Invertebrates of the Royal National Park

Helen M. Smith & Michael R. Gray
Australian Museum, 6 College Street, Sydney 2010

Introduction

The habitats of the Royal National Park (RNP) range from rainforest to coastal heath and freshwater to marine. Invertebrates are ubiquitous in each of these habitats, but their diversity is often not appreciated. Any attempt at listing the invertebrate fauna of an area will be incomplete, even for a small and relatively homogeneous environment; to attempt such a feat for a diverse area such as the RNP would therefore only scratch the surface. Here we sidestep this problem by focussing on taxa for which the RNP is a type locality—either for the primary or a secondary type. These invertebrate species described from RNP represent a tiny part of the diversity present in the park. However, they do give an insight into the taxonomic activity associated with the park over more than a century. The species listed here should be recognised as parts of wider taxonomic studies that have contributed to our knowledge of regional invertebrate diversity and ecology.

Methods and scope

The type data lists are compiled from the databases of the three major mainland museums in eastern Australia: Australian Museum, Sydney (AM); Museum of Victoria, Melbourne (MV); and Queensland Museum, Brisbane (QM). For various reasons, especially the absence of digitised data (e.g., ANIC) and material in overseas institutions, it was not feasible to assemble a verifiably complete type list, or a species records list.

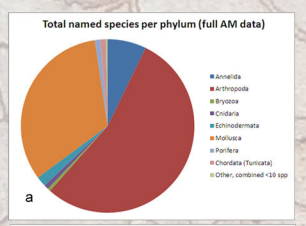
Figure1 Map showing Royal National Park and surrounding area used in this study. Source: ©Google - Map data ©2011 Google, Whereis(R), Sensis Pty Ltd.

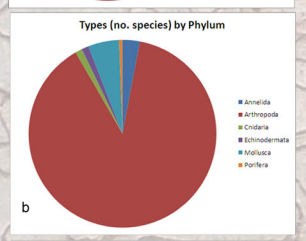
We requested data from a rectangular area bounded by 34°02'30"S to 34°18'00"S and 150°56'00"E to 151°11'00"E (the whole area of the map in Fig. 1, including marine areas). A GIS mapping algorithm was used to filter the data and make a second list of only records from within the park boundary. Type records were separated from both lists, and area type records were then further screened to remove those from non-contiguous localities from the north side of Port Hacking (e.g. Gunnamatta Beach, Cronulla). All records were then classified as a primary type (cotype, holotype, syntype, type) or a secondary type (allotype, paratype).

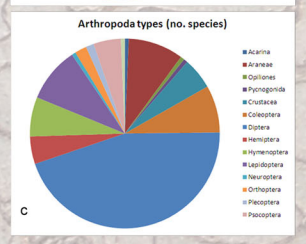
The AM full area list was also used to make a provisional species count per invertebrate group. It should be noted that many factors will combine to make this a gross underestimate. We consider some of the known effects of limitations of our data set in the discussion.

Results: Summary data

Table 1 summarises the number of type specimens from the RNP; from the wider area from Port Hacking to Stanwell Park; and the total named species count in the full AM data.







	Types from RNP only (AM, MV, QM)	Types from land area S of Port Hacking + marine (AM, MV, QM)	Total data (no records removed, AM only)
Named species	92 (44 primary types)	168 (91 primary types)	2370
Genera	69	131	1454
Families	53	94	578
Classes	5	13	40
Phyla	2	6	13

Table 1. The number of species and higher taxonomic ranks in different sections of the data.

Within phyla, the arthropods are the dominant group represented, followed by Mollusca and Annelida. This is true for both the total species recorded (Fig. 2a) and the types (Fig. 2b), but in the types the proportion of Arthropoda is much larger (89%, c.f. 54%).

Within the arthropod types, Diptera (Flies) are the main group (45%), with Araneae (Spiders) and Lepidoptera (moths) equal second, followed by Coleoptera (beetles) and Hymenoptera (wasps, bees and ants) (Fig. 2c).

A full list of species with types from the park and surrounding area is given in Table 2.

Figure 2. Numbers of species from the RNP and surrounding area: a. All named species, from raw AM data of entire area; b. Species described from the RNP and contiguous area, per phylum; c. Breakdown of arthropod species from b, by sub-phylum or Class.

Discussion

To a great extent, the type list reflects the strengths of scientists working at the Australian Museum. This is not only the species directly described by these researchers and their collaborators, but also work by other parties, facilitated by the local knowledge and a well sorted collection.

