Part II – the other Alberta Acari

Introduction ......................................................................................................................... 8
Acknowledgements ................................................................................................................ 8
Key to Superorders & Orders of Mites in Alberta ................................................................. 9
Supercohort Palaeosomatides Grandjean, 1969 .............................................................. 11
  Superfamily Ctenacaroidae Grandjean, 1954 ................................................................. 11
  Aphelacaridae Grandjean, 1954 ................................................................................... 11
Supercohort Enarthronotides Grandjean, 1969 .............................................................. 11
  Superfamily Atopechthonioidea Grandjean, 1948 ...................................................... 11
  Atopechthoniidae Grandjean, 1948 ........................................................................... 11
  Pterochthoniidae Grandjean, 1950 ............................................................................. 12
Superfamily Protoplophoroidea Ewing, 1917 .................................................................. 13
  Haplochthoniidae van der Hammen, 1959 ................................................................. 13
  Sphaerochthoniidae Grandjean, 1947 ....................................................................... 13
Superfamily Brachychthonioidea Thor, 1934 .................................................................. 14
  Brachychthoniidae Thor, 1934 .................................................................................. 14
Supercohort Desmonomatides Woolley, 1973 ............................................................... 21
Superfamily Ameroidea Bulanova-Zachvatkina, 1957 .................................................. 22
  Caleremaeidae Grandjean, 1965 ............................................................................... 22
  Damaeolidae Grandjean, 1965 .................................................................................. 22
Superfamily Licneremaeoidea Grandjean, 1954 ............................................................... 23
  Licnodamaeidae Grandjean, 1954 ............................................................................. 23
Superfamily Oppioidea Grandjean, 1951 ....................................................................... 24
  Oppiidae Grandjean, 1951 ...................................................................................... 24
  Quadroppiidae Balogh, 1983 .................................................................................... 35
  Suctobelbidae Jacot, 1938 ....................................................................................... 35
Cohort Astigmatina (Astigmata) Canestrini, 1891 ............................................................. 42
Acaridia ............................................................................................................................... 43
Superfamily Acaroidea Latreille, 1802 ......................................................................... 43
  Acaridae Latreille, 1802 ......................................................................................... 43
  Lardoglyphidae Oudemans, 1927 ............................................................................ 45
  Suidasiidae Hughes, 1948 ....................................................................................... 45
Superfamily Glycypagoidea Berlese, 1897 ..................................................................... 45
  Glycypagidae Berlese, 1897 .................................................................................... 45
Superfamily Hemisarcoptoidae Oudemans, 1904 ........................................................... 47
  Algophagidae Fain, 1974 ........................................................................................ 47
  Carpoglyphidae Fain, 1974 ...................................................................................... 47
  Chaetodactyliidae Zachvatkin, 1941 ........................................................................ 47
Superfamily Histiostomatoidea Berlese, 1897 ................................................................. 48
  Histiostomatidae Berlese, 1897 ................................................................................ 48
  Winterschmidtiiidae Oudemans, 1923 ..................................................................... 49
Psoroptidia .......................................................................................................................... 49
Superfamily Analgoidea Trouessart & Méglin, 1884 ......................................................... 49
  Alloptidae Gaud, 1957 ............................................................................................ 50
  Analgidae Trouessart & Méglin, 1884 ...................................................................... 50
  Avenzoariidae Oudemans, 1905 ............................................................................. 51
Dermationidae Fain, 1965 ................................................................. 52
Dermoglyphidae Méggn & Trouessart, 1884 .................................. 53
Epidermoptidae Trouessart, 1892 .................................................. 53
Proctophylloidea Méggn & Trouessart, 1884 ................................. 54
Pteronyssidae Oudemans, 1941 ..................................................... 55
Psoroptoididae Gaud, 1983 .............................................................. 55
Trouessartiidae Gaud, 1957 ............................................................. 56
Pyroglyphidae Cunliffe, 1958 ......................................................... 56
Turbinoptidae Fain, 1957 ................................................................. 56
Xolalgidae Dubinin, 1953 ............................................................... 57
Superfamily Pterolichoidea Trouessart & Méggn, 1884 ............... 58
Freyanidae Dubinin, 1953 ............................................................... 58
Gabuciniidae Gaud & Atyeo, 1975 ............................................... 58
Kramerellidae Gaud & Mouchet, 1961 .......................................... 58
Pterolichidae Trouessart & Méggn, 1884 ...................................... 59
Ptiloxenidae Gaud, 1982 ................................................................. 59
Superfamily Sarcoptoidea Murray, 1877 ...................................... 60
Myocoptidae Gunther, 1942 .......................................................... 60
Psoroptidae G. Canestrini, 1892 .................................................... 60
Sarcoptidae Murray, 1877 ............................................................. 60
Suborder Endeostigmata ............................................................... 61
Alicorhagiidae Grandjean, 1939 .................................................. 61
Alycidae G. Canestrini & Fanzago, 1877 ....................................... 61
Nanorchestidae Grandjean, 1937 ................................................ 62
Oehserchestidae Kethley, 1977 ..................................................... 62
Terpnacaridae Grandjean, 1939 ................................................... 62
Suborder Sphaerolichida ............................................................... 64
Lordalycidae Grandjean, 1939 ..................................................... 64
Suborder Prostigmata ................................................................. 64
Supercohort Eupodides ............................................................... 64
Superfamily Bdelloidea Dugès, 1834 ........................................... 64
Bdellidae Dugès, 1834 ................................................................. 64
Cunaxidae Thor, 1902 ................................................................. 65
Superfamily Halacaroidea .......................................................... 65
Halacaridae Murray, 1877 .......................................................... 65
Superfamily Eriophyoidea .......................................................... 66
Eriophyidae Nalepa, 1898 ........................................................... 66
Superfamily Eupodoidea ............................................................. 66
Eupodidae CL Koch, 1842 .......................................................... 66
Penthaleidae Oudemans, 1931 ................................................... 67
Rhogidiidae Oudemans, 1922 ..................................................... 67
Superfamily Tydeoidea ............................................................. 68
Ereynetidae Oudemans, 1931 ...................................................... 68
“Triophtydeidae André, 1979” .................................................... 69
Tydeidae Kramer, 1877 .............................................................. 69
Supercohort Anystides ............................................................. 70
Cohort Anystina ................................................................. 70
Superfamily Anystoidea...................................................... 70
  Anystidae Oudemans, 1936 .............................................. 70
  Paratydeidae Baker, 1949 ............................................... 70
Cohort Parasitengonina (Parasitengona) .......................... 70
Superfamily Erythraeoida .................................................... 70
  Erythraeidae Robineau-Desvoidy, 1828 .......................... 70
Superfamily Trombiculoidea .............................................. 71
  Johnstonianidae Thor, 1935 .......................................... 71
  Trombiculidae Ewing, 1929 ......................................... 71
Superfamily Trombidioida .................................................. 72
  Microtrombidiidae Thor, 1935 ...................................... 72
Subcohort Stygothrombidae ............................................... 72
Superfamily Stygothrombidioida ........................................ 72
  Stygothrombidiidae Thor, 1935 .................................... 72
Subcohort Hydracarina (Hydrachnidae) – Water Mites .... 73
Superfamily Arrenuroidea .................................................. 73
  Acalyptonotidae Walter, 1911 ....................................... 73
  Arrenuridae Thor, 1900 ............................................... 73
  Athienemannidae Viets, 1922 ........................................ 73
  Chappuisididae Motas & Tanasachi, 1946 ....................... 73
  Laversiidae Cook, 1955 ............................................... 74
  Mideidae Thor, 1911 ................................................... 74
  Mideopsidae Koenike, 1910 ......................................... 74
  Momoniidae Viets, 1926 .............................................. 74
  Nudomideopsidae ....................................................... 74
Superfamily Eylaoidea ...................................................... 74
  Limnocharidae .......................................................... 74
  Eylaiidae Leach, 1815 ................................................ 74
Superfamily Hydrovolzioida ............................................ 74
  Hydrovolziidae Thor, 1905 ......................................... 74
Superfamily Hydrachnoidea ............................................... 74
  Hydrachnidae Leach, 1815 .......................................... 74
Superfamily Hydryphantoidea .......................................... 75
  Hydryphantidae Piersig, 1896 ...................................... 75
  Hydrodromidae Viets, 1936 ........................................ 75
Superfamily Hygrobatoida ............................................... 75
  Aturidae Thor, 1930 .................................................. 75
  Feltriidae Viets, 1926 ................................................ 75
  Hygrobatidae CL Koch, 1842 .................................... 75
  Limnesiidae Thor, 1930 .............................................. 76
  Pionidae Thor, 1930 .................................................. 76
  Unio nicolidae Oudemans, 1909 ................................... 76
  Wettinidae Cook, 1956 .............................................. 76
Superfamily Lebertioidea .................................................. 76
  Anisitsiellidae Koenike, 1910 ..................................... 76
<table>
<thead>
<tr>
<th>Taxon</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lebertiidae Thor, 1900</td>
<td>76</td>
</tr>
<tr>
<td>Oxidae Viets, 1926</td>
<td>76</td>
</tr>
<tr>
<td>Sperchontidae Thor, 1900</td>
<td>77</td>
</tr>
<tr>
<td>Teutoniiidae Koenike, 1910</td>
<td>77</td>
</tr>
<tr>
<td>Torrenticolidae Piersig, 1902</td>
<td>77</td>
</tr>
<tr>
<td>Supercohort Eleutherengonides</td>
<td>77</td>
</tr>
<tr>
<td>Cohort Raphignathina</td>
<td>77</td>
</tr>
<tr>
<td>Superfamily Cheyletoidea</td>
<td>77</td>
</tr>
<tr>
<td>Cheyletidae Leach, 1815</td>
<td>77</td>
</tr>
<tr>
<td>Demodecidae Nicolet, 1855</td>
<td>78</td>
</tr>
<tr>
<td>Harpirlynchidae Dubinin, 1957</td>
<td>78</td>
</tr>
<tr>
<td>Myobiidae Mégnin, 1877</td>
<td>78</td>
</tr>
<tr>
<td>Psorergatidae Dubinin, 1955</td>
<td>78</td>
</tr>
<tr>
<td>Syringophilidae Lavoipierre, 1953</td>
<td>79</td>
</tr>
<tr>
<td>Superfamily Raphignathoidea</td>
<td>79</td>
</tr>
<tr>
<td>Barbutiidae Robaux, 1975</td>
<td>79</td>
</tr>
<tr>
<td>Cameroibiidae Southcott, 1957</td>
<td>79</td>
</tr>
<tr>
<td>Caligonellidae Grandjean, 1944</td>
<td>79</td>
</tr>
<tr>
<td>Cryptognathidae Oudemans, 1902</td>
<td>80</td>
</tr>
<tr>
<td>Dasythyreidae Walter &amp; Gerson, 1998</td>
<td>80</td>
</tr>
<tr>
<td>Homocaligidae Wood, 1969</td>
<td>80</td>
</tr>
<tr>
<td>Stigmoeidae Oudemans, 1931</td>
<td>80</td>
</tr>
<tr>
<td>Superfamily Tetranychioidea</td>
<td>81</td>
</tr>
<tr>
<td>Linotetranidae Baker &amp; Pritchard, 1953</td>
<td>81</td>
</tr>
<tr>
<td>Tenuipalpidae Berlese, 1913</td>
<td>81</td>
</tr>
<tr>
<td>Tetranychidae Donnadieu, 1876</td>
<td>82</td>
</tr>
<tr>
<td>Cohort Heterostigmatina</td>
<td>82</td>
</tr>
<tr>
<td>Superfamily Pyemotoidea</td>
<td>82</td>
</tr>
<tr>
<td>Acarophenacidae Cross, 1965</td>
<td>82</td>
</tr>
<tr>
<td>Pyemotidae Oudemans, 1937</td>
<td>83</td>
</tr>
<tr>
<td>Superfamily Pygmephoroida</td>
<td>83</td>
</tr>
<tr>
<td>Pygmephoridae Cross, 1965 (sensu Khaustov &amp; Ermilov 2011)</td>
<td>84</td>
</tr>
<tr>
<td>[Siteroptidae Mahunka, 1970]</td>
<td>85</td>
</tr>
<tr>
<td>Neopygmephoridae Cross, 1965 (sensu Khaustov &amp; Ermilov 2011)</td>
<td>85</td>
</tr>
<tr>
<td>Scutacaridae Oudemans, 1916</td>
<td>87</td>
</tr>
<tr>
<td>Superfamily Trochometridioidea</td>
<td>88</td>
</tr>
<tr>
<td>Trochometridiidae</td>
<td>88</td>
</tr>
<tr>
<td>Superfamily Tarsenemoidea</td>
<td>88</td>
</tr>
<tr>
<td>Podapolipidae Ewing, 1922</td>
<td>88</td>
</tr>
<tr>
<td>Tarsenemidae Kramer, 1877</td>
<td>88</td>
</tr>
<tr>
<td>Superorder Parasitiformes</td>
<td>90</td>
</tr>
<tr>
<td>Order Ixodida Leach, 1815</td>
<td>90</td>
</tr>
<tr>
<td>Superfamily Ixodoidea</td>
<td>90</td>
</tr>
<tr>
<td>Ixodidae Dugès, 1834</td>
<td>93</td>
</tr>
<tr>
<td>Argasidae CL Koch, 1844</td>
<td>96</td>
</tr>
<tr>
<td>Order Mesostigmata G. Canestrini, 1891</td>
<td>97</td>
</tr>
</tbody>
</table>
Suborder Sejida .......................................................................................................................... 97
  Superfamily Sejoidea .................................................................................................................. 97
    Sejidae Berlese, 1913 .............................................................................................................. 97
Suborder Trigynaspida ................................................................................................................ 97
Cohort Antennophorina .............................................................................................................. 97
  Superfamily Antennophoroidea .................................................................................................. 97
    Antennophoridae Berlese, 1892 ............................................................................................... 97
Suborder Monogynaspida ........................................................................................................... 97
Cohort Uropodina ....................................................................................................................... 97
  Superfamily Polyaspidioidea ....................................................................................................... 97
    Trachyidae Trägårdh, 1943 .................................................................................................... 98
  Superfamily Uropodoidea .......................................................................................................... 98
    Dinychidae Vitzthum, 1931 .................................................................................................... 98
    Oplitidae Johnston, 1968 ....................................................................................................... 98
    Trachyuropodidae Berlese, 1917 ............................................................................................ 98
    Trematuridae Berlese, 1917 .................................................................................................... 98
    Urodinychidae Berlese, 1917 ................................................................................................. 99
    Uropodidae Berlese, 1917 ..................................................................................................... 99
Infraorder Gamasina .................................................................................................................. 99
Cohort Arctacarina ...................................................................................................................... 99
  Superfamily Arctacaroidea ........................................................................................................ 99
    Arctacarididae Evans, 1955 .................................................................................................. 99
Cohort Zerconina ......................................................................................................................... 99
  Superfamily Zerconoidea ......................................................................................................... 99
    Zerconidae Berlese, 1892 ...................................................................................................... 100
Cohort Parasitina ......................................................................................................................... 100
  Superfamily Parasitoidea ......................................................................................................... 100
    Parasitidae Oudemans, 1901 ............................................................................................... 100
Cohort Gamasina ........................................................................................................................ 101
  Superfamily Veigaioidea .......................................................................................................... 101
    Veigaiidae Oudemans, 1939 ................................................................................................ 101
  Superfamily Rhodacaroidea ..................................................................................................... 101
    Digamasellidae Evans, 1957 ................................................................................................ 102
    Halolaelapidae Karg, 1965 .................................................................................................. 102
    Ologamasidae Ryke, 1962 .................................................................................................... 102
    Rhodacaridae Oudemans, 1902 ............................................................................................ 103
  Superfamily Ascoidea ............................................................................................................... 103
    Ameroseiidae Evans, 1961 .................................................................................................... 103
    Ascidae Voigts & Oudemans, 1905 ...................................................................................... 103
    Melicharidae Hirschmann, 1962 ........................................................................................ 104
  Superfamily Phytoseioidea ....................................................................................................... 105
    Blattisociidae Garman, 1948 ............................................................................................... 105
    Phytoseiidae Berlese, 1916 ................................................................................................. 106
  Superfamily Eviphidoidea ......................................................................................................... 108
    Eviphididae Berlese, 1913 ................................................................................................... 108
    Macrochelidae Vitzthum, 1930 ............................................................................................ 108
Pachylaelapidae Berlese, 1913 ................................................................................... 109
Superfamily Dermanyssooidea .................................................................................. 109
Dermanyssidae Kolenati, 1859 ............................................................................. 109
Halarachnidae Oudemans, 1906 ......................................................................... 109
Laelapidae Berlese, 1892 ..................................................................................... 110
Macronyssidae Oudemans, 1936 ......................................................................... 111
Rhinonyssidae Trouessart, 1895 ........................................................................... 111
Spinturnicidae Oudemans, 1902 .......................................................................... 112
Varroidae Delfinado & Baker, 1974 ..................................................................... 113
Glossary of Acarological Terms ........................................................................... 114
References ............................................................................................................. 142
Introduction

This is the second volume in the ongoing Royal Alberta Museum acarine Almanac series. Part I is devoted to the oribatid mites (species over 0.3 mm in length) used as bioindicators by the Alberta Biodiversity Motoring Institute (ABMI). This volume, Part II, is devoted to the rest of the Acari known from Alberta. Included are the rest of the Superorder Acariformes: the smaller Oribatida (≤ 0.3 mm in length) and Astigmatina (Astigma); members of the sarcoptiform suborder Endeostigmata and the trombidiform suborders Sphaerolichida and Prostigmata. Finally, the members of the Superorder Parasitiformes (Orders Ixodida, Mesostigmata) are listed. In total in both Almanacs there are records for 920 species, although many are unidentified species or spp. Also to be found here is a Glossary of Acarological Terms and references appropriate to this section of the Almanac.

