

A revision of the annotated checklist of ectoparasites of terrestrial mammals in New Zealand

J. D. Tenquist*, W. A. G. Charleston**

The 1981 annotated checklist of Tenquist and Charleston is completely revised. Forty five new records have been added, and recent taxonomic changes are included for both hosts and parasites.

Keywords: checklist, New Zealand mammals, terrestrial parasites, ectoparasites, Acari, Diptera, Pentastomida, Phthiraptera, Siphonaptera, fleas, flies, lice, mites, ticks.

INTRODUCTION

Since the first annotated checklist of ectoparasites of terrestrial mammals in New Zealand was published (Tenquist & Charleston 1981), there have been a number of additional records and several taxonomic changes. This revision adds them, and also provides an opportunity to correct errors and add further information where appropriate.

In the first part of the checklist, parasites are listed alphabetically by their generic name and, as far as possible, the arrangement within each entry is consistent. The term “Regular host(s)” is used throughout to denote the host or hosts of which the species listed is usually considered a parasite, and includes such designations as “definitive” or “preferred” hosts. Following the convention of the previous list, we have included the scientific name of the host the first time it appears, thereafter, only the common name is used. The term “cattle” has been used to indicate domesticated *Bos taurus* rather than “ox”, as the former is in more common use. In addition, following modern usage, the term “man” has been replaced with “humans” (except in the titles of cited papers). The heading “Also recorded from” is included throughout to indicate, not only where there is an additional host record for New Zealand, but also where there is none by the entry “host specific” or “NR” (no record).

The entry under “New Zealand record” indicates the first published or unpublished record of which we are aware. The reference given under the heading “Description” is an attempt to indicate, where possible, a description, illustration, or key that should be reasonably accessible but is not necessarily the original or a complete description.

There have been a considerable number of taxonomic alterations. For example, Dear (1985) completely revised the New Zealand Calliphoridae and made several significant changes, which are now incorporated. In general these do not affect the arrangement of the checklist, but one “species” has been deleted (*Calliphora nothocalliphoralis* Miller, 1939). Of considerable economic impact was the arrival of *Lucilia cuprina*. It is not known exactly

*Wallaceville Animal Research Centre, Animal Health Division of AgResearch Ltd,
P O Box 40 063 Upper Hutt, New Zealand

Present address: 12 Bethune Street, Featherston, New Zealand

**Institute of Veterinary, Animal & Biomedical Sciences, Massey University, Private Bag 11 222
Palmerston North, New Zealand

when *L. cuprina* became established in New Zealand but Dear (1985) had identified specimens collected from aircraft prior to 1985. Bishop (1993) established that the fly was present in New Zealand in 1984, and it was probably introduced in the late 1970s (Heath et al. 1991).

The classification of the family Trichodectidae (Phthiraptera) at the generic level has been a matter of contention for many years (see Hopkins 1949; Hopkins & Clay 1952; Emerson & Price 1981). The latest revision of this family, based on a cladistic analysis of a large number of characters, was published by Lyal (1985). His generic classification and allocation of species are followed in this checklist. Accordingly, the generic name "*Damalinia*", which was in common usage from 1960–1985 and which was used in the previous list, is replaced by "*Bovicola*" in a number of species. Following Lyal (1985), the two trichodectid lice from white-tailed deer remain in the genus *Damalinia* but in the subgenus *Tricholipeurus*. However, it is understood that *Tricholipeurus* may be given generic status in a forthcoming world catalogue.

Some hosts that previously had no parasites recorded from them have been added. An additional species of bat (*Mystacina robusta*) is included, and the list of wallabies has been amended with one further species added (King 1990). The scientific and common names used for hosts have also been amended where necessary to be consistent with those used by King (1990); for this reason *Rattus exulans* is referred to by its Maori name, kiore, rather than Pacific rat.

Of interest are several newly recorded parasites. Desch (1989) described two new species of *Demodex* from the native lesser short-tailed bat (*Mystacina tuberculata*) and a previously undescribed species from sheep (Desch 1986). Heath et al. (1987a) added a new laelapid mite to the list of parasites of the short-tailed bat. The bat-fly *Mystacinobia zelandica* has not been included in the checklist as, unlike other bat-flies, it is not parasitic. It lives in a close commensal relationship with the lesser short-tailed bat, feeding on bat guano (Holloway 1976; Daniel 1979). It appears, however, that there are a number of ectoparasites of short-tailed bats, including an argasid tick, that have yet to be described (Daniel 1990).

The original checklist recorded only two ectoparasites from the brushtail possum (*Trichosurus vulpecula*) (previously known as "opossum"). During the last few years, efforts to rid the country of the possums have prompted much research into their habits, and the biology of their parasites (Clark 1993; Clark et al. 1997) and a number of new records have been added.

As in the previous list, several free-living mites that are regularly or occasionally associated with allergic (hypersensitivity) reactions in humans are included. Not all of these have been associated with allergic reactions in New Zealand but have been found here in houses or recorded from other hosts. Some other free-living, predatory or saprophytic mites have been added which are commonly associated overseas with rodents and their nests, and have now been recovered from rodents in New Zealand. However, there are a substantial number of other free-living mites, recorded as incidentally associated with rodents in New Zealand, which have not been included except where the mite is already in the checklist in association with other hosts. Most of these, particularly those associated with *Rattus exulans*, are listed in Roberts (1991a, 1991b, citing G. W. Ramsay pers. comm.); others can be found in Gibson (1972).

Despite our efforts to avoid them, there were a number of errors and omissions in the earlier version of this list. We have made every effort to find these and correct them in this revision.

ACKNOWLEDGMENTS

The contributions of our colleagues who checked the entries for the various groups are gratefully acknowledged: Dallas Bishop, Wallaceville Animal Research Centre (Calliphoridae); Ricardo Palma, Museum of New Zealand (Phthiraptera); R. L. C. (Bob) Pilgrim, University of Canterbury (Siphonaptera); Trevor Crosby and Tingkui Qin, Landcare Research; (Culicidae); Allen Heath, Wallaceville Animal Research Centre (Acari). We would also like to thank the referees, Allen Heath and Ricardo Palma, for their critical review of the manuscript and many helpful comments and suggestions.

CHECKLIST

An asterisk preceding an entry indicates that it was included in the previous list but that the genus or species name has been revised. Entries preceded by # are additions to the previous list. For ease of reference and where appropriate, a page number has been included in the citation of references: for example, Hughes (1976:33) indicates page 33 in that reference.

***Acarus siro* (Linnaeus, 1758)**

(= *Aleuiobius farinae* var. *africana* Oudemans, 1906)

(= *Tyroglyphus farinae* de Geer, 1778)

Acaridae

Acari

Regular hosts: stored product mite; not parasitic.

Also recorded from: humans (*Homo sapiens*) (Helson 1956) [as *Tyroglyphus farinae*].

Distribution: cosmopolitan. N.Z. distribution unknown.

N.Z. record: Thomson (1922) (as *T. farinae*).

Description: Hughes (1976:33); Domrow (1992:1481).

Notes: occasionally associated with allergic reactions in humans. 0.1% of mites recovered from 59 house dust samples from Christchurch were of this species (Martin et al. 1997).

***Aedes (Finlaya) notoscriptus* (Skuse, 1889)**

Culicidae

Diptera

Regular hosts: probably birds.

Also recorded from: humans, cattle (*Bos taurus*) (Graham 1929:209).

Distribution: Australia, N.Z., New Caledonia, New Guinea, Moluccas and other island groups in the western Pacific (see Belkin 1968:105). In N.Z., North Auckland, Little Barrier Island, Gisborne, Wellington district, Nelson, Canterbury.

N.Z. record: Miller (1920) (as *Ochlerotatus notoscriptus*).

Description: Belkin (1962, 1968:103).

Notes: having considered the distribution of this species in N.Z., Belkin (1968:105) concluded this may well be an introduced species as originally suggested by Graham (1939).

***Aedes (Ochlerotatus) antipodeus* (Edwards, 1920)**

(= *Ochlerotatus antipodeus* Edwards, 1920)

Culicidae

Diptera

Regular hosts: probably birds.

Also recorded from: humans (Graham 1939:212).

Distribution: recorded only from N.Z., widespread.

N.Z. record: Edwards (1920).

Description: Belkin (1968:98).

Notes: it is unlikely that humans are the only mammalian hosts; may bite day or night (Graham 1939).

***Aedes (Ochlerotatus) subalbirostris* Klein & Marks, 1960**

Culicidae

Diptera

Regular hosts: probably birds.

Also recorded from: humans (Belkin 1968:102).

Distribution: recorded only from N.Z., [Otago, Coastal Southland].

N.Z. record: Hutton (1881) (as *A. albirostris*).

Description: Belkin (1968:100).

***Allothyrus australasiae* (Womersley, 1935)**

Holothyridae

Acari

Regular hosts: free living; not parasitic.

Also recorded from: humans (Helson 1956).

Distribution: not known.

N.Z. record: Womersley (1935).

Description: Womersley (1935) (as *Holothyryus australasiae*).

Notes: occasionally associated with allergic reactions in humans.

*Amblyomma cyprium cyprium* Neumann, 1899

Ixodidae

Acari

Regular hosts: recorded from pig (*Sus scrofa*), cattle, and horse (*Equus caballus*) in Fiji.

Also recorded from: NR.

Distribution: known from Fiji, Guam, and Philippines.

N.Z. record: one confirmed record on foodstuffs imported from Fiji (Fairley & Heath 1997).

Description: Anastos (1950:89).

***Amblyomma triguttatum triguttatum* Koch, 1844**

Ixodidae

Acari

Regular hosts: Macropodidae.

Also recorded from: humans (Rowe 1980).

Distribution: Queensland, New South Wales, and Western Australia.

N.Z. record: Rowe (1980).

Description: Roberts (1970:109).

Notes: one engorged nymph was collected from a visitor from Australia: Rowe's identification confirmed to species by A. C. G. Heath (pers. comm.). Further introductions recorded in Fairley & Heath (1997).

***Androlaelaps casalis casalis* (Berlese, 1887)**

(= *Haemolaelaps megaventralis* (Oudemans, 1929))

Laelapidae (= Laelaptidae of some authorities)

Acari

Regular hosts not parasitic (see Notes)

Also recorded from European hedgehog (*Erinaceus europaeus occidentalis*) (in N Z) (Sweatman 1962), Norway rat (*Rattus norvegicus*) (Gibson 1972)

Distribution cosmopolitan N Z distribution unknown

N Z record Sweatman (1962) (as *H megaventralis*)

Description Evans & Till (1966 152), Hughes (1976 288)

Notes Sweatman (1962) records that this was identified as *H megaventralis* by H Womersley following collection from a hedgehog's nest in Wellington by R E Brockie Recorded from the bodies and nests of a wide range of mammals and birds, and other habitats overseas (see Strandtmann & Wharton (1958) and Hughes (1976) Sweatman (1962) and Brockie (1990) refer to these mites as blood-sucking but the species is a general feeder and not parasitic (see Hughes 1976 290) For synonymy, see Evans & Till (1966) and Hughes (1976 290)

*Aponomma hydrosauri* (Denny, 1843)

(= *Ixodes hydrosauri* Denny, 1843)

Ixodidae

Acari

Regular hosts found on a wide range of reptilian hosts in Australia and occasionally taken from cattle and horses

Also recorded from humans (A C G Heath pers comm)

N Z record A C G Heath (pers comm)

Distribution widely distributed throughout Australia

Description Roberts (1970 116)

Notes intercepted in a traveller's clothing in Auckland

***Atellana papilio* Domrow, 1958**

Listrophoridae

Acari

Regular hosts brushtail possum (*Trichosurus vulpecula*)

Also recorded from *T caninum* in Australia (Domrow 1992)

Distribution Australia (SE Queensland, NE New South Wales, and Tasmania) (Domrow 1992), N Z

N Z record Sweatman (1962)

Description Domrow (1958)

Notes Clark et al (1997) established that this mite is present on possums throughout N Z

***Austrosimulium* (*Austrosimulium*) *australense* (Schiner, 1868)**

(= *Austrosimulium tullyardi* (Tonnoir, 1925))

Simuliidae

Diptera

Regular hosts probably birds, recorded from Fiordland crested penguin (*Eudyptes pachyrynchus*) (Fallis et al 1976)

Also recorded from humans (Helson 1956)

Distribution known only from N Z, recorded from North Island and coastal areas of South Island and Stewart Island

N Z record Hutton (1881)

Description Dumbleton (1972 505)

Notes: principal North Island blackfly pest species. In N.Z., these are popularly known as “sandflies”. They are more correctly referred to as “blackflies” (Ferro et al. 1977).

***Austrosimulium (Austrosimulium) dumbletoni* Crosby, 1976**

Simuliidae

Diptera

Regular hosts: Fiordland crested penguin and probably other birds.

Also recorded from: humans (Crosby 1976).

Distribution: known from South Island of N.Z. only.

N.Z. record: Crosby (1976).

Description: Crosby (1976).

***Austrosimulium (Austrosimulium) ungulatum* Tonnoir, 1925**

Simuliidae

Diptera

Regular hosts: probably birds, recorded from Fiordland crested penguin (Fallis et al. 1976).

Also recorded from: humans (Helson 1956).

Distribution: known from South Island and Stewart Island of N.Z. only.

N.Z. record: Tonnoir (1925:250).

Description: Dumbleton (1972:526).

Notes: principal South Island blackfly pest species.

*Boopia notafusca* Le Souëf, 1902

Boopidae

Phthiraptera

Regular hosts: swamp wallaby (*Wallabia bicolor*) [in Australia].

Also recorded from: brushtailed rock wallaby [also known as blacktailed rock wallaby or rock wallaby] (*Petrogale penicillata penicillata*) (Palma 1996).

Distribution: Australia, N.Z.

N.Z. record: Palma (1996:162).

Description: Kéler (1971).

*** *Bovicola (Bovicola) bovis* (Linnaeus, 1758)**

(= *Damalinea bovis* (Linnaeus, 1758))

(= *Pediculus bovis* Linnaeus, 1758)

Trichodectidae

Phthiraptera

Regular hosts: cattle.

Also recorded from: host specific.

Distribution: cosmopolitan: widespread in N.Z.

N.Z. record: Thomson (1922) [as *Trichodectes scalaris* (misdet.)].

Description: Séguy (1944:388)

*** *Bovicola (Bovicola) caprae* (Gurlt, 1843)**

(= *Damalinea caprae* (Gurlt, 1843))

(= *Trichodectes caprae* Gurlt, 1843)

Trichodectidae

Phthiraptera

Regular hosts: goat (*Capra hircus*).

Also recorded from: host specific.

Distribution. cosmopolitan.

N.Z. record: Johnston & Harrison (1911) [as *Trichodectes climax* (misdet)].

Description: Séguy (1944:391) [as *T. climax*].

* ***Bovicola (Spinibovicola) hemitragi* (Cummings, 1916)**

(= *Damalima hemitragi* (Cummings, 1916))

(= *Trichodectes hemitragi* Cummings, 1916)

Trichodectidae

Phthiraptera

Regular hosts: tahr (*Hemitragus jemlahicus*).

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: Andrews (1970) [as *Damalima hemitragi*].

Description: Andrews (1971) [male]; Cummings (1916:273) [female].

Notes: for synonymy, see Andrews (1973).

* ***Bovicola (Bovicola) limbatus* (Gervais, 1844)**

(= *Damalima limbata* (Gervais, 1844))

(= *Trichodectes limbatus* Gervais, 1844)

Trichodectidae

Phthiraptera

Regular hosts: goat.

Also recorded from: host specific.

Distribution: cosmopolitan. Presumed range of host.

N.Z. record: R. L. Pilgrim, unpubl. in: Andrews (1973) [as *Damalima limbata*].

Description: Séguy (1944:394) [as *T. limbatus*].

Notes: similar to *B. caprae* with which it is probably often confused and occupying the same ecological niche.

* ***Bovicola (Bovicola) longicornis* (Nitzsch, 1818)**

(= *Damalima longicornis* (Nitzsch, 1818))

(= *Trichodectes longicornis* Nitzsch, 1818)

Trichodectidae

Phthiraptera

Regular hosts: red deer (*Cervus elaphus scoticus*).

Also recorded from: wapiti (*Cervus elaphus nelsoni*), chamois (*Rupicapra rupicapra*) (Andrews 1973)

Distribution: presumed range of hosts.

N.Z. record: Andrews (1964) [as *Damalima longicornis*].

Description: Séguy (1944:396) [as *T. longicornis*]; Andrews (1964) [male].

* ***Bovicola (Bovicola) ovis* (Schrank, 1781)**

(= *Damalima ovis* (Schrank, 1781))

(= *Pediculus ovis* Schrank, 1781)

Trichodectidae

Phthiraptera

Regular hosts: sheep (*Ovis aries*).

Also recorded from: host specific.

Distribution: cosmopolitan: common throughout N.Z.
N.Z. record: early Department of Agriculture records before 1880.
Description: Séguy (1944:399) [as *Trichodectes ovis*].

***Calliphora hilli* Patton, 1925**

(= *C. milleri* Hardy, 1937)

Calliphoridae

Diptera

Regular "host": carrion (larvae).

Also recorded from: live sheep (larvae only). Also recorded from human corpses (Smeeton et al. 1984).

Distribution: known only from N.Z. and Australia. Widespread in N.Z.

N.Z. record: Miller (1921) (as *C. rufipes*).

Description: Dear (1985:22); Holloway (1985:14) [larvae].

Notes: *C. hilli* is recorded as an occasional cause of myiasis (fly strike) in sheep (Dear 1985:23). Miller (1939b) found 0.36% of approximately 15 000 flies reared from larvae from fly strike samples to be of this species. See Dear (1985:8) for discussion of the synonymy of this species.

***Calliphora quadrimaculata* (Swederus, 1787)**

(= *Calliphora cockaynei* Hutton, 1904))

Calliphoridae

Diptera

Regular "host": carrion (also decaying plant material (Holloway 1985)) (larvae).

Also recorded from: live sheep (larvae only).

Distribution: throughout N.Z. Recently recorded from Australia (Kurahashi & Wells 1995).

N.Z. record: Hutton (1881).

Description: Dear (1985:23); Holloway (1985:14) [larvae].

Notes: An occasional cause of myiasis (fly strike) in sheep (Dear 1985:24). Miller (1939b) found 1.2% of approximately 15 000 flies reared from larvae from fly strike samples to be of this species.

***Calliphora stygia* (Fabricius, 1781)**

(= *Musca stygia* Fabricius, 1781)

(= *Calliphora villosa* Robineau-Desvoidy, 1830)

(= *Musca laemica* White, 1843)

(= *Calliphora laemica* (White, 1843))

Calliphoridae

Diptera

Regular "host": carrion, other meat-based substrates and decaying plant material (larvae).

Also recorded from: live sheep (Miller 1921), goat and cattle (larvae only) (D. M. Bishop pers. comm.). Also recorded from human corpses during forensic examinations (T. K. Crosby, pers. comm.).

Distribution: Australia and N.Z.

N.Z. record: White (1846) (as *C. laemica*).

Description: Dear (1985:24); Holloway (1985:14) [larvae].

Notes: a common primary strike fly of sheep. Miller (1939b) found 49.0% of approximately 15 000 flies reared from larvae from fly strike samples to be of this species. Heath (1985) recorded its presence in 54.9% of 91 fly strike cases.

***Calliphora vicina* Robineau-Desvoidy, 1830**

(= *Musca erythrocephala* Meigen, 1826)

(= *Calliphora erythrocephala* Séguy, 1928)

Calliphoridae

Diptera

Regular "host": carrion and other decomposing organic matter (larvae only).

Also recorded from: live sheep (Heath 1985) (larvae only). This species has also been recorded from human corpses during forensic examinations (T. K. Crosby, pers. comm.).

Distribution: cosmopolitan (except for African continent south of Sahara). Throughout N.Z. N.Z. record: Miller (1921) (as *C. erythrocephala*).

Description: Dear (1985:26); Holloway (1985:14) [larvae].

Notes: regarded as a secondary strike fly by Miller (1939a). Miller (1921) considered it likely to be a contributor to fly strike in sheep although he did not rear it from almost 15 000 larvae from fly-struck sheep (Miller 1939b). Heath (1985) reported it from 1.1% of 91 fly strike cases.

***Caparinia tripilis* (Michael, 1889)**

Psoroptidae

Acari

Regular hosts: European hedgehog.

