

ESTABLISHING A CHECK-LIST OF MACROMYCETES: THE EUROPEAN GASTEROMYCETES

by

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Resumen

DEMOULIN, V. (1989). Hacia un catálogo de macromicetas: los Gasteromycetes europeos. *Anales Jard. Bot. Madrid* 46(1): 155-160 (en inglés).

Antes de escribir una flora para un área determinada o una revisión de algún grupo taxonómico, la preparación de un catálogo es una labor preliminar útil. Para los hongos, las floras no son frecuentes, y la necesidad de catálogos es aún más urgente. La taxonomía de hongos, sin embargo, está menos avanzada que la de fanerógamas porque en muchas especies la fructificación es irregular, no todos los caracteres se conservan bien en el herbario y hacen falta buenas observaciones microscópicas. Esto crea problemas a tres niveles para establecer un catálogo micológico: la elección de un marco taxonómico determinado, la nomenclatura, y la decisión acerca de qué citas deben ser aceptadas. Estos problemas se comentan e ilustran con ejemplos ocurridos durante la preparación de un catálogo de *Gasteromycetes* europeos que comprende unas 250 especies.

Palabras clave: *Gasteromycetes*, catálogo, Europa.

Abstract

DEMOULIN, V. (1989). Establishing a check-list of macromycetes: the european Gasteromycetes. *Anales Jard. Bot. Madrid* 46(1): 155-160.

Before writing up a flora for a given area or a revision of a given taxonomic group, establishing a check-list is a useful preliminary work. For fungi, floras are not frequent and the necessity of check-lists even more urgent. Taxonomy of fungi is however less advanced than that of phanerogams because for many species fruiting is irregular, all characters do not preserve well in the herbarium and good microscopic observations are necessary. This creates problems at three levels in the establishment of a mycological check-list. Those levels are the choice of a given taxonomic framework, that of nomenclature and that of deciding which records should be accepted. Those problems are discussed and illustrated by examples met in the preparation of a check-list of european *Gasteromycetes* which includes some 250 species.

Key words: *Gasteromycetes*, check-list, Europe.

INTRODUCTION

Before writing up the flora of a given area or a revision of a given taxonomic group, establishing a check-list is a useful preliminary work. An important phane-

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rogamic example is Med-Checklist prepared by an international committee and which is becoming a fundamental tool in the preparation of phanerogamic floras in the mediterranean region.

For fungi, floras are not frequent and the necessity of check-lists even more urgent. There are however numerous problems that occur in mycology and do not exist or are less acute in phanerogamy. Those problems are ultimately linked to a taxonomic knowledge that is less advanced because for many fungi fruiting is irregular, all characters do not preserve well in the herbarium and good microscopic observations are necessary.

Those problems are encountered at three levels in the establishment of a mycological check-list. As we will see in detail below the first level is the choice of a given taxonomic framework, the second that of nomenclature and the third that of deciding which records should be accepted.

Those problems will be illustrated by examples met in the preparation of my check-list of european *Gasteromycetes* which includes some 250 species.

The choice of a taxonomic framework

If one wants to prepare a regional check-list one will usually discover that existing floras for neighbouring or more local areas, monographs or other relevant literature use widely divergent concepts.

For example, for the genus *Geastrum* in Europe, according to STANĚK (1958), whose revision of the Czechoslovak flora has long been a standard treatment for Europe, 26 species occur in this continent. On the opposite, following PONCE DE LEÓN monograph (1968) only 15 species would occur in Europe. Personal experience led me to believe the true situation is inbetween, Staněk having sometime a species concept that is too narrow while Ponce de León has been lumping species exagerately. A similar conclusion was reached by KOTLABA & POUZAR (1987). I presently admit 25 species in Europe which is close to Staněk's total. One of those however, *G. morganii* C. Lloyd was only recently reported for Europe (BOIFFARD, 1976) which means there are two species recognized by Staněk which I now place in synonymy. Those are *G. hollosii* Staněk and *G. pseudostriatum* Hollós, which should be included in *G. berkeleyi* Massee as well established by KOTLABA & POUZAR (1987).