The smaller oribatid mites in Part II are listed in a format similar to Part I, but abbreviated, and in phylogenetic sequence (see Krantz & Walter 2009) by supercohort through family, but alphabetically for genus and species under family. Keys will be added as they are developed. DOC distribution information is from the Diversity of Oribatida in Canada website. The remainder of the Acari are presented in various summary formats, often simply as lists of species with collection data under a family, and when possible a paragraph about the ecology of the mites and one with diagnostic features. Feather mites (Astigmatina, Analgoidea, Pterolichoidea) are listed primarily as genera with host records, because the species identifications are part of an ongoing study at the University of Alberta. Most other groups are identified to a species level, although these are often unspecified.

Naming protocols of unidentified species follow those in Part I (i.e. sp. 1-x, A-Z followed by the initials of the identifier; cf for questionable identifications; s.l. for probable species complexes) and may include additional qualifiers such as ‘sp. nr.’ (species near) or ‘n. sp.’ (new species). If an identification is not credited to another or supported by a literature citation, then the identification is my own (DEW). Since I am trying to provide a list of all Albertan Acari, but I cannot be considered a specialist on all groups, the reader should use their own judgement if an identification seems doubtful. Please feel free to request images or specimens if you are revising a group (David.Walter@gov.ab.ca). Additionally, the reader should remember that taxonomic concepts can vary among specialists and are subject to change.

Version 2.1

This version of Part II includes significant additions to the known acarine fauna of Alberta and several new keys including illustrated keys to the families and genera of Alberta ticks and to species of Dermacentor (Rocky Mountain Wood Tick, Winter Tick, American Dog tick) and Haemaphysalis.

Acknowledgements

Given the caveats above, and accepting responsibility for any errors, I would like to thank the following for contributing specimens, identifications or records of Alberta mites. At the University of Alberta, Professor Heather Proctor (HCP) provided the data on feather mites, water mites, and most of the terrestrial Parasitengonina identifications; Professors Felix Sperling (FAHS) and Bill Samuel and their student Winnie Lam provided much of the information on
ticks; Associate Professor Maya Evenden and her student Boyd Mori provided mites associated with Mountain Pine Beetle (*Dendroctonus ponderosae*). At the University of Calgary, Associate Professor Mary Reid and her student Haydéé Peralta-Vázquez provided specimens of mites associated with the Pine Engraver (*Ips pini*). At the Canadian National Collection of Insects & Arachnids, Dr Evert Lindquist (EEL) provided identifications and records; Dr Frederic Beaulieu generously shared his database, Dr Valerie Behan-Pelletier (VB-P) provided identifications and records; and Dr Ian Smith contributed records of water mites and cooperated with HCP on preparing the final list. Dr Kevin Floate and Derrick K. Kanashiro (DKK) of Agriculture Canada, Lethbridge, provided records of mites associated with dung beetles and soil mites, respectively. Dr Zoë Lindo (ZL) provided soil mite identifications and specimens. Dr Matthias Buck of the Royal Alberta Museum (RAM) provided collections of mites phoretic on Hymenoptera. Dr Bruce Halliday at CSIRO, Black Mountain, provided helpful comments and corrections on earlier drafts as did Professor Barry OConnor and Dr Pavel Klimov at the University of Michigan on the section on Astigmatina (Astigmata). Dr Ken Fry at Olds College is searching for records of agriculturally important mites that will be added when they are ready. Finally, there are all of those who have submitted mites for identification to me at the RAM or UA and my acarological colleagues around the world who I have pestered for papers or other resources over the last year. To one and all, thanks. This section of the *Almanac* would not have been possible without their help.

**Key to Superorders & Orders of Mites in Alberta**

As time permits, I will write a series of keys to help readers identify the mites known from Alberta. Unless noted in the title, these keys will only apply to those mites that I know occur in Alberta. This considerably simplifies both writing and using a key, but limits its application in other regions of the world.

Identification of a mite usually requires having the correct stage (usually the adult, but sometimes the deutonymph or larva) and often the correct sex (usually the adult female, but in some taxa the male). Also, in the vast majority of cases, your mite will need to be cleared (i.e. the internal tissues need to be dissolved so that only the cuticle remains) and mounted on a microscope slide – and you will usually need a good compound microscope. See the *Manual of Acarology 3rd Edition* (Krantz & Walter, editors, 2009) for detailed instructions.

**Key to the superorders & orders of mites in Alberta (adults)**

1. Stigmatal openings above or behind the leg bases in mid-body region, usually associated with a papillate groove (peritreme), plastron-like band, or sieve plate (behind leg IV); leg coxae distinct and usually movable, not insensibly fused to body; gnathosoma with ring-like band of cuticle surrounding cheliceral bases and on which the free segments (usually 5, rarely 3 or 4) of the palps articulate; venter of gnathosoma (subcapitulum) with median groove usually with several rows of small teeth (denticles) or produced anteriorly into a hypostome with dense field of retrorse spines; ocelli usually absent (one pair present on dorsal scutum in some ticks) ...................................................................................................... Superorder *Parasitiformes* (2)

- Stigmatal openings absent or on anterior of the body (between cheliceral bases or on anterior plate), never above or behind the legs in mid-body region; short peritremes sometimes present
on anterior plate or variously elaborated on cheliceral bases; leg coxae fused to body as distinct plates, epimeral fields, or reduced to folds or internal apodemes (NB - trochanter is first free leg segment and may resemble a coxa); gnathosoma with cheliceral bases exposed dorsally, fused into a stylophore (separate from subcapitulum), or integrated with subcapitulum into a head-like capsule; palps well developed (5 free segments) or variously reduced or apparently absent; venter of gnathosoma entire or with articulations, but never with a median denticulate groove or with dense field of retrorse spines; 1-2 pairs of ocelli maybe present, but many taxa are blind ...........................................Superorder Acariformes (3)

2. Stigmatal openings above legs and usually associated with a distinct peritrematal groove (rarely absent) extending anteriorly or plastron like band; chelicerae usually chelate-dentate, but produced as elongate stylets in some parasites; anterior margin of subcapitulum (hypostome) usually with a pair of horn-like or bidentate corniculi (rarely membranous), never with field of retrorse spines; base of subcapitulum with a median groove with rows of 1-many denticles; stalk-like tritosternum with 2-3 processes present at base of median groove .................................................................Order Mesostigmata

- Stigmatal openings above coxae III-IV on small plates (Argasidae – soft ticks) or on sieve-plate behind base of legs IV (Ixodidae – hard ticks); gnathosoma visible dorsally and articulated with sclerotized scutum (Ixodidae) or mostly hidden under leathery body without sclerotized dorsal plate (Argasidae); chelicerae with parallel bases and complex distal array of teeth and membranes and supported by hypostome with ventral field of retrorse spines (reduced in some male hard ticks and non-feeding adult soft ticks); median deutosternal groove and tritosternum absent .................................................................Order Ixodida (ticks)

3. Functional chelicerae present (often highly modified), palps present, but may be reduced to small nubs, and ventral sucker plate absent.........................................................................................4

- Chelicerae absent, palps reduced to a pair of whip-like structures, and ventral sucker plate present..................................................................................Astigmatina (heteromorphic deutonymph or hypopus)

4. Chelicerae usually chelate-dentate, sometimes attenuate distally or modified into whip- or rake-like structures; internal gut bolus often visible; stigmatal openings and peritremes absent; prodorsal plate usually present (may be very lightly sclerotized) and often bearing a pair of trichobothria (absent in Astigmatina, 2 pairs present in some Endeostigmata); toothed or chisel-like rutella often present on hypostome; empodium of pretarsus usually claw-like and often associated with a pair of lateral claws (one claw absent in some Oribatida); opisthosoma usually with a pair of lateral gland openings and well developed internal vesicles (absent in Endeostigmata and some Oribatida); genital opening longitudinal and usually with vestibule with 2-3 pairs of genital papillae; legs III-IV present ............. Order Sarcoptiformes

- Chelicerae usually with needle- or stylet-like digit, rarely chelate dentate; internal gut bolus never present; stigmatal openings may be present at base of chelicerae or on anterior dorsal shield; peritremes absent, linear, or elaborated on cheliceral bases; prodorsal plate present or absent, with or without 1-2 pairs of trichobothria; rutella absent; empodium of pretarsus often pad-like or covered with processes or produced as tenant hairs, rarely claw-like; lateral claws usually present at least on legs II-III (leg I pretarsus may be claw-like or absent; leg IV pretarsus sometimes absent); opisthosomal glands absent; genital opening longitudinal, transverse, or absent; genital papillae present or absent; legs III-IV present or absent ...................

..............................................................................................................................................Order Trombidiformes
Superorder Acariformes Zachvatkin, 1952

Order Sarcoptiformes Reuter, 1909

Suborder Oribatida van der Hammen, 1968 – adults under 0.3 mm long

\[DOC (5/2011) = \text{Diversity of Oribatida in Alberta}\] 13 May 2011

Supercohort Palaeosomatides Grandjean, 1969

Superfamily Ctenacaroidea Grandjean, 1954

Aphelacaridae Grandjean, 1954

Aphelacarus Grandjean, 1954

Type species: \textit{Parhypochthonius acarinus} Berlese, 1910

Also Known As:

\textit{Aphelacarus acarinus} (Berlese, 1910)

Also Known As: \textit{Parhypochthonius acarinus} Berlese, 1910

ABMI code: APHEACA

Diagnostic characters: 440 long; pale, sack-like body, long setae

\[DOC (5/2011) = \text{[+other]} \] Distribution: AB; [Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W); Cosmopolitan]

Collections: none on hand

Supercohort Enarthronotides Grandjean, 1969

Superfamily Atopochthonioidea Grandjean, 1948

Atopochthoniidae Grandjean, 1948

Atopochthonius Grandjean, 1948

Type species: \textit{Atopochthonius artiodactylus} Grandjean, 1948

Also Known As:

\textit{Atopochthonius artiodactylus} Grandjean, 1948

Also Known As:

ABMI code: ATOPART

Diagnostic characters: length 200; dorsal setae leaf-like, foveolate, posterior setae elongate

\[DOC (5/2011) = \text{[+other]} \] Distribution: AB, ON, QC, NB, NS; [Holarctic]

Collections: none on hand
Pterochthoniidae Grandjean, 1950

*Pterochthonius* Berlese, 1913

Type species: *Cosmochthonius angelus* Berlese, 1910

Also Known As:

*Pterochthonius angelus* (Berlese, 1910)

Also Known As: *Cosmochthonius angelus* Berlese, 1910

ABMI code: PTERANG

**Diagnostic characters**: length 200; dorsal setae leaf-like, foveolate

**Collections**: Moose Pasture Research Site (DEW) 8 km W Chipman, AB (53.656667, -112.759444); Lindo & Visser (2004)

**DOC (5/2011)**: [+other] Distribution: AB, QC; [Holarctic]

**Overview**: This minute, ornate mite is common in aspen forest litter. No males are known and the mite probably reproduces by parthenogenesis.
Superfamily Protoplophoroidea Ewing, 1917

Haplochthoniidae van der Hammen, 1959

_Haplochthonius_ Willmann, 1930

Type species: _Cosmochthonius (Haplochthonius) simplex_ Willmann, 1930
Also Known As: _Tetrochthonius_ Hammer, 1958

_Haplochthonius_ sp. 1 DKK (Osler et al. 2008)
Also Known As:
ABMI code: HAPLSP1

**Diagnostic characters:**

**Collections:** Lethbridge (49.48 N, 112.54’ W)


Sphaerochthoniidae Grandjean, 1947

_Sphaerochthonius_ Berlese, 1910

Type species: _Hypochthonius splendidus_ Berlese, 1904
Also Known As:

_Sphaerochthonius_ sp. 1 DKK (Osler et al. 2008)
Also Known As:
ABMI code: SPHASP1

**Diagnostic characters:**

**Collections:** Lethbridge (49.48 N, 112.54’ W)


_Sphaerochthonius_ cf _splendidus_ (Berlese, 1904)
Also Known As: _Hypochthonius splendidus_ Berlese, 1904
ABMI code: SPHASPL

**Diagnostic characters:** ~ 0.3 mm in length, brownish, light-bulb shape. Notogaster reticulate, each reticulum lined with globules of cerotegument and with numerous small internal tubercles, and with one scissure; dorsal notogastral setae mostly asymmetrically T-shaped (posterior branch ~3x anterior branch in mid-dorsal rows, less asymmetrical on margin and venter) on short bases, each branch plumose and covered in papillate cerotegument, but _d_-setae minute within scissure. Prodorsum and its setae similarly ornamented, setae _in, le, ro_
T-shaped, exs branched, exi minute, not branched, bo not branched. 4 pairs T-shaped adanal setae, 4 pairs simple anal setae; 7 pairs simple genital setae; heterotridactyl.

Collections: Dinosaur Provincial Park (DEW)

DOC (5/2011): [+other] Distribution: [New Mexico, Neotropics, Palearctic, Australia].

Superfamily Brachychthonioidea Thor, 1934

Brachychthoniidae Thor, 1934

Comments: Brachychthoniid mites are among the smallest of the Oribatida and no species in Alberta reach the 0.3 mm length limit. Unlike many soil microarthropods, brachychthoniids are able to tolerate the disturbance of cropping and maintain a high diversity and abundance in some systems (Osler et al. 2008).

Brachychthonius Berlese, 1910

Type species: Brachychthonius berlesei Willmann, 1928 (=Brachychthonius brevis Michael sensu Berlese, 1910)

Also Known As: Brachychochthonius Jacot, 1938

Brachychthonius berlesei Willmann, 1928 (Osler et al. 2008)

Brachychthonius nr. berlesei Willmann, 1928 (Lindo & Visser 2004)

Also Known As: Brachychthonius berlesei (Willmann, 1928); Brachychthonius brevis Berlese, 1910

ABMI code: BRACBER

Diagnostic characters: 196-212 long

Collections: EMEND (56.46, -118.22), Lethbridge (49.48 N, 112.54° W)

DOC (5/2011): [+other] Distribution: AB; NU, NT; [Holarctic].

Overview: Specimens have been found in the feathers of birds in Russia, a possible means of long distance dispersal (see Krivolutsky & Lebedeva 2004).

Brachychthonius bimaculatus Willmann, 1936

Also Known As: Brachychthonius bimaculatus (Willmann, 1936)

ABMI code: BRACBIM

Diagnostic characters: prodorsal and notogastral setae ciliated; Na with a pair of eye-like spots; sensillus strongly clavate and with two rows of cilia.

Overview: a very similar mite with smooth setae on the pygidial shield occurs in Canola fields near Lethbridge (49.684619°, -112.749009°).
Collections: Lethbridge (49.48 N, 112.54’ W)

**DOC (5/2011):** [+other] Distribution: BC;

*Brachychthonius pius* Moritz, 1976
Also Known As: *Brachychochthonius berlesei erosus* sensu Hammer, 1952
ABMI code: BRACPIU

**Diagnostic characters:**

Collections: Lethbridge (49.48 N, 112.54’ W)

**DOC (5/2011):** [+other] Distribution: NU, NT

*Brachychthonius* sp. 1 DKK (Osler et al. 2008)
Also Known As:
ABMI code: LIOCSP1

**Diagnostic characters:**

Collections: Lethbridge (49.48 N, 112.54’ W)

**DOC (5/2011):** [+other] Distribution

*Brachychthonius* sp. 2 DKK (Osler et al. 2008)
Also Known As:
ABMI code: LIOCSP1

**Diagnostic characters:**

Collections: Lethbridge (49.48 N, 112.54’ W)

**DOC (5/2011):** [+other] Distribution

*Liochthonius van der Hammen, 1959*

Type species: *Hypochthonius brevis* Michael, 1888
Also Known As: see *Brachychthonius*

Also Known As: *Brachychthonius perpusillus* Berlese, 1910; *Liochthonius perpusillus* (Berlese, 1910)
ABMI code: LIOCBRE

**Diagnostic characters:** length 160-223
Collections: EMEND (56.46, -118.22);

**DOC (5/2011):** [+other] Distribution: **AB**; [Holarctic]

*Liochthonius* nr. *clavatus* (Forsslund, 1942) (Lindo & Visser 2004)
Also Known As:
ABMI code: LIOCCLA

**Diagnostic characters:**

Collections: EMEND (56.46, -118.22);

**DOC (5/2011):** [+other] Distribution: **AB**; [Holarctic]

*Liochthonius lapponicus* (Trägårdh, 1910)
Also Known As: *Hypochthonius brevis lapponica* Trägårdh, 1910; *Brachychthonius lapponica* (Trägårdh, 1910); *Liochthonius perpusillus* sensu Pérez-Inigo, 1968
ABMI code: LIOCLAP

**Diagnostic characters:** length 175-200

Collections: Lethbridge (49.48 N, 112.54’ W); Dinosaur Provincial Park (DEW)

**DOC (5/2011):** [+other] Distribution: **AB, NU, NT, MB, ON, NF**; [Holarctic; Lethbridge, Dinosaur Provincial Park (DEW)]

*Liochthonius leptaleus* Moritz, 1976
Also Known As:
ABMI code: LIOCLEP

**Diagnostic characters:**

Collections: Lethbridge (49.48 N, 112.54’ W)

**DOC (5/2011):** [+other] Distribution: [Russia]

Also Known As:
ABMI code: LIOCMUS

**Diagnostic characters:** length 200-228

Collections: EMEND (56.46, -118.22);

**DOC (5/2011):** [+other] Distribution: **AB**; [Holarctic].
Liochthonius sellnicki (Thor, 1930)
Also Known As: Brachychthonius sellnicki Thor, 1930; Brachychthonius scalaris Forsslund, 1942 in Hammer 1952; Liochthonius scalaris (Forsslund, 1942); Brachychthonius nodosus Willmann, 1952; Brachychthonius brevis sensu Hammer, 1944
ABMI code: LIOCSEL

**Diagnostic characters**: length 200-237

**DOC (5/2011)**: [+other] Distribution: YT, NU, NT, MB, QC, NF; [AK; Holarctic]
**Collections**: EMEND (56.46, -118.22);

**Overview**: A suspected parthenogen. Specimens have been found in the feathers of birds in Russia, a possible means of long distance dispersal (see Krivolutsky & Lebedeva 2004).

