte decomposing coniferous wood in lying logs (Pilát 1938: 179; Lowe 1942: 76; Bondarcew 1953: 235; Overholts 1953: 277; Kotlaba and Pouzar 1963: 180; Domański, Orłoś, Skirgiełło 1967: 80). It is a very rare species which occurs almost exclusively in virgin forests. It is probably owing to this that this fungus has not been elaborated in detail, neither has its culture. Isolation of such a culture is very difficult. The fungus is rather common in Białowieża, particularly in August and September (Domański 1959),

* Syn.: *Polyporus lapponicus* Romell in Ark. Bot. 11(3): 17. 1912; in Sv. Bot. Tidskr. 20: 11. 1926; Overholts, Polyp. Un. St., Al. Can. 276. 1953. — *Ungulina lapponica* (Romell) Pilát in Bull. Soc. Myc. 49: 268. 1933. — *Leptoporus lapponicus* (Romell) Pilát in Atl. Champ. Eur., 3: 179. 1938; Murashk. in Tr. Omsk. C. — ch. Inst. 17: 81, 1939; Domański in Monogr. Botan. 8: 171. 1959. — *Amylocystis lapponica* (Romell) Bond. & Sing. in Ann. Myc. 39: 52. 1941; Singer in Mycologia 36: 66, 67. 1944; Bond., Trut. griby 234. 1953; Kotl. & Pouz. in Česka Mykol. 17: 179. 1963; Pilát in Česka Mykol. 19: 9. 1965; Domański et all. Grzyby 3: 80. 1967. — *Polyporus ursinus* Lloyd, Synop. Polyp. Apus 319. 1915; Shope in Ann. Miss. Bot. Gard. 18: 332. 1931; Lowe, Pol. N. Y. St. 82. 1934; in N. Y. St. Coll. For. Techn. Publ. No. 60: 75. 1942.

but the fresh fruitbodies contain a great deal of water and take a long time to dry, frequently in the meantime they become contaminated by various microscopic fungi as *Hypomyces aurantius*. In this state it is difficult to obtain from them a pure culture. Besides, the fungus infects wood lying on the ground and showing symptoms of decomposition due to *Fomitopsis rosea* (Alb. & Schw. ex Fr.) P. Karst., as pointed out by Kotlaba and Pouzar (1963: 180). The same is observed in the Białowieża National Park. Therefore mycelium had to be obtained from spores extracted from freshly collected fruitbodies.

The microscopic characters of the fruitbody have been described by numerous authors. It has traits typical for the genus *Tyromyces* P. Karst., but differs from the latter by thick-walled amyloid cystidia in the hymenium, and that is why it was included in the monotypic genus *Amylocystis* Bond. & Sing. described by Bondarcew and Singer, for which *Polyporus lapponicus* Romell is the type species. Precise descriptions of the microscopic structure of the fruitbody and culture of this fungus are, however, lacking. The present paper tries to fill this gap. In the investigations identical methods were used as in the preceding studies of this series.

MATERIALS

Table 1 contains a list of the fruitbodies and cultures used in the present study with their numbers in the Forest Protection Institute, Kraków, Mycological Herbarium (HMIPC).

Table 1

Fruitbodies of *Amylocystis lapponica* collected in Białowieża virgin forest from logs of *Picea excelsa* and cultures obtained from some of them used in tests

HMIPC No.	Date of collection	Source of culture*
286	August, 1956	
526	August 26, 1956	
3724	August 8, 1962	
3418	October 20, 1963	
4252	July 26, 1964	
4259	July 27, 1964	
4512	August 6, 1965	
4543	August 10, 1965	
4913	September 25, 1965	
5142	September 9, 1966	
5289	September 13, 1967	
5622	August 26, 1968	Sp
5644	August 30, 1968	Sp
5645	August 30, 1968	Sp
5683	September 3, 1968	Sp

* Sp – from spore print obtained from fruitbody grown in forest.

