

Identification and Ecology of

Australian Freshwater Invertebrates

An interactive guide with colour digital imagery to assist in the identification of aquatic invertebrates.



Draft Index of Keys

This document is an update of the taxonomic references contained within Hawking 2000¹ which can still be purchased from MDFRC on (02) 6024 9650 or info@mdfrc.org.au.

We have made the decision to make this **draft version** publicly available so that other taxonomy end-users may have access to the information during the refining process and also to encourage comment on the usability of the keys referred to or provide information on other keys that have not been referred to.

Please email all comments to bugsonline@mdfrc.org.au.

¹Hawking, J.H. (2000) A preliminary guide to keys and zoological information to identify invertebrates from Australian freshwaters. Identification Guide No. 2 (2nd Edition), Cooperative Research Centre for Freshwater Ecology: Albury

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Introduction

This **Index of Keys** is a summary of the applicable information held in Hawking et al. 2009, the online guide to the *Identification and Ecology of Australian Freshwater Invertebrates* (Bug Guide) at <http://www.mdfrc.org.au/bugguide/index.htm>. Updates are made to the Bug Guide and this **Index** as time allows. As such we do not claim that it will always be definitively current. If an entry does not exist for a particular taxon or group of taxa this indicates that there are no keys available.

The Bug Guide content focuses on invertebrates from fresh and inland saline surface waters of mainland Australia and Tasmania, in particular taxa utilised in routine biomonitoring. Detailed information and key references are not included for the following major groups; Aphanoneura, Bryozoa, Gastrotrichia, Nematoda, Nematomorpha, Nemertea, Protozoa, Rotifera and Tardigrada.

The status of taxonomic levels above Order are reviewed or debated as knowledge is gained or refuted with the majority of groupings remaining constant. For this reason, major groups and minor groups above Order level have not been assigned taxonomic status in the Bug Guide.

For a list of recent taxonomic name changes go to <http://www.mdfrc.org.au/bugguide/resources/namechanges.pdf>

This document is organised in alphabetical order with the following hierarchy;

Major Group

Minor Group

Order

Family

Genus species Author

Notations

Incomplete	key does not contain all of the species currently recognised
*	unsure of aquatic status OR may include terrestrial species
+	unsure of freshwater status OR may include marine/saline species
(State or territory)	regional key

Citation

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Where to start

Key to Major Groups: [Bug Guide](#)

Acarina / Acari

Key to Minor Groups: Bug Guide from Harvey & Growns 1998

Note: New keys to groups and families exist in Krantz & Walter 2009 (adults & larvae), however that book includes world taxa, and no new Australian aquatic families have been recorded since 1998 so the keys in Krantz & Walter 2009 are not included in the Bug Guide.

Halacaroidea

Key to Families: Harvey 1990 or Harvey 1998

Key to Species: Harvey 1990 (Pezidae: *Peza*)

Hydracarina / Hydrachnidiae

Key to Families: Harvey & Growns 1998 or Harvey 1998 (same key more detail)

Key to Genera: Harvey 1998

Key to Species: Harvey 1990b (Anisitsiellidae, incomplete)

Smit 1997 (Arrenuridae: *Arrenurus*, incomplete)

Harvey 1989 (Arrenuridae: *Wuria*, additional species)

Smit 2010 (Aturidae: *Austraturus*, males only, apart from one species)

Harvey & Cook 1988 (Hygrobatidae: *Aspidiobates*)

Harvey 1989 (Hygrobatidae: *Australorivacarus*)

Pesic & Smit 2011 (Hydromidae: *Hydrodroma*)

Harvey 1988 (Hydryphantidae: *Mamersa*, *Pseudohydryphantes*, Australasian)

Harvey 1990c (Limnocharidae)

Harvey 1996b (Mideopsidae: *Penemideopsis*)

Harvey 1990d (Momoniidae: *Partidomomonía*)

Harvey 1996a (Pionidae)

Smit 2004 (Unionicolidae: *Koenikea*)

Smit 2007 (Unionicolidae: *Recifella*)

Pesic & Smit 2012 (Torrenticolidae: *Monatractides*)

Cook 1986 (incomplete)

LUCID Key: CSIRO 2001

Bivalvia

Key to Orders: Bug Guide from Smith & Kershaw 1979

Unionoida: Hyriidae

Key to Genera: Walker 2004

Key to Species: Walker 2004

Veneroida

Key to Families: Bug Guide from Smith 1996

Key to Genera: Smith 1996 (Corbiculidae)

Korniushin 2000 (Sphaeriidae)

Key to Species: Korniushin 2000 (Sphaeriidae)

Cnidaria

Hydrozoa

Key to Families: Bug Guide from Pennak 1989 (USA), Williams 1980

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Australomedusidae

Australomedusa baylII Russell [Single inland waters species](#)

Clavidae

Cordylophora caspia Pallas [Single freshwater species](#)

Hydridae

Key to Genera: Pennak 1989 (USA) no Australian key

Olindiidae

Craspedacusta sowerbyi Lankester [Single freshwater species](#)

Collembola

Note: The following families can be separated from Sminthurididae using the features noted on the Bug Guide.