Liochthonius nr. simplex (Forsslund, 1942) (Lindo & Visser 2004)
Also Known As:
ABMI code: LIOCSIM

**Diagnostic characters**: length 150-175

**DOC (5/2011)**: [+other] Distribution: AB; [Holarctic]
**Collections**: EMEND (56.46, -118.22);

Liochthonius sp. 1 DKK (Osler et al. 2008)
Also Known As:
ABMI code: LIOCSP1

**Diagnostic characters**: 
**Collections**: Lethbridge (49.48 N, 112.54’ W)
**DOC (5/2011)**: [+other] Distribution

Liochthonius sp. 2 DKK (Osler et al. 2008)
Also Known As:
ABMI code: LIOCSP1

**Diagnostic characters**: 
**Collections**: Lethbridge (49.48 N, 112.54’ W)
**DOC (5/2011)**: [+other] Distribution:

Liochthonius sp. 3 DKK (Osler et al. 2008)
Also Known As:
ABMI code: LIOCSP1

**Diagnostic characters:**

**Collections:** Lethbridge (49.48 N, 112.54’ W)

**DOC (5/2011):** [+other] Distribution:

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**Mixochthonius Niedbala, 1972**

Type species: *Brachychthonius pilososetosus* Forsslund, 1942

Also Known As: see *Brachychthonius*


Also Known As:

**ABMI code:** MIXOCON

**Diagnostic characters:**

**Collections:** EMEND (56.46, -118.22)

**DOC (5/2011):** [+other] Distribution: AB;

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**Neoliochthonius Lee, 1982**

Type species: *Hypochthonius brevis* Michael, 1888

Also Known As: *Paraliochthonius* Moritz, 1976 (pre-occupied)

*Neoliochthonius* nr. *occultus* (Niedbala, 1971)

Also Known As: *Paraliochthonius* nr. *occultus* (Niedbala, 1971) (Lindo & Visser 2004)

**ABMI code:** NEOLOCC

**Diagnostic characters:**

**Collections:** EMEND (56.46, -118.22)

**DOC (5/2011):** [+other] Distribution: AB;

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*Neoliochthonius piluliferus* (Forsslund, 1942)

Also Known As: *Brachychthonius piluliferus* Forsslund, 1942

**ABMI code:** NEIOPIL

**Diagnostic characters:**

**Collections:** Lethbridge (49.48 N, 112.54’ W)

**DOC (5/2011):** [+other] Distribution
**Paraliochthonius** nr. *occultus* (Niedbala, 1971) (Lindo & Visser 2004) – see *Neoliochthonius*

**Poecilochthonius Balogh, 1943**

Type species: *Brachychthonius brevis italicus* Berlese, 1910

Also Known As: see *Brachychthonius*

*Poecilochthonius* nr. *spiciger* (Berlese, 1910) (Lindo & Visser 2004)

Also Known As: ABMI code: POECSPI

**Diagnostic characters**: length 175-208

**Collections**: EMEND (56.46, -118.22)

**DOC (5/2011)**: [+other] Distribution: AB; NB: *Poecilochthonius spiciger* (Berlese, 1910) ON, QC; [Holarctic]

**Sellnickochthonius Krivolutsky, 1964**

Type species: *Brachychthonius zelawaiensis* Sellnick, 1928

Also Known As: see *Brachychthonius, Poecilochthonius*

Diagnostic characters: 3 suprapleural plates; hypertrophied an2-3

*Sellnickochthonius furcatus* (Weis-Fogh, 1948)

Also Known As:

ABMI code: SELLFUR

**Diagnostic characters**:  

**Collections**: Lethbridge (49.48 N, 112.54’ W)

**DOC (5/2011)**: [+other] Distribution:

*Sellnickochthonius immaculatus* (Forsslund, 1942)

Also Known As: *Brachychochthonius immaculatus* Forsslund 1942; *Brachychthonius immaculatus* (Forsslund, 1942); *Brachychochthonius arcticus* Hammer, 1952; *Liochthonius arcticus* (Hammer, 1952); *Brachychthonius obscurus* Krivolutsky, 1966

ABMI code: SELLIMM

**Diagnostic characters**: length 170-195

**Collections**: 
Sellnickochthonius jugatus (Jacot, 1938)

Also Known As: Brachychochthonius jugatus Jacot, 1938; Brachychochthonius jugatus (Jacot, 1938); Sellnickochthonius nr jugatus (Osler et al. 2008)

ABMI code: SELLC

Diagnostic characters:
Collections: Lethbridge (49.48 N, 112.54’ W)

Sellnickochthonius rostratus (Jacot, 1936)

Also Known As: Brachychochthonius rostratus Jacot, 1936; Brachychochthonius rostratus (Jacot, 1936)

ABMI code: SELLROS

Diagnostic characters: length 175-205
Collections:

Sellnickochthonius sp. 1 DKK (Osler et al. 2008)

Also Known As:
ABMI code: SELLSP1

Diagnostic characters:
Collections: Lethbridge (49.48 N, 112.54’ W)

Sellnickochthonius suecica (Forsslund, 1942) (Lindo & Visser 2004)

Sellnickochthonius nr suecica (Forsslund, 1942) (Osler et al. 2008)

Also Known As: Brachychochthonius suecica (Forsslund, 1942); Brachychochthonius jugatus suecica Forsslund, 1942

ABMI code: SELLSUE

Diagnostic characters: length 150-170

DOC (5/2011): [+other] Distribution: AB, NU, NT, YT; [Holarctic];
Synchthonius van der Hammen, 1952

Type species: Brachychochthonius crenulatus Jacot, 1938 (=Synchthonius boschmai van der Hammen, 1952)

Also Known As: see Brachychochthonius

Synchthonius crenulatus (Jacot, 1938)

Also Known As: Brachychochthonius crenulatus Jacot, 1938; Synchthonius boschmai van der Hammen, 1952

ABMI code: SYNCCRE

Diagnostic characters: seta $d_2$ not on margin of anterior plate (Na), inserted more medially; seta $ad_2$ broad, blade-like; one pair of suprapleural plates; dorsal depressions with foveolate margins; setae relatively short; SEM (Meanook)

Similar species: Synchthonius elegans Forsslund, 1957 has much longer setae ($c_1$ passing insertion of $d_1$)

Collections: Lethbridge (49.48 N, 112.54’ W); Meanook; Moose Pasture Research Site (DEW) 8 km W Chipman, AB (53.656667, -112.759444)

DOC (5/2011): [+other] Distribution: AB, NU, NT, YT; [Holarctic]

Verachthonius Moritz, 1976

Type species: Brachychthonius laticeps Strenzke, 1951

Also Known As: see Brachychthonius

Verachthonius montanus (Hammer, 1952)

Also Known As: Eobrachychthonius montanus Hammer, 1952

ABMI code: VERAMON

Diagnostic characters: length 240

Collections: Lethbridge (49.48 N, 112.54’ W); Moose Pasture Research Site (DEW) 8 km W Chipman, AB (53.656667, -112.759444); Rocky Mountains near Jasper


Back to Table of Contents

Supercohort Desmonomatides Woolley, 1973
Cohort Brachypylina Hull, 1918
Superfamily Ameroidea Bulanova-Zachvatkina, 1957
Caleremaeidae Grandjean, 1965

*Veloppia* Hammer, 1955

**Diagnostic characters**: small oppioid-like mites with fluffy, granular cerotegument; genital and anal plates large, but separate

Also Known As:

Type species: *Veloppia pulchra* Hammer, 1955

World species:

Comments:

Canadian species listed on DOC (bold = AB): *Veloppia kananaskis* Norton, 1978 AB; *V. pulchra* Hammer, 1955 YT NF; *Veloppia sp.* YT NF

*Veloppia kananaskis* Norton, 1978

Also Known As:

ABMI code: VELOKAN

**Diagnostic characters**: length 275; prodorsum foveolate, costular ridges running from tubercle A to le (37), in (~32), ex (~20), ro (~35) curve mediad, bo smoothly spindle-shaped (~45), bothridium with posterior tubercle that fits between paired sejugal tubercles; notogastral carinae run from outer tubercle laterad 7 pairs long (65-80) dorsal setae, lm set mediad others, 3 pairs ps setae lateroposterial; donut-like cavity cng between c-la; 6 pairs long genital setae, 1-4 aligned near anterior median margin of plate; epimere with a variety of tubercles

**Overview**: most specimens probably pass through the 300 μm grid

**Barcodes**: 

**ID Check**: Determination by DEW.

**Similar taxa**: *Veloppia pulchra* Hammer, 1955 (YT, NF); *Veloppia sp.* (YT, NF); *Veloppia nortoni* Chen & Wang, 2002 (China)

**Collections**: 2007: 1133

**DOC (5/2011)**: [+other] Distribution: AB

**Images**: 

**Ecology**: 

**Literature**: Marshall et al. (1987); Norton (1979)

Damaeolidae Grandjean, 1965

*Fosseremus* Grandjean, 1954
**Diagnostic characters**: small oppioid-like mites with fluffy, granular cerotegument; genital and anal plates large, but separate

Also Known As:

Type species: *Damaeosoma laciniatum* Berlese, 1905

World species: 1-3

Comments:

Canadian species listed on DOC (bold = AB): none.

**Fosseremus laciniatum** Berlese, 1905

Also Known As: *Damaeosoma laciniatum* Berlese, 1905; *Fosseremus quadripertitus* Grandjean, 1965; *Fosseremus laciniatus* (Berlese, 1905)

ABMI code: FOSSLAC

**Diagnostic characters**:

**Overview**: Often misspelled as ‘Fosseremaeus’ and the like.

**Barcodes**:

**ID Check**: Determination by DEW.

**Similar taxa**: *Fosseremus americanus* (Jacot, 1938)?

**Collections** Onoway (53.77N, 114.06W):

**DOC (5/2011)**: [+other] Distribution: [Cosmopolitan]

**Images**:

**Ecology**: Suspected parthenogen, only males known. Specimens (as “Fosseremaeus laciniatus”) have been found in the feathers of birds in Russia, a possible means of long distance dispersal (see Krivolutsky & Lebedeva 2004).

**Literature**: Marshall et al. (1987)

[Back to Table of Contents]

**Superfamily Licneremaeoidea Grandjean, 1954**

**Licnodamaeidae Grandjean, 1954**

*Licnodamaeus* Grandjean, 1931

**Diagnostic characters**: small oribatid mites with a dense pustulate to reticulate cerotegument, notogaster flattened and with 5 pairs of setae, but no scalp; 2 pairs anal setae; 5 pairs of genital setae, sensillus expanded, spiculate-flabellate.

Also Known As:

Type species: *Licneremaeus undulatus* Paoli, 1908
World species:
Comments: An unidentified species in this genus has been reported from NS and CA, but we also have seen collections from the Yukon and grassland soil in Alberta. *Licnocephus reticulatus* Woolley, 1969 was described from Louisiana.

Canadian species listed on DOC (bold = AB): *Licneremaeus* sp. NS

*Licneremaeus* sp. 1 DEW

Also Known As:

ABMI code: LICNSP1

**Diagnostic characters**: 0.280 long; cerotegument of legs, prodorsum, notogaster, and ventral plate composed of dense spherical pustules 1-2 µm in diameter, no reticulate pattern; *bo* flabellate (30 long x 25 wide) and spiculate; movable digit of chelicera with 3 large teeth, distal tooth larger than others; fixed digit with large basal tooth and 3 smaller distal teeth; rutellum with cup-like median portion and lateral bidentate stalk; tridactyl.

**Overview**: most specimens probably pass through the 300 µm grid.

**Barcodes**:

**ID Check**: Determination by DEW based on Balogh & Balogh (2002).

**Similar taxa**: *Licnobelba* (carries scalps, 6 pairs genital setae).

**Collections**: Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W).

**DOC (5/2011)**: [+other] Distribution:

**Images**: Light-micrographs Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W)

**Ecology**: Gut contents include brown hyphae.

**Literature**: Marshall et al. (1987);

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**Superfamily Oppioidea Grandjean, 1951**

**Key to the subfamilies and genera of Oppiidae of North America**

1. **Crista present** or **seta c2 subequal** to other notogastral setae (except *Dissorrhina*); 4-6 pairs genital setae; lyrifissure *iad* parallel to anal shield (paranal) .........................................................2

- **Crista absent** or weakly developed and *c2* either absent, or shorter than other notogastral setae; 4-5 pairs of genital setae; lyrifissure *iad* paranal or apoanal (tangential) ........................................3

2. **Costulae absent** (lamellar lines maybe present).... **MEDIOPPIINAE** Subías & Minguez 1985
- Costulae present .................................................................OPPIELLINAE Seniczak 1975

3. Anterior notogaster with one pair of small humeral processes or spines present, or interbothridial region with or without costulae, if without, then faint lamellar and translamellar shelves present. Lyrifissure iad paranal or apoanal ..............................................4
- Anterior of notogaster without humeral spines or processes; costulae absent; lamellar and translamellar lines present or absent. Lyrifissure iad usually paranal ..............................................5

4. (3) Interbothridial costulae present. Translamellar crest usually more developed than lamellar ones. Anterior of notogaster without humeral spine or process. Lyrifissure iad paranal. Notogaster with 9 pairs of setae; seta $c_2$ absent ... MYSTROPPIINAE Balogh 1983
(One genus in North America Striatoppia Balogh 1958)
- Interbothridial costulae absent. Lamellar crests usually more developed than translamellar one. Anterior of notogaster with humeral spine or process well or weakly developed. Lyrifissure iad paranal or apoanal .............................................. OXYOPPIINAE Subías 1989
(One genus in North America Subiasella (Lalmoppia) Subías & Rodriguez 1986)

5. (3) Lamellar and translamellar lines absent and bothridial sensillus lanceolate or fusiform, never pectinate, radiate or ciliate ..................................OPPIINAE Grandjean 1951
- Lamellar and/or translamellar lines present, or if absent, bothridial sensillus either radiate, pectinate or ciliate.................................................................MULTIOPPIINAE Balogh 1983

MEDIOPPIINAE

1. Crista absent. Without lines or sclerotized apophyses running from dorsosejugal scissure to basal part of prodorsum ...................... Discoppia (Cylindroppia) Subías and Rodriguez 1986
- Crista present, or sclerotized apophyses running from dorsosejugal scissure to basal part of prodorsum present .................................................................2

2. Bothridial seta pectinate or fusiform and ciliate. Genital plates usually with 6 pairs of setae
......................................................................................... Medioppia Subias and Minguez 1985
- Bothridial seta lanceolate to globular, usually aciculate. Genital plates usually with 4 pairs of setae ................................................................. Microppia Balogh 1983

OPPIELLINAE

1. Dorsosejugal scissure straight or slightly arched, anterior part of notogaster never penetrating into basal part of prodorsum. Bothridial setae usually fusiform, ciliate ........................................2
- Dorsosejugal scissure strongly convex, parabolic or semicircular, penetrating deeply into basal part of prodorsum. Bothridial setae various .........................................................3
2 Notogaster with protruding humeral processes anteriorly. Genital plates with 5 pairs of setae
............................................................................................................. Oppiella (Oppiella) Jacot 1937
- Notogaster without protruding humeral processes anteriorly. Genital plates usually with 6 pairs
of setae .............................................................................. Lauroppia Subias & Minguez 1986

3 Seta \( c_2 \) shorter than other notogastral setae. Rostral setae inserted on medial protuberance on
rostrum. Bothridial seta setiform or lanceolate, either smooth, ciliate, or ciliate-pectinate.
Genital plates with 5 pairs of setae ............................................. Dissorrhina Hull 1916
- Seta \( c_2 \) subequal in length to other notogastral setae. Rostral setae not inserted on medial
protuberance of rostrum. Bothridial seta fusiform or globular, ciliate or radiate. Genital plates
with 4 or 5 pairs of setae .......................................................... 4