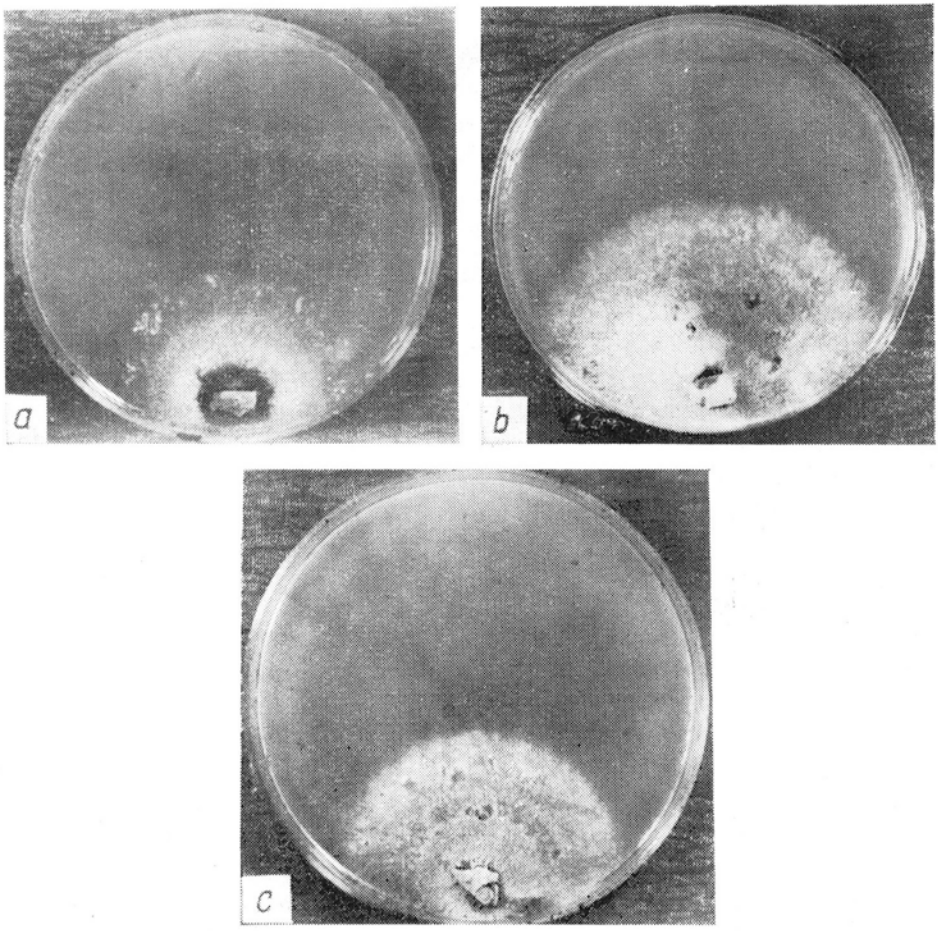

Fig. 1. Cultures of *Amylocystis lapponica* after five weeks growth on malt agar in the dark at 22°C: *a* – HMIPC No. 5644, *b* – HMIPC No. 5683, *c* – HMIPC No. 5658.

MICROSCOPIC STRUCTURE OF FRUITBODY

The monomitic hyphal system consisted of nodose-septate hyphae with acyanophilous, indextrinoid and partly inamyloid walls. The pileus cover is built of thick-walled nodose-septate hyphae 4 μm thick, collected in fascicles measuring 200–500×20–75 μm, and under it there is a layer, 25–50 μm thick, of the same hyphae, strongly conglutinate and more or less horizontal. The context near the upper surface of the pileus contains relatively very thin-walled hyaline and branched generative hyphae 2–3 μm thick, but in its remaining part the hyphae become so thick-walled that the lumen is often partially obscured or relatively narrow and follows an erratic course. They are branched, flexuose, 4–8(–10.5) μm thick, interlaced in various directions. In dissepiments the hyphae are mostly thick-walled, 3–4

Fig. 2. Microstructures of fruitbody of *Amylocystis lapponica*:

a — endings of hyphae on the edge of dissepiment, *b* — hyphae of hairs of cover and upper surface of pileus, b_1 — hypha of dissepiment, *c* — hyphae in the upper part of context, *d* — hyphae most numerous in context (×500 except a ×800).

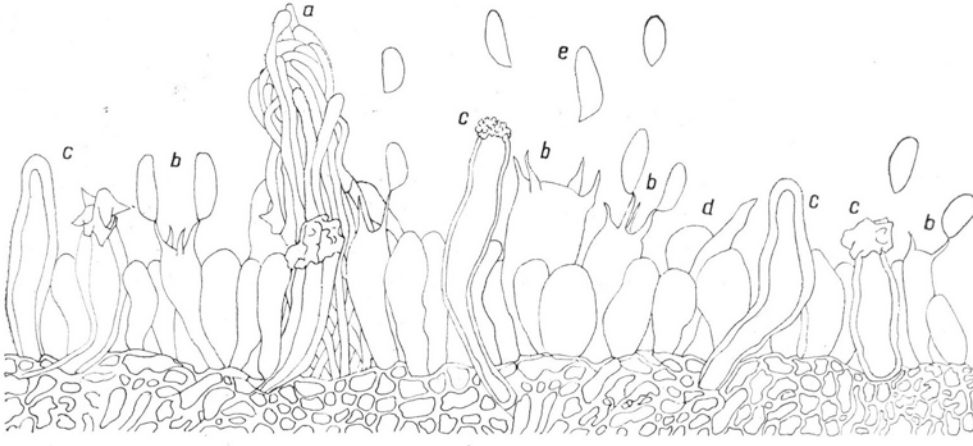

Fig. 3. Fragment of hymenium of *Amylocystis lapponica*:

a — hyphal peg, *b* — basidia with or without spores, *c* — cystidia, *d* — cystidiole, *e* — spores (×1000).