Dicyrtomidae
Hypogastruridae
Isotomidae
Neelidae

Note: The following families cannot be separated from Sminthurididae unless slide mounted.

Katiannidae
Sminthuridae

Sminthurididae

[Only family with obligate aquatic species](#)

Key to Genera: none use distribution (except for WA)

Pygicornides stagnalis Womersley WA
Sminthurides aquaticus Bourlet SA, Vic, WA

Crustacea

Key to Minor Groups: Bug Guide

Anostraca

Key to Families: Timms 2004, Timms 2012 (brine species)

Key to Genera: Timms 2004, Timms 2012 (brine species)

Key to Species: Timms 2004 (incomplete), Timms 2012 (brine species)

Branchiura: Argulidae

Key to Genera: none, separate by distribution

Note: *Argulus* – mainland, *Dolops tasmanianus* Fryer - Tas

Argulus

Key to Species: none, separate by distribution

Note: *A. macropterus* – WA; *A. foliaceus* and *A. japonicus* – NSW, Vic

Cladocera

Key to Families: Shiel 1995, Ingram *et al* 1997 (still waters, SE Aus, incomplete)

Key to Genera: Shiel 1995 (Chydoridae, Daphniidae, Macrothricidae, Moinidae, incomplete)

Key to Species: Kotov *et al.* 2009 (Bosminidae: *Bosmina*, males, world) (maybe more than 1 species in Aus)

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Shiel 1995 (Chydoridae: *Chydorus*, Daphniidae: *Ceriodaphnia*, Moinidae: *Moina*, incomplete)
Hebert & Wilson 2000 (Daphniidae: *Daphnia* as *Daphniopsis*, ehippial females)
Benzie 1988 (Daphniidae: *Daphnia*)
Timms 1989 (Daphniidae: *Simocephalus*)
Orlova-Bienkowskaja 2001 (Daphniidae: *Simocephalus*, world)

Conchostraca

Key to Families: Timms 2009b

Key to Genera: Timms 2009b

Timms & Schwentner 2012 (Limnadiidae, world) refers to Rogers et al. 2012 (Limnadiidae, world, incomplete)

Key to Species: Timms 2009a (*Limnadopsis*)

Copepoda

Key to Orders: Shiel 1995

Malacostraca

Key to Orders: Bug Guide from Horwitz et al 1995, Lowry & Yerman 2002, Serov 2002

Amphipoda

Key to Families: Bug Guide from King & Bradbury 2012

Key to Genera: King & Bradbury 2012

Key to Species: King & Bradbury 2012

Bogdiellidae

Chiltoniidae

Eusiridae

Neoniphargidae

Paracalliopiidae: *Paracalliope*

Perthiidae: *Perthia*

Paramelitidae: *Antipodeus*, *Austrocrangonyx*, *Austrogammarus*, *Uroctena*

King & Leys 2011 (Chiltoniidae: same key as in King & Bradbury 2012) These keys do "not include all Australian chiltoniid species. Currently the key is only useful to identify the freshwater surface species from Tasmania, Victoria and South Australia (but not including Kangaroo Island and Eyre Penisular)."

Bradbury 2000 (Paramelitidae: *Chydaekata*, WA [stygobitic](#))

Anaspidacea

Key to Families: Bug Guide from Serov 2002

Key to Genera: Serov 2002

Decapoda

Key to Families: Bug Guide from Horwitz et al. 1995

Atyidae

Key to Genera: Bug Guide from Horwitz 1995

Key to Species: Horwitz 1995 (*Parisia*, *Stygiocaris*, *Caridina* - incomplete)

Page et al 2005 (*Caridina*, SE Aus morphospecies)

Paratya none, use distribution

Note: *P. australiensis* - E Aus, Tas; *P. howensis* - Lord Howe Island; *P. norfolkensis* - Norfolk Island

Hymenosomatidae

Amarinus lacustris Chilton [Single freshwater species](#)

Palaemonidae

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Key to Genera: Bug Guide from Horwitz 1995, Bruce & Short 1993 (except *Leptopalaemon*)

Key to Species: Short 2004 (*Macrobrachium*)

Short et al. 2013 (*Leptopalaemon*)

Parastacidae

Key to Genera: Bug Guide from Horwitz 1995

Key to Species: Horwitz 1995 (incomplete)

Key to species: McCormack 2013 (*Euastacus*, males)

Hansen & Richardson 2006 (*Ombrastacoides*, *Spinastacoides*)

Horwitz & Adams 2000 (*Engaewa*)

Horwitz 1995 (*Astacopsis*, *Cherax*, *Geocharax*, *Engaewa*, *Engaeus*, *Euastacus*, SWA, N & E Aus incomplete)