4 (3) Genital plates with 5 pairs of setae. Anterior of notogaster partially fused to prodorsum
medially. Bothridial seta either fusiform and ciliate or globular..... Hypogeoppia Subias 1981
- Genital plates with 4 pairs of setae. Notogaster not fused prodorsum medially. Bothridial seta
either radiate or globular and aciculate.......................................................... Moritzoppia Subias & Rodriguez 1988 (= Moritziella Balogh 1983)

**OPPIINAE**

1. Bothridial seta setiform, long, bifurcate ............... Sphagnoppia J. Balogh & P. Balogh 1986
   - Bothridial seta not bifurcate ................................................................. 2

2. Bothridial seta globular or clavate ............................................. Aeroppia Hammer 1961
   - Bothridial seta setiform, lanceolate, or elongate fusiform .......................... 3

3. Bothridial seta setiform or lanceolate. Notogastral heterotrichy present, with 5 or 6 pairs of
long notogastral setae ................................................................. Lasiobelba Aoki 1959
   - Bothridial seta elongate fusiform or lanceolate. Notogastral heterotrichy (other than \( p \) series
setae) absent............................................................................... Oppia C. L. Koch 1836

**MULTIOPIPINAE**

1. Notogaster with 10-12 pairs of setae.................................................. 2
   - Notogaster with 9 pairs of setae .......................................................... 3

2. Five pairs of genital setae; 10-12 pairs of notogastral setae..........................
........................................................................................................ Multioppia (Multioppia) Hammer 1961
- Four pairs of genital setae; 10 pairs of notogastral setae including small c2 (ta)..........................
  .......................................................... \textit{Graptoppia (Stenoppia) cf italica} (Bernini, 1973)

3. Interlamellar setae absent ................................................................. \textit{Pseudoamerioppia} Subíás 1989
- Interlamellar setae present ..............................................................................................................4

4. Rostral setae straight, divergent distally................. \textit{Ramusella (Rectoppia)} Subías 1980
- Rostral setae slightly arched or geniculate, converging distally ..................................................5

5. Rostral setae geniculate, distance between their insertions about 0.25 length of setae............
  .................................................................................................................................\textit{Ramusella (Ramusella)} Hammer 1962
- Rostral setae more or less arched, distance between their insertions about 0.5
  length of setae .................................................\textit{Ramusella (Insculptoppia)} Subíás & Rodríguez 1986

\textbf{Oppiidae Grandjean, 1951}
\textit{Graptoppia (Stenoppia)} Balogh, 1983

\textbf{Diagnostic characters:}
Also Known As:
Type species: \textit{Graptoppia (Stenoppia) italica} (Bernini, 1973)
World species:
Comments:

Canadian species listed on DOC (bold = AB):

** \textit{Graptoppia (Stenoppia) italica} (Bernini, 1973)

Also Known As: \textit{Oppia italica} Bernini, 1973; =\textit{Oppia heterotricha} Bernini, 1969 (preoccupied)
ABMI code: GRAITA

\textbf{Diagnostic characters}: 0.205-0.210 mm long; crista absent; 10 pairs mostly lightly barbed
notogastral setae, but c2 very short (~3 µm) and smooth; prodorsum with strong
translamellar shelf bearing barbed lamellar setae; short basal costular lines, evanescent
posteriorly with 3 sigillae laterad; \textit{in} short, intercostular area with two pairs of sigillae; \textit{bo}
with club ciliate on outer margin; 4 pairs genital setae; \textit{iad} parallel to anal shield; \textit{ad1}
posterior to anal shield.

\textbf{Overview:}

\textbf{Barcodes:}

\textbf{ID Check:} Determination by DEW based on Subíás & Arillo (2001).
Similar taxa:
Collections: Edmonton (ex Pandinus imperator terrarium organic matter)

**DOC (5/2011):** [+other] Distribution: [Italy, Western Mediterranean Region, NY]
Images:
Ecology:

**Literature:** Balogh (1983); Subias & Arillo (2001); Minor et al. (2004)

*Microppia Balogh, 1983*

**Diagnostic characters:**
Also Known As:
Type species: *Damaeosona minus* Paoli, 1908
World species:
Comments:
Canadian species listed on DOC (bold = AB): *Microppia minus* (Paoli, 1908); *M. simplissimus* (Jacot, 1938)

*Microppia minus* (Paoli, 1908)
Also Known As: *Damaeosona minus* Paoli, 1908
ABMI code: MICRMIN

**Diagnostic characters:** 0.200 mm long; short crista, short basal costular line; short, clubbed bo

**Overview:** most specimens probably pass through the 300 μm grid

**Barcodes:**
**ID Check:** Determination by DEW based on Balogh & Balogh (2002).

Similar taxa:
Collections: ABMI 1150 residuals.

**DOC (5/2011):** [+other] Distribution: NU, NT, MB, ON, QC; [Holarctic]
Images:
Ecology: Suspected parthenogen, only females known.

**Literature:** Marshall et al. (1987); Weigmann (2006); Gilyarov & Krivolutsky (1975)

*Microppia simplissimus* (Jacot, 1938)
Also Known As: *Oppia minus* simplissimus Jacot, 1938
ABMI code: MICRSIM
Diagnostic characters:

Overview:

Barcodes:

ID Check: Determination by DKK.

Similar taxa:

Collections: Lethbridge (49.48 N, 112.54’ W)


Images:

Ecology:

Literature: Marshall et al. (1987);

Moritzoppia Subias & Rodríguez, 1988

Diagnostic characters: 4 pairs genital setae; crista absent

Also Known As: Moritziella Balogh, 1983

Type species: Oppia keilbachi Moritz, 1969

World species: ~32

Comments: see also Part I.

Canadian species listed on DOC (bold = AB): Moritzoppia clavigera (Hammer, 1952);

Moritzoppia sp. NF

Moritzoppia clavigera (Hammer, 1952)

Also Known As: Moritzoppia uncinarina (Paoli, 1908) sensu Subias (2004)

ABMI code: MORICLA

Diagnostic characters: 235-280 long; prodorsum punctate, ro (25) barbed, le (15) simple at tip of costulae, in (25-30) in basal costular pocket; bo 930-33) with swollen (spoon) head covered in minute barbs; notogastral setae long, fine, c2 (40), others subequal, lm, la (30); 4 pairs genital setae; iad paranal

Overview: most specimens probably pass through the 300 μm grid

Barcodes:


Similar taxa:

Collections: ABMI (residuals) 216, 1133; EMEND (56.46, -118.22)


Images:
Ecology:

**Literature:** Marshall et al. (1987); Weigmann (2006); Gilyarov & Krivolutsky (1975); Hammer (1952); Colloff & Syed (1991); Lindo & Visser (2004)

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**Multioppia Balogh, 1965 (Hammer, 1961)**

**Diagnostic characters:** costulae and cristae absent

Also Known As: *Oppia* CL Koch, 1836

Type species: *Multioppia radiata* Hammer, 1961

World species: 43

Comments:

Canadian species listed on DOC (bold = AB): *Multioppia carolinae* (Jacot, 1938); *Multioppia* sp.

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**Multioppia sp. 2 DEW**

Also Known As:

ABMI code: MULTSP2

**Diagnostic characters:** 240 long; costulae and cristae absent; *bo* (35) with oval, ciliated club, bothridial simple; *in* (7) simple; *le* (~12) barbed; *ro* (~19) strongly barbed, curve mediad; rostrum entire. Notogaster with 12 pairs of setae, mostly subequal (~15) and simple, but *ti* with a few distal barbs and *c2* minute (~4); inserted mediad short ridge on anterior margin of notogaster; 4 pairs of genital setae.

**Overview:**

**Barcodes:**

**ID Check:** Determination by DEW based on Balogh & Balogh (2002).

**Similar taxa:**

**Collections:** Lethbridge (canola) (49.68N, 112.75W)

**DOC (5/2011):** [+other] Distribution: *Multioppia* sp. reported from NS;

**Images:**

**Ecology:**

**Literature:** Marshall et al. (1987);

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**Oppiella Jacot, 1937**

**Diagnostic characters:** 5 pairs genital setae; costulae and cristae present

Also Known As:

Type species: *Eremaeus novus* Oudemans, 1902
World species: 6 or more described species depending on generic definitions. Marshall et al. (1987) report

Comments:
Canadian species listed on DOC (bold = AB): Oppiella nova (Oudemans, 1902); Oppiella sp.; *O. washburni* (Hammer, 1952) (see Part I)

**Key to adults of species of Oppiella > 300 long in Alberta**

1. Sensillus fusiform to spindle-shaped with acuminate tip; crista with strong lateral spur meeting posterior tubercle on bothridium and with posterior ridge running towards *la*; costula median, without ridges encompassing *in* ............................................................................................................2

- Sensillus ciliate, with rounded tip; crista without lateral spur, posterior ridge short, running only to base of *c2*; costula with broad ridges encompassing *in*; rostrum with shallow notch; ventral length 315 ............................................................................................................Oppiella sp. B DEW

2. Sensillus spindle-shaped with long barbs along one margin; costulae with median patch of tubercles; ventral length >300 ............................................................................................................3

- Sensillus fusiform and with short, sparse barbs; costulae without median patch of tubercles; ventral length ~300 ............................................................................................................Oppiella sp. 2 DEW

3. Female ventral length <365; barbs on sensillus longer (~4) ........................................................ ..........................................................Oppiella cf washburni (Hammer, 1952)

- Female ventral length >375; barbs on sensillus short (~2) ........................................Oppiella sp. 3 DEW

**Oppiella nova (Oudemans, 1902)**
Also Known As:
ABMI code: OPPINOV

**Diagnostic characters**: 220-280 long, yellow brown; prodorsum smooth; costulae (30-40) end about midway, fork around *le* (15-20) and *in* (10), with backward-pointing tubercle at posterior end; *ex* (20); bothridium with posterior tubercle that meets crista, *bo* (45-63) spindle-shaped, usually with 4-6 distal marginal hairs (+ smaller hairs at base of club) + distal filament; cristae doubled, encompass *c2* (~20, curved posteriorly), end about half way to *la* (25-30); *lm* (15-20); *lp* (~15); 5 pairs genital setae, anterior pair (~10) longer than others

**Overview**: most specimens probably pass through the 300 μm grid

**Barcodes**

**ID Check**: Determination by DEW.

**Similar taxa**

**Collections**: ABMI (residuals) 216, 217, 218, 248, 277, 650, 855, 857, 1133, BOG7; EMEND (56.46, -118.22), Lethbridge (49.48 N, 112.54’ W)
**Oppiella** sp. 2 DEW

Also Known As:

ABMI code: OPPISP2

**Diagnostic characters**: 240-280 long, yellow brown; prodorsum smooth; ro (27), ex (30) very long; costulae (47) end about midway, le (~20) inserted subdistally on costula; in (30) in pocket, with backward-pointing tubercle at posterior end; bothridium with posterior microtuberculate tubercle that meets crista, bo (60) with fusiform head with microciliate margins; cristae doubled, encompass c2 (28), outer ridge runs about to la (35), lm (22); 5 pairs genital setae

**Overview**: most specimens probably pass through the 300 μm grid.

**Barcodes**:

**ID Check**: Determination by DEW based on Balogh & Balogh (2002).

**Similar taxa**: *Oppiella nova*

**Collections**: ABMI (residuals) 248, 857

**DOC (5/2011)**: [+other] Distribution:

**Images**:

**Ecology**: A cosmopolitan parthenogenetic (thelytokous) species known from many habitats. Specimens have been found in the feathers of birds in Russia, a possible means of long distance dispersal (see Krivolutsky & Lebedeva 2004).


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**Oppiella** sp. 4 DEW

Also Known As:

ABMI code: OPPISP4

**Diagnostic characters**: 235-270 long, yellow brown; prodorsum smooth, with a half dozen cells above pedotectum I and microtuberculate along leg bases, rostrum with shallow, convex median process; ro (21-22) barbed, ex (21-25) smooth; costulae (~30), about 1/3rd length of prodorsum, with patch of microtubercles, le (~17-18) inserted subdistally in Y; in (25-26) in pocket, with backward-pointing tubercle at posterior end; bothridium with posterior
microtuberculate and large tubercle that meets crista, \( bo \) (31-35) with subglobose, ciliated head occupying about half length; notogastral margin straight, cristae doubled, encompass \( c2 \) (25-30), outer ridge runs 3/4ths distance to \( la \) (30), \( lm \) (~20); 5 pairs genital setae; epimeral region III-IV with a half dozen cells on either side of the midline and 4 setae (2 on posterior margin); iad paranal.

**Overview:** most specimens probably pass through the 300 μm grid

**Barcodes:**

**ID Check:** Determination by DEW based on Balogh & Balogh (2002).

**Similar taxa:** *Oppiella nova*

**Collections:** Moose Pasture Research Site (DEW) 8 km W Chipman, AB (53.656667, -112.759444)

**DOC (5/2011):** [+other] Distribution:

**Images:**

**Ecology:**

**Literature:**

*Oppiella* sp. 5 DEW

Also Known As:

ABMI code: OPPISP5

**Diagnostic characters:** 275 long, yellow brown; prodorsum rather short and broad, with a half dozen cells above pedotectum I and microtuberculate along leg bases, rostrum bluntly acuminate; \( ro \) (25) barbed, \( ex \) (~30) barbed?; costulae (~40), <1/2 length of prodorsum, without patch of microtubercles, \( le \) (~15) inserted subdistally in Y; \( in \) (15) in pocket, interbothridial tubercle bifurcate; bothridium with posterior microtuberculate, inner margin of bothridium and tubercle with parallel ridges, \( bo \) (40) with spoon-like head with short barbs; notogastral margin straight, cristae very faint, \( c2 \) (~25) on notogastral margin and directed laterally; \( la \) (22) directed laterally, \( lm \) (~20); 5 pairs genital setae; epimeral region III-IV with a half dozen cells on either side of the midline and 4 setae (2 on posterior margin), posterior margin crenulate; iad paranal.

**Overview:**

**Barcodes:**

**ID Check:** Determination by DEW based on Balogh & Balogh (2002).

**Similar taxa:**

**Collections:** 2007: none

**DOC (5/2011):** [+other] Distribution: [Moose Pasture Research Site (DEW) 8 km W Chipman, AB (53.656667, -112.759444)]

**Images:**
Ecology:

Literature: Marshall et al. (1987); Weigmann (2006); Gilyarov & Krivolutsky (1975)

Subiasella (Lalmoppia) Subías & Rodriguez 1986

Diagnostic characters: Oxyoppiinae: 5 pairs genital setae; small humeral process and translamellar ridge present; 10 pairs of setae (c2 small); sensillus club-shaped and ciliated; iad apoanal.

Also Known As: Cassioppia Poltavskaja, 1994, Pararectoppia Mahunka, 1987


World species:

Comments:

Canadian species listed on DOC (bold = AB): Subiasella sp. ON, NS, NF

*Subiasella (Lalmoppia) sp. 1 DEW

Also Known As:

ABMI code: SUBISP1

Diagnostic characters: 250-300 long, prodorsum with faint translamellar ridge and lamellar setae (sinuate, ~12) on short apophysis; sensillus with long stalk and suboval head with short-ciliate margin; bothridium with posterior tubercle; interlamellar setae short (~7), slender; rostral seta (~30) barbed; ex short (10), acicular. Notogaster with 10 pairs of setae, setae c2 small (~10-12) minute, inserted between small tubercles on anterior margin of notogaster; other setae (15-20) curved, barbed, tapering; 5 pairs genital setae, g1 directed anteriad; iad apoanal near posterior corner of anal shield; adl postanal.

Overview:

Barcodes:

ID Check: Determination by DEW based on Balogh & Balogh (2002).

Similar taxa:

Collections: ABMI 1223 (residuals); Dinosaur Provincial Park (DEW); Moose Pasture Research Site (DEW) 8 km W Chipman, AB

DOC (5/2011): [+other] Distribution:

Images:

Ecology:

Quadroppiidae Balogh, 1983
Quadroppia Jacot, 1939

Diagnostic characters:

Also Known As:

Type species: Notaspis quadricarinata Michael, 1885

World species:

Comments: Nearctic Quadroppia (Quadroppia) hammerae, illinoisensis, quadricarinata; Quadroppia (Coronoquadroppia) monstruosa, pseudocircumita

Canadian species listed on DOC (bold = AB): Quadroppia ferrumequina (Jacot, 1938) BC; Quadroppia quadricarinata (Michael, 1885) AB YT NU NT MB QC; Quadroppia sp. ON QC NS NF

Quadroppia quadricarinata (Michael, 1885)

Also Known As:

ABMI code: QCADQUA

Diagnostic characters: 225 long; bo (30-35) with long, oval, barbed club, bothridium with posterior tubercle; costulae long, translamella recurved; cristae large, tubercles with squared corners, carinae run most length of oval notogaster

Overview:

Barcodes:

ID Check: Determination by DEW. SEM from Meanook.

Similar taxa: Quadroppia ferrumequina (Jacot, 1938), Quadroppia illinoisensis (Jacot, 1938), Quadroppia skookumchucki Jacot, 1939. Quadroppia sp. reported by Osler et al. (2008).

Collections: ABMI (residuals) 484, 1101, BOG5, UPL7; EMEND (56.46, -118.22); Meanook, Moose Pasture Research Site (DEW) 8 km W Chipman, AB.


Images:

Ecology: Parthenogenetic (thelytokous).


