THE FRESHWATER MACROINVERTEBRATES OF FLORIDA:
A GUIDE TO REFERENCES FOR THEIR IDENTIFICATION

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ABSTRACT

A list of identification guides is presented, including keys, descriptions, and other information, many with attached annotations. We have found these manuscripts useful in the determination of the freshwater macroinvertebrates of Florida.

Key Words: Keys, macroinvertebrates, aquatic, freshwater, Florida fauna

RESUMEN

Es presentada una lista de guías de identificación que incluye claves, descripciones y otras informaciones, muchas con anotaciones adjuntas, que son útiles para la determinación de macroinvertebrados de agua dulce de la Florida.

Identification of the freshwater macroinvertebrate fauna of many areas is often a difficult process. Florida is certainly no exception. For most groups there are no comprehensive keys to the Florida fauna and other useful keys are usually scattered and hard to find for the non-specialist.

This paper contains a list of publications and keys, many annotated, which we have found useful for identifying the freshwater macroinvertebrates of Florida. It is an attempt to make these references more available to researchers who need to identify the freshwater macroinvertebrates of Florida. Some of the groups of Florida freshwater macroinvertebrates are not well known and this is reflected in the lack of adequate literature for identifying these groups.

The number of papers listed for the different groups varies widely. This is related to, among other factors, the number of species present in Florida, the difficulty in actually determining the identity of these species, and the recency and availability of comprehensive revisions of the various taxa.

We have tried to include all taxa of truly aquatic macroinvertebrates; i.e., those with at least one aquatic life history stage. We have also included some semiaquatic taxa which are likely to be found in aquatic collections.

In order to facilitate use, taxa in this paper are arranged alphabetically within groups, starting with phyla and working down the taxonomic hierarchy.

GENERAL REFERENCES


PHYLM ANDELLIDA

PHYLM ARTHROPODA
CRUSTACEA
BOUSFIELD, E. L. 1963. New fresh-water amphipod crustaceans from Florida. National Museum of Canada, Natural History Papers No. 18:1-9. [Although somewhat old, the data are still valid]


**CHELICERATA (ACARI: HYDRACARINA)**

[Contains keys, description, and discussions for 35 species of Arrenurus]


[Contains key to common Florida genera; includes basic biological information]

**INSECTA (COLEOPTERA: GENERAL)**

[Includes keys to families, subfamilies and genera of the beetles of North America north of the Rio Grande, with brief notes about numbers of species for each genus. It is now extremely out of date, and was fraught with numerous difficulties when first published; many of the keys do not work]

[Keys are fairly simple; some taxonomy is outdated]

[Somewhat out of date taxonomically; illustrations are provided that could be of use]

[Somewhat out of date taxonomically; illustrations are provided that could be of use]

[Includes figures and keys to genera of beetles; while geared specifically to that region, most of the genera are common to Florida, and it is far better illustrated than Arnett, 1963]

[An illustrated expert system for the identification of larvae of Coleoptera to family and subfamily; requires CD ROM system]


[Nice volume but quite out of date; includes all the “water beetles”, strictly speaking, the Dytiscidae, etc., and certain non-Adephaga families: Hydrophilidae, Hydraenidae, Dryopidae and Elmidae; Hydrochidae were separated from the Hydrophilidae]

**INSECTA (COLEOPTERA: CHELONARIIDAE)**


**INSECTA (COLEOPTERA: CHRYSOMELIDAE)**

[A number of subfamilies include somewhat aquatic species, such as the flea beetle *Agasicles* that has been introduced on alligator weed, and *Mantura* that is often collected in roadside ditches. However, only the Donaciinae are entirely aquatic]


[Needed to key specimens to subfamily]


**ASKEVOLD, I. S.** 1987. The identity of *Donacia cuprea* Kirby, 1837, and *Donacia quadriocollis* Say, 1827, with a taxonomic revision of members of the *D. subtilis* Kunze-group (Coleoptera: Chrysomelidae: Donaciinae) Canadian Entomol. 19:629-645.