Merrick 1993 (*Cherax*, *Engaeus*, *Euastacus*, NSW)

Morgan 1988 (*Euastacus*, Qld), Morgan 1986 (*Euastacus*, Vic)

Riek 1969 (*Astacopsis*, *Cherax*, *Geocharax*, *Engaeus*, *Euastacus*, incomplete)

Parathelphusidae: *Austrothelphusa*

Key to Species: Horwitz 1995

Trogloplacidae: *Australocarcinus riparius* Davie

Isopoda

Key to Families: Bug Guide from Horwitz et al 1995, Wilson 2012 (Phreatoicoidea)

Note: Anthuridae, Cirolanidae, Sphaeromatidae and Styloniscidae not included, as they are not noted as freshwater families occurring in Australia in Zoological Catalogue (Poore 2002). These families were included in Horwitz 1995.

Key to Genera: Wilson 2012

Amphisopidae

Hypsimetopodidae

Phreatoicidae – incomplete

Phreatoicopsidae

Ponderellidae

unplaced *Crenisopsus acinifer* Wilson & Keable

Wilson & Keable 2002 (WA - Amphisopidae)

Key to Species: Wilson & Keable 2000 (Phreatoicidae: *Colubotelson*, *Metaphreatoicus*, incomplete)

Wilson & Keable 2002 (Phreatoicopsidae: *Phreatoicopsis*)

Taiti & Humphreys 2001 (Scyphacidae: *Haloniscus*)

Notostraca: Triopsidae

Key to Species: Williams 1980

Ostracoda

Key to families: De Deckker 2002

Key to Genera: Karanovic et al. 2012 (Cyprididae: Scottiinae, world)

Karanovic 2005 (Candonidae: Candoninae)

Key to Species: Karanovic et al. 2012 (Cyprididae: Scottiinae, world)

Karanovic 2005 (Candonidae: Candoninae)

Karanovic 2009 (Limnocytheridae: Timiriaseviinae)

Gastropoda

Key to Orders: Bug Guide from Smith 1996

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Architaenioglossa

Key to Families: Bug Guide from Thompson 2004 (USA), no Australian key

Ampullariidae: *Pomacea*

Key to Species: Thompson 2004 (USA), no Australian key

Viviparidae

Key to Genera: Smith 1996

Key to Species: Ponder *et al* 2000 (*Notopala* NSW)

Basommatophora: Glacidorbidae

Key to Genera: Ponder & Avern 2000

Cerithimorpha: Thiaridae

Key to Genera: Smith 1996

Key to Species: Ponder *et al* 2000 (NSW)

Hygrophila

Key to Families: Bug Guide from Smith 1996, Ponder 2013

Key to Genera: Smith 1996

Note: *Ferrissia*, *Stimulator* were in Ancyliidae

Lymnaeidae

Key to Species: Smith 1996 (*Austropeplea* incomplete)

Planorbidae

Key to Species: Ponder *et al* 2000 (NSW), Smith & Kershaw 1981 (Tas)

Hypsogastropoda

Key to Families: Bug Guide from Smith 1996

Assimineidae

Key to Genera: Fukuda & Ponder 2005 (salt marsh species, excludes *Austroassiminea*)

Key to Species: Fukuda & Ponder 2005 (salt marsh species, *Cryptassiminea*)

Key for freshwater spring species: none, use distribution

Note: *Austroassiminea lethae* Solem *et al.* - SW WA; *Aviassiminea palitans* Fukuda & Ponder - N WA, N NT

Bithyniidae: *Gabbia*

Key to Species: Ponder 2003

Tateidae

Key to Genera: Smith & Kershaw 1979 (SE Aus), Ponder *et al.* 2000 (NSW)

Key to Species: Ponder *et al.* 2000 (NSW)

Hirudinea

Key to Orders: Bug Guide from Govedich 2001

Key to Families: Govedich 2001

Key to Genera: Govedich 2001

Key to Species: Govedich 2001

Note: Arhynchobdellida: The key to families requires dissection of specimens and slide mounting for all characters to be viewed.

Insecta

Key to Orders: Bug Guide

Coleoptera

Key to Families: adults – Bug Guide from Lawrence 1995
larvae - Bug Guide from Lawrence 1995, Watts 2002

Carabidae

Key to Subfamilies and Tribes: Lawrence & Britton 1994, 1991 (adults)

Key to Genera:

Baehr 2009a refers to Baehr 2005 (Odacanthinae adults)
Will & Kavanaugh 2012 (Pterostichitinae adults extract from PNG))
Grebennikov 2008 (Trechinae larvae, world, incomplete)

Key to Species:

Baehr 1990a (Apotominae: *Apotomus* adults)
Toledano 2005 (Bembidiinae: *Bembidion* adults)
Baehr 2012 (Brachininae: *Pheropsophus* adults)
Baehr 2009a refers to Baehr 2005, 2006 (adults) (Odacanthinae: *Dicraspeda*, *Eudalia* adults)
Baehr 2005 (Odacanthinae adults)
Baehr 2010 refers to Hudson 2000 (adults) (Pogoninae: *Pogonus* adults)
Giachino 2005 (Pterostichitinae: *Catadromus* adults)
Baehr 2008a, 2008b, 2009b (Trechinae: *Tasmanitachoides* adults)
Moore 1994 (Trechinae: *Tasmanotrechus* adults)
Baehr 1987 (Trechinae: *Perileptus* adults)

Chrysomelidae

Key to Subfamilies: Lawrence & Britton 1991 (adults)

Note: A key to genera of subtribe Galerucina is available in Reid 2001, however *Galerucella* is the only genus favouring wet habitats. A description of *Galerucella* is given.

Curculionidae

Key to Genera: Zimmerman 1994 (Eirrhiniinae larvae)
Key to Species: Zimmerman 1994 (*Cyrtobagous* larvae)

Dytiscidae

Key to Genera: Watts 2002 (adults and larvae, incomplete)

Key to Species: Watts 1978 (all adults incomplete)
Alarie & Watts 2004 (*Antiporus* larvae, incomplete)
Watts 1997 (*Antiporus* adults, incomplete)
Hendrich & Watts 2009 (*Carabhydrus* adults)
Hendrich 1997 (*Cybister* adults)
Miller 2002 (*Eretes* adults, world)
Hendrich 1999 (*Hydroglyphus* adults)
Bistrom 1996 (*Hydrovatus* adults)
Watts & Leys 2006 (*Hyphydrus* adults)
Alarie & Watts 2005 (*Hyphydrus* larvae)
Watts & Leys 2005 (*Limbodessus* adults)
Michat et al. 2012 (*Limbodessus* larvae)
Hendrich & Balke 2011 (*Neobidessodes* adults, epigeal)
Alarie et al. 2009 (*Paroster* larvae, incomplete)
Balke et al. 2000 (*Rhantus* adults)
Hendrich & Watts 2004 (*Sternopriscus* adults, incomplete)
Brancucci & Monteith 1996 (*Terradessus* adults)
Watts 2000 (*Tiporus* adults) add Hendrich 2008

Elmidae

Key to Genera: Glaister 1999 (larvae), Lawrence 1992 (adults)

Key to Species: Glaister 1999 (larvae, *Coxelmis*, *Kingolus*, *Notriolus*, *Simsonia*)

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Hinton 1965 (*Austrolimnius* adults)

Carter & Zeck 1929 (*Coxelmis*, *Kingolus*, *Notriolus*, *Simsonia* adults, incomplete)

Gyrinidae

Key to Genera: Watts & Hamon 2010 (adults, larvae – excluding *Gyrinus*), Watts 2002 (adults, larvae - *Aulonogyrus* & *Macrogyrus* not separated)

Key to Species: Watts & Hamon 2010 (adults, larvae)

Haliplidae: *Halipilus*

Key to Species: Van Vondel 1995 (adults), Watts & McCrae 2010 (adults, Pilbara WA)

Heteroceridae

Key to Genera: Charpentier 1968 (Notogean region)

Key to Species: Charpentier 1968 (Notogean region)

Hydraenidae

Key to Genera: Watts 2002 (adults, incomplete)

Key to Species: Perkins 2004a (*Gymnanthelius* adults)

Perkins 2005 (*Gymnochthebius* adults)

Perkins 2006 (*Tympanogaster* adults) possibly only the subgenus *Tympanogaster* (*sensu stricto*) are semi-aquatic

Perkins 2007a (*Hydraena* adults - monograph not key)

Hydrochidae

Key to Species: Watts 1999 (adults)

Hydrophilidae

Key to Genera: Watts 2002 (adults and larvae, incomplete)

Note: Watts 2002 (adults) does not include *Gentilina*

Hebauer 2003 (adults, incomplete, worldwide)

Key to Species: Komarek 2007 (*Anacaena* (*Paracaena*) adults)

Gentili 2006 (*Notohydrus* adults)

Gentili 2000 (*Paracymus* adults)

Hebauer & Hendrich 1999 (*Helochares* adults, incomplete)

Watts 1998a (*Enochrus* adults)

Watts 1998b (*Amphiops*, *Allocotocerus* adults)

Watts 1990 (*Hydrobiomorpha* adults)

Watts 1989 (*Sternolophus* adults)

Watts 1988a (*Hydrophilus* adults)

Watts 1987 (*Berosus* adults)

Gentili 1980 (*Laccobius*, *Notohydrus* adults)

Hygrobiiidae: *Hygrobia*

Key to Species: Britton 1981 (adults), Alarie *et al* 2004 (larvae world)