If *Geastrum* are relatively well known fungi for which a satisfactory treatment can be reached other genera create more difficult problems. This is specially the case for hypogeous fungi. Those are less frequently collected than the epigeous ones, present less morphological diversity and probably present a great variability of their spore characters due to a long period of maturation. The worst genus is probably *Hymenogaster* for which SVRČEK (1958) recognised 38 species in Europe, and SOEHNER (1962) 45. Most people who tried to key an *Hymenogaster* with those works, especially that of Soehner will recognise the situation is very unsatisfactory and one is possibly dealing with a more limited number of rather variable species. While at the time maintaining 39 species, Gross (*in* GROSS & *al.*, 1980), suggest this maybe the case and his treatment which seems the best at the moment has largely inspired me for my check-list. I nonetheless decided to already reduce the number of accepted species to 24. It should however be clear this is tentative and the genus needs a careful revision by a worker attentive to the problem of variability of fungi, especially the hypogeous ones.

The alternative to developing a tentative personal position would have been to uncritically list all the species reported, or at least those accepted by the treatment which recognises the largest number of species, that is that of Soehner. My feeling is this would not have been very helpful, it can nonetheless be argued, in cases where the taxonomy is still unsatisfactory, it would be the only objective way of dealing with it.

Establishing a check-list of macromycetes is thus intimately linked to a revision work and can only be performed by a person or a team experienced in the taxonomy of the group. For relatively well known groups like the epigeous *Gasteromycetes* it can however be more independent of a taxonomic revision than for groups like the hypogeous where taxonomic revision is needed first. Given the divergences in mycological taxonomy any check-list will have to include ample synonymy and data on how the taxa recognised are treated in the most widely used literature.

Nomenclature

When preparing a check-list, a nomenclature must be adopted and mycological nomenclature is notoriously difficult. This is partly linked to past and present peculiarities of the rules of nomenclature. The major problem is however the difficulty to interpret correctly the work of authors who published before the generalisation of microscopical observation and preservation of accurately labelled herbarium specimens. This can lead either to the use of the same name to designate different species or to instability caused by names considered *nomina dubia* by some authors and accepted by others.

One unfortunate case in the *Gasteromycetes* is that of *Geastrum rufescens* Pers., Neues Mag. Bot. (Roemer) 1: 86, 1794; Pers., Syn. fung.: 134, 1801. This was introduced for the plate 182 of Schaeffer which most specialist would agree represent a large reddening *Geastrum* also known as *G. vulgatum* Vitt. In his Synopsis Persoon however added references to some Schmiedel plates which in part depict a smaller fungus which Persoon called var. *minor* and is also known as *G. fimbriatum* Fr., *G. sessile* (Sow.) Pouzar or *G. tunicatum* Vitt. This description of the Synopsis was probably already too inclusive and when KITS VAN WAVEREN (1926) found that in the Persoon herbarium only material of the small species was present he decided to use the name for this small species. This was giving an exaggerated importance to Persoon herbarium. It is probable most of it dates from the Paris days of Persoon after the publication of much of his work and especially the Synopsis fungorum. Since Persoon's labels usually do not bear dates or localities this was probably not fully understood in the twenties. For many years two usages of the name *Geastrum rufescens* have existed according to whether people were giving more importance to Persoon's herbarium or to the Schaeffer's plate. This led KREISEL (1958) and I (DEMOULIN, 1968) to reject the name under article 69 of the International Code of Botanical Nomenclature, that is as a name used in different senses which has thus become a long persistent source of error. Nowadays the situation has however evolved. The use of *G. rufescens* for the large species has been maintained by some authors, while the other use has largely disappeared. Further there is a consensus that the first interpretation is the correct one (DÖRFELT & MÜLLER-URI, 1984) and finally the conditions for applying article 69 of the ICBN have been made more restrictive. For my checklist I thus decided to

return to the use of *G. rufescens* for the large reddening species for which I had previously used the later synonym *G. vulgatum* Vitt. The latter name is anyway unpriorable given the existence of another synonym posterior to *Geastrum rufescens* but anterior to *G. vulgatum*: *Lycoperdon radicans* J. F. Gmel.

An example of a name usually considered a nomen dubium but used by some authors is *Cycloderma indicum* Klotzsch, *Linnaea* 7: 203, 1832. RAUSCHERT (1959) introduced the combination *Geastrum indicum* (Klotzsch) Rauschert to displace the better known *G. triplex* Jungh. I however pointed out (DEMOULIN, 1968) that LLOYD (1904) was the only one to have examined the now destroyed type and categorically disclaimed it was an unopened *Geastrum triplex*. The general attitude towards *Geastrum indicum* is thus to treat it as a nomen dubium but the name still can be met in the literature.