There are three major sources of omissions in the completeness of our lists. From the overall species count we are missing taxa for which there have been no major revisionary works, or for which the specimens are unsorted, only partially identified, or not databased. From the types the main omissions are the type specimens held in other institutions, such as older types in overseas museums and types held in the Australian National Insect Collection in Canberra (ANIC), which is incompletely databased.

We can illustrate the extent of one part of this missing data with a case study of flies in the family Drosophilidae using research data supplied by Dr Shane McEvey of the Australian Museum. Of 49 species recorded from the Park and surrounding area, only five (the AM types) are included in our data. Cataloguing is an ongoing process, and the main Drosophilidae collections of the Australian Museum are still waiting to be databased. In general, type lists are more reliable because types are the focus of databasing efforts at most institutions. The AM holds types of five Drosophilidae species; nevertheless, we find that another seven species, held by institutions we have not accessed, are missing from our types list (Table 3). This rather woeful result is probably most pronounced for insects—where we know we are missing the significant type holdings of ANIC—however, other groups may also have significant omissions.

Leucophenga flavohalterata Malloch, 1925 PT A
Mycodrosophila margoae Bock, 1980 HT P
Mycodrosophila rayi Bock, 1980 PT A
Mycodrosophila rosemaryae Bock, 1980 HT P
Scaptodrosophila adelphe (Bock, 1976) PT P
Scaptodrosophila collessi (Bock, 1976) HT P
Scaptodrosophila mania (Bock, 1976) HT P

Table 3. Supplementary list of Drosophilidae species missing from Table 2. (see Table 2 for key)

The data we have gathered, combined with some understanding of the shortfalls, gives a glimpse of the immense diversity of invertebrates present in the environs of the RNP. We hope these figures and examples of some interesting taxa will bring more awareness of the importance and diversity of these often overlooked animals. The considerable research interest in the area also indicates the importance of the park habitats in the eyes of scientists and the necessity for continuing support for conservation of this diverse area.

Acknowledgments. We thank: Michael Elliott (AM) for numerous iterations of database searches and the GIS mapping algorithm to separate out Park records; Collections staff at AM, ANIC, MV and QM, who provided their data and advice; Shane McEvey (AM), for Drosopilidae data; all the suppliers of wonderful photos, who are credited by their works; a number of authors who assisted with original reprints and information.

Table 2. Species for which the primary or secondary type is from the Royal National Park or surrounding area