Limnichidae

Semi-aquatic

Key to Genera: Matthews 1980 part 4 (SA adults incomplete)

Nanophyidae: *Austronanodes*

Key to Species: Zimmerman 1993 (adults)

Noteridae

Key to Genera: Watts 2002 (adults and larvae)

Key to Species: Watts 2001 (adults incomplete)

Toledo & Hendrich 2006 (*Hydrocanthus* adults, including Asian species)

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Psephenidae: *Sclerocyphon*

Adults terrestrial

Key to Species: Davis 1998 (larvae)

Diptera

Key to Families: Bug Guide from Madden 2013

Blephariceridae

Key to Subfamilies: Bug Guide from Zwick 1977

Zwick 1977 (pupae)

Key to Genera: Zwick 1998 (larvae & pupae)

Key to Species: Zwick 1998 (larvae & pupae)

Ceratopogonidae*

Key to Subfamilies: Bug Guide from Madden 2013

Elson-Harris 1990 (pupae)

Ceratopogoninae

Key to Genera: Elson-Harris 1990 (larvae & pupae, incomplete)

Key to Species: Elson-Harris & Kettle 1985b (*Alluaudomyia* - larvae & pupae, incomplete)

Elson-Harris 1986 (*Clinohelea* - larvae & pupae, incomplete)

Elson-Harris & Murray 1992 (*Culicoides*, *Paradasyhelea* - pupae, incomplete)

Hagan & Reye 1986 (*Culicoides* - larvae, incomplete)

Elson-Harris 1987 (*Nilobezzia* - larvae & pupae, incomplete)

Elson-Harris & Kettle 1985a (*Paradasyhelea* - larvae, incomplete)

Chaoboridae: Chaoborinae

Key to Genera: Colless 1986 (larvae & pupae, including genera no longer in Chaoboridae)

Key to Species: Colless 1986 (larvae & pupae - *Chaobrus*)

Chironomidae

Key to Subfamilies: Bug Guide from Madden 2010

Aphroteniinae

Key to Genera: Madden 2010 (plating not required)

Key to Species: Cranston & Edward 1992

Chironominae

Key to Genera: Cranston 2000

Madden 2010 (plating not required, Not in key *Lauterborniella Megacentron*, ?*Omisus Parvitergum*)

Key to Species: Sæther & Oyewo 2008 (*Polypedilum* (*Uresipedilum*))

Cranston 2000 (*Riethia*, *Tanytarsus*, *Chironomus*, *Dicrotendipes*, *Kiefferulus*, *Polypedilum*, *Zavreliella*)

*Orthoclaadiinae

Key to Genera: Cranston 2000

Madden 2010 (plating not required, Not in key *Allometriocnemus Austrocladius Comptosmittia Doloplastus Kiefferophyes Metriocnemus Nasuticladus Nilothauma Rhinocladus*)

Note: *Echinocladus martini* = MO3

Key to Species: Cranston & Saether 2010 (*Stictocladus* except *S. uniserialis*)

Cranston 2009 (*Anzacladius*)

Cranston 2000 ("genus Australia", *Cricotopus*)

Podonominae

Key to Genera: Madden 2010 (plating not required)

Note: *Austrochlus* = *Archaeochlus*

Key to Species: Cranston *et al* 2002 (*Austrochlus*)

Tanypodinae

Key to Genera: Cranston 2000 (except *Alotanypus*)

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Madden 2010 (plating not required, Not in key *Anatopynia Coelotanypus Hayesomyia Isoplastus Macropelopia Pentaneura*)

Key to Species: Cranston 2000 (*Procladius*, incomplete)

Culicidae

Key to Subfamilies: Bug Guide using characters from Bugledich 1999

Anophelinae

Key to Species: Russell 1993 (*Anopheles*, SE Aus)

Culicinae

Key to Genera: Russell 1993 (SE Aus, incomplete)

Key to Species: Russell 1993 (SE Aus, incomplete)

Note: There has been significant revision of the species since this key was written.

Simuliidae: Simulinae

Key to Genera: Mackerras & Mackerras 1949

Key to Species: Mackerras & Mackerras 1949 (*Austrosimulium* & *Cnephia* - incomplete)

Colbo 1976 (*Simulium* - incomplete)

Tabanidae

Key to Tribes: Mackerras 1971 (Tabaninae)

Thaumaleidae

Key to Genera: Sinclair 2000a

Ephemeroptera

Key to Families: Bug Guide from Dean & Suter 1996

Ameletopsidae: *Mirawara*

Key to Species: Suter & Webb 2012a (morphospecies)

Note: Specimens without wing pads are early instars and cannot be confidently identified at species level.

Baetidae

Key to Genera: Bug Guide from Webb & Suter 2011

Key to Species: Webb & Suter 2011

LUCID Key: Webb & Suter 2010 (genera)

Note: Specimens without wing pads are early instars and cannot be confidently identified at genus level.