[includes keys to subfamilies and many of the species that occur in Florida]


[Key to species, distributional and host data for species of what is now restricted to Donacia (Donacia) and Donacia (Donaciomima); keys work fairly well, and taxonomy can be updated using Askevold, 1991b]


[includes a few genera that often occur in semiaquatic habitats]


[Assists in correct taxonomic placement of species to genus, but provides no references or aids to identification]
INSECTA (COLEOPTERA: CURCULIONIDAE)

[There are many genera and species of aquatic weevils, and they are very difficult to identify. Most genera are poorly studied, with numerous undescribed species, even from Florida alone. There are also a number of aquatic weevils introduced as biocontrol agents, and these are not covered by most available literature]


[Very out of date, but some of the keys and descriptions are useful; taxonomy needs to be carefully traced using O'Brien & Wibmer, 1982; many of the aquatic weevils of Florida are treated]


[Endalus is no longer valid; Notiodes Schönherr is the valid name]

KISSINGER, D. G. 1964. Curculionidae of America north of Mexico. A key to the genera. v + 143 pp. S. Lancaster, MA.

[The only published key to all genera of North American weevils; some taxonomy out of date]


[One species, Bagous hydrillae, has been introduced into Florida for biocontrol of Hydrilla]


[An essential reference to trace taxonomy, identifications and distributions, from older literature]


[Outdated, keys difficult to use; many species in Florida, distribution poorly known; keys genera of most aquatic weevils, treated as a single group, but this is a polyphyletic assemblage; contains a number of very good and accurate habitus illustrations, however]


INSECTA (COLEOPTERA: DRYOPIDAE)


INSECTA (COLEOPTERA: DYTISCIDAE)


[One species probably occurs in northernmost Florida]


INSECTA (COLEOPTERA: ELMIDAE)


INSECTA (COLEOPTERA: GYRINIDAE)


INSECTA (COLEOPTERA: HALIPLIDAE)


INSECTA (COLEOPTERA: HETEROCERIDAE)


INSECTA (COLEOPTERA: HYDRAENIDAE)

PERKINS, P. D. 1980. Aquatic beetles of the family Hydraenidae in the Western Hemisphere: Classification, biogeography and inferred phylogeny (Insecta: Coleoptera). Quaestiones Entomologicae 16:3-554.

YOUNG, F. N. 1954. The water beetles of Florida. Univ. of Florida Biological Science Series 5(1):1-238. [Refers to this family as the Limnebiidae; quite out of date but may be useful for supplementary information]

INSECTA (COLEOPTERA: HYDROPHILIDAE)


Insecta (Coleoptera: Limnichidae)


Insecta (Coleoptera: Noteridae)


Insecta (Coleoptera: Psephenidae)


Insecta (Coleoptera: Ptilodactylidae)


Insecta (Collembola)


[Good illustrated key including most North American species which regularly occur on water]

**INSECTA (DIPTERA: GENERAL)**


**INSECTA (DIPTERA: CERATOPOGONIDAE)**


**INSECTA (DIPTERA: CHIRONOMIDAE)**


EPLER, J. H. 1992. Identification manual for the larval Chironomidae (Diptera) of Florida. Florida Dept. of Environmental Regulation. 302 pp. [Illustrated keys to larvae; most up-to-date reference available for Chironomidae larvae]


[Keys and descriptions for pupae and larvae]

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[Keys and descriptions for pupae and larvae]

[Keys and descriptions for pupae and larvae]

[Keys and descriptions for pupae and larvae; taxonomy outdated]

[Keys and descriptions for pupae and larvae]

[Adults only]

[Mostly adults]

[Keys for adults, pupae, and larvae]

[Keys and descriptions for adults, pupae, and larvae]

[Mostly adults, but some information of immature stages]

[Keys to some larvae; only marginally useful because of extralimital nature; some taxonomy outdated]

[Keys for adults, pupae, and larvae deals mostly with European species]

[Keys and descriptions for adults, pupae, and larvae]

[Keys for adults; some taxonomy outdated]