Annelida: Hirudinea
Piscicolidae: *Austrobdella translucens* Badham, 1916 PT A
Annelida: Polychaeta
Onuphidae: *Hirsutonuphis armillata* Paxton, 1996 PT A
Pectinariidae: *Amphictene uniloba* Hutchings & Peart, 2002 HT,PT A
Syllidae: *Murrindisyllis kooromundroola* San Martin et al., 2007 HT,PT A
Trichobranchidae: *Trichobranchus bunnabus* Hutchings & Peart, 2000 PT A
Arthropoda: Arachnida: Acarina
Arrenuridae: *Arrenurus pseudomargatellus* Smit, 2010 PT P
Arthropoda: Arachnida: Araneae
Araneidae: *Arkys bulburinensis* Heimer, 1984 HT P
Araneidae: *Arkys speechleyi* (Mascord, 1968) HT,PT P
Araneidae: *Poltys noblei* Smith, 2006 PT P
Gallieniellidae: *Meedo bluff* Platnick, 2002 HT P
Hersiliidae: *Tamopsis brisbanensis* Baehr & Baehr, 1987 PT P
Hexathelidae: *Paraembolides grayi* (Raven, 1978) HT,PT P,A
Microholcommatidae: *Eterosonycha complexa* (Forster, 1959) HT P
Nemesiidae: *Stanwellia hoggi* (Rainbow, 1914) Type A
Salticidae: *Helpis kenilworthi* Zabka, 2002 PT P
Stiphidiidae: *Jamberoo johnnoblei* Gray & Smith, 2008 PT P
Theridiidae: *Argyrodes incursus* Gray & Anderson, 1988 PT P
Zodariidae: *Asteron zabkai* Jocque & Baehr, 2001 HT,PT P
Zodariidae: *Habronestes grahami* Baehr, 2003 PT P
Zodariidae: *Habronestes hunti* Baehr, 2003 PT A
Arthropoda: Arachnida: Opiliones
Triaenonychidae: *Equitius formidabilis* Hunt, 1985 HT,PT P
Arthropoda: Insecta: Coleoptera
Alleculidae: *Hybrenia nitidior* Carter, 1915 PT A
Buprestidae: *Castiarina pulla* (Barker, 1986) PT A
Carabidae: *Austranillus macleayi* (Lea, 1906) Type A
Cerambycidae: *Atesta longoelytrata* Wang, 1993 HT P
Cerambycidae: *Strongylurus musgravei* (McKeown, 1940) H A
Cerambycidae: *Syllitosimilis abberans* McKeown, 1938 PT P
Cerambycidae: *Wahn zonulitis* McKeown, 1940 PT A
Chrysomelidae: *Menippus darcyi* Reid & Nally, 2008 HT,PT A
Cleridae: *Apteropilo raldae* Bartlett, 2009 PT A
Dytiscidae: *Platynectes laurianus* Watts, 1978 PT P
Nitidulidae: *Pocadius expectatus* Kirejtshuk PT A
Staphylinidae: *Polylobus longulus* Olliff, 1886* Type P
Arthropoda: Insecta: Diptera
Agromyzidae: *Cerodontha (Cerodontha) delectabilis* Spencer, 1977 HT,PT A
Agromyzidae: *Cerodontha poemyzina* (Spencer, 1963) HT A
Agromyzidae: *Cerodontha triplicata* (Spencer, 1963) PT P
Agromyzidae: *Liriomyza australina* Spencer, 1963 PT A
Agromyzidae: *Melanagromyza seneciophila* Spencer, 1963 PT P
Agromyzidae: *Ophiomyia otfordensis* Spencer, 1977 HT,PT A
Agromyzidae: *Phytoliriomyza australensis* Spencer, 1963 HT P
Agromyzidae: *Pseudonapomyza parilis* Spencer, 1977 HT,PT A
Bombyliidae: *Anthrax dolabratus* Yeates & Lambkin, 1998 PT A
Clusiidae: *Clusiodes gladiator* McAlpine, 1960 HT,PT P,A
Clusiidae: *Heteromeringia laticornis* McAlpine, 1960 HT,PT P,A
Clusiidae: *Heteromeringia pulla* McAlpine, 1960* HT,PT P,A
Clusiidae: *Heteromeringia spinulosa* McAlpine, 1960 PT A
Clusiidae: *Tetrameringia ustulata* McAlpine, 1960 PT P
Dolichopodidae: *Austrosciapus janae* Bickel, 1994 PT P
Dolichopodidae: *Austrosciapus otfordensis* Bickel, 1994 HT P
Dolichopodidae: *Sympycnus taenicornis* Bickel, 2000 HT,PT P
Drosophilidae: *Dichaetophora macalpinei* (Bock, 1982) PT A
Drosophilidae: *Drosophila teratos* Bock, 1982 HT P
Drosophilidae: *Leucophenga lubrica* Bock, 1979 PT P
Drosophilidae: *Leucophenga patternella* Bock, 1979 HT A
Drosophilidae: *Scaptodrosophila barkeri* (Bock, 1976) HT A
Empididae: *Ceratomerus maculatus* Sinclair, 2003 PT P
Empididae: *Ceratomerus orientalis* Sinclair, 2003 HT P
Empididae: *Clinocera australiana* Sinclair, 2000 PT P,A
Empididae: *Clinocera rubriventris* Sinclair, 2000 PT P
