Fruiting and Identification of Some Medicinal Mushrooms in Pure Culture

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Some mushrooms that are cultivated throughout most of the world are well known as medicinal mushrooms. Species of such genera as *Flammulina, Ganoderma, Lentinus,* and *Pleurotus* possess a wide spectrum of biologically active substances. These mushrooms have been used in folk medicine of many countries from ancient times until the present. Moreover they were and still are the object of investigations concerning biological activity. One problem, however, is that research is often undertaken on cultures of incorrectly identified basidiomata. The taxonomy of *Pleurotus* and *Flammulina* has been reevaluated in a number of recent studies where the morphological species concept was compared with the biological species concept. Such studies increase the importance of correct identification of cultures from these genera. This problem can be solved, in part, by mating studies. In *Flammulina* compatibility experiments the following biological species could be distinguished: *F. velutipes* (Curt.: Fr.) P. Karst., *F. ononidis* Arnolds, *F. fennae* Bas, *F. rossica* Readhead et Petersen, *F. populicola* Readhead et Petersen, *F. elastica* (Lasch) Readhead et Petersen, *F. stratosa* Redhead, *F. mexicana* Readhead et al. Two complexes were identified with partial compatibility: *F. velutipes/F. ononidis* and *F. rossica/F. elastica.* In *Pleurotus,* 14 "intersterility groups" have been established by matings: *P. ostreatus* (Jacq.: Fr.) Kumm., *P. pulmonarius* (Fr.) Quél., *P. abieticola* Petersen, *P. djamor* (Fr.) Boedijn, *P. opuntiae* (Durieu et Lév.) Sacc., *P. cornucopiae* (Paul.) Roll., *P. calyptratus* Lindbl., *P. eryngii* (DC.) Gill., *P. levis* (Berk. et M. A. Curt.) Sing., *P. dryinus* (Pers.) Fr., *P. populinus* O. Hilber et O. K. Mill., *P. purpureo-olivaceus* (G. Stev) Segedin, P. K. Buchanan et J. P. Wilkie, *P. australis* (Cooke et Massee) Sacc., and *P. tuber-regium* (Fr.) Sing. Each taxon of *Flammulina* and *Pleurotus* was represented by a standard set of tester strains [usually 4 single-basidiospore isolates (SBIs) of different mating types]. The tester strains have been deposited with the CBS Culture Collection in Baarn, The Netherlands, and are available for identification purposes.

Research on sexual compatibility (= biological species) has been done in the mycology laboratory of an institution where a collection of cultures of basidiomycete species, with a variety of dikaryon and monokaryon strains, is maintained. If only dikaryon cultures represented a collection, the dikaryon strains were fruited to obtain monokaryon isolates through spore germination. Fruiting was carried out in small containers on sawdust/bran substrate. After being overgrown in the dark at 25°C the mycelial blocks were removed from containers to ziploc bags in the light and high humidity at 15–20°C for fructification. Ripe basidiomata were used for obtaining SBIs. Isolated SBIs were crossed with tester strains.

This study allowed recognition of *F. velutipes, F. fennae, F. populicola,* and *F. rossica/F. elastica* complex among *Flammulina* cultures. Many of them originally were maintained as *F. velutipes.* Compatibility experiments with *Pleurotus* strains presented the possibility of identifying all strains maintained as *Pleurotus* sp. It was shown that *P. citrinopileatus* Sing. was of one biological species with *P. cornucopiae. Pleurotus columbinus, P.* f. *florida,* and *P. salignus* (Schrad.) Quél. were compatible with *P. ostreatus.* Some strains under the name *P. ostreatus* as well as *P. sajor-caju* (Fr.) Sing. appeared to be *P. pulmonarius.* The taxonomic status of the studied *Lentinus edodes* (Berk.) Sing. strains was confirmed.

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