

Handbook of AUSTRALIAN, NEW ZEALAND & ANTARCTIC BIRDS

Volume 1 Ratites to Ducks

Part A Ratites to Petrels

Part B Australian Pelican to Ducks

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APPENDIX I

ECTOPARASITES OF AUSTRALIAN, NEW ZEALAND AND ANTARCTIC BIRDS

M.D. Murray*, R.L. Palma** and R.L.C. Pilgrim†

INTRODUCTION

The ectoparasites considered are those that may be seen when a bird is handled. Consequently, only lice, fleas, louse-flies and ticks are listed, not flying insects such as midges, black flies or mosquitoes. In future checklists mites may be given. Only published data have been accepted (excluding records considered to be stragglers or contaminants) as it was felt that much of the material in collections requires to be re-examined to avoid a perpetuation of errors. Only those hosts are listed on which or in association with which ectoparasites have been found; absence of a host from the list means ignorance. The nomenclature of hosts follows that of the Handbook and, in the main, subspecies are not given. However, it must be emphasized that subspecies of hosts are important as usually they differ in distribution, and ectoparasites, such as fleas and ticks, have distinct geographical distributions of their own related to the conditions that favour the survival off the host of the several stages of their life-cycles. Even lice, which live permanently on their hosts, may differ between subspecies of their hosts. The subspecies of hosts are given, therefore, where they are considered to be relevant and informative.

It is fortunate that the lice of the birds of NZ and the birds of the Southern Ocean have been well studied in recent years by Palma & Pilgrim (1982-88). Examination of the checklist will reveal the extensive fauna on NZ birds; the apparent cleanliness of Aust. birds simply indicates an appalling lack of data. A more critical examination of the NZ birds will reveal anomalies that indicate that even there more collecting is required.

LICE (Phthiraptera)

There are four sub-orders of lice within the Phthiraptera and two of these, Amblycera and Ischnocera, are found on birds. They are biologically quite different. Amblyceran lice are usually active and have more varied diets: species of *Piagetiella* feed within the gular pouches of pelicans and cormorants (Marshall 1981); *Colpocephalum turbinatum* lives inside the quills of primary feathers of the wings of the Feral Pigeon *Columba livia* and can be predatory on moulting lice and the eggs of lice and mites (Nelson 1971); and other species may feed on blood or feathers. Ischnoceran lice feed on feathers and avoid preening by their host through morphological adaptations. Those on wings and tail, which are usually elongated and narrow, lie between the rami of the feather whereas those in down feathers may be broadened and flattened. There is often one species of louse of each sub-order on each species of bird, and the genera of these lice usually differ between avian orders (Table 1).

Often, in compact groups such as albatrosses and storm-petrels, different hosts may be infested with the same species of lice, as judged by current morphological interpretations. The sophisticated techniques of protein and DNA analyses

and interbreeding experiments have not yet been attempted. In many genera of lice different species occur on each host and not infrequently on host subspecies, as may be seen for kiwis. In large families of birds, such as Procellariidae and Anatidae, many genera of lice are found whereas few are associated with smaller families. Within this great range of host-lice associations some are quite unexpected. *Austrogoniodes* is a genus found on penguins but one species lives on the Musk Duck *Biziura lobata* (Clay 1971a). Another example, outside the scope of the Handbook, is from the amblyceran family Boopiidae which is confined to Aust. marsupials with two exceptions; one species is also found on the domestic dog and another, *Therodoxus oweni* Clay, 1971, is solely found on *Casuarium casuarium sclateri* in PNG (Clay 1971b).

FLEAS (Siphonaptera)

The fleas of seabirds of the regions covered in the Handbook fall into three families (Dunnet 1964; Dunnet & Mardon 1974; Smit 1979). The family Rhopalopsyllidae is widely distributed on burrowing rodents in South America, but *Parapsyllus* are confined to birds, mostly seabirds; Pygiopsyllidae is predominantly found on mammals with a representation in Africa and South America, but *Notiopsylla* spp are confined to seabirds of Aust.-NZ and Subantarctic Zone; Ceratophyllidae, which is well represented on South American birds, is present as a single species, *Glaciopsyllus antarcticus*, the only flea found in Antarctica. The whole life-cycle of this flea takes place on the body of the host (Bell *et al.* 1988) whereas the immature stages of bird-fleas are usually found in the nest of their host.

All the fleas listed are found in Aust., NZ and the subantarctic islands with the exception of *Parapsyllus taylori*, which occurs round the s. coast of Aust.; *P. cardinis*, which is found in NZ and on Macquarie I. and *G. antarcticus*, which is confined to Antarctica. In flea-taxonomy the triple nomenclature is common, and reflects further separation within these species whose hosts live in a vast area of widely isolated breeding islands.

LOUSE-FLIES (Hippoboscidae: Diptera)

Louse-flies are associated with Diomedidae, Procellariidae, Phaethontidae, Fregatidae and Sulidae in pantropical Indian and Pacific Oceans, and with Phalacrocoracidae there and elsewhere. Records from Ciconiidae, Plataleidae, Ardeidae,

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TABLE 1
Genera of lice associated with families of birds