Also recorded from: host specific.

Distribution: presumed range of European hedgehog.

N.Z. record: Brockie (1958).

Description: Krantz (1978:426).

*Cephenomyia trompe* (Modeer, 1786)

Oestridae

Diptera

Regular hosts: reindeer (*Rangifer tarandus*).

Also recorded from: (in N.Z.) wapiti, white-tailed deer (*Odocoileus virginianus borealis*) [A. C. G. Heath pers. comm.].

Distribution: range of reindeer

N.Z. record: P. Mason (pers. comm.).

Description: Zumpt (1965:147).

Notes: intercepted on imported animals at Somes Island quarantine station.

***Ceratophyllus (Ceratophyllus) gallinae* (Schrank, 1803)**

(= *Pulex avium* Kirk, 1900)

Ceratophyllidae

Siphonaptera

Regular hosts: domestic fowl (*Gallus domesticus*) and other birds.

Also recorded from: humans (J. D. Tenquist, pers. obs.); stoat (*Mustela erminea*) (C. M. King pers. comm.).

Distribution: cosmopolitan; prevalence and distribution in New Zealand not known.

N.Z. record: Kirk (1900) (as *P. avium*).

Description: Dunnet & Mardon (1974:130); Smit (1979).

Notes: Pilgrim (pers. comm.) unsuccessfully tried to locate Kirk's material; it is variously synonymised with *C. gallinae*, *C. columbae*, and *C. hirundinis* (neither of the latter two known from N.Z.). See Bishop & Heath (1998) for avian host list.

*Cheyletiella blakei* Smiley, 1970

Cheyletiellidae

Acari

Regular hosts: house cat (*Felis catus*).

Also recorded from: *Ctenocephalides felis* as “hyperparasitic” (Guzman 1982).

Distribution: not known.

N.Z. record: Guzman (1982).

Description: Smiley (1970).

Notes: the distinction of *Cheyletiella blakei* from *C. parasitivorax* is based on the descriptions given by Smiley (1970). Prior to this date, *Cheyletiella* from cats was generally reported as *C. parasitivorax*. Whether or not cats can be hosts to *C. blakei* and *C. parasitivorax* has not been established.

***Cheyletiella parasitivorax* (Megnin, 1878)**

Cheyletiellidae

Acari

Regular hosts: European rabbit (*Oryctolagus cuniculus cuniculus*).

Also recorded from: humans, house cat (Moxham et al. 1968).

Distribution: cosmopolitan: prevalence and distribution in N.Z. not known.

N.Z. record: Womersley (1941) [European rabbit].

Description: Womersley (1941); Smiley (1970).

Notes: see notes for *C. blakei*.

***Cheyletiella yasguri* Smiley, 1965**

Cheyletiellidae

Acari

Regular hosts: dog (*Canis familiaris*).

Also recorded from: humans (Davis & Kyle 1969).

Distribution: cosmopolitan. Presumed range of host.

N.Z. record: Davis & Kyle (1969).

Description: Foxx & Ewing (1969); Smiley (1970).

***Cheyletus eruditus* (Schrank, 1781)**

Cheyletidae

Acari

Regular hosts: not parasitic; predatory on other mites.

Also recorded from: kiore (*Rattus exulans*) (Roberts 1991a, citing Ramsay pers. comm.).

Distribution: cosmopolitan. Likely to be found throughout N.Z.

N.Z. record: Spain & Luxton (1971).

Description: Hughes (1976:235).

Notes: occasionally associated with allergic reactions in humans overseas. 1.8% of mites recovered from 59 samples of house dust in Christchurch were of this species (Martin et al. 1997). Cornere (1971) found *Cheyletus* sp. in 18/22 samples of house dust from Auckland.

*Chirodiscoides caviae* Hirst, 1917

Listrophoridae

Acari

Regular hosts: guinea pig (*Cavia porcellus*)

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: Swee Khoo, unpubl. (D. M. Bishop pers. comm.).

Description: Baker et al. (1956:151) as *Campylochirus caviae*; Domrow (1992:1538).

*Chirolaelaps mystacinae* Heath, Bishop & Daniel, 1987

Acari

Laelapidae (= Laelaptidae of some authorities)

Regular hosts: lesser short-tailed bat (*Mystacina tuberculata*).

Also recorded from: NR.

Distribution: N.Z. only.

N.Z. record: Heath et al. (1987a, 1987b).

Notes: collected from the roost of captive bats held at Wellington Zoological Gardens.

*Chirophagoides mystacopis* Fain, 1963

Acari

Sarcoptidae

Regular hosts: greater short-tailed bat (*Mystacina robusta*).

Also recorded from: NR.

Distribution: N.Z. only.

N.Z. record: Fain (1963).

Note: Worthy et al. (1996) consider *M. robusta* to be extinct.

***Chorioptes bovis* (Hering, 1845)**

Psoroptidae

Acari

Regular hosts: sheep, cattle, goat, horse.

Distribution: cosmopolitan: widespread in N.Z.

Also recorded from: specific to ruminants and equids.

N.Z. record: Helson (1956) [sheep]; Heath (1979) [goat].

Description: Sweatman (1957).

Notes: for synonymy, see Sweatman (1957). *Chorioptes* sp. (presumably *C. bovis*) also recorded from an alpaca (*Lama pacos*) (Arthur 1997).

***Chortoglyphus arcuatus* (Troupeau, 1879)**

(= *Tyroglyphus arcuatus* Troupeau, 1879)

(= *Chortoglyphus nudus* Berlese, 1884)

Chortoglyphidae

Acari

Regular hosts: stored product mite: not parasitic.

Also recorded from: NR.

Distribution: Eurasia, Barbados, N.Z.: probably cosmopolitan.

N.Z. record: Robertson (1946).

Description: Hughes (1976:183).

Notes: occasionally associated with allergic reactions in humans overseas. 1.2% of mites recovered from 59 samples of house dust in Christchurch were of this species (Martin et al. 1997). Cornere (1971) recorded this species [as *Tyroglyphus arcuatus*] in 17/22 house dust samples from Auckland.

***Chrysomya rufifacies* (Macquart, 1843)**

Calliphoridae

Diptera

Regular "host": carrion (larvae only).

Also recorded from: live sheep (Miller 1922), goat, cattle (D. M. Bishop pers. comm.). Also recovered from human cadaver (D. M. Bishop pers. comm.) (larvae only).

Distribution: South-east Asia, Australasia. In N.Z. throughout the North Island; rare in the South Island, recorded from Marlborough, Nelson, North Canterbury, and Southland (D. J. W. Cole & A. C. G. Heath, pers. comm.).

N.Z. record: Miller (1922).

Description: Dear (1985:58); Holloway (1985:14) [larvae].

Notes: this species is generally regarded as a secondary strike fly but in about 4% of c. 5000 samples of larvae from field strikes it was the only species present (D. M. Bishop & A. C. G. Heath pers. comm.). In a small number of samples the larvae were at the first instar stage only. This indicated that they had not reached sufficient maturity to have eradicated other species in the lesion if any had been present (the species is predatory on other blowfly larvae). This suggests that *C. rufifacies* can initiate fly strike.

***Cimex lectularius* (Linnaeus, 1758)**

Cimicidae

Hemiptera

Regular hosts: humans.

Also recorded from: NR.

Distribution: cosmopolitan. N.Z. distribution unknown.

N.Z. record: Hutton (1904).

Description: Smith (1973:385).

Notes: Thomson (1922) states that this parasite was present in N.Z. from the time of early European settlement. Commonly known as the "bed bug" because of its habit of feeding on people at night while they are asleep.

***Coquillettidia* (*Austromansonia*) *tenuipalpis* (Edwards, 1924)**

(= *Mansonia tenuipalpis* Miller, 1950)

(= *Taeniorhynchus* (*Coquillettidia*) *tenuipalpis* Edwards, 1924))

Culicidae

Diptera

Regular hosts: probably birds.

Also recorded from: humans (Graham 1939).

Distribution: known only from N.Z., mainly in the west (Belkin 1968).

N.Z. record: Edwards (1924).

Description: Belkin (1968:76).

Notes: for synonymy, see Belkin (1968).

***Coquillettidia* (*Coquillettidia*) *iracunda* (Walker, 1848)**

(= *Culex iracundus* Walker, 1848)

Culicidae

Diptera

Regular hosts: probably birds.

Also recorded from: humans (Graham 1939:212).

Distribution recorded only from N Z [North Auckland, Great Barrier Island, Mayor Island, Ohakune, and Westland]

N Z record Hutton (1881) (as *Culex vacundus*)

Description Miller & Phillipps (1952: 23), Belkin (1968: 78)

Notes for synonymy, see Belkin (1968) who also records this mosquito as attacking unspecified farm livestock

***Ctenocephalides canis* (Curtis, 1826)**

(= *Pulex canis* Curtis, 1826)

Pulicidae

Siphonaptera

Regular hosts dog

Also recorded from humans (Smit 1979), brown hare (*Lepus europaeus occidentalis*) (Smit 1965), house cat (Guzman 1982)

Distribution cosmopolitan, widespread in N Z

N Z record Thomson (1922)

Description Dunnet & Mardon (1974: 36), Smit (1979)

Notes for synonymy see Dunnet & Mardon (1974)

***Ctenocephalides felis felis* (Bouché, 1835)**

(= *Pulex canis* Duges, 1832)

(= *Pulex felis* Bouché, 1835)

Pulicidae

Siphonaptera

Regular hosts house cat

Also recorded from brushtail possum (R. L. C. Pilgrim pers. comm.) dog (J. D. Tenquist et al. pers. obs.), European hedgehog (Brockie 1958), European rabbit (Bull 1953), humans (Smit 1965), ship rat (*Rattus rattus*) (Smit 1979)

Distribution cosmopolitan, widespread in N Z

N Z record Thomson (1922)

Description Dunnet & Mardon (1974: 38), Smit (1979)

Notes commonly responsible for household infestations

***Culex (Culex) pervigilans* Bergroth, 1889**

Culicidae

Diptera

Regular hosts probably birds

Also recorded from humans (Graham 1929), cattle (Graham 1939), sheep

Distribution known only from N Z [widespread]

N Z record Edwards (1924)

Description Miller & Phillipps (1952: 19), Belkin (1968: 56)

***Culex (Culex) quinquefasciatus* Say, 1823**

(= *Culex (C.) fatigans* Miller & Phillipps, 1952)

Culicidae

Diptera

Regular hosts not known

Also recorded from humans (Graham, 1939 as *C. fatigans*)

Distribution: widespread in tropical, subtropical, and temperate zones. In N.Z. recorded from North Auckland, Auckland, Waitomo, Coastal Coromandel.

N.Z. record: Hutton (1881) [as *C. acer* (misdet.)].

Description: Belkin (1968:68).

Notes: introduced into N.Z. For synonymy, see Belkin (1968).

***Culiseta (Climacura) tonnoiri* (Edwards, 1925)**

(= *Theobaldia tonnoiri* Edwards, 1925)

(= *Theobaldinella tonnoiri* Miller & Phillipps, 1952)

Culicidae

Diptera

Regular hosts: probably birds, recorded from Fiordland crested penguin (Crosby 1978).

Also recorded from: humans (Dumbleton 1965).

Distribution: found only in N.Z. [recorded from North Auckland, most of South Island].

N.Z. record: Tonnoir (1922) (in Edwards 1925).

Description: Miller & Phillipps (1952:26); Belkin (1968:71).

Notes: Dumbleton (1965) discusses the potential role of this species as a vector of viruses to humans.

*** *Damalinia (Tricholipeurus) lipeuroides* (Megnin, 1884)**

(= *Damalinia lipeuroides* (Megnin, 1884))

(= *Trichodectes lipeuroides* Megnin, 1884)

(= *Tricholipeurus virginianus* Peters, 1930)

Trichodectidae

Phthiraptera

Regular hosts: white-tailed deer.

Also recorded from: host specific.

Distribution: not known, presumed range of host.

N.Z. record: Andrews (1969) as *Damalinia lipeuroides*.

Description: Peters (1930).

*** *Damalinia (Tricholipeurus) parallela* (Osborn, 1896)**

(= *Damalinia parallela* (Osborn, 1896))

(= *Trichodectes parallela* Osborn, 1896)

Trichodectidae

Phthiraptera

Regular hosts: white-tailed deer.

Also recorded from: host specific.

Distribution: not known. Presumed range of host.

N.Z. record: Andrews (1973) as *Damalinia parallela*.

Description: Emerson & Price (1975).

*Demodex aries* Desch, 1986

Demodicidae

Acari

Regular hosts: sheep.

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: Desch (1986).

Description: Desch (1986).

***Demodex bovis* Stiles, 1892**

Demodicidae

Acarı

Regular hosts: cattle.

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: Helson (1956).

Description: Desch & Nutting (1971)

***Demodex brevis* Akbulatova, 1963**

Demodicidae

Acarı

Regular hosts: humans.

Also recorded from: host specific.

Distribution: cosmopolitan, presumed range of host.

N.Z. record: Nutting et al (1975).

Description: Desch & Nutting (1972).

Notes: Nutting (pers. comm.) has recorded this species from many countries. J. A. Andrews (pers. comm.) considers that both *D. brevis* and *D. folliculorum* are common throughout New Zealand

***Demodex caballi* Railliet, 1895**

(= *Demodex folliculorum* var. *equi* Railliet, 1895)

Demodicidae

Acarı

Regular hosts: horse.

Also recorded from. host specific.

Distribution: presumed range of host.

N.Z. record: Nutting et al. (1975) [as *Demodex* sp.].

Description: Desch & Nutting (1979a).

***Demodex canis* Leydig, 1859**

Demodicidae

Acarı

Regular hosts: dog.

Also recorded from. host specific.

Distribution: cosmopolitan. Common and widespread in N.Z.

N Z. record: Thomson (1922) [as *D. folliculorum* var. *canis*].

Description: Nutting & Desch (1978).

***Demodex caprae* Railliet, 1895**

Demodicidae

Acarı

Regular hosts: goat.

Also recorded from: host specific.

Distribution: presumed range of host

N Z. record: Nutting et al (1975).

Description: Cram (1925).

***Demodex cati* Hirst, 1919**

Demodicidae

Acari

Regular hosts: house cat.

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: D. Rutherford (pers. comm.).

Description: Desch & Nutting (1979b).

***Demodex erminae* Hirst, 1919**

Demodicidae

Acari

Definitive host: stoat.

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: Nutting et al. (1975).

Description: Hirst (1919).

***Demodex folliculorum* Simon, 1842**

Demodicidae

Acari

Regular hosts: humans.

Also recorded from: host specific.

Distribution: cosmopolitan.

N.Z. record: Thomson (1922).

Description: Desch & Nutting (1972).

Notes: Nutting (pers. comm.) has recorded this species from many countries throughout the world. See also *D. brevis*.

*Demodex mystacina* Desch, 1989

Demodicidae

Acari

Regular host: lesser short-tailed bat.

Also recorded from: presumed host specific.

N.Z. record: Desch (1989).

Distribution: N.Z. only. Presumed range of host.

Description: Desch (1989).

*Demodex novazelandica* Desch, 1989

Demodicidae

Acari

Regular hosts: lesser short-tailed bat.

Also recorded from: presumed host specific.

N.Z. record: Desch (1989).

Distribution: N.Z. only. Presumed range of host.

Description: Desch (1989).

Demodex ovis Hirst, 1919

Demodicidae

Acarı

Regular hosts: sheep.

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: Desch (1986).

Description: redescribed by Desch (1986).

Notes: Whitten (1962) recorded *Demodex* from sheep as *D. folliculorum*; Nutting et al. (1975) also recorded *Demodex* sp. from sheep. Since both records precede the description of *D. aries* and its differentiation from *D. ovis*, it is not known to which species the earlier records refer.

Demodex phylloides Csokor, 1879

Demodicidae

Acarı

Regular hosts: pig.

Also recorded from: host specific.

Distribution: cosmopolitan: widespread in N.Z.

N.Z. record: Thomson (1922) [as *D. folliculorum* var. *suis*].

Description: Desch & Nutting (1971).

Demodex sp.

Demodicidae

Acarı

Regular hosts: brown hare.

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: Nutting et al (1975).

Description: undescribed. One specimen only from Wairarapa (J. D. Tenquist pers. obs.).

Demodex sp.

Demodicidae

Acarı

Regular hosts: European hedgehog.

Also recorded from: host specific.

Distribution: presumed range of host.

N Z record: Smith (1968).

Description: undescribed.

Demodex sp.

Demodicidae

Acarı

Regular hosts: ferret or fitch (*Mustela furo*).

Also recorded from: host specific.

Distribution: presumed range of host.

N Z record: Nutting et al (1975)

Description: undescribed.

***Demodex* sp.**

Demodicidae

Acari

Regular hosts: kiore.

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: Sweatman (1962).

Description: undescribed.

***Demodex* sp.**

Demodicidae

Acari

Regular hosts: red deer.

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: Nutting et al. (1975).

Description: undescribed.

***Demodex* sp.**

Demodicidae

Acari

Regular hosts: weasel (*Mustela nivalis vulgaris*).

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: Nutting et al. (1975).

Description: undescribed.

*Dermacentor albipictus* (Packard, 1869)

Ixodidae

Acari

Regular hosts: moose (*Alces alces andersoni*).

Also recorded from: wapiti.

Distribution: widely distributed throughout North America.

N.Z. record: Fairley & Heath (1997).

Description: Gregson (1956:30).

Notes: 17 specimens found on quarantined wapiti imported from Canada.

*Dermacentor variabilis* (Say, 1821)

Ixodidae

Acari

Regular hosts: dog.

Also recorded from: humans (Fairley & Heath 1997).

Distribution: widely distributed throughout North America.

Description: Gregson (1956:30).

N.Z. record: Fairley & Heath (1997).

Notes: one specimen found on a child from West Virginia, U.S.A.

Dermatobia hominis (Linnaeus jun., 1781)

Cuterebridae

Diptera

Regular hosts humans

Also recorded from NR

Distribution neotropical

N Z record Murdoch et al (1996)

Description Smith (1973 303)

Notes one record only from a woman who had recently returned from Peru

Dermanyssus gallinae (de Geer, 1778)

(= *Acarus gallinae* de Geer, 1778)

Dermanyssidae

Acari

Regular hosts poultry and other bird species

Also recorded from humans (Laird 1950), dog (Ramsay et al 1975)

Distribution cosmopolitan Widespread in N Z (D C Elliott, pers comm)

N Z record Laird (1950)

Description Baker et al (1956 12), Evans & Till (1966 350)

Notes for synonymy, see Evans & Till (1966) Gibson (1972) also recorded this mite from a vessel containing a kiore preserved in alcohol but did not find it on the animal

Dermatophagoides pteronyssinus (Trouessart, 1897)

(= *Mealia pteronyssina* Trouessart, 1897)

Pyroglyphidae

Acari

Regular hosts free-living mite, not parasitic

Also recorded from NR (see Notes)

Distribution cosmopolitan Widespread and very common in N Z

N Z record Cornere (1971)

Description Fain (1966)

Notes a common house dust mite and a frequent cause of asthma in humans Cornere (1971) found it in all of 22 samples of house dust from Auckland (59% of mites recovered) 95% of mites recovered from 59 house dust samples in Christchurch were of this species (Martin et al 1997)

Eulaelaps stabularis (Koch, 1836)

Laelapidae (= Laelaptidae of some authorities)

Acari

Regular hosts small mammals including rodents, in N Z ship rat (Wilson 1964), kiore and house mouse (*Mus musculus*) (Gibson 1972) (see Notes)

Also recorded from NR

Distribution cosmopolitan, N Z distribution unknown

N Z record Wilson (1964) (from ship rat)

Description Wilson (1964), Evans & Till (1966 260), Hughes (1976 304)

Notes frequently recorded from the fur and nests of small mammals, nests of birds, and poultry litter, appears to be blood-sucking (see Hughes 1976 306)

***Falculifer rostratus* Bucholz, 1889**

Dermoglyphidae

Acari

Regular hosts: pigeons.

Also recorded from: humans (Heath et al. 1971a).

Distribution: cosmopolitan.

N.Z. record: Whitten (1962).

Description: Baker & Wharton (1952:380).

***Felicola (Felicola) subrostratus* (Burmeister, 1838)**

(= *Trichodectes subrostratus* Burmeister, 1838)

Trichodectidae

Phthiraptera

Regular hosts: house cat.

