
Through the efforts of professional and amateur microscopists, the cladoceran fauna of Great Britain has been well known for more than half a century. The present publication serves admirably as an illustrated key to this fauna, and in addition has brief ecological notes and distribution records in Britain for each species included. Because of the almost cosmopolitan distribution of most species of Cladocera, especially in the Holarctic Realm, this booklet served almost equally well for Western Europe, and is even useful for the U.S. However, for the U.S. the key would have to be used with some caution, since the fauna of North America is considerably more extensive than that of Europe, especially in certain chydrid genera such as Pleurozus, Chydorus, and Alonella.

In organization the second edition of this booklet is much better than the first. The family is determined not by working through some rather obscure characters in a key but by comparing the specimen in hand with line drawings of typical genera.

For each family there is an illustrated key to the species. The ecological and distributional information for each species is given in a short paragraph immediately following the terminal listing of the species in the key. This arrangement is convenient to use and should facilitate identification of cladocera by the non-specialist.


The impasse in the classification of Daphnia which has embarrassed limnologists for decades at long last appears to have been resolved. Brooks' treatment of the genus is exciting, logical, and well documented. It brings the systematics of the North American species into conformity with the current trends in systematics and in the geographical delimitation of species.

Many species of Daphnia are highly variable morphologically, both in a geographic and temporal sense. As a result there has been an almost hopeless confusion of names to designate species, subspecies, varieties, forms, etc. Many geographical entities have been designated by trinomials and even quadrinomials. This implied precision of recognition has been negated by the fact, as shown in the present study, that both Daphnia pulex and D. longispina as formerly recognized is each a composite of many species. This resulted from the separation of these two "species" on the basis of a single character—the presence or absence of a pecten in the middle comb of the postabdominal claw. Convergence has occurred in this character, as indicated by the fact that D. ambiguus with a "longispina-like" claw is related to D. middendorffiana which has a "pulex-like" claw.

Much of the revision involves a mere rearrangement of the material in the first edition. For the highly variable genera Daphnia and Bosmina, however, there is a new treatment. In Daphnia three groups of species are recognized—the magna, pulex, and longispina groups. For D. hyalina and D. cucullata a number of varieties are recognized. The revision includes three species of Daphnia—carinata, ambiguus, and carrirostris—not in the original edition, and these represent the only additions to the fauna.

Bosmina, in accord with current practise, is now separated into just the two species—B. longirostris and B. coregoni—each with a number of recognizable varieties.

Whereas the nomenclature of the morphologically stable macrothricids and chydrids living in the littoral regions is quite firmly established and satisfactory, that of the highly variable planktonic species is not. The present treatment of Daphnia and Bosmina is a reflection of current European thinking regarding these two genera.

Harding has done a nice job on this revision. For one who cannot afford Liljeborg's monograph or cannot locate copies of the works by Keilhack or Wagler, this booklet furnishes good treatment of most of the species of western Europe.

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Brooks recognizes 15 species of Daphnia from North America. Most of the names used are unfamiliar to limnologists, although no new names are proposed. D. longispina described from Europe does not occur in North America. D. pulex is retained, although in a much more restricted sense than commonly used hitherto. Morphological variants are not named. The only trinomial used is D. galeata mendotae, which is a new combination. This represents the only instance where the North American population of a species is similar to, yet sufficiently distinct from, its Eurasian counterpart to merit recognition. Thus the use of trinomials has been restricted to geographic subspecies in accord with modern practise.

The logic of Brooks' proposed scheme is demonstrated by his fascinating analysis of relationships between species, their phylogeny, recency of origin, etc. Chapter I, "A general account of the systematics of North American Daphnia," is in reality the conclusion of the monograph. The concentration of species in northwestern North
America indicates to Brooks that exchange with Eurasia has occurred across the Bering Strait rather than across the Atlantic, and that western Europe and eastern North America are in reality at opposite ends of the range of distribution. Eight species are holarctic in distribution, and since except for *galeata mendotae* they show the same range of variation in Eurasia and Europe they are not named beyond the species. The other 7 species apparently are of New World origin, although *thorata* and *catawba* may have been derived from stocks still having representatives in Eurasia, and *laevis* is closely related to an undescribed species occurring in Africa south of the Sahara.

One of the most interesting species is *D. middendorfiana*, which is the most successful and often the only species occurring in the Arctic. In this species resting eggs are produced parthenogenetically, which would be of distinct survival advantage where the ice-free season is short and where most of the shallow waters freeze solid in winter. Because of the great morphological uniformity of this species in the Arctic both of North America and Eurasia, Brooks postulates that this whole population may be in reality a single clone.

Other developments of the proposed system of classification which seem to attest to its validity, are the existence of several species pairs, with in each instance the southern member being the more primitive and apparently of greater age.

Without presenting a detailed analysis of species outside the New World, Brooks lists a total of 30 described species for the world as a whole. In 1936 Wagler listed just 4 species in the subgenus *Daphnia*, including the now-discredited *pulex* and *longispina* in the broad sense, whereas Brooks now recognizes 21 species in this subgenus. The number of species in the subgenus *Ctenodaphnia* has been increased only from 7 to 9.

For the North American species there is an illustrated key, followed by a detailed description of the morphology and ecology of each species and its nomenclatorial history. In a couple instances previously unpublished drawings by Richards and Herrick are presented to help establish the validity of the species names used. In a number of instances the original species descriptions are quoted verbatim. Each of the species descriptions is accompanied by large and detailed camera lucida drawings.

One of the valuable parts of the monograph for the average user is Chapter IV, "Regional aspects of *Daphnia* systematics." Brooks recognizes 10 geographical subregions in North America, each of which contains a relatively constant assemblage of species. For a species occupying more than one subregion the intraspecific variation is greater between regions than within a region. For each subregion there is a chart of the species present, with camera lucida drawings of specimens from the subregion, and notes on relative abundance and types of habitat occupied.

With the systematics of North American *Daphnia* now in hand it should be possible to work out some of the phylogenetic problems from subfossil remains in lake sediments. Identification at the present level of our knowledge has to be based entirely on postabdominal claws and the adjoining postabdominal teeth, or on ephippia. Mandibles occur abundantly, and also the filter combs and other thoracic appendages, but these have not been studied sufficiently to enable species recognition from the isolated parts. As examples of the types of information obtainable, Brooks reports the occurrence of *D. catawba*, a southern species, near the beginning of the CI pollen zone (7000–8000 years ago) in the sediments of a Connecticut pond; and Ogden (unpublished) has found the ephippium of *D. middendorfiana*, an arctic species, in the late-glacial pollen zone A4 from Martha’s Vineyard.

The primary goal of systematics is the definition of species. Once this has been achieved, then problems of introgression, interspecific competition, phylogeny, etc. can be dealt with satisfactorily. In the systematics of *Daphnia* Brooks has wrought a mutation that is scholarly, logical, appealing, and unquestionably has survival value.

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