Orders and families of birds (and some genera)	Sub-orders and genera of lice	
	Amblycera	Ischnocera
Struthioniformes		
Dromaiidae		<i>Dahlehornia</i>
Struthionidae		<i>Stuthiolipeurus</i>
Apterygiformes		
Apterygidae	←	Apterygon , <i>Rallicola</i>
Podicipediformes		
Podicepedidae		<i>Aquanirmus</i>
Sphenisciformes		
Spheniscidae		<i>Austrogoniodes</i> , <i>Nesiotinus</i>
Procellariiformes		
Diomedidae	<i>Austromenopon</i>	<i>Docophoroides</i> , <i>Episbates</i> , <i>Harrisoniella</i> , <i>Paraclisis</i> , <i>Perineus</i> , <i>Saemundssonina</i>
Procellariidae		
<i>Macronectes</i>	<i>Austromenopon</i>	<i>Docophoroides</i> , <i>Paraclisis</i> , <i>Perineus</i> , <i>Saemundssonina</i>
<i>Fulmarus</i>	<i>Ancistrona</i> , <i>Austromenopon</i>	<i>Perineus</i> , <i>Saemundssonina</i>
<i>Thalassoica</i> , <i>Daption</i> ,	<i>Ancistrona</i> , <i>Austromenopon</i>	<i>Pseudonirmus</i> , <i>Saemundssonina</i>
<i>Pagodroma</i>		
<i>Pterodroma</i>	<i>Ancistrona</i> , <i>Austromenopon</i> , <i>Longimenopon</i>	<i>Bedfordiella</i> , <i>Halipeurus</i> , <i>Naubates</i> , <i>Saemundssonina</i> , <i>Trabeculus</i>
<i>Halobaena</i>	<i>Ancistrona</i> , <i>Austromenopon</i> , <i>Longimenopon</i>	<i>Naubates</i> , <i>Saemundssonina</i>
<i>Pachyptila</i>	<i>Ancistrona</i> , <i>Austromenopon</i> , <i>Longimenopon</i>	<i>Naubates</i> , <i>Saemundssonina</i>
<i>Procellaria</i>	<i>Ancistrona</i> , <i>Austromenopon</i>	<i>Naubates</i> , <i>Trabeculus</i>
<i>Puffinus</i>	<i>Ancistrona</i> , <i>Austromenopon</i>	<i>Halipeurus</i> , <i>Naubates</i> , <i>Saemundssonina</i> , <i>Trabeculus</i>
<i>Oceanitidae</i>	<i>Ancistrona</i> , <i>Austromenopon</i> , <i>Longimenopon</i>	<i>Halipeurus</i> , <i>Philoceanus</i> , <i>Saemundssonina</i>
<i>Pelecanoididae</i>	<i>Austromenopon</i>	<i>Halipeurus</i> , <i>Pelmatocerandra</i>
Pelecaniformes		
Pelecanidae	<i>Colpocephalum</i> , <i>Piagetiella</i>	<i>Pectinopygus</i>
Sulidae	<i>Eidmanniella</i>	<i>Pectinopygus</i>
Anhingidae		<i>Pectinopygus</i>
Phalacrocoracidae	<i>Eidmanniella</i> , <i>Piagetiella</i>	<i>Pectinopygus</i>
Phaethontidae	<i>Austromenopon</i>	<i>Saemundssonina</i>
Ciconiiformes		
Ardeidae	<i>Ciconiphilus</i>	<i>Ardeicola</i>
Ciconiidae		<i>Neophilopterus</i>
Plataleidae	<i>Colpocephalum</i> , <i>Eucolpocephalum</i> , <i>Plegadiphilus</i>	<i>Ardeicola</i> , <i>Ibidocetus</i>
Anseriformes		
Anatidae	<i>Ciconiphilus</i> , <i>Holomenopon</i> , <i>Trinoton</i>	<i>Acidoproctus</i> , <i>Anaticola</i> , <i>Anatoecus</i> , <i>Austrogoniodes</i> , <i>Ornithobius</i> , <i>Saemundssonina</i>

and Anatidae are common. The few records reported reflect a lack of study of the fauna within the regions covered by the Handbook.

TICKS (Ixodoidea)

Both groups of ticks are present, the Argasidae (soft ticks) and the Ixodidae (hard ticks). Argasid ticks feed rapidly when they visit a host whereas ixodid ticks remain attached for several days to engorge and greatly increase in size. Eggs are laid off the host and develop on the ground or in the nest as does moulting to the next instar. The geographical distribution of ticks greatly influences the hosts they infest. The argasid ticks, *Argas* and *Ornithodoros*, are common in Aust. They are well adapted to survive prolonged periods, even many months, where the return of a host is not certain. *Ornithodoros capensis* is common throughout the islands and cays of the Great Barrier Reef where it waits beneath the sand for the return of boobies and terns. It has also been found on Spotted Shags *Phalacrocorax punctatus* in NZ. *Argas robertsi* can be found beneath the bark of *Melaleucas* waiting the return of egrers. These ticks transmit several arboviruses, which can cause dis-

ease and mortality of birds.

Ixodid ticks usually require moist conditions for survival off the host. *Amblyomma loculosum* is a large tick of tropical seabirds and the *Ixodes* are found in the S. *Ixodes kohlsi* is commonly found on and in the nests of Little Penguins *Eudyptula minor* round the coast of Aust. and as far N as Port Stephens, NSW; *Ixodes eudyptidis* occurs in Tas. and round NZ where it is associated with a paralysis of chicks of Silver Gulls *Larus novaehollandiae scopulinus* and *I. auritulus* and *I. jacksoni* have been found only in NZ. *Ixodes kerguelensis* is found on subantarctic islands, often in the burrows of petrels, and future studies may reveal more than the one species that is currently accepted (Wilson 1970). *Ixodes uriae* is circumpolar in both s. and n. hemispheres where it transmits several arboviruses to seabirds. Massive infestations have been seen on Royal Penguins *Eudyptes schlegeli* on Macquarie I. (Murray & Vestjens 1967).

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CHECK LIST OF ECTOPARASITES

(Emu — Ducks)

Family DROMAIIDAE

*Dromaius novaehollandiae*Lice: *Dahlehornia asymmetrica* (Burmeister, 1838)

Family STRUTHIONIDAE

*Struthio camelus*Lice: *Struthiolipeurus struthionis* (Gervais, 1844)

Family APTERYGIDAE

*Apteryx australis mantelli*Lice: *Apterygon mirum* Clay, 1961*Rallicola (Aptericola)* sp.Ticks: *Ixodes anatis* Chilton, 1904*Apteryx australis australis*Lice: *Apterygon dumosum* Tandan, 1972*Apterygon* sp.*Rallicola (Aptericola) gadowi* Harrison, 1915*Apteryx australis lawryi*Lice: *Apterygon dumosum* Tandan, 1972*Rallicola (Aptericola) gadowi* Harrison, 1915*Apteryx owenii*Lice: *Apterygon dumosum* Tandan, 1972*Rallicola (Aptericola) gadowi* Harrison, 1915*Rallicola (Aptericola) pilgrimi* Clay, 1972*Apteryx haastii*Lice: *Apterygon hintoni* Clay, 1966*Rallicola (Aptericola) gracilentus* Clay, 1953

Family PODICIPEDIDAE

*Podiceps rufopectus*Lice: *Aquanirmus australis* Kettle, 1974*Podiceps cristatus*Lice: *Aquanirmus* sp.