Mycologists have for many years worked with an unsatisfactory system of nomenclature based on later starting points. The problems associated with this system exposed by DEMOULIN & al. (1981) have led to the adoption of a 1753 starting point with special, "sanctioned", status for names used in former starting point books (KORF, 1983). This system enacted at the Sydney congress of 1981 received some clarification at the recent Berlin congress and now provides clear, easy to apply rules that together with a consistent application of the type method should in the long run stabilize mycological nomenclature.

This will however not be easy for there is one problem for which improvements of rules are of minor help, that is how to apply the type method to authors like Fries who based their taxonomy on a broad synthesis of the literature as well as on their own field experience and usually did not preserve specimens in herbarium. The long standing controversy as to whether one should typify a name according to its original author or according to what was a revalidating and now is a sanctioning author is not over. The present code, in a wish not to change existing typifications, still allows both options. It is true in some cases typification according to Fries allows to preserve current usage. It is however always a much more subjective action than typifying according to the original author. This is due to a simple reason: the original description often refers to a single element, often depicted by a plate, while Fries and to a lesser degree Persoon, makes descriptions which are synthesis. If you deal with a name introduced by Batsch who gives a superb colour plate of a fungus for which he clearly states it has been found on a given date in a given locality, typification is straightforward. With a description by Fries there will always be place for discussion since his concept is based on a variety of elements.

Typification should thus always be performed with a deep knowledge of the taxa involved and this in the area where they have been described. If neotypes are designated they should fit as well as possible the most stable part of the protologue that is usually a plate by Schaeffer, Bulliard, Batsch or Sowerby. They should thus come from the area where those authors worked. How unfortunate it is to see collections from Sweden be used as neotypes for Bulliard names because they have been sanctioned by Fries. Rejection of neotypes not originating from the area of origin are more liable to occur as I had to do with *Scleroderma macrorrhizon* Wallr. (DEMOULIN, 1974).

Careless typification will create more problems than it solves, typification should thus only be performed when the revision of a group is fully mature and

establishing a check-list should not be the opportunity for such an important action. One should however be able to appreciate existing typifications which may be decisive for the nomenclature to be adopted. Doing this one should keep in mind that making a typification or judging an existing one requires not only familiarity with the nomenclature rules but also with the fungi.

A final note should be made about the illegitimacy and automatic typification of superfluous names (art. 63). Those rules, the counterproductive nature of which was well demonstrated by DONK (1963) have been largely ignored by cryptogamists and applying them to fungi would probably imply more changes of accepted names than those that occurred because of the change in starting point date. Several cases were met during the preparation of my check-list but I will let those sleeping dogs lie and limit myself to one published example.

DÖRFELT & HEKLAU (1987) reject *Geastrum nanum* Pers. as superfluous for *G. striatum* DC. and propose to replace it by *G. schmidelii* Vitt. They however overlooked that the latter name like many names of Vittadini is also superfluous for the protologue includes the plate 100 figure 2 of Micheli which is the type of *Lycoperdon pedicellatum* Batsch (DÖRFELT & MÜLLER-URI, 1983). With the present rules strictly applied the correct name of this common fungus is still to be determined. A committee has been appointed by the recent International Botanical Congress to review the problems of superfluity and one could hope that if the cryptogamists present enough evidence of the potential damage to nomenclatural stability that exists in article 63, at least a special rule for cryptogams could be devised. In the meantime it might be unwise to apply too quickly this rule to fungi.

The choice of records to be accepted

Erroneous determinations are so frequent in mycology that a check-list based on all the published records or all the names appearing on herbarium labels or other documents will be a compilation without much biological significance. Indexing the literature is necessary but the data have to be critically evaluated.

For example, because *Lycoperdon pulcherrimum* Berk. & Curt. a very well characterized north american species has been included in the keys of MOSER (1955) and ŠMARDÁ (1958), it has been occasionally reported in Europe. Having revised most of the available european material of *Lycoperdon*, which represents thousands of collections I never came across this species. Further, given its ecology and the type of area it occupies in North America, its occurrence in Europe would not be in line with the general trends observed in the chorology of the genus. Until now I would thus not include this species in a check-list of european *Lycoperdon*.

The safest technique is to rely only on herbarium material revised by the author himself. This is however not always possible when one intends to cover the flora of a large area or deal with numerous taxa. The published evidence for the occurrence of a species will then have to be critically assessed and the record accepted eventually with a word of caution. It should anyway be stressed that the ideal data base for writing up a flora are adequately labelled herbarium specimens and mycologists should be encouraged to devote more efforts to building up herbaria.