Fanniidae: *Australofannia spiniclunis* Pont, 1977 PT P
Heleomyzidae: *Austroleria extensa* McAlpine, 1967 PT A
Heleomyzidae: *Diplogeomyza annularis* McAlpine, 1967 HT,PT P,A
Heleomyzidae: *Diplogeomyza maculipennis* Malloch,1926 HT P
Heleomyzidae: *Diplogeomyza media* McAlpine, 1967 PT P
Heleomyzidae: *Diplogeomyza pectinervis* McAlpine, 1967 PT P
Heleomyzidae: *Diplogeomyza signata* McAlpine, 1967 PT P,A
Heleomyzidae: *Diplogeomyza spinosa* McAlpine, 1967 HT,PT P,A
Heleomyzidae: *Pentachaeta physopus* McAlpine, 1985 PT P,A
Heleomyzidae: *Tapeigaster digitata* McAlpine & Kent, 1982 PT P,A
Heleomyzidae: *Tapeigaster pulverea* McAlpine & Kent, 1982 HT,PT P
Lonchaeidae: *Silba adelosa* McAlpine, J. F., 1964 PT A
Perissclelidiae: *Cyamops delta* Khoo, 1984 PT A
Pipunculidae: *Clistoabdominalis condylostylus* Skevington, 2001 PT P
Pipunculidae: *Eudorylas anfractus* Skevington, 2003 PT P
Platystomatidae: *Duomyia brevicornis* McAlpine, 1972 HT P
Platystomatidae: *Duomyia scintilla* McAlpine, 1972 PT P
Platystomatidae: *Euprosopia megastigma* McAlpine, 1973 HT,PT A
Platystomatidae: *Euprosopia subula* McAlpine, 1973 HT,PT P,A
Platystomatidae: *Lenophila achilles* McAlpine & Kim, 1977 HT,PT P
Platystomatidae: *Lenophila danielsi* McAlpine & Kim, 1977 HT,PT P,A
Psychodidae: *Pericoma albipes* Tonnoir, 1953 PT A
Sphaeroceridae: *Leptocera aestivalis* Richards, 1973 PT A
Sphaeroceridae: *Leptocera cercalis* Richards, 1973 HT A
Sphaeroceridae: *Leptocera dorrigonis* Richards, 1973 PT P,A
Sphaeroceridae: *Leptocera fenestrata* Richards, 1973 PT A
Sphaeroceridae: *Leptocera nitidipleura* Richards, 1973 HT,PT P
Sphaeroceridae: *Leptocera populatis* Richards, 1973 HT,PT P
Sphaeroceridae: *Leptocera subsinuata* Richards, 1973 PT P,A
Sphaeroceridae: *Leptocera trivittata* Richards, 1973 HT A
Tabanidae: *Cydistomyia infirmus* Mackerras & Spratt, 2008 HT A
Tachinidae: *Carcelia flavitibia* Cantrel, 1984 PT P
Tephritidae: *Micronevrina setosa* Permkam & Hancock, 1995 HT,PT P
Thaumaleidae: *Austrothaumalea barrydayi* Theischinger, 1986 PT P
Thaumaleidae: *Austrothaumalea mcalpinei* Theischinger, 1986 HT,PT A
Thaumaleidae: *Austrothaumalea ramosa* Sinclair, 2008 PT P
Thaumaleidae: *Austrothaumalea uloola* Sinclair, 2008 HT,PT P
Therevidae: *Anabarhynchus loneae* Lyneborg, 2001 PT P,A
Therevidae: *Anabarhynchus mcalpinei* Lyneborg, 2001 PT P
Therevidae: *Anabarhynchus plumboides* Lyneborg, 2001 PT P
Therevidae: *Anabarhynchus stylatus* Lyneborg, 2001 PT P
Arthropoda: Insecta: Hemiptera
Achilidae: *Aneipo minerva* Lambkin, 1978 HT P
Aradidae: *Ctenoneurus meridionalis* Monteith, 1997 PT A
Aradidae: *Neuroctenus woodwardi* Monteith, 1997 PT A
Cicadellidae: *Eutartessus whiamensis* F. Evans, 1981 HT P
Pentatomidae: *Paradictyotus fuscus* Gross, 1975 PT P
Reduviidae: *Ploiaria obscura* Wygodzinsky, 1956 HT A
Rhyparochromidae: *Tomocoris minutus* Woodward 1955 HT,PT P
Arthropoda: Insecta: Hymenoptera
Colletidae: *Leioproctus (Filiglossa) hamatus* Maynard, 1994 HT P
Formicidae: *Rhytidoponera confusa* Ward, 1980 PT P
Formicidae: *Rhytidoponera enigmatica* Ward, 1980 PT P
Halictidae: *Lasioglossum (Chilalictus) grumiculum* Walker, 1995 PT P
Halictidae: *Lipotriches (Austronomia) fortior* (Cockerell, 1929) HT A
Ichneumonidae: *Casinaria hesperiophaga* Jerman & Gauld, 1988 PT A
Ichneumonidae: *Certonotus andrewi* Gauld and Halloway, 1986 HT A
Ichneumonidae: *Paraphylax corvax* Gauld, 1984 PT A
Ichneumonidae: *Zaglyptus hollowayi* Gauld, 1984 HT P
Pergidae: *Clarissa flammea* Benson, 1935 HT P
Arthropoda: Insecta: Lepidoptera
Cosmopterygidae: *Hoplophanes aerodes* Lower* HT P