Also recorded from: host specific.

Distribution: cosmopolitan. Common throughout N.Z.

N.Z. record: Helson (1956) [as *F. subrostrata*].

Description: Séguy (1944:404) [as *T. subrostratus*].

***Gasterophilus intestinalis* (de Geer, 1776)**

(= *Oestrus intestinalis* de Geer, 1776)

(= *Oestrus equi* Clark, 1797)

Gasterophilidae

Diptera

Regular hosts: horse.

Also recorded from: humans [accidental host] (Heath et al. 1968).

Distribution: cosmopolitan. Widespread and common throughout N.Z.

N.Z. record: Hutton (1904) [as *G. equi*].

Description: Zumpt (1965:125).

Notes: see Kettle (1974) for notes on history of *G. intestinalis* in N.Z. and confusion with *G. equi*.

***Gasterophilus nasalis* (Linnaeus, 1758)**

(= *Oestrus nasalis* Linnaeus, 1758)

(= *Gasterophilus veterinus* Séguy, 1928)

(= *Gasterophilus crossi* Paton, 1928)

Gasterophilidae

Diptera

Regular hosts: horse

Also recorded from: NR.

Distribution: cosmopolitan; less common than *G. intestinalis* in N.Z. (Kettle, 1974).

N.Z. record: Hutton (1904) [as *G. equi*].

Description: Zumpt (1965:117).

***Gliricola porcelli* (Schrank, 1781)**

(= *Pediculus porcelli* Schrank, 1781)

Gyropidae

Phthiraptera

Regular hosts guinea pig
 Also recorded from host specific
 Distribution presumed range of host
 N Z record J D Tenquist (pers obs)
 Description Séguy (1944 53)
 Notes recorded from laboratory and pet animals

***Glycyphagus domesticus* (de Geer, 1778)**

(= *Acarus domesticus* de Geer, 1778)
 Glycyphagidae
 Acari
 Regular hosts free living mite, not parasitic
 Also recorded from humans (Helson 1956), kiore (Roberts 1991a)
 Distribution cosmopolitan N Z range unknown
 N Z record Thomson (1922)
 Description Hughes (1976 140)
 Notes occasionally associated with allergic reactions in humans Cornere (1971) recorded this mite in 3/22 samples of house dust from Auckland (0.9% of mites recovered) 0.6% of mites recovered from 59 house dust samples in Christchurch were of this species (Martin et al 1997)

***Gohieria fusca* (Oudemans, 1902)**

(= *Glycyphagus fuscus* Oudemans, 1902)
 Glycyphagidae
 Acari
 Regular hosts free-living mite, not parasitic
 Also recorded from kiore (Roberts 1991a)
 Distribution cosmopolitan, N Z distribution unknown
 N Z record Robertson (1946)
 Description Hughes (1976 178)
 Notes occasionally associated with allergic reactions in humans overseas Cornere (1971) recorded this species in 14/22 house dust samples in Auckland (10% of mites recovered)

***Gymnolaelaps annectans* Womersley, 1955**

Laelapidae (= Laelaptidae of some authorities)
 Acari
 Regular hosts *Rattus* spp , recorded from kiore in NZ
 Also recorded from stoat (Ramsay & Paterson 1977)
 Distribution probably cosmopolitan N Z distribution unknown
 N Z record Ramsay & Paterson (1977)
 Description Womersley (1955)
 Notes Ramsay & Paterson (1977) also recorded this mite from kiore and Norway rats from Raoul Island in the Kermadec group It has been found on a range of *Rattus* spp , bandicoots and other mammals in Australia and in the nests of birds (see Ramsay & Paterson 1977 for further details)

***Gyropus ovalis* Burmeister, 1838**

Gyropidae
 Phthiraptera

Regular hosts: guinea pig.

Also recorded from: host specific.

Distribution: cosmopolitan. Presumed range of host.

N.Z. record: J. D. Tenquist (pers. obs.).

Description: Séguy (1944:52).

Notes: recorded from laboratory colonies.

*Haemaphysalis bancrofti* Nuttall & Warburton, 1915

Ixodidae

Acari

Regular hosts: macropodids and other marsupials.

Also recorded from: humans (A. C. G. Heath pers. comm.)

N.Z. record: A. C. G. Heath (pers. comm.).

Distribution: throughout Australia.

Description: Roberts (1970).

Notes: not normally present in N.Z.

***Haemaphysalis (Kaiseriana) longicornis* Neumann, 1901**

Ixodidae

Acari

Regular hosts: most mammals particularly Bovidae, Cervidae (see below), and some birds.

Also recorded from: see notes below.

Distribution: Korea, Japan, Australia, Pacific Is., N.Z. (mainly North Island).

N.Z. record: Reid (1911) [as *H. bispinosa**].

Description: Hoogstraal et al. (1968); Roberts (1970:80).

Notes: recorded from the following in N.Z.: Bovidae (goat, cattle, sheep, yak [*Bos mutus grunniens*]; Canidae (dog); Cervidae (fallow deer [*Dama dama dama*]; red deer, rusa deer [*Cervus timorensis*]; sambar deer [*C. unicolor unicolor*]); Equidae (donkey [*Equus asinus*], horse); Erinaceidae (European hedgehog); Felidae (house cat); Hominidae (humans); Leporidae (brown hare, European rabbit); Muridae (ship rat, Norway rat, house mouse); Mustelidae (ferret, stoat, weasel); Phalangeridae (brush-tail possum); Suidae (pig).

**H. bispinosa* does not occur in N.Z.

***Haematopinus asini* (Linnaeus, 1758)**

(= *Pediculus asini* Linnaeus, 1758)

Haematopinidae

Phthiraptera

Regular hosts: horse.

Also recorded from: host specific.

Distribution: cosmopolitan. Probably widespread in N.Z.

N.Z. record: Thomson (1922) [as *Haematopinus macrocephalus* (misdet.)].

Description: Ferris (1951:85); Kim et al. (1986:80).

Notes: see Ferris (1951) for full synonymy.

***Haematopinus eurysternus* (Nitzsch, 1818)**

(= *Pediculus eurysternus* Nitzsch, 1818)

Haematopinidae

Phthiraptera

Regular hosts: cattle.

Also recorded from host specific

Distribution cosmopolitan Prevalence and distribution in N Z unknown

N Z record Kirk (1900 303)

Description Ferris (1951 88), Kim et al (1986 82)

Notes see Ferris (1951) for full synonymy

***Haematopinus suis* (Linnaeus, 1758)**

(= *Pediculus suis* Linnaeus, 1758)

(= *Haematopinus wuius* (Nitzsch, 1818))

Haematopinidae

Phthiraptera

Regular hosts pig

Also recorded from humans (Tenquist, 1977) accidental normally host specific

Distribution cosmopolitan Common in N Z

N Z record Thomson (1922) [as *H wuius*]

Description Ferris (1951 91), Kim et al (1986 86)

Notes see Ferris (1951) for full synonymy

***Haemodipsus lyriocephalus* (Burmeister, 1839)**

Polyplacidae

Phthiraptera

Regular hosts brown hare

Also recorded from host specific

Distribution presumed throughout range of host

N Z record collected from brown hare at Greytown c 1960, specimen lost Collected from brown hares around Wairoa c 1978 (A C G Heath & J D Tenquist pers obs)

Description Ferris (1951 19)

Notes see Ferris (1951) for full synonymy

***Haemodipsus ventricosus* (Denny, 1842)**

(= *Haematopinus ventricosus* Denny, 1842)

Polyplacidae

Phthiraptera

Regular hosts European rabbit

Also recorded from host specific

Distribution cosmopolitan

N Z record Thomson (1922 339) [as *Haematopinus ventricosus*]

Description Ferris (1951 179), Kim et al (1986 170)

*Haemogamasus pontiger* (Berlese, 1904)

(= *Laelaps pontiger* Berlese 1904)

Laelapidae (Laelaptidae of some authors)

Acar

Regular hosts not parasitic, free living

Also recorded from ship rat and house mouse (Gibson 1972) (see Notes)

Distribution cosmopolitan

N Z record Gibson (1972)

Description Evans & Till (1966 257) Hughes (1976 301)

Notes: feeds on a wide range of substrates and predatory on other mites; often found in association with rodents and their nests (see Hughes 1976:303).

***Heterodoxus ampullatus* Kéler 1971**

Boopidae

Phthiraptera

Regular hosts: brushtailed rock wallaby.

Also recorded from: host specific.

N.Z. record: Palma (1996:161).

Description: Kéler (1971).

***Hirstionyssus laticutatus* (de Meillon & Lavoipierre, 1944)**

(= *Liponyssus laticutatus* de Meillon & Lavoipierre, 1944)

Laelapidae (Laelaptidae of some authorities)

Acari

Regular hosts: rodents; in N.Z. kiore, Norway rat, ship rat, and house mouse.

Also recorded from: NR.

Distribution: cosmopolitan.

N.Z. record: Gibson (1972).

Description: Evans & Till (1966:291).

Notes: recorded overseas from a wide range of rodents. Gibson (1972) recorded this mite from Norway rat, ship rat, and house mouse. Its recovery from kiore is recorded by Roberts (1991a) citing Ramsay (pers. comm.).

***Hirstionyssus talpae* Zemsкая, 1955**

(= *Hirstionyssus arcuatus* Koch, 1839)

Laelapidae (Laelaptidae of some authorities)

Acari

Regular hosts: European mole (*Talpa europaea*).

Also recorded from: European hedgehog (Sweatman 1962).

Distribution: Eurasia, New Zealand.

N.Z. record: Sweatman (1962) [as *H. arcuatus*].

Description: Womersley (1956) [as *H. arcuatus*]; Evans & Till (1966:281).

Notes: Sweatman (1962) notes that this mite was collected by R. E. Brockie from a hedgehog nest and identified by H. Womersley.

***Hoplopleura pacifica* Ewing, 1924**

Hoplopleuridae

Phthiraptera

Regular hosts: *Rattus* spp. Recorded from kiore and Norway rat in N.Z.

Also recorded from: NR.

Distribution: presumed range of hosts.

N.Z. records: Ford-Robertson & Bull (1966); Gibson & Pilgrim (1986).

Description: Ferris (1951:139); Kim et al. (1986:112).

Notes: see Ferris (1951) for full synonymy. Specific to *Rattus* species.

* ***Hydrotaea rostrata* (Robineau-Desvoidy, 1830)**

(= *Ophyra rostrata* (Robineau-Desvoidy, 1830)

(= *Peronia rostrata* Robineau-Desvoidy, 1830)

(= *Ophyia analis* Macquart, 1846)

Muscidae

Diptera

Regular “host” carrion

Also recorded from sheep (larvae only) (Miller 1939b)

Distribution Australasia

N Z record Miller (1939b)

Description Zumpt (1965:41)

Notes for full synonymy, see Zumpt (1965) Miller (1939a) refers to this fly as a “tertiary maggot fly” He found 0.25% of approximately 15 000 flies reared from larvae from fly strike samples to be of this species (Miller 1939b)

*Hypoaspis nidicorva* Evans & Till, 1966

Laelapidae (= Laelaptidae of some authorities)

Acari

Regular hosts not parasitic, described from a bird’s nest

Also recorded from stoat (A. C. G. Heath, *in* King 1975), Norway rat (Christchurch), kiore (Cuvier Island) (Gibson 1972) (see Notes)

Distribution probably cosmopolitan

Description Evans & Till (1966:179)

Notes not recorded from birds in N Z (Bishop & Heath 1998) In general, species of *Hypoaspis* have been found in the nests of rodents and other small mammals and birds, as well as in organic debris such as warehouse sweepings and poultry litter At least some species are known to be predatory on other mites (Hughes 1976) They are not infrequently recorded from the fur of rodents but the relationship does not appear to be parasitic

*Hypoaspis miles* (Berlese, 1892)

(= *Laelaps miles* Berlese, 1892)

Laelapidae (= Laelaptidae of some authorities)

Acari

Regular hosts associated with rodents and their nests, and cereal waste

Also recorded from kiore (Gibson 1972)

Distribution Europe, Asia (U S S R), U S A, N Z probably cosmopolitan

N Z record Gibson (1972)

Description Evans & Till (1966:222), Hughes (1976:299)

Notes not strictly parasitic see notes on *H. nidicorva* Found on kiore from Cuvier Island (Gibson 1972)

*Hypoaspis sardoa* (Berlese, 1911)

(= *Hypoaspis sardous* Berlese, 1911)

Laelapidae (= Laelaptidae of some authorities)

Acari

Regular hosts found in nests of small mammals and in organic debris

Also recorded from kiore (Gibson 1972)

Distribution probably cosmopolitan

N Z record Gibson (1972)

Description Evans & Till (1966:175), Hughes (1976:297)

Notes commonly associated with small mammals and their nests see notes on *H. nidicorva* In N Z, recorded from kiore from Cuvier Island (Gibson 1972)

***Hypoderma* sp. Latreille, 1818**

Oestridae

Diptera

Regular hosts: cattle.

Also recorded from: host specific.

Distribution: widespread in Northern Hemisphere.

N.Z. record: Thomson (1922) [as *H. bovis*].

Description: Zumpt (1965:218–225).

Notes: introduced with imported cattle on several occasions and recorded from animals in quarantine but has never become established in N.Z. Species introduced have not been recorded except by Thomson (1922), though the basis for his specific identification is uncertain. Larvae from quarantined animals have been found to include *H. lineatum* (Charleston pers. obs.). It is possible that both species have been introduced at various times.

***Ixodes holocyclus* Neumann, 1899**

Ixodidae

Acari

Regular hosts: recorded in Australia from a wide range of marsupials and other mammals, and some birds: see Roberts (1976) for host list.

Also recorded from: in N.Z.: humans (Fairley & Heath 1997), dog (Hutton 1974).

Distribution: east coast of Australia.

N.Z. record: Hutton (1974).

Description: Roberts (1970:56).

Notes: this tick is confined to the east coast of Australia and has a wide host range. In Australia, in addition to marsupials, it has been recorded from many introduced mammalian species and several birds (Roberts 1970:58–59). It is capable of causing paralysis in humans and a variety of domestic animals but is not associated with other diseases. During the period 1984–1996, there were 11 recorded importations into N.Z. (Fairley & Heath 1997) in association with humans and dogs.

*Ixodes ricinus* Linnaeus, 1758

Ixodidae

Acari

Regular hosts: various mammals including cattle, sheep, and goats.

Also recorded from: in N.Z.: humans, dog (Fairley & Heath 1997).

N.Z. record: Rutherford (1982).

Description: Arthur (1963:23).

Notes: this species is widespread across northern Europe and is implicated in the transmission of a number of human and livestock diseases. There are two recorded introductions to N.Z. since 1980, one on a human and one on a dog (Fairley & Heath 1997).

*** *Leporacarus gibbus* (Pagenstecher, 1861)**

(= *Listrophorus gibbus* Pagenstecher, 1861)

Listrophoridae

Acari

Regular hosts: European rabbit.

Also recorded from: brown hare, brushtail possum (Sweatman 1962) (as *Listrophorus gibbus*).

Distribution presumed range of European rabbit
 N Z record Bull (1953) (as *Listrophorus gibbus*)
 Description Coffee (1971)

* ***Leporacarus mustelae* (Megnin, 1885)**

(= *Listrophorus mustelae* Megnin, 1885)

Listrophoridae

Acanthocheilidae

Regular hosts ferret, stoat

Also recorded from NR

Distribution presumed range of hosts

N Z record Sweatman (1962) (as *Listrophorus mustelae*)

Description no recent description found See Krantz (1978) for generic characteristics

***Leptoconops (Styloconops) myersi* (Tonnoir, 1924)**

Ceratopogonidae

Diptera

Regular hosts probably birds

Also recorded from humans (Dumbleton 1971)

Distribution recorded only from N Z [North Auckland, Bay of Plenty]

N Z record Tonnoir (1924)

Description Dumbleton (1971) as *Styloconops myersi*

Notes The type material was collected by Myers in 1924 near Cape Reinga (see Dumbleton 1971)

***Leptopsylla (Leptopsylla) segnis* (Schonherr, 1811)**

(= *Pulex segnis* Schonherr, 1811)

Leptopsyllidae

Siphonaptera

Regular hosts house mouse

Also recorded from ship rat, Norway rat, kiore (Smit 1979), European hedgehog (R E Brockie citing B M Fitzgerald unpubl data in King 1990)

Distribution cosmopolitan Probably widespread in N Z

N Z record Thomson (1922) [as *Ctenopsyllus musculi*]

Description Dunnet & Mardon (1974 125), Smit (1979 225)

***Linguatula serrata* (Leuckart, 1860)**

Linguatulidae

Pentastomida

Regular hosts dog

Also recorded from (nymphal stages) brown hare (Sweatman 1962), European rabbit (Gurr 1953), house cat (developmental stage not known), sheep (L K Whitten pers comm)

Distribution not known, probably cosmopolitan Rare in N Z

N Z record Thomson (1922)

Description Zumpt (1961 362)

***Limognathus ovillus* (Neumann, 1907)**

(= *Haematopinus ovillus* Neumann, 1907)

Linognathidae

Phthiraptera

Regular hosts: sheep.

Also recorded from: host specific.

Distribution: N.Z., U.K., U.S.A., Russia, Falkland Islands.

N.Z. record: Gilruth (1908).

Description: Ferris (1951:231); Kim et al. (1986:126).

Notes: this parasite was described originally from New Zealand and Scottish material and subsequently found elsewhere. It is very rarely seen and may be extinct in N.Z. For full synonymy, see Ferris (1951).

***Linognathus pedalis* (Osborn, 1896)**

(= *Haematopinus pedalis* Osborn, 1896)

Linognathidae

Phthiraptera

Regular hosts: sheep.

Also recorded from: host specific.

Distribution: N.Z., Australia, North and South America, South Africa.

N.Z. record: Thomson (1922) [as *H. pedalis*].

Description: Ferris (1951:231), Kim et al. (1986).

Notes: now rarely seen in N.Z. For full synonymy, see Ferris (1951).

***Linognathus setosus* (von Olfers, 1816)**

(= *Pediculus setosus* von Olfers, 1816)

Linognathidae

Phthiraptera

Regular hosts: dog.

Also recorded from: host specific.

Distribution: cosmopolitan. Anecdotal evidence suggests it is common throughout N.Z.

N.Z. record: Thomson (1922) [as *Haematopinus piliferus* (misdet.)].

Description: Ferris (1951:235).

Notes: for full synonymy, see Ferris (1951).

***Linognathus stenopsis* (Burmeister, 1838)**

(= *Pediculus stenopsis* Burmeister, 1838)

Linognathidae

Phthiraptera

Regular hosts: goat.

Also recorded from: host specific.

Distribution: cosmopolitan. Presumed range of host.

N.Z. record: Helson (1956).

Description: Ferris (1951:238); Kim et al. (1986:132).

Notes: for full synonymy, see Ferris (1951).

***Linognathus vituli* (Linnaeus, 1758)**

(= *Pediculus vituli* Linnaeus, 1758)

Linognathidae

Phthiraptera

Regular hosts cattle

Also recorded from host specific

Distribution cosmopolitan Widespread and common in N Z

N Z record Thomson (1922) [as *Haematopinus vituli*]

Description Ferris (1951 241), Kim et al (1986 134)

Notes for full synonymy, see Ferris (1951)

*Lucilia cuprina* (Wiedemann, 1830)

Calliphoridae

Diptera

Regular hosts carrion and live sheep (larvae only)

Also recorded from goat, cattle (D M Bishop pers comm) (larvae only)

Distribution Australia, Africa, Pakistan, and N Z (see Notes)

N Z record Heath et al (1991)

Description Waterhouse & Paramov (1950)

Notes from preserved material, Bishop (1995) identified this fly as having been present in N Z at least since 1984 Its spread throughout N Z has been rapid, being identified in South Canterbury by 1995 It is now considered to be endemic in most parts of N Z and a common cause of fly strike in sheep Two subspecies of *L cuprina* are recognised in taxonomic literature (Bishop 1995) *L cuprina cuprina* occurs in Asia, many Pacific Islands and the Americas with occasional records from several eastern areas of Australia *L cuprina dorsalis* occurs in Australia, Africa, Pakistan, and N Z (see Introduction)

***Lucilia sericata* (Meigen, 1826)**

(= *Musca sericata* Meigen, 1826)

(= *Phaenicia sericata* Robineau-Desvoidy, 1863)

Calliphoridae

Diptera

Regular hosts carrion

Also recorded from live sheep (Gilruth 1907), cattle, goat, dog (D M Bishop pers comm) (larvae only) This species has been recorded from human corpses during forensic examinations (D M Bishop, T K Crosby pers comm)

Distribution throughout the temperate zone in both hemispheres

N Z record Gilruth (1907)

Description Dear (1985 27), Holloway (1985 14) [larvae]

Notes common primary strike fly of sheep in N Z Also recorded breeding in animal dung (Bishop 1998)

*Lynxacarus (Felistrophorus) radovskyi* Tenorio, 1974

Listrophoridae

Acari

Regular hosts house cat

Also recorded from host specific

Distribution U S A , Oceania, Australia

N Z record Heath & Mariadass (1999)

Description Tenorio (1974) See also Domrow (1992 1520, 1522)

Notes recovered from a house cat in quarantine from Samoa

Maorigoeldia (Maorigoeldia) argyropus (Walker, 1848)

(= *Culex argyropus* Walker, 1848)

(= *Rachionotomyia argyropus* (Walker, 1848)

(= *Tripteroides argyropus* Miller & Phillips, 1952)

Culicidae

Diptera

Regular hosts: probably birds.