Family SPHENISCIDAE

*Aptenodytes patagonicus*Lice: *Austrogoniodes brevipes* (Giebel, 1876)*Nesiotinus demersus* Kellogg, 1903Ticks: *Ixodes uriae* White, 1852*Aptenodytes forsteri*Lice: *Austrogoniodes mawsoni* Harrison, 1937

Pygoscelis papuaLice: *Austrogoniodes gressitti* Clay, 1967Ticks: *Ixodes uriae* White, 1852**Pygoscelis adeliae**Lice: *Austrogoniodes antarcticus* Harrison, 1937Ticks: *Ixodes uriae* White, 1852**Pygoscelis antarctica**Lice: *Austrogoniodes gressitti* Clay, 1967**Eudyptes chrysocome**Lice: *Austrogoniodes concii* (Kéler, 1952)*Austrogoniodes cristati* Kéler, 1952*Austrogoniodes hamiltoni*, 1937*Austrogoniodes macquariensis* Harrison, 1937Fleas: *Parapsyllus heardi* de Meillon, 1952*Parapsyllus longicornis* (Enderlein, 1901)*Parapsyllus magellanicus magellanicus* Jordan, 1938Ticks: *Ixodes uriae* White, 1852**Eudyptes pachyrhynchus**Lice: *Austrogoniodes concii* (Kéler, 1952)*Austrogoniodes cristati* Kéler, 1952**Eudyptes robustus**Lice: *Austrogoniodes concii* (Kéler, 1952)*Austrogoniodes cristati* Kéler, 1952Ticks: *Ixodes uriae* White, 1852**Eudyptes sclateri**Lice: *Austrogoniodes concii* (Kéler, 1952)*Austrogoniodes cristati* Kéler, 1952*Austrogoniodes struethus* Harrison, 1915**Eudyptes chrysolophus**Lice: *Austrogoniodes cristati* Kéler, 1952*Austrogoniodes bicornutus* (Kéler, 1954)*Austrogoniodes macquariensis* Harrison, 1937*Austrogoniodes keleri* Clay, 1967*Austrogoniodes* sp.Fleas: *Parapsyllus heardi* de Meillon, 1952Ticks: *Ixodes uriae* White, 1852**Eudyptes schlegeli**Lice: *Austrogoniodes cristati* Kéler, 1952*Austrogoniodes hamiltoni* Harrison, 1937*Austrogoniodes macquariensis* Harrison, 1937Ticks: *Ixodes uriae* White, 1852**Megadyptes antipodes**Lice: *Austrogoniodes concii* (Kéler, 1952)*Austrogoniodes* sp.Fleas: *Parapsyllus longicornis* (Enderlein, 1901)**Eudyptula minor**Lice: *Austrogoniodes waterstoni* (Cummings, 1914)Fleas: *Parapsyllus australiacus* Rothschild, 1909*Parapsyllus jacksoni* Smit, 1965*Parapsyllus longicornis* (Enderlein, 1901)Ticks: *Ixodes eudyptidis* Maskell, 1885*Ixodes kohlsi* Arthur, 1955*Ixodes uriae* White, 1852*Ornithodoros capensis* Neumann, 1901

Family DIOMEDEDEIDAE

Diomedea exulansLice: *Austromenopon affine* (Piaget, 1890)*Docophoroides brevis* (Dufour, 1835)*Episbates pederiformis* (Dufour, 1835)*Harrisoniella hopkinsi* Eichler, 1952*Paraclisis hyalina* (Neumann, 1911)*Perineus concinnoides* Kéler, 1957Fleas: *Parapsyllus magellanicus magellanicus* Jordan, 1938Ticks: *Ixodes kerguelenensis* André & Colas-Belcour, 1942*Ixodes uriae* White**Diomedea epomophora**Lice: *Austromenopon affine* (Piaget, 1890)*Docophoroides brevis* (Dufour, 1835)*Episbates pederiformis* (Dufour, 1835)*Harrisoniella hopkinsi* Eichler, 1952*Paraclisis hyalina* (Neumann, 1911)*Perineus concinnoides* Kéler, 1957Fleas: *Parapsyllus longicornis* (Enderlein, 1901)**Diomedea melanophrys melanophrys**Lice: *Austromenopon navigans* (Kellogg, 1896)*Docophoroides harrisoni* Waterston, 1917*Docophoroides simplex* (Waterston, 1914)*Harrisoniella ferox* (Giebel, 1867)*Paraclisis diomedae* (J.C. Fabricius, 1775)*Perineus circumfasciatus* Kéler, 1957Ticks: *Ixodes uriae* White**Diomedea melanophrys impavida**Lice: *Austromenopon pinguis* (Kellogg, 1896)*Docophoroides simplex* (Waterston, 1914)*Harrisoniella ferox* (Giebel, 1867)*Paraclisis diomedae* (J.C. Fabricius, 1775)*Perineus circumfasciatus* Kéler, 1957*Saemundssonina* sp.Fleas: *Notiopsylla kerguelensis kerguelensis* (Taschenberg, 1880)*Parapsyllus longicornis* (Enderlein, 1901)**Diomedea cauta**Lice: *Austromenopon navigans* (Kellogg, 1896)*Austromenopon pinguis* (Kellogg, 1896)*Docophoroides harrisoni* Waterston, 1917*Harrisoniella ferox* (Giebel, 1867)*Paraclisis diomedae* (J.C. Fabricius, 1775)*Perineus circumfasciatus* Kéler, 1957Fleas: *Parapsyllus australiacus* Rothschild, 1909*Parapsyllus magellanicus largificus* Smit, 1984Ticks: *Ixodes eudyptidis* Maskell, 1885*Ixodes uriae* White, 1852**Diomedea chrysostoma**Lice: *Austromenopon navigans* (Kellogg, 1896)*Austromenopon pinguis* (Kellogg, 1896)*Docophoroides simplex* (Waterston, 1914)*Paraclisis diomedae* (J.C. Fabricius, 1775)*Perineus circumfasciatus* Kéler, 1957*Saemundssonina* sp.Fleas: *Notiopsylla kerguelensis kerguelensis* (Taschenberg, 1880)*Parapsyllus longicornis* (Enderlein, 1901)Ticks: *Ixodes uriae* White, 1852**Diomedea chlororhynchus**Lice: *Perineus circumfasciatus* Kéler, 1957**Diomedea bulleri**Lice: *Austromenopon bulleri* Price & Clay, 1972

