

KEYS TO FAMILIES

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INTRODUCTION

This list is of keys needed to identify invertebrates to the families (and Chironomid to subfamily) used in National River Health Program (Hawking 1995). A more comprehensive list can be found in Hawking (2000).

References

- Hawking, J.H. (1995). Monitoring River Health Initiative Taxonomy Workshop Handbook. MRHI Taxonomy Workshop, Murray-Darling Freshwater Research Centre, 6-7th February 1995.
- Hawking, J.H. (2000). *Key to keys A guide to keys and zoological information to identify invertebrates from Australian inland waters*. Identification Guide No. 2. 2nd edn. Cooperative Research Centre for Freshwater Ecology: Albury.

TAXONOMIC INFORMATION

Key to Phyla/Classes/Orders: Williams (1980), Miller (1996).

Interactive key to Phyla/families: Gunn *et al.* (1999).

Field Guide: Hawking & Smith (1997).

References

- Gunn, B., Cranston, P.S., Dimitriadis, S. & Trueman, J.W.H. (1999). *Interactive guide to Australian Aquatic Invertebrates*. Windows edn 2. CSIRO, Land & Water Resources Research & Development Corporation, & Environment Australia: Canberra.
- Hawking, J.H. & Smith, F.J. (1997). *Colour guide to invertebrates of Australian inland waters*. Identification Guide No. 8. Cooperative Research Centre for Freshwater Ecology: Albury.
- Miller, R. (1996). *Freshwater Invertebrates*. Gould League of Victoria: Moorabbin.
- Williams, W.D. (1980). *Australian Freshwater Life*. 2nd edn Macmillan: Melbourne. 681-703.

PHYLUM PLATYHELMINTHES (Primitive worms, Flatworms)

Key to families: Williams (1980), Hickman (1967).

Families

Temnocephalidae
 DugesIIDae
 Planariidae

PHYLUM NEMERTEA (Proboscis worms)

Key to families: Williams (1980).

Families

Tetrastemmatidae

References

- Hickman, V.V. (1967). Tasmanian Temnocephalidea. *Pap. Proc. R. Soc. Tasm.* **101**: 227-250.
- Williams, W.D. (1980). *Australian Freshwater Life*. 2nd edn Macmillan: Melbourne. 681-703.

PHYLUM MOLLUSCA (Snails, mussels)

CLASS GASTROPODA (Snails)

Key to families: Smith (1996, 1979).

Families

Ancylidae
Assimineidae
Bithyniidae
Glacidorbidae
Hydrobiidae
Lymnaeidae
Neritidae
Planorbidae
Physidae
Thiaridae
Viviparidae

CLASS BIVALVIA (Mussels)

Key to families: Smith (1996, 1979).

Families

Hyriidae
Sphaeriidae
Corbiculidae

References

Smith, B.J. (1996). *Identification keys to the families and genera of bivalve and gastropod molluscs found in Australian inland waters*. Identification Guide No. 6. Cooperative Research Centre for Freshwater Ecology: Albury.

Smith, B.J. & Kershaw, R.C. (1979). *Field Guide to the Non-marine Molluscs of South-eastern Australia*. Australian National University Press: Canberra.

PHYLUM ANNELIDA (True worms, leeches)

CLASS OLIGOCHAETA (Aquatic earthworms)

Key to families: Pinder & Brinkhurst (1994)

Families

Capilloventridae
Haplotaxidae
Lumbriculidae
Phreodrilidae
Naididae
Tubificidae

CLASS APHANONEURA

Key to family: Pinder & Brinkhurst (1994).

Families

Aeolosomatidae

References

Pinder, A.M. & Brinkhurst, R.O. (1994). *A preliminary guide to the identification of microdrile oligochaetes of Australian freshwaters*. Identification Guide No. 1. Co-operative Research Centre for Freshwater Ecology: Albury.

PHYLUM ARTHROPODA

CLASS ARACHNIDA (Mites & spiders)

Order Acariformes (formerly Acarina) (Mites)

Key to families: Harvey (1998), Harvey & Growns (1998).

Suborder Prostigmata

Families

Anisitsiellidae
Arrenuridae
Astacocrotonidae
Athienemanniidae
Aturidae
Eylaidae
Frontipodopsidae
Hydrachnidae
Hydrodromidae
Hydryphantidae
Hygrobatidae
Limnesiidae
Limnocharidae
Mideopsidae
Momonidae
Omartacaridae
Oxidae
Piersigiidae
Pionidae
Pontarachnidae
Torrenticolidae
Unionicolidae
Wettinidae
Zelandothyadidae

Subcohort Trombidioidea

Families

Trombidiidae

Superfamily Halacaroidea

Families

Halacaridae
Pezidae

Suborder Oribatida

Key to families: Interactive Key (CD Rom) – Hunt *et al.* (1998).