Like for woody *Aphyllphorales*, herbarium specimens of *Gasteromycetes* are easily prepared. This made it easier for me to elaborate a check-list that is a neces-

sary step in the preparation of a key to the *Gasteromycetes* of Europe and will also make easier the preparation of revisions at a regional scale. For *Agaricales* herbarium specimens which should be accompanied by field notes need time and expertise to be prepared. This is no reason to give up work with those groups but great efforts should go in preparing good herbarium collections and it should not be overlooked that if properly advised, amateurs could do substantial contributions in this field.

BIBLIOGRAPHIC REFERENCES

- BOIFFARD, J. (1976). Contribution à l'étude des Geastraceae du littoral atlantique (genres *Geastrum* et *Myriostoma*). *Doc. Mycol.* 6(24): 1-34.
- DEMOULIN, V. (1968). Gastéromycètes de Belgique: Sclerodermatales, Tulosmatales, Lycoperdales. *Bull. Jard. Bot. Natl. Belgique* 38(1): 1-101.
- DEMOULIN, V. (1974). *Scleroderma meridionale* Demoulin et Malençon, the correct name for the large *Scleroderma* of great lakes sand dunes. *Michigan Bot.* 13(2): 68-72.
- DEMOULIN, V., D. L. HAWKSWORTH, R. P. KORF & Z. POUZAR (1981). A solution to the starting point problem in the nomenclature of fungi. *Taxon* 30(1): 52-63.
- DONK, M. A. (1963). On superfluous names. *Taxon* 12(9): 319-329.
- DÖRFELT, H. & H. HEKLAU (1987). Beitrag zur Systematik der Geastrales. II. *Feddes Repert.* 98(5-6): 357-368.
- DÖRFELT, H. & C. MÜLLER-URI (1983). Notizen zur Systematik der Geastrales. *Boletus* 7(1): 13-20.
- DÖRFELT, H. & C. MÜLLER-URI (1984). Beitrag zur Systematik der Geastrales. *Feddes Repert.* 95(9-10): 701-711.
- GROSS, G., A. RUNGE & W. WINTERHOFF (1980). Bauchpilze (*Gasteromycete* s.l.) in der Bundesrepublik und Westberlin. *Beih. Z. Mykol.* 2: 220 pp.
- KITS VAN WAVEREN, E. (1926). De Nederlansche Soorten der Genera *Geaster*, *Myriostoma* en *Astraeus*. *Medd. Ned. Mycol. Ver.* 15: 85-129.
- KORF, R. P. (1983). Sanctioned epithets, sanctioned names and cardinal principles. *Mycotaxon* 16(2): 341-352.
- KOTLABA, F. & Z. POUZAR (1987). *Geastrum berkeleyi* v Československu [G.b. in Czechoslovakia]. *Česka Mykol.* 41(2): 115-119.
- KREISEL, H. (1958). Die Erdsterne Mecklenburgs und des unmittelbar angrenzenden Gebiete. *Arch. Freunde Naturgesch. Mecklenburg* 4: 182-199.
- LLOYD, C. G. (1904). Erroneous Genera and Species. *Mycol. Writ. I, Mycol. Notes* 17 (Note 275): 178-182, fig. 71-73.
- MOSER, M. (1955). Die Röhrlinge, Blätter- und Bauchpilze (*Agaricales* und *Gasteromycetales*): Bd. III b. In: A. Gams, *Kleine Kryptogamenflora* 9: + 327 pp. Stuttgart.
- PONCE DE LEÓN, P. (1968). A revision of the family Geastraceae. *Fieldiana Bot.* 31 (11-14): 303-349.
- RAUSCHERT, S. (1959). Beitrag zur Nomenklatur mitteleuropäischer *Gasteromyceten*. *Z. Pilzk.* 25(1): 50-55.
- ŠMARDÁ, F. (1958). *Lycoperdaceae*. In: A. Pilát (Ed.), *Flora ČSR B*, 1, *Gasteromycetes*: 257-377, 755-775. Praha.
- SOEHNER, E. (1962). Die Gattung *Hymenogaster* Vitt. *Beih. Nova Hedwigia* 2: 113 pp., 8 pl.
- STANĚK, V. J. (1958). *Geastraceae* pp. 392-526, 777-795. In: A. Pilát (Ed.), *Flora ČSR B*, 1, *Gasteromycetes*: 392-526, 777-795. Praha.
- SVRČEK, M. (1958). *Hysterangiales*, *Hymenogastrales*. In: A. Pilát (Ed.), *Flora ČSR B*, 1, *Gasteromycetes*: 96-208, 715-743. Praha.

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