Also recorded from: humans (Graham 1929:232).

Distribution: recorded from N.Z. only [widespread].

N.Z. record: Walker (1848) [as *Culex argyropus*].

Description: Belkin (1968:106).

Notes: see Belkin (1968) for synonymy. Graham (1929) considered this species to be persistent biters of people but Belkin (1968:109) question this.

*Marsupiopus trichosuri* Fain, 1968

Glycyphagidae

Acari

Regular hosts: brushtail possum.

Also recorded from: NR. Probably host specific.

Distribution: Australia [N.S.W.]; N.Z. Presumed range of brushtail possum.

Description: Fain (1968). Domrow (1992:1472) provides a key to species.

N.Z. record: Clark et al. (1997).

Notes: Clark et al. (1997) found this mite on brushtail possums from Kawau Island and the Orongorongo Valley in N.Z.

***Melophagus ovinus* Latreille, 1802**

Hippoboscidae

Diptera

Regular hosts: sheep.

Also recorded from: goat (Helson 1956), humans (Tenquist pers. obs.).

Distribution: cosmopolitan.

N.Z. record: Thomson (1922).

Description: Bequaert (1942).

Notes: see Bequaert (1942) for synonymy. The once ubiquitous “sheep ked” or “sheep tick” is now rare in N.Z.

***Mesolaelaps australiensis* (Hirst, 1926)**

(= *Laelaps (Mesolaelaps) australiensis* Hirst, 1926)

Laelapidae (= Laelaptidae of some authorities)

Acari

Regular hosts: rodents; recorded from kiore in N.Z. (Sweatman 1962).

Also recorded from: NR. (see Notes.)

Distribution: Australasia, New Guinea, Kermadec Islands group.

N.Z. record: Sweatman (1962) citing an identification by Womersley (no reference given).

Description: Hirst (1926).

Notes: recorded from a variety of rodents, marsupial mammals, birds, and birds' nests in Australia; also from Norway rat and a range of bird species and birds' nests in the Kermadec group. See Ramsay & Paterson (1977) for further details.

*Murichirus anabiotus* Domrow, 1992

Lisrophoridae: Atopomelinae

Acari

Regular hosts: brushtail possum.

Also recorded from: host specific.

Distribution: range of brushtail possums in Australia and N.Z.

N.Z. record: Clark et al. (1997).

Description: Domrow (1992).

Notes: Clark et al. (1997) established that this mite is present on brushtail possums throughout N.Z.

***Musca domestica* Linnaeus, 1761**

Muscidae

Diptera

Regular hosts: not normally parasitic.

Also recorded from: live sheep (larvae only) (Miller 1939b) (see Notes). Has been recorded from human corpses during forensic examinations (D. M. Bishop, T. K. Crosby pers. comm.).

Distribution: cosmopolitan.

N.Z. record: Bathgate (1870).

Description: Zumpt (1965:31).

Notes: possibly associated with myiasis on rare occasions. Miller (1939b) found 0.01% of approximately 15 000 adult flies reared from fly strike samples sent to him to be of this species; he speculated that infestation of the samples might have occurred after their removal from the sheep.

***Muscina stabulans* (Fallen, 1816)**

Muscidae

Diptera

Regular hosts: not normally parasitic.

Also recorded from: live sheep (larvae only) (Miller 1939b) (see Notes). Also recorded from human cadavers (D. M. Bishop pers. comm.).

Distribution: cosmopolitan.

N.Z. record: Thomson (1922).

Description: Zumpt (1965:36).

Notes: possibly associated with myiasis on rare occasions. Miller (1939b) found 1.36% of approximately 15 000 adult flies reared from fly strike samples sent to him to be of this species.

*** *Myobia murismusculi* (Schrank, 1781)**(= *Myobia musculi* (Poppe, 1896))

Myobiidae

Acari

Regular hosts: house mouse.

Also recorded from: host specific.

Distribution: cosmopolitan. Presumed range of host.

N.Z. record: Sweatman (1962); Whitten (1962).

Description: Baker et al. (1956:79); Domrow (1991:1322).

***Myocoptes musculus* (Koch, 1836)**

Myocoptidae

Acari

Regular hosts: house mouse.

Also recorded from: host specific.

Distribution: cosmopolitan.

N.Z. record: Sweatman (1962); Whitten (1962).

Description: Baker et al. (1956:149); Domrow (1992:1520).

*Myonyssus decumani* Tiraboschi, 1904

Laelapidae (= Laelaptidae of some authorities)

Acari

Regular hosts: house mouse.

Also recorded from: NR.

Distribution: probably cosmopolitan.

N.Z. record: Gibson (1972).

Description: Hirst (1916:64).

***Nosopsyllus (Nosopsyllus) fasciatus* (Bosc, 1800)**

(= *Pulex fasciatus* Bosc, 1800)

(= *Ceratophyllus fasciatus* Thomson, 1922)

Ceratophyllidae

Siphonaptera

Regular hosts: *Rattus* spp. including kiore, Norway rat, ship rat.

Also recorded from: house cat, dog, European rabbit, ferret, stoat, weasel, house mouse, and European hedgehog nest (Smit 1979).

Distribution: cosmopolitan.

N.Z. record: Thomson (1922) [as *C. fasciatus*].

Description: Dunnet & Mardon (1974:128); Smit (1979).

Notes: authority date in Dunnet & Mardon as 1801 in error (R. L. C. Pilgrim pers. comm.).

Also recorded from various avian species (Bishop & Heath 1998).

***Nosopsyllus (Nosopsyllus) londiniensis* (Rothschild, 1903)**

(= *Ceratophyllus londiniensis* Rothschild, 1903)

Ceratophyllidae

Siphonaptera

Regular hosts: house mouse, ship rat.

Also recorded from: NR.

Distribution: cosmopolitan.

N.Z. record: Smit (1965).

Description: Dunnet & Mardon (1974:129); Smit (1979).

Notes: mainly recorded from house mouse in N.Z.; this flea has been carried to many parts of the world on ship rats and so is often found near ports (Smit 1979).

***Notoedres cati* (von Hering, 1838)**

Sarcoptidae

Acari

Regular hosts: house cat.

Also recorded from host specific

Distribution cosmopolitan Prevalence and distribution in N Z unknown

N Z record Whitten (1962)

Description Baker & Wharton (1952:362), Baker et al (1956:137) See also Domrow (1992:1569) for key to species occurring in Australia

***Notoedres muris* (Megnin, 1877)**

Sarcoptidae

Acari

Regular hosts rodents in N Z ship rat, kiore (Sweatman 1962), Norway rat (Whitten 1962)

Also recorded from European hedgehog (Heath et al 1971b)

Distribution cosmopolitan Probably widespread in N Z

N Z record Sweatman (1962), Whitten (1962)

Description Hughes (1959:45) See also Domrow (1992:1569) for key to species occurring in Australia

***Oestrus ovis* Linnaeus, 1758**

Oestridae

Diptera

Regular hosts sheep

Also recorded from humans [accidental host] (Tenquist 1977), goat (D M Bishop, pers comm), dog [accidental host] (A C G Heath & C Johnston, pers comm)

Distribution cosmopolitan Distribution in N Z unknown

N Z record Hudson (1892) [as *O perplexus*]

Description Zumpt (1965:175)

Notes a worldwide survey in 1952 suggested that accidental parasitism of humans is more common in countries where the sheep population is sparse (Sergent 1952) Human infestations are uncommon in N Z but Palmer and Holloway (1992) reported a case in Tauranga in which over 30 larvae were removed from the eye of a patient

***Opifex fuscus* Hutton, 1902**

Culicidae

Diptera

Regular hosts probably birds

Also recorded from humans (Graham 1939)

Distribution confined to N Z, endemic [coastal areas of mainland, offshore and Kermadec Islands]

N Z record Hutton (1902)

Description Belkin (1968:84)

Notes breeds in saltwater pools Commonly known as the “saltpool mosquito”

***Ornithonyssus bacoti* (Hirst, 1913)**

Macronyssidae

Acari

Regular hosts Norway rat

Also recorded from humans (Lamb 1952)

Distribution tropical zones, with incursions into temperate regions

N Z record Lamb (1952) [as *Bdellonyssus bacoti*] (on humans)

Description Baker et al (1956:22), Evans & Till (1966:321)

Notes: recovered from Norway rat and kiore on Raoul Island in the Kermadec group (Ramsay & Paterson 1977). For synonymy, see Evans & Till (1966).

***Ornithonyssus bursa* (Berlese, 1888)**

Macronyssidae

Acari

Regular hosts: domestic fowl and other domestic and wild birds.

Also recorded from: humans (Murray 1951), house cat (Black & Orr 1997).

Distribution: cosmopolitan; prevalence and distribution in N.Z. unknown.

N.Z. record: Murray (1951) [as *Liponyssus bursa*].

Description: Strandtmann & Wharton (1958:86); Baker et al. (1956:30).

Notes: circumstantially associated with allergy in humans (W. A. G. Charleston pers. obs.).

Commonly known as the tropical fowl mite.

***Ornithonyssus spinosa* Manson, 1973**

Macronyssidae

Acari

Regular hosts: New Zealand long-tailed bat (*Chalinolobus tuberculatus*).

Also recorded from: NR.

Distribution: N.Z. only; one record only from Mahoenui, near PioPio in the North Island of N.Z.

N.Z. record: Manson (1972).

Description: Manson (1972).

*Ornithonyssus sylviarum* (Canestrini & Fanzago, 1877)

Macronyssidae

Acari

Regular hosts: domestic fowl and many other birds (domestic and wild).

Also recorded from: humans (D. C. Elliott pers. comm.).

Distribution: cosmopolitan, particularly in temperate regions. N.Z. distribution unknown.

N.Z. record: D. C. Elliott (pers. comm.).

Description: Baker et al. (1956:26).

***Otodectes cynotis* (von Hering, 1838)**

Psoroptidae

Acari

Regular hosts: house cat, dog.

Also recorded from: ferret (Sweatman 1962).

Distribution: cosmopolitan. Common and widespread in N.Z.

N.Z. record: Thomson (1922) [as *Chorioptes auricularum* (misdet.)].

Description: Sweatman (1958a).

***Pagipsylla galliralli* (Smit, 1965)**

(= *Stivalius galliralli* Smit, 1965)

Pygiopsyllidae

Siphonaptera

Regular hosts: birds of various species.

Also recorded from: humans (Smit 1979).

Distribution: N.Z. [South Island, Snares Islands, Antipodes Islands. (Smit 1979), Chatham Islands (Bishop & Heath 1998)].

Description: Smit (1979:170).

Notes: originally described (as *S. gallinalli*) from a single specimen from a weka (*Gallinallus australis*) and subsequently found on a range of bird species on Snares Islands. See Smit (1979) and Bishop & Heath (1998) for host lists. Smit (1979) suggests that the single record from Antipodes Islands should be regarded as suspect.

***Parapsyllus longicornis* (Enderlein, 1901)**

(= *Pulex longicornis* Enderlein, 1901)

Rhopalopsyllidae

Siphonaptera

Regular hosts: a wide variety of seabirds, shags and other birds.

Also recorded from: kiore (Smit 1979).

Distribution: N.Z. mainland and subantarctic islands, Chatham Islands, Falkland Islands, Tristan da Cunha.

N.Z. record: Smit (1965).

Description: Smit (1979).

Notes: see Smit (1979) and Bishop & Heath (1998) for host lists.

***Parapsyllus magellanicus magellanicus* Jordan, 1938**

Rhopalopsyllidae

Siphonaptera

Regular hosts: wide variety of seabirds and shags; Antipodes Island parakeet.

Also recorded from: humans [one record from Antipodes Islands] (Smit 1979).

Distribution: subantarctic islands.

N.Z. record: Smit (1979).

Description: Smit (1979:162).

Notes: see Smit (1979) and Bishop & Heath (1998) for host lists.

***Parapsyllus nestoris antichthones* Smit, 1979**

Rhopalopsyllidae

Siphonaptera

Regular hosts: prions and parakeets.

Also recorded from: humans [one record from Antipodes Islands] (Smit 1979).

Distribution: Antipodes Islands.

N. Z. record: Smit (1979).

Description: Smit (1979:160).

Notes: see Smit (1979) and Bishop & Heath (1998) for host lists.

***Pediculus humanus* Linnaeus, 1758**

Pediculidae

Phthiraptera

Regular hosts: humans.

Also recorded from: host specific.

Distribution: cosmopolitan.

N.Z. record: Banks (1896).

Description: Ferris (1951:261); Kim et al. (1986:150).

Notes: the authors follow Ferris (1951) in considering *P. humanus* inclusive of *P. humanus capitis*, the head louse, and *P. humanus humanus* (= *P. humanus corporis*), the body louse. The confusion over whether these and their variants should be given subspecies status is reviewed by Ferris (1951). Both “head” and “body” lice have been recorded in N.Z., although the former is by far the more common.

*Petrogalochirus dycei* (Domrow, 1960)

(= *Austrochirus dycei* Domrow, 1960)

Listrophoridae

Acari

Regular hosts: brushtail possum.

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: Clark (1995).

Description: Domrow (1960) (as *A. dycei*); Fain (1970) as (*P. dycei*); key to species, Domrow (1992:1562).

Notes: Clark (1995) collected this fur mite from possums throughout N.Z.

*Petrogalochirus macropus* Fain & Domrow, 1974

Listrophoridae

Acari

Regular hosts: Bennett’s or red-necked wallaby (*Macropus rufogriseus rufogriseus*)

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: Clark (1995), [host as “red wallaby”] from Hunter Hills in the South Island of N.Z.

Description: Fain & Domrow (1975); key to species, Domrow (1992:1562).

*Petrogalochirus tasmaniensis* Fain, 1970

Listrophoridae

Acari

Regular hosts: brushtailed rock wallaby.

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: Clark (1995).

Description: Fain (1972); key to species, Domrow (1992:1562).

***Polyplax serrata* (Burmeister, 1839)**

(= *Pediculus serratus* Burmeister, 1839)

Polyplacidae

Phthiraptera

Regular hosts: house mouse.

Also recorded from: host specific.

Distribution: cosmopolitan; probably widespread in N.Z.

N.Z. record: Gibson & Pilgrim (1986).

Description: Ferris (1951:210); Kim et al. (1986:204).

Notes: see Ferris (1951) for full synonymy.

***Polyplax spinulosa* (Burmeister, 1839)**

(= *Pediculus spinulosus* Burmeister, 1839)

Polyplacidae

Phthiraptera

Regular hosts *Rattus* spp, in N Z ship rat, Norway rat, kiore

Also recorded from appears to be specific to *Rattus* spp

Distribution cosmopolitan, probably widespread in N Z

N Z records Clay (1964) [from Campbell Islands], Gibson & Pilgrim (1986)

Description Ferris (1951 211), Kim et al (1986 206)

Notes for full synonymy, see Ferris (1951)

***Porribius pacificus* Jordan, 1946**

Ischnopsyllidae

Siphonaptera

Regular hosts New Zealand long-tailed bat

Also recorded from lesser short tailed bat (Smit 1979 173)

Distribution N Z only (Smit 1979 173)

N Z record Jordan (1946)

Description Jordan (1946)

*Proctolaelaps pygmaeus* (Muller, 1959)

(= *Proctolaelaps hypudaei* (Oudemans, 1929))

Ascidae

Acari

Regular hosts free-living mite, not parasitic

Also recorded from humans (Andrews & Ramsay 1982), kiore (Roberts 1991a), house mouse (Roberts 1991b)

N Z record Evans (1958) (as *P hypudaei*)

Description Hughes (1976 317)

***Psorergates (Psorobia) mustelae* Lukoschus, 1969**

Psorergatidae

Acari

Regular hosts weasel

Also recorded from host specific

Distribution presumed range of host

N Z record P R Kettle (pers comm)

Description Lukoschus (1969)

***Psorergates ovis* Womersley, 1941**

(= *Psorobia ovis* (Womersley, 1941))

Psorergatidae

Acari

Regular hosts sheep

Also recorded from host specific

Distribution throughout Australia, parts of N Z and South America

N Z record Whitten & Elliott (1956)

Description: Womersley (1941); Domrow (1991:1337) as *Psorobia ovis*.

Notes: in N.Z., this parasite appears to be confined to Merino and Corriedale flocks. Current prevalence unknown. Domrow (1991) lists this species as *Psorobia ovis*.

***Psoroptes cuniculi* (Delafond, 1859)**

(= *Dermatodectes cuniculi* Delafond, 1859)

(= *Psoroptes communis* var. *cuniculi* (Delafond, 1859))

Psoroptidae

Acari

Regular hosts: European rabbit.

Also recorded from: goat (Sweatman 1962); horse (Shaw 1966).

Distribution: cosmopolitan. Distribution and prevalence in N.Z. unknown.

N.Z. record: Thomson (1922) [as *Sarcoptes minor* (misdet.)].

Description: Sweatman (1958b); Sanders et al. (2000).

Notes: usually confined to ear canal. Whether or not this should be considered a separate species from *Psoroptes ovis* has been the subject of debate for many years. Recent studies have shown that the two are morphologically and genetically indistinguishable and capable of interbreeding. It has therefore been suggested that the two should be synonymised as *Psoroptes ovis* (Sanders et al. 2000).

***Psoroptes natalensis* Hirst, 1919**

Psoroptidae

Acari

Regular hosts: cattle.

Also recorded from: host specific.

Distribution: South Africa, South America, N.Z., France. Distribution and prevalence in N.Z. unknown.

N.Z. record: Sweatman (1958b).

Description: Sweatman (1958b).

***Psoroptes ovis* (von Hering, 1838)**

(= *Sarcoptes ovis* von Hering, 1838)

(= *Dermatodectes bovis* Gerlach, 1857)

(= *Psoroptes communis* var. *ovis* (von Hering, 1838))

Psoroptidae

Acari

Regular hosts: sheep.

Also recorded from: host specific.

Distribution: probably worldwide except for Australia and N.Z.

N.Z. record: early N.Z. provincial government records c. 1850.

Description: Sanders et al. (2000).

Notes: the cause of the disease known as "sheep scab". This was eradicated from N.Z. c. 1880. See notes on *P. cuniculi* concerning the taxonomy of the two species.

***Pthirus pubis* (Linnaeus, 1758)**

(= *Pediculus pubis* Linnaeus, 1758)

Pthiridae

Phthiraptera

Regular hosts: humans.