- Austromenopon navigans* (Kellogg, 1896)
Austromenopon pinguis (Kellogg, 1896)
Docophoroides harrisoni Waterston, 1917
Harrisoniella ferox (Giebel, 1867)
Paraclisis diomedae (J.C. Fabricius, 1775)
Perineus circumfasciatus Kéler, 1957
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Parapsyllus longicornis (Enderlein, 1901)
Parapsyllus lynnae lynnae Smit, 1965
- Phoebetria fusca**
Fleas: *Notiopsylla kerguelensis kerguelensis* (Tachenberg, 1880)
- Phoebetria palpebrata**
Lice: *Austromenopon pinguis* (Kellogg, 1896)
Docophoroides simplex (Waterston, 1914)
Paraclisis diomedae (J.C. Fabricius, 1775)
Perineus circumfasciatus Kéler, 1957
Saemundssonina sp.
Fleas: *Parapsyllus heardi* de Meillon, 1952
Parapsyllus longicornis (Enderlein, 1901)
Ticks: *Ixodes uriae* White, 1852
- Family PROCELLARIIDAE**
Macronectes giganteus
Lice: *Austromenopon ossifragae* (Eichler, 1949)
Docophoroides murphyi (Kellogg, 1914)
Paraclisis obscura (Rudow, 1869)
Paraclisis miriceps (Kellogg & Kuwana, 1902)
Perineus macronecti Palma & Pilgrim, 1988
Saemundssonina gaini (Neumann, 1913)
Fleas: *Parapsyllus cardinis* Dunnet, 1961
Parapsyllus heardi de Meillon, 1952
Ticks: *Ixodes uriae* White, 1852
- Macronectes halli**
Lice: *Austromenopon ossifragae* (Eichler, 1949)
Docophoroides murphyi (Kellogg, 1914)
Paraclisis obscura (Rudow, 1869)
Perineus macronecti Palma & Pilgrim, 1988
Saemundssonina gaini (Neumann, 1913)
Fleas: *Parapsyllus longicornis* (Enderlein, 1901)
Ticks: *Ixodes uriae* White, 1852
- Fulmarus glacialisoides**
Lice: *Ancistrona* sp.
Austromenopon brevifimbriatum (Piaget, 1880)
Perineus nigrolimbatus (Giebel, 1874)
Saemundssonina bicolor (Rudow, 1870)
Fleas: *Glaciopsyllus antarcticus* Smit & Dunnet, 1962
- Thalassoica antarctica**
Lice: *Ancistrona* sp.
Austromenopon brevifimbriatum (Piaget, 1880)
Pseudonirmus lugubris (Taschenberg, 1882)
Saemundssonina antarctica (Wood, 1937)
- Daption capense**
Lice: *Ancistrona* sp.
Austromenopon brevifimbriatum (Piaget, 1880)
Pseudonirmus gurlti (Taschenberg, 1882)
Saemundssonina stammeri Timmermann, 1959
Fleas: *Glaciopsyllus antarcticus* Smit & Dunnet, 1962
Parapsyllus longicornis (Enderlein, 1901)
Ticks: *Ixodes uriae* White, 1852
- Pagodroma nivea**
Lice: *Ancistrona* sp.
Austromenopon brevifimbriatum (Piaget, 1880)
Pseudonirmus charcoti (Neumann, 1907)
Saemundssonina antarctica (Wood, 1937)
Fleas: *Glaciopsyllus antarcticus* Smit & Dunnet, 1962
- Pterodroma macroptera**
Lice: *Ancistrona* sp.
Austromenopon popellus (Piaget, 1890)
Halipeurus (Halipeurus) procellariae (J.C. Fabricius, 1775)
Naubates heteroproctus Harrison, 1937
Trabeculus schillingi Rudow, 1866
Fleas: *Parapsyllus heardi* de Meillon, 1952
Parapsyllus jacksoni Smit, 1965
- Pterodroma lessonii**
Lice: *Ancistrona* sp.
Austromenopon popellus (Piaget, 1890)
Halipeurus (Halipeurus) procellariae (J.C. Fabricius, 1775)
Naubates sp.
Saemundssonina sp.
Trabeculus schillingi Rudow, 1866
Fleas: *Parapsyllus cardinis* Dunnet, 1961
Parapsyllus magellanicus magellanicus Jordan, 1938
Notiopsylla enciari enciari Smit, 1957
Notiopsylla kerguelensis kerguelensis (Taschenberg, 1880)
Ticks: *Ixodes uriae* White, 1852
- Pterodroma solandri**
Lice: *Naubates thieli* Timmermann, 1965
Ticks: *Ixodes kerguelensis* André & Colas-Belcour, 1942
- Pterodroma magentae**
Lice: *Ancistrona* sp.
Austromenopon popellus (Piaget, 1890)
Halipeurus (Halipeurus) procellariae (J.C. Fabricius, 1775)
- Pterodroma neglecta**
Lice: *Austromenopon popellus* (Piaget, 1890)
Halipeurus (Halipeurus) kermadecensis (Johnston & Harrison, 1912)
Longimenopon sp.
Trabeculus fuscoclypeatus (Johnston & Harrison, 1912)
- Pterodroma brevisrostris**
Lice: *Ancistrona* sp.
Austromenopon popellus (Piaget, 1890)
Bedfordiella unica Thompson, 1937
Saemundssonina pterodromae Timmermann, 1959
Ticks: *Ixodes kerguelensis* André & Colas-Belcour, 1942
- Pterodroma mollis**
Lice: *Austromenopon popellus* (Piaget, 1890)
Halipeurus (Halipeurus) procellariae (J.C. Fabricius, 1775)
Trabeculus schillingi Rudow, 1866
Ticks: *Ixodes kerguelensis* André & Colas-Belcour, 1942

Pterodroma inexpectata

- Lice: *Ancistrona* sp.
Austromenopon popellus (Piaget, 1890)
Austrmenopon sp.
Halipeurus (*Halipeurus*) *consimilis* Timmermann, 1960
Longimenopon sp.
Naubates pterodromi Bedford, 1930
Trabeculus schillingi Rudow, 1866
- Fleas: *Notiopsylla enciari enciari* Smit, 1957
Notiopsylla enciari regula Smit, 1979
Parapsyllus lynnae lynnae Smit, 1965
Parapsyllus magellanicus magellanicus Jordan, 1938

Pterodroma externa

- Lice: *Austromenopon popellus* (Piaget, 1890)
Halipeurus (*Halipeurus*) *kermadecensis* (Johnston & Harrison, 1912)
Trabeculus hexakon (Waterston, 1914)

Pterodroma cervicalis

- Lice: *Ancistrona* sp.
Austromenopon popellus (Piaget, 1890)
Halipeurus (*Halipeurus*) *noctivagus* Timmermann, 1960
Trabeculus sp.