μm thick, sometimes rather strongly interlaced and more or less parallel, with somewhat amyloid walls and thin-walled and claviformly thickened to 5–6 μm, ends on the edges. Cystidia cylindric- or fusiform-clavate, 18–40×3.5–6.5 μm, thick-walled, hyaline, mostly incrusted at the apex, amyloid. Hyphal pegs present. Basidia clavate, 13–25×4–6 μm, with 2–4 sterigmata 5–6 μm long. Spores cylindric, 7.5–11×2.5–3.5 μm, with hyaline, thin, smooth, inamyloid walls.

CULTURE

Mat at first appressed, whitish and not shining or shining, and covered with whitish flocks, soon becoming pallidbrown-ochraceous, then especially near the inoculum, tomentose, rather compact, 0.5–2 mm thick, ochraceous-bricky, in some

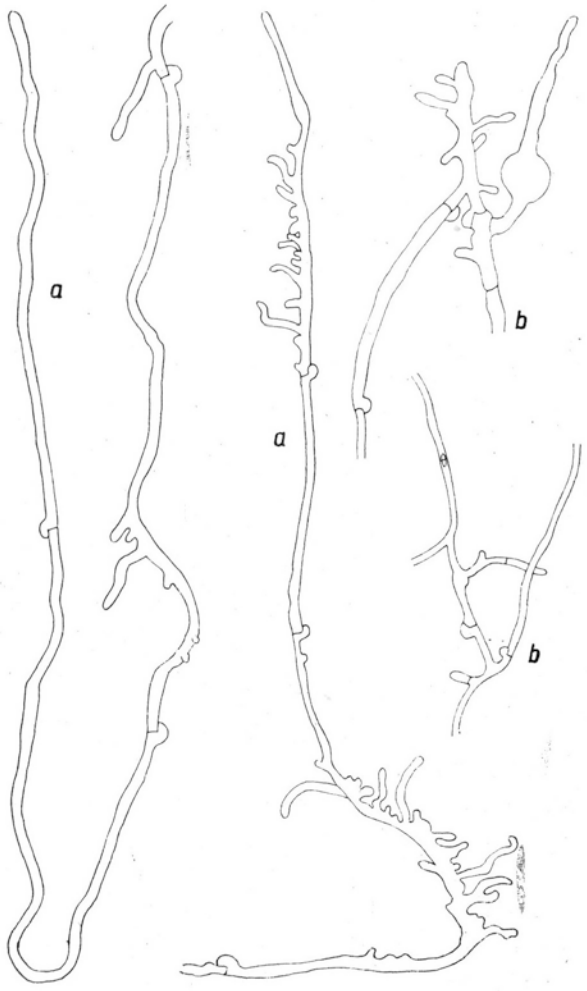

Fig. 4. Hyphae from advancing zone (*a*) and submerged mycelium (*b*) in culture of *Amylocystis lapponica* HMIPC No. 5683 (×500).