Geometridae: *Aeolochroma olivia* (Goldfinch, 1943) HT P
Geometridae: *Thallogama corticola* (Goldfinch, 1944) Type A
Hepialidae: *Fraus orientalis* Nielsen & Kristensen, 1989 PT P
Hesperiidae: *Hesperilla mastersi* Waterhouse, 1900 Type A
Oecophoridae: *Ericrypsina chorodoxa* (Meyrick, 1920) HT P
Oecophoridae: *Erythrobapta picimacula* (Turner, 1935) HT P
Oecophoridae: *Eulechria argina* Lower* HT A
Oecophoridae: *Eremnotypa steriphota* (Meyrick, 1914) HT A
Oecophoridae: *Oenochroa phaeobaphes* (Turner, 1933) HT A
Tortricidae: *Capua vulpina* Turner, 1916 HT A
Tortricidae: *Epitrichosma crymodes* (Turner, 1916) HT A
Tortricidae: *Rupicolana bleptodora* (Turner, 1925) HT A
Zygaenidae: *Hestiochora continentalis* Tarmann, 2004 PT A
Arthropoda: Insecta: Neuroptera
Berothidae: *Spermophorella disseminata* Tillyard, 1916 Type A
Arthropoda: Insecta: Orthoptera
Acrididae: *Minyacris nanum* (Sjöstedt, 1921) HT A
Phalangopsidae: *Zaclotathra oligoneura* (Chopard, 1951) PT P
Tridactylidae: *Dentridactylus albisignatus* Gunther, 1978 HT,PT P,A
Arthropoda: Insecta: Plecoptera
Gripopterygidae: *Dinotoperla dolichoprocta* Theischinger, 1982 PT P
Notonemouridae: *Kimminsoperla mcalpinei* Theischinger, 1981 PT P
Arthropoda: Insecta: Psocoptera
Amphipsocidae: *Taeniostigma trickettae* Smithers, 1974 PT P,A
Caeciliidae: *Aphyopsocus prolixus* Smithers, 1982 PT P
Lepidopsocidae: *Echmepteryx brunnea* Smithers, 1965 HT P
Myopsocidae: *Myopsocus incomptus* Smithers, 1964 HT,PT P
Philotarsidae: *Philotarsopsis lemsidia* (Thornton & New, 1977) PT A
Pseudocaeciliidae: *Austropsocus antennalis* Thornton & New, 1977 HT,PT P
Pseudocaeciliidae: *Austropsocus omega* Thornton & New, 1977 PT P
Arthropoda: Insecta: Trichoptera
Hydrobiosidae: *Austrochorema intorquatum* Schmid, 1989 HT P
Chelicerata: Pycnogonida: Ascorhynchomorpha
Ascorhynchidae: *Ascorhynchus compactum* Clark, 1963 PT P
Arthropoda: Crustacea: Calanoida
Acartiidae: *Acartia tranteri* Bradford, 1976 HT,PT A
Arthropoda: Crustacea: Cumacea
Gynodiastylidae: *Gynodiastylis tubifacturex* Gerken, 2001 PT A
Gynodiastylidae: *Paradicoides megadactylus* Gerken, 2001 PT A
Arthropoda: Crustacea: Stomatopoda
Lysiosquillidae: *Lysiosquilla colemani* Ahyong, 2001 PT A
Arthropoda: Crustacea: Amphipoda
Talitridae: *Arcitalitrus bundeena* Peart & Lowry, 2006 HT,PT P
Arthropoda: Crustacea: Myodocopida
Cypridinidae: *Lowrya taiti* Parker, 1998 HT,PT A
Arthropoda: Crustacea: Podocopida
Cytheruridae: *Semicytherura illerti* Yassini & Wright, 1988 HT,PT A
Leptocytheridae: *Hemicytherida hiltoni* Yassini in Yassini & Wright, 1988* HT,PT A
Cnidaria: Alcyonaria: Gorgonacea
Primnoidae: *Amphilaphis plumacea* Thomson & McKinnon, 1911 Type A
Primnoidae: *Pseudoplumarella corruscans* (Thomson & McKinnon, 1911) Type A
Echinodermata: Asteroidea
Echinasteridae: *Echinaster colemani* Rowe & Albertson, 1987 PT A
Echinodermata: Ophiuroidea
Amphiuridae: *Amphistigma watsonae* Baker, 1979 HT A
Mollusca: Gastropoda
Anabathronidae: *Pseudestea pyramidata* (Hedley, 1903) HT,PT A
Camaenidae: *Meridolum marshalli* McLauchlan, 1951 HT,PT P
Chromodorididae: *Chromodoris hunteri* Rudman, 1983 PT A
Chromodorididae: *Chromodoris thompsoni* Rudman, 1983 HT,PT A
Chromodorididae: *Chromodoris woodwardae* Rudman, 1983 HT,PT A
Chromodorididae: *Noumea sulphurea* Rudman, 1986 HT,PT A
Epitoniidae: *Plastiscala morchi* (Angas, 1871) HT A
Eulimidae: *Sticteulima portensis* (Laseron, 1955) Type A
Turridae: *Filodrillia stadialis* Hedley, 1922 PT A
Porifera: Demospongiae: Haplosclerida
Spongillidae: *Radiospongilla multispinifera* (Gee, 1933) Type A