Offadens and *Edmundsiops* have been synonymised

Bungona illiesi was within *B. Narila*

Webb & Suter 2011 lists names of Suter 1997 undescribed species where *Edmundsiops*=Genus 2, *Offadens* = Genus 1, Genus 4 and Genus 5, *Pseudocloeon* = Genus 3

Caenidae

Key to Genera: Bug Guide from Suter 1999

Key to Species: Suter 1999 (incomplete)

LUCID Key: CSIRO 2001

Note: *Irpacaenis* = genus C, *I. deani* = sp A, *I. coolooli* = sp B, *I. kaapi* = sp C

Tasmanocoenis tillyardi and *T. rieki* cannot be separated

Coloburiscidae: *Coloburiscoides*

Key to Species: Suter et al. 2009

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Leptophlebiidae

Key to Genera: Bug Guide from Dean 2011

Note: Genus Q = *Kaninga*, Genus S & K = *Loamaggalangta*, Genus V = *Manggabora*, Genus W = *Marmenuera*, *Thraulophlebia* = *Koornunga*, *Riekophlebia* = *Tillyardophlebia* in part

Key to Species: Bae et al. 2013 (*Jappa*) **Note:** *Jappa* AV4 = *J. Campbellii*

Bae et al. 2012 (*Ulmerophlebia*)

Dean et al. 2008 (*Marmenuera*)

Dean 1999a (except *Garinjuga*, *Nyungara*, incomplete)

Suter 1986 (*Nousia*, SA)

Nesameletidae: *Ameletoides*

Key to Species: Webb & Suter 2012b (morphospecies)

Oniscigastridae: *Tasmanophlebia*

Key to Species: Suter & Webb 2012

Note: Specimens without wing pads are early instars and cannot be confidently identified at species level.

Prosopistomatidae: *Prosopistoma pearsonorum* Campbell & Hubbard

Teloganodidae: *Austremerella picta* Riek

Hemiptera

Key to Families: Bug Guide from Andersen & Weir 2004, Carver et al 1991, Tinerella 2013

Key to Genera: Bug Guide from Andersen & Weir 2004

Key to Species: Andersen & Weir 2004

Aphelocheiridae: *Aphelocheirus australicus* Usinger

Belostomatidae

Corixidae

Gelastocoridae: *Nerthra*

Gerridae

Hebridae

Hydrometridae: *Hydrometra*

Mesoveliidae

Naucoridae: *Naucoris*

Nepidae

Notonectidae

Ochteridae

Pleidae: *Paraplea*

Veliidae

Notes:

Corixidae: *Agraptocorixa*, *Sigara* (males)

Gerridae: *Halobates*

Hydrometridae: *Hydrometra* (males)

Notonectidae: *Anisops* (males)

Veliidae: *Drepanovelgia*, *Microvelia* (males)

Dipsocoridae: *Cryptostemma*

Key to Species: Hill 1987

Micronectidae

Key to Genera: Tinerella 2013

Key to Species: Tinerella 2013

Lepidoptera: Crambidae

Key to Genera: Hawking 2012 (incomplete)

Note: Not in key to genera *Araeomorpha*, *Hygraula*, *Neoschoenobia caustodes* Turner, *Nyctiplanes polypenthes* Turner, *Paracataclysta fuscalis* Hampson, *Cataclysta*, *Hylebatis scintillifera* Turner, *Anydraula*, *Nymphicula queenslandica* Hampson, *Theila*

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Key to Species: Hawking 2012 (*Strepsinoma*, *Tetrernia*; *Eoophyla*, *Margarosticha*, *Parapoynx* incomplete)

Note: Use with reference to undescribed species in Hawking 2001

Megaloptera

Key to Families: Bug Guide from Theischinger 2000a

Key to Genera: Theischinger 2000a (Corydalidae, Sialidae)

Key to Species: Theischinger 2000a (Corydalidae: *Archichauliodes*, species groups)

Neuroptera

Nevrorthidae: *Austroneurorthus bruneipennis* Esben-Petersen

Sisyridae

Key to Genera: none separate by distribution

Note: *Sisyra* Qld, N Aus, SE Aus, *Sisyrina tropica* Smithers only found in NE Qld

Odonata

Key to Families: Bug Guide from Theischinger & Endersby 2009

Aeshnidae

Key to Genera: Bug Guide from Theischinger & Endersby 2009

Key to Species: Theischinger & Endersby 2009 (*Anax*, *Gynacantha*)

Argiolestidae

Key to Genera: Bug Guide from Theischinger & Hawking 2006 (=Theischinger & Endersby 2009)

Key to Species: Theischinger & Endersby 2009 (*Griseargiolestes*)

Hawking & Theischinger 1999 (NSW)

Theischinger & Hawking 2002 (Vic)

Watson 1962 (incomplete, SWA)