Suctobelbidae Jacot, 1938
Suctobelba Paoli, 1908

Diagnostic characters:
Also Known As: 
Type species: *Notaspis trigona* Michael, 1888

World species: ~19

Comments: Schneider (2005) place members of this family in the carnivore-scavenger-omnivore feeding guild (i.e. feeding on living and dead animals and on fungi)

Canadian species listed on DOC (bold = AB): *Suctobelba sp.*

*Suctobelba* sp. 1 ZL (Lindo & Visser 2004)

Also Known As:
ABMI code: SUCBSP1

**Diagnostic characters:**

**Overview:**

**Barcodes:**

**ID Check:**

**Similar taxa:**

**Collections:** Lindo & Visser (2004)

**DOC (5/2011):** [+other] Distribution: AB, QC, NS

**Images:**

**Ecology:**

**Literature:** Marshall et al. (1987); Weigmann (2006); Gilyarov & Krivolutsy (1975);

*Suctobelbella Jacot, 1937*

**Diagnostic characters:** suctobelbid mouthparts; anterior margin of notogaster with 1-2 pairs tubercles or cristae; generally <400 and mostly <250 long

Also Known As: *Suctobelba* Paoli, 1908

Type species: *Suctobelbella serratirostrum* Jacot, 1937

World species: ~185

Comments: Members of this genus are thought to be thelytokous. They are very diverse in Alberta, but most species are minute. See also Part I for larger species.

Canadian species listed on DOC (bold = AB): *Suctobelbella acutidens* (Forsslund, 1941); *S. frothinghami* Jacot, 1937; *S. hammerae* (Krivolutsky, 1965); *S. hurshi* Jacot, 1937; *S. laxtoni* Jacot, 1937; *S. longicuspis* Jacot, 1937; *S. nr. acutidens* (Forsslund, 1941); *S. palustris* (Forsslund, 1953); *S. sarekensis* (Forsslund, 1941); *S. setosoclavata* (Hammer, 1952); *Suctobelbella sp.*
Key to *Suctobelbella* (<0.3 mm) in Alberta

*(return to Suctobelbidae > 0.3 mm)*

1. 5 pairs (3+2) of genital setae ....................................................................................................4
   - 6-7 pairs (4-5+2) of genital setae ..........................................................................................2

2. Rostral margin with 4-5 teeth; sensillus strongly barbed .......................................................3
   - Rostral margin with a single large tooth; sensillus spatulate and lightly barbed ..................
     .................................................................................................................................*Suctobelbella* sp. B DEW

3. Head of sensillus distinctly swollen, not tapering; interlamellar tubercle tuberculate
   ...........................................................................................................................................*Suctobelbella* sp. C DEW
   - Head of sensillus slender, tapering to acuminate tip and barbed along margin; interlamellar
     tubercle smooth .................................................................................................................*Suctobelbella* sp. A DEW

4. Rostral margin with strong foveolate-reticulate ornamentation between legs I and rostral teeth.
   .............................................................................................................................................*Suctobelbella* sp. 1192R DEW
   - Rostral margin smooth between legs I and rostral teeth ...... *Suctobelbella* arcana Moritz, 1970

*Suctobelbella* sp. A DEW

Also Known As:

ABMI code: SUCTSPA

**Diagnostic characters**: 200 long; 4+2 genital setae; 8 pairs relatively short (10-15), simple
notogastral setae; crista with 2 well developed tubercles; *bo* long (60) with slender (38)
tapering head with strong barbs (~20) on one margin, rim of bothridium weakly tuberculate;
interlamellar setae (~10) fine, interlamellar tubercle well developed and smooth posteriorly;
lamellar setae (~8) simple, tubercle with anterior and posterior tooth; *ex* (~12) simple;
tectopedal fields large, with a pair of weak, faintly foveolate posterior depressions and
sparse, rounded teeth on margin; lateral fields weakly tuberculate; *ro* geniculate with barbed
joint and long (~22) process; rostrum evenly tuberculate with 4 teeth: a distinct lateral cusp
followed by 2 large and 1 small tooth; chelicerae (~68) relatively stout.

**Overview**:

*Barcodes*:

*ID Check*:

**Similar taxa**:

**Collections**: ABMI (residuals) 343 SE.

**DOC (5/2011)**: [+other] Distribution:

**Images**:

**Ecology**:

**Literature**: Marshall et al. (1987); Weigmann (2006); Gilyarov & Krivolutsky (1975)
**Suctobelbella sp. B DEW**

Also Known As:

ABMI code: SUCTSPB

**Diagnostic characters**: 280 long; 5+2 genital setae; 8 pairs relatively long (33-45), simple notogastral setae; crista with well developed, tuberculate lateral tubercle and weak median tubercle; *bo* long (55), slender with weakly barbed, acuminate spatulate head (18), rim of bothridium tuberculate, weakly mitten-shaped; interlamellar setae (~10) fine, interlamellar tubercle tuberculate, well developed posteriorly; lamellar setae (~20) simple, tubercle with postero-median tooth; *ex* (~11) extremely fine; tectopedal fields elongate, merging at midpoint, with a pair of weak, faintly foveolate posterior depressions and sparse, rounded teeth on margin; lateral fields strongly tuberculate; *ro* geniculate with barbed joint and simple (~20) process; rostrum evenly tuberculate, truncate laterally at palp setal portal, without lateral cusps; with a single, large lateral tooth; chelicerae (~74) relatively stout.

**Overview**:

**Barcodes**:

**ID Check**:

**Similar taxa**:

**Collections**: ABMI (residuals) 1101 NE

**DOC (5/2011)**: [+other] Distribution:

**Images**:

**Ecology**:

**Literature**: Marshall et al. (1987); Weigmann (2006); Gilyarov & Krivolutsky (1975)

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**Suctobelbella sp. C DEW**

Also Known As:

ABMI code: SUCTSPC

**Diagnostic characters**: 270-290 long; 4(5)+2 genital setae; 8 pairs relatively long (30-40), simple notogastral setae; crista with both tubercles well developed; *bo* long (60), stout, with strong, subfusciform head (~30), acuminate and strongly barbed on outer face, rim of bothridium tuberculate; interlamellar setae (~13) fine, interlamellar tubercle tuberculate, well developed posteriorly; lamellar setae (~18) simple, tubercle with antero-median tooth; *ex* (~20) simple; tectopedal fields subcircular, separated by a few large tubercles, with rounded teeth on margin and extending antero-ventrally to rim; lateral fields with large and small tubercles; *ro* geniculate with barbed joint and simple (~27) process; rostrum weakly tuberculate and with subreticulate areas posteriorly and marginally, with 5 marginal teeth: a lateral cusp followed by 2 large teeth and 2 small teeth; chelicerae (~80) relatively stout.

**Overview**:
Barcodes:
ID Check:
Similar taxa:
Collections: ABMI (residuals) 330, 388, 584, 793
DOC (5/2011): [+other] Distribution:
Images: SEM (388)
Ecology:
Literature: Marshall et al. (1987); Weigmann (2006); Gilyarov & Krivolutsky (1975)

**Suctobelbella sp. 1192R DEW**

Also Known As:
ABMI code: SUCTPS

Diagnostic characters:

Overview:
Barcodes:
ID Check:
Similar taxa:
Collections: ABMI (residuals) 1192
DOC (5/2011): [+other] Distribution:
Images:
Ecology:
Literature: Marshall et al. (1987); Weigmann (2006); Gilyarov & Krivolutsky (1975)

**Suctobelbella nr. acutidens** (Forsslund, 1941) (Lindo & Visser 2004)

Also Known As:
ABMI code: SUCTACU

Diagnostic characters: length 195-220; tectopedal fields granular; sensillus with smooth, elongate club; rostrum notched, bracketed by broad, notched tooth and 2 teeth; le on single tubercle

Overview: most specimens probably pass through the 300 μm grid
Barcodes:
ID Check:
Similar taxa: *S. arcana* Moritz, 1970; *S. acutidens lobata* (Stenzke, 1951); *S. sarekensis* (Forsslund, 1941)
Collections: EMEND (56.46, -118.22)  
**DOC (5/2011):** [+other] Distribution: AB, *S. acutiens* reported from YT, NU, NT, QC, NF; [AK, Holarctic]

Images:

Ecology:

**Literature:** Marshall et al. (1987); Weigmann (2006); Gilyarov & Krivolutsky (1975); Lindo & Visser (2004)

**Suctobelbella arcana Moritz, 1970**

Also Known As:

ABMI code: SUCTARC

**Diagnostic characters:**

180-210 long; 3+2 genital setae; 8 pairs relatively long (20-30), simple notogastral setae; crista with both tubercles well developed; *bo* short (~40), stout, with strong, subfusiform head (~23), acuminate and strongly barbed on outer face, rim of bothridium weakly tuberculate and distinctly notched posterolaterally; interlamellar setae (~12) fine, interlamellar tubercle weakly tuberculate posteriorly, smooth dorsally; lamellar setae (~10) simple, tubercle smooth, with antero-median tooth; *ex* (~11) simple; tectopedal fields obteardrop shaped, separated by a few large tubercles, with coarsely toothed, gear-like margin and extending antero-ventrally to rim; lateral fields mostly smooth, with a few tubercles; *ro* geniculate with barbed joint and simple (~15) process; rostrum weakly tuberculate and with subreticulate areas posteriorly and marginally, with 3 marginal teeth: lateral cusp replaced by rounded to emarginate lobe and followed by 1 large tooth and 2 smaller teeth; chelicerae (~80) relatively stout.
length 180-225; prodorsum microtuberculate with median and lateral fields with larger tubercles surrounding smooth tectopedal fields with crenulate margins, smooth cuticle reaches rostral teeth; rostrum concave, flanked by rectangular tooth-slit-large tooth-narrow pocket-tooth, with reticulate-foveolate posterior margin; bo directed dorso-medially with elongate club with short bristles on outer margin; le short (~in), directed anteriad on single tubercle with anterior point; in short, at base of small tubercles; notogastral margin with pair of pointed tubercles separated by concave channel, outer carina reaches to level of c2; notogastral setae short, smoothly acuminate, la longest, others not reaching insertion of next seta

**Overview:** most specimens probably pass through the 300 μm grid; SEM from Meanook

**Barcodes:**

**ID Check:** Determination by DEW based on Weigmann (2006).

**Similar taxa:** *S. acutidens* (Forsslund, 1941); *S. acutidens lobata* (Strenzke, 1951); *S. sarekensis* (Forsslund, 1941)

**Collections:** ABMI (residuals) 248, 277; Meanook

**DOC (5/2011):** [+other] Distribution: [Holarctic]

**Images:** SEM

**Ecology:**

**Literature:** Weigmann (2006)

*Suctobelbella sp. 1 ZL* (Lindo & Visser 2004)
Also Known As:
ABMI code: SUCTS1Z

Diagnostic characters:
Overview:
Barcodes:
ID Check:

Similar taxa:
Collections: EMEND (56.46, -118.22)

**DOC (5/2011):** [+other] Distribution:
Images:

Ecology:

**Literature:** Marshall et al. (1987); Weigmann (2006); Gilyarov & Krivolutsky (1975); Lindo & Visser (2004)

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**Suctobelbella sp. 2 ZL** (Lindo & Visser 2004)

Also Known As:
ABMI code: SUCTS2Z

Diagnostic characters:
Overview:
Barcodes:
ID Check:

Similar taxa:
Collections: EMEND (56.46, -118.22)

**DOC (5/2011):** [+other] Distribution:
Images:

Ecology:

**Literature:** Marshall et al. (1987); Weigmann (2006); Gilyarov & Krivolutsky (1975); Lindo & Visser (2004)

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**Back to Table of Contents**

**Cohort Astigmatina (Astigmata) Canestrini, 1891**

**Overview:** The Astigmatina has traditionally been treated as its own order or suborder (Astigmata, Acaridida), but recent work indications that it is likely a derived lineage from
within the Brachypylina. House dust mites, fur mites, feather mites, cheese mites, grain mites, and the human itch mite are only some of the well known Astigmatina.

Acaridia

Superfamily Acaroidea Latreille, 1802

Acaridae Latreille, 1802

Overview: Acarid mites are generally microbivores or omnivores that take a variety of small, soft-bodied arthropods, nematodes, and other small invertebrates as well as microphytes such as algae and fungi. The deutonymphal dispersal stage (hypopus) does not feed and attaches to insects and other arthropods using a sucker plate.

Acarus Linnaeus, 1758

Type species: *Acarus siro* Linnaeus, 1758

*Acarus* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Acarus farris* (Oudemans 1905) – CNC record

*Acarus siro* L. – ex granaries (Liscombe & Watters 1962)

Acotyledon Oudemans, 1903

Type species: *Acotyledon paradoxa* Oudemans 1903

*Acotyledon paradoxa* Oudemans 1903 – CNC record

Cosmoglyphus Oudemans, 1932

Type species: *Tyroglyphus kramerii* Berlese, 1881

*Cosmoglyphus* sp. 1 DEW – deutonymph, Dinosaur Provincial Park (DEW)

Kuzinia Zachvatkin, 1941

Type species: *Hypopus laevis* Dujardin, 1849

The European species, *Kuzinia laevis* (Dujardin, 1849), is known to feed on pollen in bumblebee nests and the deutonymphs are phoretic on various species of *Bombus*. Two species based on deutonymphs were described by Delfinado & Baker (1976): *Kuzinia affinis* from *Bombus perplexus* and *Psithyrus ‘laboriosus’* (= *Bombus citrinus* (Smith)) in New York and *Psithyrus ‘laboriosus’* in New York and *Bombus vagans* and unidentified bumblebees from Colorado. Unidentified species of *Kuzinia* have been reported from a variety of Carabidae in Ontario (Olynyk & Freitag 1979).
Kuzinia sp. 1 DEW – ex Bombus rufocinctus thorax, Edmonton (Parkallen), 23 August 2010

**Histiogaster Berlese, 1883**
Type species: *Tyroglyphus carpio* Kramer, 1882

*Histiogaster arborsignum* Woodring, 1963 – ex Comandra Blister Rust (Powell 1971); ex *Dendroctonus ponderosae* (Mori et al. 2011).

*Histiogaster* sp. – ex Comandra Blister Rust (Powell 1971)

**Neoacotyledon** Samšičák, 1980
Type species: *Eberhardia rhizoglyphoides* Zachvatkin, 1937

*Neoacotyledon rhizoglyphoides* (Zachvatkin, 1937) – CNC record

**Pelzneria Scheuter, Stammer, 1957**
Type species: *Anoetus crenulatus* Oudemans, 1909

*Pelzneria crenulatus* (Oudemans, 1909) – CNC record.

**Sancassania Oudemans, 1916**
Type species: *Sancassania chelone* Oudemans, 1916

*Sancassania* sp. 1 DEW (*nidicola* group) - Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Sancassania berlesei* (Michael, 1903) – Edmonton ex soil under rhubarb

*Sancassania michaeli* (Oudemans, 1924) – CNC record

**Schwiebea Oudemans, 1916**
Type species: *Schwiebea talpa* Oudemans, 1916

*Schwiebea* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Schwiebea* sp. 2 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Schwiebea eurynymphae* (Oudemans, 1911) - ex Richardson’s Ground Squirrel (*Urocitellus richardsonii*), Columbian Ground Squirrel (*Urocitellus columbianus*) (Hilton & Mahrt 1971)

**Tyrophagus Oudemans, 1924**
Type species: *Acarus putrescentiae* Schrank, 1781
Tyrophagus sp. 1 DEW (similis group) - Moose Pasture Research Site (DEW) 8 km W Chipman, AB (possibly *Tyrophagus silvester* Zachvatkin, 1941)

*Tyrophagus perniciosus* Zachvatkin, 1941 – CNC record

*Tyrophagus putrescentiae* (Schrank, 1781) – ex Comandra Blister Rust (Powell 1971)

**Lardoglyphidae Oudemans, 1927**

**Overview:** Found on stored meat and fish, cadavers and carrion, and bird nests.

**Lardoglyphus Oudemans, 1917**

Type species: *Lardoglyphus zacheri* Oudemans, 1927

**Overview:** Feed on animal products including hides, sheep skins, sausage casings, offal, and carrion and may be a pest in museum dermestid beetle colonies (Iverson et al. 1996).


**Suidasiidae Hughes, 1948**

**Overview:** Found in stored food products, bird nests, bat roosts, deep soil, and in the nests of Hymenoptera (*Tortonia* spp.).

**Tortonia Oudemans, 1911**

Type species: *Trichotarsus intermedius* Oudemans, 1901

**Overview:** Deutonymphs were collected on the solitary mason bee *Osmia bucephala* Cresson which nests in holes in wood with chewed leaf material used for partitions (CD Michener 2000, *Bees of the World* p. 466).

