

Book Review

JAN VESTERHOLT

The genus *Hebeloma*

In: Fungi of Northern Europe, vol. 3, 146 p. – Published by Svampetryk, Tilst, Denmark (www.mycosoc.dk), 2005. ISBN: 87-983581-6-2. The book is available in library of the Czech Scientific Society for Mycology.

In this book, Jan Vesterholt presents in word and picture all substantial information for an identification and an infrageneric classification of the 45 species and 2 varieties of the genus *Hebeloma* in northern Europe. He summarises the results of 24 years of study of rich mycological material collected in that area, especially in Denmark. Wherever necessary, he takes into consideration also collections from countries located southwards, like Germany, Switzerland, Italy etc. The southernmost limits of the area of northern Europe defined for the purpose of his book are drawn along a region north of Paris, the Alps and the Carpathians, and reach the area west of the Ural. Consequently, his publication certainly includes almost all the taxa occurring in Central Europe, including the Czech Republic.

The genus *Hebeloma* is species-rich and taxonomically complicated. It tends to be overlooked due to a large extent of uniformity and also inedibility of the fruitbodies. A lack of publications like this is yet another reason of this situation. Vesterholt's monograph catches the eye thanks to its overall design and carefully structured text and images, leaving an impression which sticks with the reader. The layout is such that the presentation of each species begins at a new page and the sub-headings of description and sketches of individual characters are positioned consistently making the layout transparent. The set of characters selected by the author for each species is comprehensive, no specific details being omitted as unsubstantial, which enables the reader to make himself an individual comparison of the different species, especially when no comparative tables or graphs are included.

The images are good and colour print quality is high. Close-ups are not included and fruitbodies are not depicted in cross-section but this does not seem to be a major issue.

Colours, their nomenclature and standardised usage are emphasised. A list of the colour terms used in the book, with references to Kornerup & Wanscher (1974), is attached at the end. However, the brownish red of the spore print of *Hebeloma sarcophyllum* (sect. *Porphyrospora*) cannot be found in this list. The most frequent spore print colour referred to is umber but there is also cinnamon in *H. polare* and dark brick in *H. velutipes* and *H. syrjense*. Maybe these variations are not taxonomically relevant (in contrast to other genera of fungi) and therefore a special spore print colour scale is not necessary. The spore print colour of *Hebeloma domardianum* is whitish and a transfer of this species from the genus *Hebelomina* to *Hebeloma* sect. *Denudata* is quite surprising.

The creation of scales to express types of spore ornamentation, spore shape, loosening of perispore, dextrinoidity, and shape of cheilocystidia is positive. Such ranking in the form of a scale is usually more precise and communicable than a mere verbal expression.

The arrangement of this genus in several sections (7) and subsections (9) on the basis of well-defined combinations of macroscopic and especially microscopic characters is beneficial. The infrageneric classification presented here is based on the traditional concepts, introducing some new aspects as well. It is indicated, in particular, that the presence of a cortina (velum parziale) is of taxonomic relevance in sect. *Hebeloma* whereas a universal veil (velum generale) can be seen, in various forms and degrees, also in other sections of this genus.

Shape of cheilocystidia, shape, size, ornamentation and dextrinoidity of spores and the loosening of perispores are considered to be the most important microscopic characters, whereas the presence of a cortina, shape (tapering) of stipe base, and smell (especially if different from the most common raphanoid scent) are the most relevant macroscopic features for an infrageneric delimitation of this genus.

While much attention is paid to cheilocystidia, including the thickened cheilocystidia wall in some Nordic species, no pleurocystidia were observed and only personal information on their presence in *H. mesophaeum* is mentioned. It is true that some *Hebeloma* species have been noted to have pleurocystidia (e.g. *H. cistophilum*) but these do not occur in northern Europe. Caulocystidia are less discussed since they do not seem to be of a major significance for *Hebeloma* systematics. The same applies to basidia which, however, are usually of some taxonomic importance, most likely for an infrageneric delimitation at the level of sections. So, the small basidia existing in subsect. *Scabrispora* and the large ones in subsect. *Sacchariolentia* are eventually of a similar relevance as the size of basidiospores.

Sect. *Theobromina*, represented by a single species, *H. theobrominum*, and subsect. *Aestivale* of sect. *Velutipes*, represented by *H. aestivale* and *H. quercetorum*, are among the new higher taxa. *Hebeloma quercetorum* seems to be close to *H. sinapizans* from which it differs by having a pruinose stipe and cystidia with a clavate apical part and a ventricose basal part.

Hebeloma vejense of sect. *Denudata* is a species described as new here. Quite a few other taxa have been synonymised, e. g. *H. fastibile* and *H. strophosum* with *H. mesophaeum*, *H. senescens* and *H. edurum* with *H. laterinum* (a new combination), and *H. pallidoluctuosum* with *H. sacchariolens*, to name some of the more common ones. Some widely used names as *H. leucosarx* and *H. longicaudum* are mentioned in the discussion only.

Hebeloma polare is very interesting and impressive. However, it causes some classification problems – by having been placed in subsect. *Amagdalina* although not having amygdaliform and dextrinoid spores. Several species (*H. populinum*, *H. vaccinum*, *H. alpinum* and *H. alvarense*) in sect. *Denudata* have spores of larger and broader dimensions and it is interesting that the same can be stated about their cheilocystidia and basidia. *Hebeloma subconcolor* seems to have a special position in sect. *Denudata* due to its distinctly broader spores, sepia-tinged spore print, and to its unusual greyish brown fruitbodies. *Hebeloma cylindrosporum* is quite unique due to its cylindrical to narrowly ellipsoid spores and, consequently, has a rather isolated position within subsect. *Scabrispora* where all other species have amygdaliform spores. The same applies to *H. fusisporum* of subsect. *Saccharolentia* with its narrowly amygdaliform to almost fusiform spores.

It is widely accepted by mycologists that only a few *Hebeloma* species are common, whereas most of them are rare. This work shows that this concept is of a limited value and that some species were not known or recognised as such in the past.

Ecologically, some *Hebeloma* species are ectomycorrhizal partners of a number of tree species but some other ones are symbionts of *Salix* spp. only. In terms of environmental requirements, we can find considerable similarities between these and the species of the genus *Laccaria*, which is certainly not a mere coincidence.

This work by Jan Vesterholt shows us the fascinating world of the genus *Hebeloma* in an exact, concise and attractive form. It helps us to recognise its substantial characters and shows us what to observe when studying its fruitbodies. The evaluation of field records will be much easier, even if not all taxa growing in Central Europe are necessarily included. Finally, I fully recommend this excellent publication for both home study and laboratory as well as field work.

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