Characteristic mycelial traits in cultrues of coprinoid mushrooms

Susanna Badalyan[1]*, Alexander Gießler[2], Mónica Navarro-González[2] and Ursula Kües[2]

1 Laboratory of Fungal Biology and Biotechnology, Yerevan State University, 1 Aleg Manoogian St., 0025, Yerevan, Armenia,
2 Section Molecular Wood Biotechnology and Technical Mycology, Büsgen-Institute, Georg-August-University Göttingen, Büsgenweg 2, D-37077, Göttingen, Germany. Contact: badalyan_s@yahoo.com

Taxonomically, the coprinoid mushrooms (inky caps) distribute over two different families and genera (Agaricaceae: Coprinus; Psathyrellaceae: Coprinellus, Coprinopsis, Parasola). Inky caps are fast-growing mushrooms with fragile gills on which dark-brown to black spores are formed. In many species, the basidiospores are released in liquid droplets via autolysis of the cap [1]. Different coprinoid mushrooms are commonly difficult to distinguish. Due to the fast decomposition of the mushrooms, it is problematical to bring them in intact form to the lab for thorough morphological classification. Mycelial cultures might however be won from spore germination or from cap or stipe tissue [2]. Cultures can then serve to define morphological characteristics of the mycelia and potential asexual stages of reproduction as further features for morphological identification [3]. Cultures of Coprinellus species are most easy to describe since they often form eye-catching yellow to red-brown mycelial strands. Such coloured mycelium sterilium has also been observed in nature and described under the anamorph name Ozonium [4]. Whereas the name is a nomen dubious, an ozonium-stage appears to be an excellent taxonomic criterium to define Coprinellus species [1,3]. Ozonium formation has been observed in species curtus, disseminatus, domesticus, ellisii, micaceus, patouillardii, radians, truncorum, xanthrotrix and others. Ozoniums can be produced by monokaryotic and dikaryotic mycelia. A typical ozonium is characterized by parallel growing undifferentiated hyphae with stained cell walls and multiple anastomoses between. Single hypha can enter or leave a specific ozonium bundle and can connect different bundles with each other. Formation of new parallel growing hyphal branches starts laterally with firmly curved hyphal tips that fastly attach to the parental hypha. Typical are also coloured hyphal loops found amongst the ozonium strands that form by single hypha growing in circles. Some Coprinellus species (e.g. domesticus, radians, xanthotrix) in addition produce abundant asexual spores (oidia, arthroconidia) on specialized oidiophores. An anamorphic name Hormographiella has been introduced for mycelia with such structures [5]. However, oidia production is also very common amongst species of the genus Coprinopsis [6,7]. Specific parameters of spores and oidiophores can be defined for different species [5-7]. Other reproductive structures found in cultures of coprini are thallic arthrospores, blastoconidia-like mitospores, terminally and/or intercalary formed chlamydospores and mycelial cystidia. Simple hyphal coilings were observed in cultures from clades Coprinus and Coprinopsis. The extent of the taxonomic relevance of all these structures remains to be established.

[1] Redhead et al. (2001) Taxon 50:203-41; [2] Badalyan et al. (2011) Diversity 3:136-54; [3] Badalyan et al. (2011) ICMBMP7 1:140-54; [4] Link (1809) Mag Ges Nat Freund Berlin 3:3-42; [6] Guarro et al. [1992] Mycotaxon 45:179-90; [7] Kemp (1975) Trans Br Mycol Soc 65:375-88; [8] Polak et al. (2001) Myc Res 105:603-10.