

# 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. 2<sup>nd</sup> 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**  
**Diphebiidae (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.