Austrocorduliidae

Key to Genera: Bug Guide from Theischinger & Endersby 2009

Key to Species: Theischinger & Endersby 2009 = Theischinger 2001 (*Austrocordulia*, *Micromidia*)

Austropetaliidae

Key to Genera: Bug Guide from Theischinger & Endersby 2009

Key to Species: Theischinger 2002 (incomplete) (=Theischinger & Endersby 2009) (incomplete)

Coenagrionidae

Key to Genera: Bug Guide from Theischinger & Endersby 2009

Key to Species: Theischinger & Endersby 2009

Theischinger & Hawking 2002 (Vic)

Hawking & Theischinger 1999 (NSW)

Hawking 1993 (Alligator Rivers Region)

Hawking 1986 (SE Aus)

Watson 1962 (SWA)

Cordulephyidae: *Cordulephyia*

Key to Species: Theischinger & Endersby 2009

Hawking & Theischinger 1999 (NSW)

Corduliidae

Key to Genera: Bug Guide from Theischinger & Endersby 2009

Key to Species: Theischinger & Endersby 2009

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Diphlebiidae: *Diphlebia*

Key to Species: Theischinger & Endersby 2009
Hawking & Theischinger 1999 (NSW)

Gomphidae

Key to Genera: Bug Guide from Theischinger & Endersby 2009

Key to Species: Theischinger & Endersby 2009
(=Theischinger 2000 *Hemigomphus*)

Gomphomacromiidae: *Archaeophya*

Key to Species: Theischinger 2001 (=Theischinger & Endersby 2009)

Isostictidae

Key to Genera: Bug Guide from Theischinger & Hawking 2006 (=Theischinger & Endersby 2009)

Key to Species: Theischinger & Endersby 2009
Hawking 1993 (*Eurysticta*, Alligator Rivers Region)

Lestidae

Key to Genera: Bug Guide from Theischinger & Hawking 2006 (=Theischinger & Endersby 2009)

Key to Species: Theischinger & Endersby 2009
Hawking & Theischinger 1999 (NSW)
Theischinger & Hawking 2002 (Vic)
Watson 1962 (SWA)

Lestoideidae: *Lestoidea*

Key to Species: none, use distribution

Libellulidae

Key to Genera: Bug Guide from Theischinger & Hawking 2006, Theischinger & Endersby 2009

Key to Species: Theischinger & Endersby 2009
Hawking & Theischinger 1999 (NSW)
Theischinger & Hawking 2002 (Vic)
Hawking 1993 (Alligator Rivers Region)

Lindeniidae: *Ictinogomphus*

Key to Species: Theischinger & Endersby 2009

Macromiidae: *Macromia*

Key to Species: Theischinger 2001 (=Theischinger & Endersby 2009)

Petaluridae: *Petalura*

Key to Species: Theischinger & Endersby 2009

Platycnemidae: *Nososticta*

Key to Species: Theischinger & Endersby 2009

Synlestidae

Key to Genera: Bug Guide from Theischinger & Endersby 2009

Key to Species: Theischinger & Endersby 2009
Hawking & Theischinger 1999 (NSW)

Synthemistidae

Key to Genera: Bug Guide from Theischinger 2001, Theischinger & Endersby 2009

Key to Species: Theischinger 2001 (=Theischinger & Endersby 2009) (except *Choristhemis*, use distribution)

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Telephlebiidae

Key to Genera: Bug Guide from Theischinger & Endersby 2009

Key to Species: Theischinger & Endersby 2009

Plecoptera

Key to Families: Bug Guide from Hynes 1978 & 1989

Austroperlidae

Key to Genera: Hynes 1989 (Tas, incomplete), Hynes 1978 (Vic, incomplete), Yule 1997 (NSW, NVic)

Key to Species: Hynes 1989 (Tas, incomplete), Hynes 1978 (Vic, incomplete), Yule 1997 (NSW, NVic)

Note: *A. Illiesi* and *A. Picta* cannot be separated

Eustheniidae

Key to Genera: Hynes 1989 (Tas, incomplete), Hynes 1978 (Vic, incomplete), Yule 1997 (NSW, NVic)

Key to Species: Hynes 1989 (Tas, incomplete), Hynes 1978 (Vic, incomplete), Yule 1997 (NSW, NVic)

Gripopterygidae

Key to Genera: Yule 1997 (incomplete)

Key to Species: Yule 1997 (NSW, NVic, incomplete)

Thomas 2012 (*Dinotoperla* Vic)

Note: *D. thwaitesi* and *D. serricauda* cannot be separated.