Families

Hydrozetidae
Ameronothridae

References

- Harvey, M.S. (1998). *The Australian Water Mites. A Guide to Families and Genera*. Monographs on Invertebrate Taxonomy 4, 1-150. CSIRO Australia and Western Australian Museum.
- Harvey, M.S. & Grown, J. (1998). *Preliminary guide to the identification of families of Australian water mites (Arachnida: Acarina)*. Identification Guide No. 18. Cooperative Research Centre for Freshwater Ecology: Albury.
- Hunt, G. S., Colloff, M. J., Dallwitz, M. J. & Walter, D. E. (1998). An interactive key to Oribatid mites of Australia. In: *Oribatid Mites*. CSIRO Publishing: Melbourne.

CLASS CRUSTACEA

Key to subclass/orders: Williams (1980); Malacostraca (Amphipoda, Decapoda, Isopoda & Syncarida) – Horwitz *et al.* (1995).

References

- Horwitz, P., Knott, B. & Williams, W.D. (1995). Preliminary key to the malacostracan families (Crustacea) found in Australian inland waters. Identification Guide No. 4. Cooperative Research Centre for Freshwater Ecology: Albury.
- Williams, W.D. (1980). *Australian Freshwater Life*. 2nd edn Macmillan: Melbourne. 681-703.

Subclass Branchiopoda

Order Anostraca (Fairy shrimps)

Families

Artemiidae
Branchipodidae

Thamnocephalidae

Order Notostraca (Tadpole or shield shrimps)

Families

Triopsidae

Order Diplostraca

Suborder Conchostraca (Clam shrimps)

Key to families/genera: Williams (1980), Bayly *et al.* (1967). The family designations remain uncertain and are not included

References

Bayly, I.A.E., Bishop, J.A. & Hiscock, I.D. (eds) (1967). *An illustrated key to the genera of the Crustacea of Australian inland waters*. Australian Society for Limnology: Melbourne.

Williams, W.D. (1980). *Australian Freshwater Life*. 2nd edn Macmillan: Melbourne. 681-703.

Suborder Cladocera (Water-fleas)

Key to families: Shiel (2000).

Families

Bosminidae

Chydoridae

Daphniidae

Ilyocryptidae

Macrothricidae

Moinidae

Sididae

Subclass Copepoda

Key to families: Williams (1980).

Families

Canthocamptidae

Centropagidae

Cyclopidae

Diaptomidae

References

Shiel, R.J. (1995). *A guide to the identification of rotifers, cladocerans and copepods from Australian inland waters*. Identification Guide No. 3. Cooperative Research Centre for Freshwater Ecology: Albury.

Shiel, R.J. (2000). *A guide to the identification of cladocerans (Branchiopoda: Anomopoda/Ctenopoda) from Australian inland waters*. Identification Guide No. 32. Cooperative Research Centre for Freshwater Ecology: Albury.

Williams, W.D. (1980). *Australian Freshwater Life*. 2nd edn Macmillan: Melbourne. 681-703.

Subclass Ostracoda (Shell or seed shrimps)

Keys to families: De Deckker (1995), Williams (1980).

Families

Cyprididae

Ilyocyprididae

Leptocytheridae

Notodromadidae

Limnocytheridae

References

De Deckker, P. (1995). Notes to help identify ostracods from Australian inland waters and a guide to ostracod dissection. Taxonomy Workshop, Murray Darling Freshwater Research Centre, 8-10th February 1995.

Subclass Malacostraca

Key to families: Horwitz *et al.* (1995).

Superorder Syncarida

Order Anaspidinea

Families

Anaspididae
Koonungidae
Psammaspididae
Stygocarididae.

Superorder Peracarida

Order Isopoda

Key to families: Horwitz *et al.* (1995).

Families

Amphisopididae
Anthuridae
Cirolanidae
Corallandae
Hypsimitopididae
Janiridae
Mesamphisopididae
Microparasellidae
Oniscidae
Phreatoicidae
Phreatoicopsididae
Sphaeromatidae
Styloniscidae

Order Amphipoda (Scuds)

Key to families: Bradbury & Williams (1999a, 1999b).