Also recorded from host specific

Distribution cosmopolitan

N Z record Thomson (1922) [as *Phthirus inguinalis* (misdet)], Helson (1956)

Description Ferris (1951 281), Kim et al (1986 210)

Notes for synonymy, see Ferris (1951) See Thomson (1922) for note on history of this species in N Z

***Pulex irritans* Linnaeus, 1758**

Pulicidae

Siphonaptera

Regular hosts humans, pig

Also recorded from dog, Norway rat, ship rat (Smit 1979)

Distribution cosmopolitan

N Z record White & Doubleday in Dieffenbach (1843) as '*Pulex*'

Description Dunnet & Mardon (1974 34)

***Pyemotes tritici* (La Greze-Fossat & Montagne, 1851)**

(= *Pyemotes ventricosus* Oudemans, 1936)

(= *P herfsi* Hughes, 1976)

Pyemotidae

Acarı

Regular hosts free-living mite not parasitic

Also recorded from humans (Helson 1956)

Distribution cosmopolitan

N Z record Helson (1956) [as *P ventricosus* (misdet)]

Description Hughes (1976 271) [as *P herfsi* (misdet)]

Notes occasionally associated with allergic reactions in humans

***Pygiopsylla hoptia* Jordan & Rothschild, 1922**

Pygiopsyllidae

Siphonaptera

Regular hosts kiore

Also recorded from Norway rat (Smit 1979)

Distribution Tasmania, southern Australia, N Z [South Island, Stewart Island and Codfish Island (Smit 1979)]

N Z record Smit (1979 171)

Description Dunnet & Mardon (1974 65)

***Pygiopsylla phiola* Smit, 1979**

Pygiopsyllidae

Siphonaptera

Regular hosts kiore, Norway rat, ship rat,

Also recorded from humans (Smit 1979)

Distribution known only from Australia, N Z mainland and offshore islands

N Z record Hilgendorf (1917) [as *P hilli* misdet]

Description Smit (1979 172)

Notes this species was also recorded by Smit (1965) and Ford-Robertson & Bull (1966) as *P hoptia* (misdet) (Smit 1979) Smit (1979 172) notes that all specimens in the type series are

from Australia, suggesting that future studies may reveal slight differences from N.Z. material.

***Radfordia affinis* (Poppe, 1896)**

Myobiidae

Acari

Regular hosts: house mouse.

Also recorded from: host specific.

Distribution: cosmopolitan. N.Z. distribution unknown but probably widespread.

N.Z. record: Gibson (1972).

Description: Poppe (1896) as *Myobia affinis*; Domrow (1991:1330).

Notes: commonly found worldwide on wild and laboratory mice.

*Radfordia ensifera* (Poppe, 1896)

Myobiidae

Acari

Regular hosts: Norway rat, ship rat.

Also recorded from: kiore (Gibson 1972).

Distribution: cosmopolitan. Probably widespread in NZ.

N.Z. record: Gibson (1972).

Description: Poppe (1896) as *Myobia ensifera*; Domrow (1991:1330).

Notes: commonly found worldwide on wild and laboratory rats. In N.Z., Gibson (1972) found this mite on all of 53 kiore examined from various localities and to be widespread but less common on Norway and ship rats.

***Rhipicephalus sanguineus* (Latreille, 1806)**

Ixodidae

Acari

Regular hosts: dog.

Also recorded from: humans (Heath 1986).

Distribution: mainly within latitudes 50°N and 35°S, but not normally in N.Z.

N.Z. record: McKenna et al. (1975).

Description: Roberts (1970:87).

Notes: occasional quarantine intercept or accidental introduction. McKenna et al. (1975) considered it could establish in N.Z. Since 1980, there have been 21 recorded interceptions of this tick, mostly from Australia but also from the Solomon Islands, Papua New Guinea, Thailand, Africa, the Philippines, Hawaii, Alaska, Singapore, and Dubai (Fairley & Heath 1997).

***Sarcoptes scabiei* (de Geer, 1778)**

Sarcoptidae

Acari

Regular hosts: humans, dog, pig, (other hosts overseas).

Also recorded from: ferret (Whitten 1962) as *S. furonis* (misdet.); European hedgehog (Gorton et al. 1999); llama (*Lama glama*) as *Sarcoptes* sp. (Arthur 1997).

Distribution: cosmopolitan. Widespread throughout N.Z.

N.Z. record: Dieffenbach (1843).

Description: Fain (1968).

Notes: for extensive synonymy and discussion of so-called subspecies, see Fain (1968).

***Solenopotes burmeisteri* (Fahrenheit, 1919)**

(= *Linognathus burmeisteri* Fahrenheit, 1919)

Linognathidae

Phthiraptera

Regular hosts: red deer.

Also recorded from: host specific.

Distribution: Europe, N.Z.

N.Z. record: Andrews (1964).

Description: Ferris (1951:253).

Notes: see Ferris (1951) for full synonymy.

***Solenopotes capillatus* Enderlein, 1904**

Linognathidae

Phthiraptera

Regular hosts: cattle.

Also recorded from: host specific.

Distribution: Holarctic, also Australia, N.Z., and South Africa. Prevalence and distribution in N.Z. unknown.

N.Z. record: Whitten (1971).

Description: Ferris (1951: 253); Kim et al. (1986:138).

*Spinturnix* sp. von Heyden, 1826

Spinturnicidae

Acari

Regular hosts: New Zealand long-tailed bat.

Also recorded from: NR.

Distribution: unknown, presumed range of host.

N.Z. record: A. C. G. Heath (*in* King 1990).

Description: undescribed. Identification by Heath to genus level based on Krantz (1978:190).

***Spilopsyllus cuniculi* (Dale, 1878)**

Pulicidae

Siphonaptera

Regular hosts: European rabbit.

Also recorded from: NR.

Distribution: presumed range of European rabbit but not present on mainland N.Z.

N.Z. record: Sobey et al. (1973).

Description: Dunnet & Mardon (1974:40).

Notes: introduced to Macquarie Island in 1968 as vector of myxomatosis.

***Stomoxys calcitrans* (Linnaeus, 1758)**

(= *Conops calcitrans* Linnaeus, 1758)

Muscidae

Diptera

Regular hosts: cattle, horse, sheep, dog, humans.

Also recorded from: see Notes.

Distribution: cosmopolitan. More common in warmer parts of N.Z. but distribution not well documented.

N.Z. record: Walker (1848) as *S. aenos* (cited by Miller 1939a).

Description: Zumpt (1965:35).

Notes: *Stomoxys* feeds preferentially on cattle and horses but will also bite a range of other mammals that, in N.Z., is likely to include more species than those listed as regular hosts.

***Trichodectes (Trichodectes) canis* (de Geer, 1778)**

(= *Ricinus canis* de Geer, 1778)

Trichodectidae

Phthiraptera

Regular hosts: dog.

Also recorded from: host specific.

Distribution: cosmopolitan; prevalence and distribution in N.Z. unknown.

N.Z. record: Thomson (1922) [as *T. latus* (misdet.)].

Description: Werneck (1936:504).

*Trichodectes (Stachiella) ermineae* (Hopkins 1941)

(= *Stachiella ermineae* Hopkins, 1941)

Trichodectidae

Phthiraptera

Regular hosts: stoat.

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: R. L. C. Pilgrim (pers. comm.).

Description: Lyal (1985:299).

*Trichodectes (Stachiella) mustelae* (Schrank, 1803)

(= *Pediculus mustelae* Schrank, 1803)

Trichodectidae

Phthiraptera

Regular hosts: weasel.

Also recorded from: host specific.

Distribution: presumed range of host.

N.Z. record: R. L. C. Pilgrim (pers. comm.).

Description: Séguy (1944:398); Lyal (1985:301).

***Trichosurolaelaps crassipes* Womersley, 1956**

Dermanyssidae

Acari

Regular hosts: brushtail possum.

Also recorded from: humans (Tenquist 1977).

Distribution: presumed range of host.

N.Z. record: Sweatman (1962).

Description: Womersley (1956).

Notes: occasionally associated with allergic reactions in humans. Clark et al. (1997) found this mite on brushtail possums throughout N.Z., except those from Kawau Island.

*Trixacarus caviae* Fain, Hovell & Hyatt, 1972

Sarcoptidae

Acari

Regular hosts: guinea pig.
 Also recorded from: host specific.
 Distribution: presumed range of host.
 N.Z. record: Jackson & Townsend (1984).
 Description: Fain et al. (1972).

Tunga penetrans (Linnaeus, 1758)

Pulicidae
 Siphonaptera
 Regular hosts: humans, pig and other large mammals.
 Also recorded from: NR.
 Distribution: Central South America, Africa, Malagasy Republic, India.
 N.Z. record: Pilgrim (1993).
 Description: Smith (1973:356).
 Notes: one record from a woman who had recently returned from a visit to the Republic of Congo. Pilgrim (1993) postulated that this flea could colonise the warmer parts of N.Z.

Tyrophagus putrescentiae (Schrank, 1781)

Acaridae
 Acari
 Regular hosts: free-living mite; not parasitic.
 Also recorded from: humans (Findlay 1921); kiore (Roberts 1991a).
 N.Z. record: Findlay (1921) [as *Tyroglyphus longior* (misdet)].
 Description: Hughes (1976:51).
 Notes: occasionally associated with allergic reactions in humans.

Werneckiella equi (Denny, 1842)

(= *Bovicola equi* (Denny, 1842))
 (= *Damalinia equi* (Denny, 1842))
 (= *Trichodectes equi* Denny, 1842)
 Trichodectidae
 Phthiraptera
 Regular hosts: horse.
 Also recorded from: host specific.
 Distribution: cosmopolitan. Widespread in N.Z.
 N.Z. record: Helson (1956) [as *Bovicola equi*].
 Description: Moreby (1978:399).

Werneckiella ocellata (Piaget, 1880)

(= *Trichodectes ocellatus* Piaget, 1880)
 Trichodectidae
 Phthiraptera
 Regular hosts: donkey.
 Also recorded from: host specific.
 Distribution: cosmopolitan.
 N.Z. record: R. L. C. Pilgrim (pers. comm.).
 Description: Moreby (1978:402).
 Note: the male of this species is unknown.

*** *Xenocalliphora hortona* (Walker, 1849)**

(= *Calliphora hortona* Walker, 1849)

Diptera

Calliphoridae

Regular "host": mainly carrion (larvae) (see Notes).

Also recorded from: live sheep (larvae only).

Distribution: throughout N.Z., endemic.

N.Z. record: Miller (1921) [as *Calliphora icela* (misdet.)].

Description: Dear (1985:53).

Notes: Miller (1939a, 1939b) described this species incorrectly as *Calliphora icela*. Tenquist & Charleston (1981) following Miller perpetuated the error. See Dear (1985:54) for discussion of the confusion over the species names. Miller (1939b) found 0.02% of approximately 15 000 flies reared from larvae from fly strike samples to be of this species. Also recorded breeding in animal dung (Bishop 1998).

***Xenopsylla cheopis* (Rothschild, 1903)**

(= *Pulex cheopis* Rothschild, 1903)

Pulicidae

Siphonaptera

Regular hosts: ship rat, Norway rat.

Also recorded from: humans (see Notes).

Distribution: cosmopolitan.

N.Z. record: MacLean (1955).

Description: Dunnet & Mardon (1974:42).

Notes: for history of plague in N.Z., see MacLean (1955). Twenty-one cases of plague occurred in N.Z. between 1900 and 1911, and it can be assumed that the infection was transmitted, at least initially, through people being bitten by *X. cheopis*. However, there appears to be no actual record of the flea being found on humans and Smit (1979) does not include humans in the host list for this flea in N.Z. It is presumed that the flea is not established in N.Z., but irregular interceptions on overseas shipping are reported (R. L. C. Pilgrim, pers. comm.).

***Xenopsylla vexabilis* Jordan, 1925**

Pulicidae

Siphonaptera

Regular host: kiore.

Also recorded from: Norway rat (Smit 1979).

Distribution: Australasia, Pacific region.

N.Z. record: Hilgendorf (1917) [as *Xenopsylla cheopis* (misdet.)].

Description: Dunnet & Mardon (1974:43).

REFERENCES

- Anastos, G. 1950: The scutate ticks, or Ixodidae, of Indonesia. *Entomologica Americana* 30 (N.S): 1–144.
- Andrews, J. R. H. 1964: The arthropod and helminth parasites of red deer (*Cervus elaphus* L.) in New Zealand. *Transactions of the Royal Society of New Zealand, Zoology* 5: 97–121.
- Andrews, J. R. H. 1969: The parasitology of some wild ruminants introduced into New Zealand. Unpublished PhD thesis, Victoria University of Wellington, Wellington, New Zealand.

- Andrews, J. R. H. 1970. Notes on infestations of *Damalnia hemitragi* (Cummings 1916) on Tahr in New Zealand. *Journal of Parasitology* 56: 846–848.
- Andrews, J. R. H. 1971. Description of the hitherto unknown males of *Damalnia longicornis* (Nitzsch, 1818), and *Damalnia hemitragi* (Cummings, 1916) -Trichodectidae; Mallophaga *Journal of Natural History* 6: 153–157.
- Andrews, J. R. H. 1973. Records of Mallophaga of the genus *Damalnia* from wild ruminants in New Zealand. *New Zealand Entomologist* 5: 324–330.
- Andrews J. R. H., Ramsay, G. W. 1982: A case of papular dermatosis in man attributed to an ascid mite (Acari) *Journal of Medical Entomology* 19: 111–112.
- Arthur, D. G. 1997: Diseases of lamoids in New Zealand *Surveillance* 24 (1): 29–30.
- Arthur, D. R. 1963. British ticks. London, Butterworths 213 p.
- Baker, E. W., Wharton, G. W. 1952. An Introduction to acarology. New York, MacMillan. 465 p
- Baker, E. W., Evans, T. M., Gould, D. J.; Hull, W. B., Keegan, H. L. 1956: A manual of parasitic mites of medical or economic importance New York, National Pest Control Association Inc. Technical Publication. 170 p
- Banks, J. 1896. Journal of the Right Hon. Sir Joseph Banks, during Captain Cook's First Voyage in the H.M.S. *Endeavour* in 1768–71 to Terra Del Fuego, Otaheite, New Zealand, Australia, the Dutch East Indies Sir Joseph D. Hooker. ed. London, MacMillan 466 p.
- Bathgate, A. 1870: On the Lepidoptera of Otago. *Transactions and Proceedings of the New Zealand Institute* 3: 137–141 [Volume issued 1871]
- Belkin, J. N. 1962: The mosquitoes of the South Pacific (Diptera, Culicidae) Vol. 1. Berkeley, University of California Press.
- Belkin, J. N. 1968. Mosquito studies (Diptera, Culicidae) 7 The Culicidae of New Zealand *Contributions of the American Entomological Institute* 3: 1–182
- Bequaert, J. 1942: A monograph of the Melophaginae, or kedflies of sheep, goats, deer and antelopes (Diptera, Hippoboscidae) *Entomologica Americana* 22: 152–172, 173–220.
- Bishop, D. M. 1993: Early records (1984–1987) of the Australian green blowfly (*Lucilia cuprina*) in New Zealand *New Zealand Entomologist* 16: 22–24.
- Bishop, D. M. 1995. Subspecies of the Australian green blowfly (*Lucilia cuprina*) recorded in New Zealand *New Zealand Veterinary Journal* 43: 164–165.
- Bishop, D. M. 1998: Parasitic Hymenoptera reared from dung-breeding Diptera in New Zealand. *New Zealand Entomologist* 21: 99–106.
- Bishop, D. M.; Heath, A. C. G. 1998. Checklist of ectoparasites of birds in New Zealand. *Surveillance* 25: 13–31 [Special Issue]
- Black, A.; Orr, M. 1997: Review of veterinary diagnostic cases – January to March 1997 *Surveillance* 24 (2): 22–24.
- Brockie, R. E. 1958: The ecology of the hedgehog (*Erinaceus europaeus* L.) in Wellington, New Zealand. Unpublished MSc thesis, Victoria University of Wellington, Wellington, New Zealand.
- Brockie, R. E. 1990: Order Insectivora. European hedgehog. In: King, C. M. ed. The handbook of New Zealand mammals. Auckland, Oxford University Press. Pp. 99–113.
- Bull, P. C. 1953: Parasites of the wild rabbit, *Oryctolagus cuniculus* (L.) in New Zealand. *New Zealand Journal of Science and Technology* 34B: 341–372.
- Clark, J. M. 1993: Towards better pelts from possums; mite fauna of *Trichosurus vulpecula*. *New Zealand Entomologist* 16: 84–90.
- Clark, J. M. 1995: Andropolymorphism in *Petrogalochirus*, an atopomelid fur mite. *Proceedings of the Australian and New Zealand Society for Parasitology Conference, Adelaide, 27–30 September 1995*.
- Clark, J. M., Heath D. D.; Stankiewicz, M. 1997. The ectoparasites of brushtail possum *Trichosurus vulpecula* in New Zealand *New Zealand Journal of Zoology* 24: 199–204.
- Clay, T. 1964: Insects of Campbell Island: Phthiraptera. *Pacific Insects Monograph* 7: 230–234
- Coffee, G. M. 1971. The genus *Listrophorus* Pagenstecher in the Ethiopian region, with a description of a new species (Acarina: Sarcoptiformes, Listrophoridae) *Journal of Natural History* 5: 465–475.
- Cornere, B. M. 1971: The incidence of house dust mites in Auckland. *New Zealand Journal of Medical Laboratory Technology* 25: 79.
- Cram, E. B. 1925: Demodectic mange of the goat in the United States *Journal of the American Veterinary Medical Association* 66: 475–480
- Crosby, T. K. 1976: *Austrosimulium* (*Austrosimulium*) *dumbletoni* n. sp. from New Zealand (Diptera: Simuliidae). *New Zealand Journal of Zoology* 3: 17–19

- Crosby, T. K. 1978: A record of *Culiseta tonnoiri* (Diptera: Culicidae) biting the penguin *Eudyptes pachyrhynchus* (Aves: Spheniscidae). *New Zealand Journal of Zoology* 5: 811–812.
- Cummings, B. F. 1916: Studies on the Anoplura and Mallophaga, being a report upon a collection from the mammals and birds in the society's gardens – Part 1, with a preface. Proceedings of the Zoological Society of London. Pp. 253–295.
- Daniel, M. J. 1979: The New Zealand short-tailed bat, *Mystacina tuberculata*; a review of present knowledge. *New Zealand Journal of Zoology* 6: 357–370.
- Daniel, M. J. 1990: Order Chiroptera. In: King, C. M. ed. The handbook of New Zealand mammals. Auckland, Oxford University Press. Pp. 114–137.
- Davis, G. B.; Kyle, M. G. 1969: *Cheyletiella yasguri* infestation of a dog. *New Zealand Veterinary Journal* 17: 136.
- Dear, J. P. 1985: Calliphoridae (Insecta: Diptera). *Fauna of New Zealand* 8: 1–86.
- Desch, C. E. 1986: *Demodex aries* Desch, a sebaceous gland inhabitant of the sheep *Ovis aries*, and a redescription of *Demodex ovis* Hirst, 1919. *New Zealand Journal of Zoology* 13: 367–375.
- Desch, C. E. 1989: Two new species of *Demodex* (Acari: Demodicidae) from the New Zealand short-tailed bat, *Mystacina tuberculata* Gray, 1843 (Chiroptera: Mystacinidae). *New Zealand Journal of Zoology* 16: 221–230.
- Desch, C. E.; Nutting, W. B. 1971: Demodicids (Trombidiformes: Demodicidae) of medical and veterinary importance. Proceedings of the 3rd International Congress of Acarology, Prague. Pp. 499–505.
- Desch, C. E.; Nutting, W. B. 1972: *Demodex folliculorum* (Simon) and *D. brevis* Akbulatova of man: redescription and re-evaluation. *Journal of Parasitology* 58: 169–177.
- Desch, C. E.; Nutting, W. B. 1979a: Redescription of *Demodex caballi* (= *D. folliculorum* var. *equi*, Railliet, 1895) from the horse *Equus caballus*. *Acarologia* 20: 235–240.
- Desch, C. E.; Nutting, W. B. 1979b: *Demodex cati* (Hirst, 1919): A redescription. *Cornell Veterinarian* 69: 280–285.
- Dieffenbach, E. 1843: Travels in New Zealand: with contributions to the geography, geology, botany, and natural history of that country. London, J. Murray.
- Domrow, R. 1958: A summary of the Atopomelinae (Acarina; Listrophoridae). *Proceedings of the Linnean Society of New South Wales* 83: 40–54.
- Domrow, R. 1960: The Genus *Austrochirus* (Acarina, Listrophoridae). *Acarologia* 2: 92–100.
- Domrow, R. 1991: Acari Prostigmata (excluding Trombiculidae) parasitic on Australian vertebrates: an annotated checklist, keys and bibliography. *Invertebrate Taxonomy* 4: 1283–1376.
- Domrow, R. 1992: Acari Astigmata (excluding feather mites) parasitic on Australian vertebrates: an annotated checklist, keys and bibliography. *Invertebrate Taxonomy* 6: 1459–1606.
- Dumbleton, L. J. 1965: Developmental stages and biology of *Culiseta tonnoiri* (Edwards) and a note on *Culex pervigilans* Bergroth (Diptera: Culicidae). *New Zealand Journal of Science* 8: 137–143.
- Dumbleton, L. J. 1971: The biting midge *Styloconops myersi* (Tonnoir) (Diptera: Ceratopogonidae), description of male and redescription of female. *New Zealand Journal of Science* 14: 270–275.
- Dumbleton, L. J. 1972: The genus *Austrosimulium* Tonnoir (Diptera: Simuliidae) with particular reference to the New Zealand fauna. *New Zealand Journal of Science* 15: 480–584.
- Dunnet, G. M.; Mardon, D. K. 1974: A monograph of Australian fleas (Siphonaptera). *Australian Journal of Zoology, Supplementary Series* 30: 1–273.
- Edwards, F. W. 1920: Mosquito notes. *Bulletin of Entomological Research* 10: 129–137.
- Edwards, F. W. 1924: A synopsis of the adult mosquitoes of the Australasian region. *Bulletin of Entomological Research* 14: 351–401.
- Edwards, F. W. 1925: Mosquito notes V. *Bulletin of Entomological Research* 15: 257–270.
- Emerson, K. C.; Price, R. D. 1975: Mallophaga of Venezuelan mammals. *Science Bulletin, Brigham Young University. Biological Series* 20: 1–77.
- Emerson, K. C.; Price, R. D. 1981: A host-parasite list of the Mallophaga on mammals. *Miscellaneous Publications of the Entomological Society of America* 12: 1–72.
- Evans, G. O. 1958: Revision of British Aceosiinae (Acarina: Mesostigmata). *Proceedings of the Zoological Society, London* 131: 177–229.
- Evans, G. O.; Till, W. M. 1966: Studies on the British Dermanyssidae (Acari: Mesostigmata) Part II. Classification. *Bulletin of the British Museum (Natural History) Zoology* 14: 107–370.
- Fain, A. 1963: Les acariens psoriques parasites des chauves-souris. xxv *Chirophagoides mystacopis* n.g., n.sp. (Sarcoptidae: Sarcoptiformes). *Bulletin et Annales de la Société Royale d'Entomologie de Belgique* 99: 159–167.