*Tortonia* sp. 1 DEW - Busby, 16 km W, George Lake Field Stn., 4-11 May 1989, malaise, T.G. Spanton, ex *Osmia bucephala* Cresson, female

**Superfamily Glycyphagoidea Berlese, 1897**

**Glycyphagidae Berlese, 1897**

**Overview:** Found in nests of rodents, insectivores, marsupials, birds and in synanthropic habitats such as granaries, house dust, mouldy furniture, etc.
**Ctenoglyphus Berlese, 1884**
Type species: *Ctenoglyphus plumiger* (CL Koch, 1835)
*Ctenoglyphus plumiger* (CL Koch, 1835) – ex granaries (Liscombe & Watters 1962)

**Dermacarus Haller, 1878**
Type species: *Homopus sciurinus* CL Koch, 1842
*Dermacarus spermophilus* Fain & Whittaker, 1978 – CNC record

** Glycyphagus Hering, 1838**
Type species: *Glycyphagus prunorum* Hering, 1838
*Glycyphagus domesticus* (De Geer, 1778) – Edmonton
*Glycyphagus hypudaei* (CL Koch, 1841) – CRC record; also as *Dermacarus hypudaei* (CL Koch, 1842) ex Richardson’s Ground Squirrel (*Urocitellus richardsonii*), Columbian Ground Squirrel (*Urocitellus columbianus*) (Hilton & Mahrt 1971); ex vole ex pitfall, Nordegg / Lodgepole, 4 May 2001, HCP record; Southern red-backed vole (*Myodes gapperi*), Strathcona County AB, May-July 2001.

**Lepidoglyphus Zachvatkin, 1936**
Type species: *Acarus destructor* Schrank, 1781
*Lepidoglyphus destructor* (Schrank, 1781) – ex granaries (Liscombe & Watters 1962)

**Orycteroxenus Zachvatkin, 1974**
Type species: *Glycyphagus dispar* Michael, 1886
*Orycteroxenus soricis* (Oudemans) - ex Masked Shrew (*Sorex cinereus*), pitfall trap, Nordegg-Lodgepole area, 23 May 2001 (Cam Stevens) HCP record

**Xenoryctes Zachvatkin, 1941**
Type species: *Glycyphagus krameri* Michael, 1886
*Xenoryctes latiporus* Fain & Whitaker, 1973 – CNC record; possibly the same as *Dermacarus heptneri* (Zachvatkin, 1941) ex Richardson’s Ground Squirrel (*Urocitellus richardsonii*) (Hilton & Mahrt 1971)

**Zibethacarus Rupes, Yunker & Wilson, 1971**
Type species: *Dermacarus ondatrae* Rupel & Whitaker, 1968
Zibethacarus ondatrae (Rupes & Whitaker, 1968) - ex beaver from Edmonton area brought in by Malcolm Abercrombie of Animal Damage Control washed 19 July 2011 HCP record

Superfamily Hemisarcoptoidea Oudemans, 1904

Algophagidae Fain, 1974

Overview: Found in phytotelmata, rivers, lakes, sap flows on trees, and in association with insects especially sap-beetles (Coleoptera, Nitidulidae) and Lepidoptera.

Hericia G. Canestrini, 1888

Type species: Glycyphagus hericius Robin, 1868
Hericia sp. nr. fermentationis Vitzthum – ex root weevil Hylobius warreni Wood (Cerezke 1973)

Carpoglyphidae Fain, 1974

Overview: The type species is associated with high sugar concentrations (e.g. dried fruit, powdered milk) and infests honeybee hives. Other species are known from composite flowers and nests.

Carpoglyphus Robin, 1869

Type species: Acarus lactis (Linnaeus, 1758)
Carpoglyphus lactis (Linnaeus, 1758) – the Dried Fruit Mite, CNC record

Chaetodactylidae Zachvatkin, 1941

Overview: Parasites in the nests of bees.

Chaetodactylus Rondani, 1866

Type species: Trichodactylus osmiae Dufour, 1839
Superfamily Histiostomatoidea Berlese, 1897

Histiostomatidae Berlese, 1897

**Overview**: Mostly filter-feeders in water and wet habitats including phytotelmata, rotting vegetation, bulbs, mushrooms, drosophila cultures, dung, and carrion. Two genera are known from the ears of large mammals; one species, *Histiostoma murchiei* Hughes & Jackson, is a predator of earthworms; and species of *Anoetus* are mutualists of halictid bees that reduce microbial loads in nests (deutonymphs are often found in specialized areas [acarinaria] on the adult bees. Some species of *Histiostoma* and *Bonomoia* are found under bark or in dead wood and are often found phoretic on bark beetles (Coleoptera: Curculionidae: Scolytinae) or other insects associated with these habitats.

**Anoetus Dujardin, 1942**

Type species: *Hypopus alicola* Dujardin, 1842

*Anoetus* sp. 1 DEW – ex *Halictus rubicundus*, Thorhild Co., 3 July 2009, M. Buck

**Bonomoia Oudemans, 1911**

Type species: *Bonomoia primitiva* Oudemans, 1911

*Bonomoia* sp. 1 DEW – ex *Chrysis coerulans*, AB: Strathcona Co., NW of Bruderheim NA, W Tract, 53°51’1”N, 113°1’41”W, 11 Jun 2010, sand, 1-yr. burn site, yellow pans, Buck & Widen, pmae00113168

**Histiostoma Kramer, 1876**

Type species: *Hypopus julorum* CL Koch, 1843

*Histiostoma* sp. 1 DEW - Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Histiostoma* sp. nr. *gordius* Vitzthum, 1923 – CNC record

*Histiostoma piceae* Scheucher, 1957 – CNC record

*Histiostoma sapromyzarum* Dufour, 1893 – CNC record

**Myianoetus Oudemans, 1929**

Type species: *Acarus muscarum* Linnaeus, 1758

*Myianoetus* sp. 1 DEW – EMEND (phoretic on *Eutrichota* sp. [Diptera, Anthomyiidae]) ex Malaise trap, MS
Winterschmidtiidae Oudemans, 1923

Overview: Members of the subfamily Ensliniellinae are characterized by the loss of solenidion σ from genu III in the adults which live in the nests of Hymenoptera (Megachilidae, Sphecidae, Vespidae) and the reduction of ω-2 on tarsus I of the deutonymphs which are phoretic on the same, especially the eumenine vespids. Genera include Kennethiella (on Ancistrocerus – several AB species); Monobiacarus Baker & Cunliffe, 1960 (on Monobia, M. quadridens (Linnaeus, 1763) is known from ON, but is probably too southern to show up in AB); Vespacarus Baker & Cunliffe, 1960 (on Parancistrocerus – several AB species); Ensliniella Vitzthum, 1925 (supposedly restricted to the European Allodynerus), Crabrovidia Zachvatkin, 1941 (on Crabronidae, Sphecidae), Sphexicozela Mahunka, 1970 (on Polistes), and Vidia Oudemans, 1905 (on Megachilidae).

Kennethiella Cooreman, 1954
Type species: Kennethiella trisetosa Cooreman, 1942
Kennethiella trisetosa (Cooreman, 1942) - Edmonton (Parkallen) 53°29’N, 113°31’W ex Ancistrocerus antilope, male, 9 August 2009 (also known As: Ensliniella trisetosa)
Kennethiella sp. 1 DEW - Edmonton (Parkallen) 53°29’N, 113°31’W ex Ancistrocerus parietum, female, 15 August 2009
Kennethiella sp. 3 DEW – Ukalta Dunes (53°58'29"N, 112°30'26"W), AB, ex Ancistrocerus albophaleratus, female, 21 June 2010

Crabrovidia Zachvatkin, 1941
Type species: Vidia (Crabrovidia) gussakovskii Zachvatkin, 1941
Crabrovidia sp. 1 DEW – ex Cerceris crucis, AB: Newell Co., Dinosaur Prov. Pk., Sandhill Creek Valley, 50°46’21”N, 111°31’9”W, 14 Jul 2010, M. Buck, pmae00114852

Vidia Oudemans, 1905
Type species: Vidia undulata Oudemans, 1905
Vidia sp. 1 DEW - ex Megachile sp., AB, Thorhild Co., Opal Dunes, 645 m, 54°0'27"N, 113°16'5"W, 3-Jul-09, yellow pans, M. Buck

Psoroptidia
Superfamily Analgoidea Trouessart & Mégnin, 1884
Overview: The Analgoidea is represented by at least 14 families of bird feather mites in Alberta based on Heather Proctor’s research at the University of Alberta. Contact her for further information.

**Alloptidae Gaud, 1957**

Overview: Alloptid feather mites are known from birds in the orders Chadriiformes and Gruiformes in Alberta.

*Alloptes G. Canestrini, 1879*

Type species: *Dermalichus crassipes* G. Canestrini, 1878

*Alloptes* spp. – ex *Larus delawarensis* (ring-billed gull), *Chlidonias niger* (black tern), *Larus pipixcan* (Franklin's gull) (HCP records)

*Psilobrephosceles Peterson & Atyeo, 1968*

Type species: *Dermalichus ortygometrae* Canestrini, 1878

*Psilobrephosceles* sp. – ex *Porzana carolina* (sora rail) (HCP records)

**Analgidae Trouessart & Mégnin, 1884**

Overview: Analgid feather mites are known from birds in the orders Passeriformes, Galliformes, Gruiformes, and Anseriformes in Alberta.

*Analges Nitsch, 1818*

Type species: *Acarus passerinus* Linnaeus, 1758

*Analges* sp. 1 HCP - Moose Pasture Research Site (DEW) 8 km W Chipman, AB ex female Northern Oriole (*Icterus galbula*)

*Analges* ssp. - ex *Eremophila alpestris*, *Bombycilla cedrorum*, *Bombycilla garrulus*, *Pheucticus ludovicianus*, *Corvus brachyrhynchos*, *Plectrophenax nivalis*, *Spizella pallida*, *Spizella passerina*, *Zonotrichia albicollis*, *Carduelis flammea*, *Carduelis pinus*, *Carpodacus purpureus*, *Coccothraustes vespertinus*, *Loxia leucoptera*, *Pinicola enucleator*, *Icterus galbula*, *Molothrus ater*, *Poecile atricapillus*, *Poecile hudsonica*, *Dendroica petechia*, *Seiurus aurocapillus*, *Vermivora peregrina*, *Sitta canadensis*, *Catharus ustulatus*, *Turdus migratorius*, *Empidonax minimus* (?) , *Vireo olivaceous* (HCP records)

*Anhemiialges Gaud & Mouchet, 1959*

Type species: *Megninia longipes* Trouessart, 1899

*Anhemiialges* sp. – ex *Tachycineta bicolor* (tree swallow) (HCP record)
**Megninia Berlese, 1883**  
Type species: *Dermalichus cubitalis* Mégnin, 1877  
*Megninia* sp. – ex *Perdix perdix* (gray partridge), *Phasianus colchicus* (ring-neck pheasant) (HCP record)

**Metanalges Trouessart, 1919**  
Type species: *longisetosus*  
*Metanalges* sp. – ex *Porzana carolina* (sora rail) (HCP record)

**Megniniella Gaud & Mouchet, 1958**  
Type species: *Megniniella gallinulae* (Buchholz, 1869)  
*Megniniella* spp. – ex *Fulica americana* (American coot), *Porzana carolina* (sora rail) (HCP record)

**Strelkoviacarus Dubinin, 1953a**  
Type species: *Pteronyssus quadratus* Haller, 1882  

**Avenzoariidae Oudemans, 1905**  
**Overview**: These mites mostly live on aquatic birds and have been reported from the bird orders Anseriformes, Chadriiformes, Gaviformes, Pelecaniformes, and the osprey and a sharp-shinned hawk (Falconiformes) in Alberta.

**Avenzoaria Oudemans, 1905**  
Type species: *Dermalichus totani* G. Canestrini, 1878  
*Avenzoaria* sp. – ex *Tringa flavipes* (lesser yellowlegs) (HCP record)

**Bdellorhynchus Mégnin & Trouessart, 1884**  
Type species: *Bdellorhynchus polymorphus* Mégnin & Trouessart, 1884  
*Bdellorhynchus* sp. – ex *Oxyura jamaicensis* (ruddy duck) (HCP record)
**Bregetovia Dubinin, 1951**

Type species: *Dermalichus limosae*

*Bregetovia* sp. – ex *Tringa melanoleuca*? (greater yellowlegs), *Accipiter striatus* (sharp-shinned hawk) (HCP record)

**Bychovskiata Dubinin, 1951**

Type species: *Dermolichus charadrii* Canestrini, 1878

*Bychovskiata* sp. – ex *Pluvialis squatarolae* (black-bellied plover) (HCP record)

**Pandoniacarus Balogh, 1937 (=Bonnetella Trouessart)**

Type species: *Analges fuscus* Nitzsch, 1818

*Pandoniacarus* sp. – ex *Pandion haliaetus* (osprey) (HCP record)

**Pseudavenzoaria Dubinin, 1951**

Type species: *Avenzoaria ochropodis* Hull, 1934

*Pseudavenzoaria* sp. – ex *Tringa solitaria* (solitary sandpiper) (HCP record)

**Scutomegninia Dubinin, 1951**

Type species: *Megninia phalacrocoracis* W. Dubinin & M. Dubinin, 1940

*Scutomegninia* spp. – ex *Gavia immer* (common loon), *Phalacrocorax auritus* (double crested cormorant) (HCP record)

**Zachvatkinia Dubinin, 1949**

Type species: *Dermalichus puffini* Buchholz, 1869

*Zachvatkinia* spp. – ex *Chlidonias niger* (black tern), *Larus californicus* (Californian gull), *Larus delawarensis* (ring-billed gull), *Larus pipixcan* (Franklin's gull), *Sterna hirundo* (common tern) (HCP record)

**Dermationidae Fain, 1965**

**Overview:** These mites live on the surface of the skin of their hosts, rather than on feathers.

**Neodermation Fain, 1964**

Type species: *Neodermation anatum* Fain, 1964
Neodermation sp. – ex Dryocopus pileatus (pileated woodpecker) (HCP records)

**Passeroptes Fain, 1964**

Type species: *Epidermoptes dermicola* Trouessart, 1886

*Passeroptes* spp. – ex *Dryocopus pileatus* (pileated woodpecker), *Archilochus colubris* (ruby-throated hummingbird), *Chordeiles minor* (common nighthawk), *Quiscalus quiscula* (common grackle), *Dendroica petechia* (yellow warbler), *Passer domesticus* (house sparrow), *Sturnus vulgaris* (European starling), *Picoides pubescens* (downy woodpecker) (HCP records)

**Dermoglyphidae Méglin & Trouessart, 1884**

**Overview**: These mites live within the quill of the feather their hosts, rather than on feather surface, and have been recorded from birds in the orders Charadriiformes, Galliformes, Passeriformes, and Piciformes in Alberta.

**Dermoglyphus Robin & Méglin, 1877**

Type species: *Dermalichus elongatus* Robin & Méglin, 1877

*Dermoglyphus* spp. – ex *Dryocopus pileatus* (pileated woodpecker), *Quiscalus quiscula* (common grackle) (HCP records)

**Paralges Méglin & Trouessart, 1884**

Type species: *Paralges pachycnemis* Méglin & Trouessart, 1884

*Paralges* spp. – ex *Larus argentatus* (herring gull), *Tympanuchus phasianellus* (sharp-tailed grouse), *Zonotrichia albicollis* (white-throated sparrow) (HCP records)

**Epidermoptidae Trouessart, 1892**

**Overview**: These mites unusual in that they utilize parasitic flies (Diptera: Hippoboscidae) to move from bird to bird and in some cases feed on the flies. In Alberta, they have been found on birds in the orders Apodiformes, Passeriformes, and Piciformes.

**Microlichus Trouessart & Neumann, 1888**

Type species: *Symbiotes avus* Trouessart, 1887

*Microlichus* spp. – ex *Archilochus colubris* (ruby-throated hummingbird), *Spizella pallida* (clay-coloured sparrow), *Turdus migratorius* (American robin), *Colaptes auratus* (northern flicker) (HCP records)
Promyialges Fain, 1964

Type species: Microlichus uncus Vitzthum, 1934

Promyialges sp. 1 DEW – ex wing base of Orinthomyia sp. (Diptera: Hippoboscidae) on Passer domesticus (house sparrow), Edmonton, AB, 26 July 2010 (DEW)

Proctophyllodidae Mégnin & Trouessart, 1884

Overview: Proctophyllodid feather mites are known from birds in the orders Charadriiformes, Passeriformes, and Piciformes in Alberta.

Amerodectes Valim & Hernandes 2010

Type species: Proctophyllodes (Pterodectes) gracilis Trouessart, 1885

Overview: Pterodectes Robin & Mégnin, 1877 (Type species: Proctophyllodes (Pterodectes) rutilus Robin, 1877) is now restricted to P. rutilus from swallows. Currently known feather mites in Alberta that would have been placed in this genus are now in Amerodectes Valim & Hernandes, 2010. Other genera may be present such as Berladectes Valim & Hernandes, 2009 [type species Dolichodectes neotropicus Hernandes et Valim, 2006]; Tyrannidectes Mironov, 2008 [type species Tyrannidectes berlai Mironov, 2008]. Additionally, the Metapterodectes muticus (Banks, 1909) has been reported from a Vesper Sparrow in Canada and may be present in Alberta (Valim & Hernandes 2010).