Key: HT, holotype; PT, paratype; P, type is from RNP;
A, type is from area; * signified the species is now in synonymy or could not be traced, not all such may be marked.

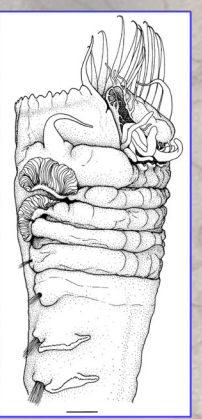


Figure 3. *Amphictene uniloba* Hutchings & Peart, 2002, lateral view of front end of holotype. Scale 1 mm. Illustration: from original paper, by Anna Murray. This species of marine worm lives in a tube made from cemented sand grains. Intertidal to 100 m depth, specimens have been recorded from a few localities in NSW and Qld. The holotype and paratypes were collected off Jibbon Beach, Port Hacking, at 60–100 m depth.

Figure 4. *Arkys speechleyi* (Mascord, 1968) on a leaf. Photo: Ramon Mascord. *Arkys* species are free living ambushing hunters with spiny legs. *Arkys speechleyi* was described (as *Neoarchemorus s.*) by R. Mascord, who later featured photographs of many RNP specimens in his two books on Australian spiders (Mascord, 1970, 1980). The holotype specimen is from the Park.

Figure 5. *Castiarina pulla* (Barker, 1986), pinned paratype specimen. Photo: Max Beatson, Australian Museum. This species links two species groups, resembling one in colour pattern and another in genitalic characters. The species is restricted to the coastal ranges of the Illawarra and Sydney regions. Some paratypes are from Waterfall.

Figure 6. *Austroscapius janae* Bickel, 1994, mounted specimen, lateral view. Photo: Max Beatson, Australian Museum. Dolichopodids are sometimes known as dancing flies. This species and its close relatives are often found on tree trunks and move upwards in a series of short, bounding flights. The species occurs from Cairns to Melbourne. Some paratypes are from RNP near Waterfall.

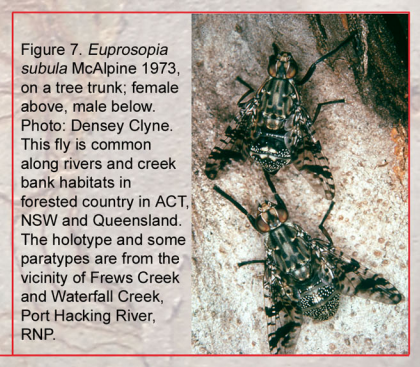


Figure 7. *Euprosopia subula* McAlpine 1973, on a tree trunk; female above, male below. Photo: Densey Clyne. This fly is common along rivers and creek bank habitats in forested country in ACT, NSW and Queensland. The holotype and some paratypes are from the vicinity of Frews Creek and Waterfall Creek, Port Hacking River, RNP.

Figure 8. *Aeolochroma olivia* (Goldfinch, 1943), pinned specimen. Photo: Max Beatson, Australian Museum. This moth is known only from coastal NSW between Gosford and Kiama (Common, 1990); species in the genus are extremely cryptic with mossy or licheny wing patterns, a living specimen would probably have greenish colouration. The holotype is from the RNP.