Pterodroma nigripennis

- Lice: *Ancistrona* sp.
Austromenopon sp.
Halipeurus (*Halipeurus*) sp.
Longimenopon sp.
Trabeculus hexakon (Waterston, 1914)

Pterodroma axillaris

- Lice: *Halipeurus* (*Halipeurus*) *theresae* Timmermann, 1969
Trabeculus hexakon (Waterston, 1914)
- Fleas: *Parapsyllus longicornis* (Enderlein, 1901)

Pterodroma cookii

- Lice: *Ancistrona* sp.
Halipeurus (*Halipeurus*) *turtur* Edwards, 1961
Naubates damma Timmermann, 1961
Trabeculus hexakon (Waterston, 1914)

Pterodroma longirostris

- Lice: *Ancistrona* sp.
Halipeurus (*Halipeurus*) *leucophryna* Timmermann, 1960
Longimenopon sp.
Trabeculus hexakon (Waterston, 1914)

Pterodroma pycrofti

- Lice: *Austromenopon popellus* (Piaget, 1890)
Halipeurus (*Halipeurus*) *leucophryna* Timmermann, 1960
Longimenopon sp.
Trabeculus hexakon (Waterston, 1914)

Pterodroma leucoptera

- Lice: *Halipeurus* (*Halipeurus*) sp.
Naubates damma Timmermann, 1961
Trabeculus hexakon (Waterston, 1914)

Halobaena caerulea

- Lice: *Ancistrona* sp.
Austromenopon stammeri Timmermann, 1963

Longimenopon sp.

Naubates clypeatus (Giebel, 1874)
Saemundssonina pterodromae Timmermann, 1959

- Fleas: *Parapsyllus heardi* de Meillon, 1952
Parapsyllus magellanicus magellanicus Jordan, 1938

Pachyptila vittata

- Lice: *Ancistrona* sp.
Austromenopon stammeri Timmermann, 1963
Longimenopon sp.
Naubates prioni (Enderlein, 1908)
Saemundssonina desolata Timmermann, 1959
- Fleas: *Parapsyllus longicornis* (Enderlein, 1901)
Parapsyllus lynnae mariae Smit, 1979
Parapsyllus nestoris antichthones Smit, 1979

Pachyptila salvini

- Lice: *Ancistrona* sp.
Austromenopon stammeri Timmermann, 1963
Longimenopon sp.
Naubates prioni (Enderlein, 1908)
Saemundssonina desolata Timmermann, 1959

Pachyptila desolata

- Lice: *Ancistrona* sp.
Austromenopon stammeri Timmermann, 1963
Longimenopon sp.
Naubates prioni (Enderlein, 1908)
Saemundssonina desolata Timmermann, 1959
- Fleas: *Parapsyllus cardinis* Dunnet, 1961
Parapsyllus heardi de Meillon, 1952
Notiopsylla kerguelensis kerguelensis (Taschenberg, 1880)
- Ticks: *Ixodes kerguelensis* André & Colas-Belcour, 1942
Ixodes uriae White, 1852

Pachyptila belcheri

- Lice: *Ancistrona* sp.
Austromenopon stammeri Timmermann, 1963
Longimenopon sp.
Naubates prioni (Enderlein, 1908)
Saemundssonina desolata Timmermann, 1959
- Fleas: *Parapsyllus magellanicus magellanicus* Jordan, 1938

Pachyptila turtur

- Lice: *Ancistrona* sp.
Austromenopon stammeri Timmermann, 1963
Longimenopon sp.
Naubates prioni (Enderlein, 1908)
Saemundssonina desolata Timmermann, 1959
- Fleas: *Notiopsylla enciari enciari* Smit, 1957
Notiopsylla enciari regula Smit, 1979
Parapsyllus australiacus Rothschild, 1909
Parapsyllus jacksoni Smit, 1965
Parapsyllus magellanicus magellanicus Jordan, 1938
Parapsyllus taylori Jordan, 1942
- Ticks: *Ixodes auritulus zealandicus* Dumbleton, 1961

Pachyptila crassirostris

- Lice: *Ancistrona* sp.
Austromenopon stammeri Timmermann, 1963
Longimenopon sp.
Naubates prioni (Enderlein, 1908)
Saemundssonina desolata Timmermann, 1959
- Fleas: *Parapsyllus nestoris antichthones* Smit, 1979

Procellaria aequinoctialis

- Lice: *Ancistrona* sp.
Austromenopon popellus (Piaget, 1890)
Naubates fuliginosus (Taschenberg, 1882)
Trabeculus hexakon (Waterston, 1914)
- Fleas: *Notiopsylla kerguelensis kerguelensis* (Taschenberg, 1880)
Notiopsylla enciari enciari Smit, 1957
Parapsyllus cardinis Dunnet, 1961
- Ticks: *Ixodes kerguelensis* André & Colas-Belcour, 1942

Procellaria westlandica

- Lice: *Ancistrona* sp.
Austromenopon popellus (Piaget, 1890)
Naubates fuliginosus (Taschenberg, 1882)
Trabeculus hexakon (Waterston, 1914)

Procellaria parkinsoni

- Lice: *Austromenopon popellus* (Piaget, 1890)
Naubates fuliginosus (Taschenberg, 1882)
Trabeculus hexakon (Waterston, 1914)

Procellaria cinerea

- Lice: *Ancistrona* sp.
Austromenopon popellus (Piaget, 1890)
Naubates fuliginosus (Taschenberg, 1882)
Trabeculus hexakon (Waterston, 1914)
- Fleas: *Notiopsylla enciari enciari* Smit, 1957
Notiopsylla kerguelensis tenuata Smit, 1979
Parapsyllus cardinis Dunnet, 1961

