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# DEFINITION AND TYPIFICATION OF THE GENUS LYCOPERDON TOURN. PER PERS. (GASTEROMYCETES)

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An account of the history of the variations in delimitation of the genus *Lycoperdon* is presented and the typification of the genus is discussed. It is pointed out that in application of art. 43 of the Code of nomenclature no Myxomycete has been validly published as *Lycoperdon* between 1753 and 1801.

The genus *Lycoperdon* was introduced by Tournefort (1700 : 563) and the name was used during the eighteenth century to refer to the more or less globose fungi with a pulverulent content.This concept allowed the inclusion of most Gasteromycetes and also of Myxomycetes, Pyrenomycetes, Tuberales, Elaphomycetales, Uredinales as one may for example find by Linnaeus (1753: 1183–1185). As long as the genus is considered to belong to the Gasteromycetes its valid publication is to be found in Persoon's Synopsis Fungorum (1801 : 140). Persoon's diagnosis is rather elliptic: "*Peridium* caulescens, apice demum ruptum, verrucis squamulosis, aut spinulosis obsitum. (*Pulvis semimalis viridis*)" However the enumeration of included species (*L. giganteum, L. bovista, L. pratense, L. utriforme, L. mammaeforme, L. excipuliforme, L. perlatum, L. candidum, L. echinatum, L. umbrinum, L. quercinum, L. pyriforme, L. gossypinum*) shows a concept of the genus somewhat wider than the one in current use but very natural, including only Gasteromycetes that are still retained in the same family Lycoperdaceae.

Some radically conservative authors still used the genus *Lycoperdon* in a very wide sense during the first quarter of the nineteenth century. Some of them like Poiret (1808) even recombined in *Lycoperdon* species described by Persoon in *Scleroderma* or *Geastrum*. For example Poiret (1808 : 588) combined *Scleroderma spadiceum* Schaeff. trans Pers. in the genus *Lycoperdon* with the unfortunate consequence that it turned *Lycoperdon spadiceum* Pers. (1809 : 20) into a later homonym. So this classical name must be replaced by the contemporary but little used *L. lividum* Pers. (1809:18).

With the Friesian era however Persoon's concept of the genus was definitively admitted and a tendency appeared even to restrict it further. Rostkovius (1839) was the first to emend *Lycoperdon* by excluding species whose opening is irregular and not through a pore. This conception was generally accepted after the paper of Morgan (1890), who brought in common use Fries's (1849 : 442) little noticed genus

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*Calvatia*. This genus is to be conserved against *Langermannia* of Rostkovius (Stafleu & al., 1972 : 254); though the type species are widely different, the genus *Langermannia* is frequently used by authors subdividing *Calvatia* (cf. Kreisel, 1962).

Quélet (1873) abandoned previous genera *Lycoperdon* and *Bovista* and created instead *Utraria* and *Globaria*, two fully superfluous names that would have had no consequences had not *Globaria* been adopted by Schroeter (1889) and Fisher (1900) in an emended sense to refer to species with a poorly developed subgleba but without the *Bovista* type capillitium. The exclusion of those species from *Lycoperdon* was taken up again by Kreisel (1964, 1967) who treated them as the subgenus *Globaria* of *Bovista*. The name *Globaria* cannot be used at the generic rank for either is it attributed to Quélet and illegitimate because it is superfluous (Art. 63) or it is attributed to Schroeter and then illegitimate because it is homonymous (Art. 64). However as a subgenus of *Bovista* it can certainly be used but its paternity must then be given to Kreisel (Art. 72, note).

Lloyd (1906) made an attempt to exclude from *Lycoperdon* all species with pedicellate spores, but he was never followed.

The latest emendation of *Lycoperdon* comes from the exclusion of species devoid of capillitium with the creation of the genera *Vascellum* by Šmarda (1958) and *Morganella* by Kreisel & Dring (1967).