Amerodectes spp. – ex Tyrannus tyrannus (eastern kingbird), Carpodacus purpureus (purple finch), Icterus galbula (Baltimore oriole), Dumetella carolinensis (gray catbird), Geothlypis trichas (common yellowthroat), Oporornis philadelphia (mourning warbler), Setophaga ruticilla (American redstart), Vermivora peregrina (Tennessee warbler), Catharus ustulatus (Swainson's thrush), Picoides pubescens (downy woodpecker – possibly a contaminant) (HCP records)

Nycteridocaulus Atyeo, 1966

Type species: Nycteridocaulus tyranni Atyeo, 1966

Nycteridocaulus lamellus Atyeo, 1966 – ex Tyrannus tyrannus (eastern kingbird) (HCP records)

Proctophyllodes Robin, 1868

Type species: Proctophyllodes glandarinus (CL Koch, 1840)

Proctophyllodes spp. – ex Gallinago gallinago, Eremophila alpestris, Bombycilla cedrorum, Bombycilla garrulus, Pheucticus ludovicianus, Certhia americana, Pica hudsonia, Ammodramus lecontei, Junco hyemalis, Plectrophenax nivalis, Spizella pallida, Spizella passerina, Zonotrichia albicollis, Zonotrichia leucophrys, Carduelis flammea,
Carduelis hornemanni, Carduelis pinus, Carduelis tristis, Carpodacus purpureus, Coccothraustes vespertinus, Loxia curvirostra, Loxia leucoptera, Pinicola enucleator, Agelaius phoenicus, Euphagus cyanoccephalus, Icterus galbula, Molothrus ater, Lanius excubitor, Dumetella carolinensis, Poecile atricapillus, Dendroica petechia, Seiurus aurocapillus, Seiurus noveboracensis, Setophaga ruticilla, Vermivora peregrina, Passer domesticus, Regulus calendula, Sitta canadensis, Sitta carolinensis, Catharus guttatus, Catharus ustulatus, Myadestes townsendi, Turdus migratorius (HCP records)

Tyranniphyllodes Hernandes, Valim & Mironov, 2007
Type species: Tyranniphyllodes pitangi Hernandes, Valim & Mironov, 2007
Tyranniphyllodes sp. – ex Empidonax minimus (Least Flycatcher) (HCP record)

Pteronyssidae Oudemans, 1941
Overview: Psoroptoidid feather mites are known from birds in the orders Passeriformes and Piciformes in Alberta.

Neopteronyssus Mironov, 2002
Type species: Dermalichus picinus CL Koch, 1841
Neopteronyssus sp. – ex Picoides villosus (hairy woodpecker) (HCP records)

Pteronyssus Robin, 1877
Type species: Parapteronyssus robini Faccini & Atyeo, 1981
Pteronyssus spp. – ex Picoides villosus (hairy woodpecker), Picoides pubescens (downy woodpecker), Sphyrapicus varius (yellow-bellied sapsucker) (HCP records)

Scutulanysus Mironov, 1985
Type species: Pteronyssus obscurus Berlese, 1884
Scutulanysus spp. – ex Progne subis (purple martin), Tachycineta bicolor (tree swallow) (HCP records)

Sturnotrogus Mironov, 1989
Type species: Pteronyssus truncatus Trouessart, 1885
Sturnotrogus spp. – ex Sturnus vulgaris (European starling) (HCP records)

Psoroptoididae Gaud, 1983
Overview: Psoroptoidid feather mites are known from the downy feathers of birds in the orders Passeriformes and Piciformes in Alberta.

**Mesalgoides Gaud & Atyeo, 1967**

Type species: *Dermalichus oscinum* CL Koch, 1840


**Trouessartiidae Gaud, 1957**

Overview: Trouessartid feather mites live on the dorsal surface of the wing coverts or head feathers and are known from birds in the order Passeriformes in Alberta.

**Trouessartia Canestrini in G. Canestrini & Kramer 1899**

Type species: *Dermalichus corvinus* CL Koch, 1840

*Trouessartia* spp. – ex *Tachycineta bicolor* (tree swallow), *Dendroica petechia* (yellow warbler), *Sturnus vulgaris* (European starling), *Catharus ustulatus* (Swainson's thrush), *Tyrannus tyrannus* (eastern kingbird) (HCP records)

**Pyroglyphidae Cunliffe, 1958**

Overview: Pyroglyphid mites occur in nests, on birds, and in stored grains, flour, and house dust.

**Dermatophagoides Bogdanoff (=Bogdanov), 1864**

Type species: *Dermatophagoides scheremetewskyi* Bogdanoff, 1864

*Dermatophagoides* sp. 1 HCP – Edmonton ex house sparrow

*Dermatophagoides microceras* Griffiths & Cunnington, 1971 – Edmonton, house dust (HCP)

**Turbinoptidae Fain, 1957**

Overview: Nasal parasites living just within the nares of a variety of birds, but known only from two species of gull in Alberta.

**Turbinoptes Boyd, 1949**

Type species: *Turbinoptes strandtmanni* Boyd, 1949
Turbinoptes strandtmanni Boyd, 1949 – ex Larus californicus, L. delawarensis (Knee et al. 2008)

Xolalgidae Dubinin, 1953

Overview: Xolalgids are found on the plumaceous feathers of birds in the orders Anseriformes, Charadriiformes, Gruiformes, Falconiformes, Passeriformes, Pelecaniformes, and Podicipediformes in Alberta.

Analloptes Trouessart, 1885
Type species: Analloptes megnini Trouessart, 1885
Analloptes sp. – ex Pandion haliaetus (osprey) (HCP records)

Fainalges Gaud & Berla, 1964
Type species: Fainalges trichocheylus Gaud & Berla, 1964
Fainalges sp. – ex Accipiter cooperii (Cooper’s hawk) (HCP records)

Ingrassia Oudemans, 1905
Type species: Megninia veliger Oudemans, 1904
Ingrassia spp. – ex Anas americana (American widgeon), Anas clypeata (northern shoveler), Mergus merganser (common merganser), Tringa flavipes (lesser yellowlegs), Podiceps auritus (horned grebe) (HCP records)

Gymnalloptes Gaud, 1968
Type species: Analloptes pallens Trouessart & Neumann, 1888
Gymnalloptes sp. – ex Porzana carolina (sora rail) (HCP records)

Metingrassia Gaud, 1974
Type species: Metingrassia minutidisca Gaud, 1974
Metingrassia sp. – ex Phalacrocorax auritus (double-crested cormorant) (HCP records)

Xolalgoides Trouessart, 1885
Type species: Xolalges scaurus Trouessart, 1885
Xolalgoides sp. – ex Tachycineta bicolor (tree swallow) (HCP records)
Superfamily Pterolichoidea Trouessart & Mégnin, 1884

Overview: The Pterolichoidea is represented by at least 3 families of bird feather mites in Alberta based on Heather Proctor’s research at the University of Alberta. Contact her for further information.

Freyanidae Dubinin, 1953

Overview: Freyanid feather mites occur on ducks,(probably geese), and swans in Alberta.

Freyana Haller, 1877

Type species: Dermalichus anatinus CL Koch, 1844

Freyana spp. – ex Anas discors (blue-winged teal), Anas platyrhynchos (mallard), Cygnus columbarius (tundra swan) (HCP records)

Gabuciniidae Gaud & Atyeo, 1975

Overview: On wing and tail feathers of birds in the orders Passeriformes and Falconiformes in Alberta.

Gabucinia Oudemans, 1905

Type species: Pterolichus delibatus Robin, 1877

Gabucinia sp. – ex Corvus corax (raven) (HCP records)

Proaposolenidia Mironov & Proctor, 2007

Type species: Proaposolenidia acciptris Mironov & Proctor, 2007

Proaposolenidia acciptris Mironov & Proctor, 2007 – ex Accipiter cooperi (Cooper’s hawk), AB (Mironov et al. 2007)

Kramerellidae Gaud & Mouchet, 1961

Overview: Kramerellid feather mites are known from owls (Strigiformes) in Alberta.

Kramerella Trouessart, 1916

Type species: Crameria lunulata Haller, 1878

Kramerella spp. – ex Aegolius funereus (boreal owl), Asio otus (long-eared owl), Surnia ulula (northern hawk-owl) (HCP records)
**Petitota Gaud & Mouchet, 1959**

Type species: *Dermalichus aluconis* Buchholz, 1870

*Petitota* spp. – ex plumaceous feathers of *Aegolius acadicus* (northern saw-whet owl), *Aegolius funereus* (boreal owl) (HCP records)

**Pterolichidae Trouessart & Mégnin, 1884**

**Overview:** Pterolichid feather mites are known from birds in the orders Galliformes, Gruiformes, and Falconiformes in Alberta.

**Grallobia Hull, 1934**

Type species: *Dermalichus porzanae* Canestrini, 1878

*Grallobia* spp. – ex *Fulica americana* (American coot), *Porzana carolina* (sora rail) (HCP records)

**Pseudalloptinus Dubinin, 1956**

Type species: *Pterolichus milvulinus* Trouessart, 1884

*Pseudalloptinus* sp. – ex *Haliaeetus leucocephalus* (bald eagle) (HCP records)

**Pseudolichus Atyeo & Gaud, 1992**

Type species: *Pterolichus solutocurtus* Dubinin, 1956

*Pseudolichus* sp. – ex *Perdix perdix* (gray partridge) (HCP records)

**Tetraolichus Atyeo & Gaud, 1992**

Type species: *Tetraolichus cupido* Atyeo & J. Gaud, 1992

*Tetraolichus* sp. – ex *Bonasa umbellus* (ruffed grouse) (HCP records)

**Ptiloxenidae Gaud, 1982**

**Overview:** Ptiloxenid are found on the flight feathers of birds in the orders Charadriiformes, Gruiformes, and Podicipediformes in Alberta.

**Ptiloxenus Hull, 1934**

Type species: *Schizurolichus elegans* Cerný, 1969

*Ptiloxenus* spp. – ex *Porzana carolina* (sora rail), *Aechmophorus occidentalis* (western grebe), *Podiceps auritus* (horned grebe) (HCP records)
Sokoloviana Dubinin, 1951
Type species: Pterolichus rehbergi Canestrini & Berlese, 1880
Sokoloviana sp. – ex Charadrius vociferus (killdeer) (HCP records)

Superfamily Sarcoptoidea Murray, 1877
Myocoptidae Gunther, 1942

Overview: Fur mites of rodents.

Myocoptes Claparédè, 1868
Type species: Sarcoptes musculinus CL Koch, 1844
Myocoptes musculinus (CL Koch, 1840) – ex House Mouse (Mus musculinus) Edmonton
Myocoptes japonensis Radford - Southern red-backed vole (Myodes gapperi), Strathcona County AB, May-July 2001
Trichoecius cf tenax (Michael) - Southern red-backed vole (Myodes gapperi), Strathcona County AB, May-July 2001

Psoroptidae G. Canestrini, 1892
Overview: Skin mites of mammals.

Chorioptes Gervais & Beneden, 1859
Type species: Sarcoptes bovis Hering, 1845
Chorioptes bovis (Hering, 1845) – ectoparasite of cattle (Kennedy & Kralka 1986)

Otodectes G. Canestrini, 1894
Type species: Sarcoptes cynotis Herring, 1838
Otodectes cynotis (Hering, 1838) – ear mite of cats and dogs

Sarcoptidae Murray, 1877
Overview: Skin burrowing mites of mammals.

Sarcoptes Latreille, 1802
Type species: Acarus scabiei DeGeer, 1778
Sarcoptes scabiei (DeGeer, 1778) – ex wolves, coyote, fox, dog, people

Back to Table of Contents
Suborder Endeostigmata

Overview: Endeostigmatid mites are mostly tiny, soft-bodied, and poorly known. The group is a waste basket of taxa that do not fit in elsewhere in the Sarcoptiformes (and sometimes have been included within the Prostigmata) and probably not a monophyletic taxon. Even the relationships among the families are not clear, so I have not arranged the Alberta mites into superfamilies.

Alicorhagiidae Grandjean, 1939

Overview: Species of *Alicorhagia* are cosmopolitan members of mesic to dry soils and feed on fungi and nematodes. Only females are known and populations in Colorado have been demonstrated to reproduce by parthenogenesis. Silken webs are spun to protect the animals during moulting and on which to lay eggs. This family has been reported from near Breton, AB, (Berg & Pawluk 1984), from near Lethbridge, AB, (Osler et al. 2008), from Rough Fescue Prairie in the Porcupine Hills near Stavely (Clapperton et al. 2002), and is common in many soils around Edmonton.

*Alicorhagia cf usitata* Theron, Meyer & Ryke, 1971 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB; Dinosaur Provincial Park (DEW); Breton; Edmonton

Alycidae G. Canestrini & Fanzago, 1877

Overview: Species in the family Alycidae (formerly Bimichaeliidae) are primitive acariform mites that feed on nematodes and fungi. Osler et al. (2008) report the family (as ‘Bimichaeliidae’) from near Lethbridge, AB.

*Alycus* sp nr *denasutus* (Grandjean, 1937) – Leg I: ω1 (20) distal, cylindrical, ω2 (14) tapering; φ1 (17) distal on tibia I; 4 tapering, erect σ, 1 tapering, θ (23) erect. Leg II: ω1 (12); φ1 (11), φ2 (10) erect, basal; σ1 (9), σ2 (11) erect. Leg III: φ1 (9), φ2 (7) erect; σ1 (7) erect, σ2 (9) erect. Leg IV: tibia IV without solenidion. Cheliceral seta smooth with basal barb, fixed digit bidentate distally and with larger subdistal tooth. Prodorsum with 2 pairs ciliated trichobothria, without naso, longitudinal plications laterally, lamellate around *in* and trichobothria and transverse lamellate between *ro; in, exa, exp, ro* short, bush-like plumose. ~24 pairs genital setae (18+6). Idiosoma hypertrichous dorsally. Adult female 600 long. ABMI 33 SER; Dinosaur Provincial Park (DEW).

*Alycus* sp. nr. *roseus* CL Koch, 1842 – Leg I: ω1 (20) distal, cylindrical, ω2 (17) tapering; φ1 (17) distal on tibia I; 4 tapering, erect σ, 2 tapering, erect θ (~30). Leg II: ω1 (16); φ1 (11), φ2 (10) erect, basal; σ1 (9), σ2 (11) erect. Leg III: φ1 (9), φ2 (7) erect; σ1 (7) erect, σ2 (9) erect. Leg IV: tibia IV with long (20), tapering, erect solenidion θ. Prodorsum with 2 pairs ciliated trichobothria, down-curved naso, longitudinal plications laterally, lamellate around *in* and trichobothria and transverse between *ro* and extending down naso; *in* elongate bushy, *exa, exp, ro* shorter, bush-like plumose. Distal cheliceral seta smooth, fixed digit bidentate distally and with large median tooth. ~22 pairs genital setae (14+8). Idiosoma hypertrichous dorsally. Adult female 500 long. Moose Pasture Research Site (DEW) 8 km W Chipman, AB.
Amphialycus cf leucogaster (Grandjean, 1937) – Leg I: ω1 (17) subdistal, cylindrical, ω2 (17) tapering, almost reaches base of ω1 (17); ϕ1 (13) subdistal on tibia I, ϕ2-3 (11-12); σ1 (11), σ2-3 (15-20) tapering, erect; 2 tapering, erect θ (~26). Leg II: ω1 (12) midtarsal, ω2 (?); ϕ1 (7), ϕ2 (11) erect; σ1 (9), σ2 (11) erect. Leg III: ϕ1 (4) club-like, ϕ2 (10) erect; σ1 (15) erect, σ2 (9) erect. Leg IV: tibia IV with (15), tapering, erect solenidion θ. Prodorsum with 2 pairs ciliated trichobothria, nude, flap-like naso, ro setae set well back, longitudinal plications laterally, lamellate around in and trichobothria, longitudinal and lineate between ro and on naso; in columnar bushy, exa, exp, ro shorter, bush-like plumose. Distal cheliceral seta smooth, chelicera long (75) with short digits; rutellum mitten-shaped. ~18 pairs genital setae (10+8). Idiosoma hypertrichous dorsally. Adult female 360-400 long. Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Laminamichaelia sp. nr. subnuda (Berlese, 1910) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Nanorchestidae Grandjean, 1937

Overview: Nanorchestids are abundant in extreme habitats worldwide, especially dry deserts (both hot and cold), microbial crusts, beaches, alpine areas, tundra, and Antarctica. Their feeding habits are not well understood, but they probably feed on the fluids of fungi and algae. Nanorchestes collinus (Hirst) has been reported from soils near Breton, AB (Berg & Pawluk 1984) and unidentified members of the family from Rough Fescue Prairie in the Porcupine Hills near Stavely (Clapperton et al. 2002) and from cropped prairie soil near Lethbridge Research Centre (49°48′N, 112°54′W) (Osler et al. 2008).

Nanorchestes sp. – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Speleorchestes sp. – Dinosaur Provincial Park (DEW)

Oehserchestidae Kethley, 1977

Overview: Oeserchestids are minute hopping fungivores characteristic of dryland soils. Only one genus is known. An unidentified member of the family from cropped prairie soil near Lethbridge Research Centre (49°48′N, 112°54′W) (Osler et al. 2008).

Oehserchestes sp. – cropped prairie soil near Lethbridge Research Centre (49°48′N, 112°54′W) (Osler et al. 2008)

Terpnacaridae Grandjean, 1939

Overview: Minute fungivores found in dry soils and litter. Unidentified members of the family have been reported from Rough Fescue Prairie in the Porcupine Hills near Stavely
(Clapperton et al. 2002) and cropped prairie soil near Lethbridge Research Centre (49°48′N, 112°54′W) (Osler et al. 2008).

*Alycosmesis* sp. – Onefour, AB (Osler, Kanashiro & Hamilton)

*Terpnacarus* cf *bouvieri* Grandjean, 1939 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB; ABMI 33 SER.