Puffinus pacificus

- Lice: *Ancistrona* sp.
Austromenopon paululum (Kellogg & Chapman, 1899)
Halipeurus (Halipeurus) mirabilis Thompson, 1940
Naubates harrisoni Bedford, 1930
Saemundssonina puellula Timmermann, 1965
Trabeculus hexakon (Waterston, 1914)
- Fleas: *Parapsyllus australiacus* Rothschild, 1909
Parapsyllus jacksoni Smit, 1965
Parapsyllus taylori Jordan, 1942
- Ticks: *Amblyomma loculosum* Neumann, 1907

Puffinus bulleri

- Lice: *Ancistrona* sp.
Austromenopon paululum (Kellogg & Chapman, 1899)
Halipeurus (Halipeurus) thompsoni Edwards, 1961
Naubates harrisoni Bedford, 1930

Puffinus carneipes

- Lice: *Ancistrona* sp.
Austromenopon paululum (Kellogg & Chapman, 1899)
Halipeurus (Halipeurus) gravis priapulus Timmermann, 1961
Naubates harrisoni Bedford, 1930
Saemundssonina sp.
Trabeculus hexakon (Waterston, 1914)

Fleas: *Parapsyllus jacksoni* Smit, 1965

Ticks: *Ixodes kerguelensis* André & Colas-Belcour, 1942

Puffinus griseus

- Lice: *Ancistrona* sp.

Austromenopon paululum (Kellogg & Chapman, 1899)

Halipeurus (Halipeurus) diversus (Kellogg, 1896)

Trabeculus hexakon (Waterston, 1914)

Fleas: *Notiopsylla enciari enciari* Smit, 1957
Notiopsylla enciari regula Smit, 1979
Notiopsylla kerguelensis kerguelensis (Taschenberg, 1880)

Notiopsylla peregrinus Smit, 1979

Parapsyllus jacksoni Smit, 1965

Parapsyllus lynnae lynnae Smit, 1965

Ticks: *Ixodes auritulus zealandicus* Dumbleton, 1961
Ixodes uriae White, 1852

Puffinus tenuirostris

- Lice: *Ancistrona* sp.
Austromenopon paululum (Kellogg & Chapman, 1899)
Halipeurus (Halipeurus) diversus (Kellogg, 1896)

Trabeculus hexakon (Waterston, 1914)

Fleas: *Parapsyllus australiacus* Rothschild, 1909
Parapsyllus taylori Jordan, 1942

Ticks: *Ixodes kerguelensis* André & Colas-Belcour, 1942

Puffinus puffinus

- Lice: *Halipeurus (Halipeurus) diversus* (Kellogg, 1896)
Trabeculus aviator (Evans, 1912)

Puffinus gavia

- Lice: *Austromenopon paululum* (Kellogg & Chapman, 1899)

Halipeurus (Halipeurus) spadix Timmermann, 1961

Saemundssonina sp.

Fleas: *Parapsyllus jacksoni* Smit, 1965

Puffinus huttoni

- Lice: *Austromenopon paululum* (Kellogg & Chapman, 1899)

Halipeurus (Halipeurus) spadix Timmermann, 1961

Naubates harrisoni Bedford, 1930

Trabeculus flemingi Timmermann, 1959

Fleas: *Notiopsylla corynetes* Smit, 1979

Parapsyllus lynnae alynnae Smit, 1979

Puffinus assimilis tunneyi

- Lice: *Halipeurus (Halipeurus) placodus* Edwards, 1961

Puffinus assimilis haurakiensis

- Lice: *Ancistrona* sp.
Austromenopon paululum (Kellogg & Chapman, 1899)

Halipeurus (Halipeurus) munda Edwards, 1961

Trabeculus mirabilis (Kellogg, 1896)

Puffinus assimilis elegans

- Lice: *Halipeurus (Halipeurus) munda* Edwards, 1961

Trabeculus mirabilis (Kellogg, 1896)

Puffinus assimilis kermadecensis

- Lice: *Ancistrona* sp.
Austromenopon paululum (Kellogg & Chapman, 1899)

Halipeurus (Halipeurus) placodus Edwards, 1961

Trabeculus mirabilis (Kellogg, 1896)

Family OCEANITIDAE

Oceanites oceanicus

- Lice: *Halipeurus* (*Synnautes*) *pelagicus* (Denny, 1842)
Philoceanus robertsi (Clay, 1940)
Saemundssonina ?marina Timmermann, 1956

Oceanites nereis

- Lice: *Philoceanus garrodiae* (Clay, 1940)
Saemundssonina nereis Timmermann, 1956

Pelagodroma marina

- Lice: *Austromenopon enigki* Timmermann, 1963
Halipeurus (*Synnautes*) *pelagicus* (Denny, 1842)
Longimenopon sp.
Saemundssonina marina Timmermann, 1956

Fleas:

- Parapsyllus cardinis* Dunnet, 1961
Parapsyllus jacksoni Smit, 1965
Parapsyllus lynnae mariae Smit, 1979
Parapsyllus taylora Jordan, 1942

Pelagodroma marina albiclunus

- Lice: *Ancistrona* sp.
Halipeurus (*Synnautes*) *pelagicus* (Denny, 1842)

Fregetta tropica

- Lice: *Austromenopon* sp.
Halipeurus (*Synnautes*) *pelagicus* (Denny, 1842)
Philoceanus fasciatus (Carriker, 1958)
Saemundssonina sp.

Fregetta grallaria

- Lice: *Halipeurus* (*Synnautes*) *pelagicus* (Denny, 1842)

Family PELECANOIDIDAE

Pelecanoides georgicus

- Lice: *Austromenopon elliotti* Timmermann, 1954
Pelmatocerandra enderleini Eichler, 1949
 Ticks: *Ixodes kerguelensis* André & Colas-Belcour, 1942

Pelecanoides urinatrix urinatrix

- Lice: *Austromenopon elliotti* Timmermann, 1954
Halipeurus (*Halipeurus*) *falsus pacificus* Edwards, 1961
Pelmatocerandra setosa (Giebel, 1876)
 Fleas: *Parapsyllus jacksoni* Smit, 1965
 Ticks: *Ixodes auritululus zealandicus* Dumbleton, 1961
Ixodes kerguelensis André & Colas-Belcour, 1942

Pelecanoides urinatrix chathamensis

- Lice: *Austromenopon elliotti* Timmermann, 1954
Halipeurus (*Halipeurus*) *falsus pacificus* Edwards, 1961
Pelmatocerandra setosa (Giebel, 1876)
 Fleas: *Notiopsylla enciari* X *peregrinus*