- Fain, A 1966 Nouvelle description de *Dematophagoides pteionyssinus* (Trouessart, 1897) Importance de cet Acarien en Pathologie Humaine (Psoroptidae Sarcoptiformes) *Acarologia* 8 302–327
- Fain A 1968 Étude de la variabilité de *Sarcoptes scabiei* avec une revision des Sarcoptidae *Acta Zoologica* 47 1–196
- Fain, A 1970 Diagnoses de nouveaux Isthrophorides de la famille Atopomelidae (Acarina Sarcoptiformes) *Bulletin et Annales de la Société Royale Entomologique de Belgique* 106 275–306
- Fain, A 1972 Les Isthrophorides d’Australie et de Nouvelle Guinée (Acarina Sarcoptiformes) *Bulletin de L Institut Royal des Sciences Naturelles Belgique Bruxelles Entomologie* 48 1–196
- Fain, A, Hovell, G J R, Hyatt, K H 1972 A new sarcoptid mite producing mange in albino Guineapigs *Acta Zoologica et Pathologica Antverpiensia* 56 73–82
- Fain, A, Domrow, R 1975 The subgenus *Metacytostethum* Fain (Acari Atopomelidae) parasites of macropodid marsupials *Acarologia* 16 719–738
- Fairley, R, Heath, A C G 1997 Exotic ticks intercepted in New Zealand since 1980 *Surveillance* 24 (1) 21–22
- Fallis, A M, Bisset, S A, Allison, F R 1976 *Leucocytozoon tawaki* n sp (Eucoccida Leucocytozoidae) from the penguin, *Eudyptes pachyrhynchus*, and preliminary observations on its development in *Austrosimulium* spp (Diptera Simuliidae) *New Zealand Journal of Zoology* 3 11–16
- Ferris, G F 1951 The sucking lice San Francisco, The Pacific Coast Entomological Society, California Academy of Sciences 320 p
- Ferro, D N, Lowe, A D, Ordish R G, Somerfield, K G, Watt, J C 1977 Standard names for common insects of New Zealand *Entomological Society of New Zealand Bulletin* 4 1–42
- Findlay, W F 1921 Cheese mite itch and conjunctivitis – a “minor horror” of the Great War *New Zealand Medical Journal* 20 146–150
- Ford-Robertson, J de C, Bull, P C 1966 Some parasites of the kiore, *Rattus exulans*, on Little Barrier and Hen Islands, New Zealand *New Zealand Journal of Science* 9 221–224
- Fox, T S, Ewing, S A 1969 Morphologic features, behaviour and life history of *Cheyletiella yasguri* *American Journal of Veterinary Research* 30 269–285
- Gibson, R N 1972 Metazoan parasites of rodents in New Zealand Unpublished MSc thesis, University of Canterbury, Christchurch, New Zealand
- Gibson, R N, Pilgrim, R L C 1986 Some ectoparasites on rodents in New Zealand II Sucking lice (Insecta Anoplura) *Mauri Ora* 13 93–102
- Gilruth, J A 1907 The sheep maggot *New Zealand Department of Agriculture Bulletin* 12 3–4
- Gilruth, J A 1908 *Haematopinus* (blood sucking louse) of sheep *New Zealand Department of Agriculture Annual Report for 1908* Pp 194–196
- Gorton, R A, Charleston, W A G, Morris, R S 1999 *Sarcoptes scabiei* infestation of New Zealand hedgehogs Proceedings of the New Zealand Society for Parasitology 26th Conference *New Zealand Journal of Zoology* 26 80 (abstract)
- Graham, D H 1929 Mosquitoes of the Auckland district *Transactions and Proceedings of the New Zealand Institute* 60 205–244
- Graham, D H 1939 Mosquito life in the Auckland district *Transactions and Proceedings of the Royal Society of New Zealand* 69 210–224
- Gregson, J D 1956 The Ixodoidea of Canada *Canada Department of Agriculture Ottawa Ontario Publication* 930 1–92
- Gurr, L 1953 A note on the occurrence of *Linguatula serrata* (Frohlich, 1789) in the wild rabbit, *Oryctolagus cuniculus*, in New Zealand *New Zealand Journal of Science and Technology Section B* 35 49–50
- Guzman, R F 1982 *Cheyletiella blakei* (Acari Cheyletiellidae) hyperparasitic on a cat flea (*Ctenocephalides felis felis*) (Siphonaptera Pulicidae) in New Zealand *New Zealand Entomologist* 7 322–323
- Heath, A C G 1979 Arthropod parasites of goats Proceedings of the New Zealand Society for Parasitology, 7th Annual Meeting *New Zealand Journal of Zoology* 6 655 (abstract)
- Heath A C G 1985 Fly strike in New Zealand *Fauna of New Zealand* 8 15–18
- Heath, A C G 1986 Interception of the brown dog tick, *Rhipicephalus sanguineus* infesting man *New Zealand Veterinary Journal* 34 76–77
- Heath A C G 1997 Exotic ticks intercepted in New Zealand since 1980 *Surveillance* 24 (2) 24

- Heath, A. C. G.; Mariadass, B. 1999: A New Zealand record for the cat fur-mite, *Lynxacarus (Felistrophorus) radovskyi* Tenorio (Acarina: Astigmata: Listrophoridae). *New Zealand Veterinary Journal* 47: 211–212.
- Heath, A. C. G.; Elliott, D. C.; Dreadon, R. G. 1968: *Gasterophilus intestinalis*, the horse bot-fly as a cause of cutaneous myiasis in man. *New Zealand Medical Journal* 68: 31–32.
- Heath, A. C. G.; Milthorpe, A. P.; Eves, N. 1971a: Pigeon mites and human infestation. *New Zealand Entomologist* 5: 90–92.
- Heath, A. C. G.; Rush-Munro, R. M.; Rutherford, D. M. 1971b: The hedgehog: a new host record for *Notoedres muris* (Acari: Sarcoptidae). *New Zealand Entomologist* 5: 100–103.
- Heath, A. C. G.; Bishop, D. M.; Daniel, M. J. 1987a: A new laelapine genus and species (Acari: Laelapidae) from the short-tailed bat, *Mystacina tuberculata*, in New Zealand. *Journal of the Royal Society of New Zealand* 17: 31–39.
- Heath, A. C. G.; Julian, A. F.; Daniel, M. J.; Bishop, D. M. 1987b: Mite infestation (Acari: Laelaptidae) of New Zealand short-tailed bats, *Mystacina tuberculata*, in captivity. *Journal of the Royal Society of New Zealand* 17: 41–47.
- Heath, A. C. G.; Bishop, D. M.; Cole, D. J. W.; Dymock, J. J. 1991: Exotic blowflies in New Zealand. Proceedings of the New Zealand Society for Parasitology Conference, 1990. *New Zealand Journal of Zoology* 18: 85 (abstract).
- Helson, G. A. H. 1956: Some arthropods affecting man and livestock in New Zealand. *New Zealand Veterinary Journal* 4: 11–18.
- Hilgendorf, F. W. 1917: Kermadec Island fleas. *Transactions and Proceedings of the New Zealand Institute* 49: 428.
- Hirst, A. S. 1916: Notes on parasitic Acari. A. On some species of Acari parasitic on mammals and birds in Great Britain. *Journal of Zoological Research* 1: 59–76.
- Hirst, S. 1919: Studies on Acari. No. 1. The genus *Demodex* Owen. London, British Museum (Natural History). 44 p.
- Hirst, S. 1926: Descriptions of new mites, including four new species of “red spider”. *Proceedings of the Zoological Society of London, Part 3*: 825–841.
- Holloway, B. A. 1976: A new bat-fly family from New Zealand (Diptera: Mystacinobidae). *New Zealand Journal of Zoology* 3: 279–301.
- Holloway, B. A. 1985: Immature stages of New Zealand Calliphoridae. *Fauna of New Zealand* 8: 12–14.
- Hoogstraal, H.; Roberts, F. H. S.; Kohls, G. M.; Tipton, V. J. 1968: Review of *Haemaphysalis (Kaiseriana) longicornis*, Neumann (Resurrected) of Australia, New Zealand, New Caledonia, Fiji, Japan, Korea, and northeastern China and U.S.S.R. and its parthenogenetic and bisexual populations (Ixodoidea, Ixodidae). *Journal of Parasitology* 54: 1197–1213.
- Hopkins, G. H. E. 1949: The host-associations of the lice of mammals. *Proceedings of the Zoological Society of London* 119: 387–604.
- Hopkins, G. H. E.; Clay, T. 1952: A check list of the genera & species of *Mallophaga*. London, Trustees of the British Museum (Natural History). 362 p.
- Hudson, G. V. 1892: An elementary manual of New Zealand entomology: being an introduction to the study of our native insects. London, West, Newman & Co. 128 p.
- Hughes, A. M. 1976: The mites of stored food and houses. 2nd ed. *Ministry of Agriculture, Fisheries and Food, Technical Bulletin* 9: 1–400.
- Hughes, T. E. 1959: Mites, or the Acari. London, University of London, Athlone Press. 225 p.
- Hutton, F. W. 1881: Catalogues of the New Zealand Diptera, Orthoptera, Hymenoptera with descriptions of the species. Wellington, New Zealand, Government Printer. 132 p.
- Hutton, F.W. 1902: Additions to the Diptera fauna of New Zealand. *Transactions and Proceedings of the New Zealand Institute* 34: 179–196.
- Hutton, F. W. 1904 ed: Index Faunae Novae Zealandiae. London, Dulau & Co. 372 p.
- Hutton, J. B. 1974: Tick (*Ixodes holocyclus*) paralysis in an imported dog. *New Zealand Veterinary Journal* 22: 173.
- Jackson, R.; Townsend, K. 1984: Trixacarid mange in guinea pigs. *New Zealand Veterinary Journal* 32: 95–96.
- Johnston, T. H.; Harrison, L. 1911: On a collection of Mallophaga from the Kermadecs. *Transactions and Proceedings of the New Zealand Institute* 44: 363–373. (Volume issued 1912.)
- Jordan, H. E. K. 1946: On a new genus and species of bat-fleas from the Pelorus Islands and New Zealand. *Transactions of the Royal Society of New Zealand* 76: 208–210.

- Keler, S von 1971 A revision of the Australasian Boopidae (Insecta Phthiraptera), with notes on the Trimenoponidae *Australian Journal of Zoology Supplementary Series* 6 1–126
- Kettle P R 1974 The genus *Gasterophilus* in the horse in New Zealand *New Zealand Veterinary Journal* 22 43–45
- Kim, K C , Pratt, H D , Stojanovich, C J 1986 The sucking lice of North America An illustrated manual for identification Pennsylvania & London, Pennsylvania State University Press, University Park 241 p
- King, C M 1975 Report on the mustelid live trapping project in the Orongorongo Valley, 1972–75 Unpublished report, Ecology Division, DSIR, New Zealand
- King, C M ed 1990 The handbook of New Zealand mammals Auckland, Oxford University Press 600 p
- Kirk, T W 1900 Poultry pests Bird-flea (*Pulex avium*) New Zealand Department of Agriculture Annual Report for 1900 Pp 304–305
- Krantz, G W 1978 A manual of acarology 2nd ed Corvallis, Oregon, Oregon State University Press 335 p
- Kurahashi, H Wells, J D 1995 *Calliphora quadrimaculata* (Swederus) newly recorded from Australia *Entomologist* 114 104–106
- Laird, M 1950 Notes on the infestation of man by the chicken mite *Dermanyssus gallinae* (de Geer), in New Zealand *New Zealand Medical Journal* 49 22–23
- Lamb, K P 1952 The tropical rat mite, *Bdellonyssus bacoti* (Hirst, 1913) attacking man in New Zealand *New Zealand Medical Journal* 51 320–322
- Lukoschus, F 1969 *Psoreigates (Psorobia) mustelae* spec nov Eine neue Kratzmilbe von *Mustela nivalis* L (Acarina Psorergatidae) *Zoologischer Anzeiger, Leipzig* 183 110–118
- Lyal, C H C 1985 A cladistic analysis and classification of trichodectid mammal lice (Phthiraptera Ischnocera) *Bulletin of the British Museum (Natural History) Entomology Series* 51 187–346
- MacLean, F S 1955 The history of plague in New Zealand *New Zealand Medical Journal* 54 131–143
- McKenna, P B , Tenquist, J D , Ker, J 1975 The brown dog tick (*Rhipicephalus sanguineus*) on an imported dog *New Zealand Veterinary Journal* 23 242
- Manson, D C M 1972 A new species of *Ornithonyssus* (Acarina Dermanyssidae) from a New Zealand bat *New Zealand Journal of Science* 15 465–472
- Martin, I R , Henwood, J L , Wilson, F , Koning, M M , Pike, A J , Smith, S , Town, G I 1997 House dust mite and cat allergen levels in domestic dwellings in Christchurch *New Zealand Medical Journal* 10 229–231
- Miller, D 1920 Report on the mosquito investigation carried out in the North Auckland peninsula of New Zealand during the summer of 1918–19 Part 1 *Publication of the Department of Health New Zealand No 3* 1–38
- Miller, D 1921 Sheep maggot flies and their allies A New Zealand investigation *New Zealand Journal of Agriculture* 22 321–334
- Miller, D 1922 Sheep maggot flies Observations in the past season *New Zealand Journal of Agriculture* 24 335–336
- Miller, D 1939a Blowflies (Calliphoridae), and their associates in New Zealand *Cawthron Institute Monographs* 2 1–68
- Miller, D 1939b Sheep maggot fly problem New Zealand survey, 1937–38 *New Zealand Journal of Science and Technology* 21 240A–244A
- Miller, D , Phillips, W J 1952 Identification of New Zealand mosquitoes [Issued by the New Zealand Department of Health] Nelson, Cawthron Institute 28 p
- Moreby, C 1978 The biting louse genus *Werneckiella* (Phthiraptera Trichodectidae) ectoparasitic on the horse family Equidae (Mammalia Perissodactyla) *Journal of Natural History* 12 395–412
- Moxham, J W , Goldfinch, T T , Heath, A C G 1968 *Cheyletiella parasitivorax* infestation of cats associated with skin lesions of man *New Zealand Veterinary Journal* 16 50–52
- Murdoch, D R , Pilgrim, R L C , Paltridge G P 1996 Cutaneous myiasis due to *Dermatobia hominis* case report *New Zealand Medical Journal* 109 465–466
- Murray, M D 1951 The tropical fowl mite, *Liponyssus bursa* (Berlese) infesting man in New Zealand *New Zealand Medical Journal* 50 392–393

- Nutting, W B , Desch, C E 1978 *Demodex canis* – redescription and re-evaluation *Cornell Veterinarian* 68 139–149
- Nutting, W B , Kettle, P R , Tenquist, J D , Whitten, L K 1975 Hair follicle mites (*Demodex* spp) in New Zealand *New Zealand Journal of Zoology* 2 219–22
- Palma, R L 1996 First records of marsupial lice (Insecta Phthiraptera Boopidae) on a brushtailed rock wallaby from New Zealand *New Zealand Journal of Zoology* 23 161–164
- Palmer P H , Holloway B A 1992 Human ophthalmomyiasis externa caused by larvae of the sheep nasal bot fly *Oestrus ovis* *New Zealand Medical Journal* 105 84–85
- Peters, H S 1930 A new biting louse (Mallophaga) from white-tailed deer *Proceedings of the Entomological Society of Washington* 32 76–79
- Pilgrim, R L C 1993 An instance of tungiasis in New Zealand *New Zealand Medical Journal* 106 180
- Poppe, S A 1896 Wissenschaftliche Mittheilungen 1 Beitrag zur Kenntnis der Gattung Myobia v Heyden *Zoologischer Anzeiger* 19 223–52
- Ramsay, G W , Manson, P C , Hunter, A C 1975 Chicken mite (*Dermanyssus gallinae*) infesting a dog *New Zealand Veterinary Journal* 23 155–156
- Ramsay, G W , Paterson, S E 1977 Mites (Acari) from Rattus species on Raoul Island *New Zealand Journal of Zoology* 4 389–392
- Reid, H A 1911 The cattle tick A local appearance of the parasite *Journal of the Department of Agriculture New Zealand* 3 314–315
- Roberts, F H S 1970 Australian ticks Melbourne, CSIRO 267 p
- Roberts, M 1991a The parasites of the Polynesian rat within and beyond New Zealand *International Journal for Parasitology* 21 777–783
- Roberts, M 1991b The parasites of the Polynesian rat biogeography and origins of the New Zealand parasite fauna *International Journal for Parasitology* 21 785–793
- Robertson, P L 1946 Tyroglyphid mites in stored products in New Zealand *Transactions of the Royal Society of New Zealand* 76 185–207
- Rowe, R S 1980 Cattle tick infestation *New Zealand Medical Journal* 91 472–473
- Rutherford, D 1982 Dog tick *Surveillance* 9 (4) 29
- Sanders, A , Froggatt, P , Wall, R , Smith, K E 2000 Life cycle stage morphology of *Psoroptes* mange mites *Medical and Veterinary Entomology* 14 131–141
- Seguy, E 1944 Insectes ectoparasites (Mallophages, Anoploures, Siphonapteres) *Faune de France* 43 1–684
- Sergent, E 1952 La thimni, myiase oculo-nasale de l'homme causee par l'oestre du mouton *Archives Institut Pasteur d'Algerie* 30 319–61
- Shaw, J G 1966 Ear mange in horses *New Zealand Veterinary Journal* 14 127
- Smeeton, W M I , Koelmeyer, T D , Holloway, B A , Singh, P 1984 Insects associated with exposed human corpses in Auckland, New Zealand *Medicine, Science and the Law* 24 167–174
- Smiley, R L 1970 A review of the family Cheyletiellidae (Acarina) *Annals of the Entomological Society of America* 63 1056–1078
- Smit, F G A M 1965 Siphonaptera of New Zealand *Transactions of the Royal Society of New Zealand Zoology* 7 1–50
- Smit, F G A M 1979 The fleas of New Zealand (Siphonaptera) *Journal of the Royal Society of New Zealand* 9 143–232
- Smith, J M B 1968 Diseases of hedgehogs *The Veterinary Bulletin* 38 425–430
- Smith, K G V ed 1973 Insects and other arthropods of medical importance London, British Museum (Natural History) Publication 720 1–561
- Sobey, W R , Adams, K M , Johnston, G C , Gould, L R , Simpson, K N G , Keith, K 1973 Macquarie Island – the introduction of the European rabbit flea *Spilopsyllus cuniculi* (Dale) as a possible vector for myxomatosis *Journal of Hygiene, Cambridge* 71 299–308
- Spain, A V Luxton M 1971 Catalog of the Acari of the New Zealand subregion *Pacific Insects Monographs* 25 179–226