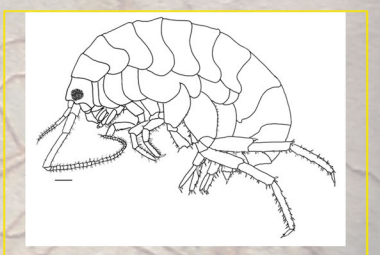


Figure 9. *Arcitalitrus bundeena* Peart & Lowry, 2006, lateral view. Illustration: from original paper. Terrestrial amphipods (landhoppers) are a familiar part of the leaf litter fauna. This species is restricted to the RNP and Woronora Dam catchment and seems to be phylogenetically isolated from other species in the genus (two other species described in the same paper are sympatric). The holotype and paratypes are from Lady Wakehurst Parkway in the RNP.

Figure 10. *Meridolum marshalli* McLauchlan, 1951, specimen shell. Photo: Vince Railton, Queensland Museum. The largest species in the group, adult shells reach almost 4 cm in diameter. It is found in rainforest and moist forests nearby from RNP south to the Wollongong area, where a second colour form also occurs. The holotype and paratypes are from near Waterfall in the RNP.

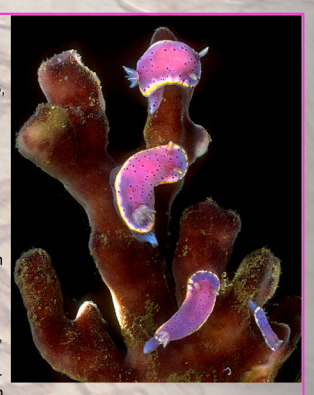


Figure 11. *Chromodoris woodwardae* Rudman, 1983, specimens on food sponge. Photo: Bill Rudman - Sea Slug Forum. The bright colour patterns of some nudibranchs, which may be similar in unrelated species from the same area, may be evidence of aposematic Müllerian mimicry (Rudman, 1991). Holotype and some paratypes from off Providential Head, Wattamolla Bay, RNP.

References

Barker, S. 1986. *Stigmodera (Castiarina)* (Coleoptera: Buprestidae): taxonomy, new species and a checklist. Transactions of the Royal Society of South Australia 110(1): 1–36.

Bickel D.J.. 1994. The Australian Sciapodinae (Diptera: Dolichopodidae), with a review of the Oriental and Australasian faunas, and a world conspectus of the subfamily. Records of the Australian Museum. (Supplement 21): 1–394.

Common, I.F.B., 1990. Moths of Australia. 535pp. Melbourne University Press, Carlton, Victoria.

Goldfinch, G. M., 1943. A new species of *Terpna* from National Park, New South Wales (Lepidoptera: Geometridae). Records of the Australian Museum 21 (4): 179.

Hutchings, P. & Peart, R., 2002. A review of the genera of Pectinariidae (Polychaeta) together with a description of the Australian fauna. Records of the Australian Museum 54 (1): 99–127.

Mascord, R.E. 1968. A new genus and species of spider (Araneida: Argiopidae). Journal of the Australian Entomological Society 4: 10–14.

Mascord, R.E., 1970. Australian spiders in colour.112 pp. Reed Publishers, Sydney.

Mascord, R.E., 1980. Spiders of Australia. 128 pp. Reed Publishers, Sydney.

McAlpine, D.K. 1973. The Australian Platystomatidae (Diptera, Schizophora) with a revision of five genera. Memoirs of the Australian Museum 15: 1–256 [174].

McLauchlan, C.F., 1951. Basic work on the life cycle of some Australian snails. Proceedings of the Royal Society of New South Wales 1949–50: 26–36.

Peart, R. & Lowry, J. K., 2006. The amphipod genus *Arcitalitrus* (Crustacea: Amphipoda: Talitridae) of New South Wales forests, with descriptions of six new species. Records of the Australian Museum 58 (1): 97–118.

Rudman, W.B., 1983. The Chromodorididae (Opisthobranchia: Mollusca) of the Indo-West Pacific: *Chromodoris splendida, C. aspersa* and *Hypselodoris placida* colour groups. Zoological Journal of the Linnean Society 78: 105–173.

Rudman, W.B., 1991. Purpose in pattern: the evolution of colour in chromodorid nudibranchs. Journal of Molluscan Studies 57: 5–21.

Background photo: traces of moth larvae (*Ogmograptis* sp.) on *Eucalyptus* sp. bark. Several species of "scribbly gum" occur in the RNP, and there may be several species of moth also. Different moth species make slightly different patterns.