Pelecanoides urinatrix exsul

- Lice: *Austromenopon elliotti* Timmermann, 1954
Halipeurus (*Halipeurus*) *falsus pacificus* Edwards, 1961
Pelmatocerandra setosa (Giebel, 1876)
 Fleas: *Notiopsylla kerguelensis kerguelensis* (Taschenberg, 1880)
Parapsyllus cardinis Dunnet, 1961
Parapsyllus magellanicus magellanicus Jordan, 1938

Family PELECANIDAE

Pelecanus conspicillatus

- Lice: *Colpocephalum eucarenum* Burmeister, 1838
Pectinopygus australis Thompson, 1948
Piagetiella africana (Bedford, 1931)

Family SULIDAE

Sula serratator

- Lice: *Eidmanniella pustulosa* (Nitzsch, 1866)
Pectinopygus bassani (O. Fabricius, 1780)
 Ticks: *Ixodes eudyptidis* Maskell, 1885
Ixodes kohlsi Arthur, 1955

Sula sula

- Lice: *Pectinopygus sulae* (Rudow, 1869)
 Ticks: *Amblyomma loculosum* Neumann, 1907

Sula leucogaster

- Lice: *Eidmanniella albescens* (Piaget, 1880)
Pectinopygus garbei (Pessôa & Guimarães, 1935)
 Ticks: *Amblyomma loculosum* Neumann, 1907
Ornithodoros capensis Neumann, 1907

Sula dactylatra

- Lice: *Pectinopygus annulatus* (Piaget, 1880)
 Ticks: *Amblyomma loculosum* Neumann, 1907
Ornithodoros capensis Neumann, 1907

Family ANHINGIDAE

Anhinga melanogaster

- Lice: *Pectinopygus aquaticus* Clay, 1973

Family PHALACROCOCORACIDAE

Phalacrocorax carbo

- Lice: *Eidmanniella pellucida* (Rudow, 1869)
Pectinopygus gyricornis (Denny, 1842)
 Fleas: *Parapsyllus longicornis* (Enderlein, 1901)
 Ticks: *Argas* (*Persiargas*) *robertsi* Hoogstraal, Kaiser & Kohls, 1968
Ixodes eudyptidis Maskell, 1885

Phalacrocorax varius

- Lice: *Eidmanniella pellucida* (Rudow, 1869)
Pectinopygus varius Timmermann, 1964

Phalacrocorax sulcirostris

- Lice: *Eidmanniella subrotunda* (Piaget, 1880)
Pectinopygus setosus (Piaget, 1880)

Phalacrocorax punctatus

- Lice: *Eidmanniella pellucida* (Rudow, 1869)
Pectinopygus punctatus Timmermann, 1964
 Fleas: *Parapsyllus longicornis* (Enderlein, 1901)
 Ticks: *Ixodes eudyptidis* Maskell, 1885
Ixodes jacksoni Hoogstraal, 1967
Ixodes uriae White, 1852
Ornithodoros capensis Neumann, 1907

Phalacrocorax featherstoni

- Lice: *Pectinopygus* sp.

Phalacrocorax fuscescens

- Lice: *Pectinopygus kosswigi* Timmermann, 1964
 Ticks: *Ixodes kohlsi* Arthur, 1955
Ixodes uriae White, 1852

Phalacrocorax bransfieldensis

- Lice: *Pectinopygus turbinatus* (Piaget, 1890)
Piagetiella caputincisa Eichler, 1950

- Phalacrocorax purpurascens**
Lice: *Pectinopygus turbinatus* (Piaget, 1890)
Ticks: *Ixodes uriae* White, 1852
- Phalacrocorax carunculatus**
Lice: *Pectinopygus* sp.
- Phalacrocorax chalconotus**
Lice: *Eidmanniella pellucida* (Rudow, 1869)
Pectinopygus sp.
Fleas: *Parapsyllus magellanicus magellanicus* Jordan, 1938
- Phalacrocorax onslowi**
Lice: *Pectinopygus* sp.
- Phalacrocorax campbelli**
Lice: *Pectinopygus carunculatus* Timmermann, 1964
- Phalacrocorax colensoi**
Lice: *Pectinopygus carunculatus* Timmermann, 1964
Fleas: *Parapsyllus magellanicus magellanicus* Jordan, 1938
- Phalacrocorax ranfurlyi**
Lice: *Pectinopygus* sp.
- Phalacrocorax melanoleucos melanoleucos**
Lice: *Pectinopygus dispar* (Piaget, 1880)
- Phalacrocorax melanoleucos brevirostris**
Lice: *Eidmanniella subrotunda* (Piaget, 1880)
Pectinopygus dispar (Piaget, 1880)
- Family FREGATIDAE
Fregata minor
Ticks: *Amblyomma loculosum* Neumann, 1907
- Fregata ariel**
Ticks: *Amblyomma loculosum* Neumann, 1907
- Family PHAETHONTIDAE
Phaethon rubricauda
Lice: *Austromenopon becki* (Kellogg, 1906)
Saemundssonina hexagona (Giebel, 1874)
- Phaethon lepturus**
Lice: *Saemundssonina upoluensis* (Rudow, 1870)
- Family ARDEIDAE
Ardea sumatrana
Louse-flies: *Icosta (Ardmoeca) ardea ardea* (Macquart), 1835
- Ardea novaehollandiae**
Lice: *Ardeicola pilgrimi* Tandan, 1972
Ciconiphilus decimfasciatus (Boisduval & Lacordaire, 1835)
- Ardea picata**
Ticks: *Argas (Persiargas) robertsi* Hoogstraal, Kaiser & Kohls, 1968
- Ardea ibis**
Lice: *Ciconiphilus decimfasciatus* (Boisduval & Lacordaire, 1835)
Ticks: *Argas (Persiargas) robertsi* Hoogstraal, Kaiser & Kohls, 1968
- Ardea alba**
Lice: *Ardeicola expallidus* Blagoveshtchensky, 1940
Ciconiphilus decimfasciatus (Boisduval & Lacordaire, 1835)
- Ticks: *Argas (Persiargas) robertsi* Hoogstraal, Kaiser & Kohls, 1968
- Ardea garzetta**
Lice: *Ardeicola expallidus* Blagoveshtchensky, 1940
Ciconiphilus decimfasciatus (Boisduval & Lacordaire, 1835)
- Ardea sacra**
Lice: *Ciconiphilus decimfasciatus* (Boisduval & Lacordaire, 1835)
- Louse-flies: *Icosta (Ardmoeca) ardea ardea* (Macquart, 1835)
- Ixobrychus minutus**
Louse-flies: *Ornithoica beccariina* Rondani, 1878
- Botaurus poiciloptilus**
Lice: *Ardeicola stellaris* (Denny, 1842)
Ciconiphilus decimfasciatus (Boisduval & Lacordaire, 1835)
- Family CICONIIDAE
Ephippiorhynchus asiaticus
Lice: *Neophilopterus horridus* (Giebel, 1876)
Louse-flies: *Icosta (Ardmoeca) sp.*
- Family PLATALEIDAE
Plegadis falcinellus
Lice: *Ardeicola raphidius* (Nitzsch, 1866)
Colpocephalum leptopygos Nitzsch, 1866
Ibidoecus bisignatus (Nitzsch, 1866)
Plegadiphilus plegadis (Dubinin, 1938)
- Threskiornis molucca**
Lice: *Ardeicola ibis* (LeSouef & Bullen, 1902)
Ibidoecus diana Tandan, 1958
Plegadiphilus threskiornis Bedford, 1939
Ticks: *Argas (Persiargas) robertsi* Hoogstraal, Kaiser & Kohls, 1968
- Threskiornis spinicollis**
Lice: *Ardeicola australis* Hajela & Tandan, 1967
Colpocephalum spinicollis Price & Beer, 1965
Ibidoecus australis Kumar & Tandan, 1966
- Platalea regia**
Lice: *Ardeicola plataleae* (Linnaeus, 1758)
Eucolpocephalum femorale (Piaget, 1880)
Ibidoecus plataleae (Denny, 1842)
- Platalea flavipes**
Lice: *Ardeicola harrisoni* Hajela & Tandan, 1970
Ibidoecus flavus Cummings, 1916
- Family ANSERANATIDAE
Anseranas semipalmata
Lice: *Acidoproctus hilli* (Harrison, 1915)
Holomenopon goliath Clay, 1961
- Family ANATIDAE
Dendrocygna eytoni
Lice: *Acidoproctus emersoni* Timmermann, 1962
Holomenopon leucoxanthum (Burmeister, 1838)
Trinoton fluviatile Clay, 1963