- Strandtmann R W, Wharton, G W 1958 A manual of mesostigmatid mites parasitic on vertebrates College Park, Maryland, University of Maryland 426 p
- Sweatman, G K 1957 Life history, non-specificity and revision of the genus *Chorioptes*, a parasitic mite of herbivores *Canadian Journal of Zoology* 35 641–689
- Sweatman, G K 1958a Biology of *Otodectes cynotis*, the ear canker mite of carnivores *Canadian Journal of Zoology* 36 849–862
- Sweatman, G K 1958b On the life history and validity of the species in *Psoroptes*, a genus of mange mites *Canadian Journal of Zoology* 36 905–929
- Sweatman G K 1962 Parasitic mites of non domesticated animals in New Zealand *New Zealand Entomologist* 3 15–23
- Tenorio, J M 1974 A new species of *Lynxacarus* (Acarina Astigmata Listrophoridae) from *Felis catus* in the Hawaiian Islands *Journal of Medical Entomology* 11 599–604
- Tenquist, J D 1977 The aetiology of an unpleasant itch *New Zealand Medical Journal* 86 435–436
- Tenquist, J D, Charleston W A G 1981 An annotated checklist of the ectoparasites of terrestrial mammals in New Zealand *Journal of the Royal Society of New Zealand* 11 257–285
- Thomson, G M 1922 The naturalisation of animals and plants in New Zealand Cambridge, Cambridge University Press 607 p
- Tonnair, A L 1924 A new biting ceratopogonid from New Zealand *Bulletin of Entomological Research* 15 443–444
- Tonnair, A L 1925 Australasian Simuliidae *Bulletin of Entomological Research* 15 213–255
- Vujcich, M V 1979 Aspects of the biology of the parma (*Macropus parma* Waterhouse) and dama (*Macropus eugenii* [Desmarest]) wallabies with particular emphasis on social organisation Unpublished MSc thesis, University of Auckland, Auckland, New Zealand
- Walker, F 1848 Lists of the specimens of dipterous insects in the collection of the British Museum Vol 1 London, British Museum 229 p
- Waterhouse, D F, Paramov, S J 1950 The status of two species of *Lucilia* (Diptera, Calliphoridae) attacking sheep in Australia *Australian Journal of Scientific Research (B)* 3 310–336
- Werneck, F L 1936 Contribuição ao conhecimentos dos mallaphagos encontrados nos mamíferos sulamericanos *Memorias do Instituto Oswaldo Cruz* 31 391–589
- White, A 1846 Insects of New Zealand Zoological Voyage *Erebus and Terror* Vol 2 P 127
- Whitten, L K 1962 Parasitic mites of domestic animals in New Zealand *New Zealand Entomologist* 3 912
- Whitten, L K ed 1971 diseases of domestic animals in New Zealand 3rd ed Wellington, Editorial Services, New Zealand Veterinary Association 439 p
- Whitten, L K, Elliott, D C 1956 A note on the occurrence of the itch mite, *Psorergates ovis*, Womersley, 1941, on New Zealand sheep *New Zealand Veterinary Journal* 4 19
- Wilson, N 1964 Insects of Campbell Island Mesostigmata Haemogamasidae *Pacific Insects Monograph* 7 129–131
- Womersley, H 1935 Species of Acarina of the genus *Holothyrs* from Australia and New Zealand *Annals and Magazine of Natural History* 16 154–157
- Womersley, H 1941 Notes on the Cheyletidae (Acarina, Trombidioidea) of Australia and New Zealand, with descriptions of new species *Records of the South Australian Museum* 7 51–64
- Womersley, H 1955 The Acarina fauna of mutton birds nests on a Bass Strait Island *Australian Journal of Zoology* 3 412–438
- Womersley, H 1956 On some new Acarina-Mesostigmata from Australia, New Zealand and New Guinea *Journal of the Linnean Society (Zoology)* 42 505–599
- Worthy, T H, Daniel, M J, Hill, J E 1996 An analysis of skeletal size variation in *Mystacina iobusta* Dwyer, 1962 (Chiroptera Mystacimidae) *New Zealand Journal of Zoology* 23 99–110
- Zumpt, F 1961 The arthropod parasites of vertebrates in Africa south of the Sahara (Ethiopian region) Vol 1 (Chelicerata) *Publications of the South African Institute for Medical Research* 19 1–457
- Zumpt F 1965 Myiasis in man and animals in the Old World A textbook for physicians, veterinarians and zoologists London, Butterworths 267 p

APPENDIX 1**Mammalian host species list**

<i>Alces alces andersoni</i>	Moose
<i>Axis axis</i>	Axis deer
<i>Bos mutus grunniens</i>	Yak
<i>Bos taurus</i>	Cattle
<i>Canis familiaris</i>	Dog
<i>Capra hircus</i>	Goat
<i>Cavia porcellus</i>	Guinea pig
<i>Cervus elaphus nelsoni</i>	Wapiti
<i>Cervus elaphus scoticus</i>	Red deer
<i>Cervus nippon</i>	Sika deer
<i>Cervus timorensis</i>	Rusa deer
<i>Cervus unicolor unicolor</i>	Sambar deer
<i>Chalinolobus tuberculatus</i>	N.Z. long-tailed bat
<i>Dama dama dama</i>	Fallow deer
<i>Equus asinus</i>	Donkey
<i>Equus caballus</i>	Horse
<i>Erinaceus europaeus occidentalis</i>	European hedgehog
<i>Felis catus</i>	House cat
<i>Hemitragus jemlahicus</i>	Tahr
<i>Homo sapiens</i>	Human
<i>Lama glama</i>	Llama
<i>Lama pacos</i>	Alpaca
<i>Lepus europaeus occidentalis</i>	Brown hare
<i>Macropus dorsalis</i>	Black striped wallaby
<i>Macropus eugenii</i>	Dama wallaby
<i>Macropus parma</i>	Parma wallaby
<i>Macropus rufogriseus rufogriseus</i>	Bennett's wallaby
<i>Mus musculus</i>	House mouse
<i>Mustela erminea</i>	Stoat
<i>Mustela furo</i>	Ferret
<i>Mustela nivalis vulgaris</i>	Weasel
<i>Mystacina robusta</i>	Greater short-tailed bat
<i>Mystacina tuberculata</i>	Lesser short-tailed bat
<i>Odocoileus virginianus borealis</i>	White-tailed deer
<i>Oryctolagus cuniculus cuniculus</i>	European rabbit
<i>Ovis aries</i>	Sheep
<i>Petrogale penicillata penicillata</i>	Brush-tailed rock wallaby
<i>Rattus exulans</i>	Kiore, Pacific rat
<i>Rattus norvegicus</i>	Norway rat
<i>Rattus rattus</i>	Ship rat
<i>Rupicapra rupicapra rupicapra</i>	Chamois
<i>Sus scrofa</i>	Pig
<i>Trichosurus vulpecula</i>	Brush-tail possum
<i>Wallabia bicolor</i>	Swamp wallaby

APPENDIX 2

Parasite list by host (New Zealand records)

(Subgenus and subspecies names are not included – refer to main list)

Alpaca	Acari	<i>Chorioptes</i> sp
Bennett's wallaby	Acari	<i>Petrogalochirus macropus</i>
Brown hare	Acari	<i>Demodex</i> sp
		<i>Haemaphysalis longicornis</i>
		<i>Leporacarus gibbus</i>
	Pentastomida	<i>Linguatula serrata</i>
	Phthiraptera	<i>Haemodipsus lyriocephalus</i>
	Siphonaptera	<i>Ctenocephalides canis</i>
Brushtail possum	Acari	<i>Atellana papilio</i>
		<i>Haemaphysalis longicornis</i>
		<i>Leporacarus gibbus</i>
		<i>Marsupiopus trichosuri</i>
		<i>Murichirus anabiotus</i>
		<i>Petrogalochirus dycei</i>
		<i>Trichosurolaelaps crassipes</i>
		<i>Ctenocephalides felis</i>
Brushtailed rock wallaby	Siphonaptera	<i>Petrogalochirus tasmaniensis</i>
	Acari	<i>Boopis notafusca</i>
	Phthiraptera	<i>Heterodoxus ampullatus</i>
Cattle	Acari	<i>Chorioptes bovis</i>
		<i>Demodex bovis</i>
		<i>Haemaphysalis longicornis</i>
		<i>Psoroptes natalensis</i>
	Diptera	<i>Aedes notoscriptus</i>
		<i>Calliphora stygia</i>
		<i>Chrysomya rufifacies</i>
		<i>Culex pervigilans</i>
		<i>Hypoderma</i> sp
		<i>Lucilia cuprina</i>
		<i>Lucilia sericata</i>
		<i>Stomoxys calcitrans</i>
	Phthiraptera	<i>Bovicola bovis</i>
		<i>Haematopinus eurysternus</i>
		<i>Linognathus vituli</i>
		<i>Solenopotes capillatus</i>
Chamois	Phthiraptera	<i>Bovicola longicornis</i>
Dog	Acari	<i>Cheyletiella yasguri</i>
		<i>Demodex canis</i>
		<i>Dermanyssus gallinae</i>
		<i>Haemaphysalis longicornis</i>
		<i>Ixodes holocyclus</i>
		<i>Ixodes ricinus</i>
		<i>Otodectes cynotis</i>
		<i>Rhipicephalus sanguineus</i>
		<i>Sarcoptes scabiei</i>
	Diptera	<i>Lucilia sericata</i>
		<i>Oestrus ovis</i>
		<i>Stomoxys calcitrans</i>
	Pentastomida	<i>Linguatula serrata</i>
	Phthiraptera	<i>Linognathus setosus</i>
		<i>Trichodectes canis</i>
	Siphonaptera	<i>Ctenocephalides canis</i>
		<i>Ctenocephalides felis</i>
		<i>Nosopsyllus fasciatus</i>

APPENDIX 2 *continued*

Donkey	Acari	<i>Pulex irritans</i>
	Phthiraptera	<i>Haemaphysalis longicornis</i>
European hedgehog	Acari	<i>Werneckiella ocellata</i>
		<i>Androlaelaps casalis</i>
		<i>Caparinia tripilis</i>
		<i>Demodex</i> sp.
		<i>Haemaphysalis longicornis</i>
		<i>Hirstionyssus talpae</i>
		<i>Notoedres muris</i> (in nest)
		<i>Sarcoptes scabiei</i>
	Siphonaptera	<i>Ctenocephalides felis</i>
		<i>Nosopsyllus fasciatus</i>
European rabbit	Acari	<i>Leptopsylla segnis</i>
		<i>Cheyletiella parasitivorax</i>
		<i>Haemaphysalis longicornis</i>
		<i>Leporacarus gibbus</i>
		<i>Psoroptes cuniculi</i>
	Pentastomida	<i>Linguatula serrata</i>
	Phthiraptera	<i>Haemodipsus ventricosus</i>
	Siphonaptera	<i>Ctenocephalides felis</i>
		<i>Nosopsyllus fasciatus</i>
		<i>Spilopsyllus cuniculi</i>
Fallow deer	Acari	<i>Haemaphysalis longicornis</i>
Ferret	Acari	<i>Demodex</i> sp.
		<i>Haemaphysalis longicornis</i>
		<i>Leporacarus mustelae</i>
		<i>Otodectes cynotis</i>
		<i>Sarcoptes scabiei</i>
		<i>Nosopsyllus fasciatus</i>
Goat	Siphonaptera	<i>Chorioptes bovis</i>
	Acari	<i>Demodex caprae</i>
		<i>Haemaphysalis longicornis</i>
		<i>Psoroptes cuniculi</i>
	Diptera	<i>Calliphora stygia</i>
		<i>Chrysomya rufifacies</i>
		<i>Lucilia cuprina</i>
		<i>Lucilia sericata</i>
		<i>Melophagus ovinus</i>
		<i>Oestrus ovis</i>
	Phthiraptera	<i>Bovicola caprae</i>
		<i>Bovicola limbatus</i>
		<i>Linognathus stenopsis</i>
Greater short-tailed bat	Acari	<i>Chirophagoides mystacopsis</i>
Guinea pig	Acari	<i>Chirodiscoides caviae</i>
		<i>Trixacarus caviae</i>
	Phthiraptera	<i>Gliricola porcelli</i>
		<i>Gyropus ovalis</i>
Horse	Acari	<i>Chorioptes bovis</i>
		<i>Demodex caballi</i>
		<i>Psoroptes cuniculi</i>
		<i>Haemaphysalis longicornis</i>
	Diptera	<i>Gasterophilus intestinalis</i>
		<i>Gasterophilus nasalis</i>
		<i>Stomoxys calcitrans</i>
	Phthiraptera	<i>Haematopinus asini</i>

APPENDIX 2 *continued*

House cat	Acari	<i>Weinbeckiella equi</i>
		<i>Cheyletiella blakei</i>
		<i>Cheyletiella parasitivorax</i>
		<i>Demodex cati</i>
		<i>Haemaphysalis longicornis</i>
		<i>Lynxacarus radovskyi</i>
		<i>Ornithonyssus bursa</i>
		<i>Otodectes cynotis</i>
		<i>Notoedres cati</i>
	Pentastomida	<i>Felicola subrostratus</i>
	Phthiraptera	<i>Ctenocephalides canis</i>
	Siphonaptera	<i>Ctenocephalides felis</i>
House mouse	Acari	<i>Nosopsyllus fasciatus</i>
		<i>Eulaelaps stabularis</i>
		<i>Haemaphysalis longicornis</i>
		<i>Haemogamasus pontiger</i>
		<i>Hirshonyssus latiscutatus</i>
		<i>Myobia murismusculi</i>
		<i>Myocoptes musculinus</i>
		<i>Myonyssus decumani</i>
		<i>Radfordia affinis</i>
	Phthiraptera	<i>Polyplax serrata</i>
	Siphonaptera	<i>Leptopsylla segnis</i>
Humans	Acari	<i>Nosopsyllus fasciatus</i>
		<i>Nosopsyllus londinensis</i>
		<i>Acarus siro</i>
		<i>Allothyrus australasiae</i>
		<i>Amblyomma triguttatum</i>
		<i>Aponomma hydrosauri</i>
		<i>Cheyletiella yasguri</i>
		<i>Cheyletiella parasitivorax</i>
		<i>Demodex brevis</i>
		<i>Demodex folliculorum</i>
		<i>Dermacentor variabilis</i>
		<i>Dermanyssus gallinae</i>
		<i>Dermatophagoides pteronyssinus</i>
		<i>Falculifer rostratus</i>
		<i>Glycyphagus domesticus</i>
		<i>Haemaphysalis bancrofti</i>
		<i>Haemaphysalis longicornis</i>
		<i>Ixodes holocyclus</i>
		<i>Ixodes ricinus</i>
		<i>Ornithonyssus bacoti</i>
		<i>Ornithonyssus bursa</i>
		<i>Ornithonyssus sylviarum</i>
		<i>Proctolaelaps pygmaeus</i>
		<i>Pyemotes tritici</i>
		<i>Rhipicephalus sanguineus</i>
		<i>Sarcoptes scabiei</i>
		<i>Trichosuroaelaps classipes</i>
		<i>Tyrophagus putrescentiae</i>
	Diptera	<i>Aedes antipodeus</i>
		<i>Aedes notoscriptus</i>
		<i>Aedes subalbirostris</i>

APPENDIX 2 *continued*

		<i>Austrosimulium australense</i>
		<i>Austrosimulium dumbletoni</i>
		<i>Austrosimulium unguatum</i>
		<i>Coquillettidia iracunda</i>
		<i>Coquillettidia tenuipalpis</i>
		<i>Culex pervigilans</i>
		<i>Culex quinquefasciatus</i>
		<i>Culiseta tonnoiri</i>
		<i>Dermatobia hominis</i>
		<i>Gasterophilus intestinalis</i>
		<i>Leptoconops myersi</i>
		<i>Maorigoeldia argyropus</i>
		<i>Melophagus ovinus</i>
		<i>Oestrus ovis</i>
		<i>Opifex fuscus</i>
		<i>Stomoxys calcitrans</i>
	Hemiptera	<i>Cimex lectularius</i>
	Phthiraptera	<i>Haematopinus suis</i>
		<i>Pediculus humanus</i>
		<i>Pthirus pubis</i>
	Siphonaptera	<i>Ceratophyllus gallinae</i>
		<i>Ctenocephalides canis</i>
		<i>Ctenocephalides felis</i>
		<i>Pagipsylla galliralli</i>
		<i>Parapsyllus antichthones</i>
		<i>Parapsyllus magellanicus</i>
		<i>Pulex irritans</i>
		<i>Pygiopsylla phiola</i>
		<i>Tunga penetrans</i>
		<i>Xenopsylla cheopis</i>
Kiore	Acari	<i>Cheyletus eruditus</i>
		<i>Demodex</i> sp.
		<i>Eulaelaps stabularis</i>
		<i>Gohieria fusca</i>
		<i>Glycyphagus domesticus</i>
		<i>Gymnolaelaps annectans</i>
		<i>Hirstionyssus latiscutatus</i>
		<i>Hypoaspis miles</i>
		<i>Hypoaspis nidicorva</i>
		<i>Hypoaspis sardoa</i>
		<i>Mesolaelaps australiensis</i>
		<i>Notoedres muris</i>
		<i>Proctolaelaps pygmaeus</i>
		<i>Radfordia ensifera</i>
		<i>Tyrophagus putrescentiae</i>
	Phthiraptera	<i>Hoplopleura pacifica</i>
		<i>Polyplax spinulosa</i>
	Siphonaptera	<i>Leptopsylla segnis</i>
		<i>Nosopsyllus fasciatus</i>
		<i>Parapsyllus longicornis</i>
		<i>Pygiopsylla hoplia</i>
		<i>Pygiopsylla phiola</i>
		<i>Xenopsylla vexabilis</i>
Llama	Acari	<i>Sarcoptes</i> sp.
Lesser short-tailed bat	Acari	<i>Chirolaelaps mystacinae</i>
		<i>Demodex mystacina</i>
		<i>Demodex novazelandica</i>

APPENDIX 2 *continued*

N Z long-tailed bat	Siphonaptera	<i>Porribius pacificus</i>	
	Acari	<i>Ornithonyssus spinosa</i> <i>Spinturnix</i> sp	
Norway rat	Siphonaptera	<i>Porribius pacificus</i>	
	Acari	<i>Androlaelaps casalis</i> <i>Haemaphysalis longicornis</i> <i>Hirstionyssus latiscutatus</i> <i>Hypoaspis nidicorva</i> <i>Notoedres muris</i> <i>Ornithonyssus bacoti</i> <i>Radfordia ensifera</i>	
	Phthiraptera	<i>Hoplopleura pacifica</i> <i>Polyplax spinulosa</i>	
	Siphonaptera	<i>Leptopsylla segnis</i> <i>Nosopsyllus fasciatus</i> <i>Pulex irritans</i> <i>Pygiopsylla hoplia</i> <i>Pygiopsylla phuola</i> <i>Xenopsylla cheopis</i> <i>Xenopsylla vexabilis</i>	
	Pig	Acari	<i>Demodex phylloides</i> <i>Haemaphysalis longicornis</i> <i>Sarcoptes scabiei</i>
		Phthiraptera	<i>Haematopinus suis</i>
	Red deer	Siphonaptera	<i>Pulex irritans</i>
		Acari	<i>Demodex</i> sp <i>Haemaphysalis longicornis</i>
	Rusa deer	Phthiraptera	<i>Bovicola longicornis</i> <i>Solenopotes burmeisteri</i>
		Acari	<i>Haemaphysalis longicornis</i>
	Sambar deer	Acari	<i>Haemaphysalis longicornis</i>
Sheep	Acari	<i>Chorioptes bovis</i> <i>Demodex aries</i> <i>Demodex ovis</i> <i>Haemaphysalis longicornis</i> <i>Psorergates ovis</i> <i>Psoroptes ovis</i>	
	Pentastomida	<i>Linguatula seriata</i>	
	Diptera	<i>Calliphora hilli</i> <i>Calliphora quadrimaculata</i> <i>Calliphora stygia</i> <i>Calliphora vicina</i> <i>Chrysomya rufifacies</i> <i>Culex pervigilans</i> <i>Hydrotaea rostrata</i> <i>Lucilia cuprina</i> <i>Lucilia sericata</i> <i>Melophagus ovinus</i> <i>Musca domestica</i> <i>Muscina stabulans</i> <i>Oestrus ovis</i> <i>Stomoxys calcitrans</i> <i>Xenocalliphora hortona</i>	
	Phthiraptera	<i>Bovicola ovis</i> <i>Linognathus ovis</i> <i>Linognathus pedalis</i>	
	Ship rat	Acari	<i>Eulaelaps stabularis</i>

APPENDIX 2 *continued*

		<i>Haemaphysalis longicornis</i>
		<i>Haemogamasus pontiger</i>
		<i>Hirstionyssus latiscutatus</i>
		<i>Hypoaspis nidicorva</i>
		<i>Notoedres muris</i>
		<i>Radfordia ensifera</i>
	Phthiraptera	<i>Polyplax spinulosa</i>
	Siphonaptera	<i>Ctenocephalides felis</i>
		<i>Leptopsylla segnis</i>
		<i>Nosopsyllus fasciatus</i>
		<i>Nosopsyllus londiniensis</i>
		<i>Pulex irritans</i>
		<i>Pygiopsylla phiola</i>
		<i>Xenopsylla cheopis</i>
Stoat	Acari	<i>Demodex erminae</i>
		<i>Gymnolaelaps annectans</i>
		<i>Haemaphysalis longicornis</i>
		<i>Hypoaspis nidicorva</i>
		<i>Leporacarus mustelae</i>
	Siphonaptera	<i>Ceratophyllus gallinae</i>
		<i>Nosopsyllus fasciatus</i>
	Phthiraptera	<i>Trichodectes ermineae</i>
Tahr	Phthiraptera	<i>Bovicola hemitrangi</i>
Wapiti	Phthiraptera	<i>Bovicola longicornis</i>
	Diptera	<i>Cephenomyia trompe</i>
	Acari	<i>Dermacentor albipictus</i>
Weasel	Acari	<i>Demodex</i> sp.
		<i>Haemaphysalis longicornis</i>
		<i>Psorergates mustelae</i>
	Phthiraptera	<i>Trichodectes mustelae</i>
	Siphonaptera	<i>Nosopsyllus fasciatus</i>
White-tailed deer	Phthiraptera	<i>Damalinia lipeuroides</i>
		<i>Damalinia parallela</i>
	Diptera	<i>Cephenomyia trompe</i>
Yak	Acari	<i>Haemaphysalis longicornis</i>

APPENDIX 3

List of families and common names (if any)

(Undescribed or unnamed species of *Demodex* not included. Subgenus and subspecies names not included – refer to main list.)