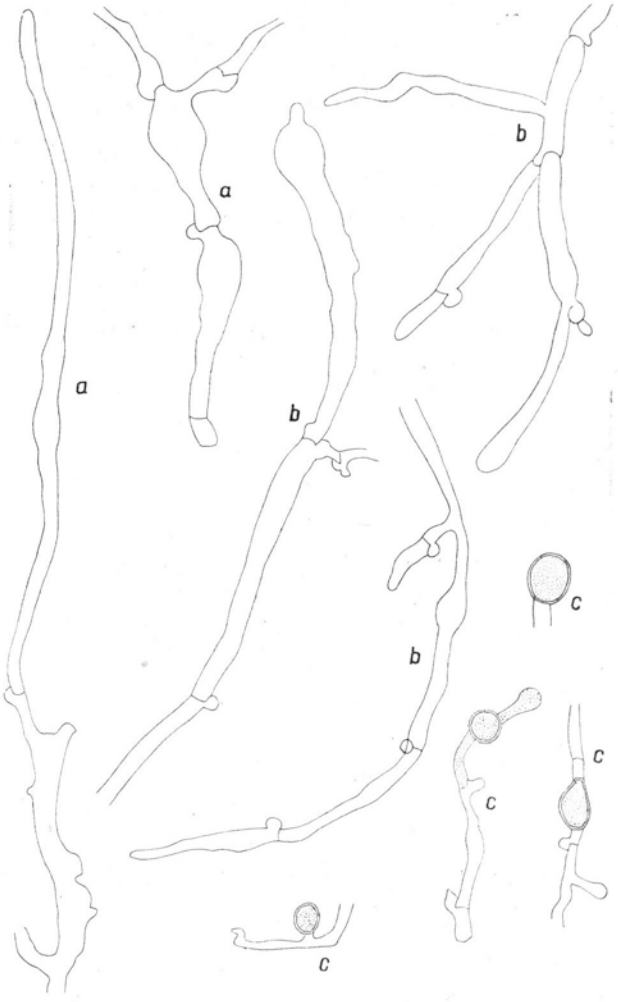

Fig. 5. Microstructures of older mycelium in culture of *Amylocystis lapponica* HMIPC No. 5683: *a*, *b* – from aerial mycelium, *c* – chlamydospores (×500).

places white, pink, pink-brown (same as colour of fresh fruitbody). Advancing zone thin, translucent, whitish. Hyphae from advancing zone nodose-septate, hyaline, thin-walled, 3–4 µm thick, or irregularly thickened to 7.5 µm, with numerous, mostly unilaterally comb-shaped tubercles or branchings. Hyphae of older aerial mycelium thin-walled, nodose-septate, often inflated to 15 µm, hyaline or mostly yellow-brown with granular contents. Hyphae of submerged mycelium hyaline, strongly differentiated, both equal-thickened to 2 µm and inflated to 15 µm, with numerous branchings. Chlamydospores hyaline or yellow-brown, globose to oblong-ellipsoid, 10–25×7.5–15 µm. Scent rather pleasant, like that of fresh fruitbody. Species Code: 1, (2), 3, 11, 14, (21), 22, 26, 34, (36), 37, 38, 39, 47, (48), 53, 55, 60.

As seen from the Code the fungus gives negative (1) or positive (2) (especially its hyploid mycelia) results in tests for extracellular oxidase and shows a tetrapolar type of interfertility (60). The type of interfertility was found in one isolate only and untill after 4 weeks of growth at 0°C. The results are presented below in abbreviated form:

HMIPC No. 5646

$A_1 B_1$: 1, 16, 19 $A_2 B_2$: 14, 15

$A_1 B_2$: 2 $A_2 B_1$: 18, 20

No pairings: $A_1 B_1 \times A_2 B_2$: 15×1, 15×16

REFERENCES

Bondarcev A. S., 1953, Trutovyje Griby.
Domański S., 1959, Monogr. Bot. 8: 171–181.
Domański S., Orłoś H., Skirgiełło A., 1967, Flora Polska, Grzyby 3.
Donk M. A., 1960, Persoonia 1(2): 173–302.
Kotlaba F. & Pouzar Z., 1963, Česka Mykol. 17(4): 174–185.
Lowe J. L., 1942, The N. Y. Sta. Coll. For. Syr. Univ. Techn. Bull. No. 60: 1–128.
Nobles M. K., 1965, Can. J. Bot. 43: 1097–1139.
Overtholts L. O., 1953, The Polyporaceae of the United States, Alaska and Canada.
Pilát A., 1936–1942, Atl. Champ. Eur. 3.
Pilát A., 1965, Česka Mykol. 19(1): 9–10, tabl. 56.

Grzyby zasiedlające drewno w Puszczy Białowieskiej XVIII. Amylocystis lapponica (Romell) Bond. & Sing.

Streszczenie

Autor zbadał mikrostrukturę owocnika oraz kulturę grzyba *Amylocystis lapponica* (Romell) Bong. & Sing. występującego powszechnie w Puszczy Białowieskiej na leżących na ziemi kłodach świerkowych, wykazujących równocześnie objawy zaawansowanej zgnilizny drewna wywołanej przez *Fomitopsis rosea* (Alb. & Schw. ex Fr.) P. Karst. Stwierdził monomityczny system strzępkowy w owocniku, złożony w przeważającej mierze z grubościennych strzępek septowanych ze sprzążkami o grubości 4–10,5 μm. Ponadto po zbadaniu 4 grzybni, wyizolowanych na sztuczną pożywkę z zarodników podstawkowych ustalił, że grzybnia diploidalna daje prawie zawsze negatywną, a grzybnia haploidalna daje pozytywną reakcję w próbie na pozakomórkową oksydazę oraz że grzyb jest tetrapolarny.