The actual concept of the genus can be considered the one developed by Kreisel in his study of Lycoperdaceae culminating in his monograph of *Bovista* of 1967. According to that concept *Lycoperdon* should contain species with an endoperidium opening by a pore, having a subgleba with large cells, a pseudocolumella and a capillitium, the latter not of the *Bovista* type. So defined the genus is fairly homogeneous and, with the exception of a few species like *L. rimulatum* Peck, whose capillitium does not exactly fit the usual type, easy to separate from neighbouring taxa. However as Malençon (1969) already noted, by transferring the borderline between *Lycoperdon* and *Bovista* this conception makes the genus *Bovista* less homogeneous. Personally I also consider that the subgleba character used to separate *Bovista* from *Lycoperdon* is of little taxonomic weight. Similarly the character of breaking up of the endoperidium, diagnostic of *Calvatia*, does not appear to me a good one in a natural classification. I believe that an analysis of Lycoperdaceae based on various characters and taking into account the world flora would lead us to significant remodelling of our generic concept. It is probable then that we would have to follow Smith (1968) and use again larger genera. For the present, however, I consider that Kreisel's conceptions of genera offer the best possible framework for studying Lycoperdaceae and I think that only after all those genera are adequately monographed can their limits be discussed again.

## Typification of the genus

*Lycoperdon perlatum* Pers. per Pers. is currently considered the type of the genus *Lycoperdon*. This tradition seems to go back to Cunningham (1942) or in some way

to Clements & Shear (1931) who cite the devalidated synonym *L. gemmatum* Batsch.

This typification should be accepted following Art. 8 (first choice of a lectotype), Recommendation 7 B (preservation of current use) and Guide for the determination of types § 4 C (respect of segregations).

A possible reason to oppose the designation of *L. perlatum* as type is to admit that since the genus *Lycoperdon* included Myxomycetes for eighteenth century authors, it was validly published by Linnaeus in 1753 since this is the starting point for the nomenclature of Myxomycetes (Art. 13) and so that it must be typified according to Linnaeus' conceptions.

This hypothesis is self destructive. Linnaeus' diagnosis published in the Genera Plantarum, ed. 5 : 493. 1754 (cf. Art. 13, Note 1) runs as follows:

1082. Lycoperdon. **Tournef.* 331. *Mich.* 97. *Vaill.* B.P. XVI: 4–10. *Bovista* Dill. *Lycoperdoides* Mich. 98. *Lycoperdastrum* Mich. 99. *Geaster* Mich. 100. *Carpobolus* Mich 101.
Fungus subrotundus, Seminibus farinaceus impalpabilibus repletus, ab apice dehiscens.

This is of course vague but the reference to Tournefort is explicit and is only made to Plate 331 which only represents Gasteromycetes. Genera cited as synonyms are also Gasteromycetes. As a matter of fact it seems that to pre-linnean authors, *Lycoperdon* is the scientific name for puff-balls and that Myxomycetes, mainly *Lycogala epidendrum*, are only accessorily added. Linnaeus was probably the first to enlarge considerably the genus with his section "Parasitica in farinam fatiscentia." It does not appear he intented to treat this section as essential for the definition of the genus. Fries summarises well this situation (1829 : 28): "Genus Lycoperdon (h.e. *Crepitus Lupi* Patrum) constituit Tournefort, optime limitavit Micheli dein latissime fluctuans, praesente angusto, nimis fere angusto, constrixit Persoon."

If the genus *Lycoperdon* of Linnaeus is to be typified it seems that following already mentioned principles (Rec. 7 B, Guide for the determination of types) as well as according to the attention one should obviously give to the concepts of Tournefort and other authors to whom Linnaeus refers, the type must be *L. bovista* L. This species practically encompasses the whole family Lycoperdaceae. Consequently the genus *Lycoperdon* is a genus of Gasteromycetes and cannot have been validly published before Persoon.

An apparently unnoticed consequence of this is that Myxomycetes published in the genus *Lycoperdon* between 1753 and 1801 are not validly published (Art. 43). I leave it to specialists of Myxomycetes to work out the nomenclatural consequences of this which affect at least some twenty names listed in Martin & Alexopoulos (1969).

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