Families

Bogidiellidae
Ceinidae
Corophiidae
Eusiridae
Melitidae
Paracalliopiidae
Paramelitidae
Perthiidae
Neoniphargidae
Talitridae

References

- Bradbury, J.H. & Williams, W.D. (1999a). Key to and checklist of inland aquatic amphipods of Australia. *Technical Reports of the Australian Museum*. **14**, 1-21.
- Bradbury, J.H. & Williams, W.D. (1999b). Described Australian Amphipoda. Taxonomy Workshop, Murray Darling Freshwater Research Centre 2-4th February 1999.
- Horwitz, P., Knott, B. & Williams, W.D. (1995). Preliminary key to the malacostracan families (Crustacea) found in Australian inland waters. Identification Guide No. 4. Cooperative Research Centre for Freshwater Ecology: Albury.
- Williams, W.D. (1980). *Australian Freshwater Life*. 2nd edn Macmillan: Melbourne. 681-703.

Superorder Eucarida

Order Decapoda

Key to families: Horwitz (1995).

Families

Atyidae
Grapsidae
Hymenosomatidae
Palaemonidae
Parastacidae
Sundatelphusidae (Potamonidae)

References

- Horwitz, P. (1995). Preliminary key to the species of Decapoda (Crustacea: Malacostraca) found in Australian inland waters. Identification Guide No. 5. Cooperative Research Centre for Freshwater Ecology: Albury.

CLASS INSECTA (Insects)

Key to orders: Lawrence *et al.* (1991), Williams (1980)

Interactive key to orders/families: Gunn *et al.* (1999)

References

- Gunn, B., Cranston, P.S., Dimitriadis, S. & Trueman, J.W.H. (1999). *Interactive guide to Australian Aquatic Invertebrates*. Windows edn 2. CSIRO, Land & Water Resources Research & Development Corporation, & Environment Australia: Canberra.
- Lawrence, J.F & Britton, E.B. (1991). Coleoptera. In: *The Insects of Australia* (ed. CSIRO) 2nd edn pp. 543-683. Melbourne University Press: Carlton.
- Williams, W.D. (1980). *Australian Freshwater Life*. 2nd edn Macmillan: Melbourne. 681-703.

Order Ephemeroptera (Mayflies)

Key to families: Dean & Suter (1996).

Families

Ameletopsidae
Baetidae
Caenidae
Coloburiscidae
Leptophlebiidae
Oniscigastridae
Prosopistomatidae
Siphlaenigmatidae
Siphonuridae
Teloganodidae (formerly Ephemerellidae)

References

- Dean, J.C. & Suter, P.J. (1996). *Mayfly nymphs of Australia: A guide to genera*. Identification Guide No. 7. Cooperative Research Centre for Freshwater Ecology: Albury.

Order Odonata (Dragonflies and damselflies)

Key to families: Hawking & Theischinger (1999).

Families

Suborder ZYGOPTERA

Calopteryidae
Coenagrionidae
Chorismagrionidae
Diphlebiidae (formerly Amphipterygidae)
Hemiphlebiidae
Hypolestidae (formerly Lestoideidae)
Isostictidae
Lestidae
Libellaginidae (formerly Chlorocyphidae)
Megapodagrionidae
Protoneuridae
Synlestidae (formerly Chlorolestidae)
Suborder ANISOPTERA
Aeshnidae
Archipetaiidae (formerly part of Neopetaliidae)
Austrocorduliidae
Austropetaliidae (formerly Neopetaliidae)
Cordulephyidae (formerly part of Corduliidae)
Corduliidae
Gomphomacromiidae
Gomphidae
Lindeniidae
Petaluridae
Pseudocorduliidae (formerly part of Corduliidae)
Synthemistidae
Telephlebiidae

MCL Complex (formerly part of Libellulidae)

References

Hawking, J.H. & Theischinger, G. (1999). *Dragonfly larvae (Odonata). A guide to the identification of larvae of Australian families and identification and ecology of larvae from New South Wales*. CRCFE Identification Guide No. 24 and AWT Identification Guide No.3. Cooperative Research Centre for Freshwater Ecology: Albury.

Order Plecoptera (Stoneflies)

Key to families: Theischinger (1991a).

Families

Austroperlidae
Eustheniidae
Gripopterygidae
Notonemouridae

References

Theischinger, G. (1991a). Plecoptera. In: *The Insects of Australia* (ed. CSIRO) 2nd edn pp. 311-319. Melbourne University Press: Carlton.

Order Mecoptera (Scorpion-flies, hanging-flies)

Key to family: Byers (1991).