Family	Species	Order	Common name
Acaridae	<i>Acarus siro</i>	Acari	Baker's itch mite
	<i>Tyrophagus putrescentiae</i>	Acari	Mould mite
Ascidae	<i>Proctolaelaps pygmaeus</i>	Acari	
Boopiididae	<i>Boopia notafusca</i>	Phthiraptera	
	<i>Heterodoxus ampullatus</i>	Phthiraptera	
Calliphoridae	<i>Calliphora hilli</i>	Diptera	
	<i>Calliphora quadrimaculata</i>	Diptera	N.Z. blue blowfly
	<i>Calliphora stygia</i>	Diptera	Brown blowfly
	<i>Calliphora vicina</i>	Diptera	European blowfly
	<i>Chrysomya rufifacies</i>	Diptera	Hairy maggot fly
	<i>Lucilia cuprina</i>	Diptera	Australian green blowfly
	<i>Lucilia sericata</i>	Diptera	Green blowfly

APPENDIX 3 *continued*

	<i>Xenocalliphora hortona</i>	Diptera	Small blue blowfly
Ceratophyllidae	<i>Ceratophyllus gallinae</i>	Siphonaptera	European chicken flea
	<i>Nosopsyllus fasciatus</i>	Siphonaptera	European rat flea
	<i>Nosopsyllus londiniensis</i>	Siphonaptera	
Ceratopogonidae	<i>Leptoconops myersi</i>	Diptera	Biting midge
Cheyletiellidae	<i>Cheyletiella blakei</i>	Acari	Cat cheyletid mite
	<i>Cheyletiella parasitivorax</i>	Acari	Rabbit cheyletid mite
	<i>Cheyletiella yasguri</i>	Acari	Dog cheyletid mite
Cheyletidae	<i>Cheyletus eruditus</i>	Acari	Common cheyletid mite
Chortoglyphidae	<i>Chortoglyphus arcuatus</i>	Acari	Large-headed flour mite
Cimicidae	<i>Cimex lectularis</i>	Hemiptera	Bed bug
Culicidae	<i>Aedes notoscriptus</i>	Diptera	Striped mosquito
	<i>Aedes antipodeus</i>	Diptera	Winter Mosquito
	<i>Aedes subalbirostris</i>	Diptera	Mosquito
	<i>Cocquillettdia tenuipalpis</i>	Diptera	
	<i>Cocquillettdia iracunda</i>	Diptera	
	<i>Culex pervigilans</i>	Diptera	Vigilant mosquito
	<i>Culex quinquefasciatus</i>	Diptera	
	<i>Culiseta tonnoyi</i>	Diptera	
	<i>Maorigoeldia argyropus</i>	Diptera	
	<i>Opifex fuscus</i>	Diptera	Saltpool mosquito
Cuterebridae	<i>Dermatobia hominis</i>	Diptera	
Demodicidae	<i>Demodex aries</i>	Acari	
	<i>Demodex bovis</i>	Acari	Cattle follicle mite
	<i>Demodex brevis</i>	Acari	Human follicle mite
	<i>Demodex caballi</i>	Acari	Horse follicle mite
	<i>Demodex canis</i>	Acari	Dog follicle mite
	<i>Demodex caprae</i>	Acari	Goat follicle mite
	<i>Demodex cati</i>	Acari	Cat follicle mite
	<i>Demodex erminae</i>	Acari	Mustelid follicle mite
	<i>Demodex folliculorum</i>	Acari	Human follicle mite
	<i>Demodex mystacina</i>	Acari	
	<i>Demodex novazelandica</i>	Acari	
	<i>Demodex ovis</i>	Acari	Sheep follicle mite
	<i>Demodex phylloides</i>	Acari	Pig follicle mite
Dermanyssidae	<i>Dermanyssus gallinae</i>	Acari	Chicken mite, red mite
	<i>Trichosurolaelaps crassipes</i>	Acari	Possum mite
Dermoglyphidae	<i>Falculifer rostratus</i>	Acari	Pigeon feather mite
Gasterophilidae	<i>Gasterophilus intestinalis</i>	Diptera	Horse bot fly
	<i>Gasterophilus nasalis</i>	Diptera	Throat bot fly
Glycyphagidae	<i>Glycyphagus domesticus</i>	Acari	Grocers' itch mite
	<i>Gohieria fusca</i>	Acari	Brown flour mite
	<i>Marsupiopus trichosuri</i>	Acari	
Gyropidae	<i>Glynicola porcelli</i>	Phthiraptera	
	<i>Gyropus ovalis</i>	Phthiraptera	
Haematopinidae	<i>Haematopinus asini</i>	Phthiraptera	Horse sucking louse
	<i>Haematopinus eurysternus</i>	Phthiraptera	Short-nosed sucking louse
	<i>Haematopinus suis</i>	Phthiraptera	Pig louse
Hippoboscidae	<i>Melophagus ovinus</i>	Diptera	Sheep ked
Holothyridae	<i>Allothyrus australasiae</i>	Acari	
Hoplopleuridae	<i>Hoplopleura pacifica</i>	Phthiraptera	
Ischnopsyllidae	<i>Porrihius pacificus</i>	Siphonaptera	N Z bat flea
Ixodidae	<i>Amblyomma cyprum</i>	Acari	
	<i>Amblyomma triguttatum</i>	Acari	Kangaroo tick
	<i>Aponomma hydrosauri</i>	Acari	
	<i>Dermacentor albipictus</i>	Acari	
	<i>Dermacentor variabilis</i>	Acari	

APPENDIX 3 *continued*

	<i>Haemaphysalis bancrofti</i>	Acari	
	<i>Haemaphysalis longicornis</i>	Acari	N.Z. cattle tick
	<i>Ixodes holocyclus</i>	Acari	Paralysis tick
	<i>Ixodes ricinus</i>	Acari	
	<i>Rhipicephalus sanguineus</i>	Acari	Brown dog tick
Laelapidae (= Laelaptidae)	<i>Androlaelaps casalis</i>	Acari	Cosmopolitan nest mite
	<i>Chirolaelaps mystacinae</i>	Acari	
	<i>Eulaelaps stabularis</i>	Acari	
	<i>Gymnolaelaps annectans</i>	Acari	
	<i>Haemogamasus pontiger</i>	Acari	Detritus mite
	<i>Hirstionyssus latiscutatus</i>	Acari	
	<i>Hirstionyssus talpae</i>	Acari	
	<i>Hypoaspis miles</i>	Acari	
	<i>Hypoaspis nidicorva</i>	Acari	
	<i>Hypoaspis sardoa</i>	Acari	
	<i>Mesolaelaps australiensis</i>	Acari	
	<i>Myonyssus decumani</i>	Acari	
Leptopsyllidae	<i>Leptopsylla seignis</i>	Siphonaptera	Mouse flea
Linguatulidae	<i>Linguatula serrata</i>	Pentastomida	Tongueworm
Linognathidae	<i>Linognathus ovillus</i>	Phthiraptera	Sheep face louse
	<i>Linognathus pedalis</i>	Phthiraptera	Sheep foot louse
	<i>Linognathus setosus</i>	Phthiraptera	Dog sucking louse
	<i>Linognathus stenopsis</i>	Phthiraptera	Goat sucking louse
	<i>Linognathus vituli</i>	Phthiraptera	Long-nosed cattle louse
	<i>Solenopotes burmeisteri</i>	Phthiraptera	
	<i>Solenopotes capillatus</i>	Phthiraptera	Little blue cattle louse
Listrophoridae	<i>Atellana papilio</i>	Acari	Possum fur mite
	<i>Chirodiscoides caviae</i>	Acari	
	<i>Leporacarus gibbus</i>	Acari	Rabbit fur mite
	<i>Leporacarus mustelae</i>	Acari	Mustelid fur mite
	<i>Lynxacarus radovskyi</i>	Acari	
	<i>Murichirus anabiotus</i>	Acari	
	<i>Petrogalochirus dycei</i>	Acari	
	<i>Petrogalochirus macropus</i>	Acari	
	<i>Petrogalochirus tasmaniensis</i>	Acari	
Macronyssidae	<i>Ornithonyssus bacoti</i>	Acari	Tropical rat mite
	<i>Ornithonyssus bursa</i>	Acari	Tropical fowl mite
	<i>Ornithonyssus spinosa</i>	Acari	
	<i>Ornithonyssus sylviarum</i>	Acari	Northern fowl mite
Muscidae	<i>Hydrotaea rostrata</i>	Diptera	
	<i>Musca domestica</i>	Diptera	House fly
	<i>Muscina stabulans</i>	Diptera	False stable fly
	<i>Stomoxys calcitrans</i>	Diptera	Stable fly
Myobiidae	<i>Myobia murismusculi</i>	Acari	Mouse myobiid mite
	<i>Radfordia affinis</i>	Acari	Mouse myobiid mite
	<i>Radfordia ensifera</i>	Acari	Rat myobiid mite
Myocoptidae	<i>Myocoptes musculus</i>	Acari	Myocoptic mange mite
Oestridae	<i>Cephenomyia trompe</i>	Diptera	
	<i>Hypoderma</i> sp.	Diptera	Cattle grub; warble fly
	<i>Oestrus ovis</i>	Diptera	Sheep nasal bot fly
Pediculidae	<i>Pediculus humanus</i>	Phthiraptera	Human head louse
Pthiridae	<i>Pthirus pubis</i>	Phthiraptera	Crab louse
Polyplacidae	<i>Haemodipsus lyriocephalus</i>	Phthiraptera	
	<i>Haemodipsus ventricosus</i>	Phthiraptera	
	<i>Polyplax serrata</i>	Phthiraptera	
	<i>Polyplax spinulosa</i>	Phthiraptera	

APPENDIX 3 *continued*

Psorergatidae	<i>Psorergates ovis</i>	Acari	Sheep itch mite
	<i>Psorergates mustelae</i>	Acari	
Psoroptidae	<i>Caparimia tripilis</i>	Acari	Hedgehog mange mite
	<i>Chorioptes bovis</i>	Acari	Chorioptic mange mite
	<i>Otodectes cynotis</i>	Acari	Ear mange mite
	<i>Psoroptes cuniculi</i>	Acari	Rabbit ear mite
	<i>Psoroptes natalensis</i>	Acari	Cattle scab mite
	<i>Psoroptes ovis</i>	Acari	Sheep scab mite
Pulicidae	<i>Ctenocephalides canis</i>	Siphonaptera	Dog flea
	<i>Ctenocephalides felis</i>	Siphonaptera	Cat flea
	<i>Pulex irritans</i>	Siphonaptera	Human flea
	<i>Spilopsyllus cuniculi</i>	Siphonaptera	
	<i>Tunga penetrans</i>	Siphonaptera	
	<i>Xenopsylla cheopis</i>	Siphonaptera	Oriental rat flea
	<i>Xenopsylla vexabilis</i>	Siphonaptera	
Pyemotidae	<i>Pyemotes tritici</i>	Acari	Straw itch mite
Pygiopsyllidae	<i>Pagipsylla gallinalli</i>	Siphonaptera	
	<i>Pygiopsylla hophia</i>	Siphonaptera	Kiore flea
	<i>Pygiopsylla phiola</i>	Siphonaptera	
Pyroglyphidae	<i>Dermatophagoides pteronyssinus</i>	Acari	European house dust mite
Rhopalopsyllidae	<i>Parapsyllus longicornis</i>	Siphonaptera	
	<i>Parapsyllus magellanicus</i>	Siphonaptera	
	<i>Parapsyllus nestoris antichthones</i>	Siphonaptera	
Sarcoptidae	<i>Trixacarus caviae</i>	Acari	
	<i>Chirophagoides mystacopis</i>	Acari	
	<i>Notoedres cati</i>	Acari	Cat mange mite
	<i>Notoedres muris</i>	Acari	Rat ear mite
	<i>Sarcoptes scabiei</i>	Acari	Scabies mite
Simuliidae	<i>Austrosimulium australense</i>	Diptera	N Z blackfly (sandfly)
	<i>Austrosimulium dumbletoni</i>	Diptera	Blackfly (sandfly)
	<i>Austrosimulium unguatum</i>	Diptera	West Coast blackfly (sandfly)
Spinturnicidae	<i>Spinturnix</i> sp	Acari	
Trichodectidae	<i>Bovicola bovis</i>	Phthiraptera	Cattle biting louse
	<i>Bovicola caprae</i>	Phthiraptera	Goat biting louse
	<i>Bovicola hemitragi</i>	Phthiraptera	
	<i>Bovicola lumbatus</i>	Phthiraptera	
	<i>Bovicola longicornis</i>	Phthiraptera	
	<i>Bovicola ovis</i>	Phthiraptera	Sheep body louse
	<i>Damalima lpeuroides</i>	Phthiraptera	
	<i>Damalima par allela</i>	Phthiraptera	
	<i>Felicola subrostratus</i>	Phthiraptera	
	<i>Trichodectes ermuneae</i>	Phthiraptera	
	<i>Trichodectes mustelae</i>	Phthiraptera	
	<i>Trichodectes canis</i>	Phthiraptera	
	<i>Werneckiella equi</i>	Phthiraptera	Horse biting louse
	<i>Werneckiella ocellata</i>	Phthiraptera	

APPENDIX 4

Additions to the 1981 list (not including two undescribed species of *Demodex*)

<i>Amblyomma cyprium cyprium</i>	<i>Hypoaspis sardoa</i>
<i>Aponomma hydrosauri</i>	<i>Ixodes ricinus</i>
<i>Boopia notafusca</i>	<i>Leptoconops (Styloconops) myersi</i>
<i>Cephenomyia trompe</i>	<i>Lucilia cuprina</i>
<i>Cheyletiella blakei</i>	<i>Lynxacarus (Felistrophorus) radovskyi</i>
<i>Chirodiscoides caviae</i>	<i>Marsupioptes trichosuri</i>
<i>Chirolaelaps mystacinae</i>	<i>Mutichurus anabiotus</i>
<i>Chirophagoides mystacopsis</i>	<i>Myonyssus decumani</i>
<i>Demodex aries</i>	<i>Ornithonyssus sylviarum</i>
<i>Demodex mystacina</i>	<i>Petrogalochinus dycei</i>
<i>Demodex novaezealandica</i>	<i>Petrogalochinus macropus</i>
<i>Demodex ovis</i>	<i>Petrogalochinus tasmaniensis</i>
<i>Deimacentor albipictus</i>	<i>Proctolaelaps pygmaeus</i>
<i>Deimacentor variabilis</i>	<i>Radfordia ensifera</i>
<i>Dermatobia hominis</i>	<i>Spinturnix sp</i>
<i>Haemaphysalis bancrofti</i>	<i>Trichodectes (Stachiella) ermineae</i>
<i>Haemogamasus pontiger</i>	<i>Trichodectes (Stachiella) mustelae</i>
<i>Heterodoxus ampullatus</i>	<i>Trixacarus caviae</i>
<i>Hirstionyssus laticutatus</i>	<i>Tunga penetrans</i>
<i>Hoplopleura pacifica</i>	<i>Tyrophagus putrescentiae</i>
<i>Hypoaspis mules</i>	<i>Werneckiella ocellata</i>
<i>Hypoaspis nidicorva</i>	

Renamed species included in the 1981 list

1981 list		Present list
<i>Calliphora hortona</i>	=	<i>Xenocalliphora hortona</i>
<i>Damalima bovis</i>	=	<i>Bovicola (Bovicola) bovis</i>
<i>Damalima caprae</i>	=	<i>Bovicola (Bovicola) caprae</i>
<i>Damalima hemitragi</i>	=	<i>Bovicola (Spinibovicola) hemitragi</i>
<i>Damalima limbata</i>	=	<i>Bovicola (Bovicola) limbatus</i>
<i>Damalima longicornis</i>	=	<i>Bovicola (Bovicola) longicornis</i>
<i>Damalima ovis</i>	=	<i>Bovicola (Bovicola) ovis</i>
<i>Damalima lypeuroides</i>	=	<i>Damalima (Tricholypeurus) lypeuroides</i>
<i>Damalima parallela</i>	=	<i>Damalima (Tricholypeurus) parallela</i>
<i>Listrophoius gibbus</i>	=	<i>Leporacarus gibbus</i>
<i>Listrophoius mustelae</i>	=	<i>Leporacarus mustelae</i>
<i>Myobia musculi</i>	=	<i>Myobia murismusculi</i>
<i>Ophyra rostrata</i>	=	<i>Hydrotaea rostrata</i>

APPENDIX 5

For some species of introduced mammals, the ectoparasitic populations are poorly known or none have been recorded. Based on King 1990, these include

Axis deer (*Axis axis*) (extinct in N.Z.)

No ectoparasites recorded

Bennett's wallaby (*Macropus rufogriseus rufogriseus*)

Additional to *Petrogalochirus macropus*, one unidentified acarine

Black-striped wallaby (*Macropus dorsalis*) (extinct in N.Z.)

No ectoparasites recorded

Dama wallaby (*Macropus eugeni*)

One unidentified ectoparasite (M. Vujcich, 1979)

Parma wallaby (*Macropus parma*)

Vujcich (1979) collected an unidentified "red-brown louse" from a parma wallaby on Kawau Island

Sika deer (*Cervus nippon*)

No ectoparasites recorded

Swamp wallaby (*Wallabia bicolor*)

No ectoparasites recorded

Water buffalo (*Bupalis arnee*)

No ectoparasites recorded