Mynott 2011 (*Riekoperla* incomplete)

Tsyrlin 2001 (*Leptoperla*)

Notonemouridae

Key to Genera: Hynes 1989 (Tas, incomplete), Hynes 1978 (Vic, incomplete), Yule 1997 (NSW, NVic)

Key to Species: Hynes 1989 (Tas, incomplete), Hynes 1978 (Vic, incomplete), Yule 1997 (NSW, NVic)

Trichoptera

Key to Families: Bug Guide from Dean et al 2004

Antipodoeciidae: *Antipodoecia*

Key to Species: Dean 2000

Atriplectididae: *Atriplectides*

Key to Species: Dean 2000

Calocidae

Key to Genera: Bug Guide from Shackleton 2013

Key to Species: Shackleton 2013 (*Caenota*, *Calocoides*, images for separation of species of other genera)

Note: *Tamasia* AV2 = *Tamasia acuta*, Cal/Hel Genus B = *Caloca*, Cal/Hel Genus D = *Calocoides*

Conoesucidae

Key to Genera: Bug Guide from Dean et al. 2004

Key to Species: Jackson 1998

Dipseudopsidae: *Hyalopsyche disjuncta* Neboiss

Ecnomidae

Key to Genera: Bug Guide from Dean et al. 2004

Key to Species: Cartwright 1997 (incomplete)

Glossosomatidae: *Agapetus*

Key to Species: Cartwright 1998 (incomplete)

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Helicophidae

Key to Genera: Bug Guide from Dean et al 2004

Key to Species: Jackson 1998

Note: Cal/Hel Genus A = *Heloccabus*

Helicopsychidae: *Helicopsyche*

Key to Species: St Clair 1997

LUCID Key: CSIRO 2001

Hydrobiosidae

Key to Genera: Bug Guide from Dean et al. 2004

Key to Species: Dean 1997 (*Apsilochorema*, *Moruya*, *Psyllobetina*, *Ulmerochorema*, Genus B, *Taschorema* complex)

Note: *Taschorema* complex = *Ethochorema*, *Megogata*, *Ptychobiosis*, *Tanjilana*, *Taschorema* - To date it has proved difficult to find characters that will consistently separate all species in a generic key (Dean 1997).

Hydropsychidae

Key to Genera: Bug Guide from Dean et al. 2004

Key to Species: Dean 1999 (except *Austropsyche*, incomplete)

Dean 2001 (*Cheumatopsyche* incomplete, NWA, NT)

Note: *Asmicridea* AV3 = *A. capricornica*

Note: *Cheumatopsyche* AV10=*C. kakaduensis*, AV11=*C. wellase*, AV12=*C. suteri*, AV13=*C. dostinei*

Hydroptilidae

Key to Genera: Bug Guide from Dean et al. 2004

Note: *Acritoptila* and *Hellyethira* cannot be separated. Distribution: *Acritoptila* - N Qld, SW WA. *Hellyethira* - Australia wide.

Key to Species: Wells 1997 (*Hellyethira*, *Hydroptila*, *Maydenoptila*)

Kokiriidae

Key to Genera: Bug Guide from Dean et al. 2004

Key to Species: St Clair 2000a (*Taskiria* preliminary)

Leptoceridae

Key to Genera: Bug Guide from Dean et al. 2004

Key to Species: St Clair 2000 (except *Oecetis* *Triaenodes* *Westriplectes*)

St Clair 2000 (*Notalina*-E Aus; WA; Tas)

St Clair 2000 (*Triplectides*-except WA)

Limnephilidae: *Archaeophylax*

Key to Species: Dean 2000

Odontoceridae

Key to Genera: Bug Guide from Dean et al. 2004

Key to Species: St Clair 2000a

Oeconesidae: *Tascuna ignota* Neboiss, 1975

Philopotamidae

Key to Genera: Bug Guide from Dean et al. 2004

Key to Species: Cartwright 1997 (incomplete)

Philorheithridae

Key to Genera: Bug Guide from Dean et al 2004

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Key to Species: St Clair 1997 (except *Austrheithrus*, *Kosrheithrus*)

LUCID Key: CSIRO 2001 (*Aphilorheithrus Tasmanthrus*)

Plectrotarsidae

Key to Genera: Bug Guide from Dean et al. 2004

Key to Species: Dean 2000

Polycentropodidae

Key to Genera: Bug Guide from Dean et al 2004

Key to Species: Cartwright 1998 (except Genus I; incomplete)

Tasimiidae

Key to Genera: Bug Guide from Dean et al 2004

Key to Species: Cartwright 1997

Oligochaeta

Key to Families: Pinder 2010 Pinder 2010

Platyhelminthes

Key to SubOrders: Bug Guide from Williams 1980 (as Orders)

Tricladida: Dugesiidae

Key to Genera: Ball 1979 (Tas)

Key to Species: Ball 1979 (Tas)

Temnocephalida

Key to Families: Bug Guide from Sewell 2013

Key to Genera: Sewell 2013

Key to Species: Sewell 2013, Hickman 1967 (Temnocephalidae, Tas)

Polychaeta

Key to Families: none

Refer to marine information sources for keys to genera and species.

Porifera: Spongillidae

Key to Genera: Williams 1980

Key to Species: unknown

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