Family

Nannochoristidae

References

Byers, G.W. (1991). Mecoptera. In: *The Insects of Australia*, (ed. CSIRO) 2nd edn pp. 696-704. Melbourne University Press: Carlton.

Order Hemiptera (Bugs)

Keys to families: Williams (1980), Carver *et al.* (1991).

Families

Belostomatidae
Corixidae
Gelastocoridae
Gerridae
Hebridae
Hydrometridae
Leptopodidae
Mesoveliidae
Naucoridae
Nepidae
Notonectidae
Ochteridae
Saldidae
Veliidae

References

Carver, M. Gross, G.F. & Woodward, T.E. (1991). Hemiptera. In: *The Insects of Australia*, (ed. CSIRO) 2nd edn pp. 429-509. Melbourne University Press: Carlton.

Williams, W.D. (1980). *Australian Freshwater Life*. 2nd edn Macmillan: Melbourne. 681-703.

Order Megaloptera (Alderflies, dobsonflies)

Key to families/genera: Theischinger (1999, 2000b).

Families

Corydalidae
Sialidae

References

Theischinger, G. (1991b). Megaloptera. In: *The Insects of Australia* (ed. CSIRO) 2nd edn pp. 517-520. Melbourne University Press: Carlton.

Theischinger, G. (2000b). *Australian alderfly larvae and adults (Insecta: Megaloptera)*. Identification Guide

Order Neuroptera (Lace-wings)

Key to families: New (1991), Williams (1980).

Families

Neurorthidae
Osmylidae
Sisyridae

References

- New, T.R. (1991). Neuroptera. In: *The Insects of Australia* (ed. CSIRO) 2nd edn pp. 525-542. Melbourne University Press: Carlton.
Williams, W.D. (1980). *Australian Freshwater Life*. 2nd edn Macmillan: Melbourne. 681-703.

Order Coleoptera (Beetles)

Key to families: Lawrence (1992), Williams (1980).

Families

Brentidae
Carabidae
Chrysomelidae
Curculionidae
Dytiscidae
Elmidae
Gyrinidae
Halipilidae
Heteroceridae
Hydraenidae
Hydrochidae
Hydrophilidae
Hygrobiidae
Limnichidae
Microsporidae (Sphaeriidae)
Noteridae
Psephenidae
Ptilodactylidae
Scirtidae (Helodidae)
Staphylinidae

References

- Lawrence, J.F (1992). Australian Aquatic Coleoptera (Adults and Larvae). Taxonomy Workshop, Murray-Darling Freshwater Research Centre, 14-15th February 1992.

Order Diptera (Two-winged flies)

Key to families: Cranston (1995).

Families

Athericidae
Blephariceridae
Ceratopogonidae
Chironomidae
 Tanypodinae
 Chironominae
 Aphroteniinae
 Orthoclaadiinae
 Diamesinae
Chaoboridae
Culicidae
Dixidae
Dolichopodidae
Empididae
Ephydriidae
Muscidae

Psychodidae
Sciomyzidae
Simuliidae
Stratiomyidae
Syrphidae
Tabanidae
Tanyderidae
Thaumaleidae
Tipulidae

References

Cranston, P.S. (1995). Keys to aquatic Diptera families. Taxonomy Workshop, Murray-Darling Freshwater Research Centre, February 1994.

Order Trichoptera (Caddisflies)

Key to families: Dean *et al.* (1995)

Families

Antipodoeciidae
Atriplectididae
Calamoceratidae
Calocidae
Chathamidae
Conoesucidae
Dipseudopsidae
Ecnomidae
Glossosomatidae
Helicophidae
Helicopsychidae
Hydrobiosidae
Hydropsychidae
Hydroptilidae
Kokiriidae
Leptoceridae
Limnephilidae
Odontoceridae
Oeconesidae
Philopotamidae
Philorheithridae
Plectrotarsidae
Polycentropodidae
Psychomyiidae
Stenopsychidae
Tasimiidae

References

Dean, J.C., St Clair, R.M. & Cartwright, D.I. (1995). A key to late instar larvae of Australian Trichoptera families. In: *Monitoring River Health Initiative Taxonomy Workshop Handbook* (ed. J.H. Hawking) Chapter 6, pp 66-101. Taxonomy Workshop, Murray-Darling Freshwater Research Centre: Albury.

Order Lepidoptera (Moths)

Key to family: Hawking (2001).

Family

Pyralidae

References

Hawking, J.H. (2001). An introduction to the aquatic caterpillars (Lepidoptera) found in Australian inland waters. Identification Guide No. 37. Cooperative Research Centre for Freshwater Ecology: Albury.