Dendrocygna arcuata

- Lice: *Acidoproctus emersoni* Timmermann, 1962
Holomenopon leucoxanthum (Burmeister, 1838)
Trinoton laveryi Clay, 1963

Biziura lobata

- Lice: *Austrogoniodes metoecus* Clay, 1971

Cygnus olor

- Lice: *Anatoecus icterodes oloris* Zlotorzycza, 1970
Ornithobius bucephalus (Giebel, 1874)

Cygnus atratus

- Lice: *Anaticola megaceros* (Johnston & Harrison, 1912)
Anatoecus dentatus magnicornutus Zlotorzycza, 1970
Anatoecus icterodes oloris Zlotorzycza, 1970
Anatoecus sp.
Ciconiphilus pectiniventris (Harrison, 1916)
Holomenopon leucoxanthum (Burmeister, 1838)
Ornithobius fuscus Le Souëf, 1902
Trinoton nigrum Le Souëf, 1902

Branta canadensis

- Lice: *Ciconiphilus pectiniventris* (Harrison, 1916)
Holomenopon leucoxanthum (Burmeister, 1838)
Ornithobius goniopleurus Denny, 1842
Trinoton querquedulae (Linnaeus, 1758)

Cereopsis novaehollandiae

- Lice: *Anaticola australis* (Rudow, 1869)
Anatoecus clayae (Kéler, 1960)

Tadorna variegata

- Lice: *Anaticola magnificus* Ansari, 1955
Anatoecus dentatus (Scopoli, 1763)
Anatoecus icterodes (Nitzsch, 1818)
Holomenopon tadornae (Gervais, 1844)
Trinoton querquedulae (Linnaeus, 1758)

Tadorna radjah

- Lice: *Holomenopon leucoxanthum* (Burmeister, 1838)

Chenonetta jubata

- Lice: *Holomenopon setigerum* (Blagoveshtchensky, 1948)

Malacorhynchus membranaceus

- Lice: *Saemundssonina minitans* Timmermann, 1977

Hymenolaimus malacorhynchus

- Lice: *Acidoproctus gottwaldhirschi* Eichler, 1958
Anatoecus icterodes (Nitzsch, 1818)

Anas gracilis

- Lice: *Anaticola crassicornis* (Scopoli, 1763)
Anatoecus dentatus (Scopoli, 1763)
Anatoecus icterodes (Nitzsch, 1818)
Trinoton querquedulae (Linnaeus, 1758)
Ticks: *Ornithodoros macmillani* Hoogstraal & Kohls, 1966

Anas chlorotis

- Lice: *Anaticola* sp.
Anatoecus icterodes (Nitzsch, 1818)

Anas aucklandica

- Lice: *Holomenopon leucoxanthum* (Burmeister, 1838)

Anas platyrhynchos

- Lice: *Anaticola crassicornis* (Scopoli, 1763)
Anatoecus dentatus (Scopoli, 1763)
Anatoecus icterodes (Nitzsch, 1818)
Holomenopon leucoxanthum (Burmeister, 1838)
Trinoton querquedulae (Linnaeus, 1758)

Anas superciliosa

- Lice: *Anaticola crassicornis* (Scopoli, 1763)
Anatoecus dentatus (Scopoli, 1763)
Anatoecus icterodes (Nitzsch, 1818)
Holomenopon leucoxanthum (Burmeister, 1838)
Trinoton querquedulae (Linnaeus, 1758)

Anas rhynchotis

- Lice: *Anaticola crassicornis* (Scopoli, 1763)
Anatoecus icterodes (Nitzsch, 1818)
Holomenopon sp.
Trinoton querquedulae (Linnaeus, 1758)

Aythya australis

- Lice: *Anaticola crassicornis* (Scopoli, 1763)
Holomenopon leucoxanthum (Burmeister, 1838)

Aythya novaeseelandiae

- Lice: *Anaticola crassicornis* (Scopoli, 1763)
Anatoecus icterodes (Nitzsch, 1818)
Holomenopon sp.
Trinoton querquedulae (Linnaeus, 1758)