[Keys and diagnoses; a necessary reference in any lab]

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**Insecta (Diptera: Culicidae)**


**Insecta (Diptera: Tabanidae)**


**Insecta (Diptera: Tipulidae)**


**Insecta (Ephemeroptera)**

[This book is indispensable for identifying the Florida mayflies. It is comprehensive and the keys are quite useful]

[Useful for additional information, descriptions, and figures; most helpful used in conjunction with the book by Berner & Pescador (1988)]

**INSECTA (HETEROPTERA)**


HERRING, J. L., AND P. D. ASHLOCK. 1971. A key to the nymphs of the families of Hemiptera (Heteroptera) of America north of Mexico. Florida Entomologist 54:207-213.


**INSECTA (HYMENOPTERA)**


**INSECTA (LEPIDOPTERA)**

[Keys work with most Florida species]


[Most complete treatment of adult Pyralidae available; excellent application to Florida fauna]

INSECTA (MEGALOPTERA)


INSECTA (NEUROPTERA)


INSECTA (ODONATA)

[Somewhat outdated, but contains ecological data on many Florida species; also general keys to adults and larvae]

[Most current and accurate key to Florida damselflies]

[Most current and accurate key to Florida dragonflies]


[Excellent photographs of Florida species; excellent beginners’ guide]

[Excellent photographs of Florida species; excellent beginners’ guide]
[Good key to Carolina larvae; includes most Florida species that range northward into Carolinas]

[Excellent guide and key to adult Florida damselflies]

[Keys and line drawings of most southeastern lotic dragonflies; omits several rare or new Florida species]

[Vital for any researcher of North American dragonflies]

INSECTA (PLECOPTERA)

[Classic work on stonefly nymphs. Includes many illustration of eastern species and genera but nomenclature is outdated]

[Classic work which gives an overview of biology for the order and includes excellent nymphal illustrations for genera and species found in Florida. The nomenclature is somewhat outdated]

[Includes a name change for P. fumipennis and records of P. drymo and P. zwicki from Florida]


[H. phormidia is described from Florida]

[Includes Florida record of T. cornelia]

[Includes Florida records of A. annulipes]

[Species keys, distributions, and descriptions are provided. Needs to be revised with updated nomenclature and a few additions]

[Includes Florida records of H. bogaloosa]

[Includes illustrations and keys to all North American stonefly genera and a detailed overview of nymphal ecology]

[Outdated nomenclature, but good coverage of southeastern stoneflies include many Florida species]

**INSECTA (TRICHOPTERA)**

[Summarizes existing, published diagnostic information; keys with figures appearing at the couplets]

[Families treated in the atlas pertinent for Florida include Polycentropodidae and Psychomyiidae]


[Includes larval key to the majority of Oecetis species occurring in Florida]

[Includes larval key to nearly all species of Triaenodes likely to occur in Florida]

[Unfortunately, this is the only state-wide survey conducted to date on Florida Trichoptera]

[Used in conjunction with Daigle and Haddock, 1981, all Florida species of Nectopsyche larvae except N. paludicola Harris can be identified]

[Does not include taxonomic keys but is useful for checking species geographic distribution]


[Includes a larval key and descriptions for most species of Ceraclea likely to occur in Florida]

[“Classic” work still very useful in the determination of both larvae and adults of many species including some from Florida]

[Taxonomic key relies heavily on coloration patterns of the head capsule and with Florida material is often problematic]

[Includes a taxonomic key and descriptions for M. blenda and M. tryphena but does not include M. ulmerina Navás]

[Useful for Florida species which range north to the Carolinas; summarizes life history and ecological information for many species]

[Essential reference for anyone working on caddisfly larvae; includes larval keys to genus for all families; excellent illustrations]

[Useful information on ranges]


**Phylum Bryozoa**


**Phylum Coelenterata**


**Phylum Mollusca**


PHYLUM NEMATOMORPHA

[One species reported from Florida: Chordodes morgani Montgomery, 1898]

PHYLUM PLATYHELMINTHES


PHYLUM PORIFERA


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