[Back to Table of Contents]
Order Trombidiformes
Suborder Sphaerolichida
Lordalycidae Grandjean, 1939

**Diagnostic characters:** Small, rounded mites with pustulate-plicate integument, two pairs of prodorsal trichobothria (anterior pair recessed in a communal pit), and highly modified chelicerae; naso absent.

**Overview:** Another group of mystery mites, probably fungivores.

*Hybalicus* sp. – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Suborder Prostigmata
Supercohort Eupodides
Superfamily Bdelloidea Dugès, 1834

**Diagnostic characters:** Slender, geniculate palps and needle-like gnathosoma; 2 pairs of prodorsal trichobothria.

**Overview:** Bdellid snout mites are a cosmopolitan group of ambush and cruise predators of small invertebrates such as mites, springtails, and rarely nematodes and some use silk to ensnare their prey. Most species are a bright orange to red in colour (members of the genus *Cyta* are purplish) and have long, needle-like mouthparts (the snout). Some species are considered important natural enemies of Lucerne flea (a springtail) and Red-legged Earth Mites.

*Bdella longicornis* (Linnaeus, 1758) – CNC record

*Bdella muscorum* Ewing, 1909 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB; CNC record

*Bdellodes hurdi* Atyeo, 1960 – CNC record

*Bdellodes lapidarius* (Kramer, 1881) – CNC record

*Bdellodes longirostris* (Hermann) – ex Comandra Blister Rust (Powell 1971)

*Bdellodes simplex* Atyeo, 1978 – CNC record

*Biscirus silvaticus* (Kramer, 1881) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Cyta latirostris* (Hermann, 1804) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB; CNC record

*Odontoscirus alpinus* Atyeo, 1960 – CNC record

*Spinibdella ornata* Atyeo, 1960 – Dinosaur Provincial Park (DEW)
Spinibdella tenuirostris (Ewing, 1917) – CNC record
Thoribdella sp. nr. simplex Atyeo – ex Comandra Blister Rust (Powell 1971)

**Cunaxidae Thor, 1902**

**Diagnostic characters:** Palps robust and raptorial or simple; needle-like gnathosoma; 2 pairs of prodorsal trichobothria.

**Overview:** Cunaxid snout mites are a cosmopolitan group of ambush or cruise predators of small invertebrates such as mites, springtails, scale insects, and nematodes. Many weave silken cocoons for moulting. Many species are a bright orange to red in colour.

Bonzia sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB
Coleoscirus sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB
Cunaxa sp. 1 DEW – Dinosaur Provincial Park (DEW)
Cunaxoides biscutum Nesbitt, 1946 – CNC record
Cunaxoides croceus (CL Koch, 1838) – CNC record
Dactyloscirus bakeri Smiley, 1992 – CNC record
Neoscirula sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB
Rubroscirus sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

**Superfamily Halacaroidea**

**Halacaridae Murray, 1877**

**Diagnostic characters:** Body covered with a series of plates; all legs long and ending in strongly developed claws; genital acetalula external (in freshwater species); palps and gnathosoma form appear raptorial.

**Overview:** The Halacaroidea is comprised of more than 1000 described species distributed across 50 genera. Most halacaroids are known from marine or estuarine waters, but about 60 species have been described from freshwater (sometimes placed in the family Porohalacaridae Viets, 1933)

Porohalacarus cf alpinus (Thor, 1910) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB lake; Edmonton pond; Holarctic; reported from oligotrophic, dystrophic and mesotrophic ponds and lakes (Barstch 1997).

Porolohmannella violacea (Kramer, 1879) – Holarctic; standing surface waters, swamps, ponds and lakes; groundwater; AB (Barstch 2007)
Superfamily Eriophyoidea
Eriophyidae Nalepa, 1898

Diagnostic characters: Minute worm-like mites with only 2 pairs of legs in all stages.
Overview: Eriophyoid mites cause galls or russetting of foliage on most vascular plants.

Aceria anthocoptes (Nalepa, 1892) – European mite naturalized in the USA, and introduced for control of Canada Thistle (Cirsium arvense). Feeding induces curling and folding of leaves.

Aceria malherbae Nuzzaci, 1985 – Gall mite endemic to the Mediterranean region and released for control of Field Bindweed (Convolvulus arvensis L.) in Alberta (McClay et al. 1999).

Aceria parapopuli (Keifer, 1940) – Poplar Bud Gall Mite

Aceria tosichella Keifer, 1969 – Wheat Curl Mite is a pest of wheat and a vector of Wheat Streak Mosaic Virus.

Cecidophyes rouhollahi Craemer, 1999 – a European mite that galls the weed Cleavers (Galium spurium) and has been introduced into Alberta for biocontrol.

Epitrimerus trilobus (Napella, 1891) – deforming leaves of Sambucus racemosus; Edmonton

Eriophyes fraxiniflora (Felt, 1906) - ash flower galls, common on street trees in Edmonton; (also Aceria)

viburnum erinose leaf patches
alder pocket galls

Superfamily Eupodoidea
Eupodidae CL Koch, 1842

Diagnostic characters: Soft-bodied; chelicerae independent; naso present; one pair of prodorsal trichobothria present, but leg trichobothria absent; peritremes and palptibial claw complex absent.
Overview: Eupodid mites are poorly known, but most are thought to feed on fungi and other microphytes in the upper layers of soil and litter.

Eupodes sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB, Dinosaur Provincial Park (DEW)

Eupodes acuminatus Willmann, 1952 – CNC record

Eupodes alaskensis Strandtmann, 1971 – CNC record

Linopodes sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB
Penthaleidae Oudemans, 1931

**Diagnostic characters:** Anal opening dorsal or dorso-terminal; cuticle reddish, internal contents dark green to black.

**Overview:** The Penthaleidae feed on low growing plants and fungi and include several important agricultural pests including the Red-legged Earth Mite and the Blue Oat Mite.

*Penthaleus* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Rhagidiidae Oudemans, 1922

**Diagnostic characters:** Soft-bodied, prodorsum with one pair of sensilli and three pairs of setae, palps with four free segments, chelicerae large and raptorial, tarsus I with three or more recumbent solenidia.

**Overview:** Rhagidiid mites (~21 genera, 125 described species) are fast moving cruise predators of small arthropods such as mites and springtails in the upper layers of soil and leaf litter. Some use silk to entangle prey and to protect themselves during molts. They occur worldwide, but are especially prevalent in alpine or high latitude areas including Arctic tundra and Antarctica. Some species inhabit caves and exhibit troglodytic adaptations.

*Brevipalpia minima* Zacharda, 1980 – CNC record

*Coccorhagidia clavifrons* (Canestrini, 1886) – CNC record

*Coccorhagidia pittardi* Strandtmann, 1971 – CNC record

*Evadorhagia cf bezdezensis* Zacharda, 1980 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB ex spruce litter under snow (27 December 2010)

*Foveacheles (Mediostella) vancouverensis* Zacharda, 1986 - Alberta, Mountain View, prairie grass and sod, 1 September 1980

*Hammenia macrostella* Zacharda, 1980 – ABMI Site 569 (residuals); Moose Pasture Research Site (DEW) 8 km W Chipman, AB; CNC record

*Kouchibouguacia cryptosoleniadiata* Zacharda, 1986 – CNC record

*Kouchibouguacia transcendata* Zacharda, 1994 - Writing-on-Stone Provincial Park, Milk River valley, Alberta, Canada, ex juniper and litter below, 25 July 1978

*Poecilophysis oregonensis* Zacharda, 1983 – CNC record

*Poecilophysis (Dentocheles) pratensis* (CL Koch, 1835) – Heather’s Meadow, ex aspen litter, 9 September 2007; Dinosaur Provincial Park (DEW) ex grass and herbs in coulee (DPP#2), 13 July 2010; CNC record

*Poecilophysis (Procerocheles) pseudoreflexa* Zacharda, 1978 – Dinosaur Provincial Park (DEW) ex cottonwood litter; CNC record

*Poecilophysis recusa* (Thor, 1909) – CNC record

*Poecilophysis saxonica* (Willmann, 1934) – CNC record
Poecilophysis spelaea Wankel, 1861 – CNC record

Poecilophysis weyerensis (Packard, 1888) – CNC record

Rhagidia (Noerneria) distisolediata Zacharda, 1995 - Alberta, 1 mi (1 mi = 1.609 km) south Elkwater, Lodgepole Pine Campground area, Cypress Hills Provincial Park, in rotten stump, some moss, 27 July 1978

Rhagidia (Noerneria) diversicolor (CL Koch, 1838) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB 13 June 2007 (aspen litter); CNC record

Rhagidia (Noerneria) gigas (Canestrini, 1886) – CNC record

Rhagidia pasadenensis Zacharda, 1986 – CNC record

Rhagidia ponderosae Zacharda, 1973 – CNC record

Rhagidia hilli (Strandtmann, 1971) – CNC record

Robustocheles (Robustocheles) mucronata (Willmann 1936) – Dinosaur Provincial Park (DEW) ex playa soil (DPP#4), 14 July 2010; CRC record

Robustocheles sp. nr. obscuritata Zacharda, 1997 - Dinosaur Provincial Park (DEW) ex playa soil (DPP#4), 14 July 2010

Robustocheles (Lewia) occulta Zacharda & Pugsley, 1988 – Castleguard Cave, Banff National Park.

Robustocheles (Robustocheles) pascuaria Zacharda, 1997 - Cypress Hills Provincial Park., 3 mi south Elkwater, fire tower area plateau, from herbs, grass, sod below; 22 July 1978; Dinosaur Provincial Park (DEW), litter near rocks in coulee

Robustocheles (Lewia) lacustris Zacharda, 1997 - Cypress Hills Provincial Park, Elkwater Lake, from sedge debris, substrate, edge of lake, 5-15 August 1978

Shibaia longisensilla (Shiba, 1969) – ex grassy litter, Moose Pasture Research Site (DEW) 8 km W Chipman, AB 13 April 2008; CNC record; CNC record

Superfamily Tydeoidea

Ereynetidae Oudemans, 1931

Diagnostic characters: Ereynetal organ (recessed solenidion, canal, and famulus) on tibia I.

Overview: Less than 200 species in three subfamilies are known. Species of Ereynetes (Ereynetinae) are free-living or associated with bark beetles, bees, and flies and are thought to be predatory, but some live in the gill chambers of pagurid land crabs. Species in other ereynetine genera may be free-living or parasites of slugs. Members of the subfamily Lawrencariniae feed on blood in the nasal passages of frogs and toads. Members of the subfamily Spleognathinae including species of Boydaia and Neoboydaia are parasites in the nares of birds.

Boydaia sp. – ex Falco sparverius (Sparrow Hawk) (Knee et al. 2008)
Boydaia faini Cerny & Dusbabek, 1970 – ex *Loxia curvirostra* (Red Crossbill) (Knee et al. 2008)

Boydaia psalidoprocnei Fain, 1956 – ex *Tachycineta bicolor* (Tree Swallow) (Knee et al. 2008)

Boydaia sturni (Boyd, 1948) – ex *Sturnus vulgaris* (Starling) (Knee et al. 2008)

Ereynetes sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Ereynetes sp. 2 DEW (scutulis group) – ex *Ips pini*, Calgary

Neoboydaia sp. – ex *Tringa melanoleuca* (Greater Yellowlegs) (Knee et al. 2008)

"Triophtydeidae André, 1979"

Diagnostic characters: Legs I antenniform, apotele vestigial to absent; median eye spot present.

Overview: *Triophtydeus* Oudemans, 1929 has a confusing taxonomic history and has been variously attributed to Tydeidae, Triophtydeidae André, 1979; Meyerellidae H. M. André, 1979; and Edbakerellidae André, 2004. Meyerellidae is not available and the mite is not considered a member of the Edbakerellidae, so Tydeidae may be the only option.

*Triophtydeus* sp. 1 DEW – Edmonton

Tydeidae Kramer, 1877

Diagnostic characters: Legs I with apotele.

Overview: Tydeid mites are thought to be fungivores, algivores, and omnivores, but the biology of most are poorly known. Additionally, the taxonomy is more than normally contradictory. Some species occur on plants and some in stored products. Tydeid mites are often among the most abundant mites in grassland and other dryland soils.

*Lorryia* sp. 1 DEW – reticulate-denticulate I(8[1ω]-3+[k]-3-3-0), II(6[1ω]-2-2-3-0), III(5-2-1-1-1), IV(5-2-1-1-0) ; cuticle plicate-dentate-reticulate throughout; bo smooth, reticula longitudinal, between them, vi, ve, se on small plates; DS densely barbed; coxal gland small, oval; palpal eupathidia simple; eyes not apparent; 5, 6 pairs GS, F, M, respectively. DPP. 320 long

*Lorryia* sp. 2 DEW – narrow, small (240 long) - Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Lorryia* sp. 3 DEW – plicate-dashed, broad, green in life (330 long) - Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Microtydeus* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Oakvillae eglalea* Momen & Sinha, 1991 – ex stored oats and grain spill Bowden, Alberta

*Paratydaeolus* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB
Tydeus brusti Momen & Sinha, 1991 – ex stored grain spill at Carstairs, Alberta

Tydeus sp. 1 DEW - I(8[-1]+k]-3-2-1), II(6-1-2-2-0), III(5-2-1-1-1), IV(5-2-1-1-0); cuticle plicate-denticulate; bo smooth, striae longitudinal, converging, but recurved anterior to c1; DS densely barbed, striae looping procurred to d1, transverse at d1, weakly procurred posteriorly; coxal gland small, oval; palpal eupathidia bifurcate distally; eyes not apparent; 5, 6 pairs GS, F, M, respectively. DPP

Tydeus sp. 2 DEW I(8[-1]+k]-3-3-0), II(6-2-2-3-0), III(5-2-1-1-1), IV(5-2-1-1-0); cuticle plicate-dentate-reticulate throughout; bo smooth, reticula longitudinal, between them; DS simple, thick; coxal gland small, oval; palpal eupathidia bifurcate; eyes not apparent; 6 pairs GS. MP

Supercohort Anystides

Cohort Anystina

Superfamily Anystoidea

Anystidae Oudemans, 1936

Diagnostic characters: Long-legged, oval body, often red or red and blue.

Overview: Anystids are known as whirligig mites in North America because of their rapid and twirling movement. They are predators commonly found on vegetation, bare soil, rocks, and other open, warm sites. The widely distributed Anystis agilis Banks 1894 is apparently a junior synonym of Anystis baccarum (Linnaeus 1758).

Anystis sp. – ex Comandra Blister Rust (Powell 1971)

Erythracarinae sp. – open ground and rocks in Milk River Valley (Lindquist 1979)

Paratydeidae Baker, 1949

Diagnostic characters: Elongate soil mites often with a postpedal furrow.

Overview: Paratydeids are elongate, soft-bodied predators characteristic of dryland soils.

Unidentified – cropped prairie soil near Lethbridge Research Centre (49°48°N, 112°54°W) (Osler et al. 2008)

Cohort Parasitengonina (Parasitengona)

Superfamily Erythraeoida

Erythraeidae Robineau-Desvoidy, 1828
Diagnostic characters: Adult with chelicera styletiform and retractable into idiosoma, body setae usually setiform, not flattened. Larva without urstigmata or anal opening, palp genu with 1 seta, 2 pairs of prodorsal trichobothria, legs without trichobothria.

Overview: Erythraeids are predatory on arthropods as nymphs and ectoparasites of arthropods as larvae.

*Abrolophus* sp. – Dinosaur Provincial Park (DEW); Moose Pasture Research Site (DEW) 8 km W Chipman, AB; ex Comandra Blister Rust (Powell 1971)

*Angustsonella tuberculatus* (Auguston, 1940) – CNC record

*Balaustium* sp. – Dinosaur Provincial Park (DEW); ex Comandra Blister Rust (Powell 1971)

*Bochartia kuyperi* Oudemans, 1910 – ex Comandra Blister Rust (Powell 1971)

*Leptus* sp. – Dinosaur Provincial Park (DEW); Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Tepoztlana* sp. – Milk River Valley (Lindquist 1979)

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**Superfamily Trombiculoidea**

**Johnstonianidae Thor, 1935**

Diagnostic characters: Gnathosoma not retractable, cheliceral digit blade-like and curved, palp tibia with claw and large ventral or lateral spine-like seta, 1 pair of prodorsal trichobothria, 2 vi setae, body setae sessile on platelets, simple to sparsely barbed. Larva with scutellum bearing setae c1 and scutum with trichobothria and 3 pairs of setae, palp genu with 1 seta, pretarsus without empodium.

Overview: Larvae are parasites of semi-aquatic flies. Also placed in the Trombidioidea.

*Diplothrombium* sp. – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

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**Trombiculidae Ewing, 1929**

Diagnostic characters: Gnathosoma not retractable, cheliceral digit blade-like and curved, palp tibia with claw and 2-3 associated spine-like setae (without ventral or lateral spine-like seta), 1 pair of prodorsal trichobothria, 0-1 vi setae, body setae branched, body constricted between legs II-III. Larva with setae c1 on separate platelets and scutum with trichobothria and 4-5 setae (0-1 vi), palp genu with 1 seta, pretarsi I-II with empodium.

Overview: Trombiculids are predatory on arthropods as nymphs and adults, but ectoparasites of birds, mammals, lizards, and amphibians as larvae (chiggers).

*Euschoengastia camgi* Brown & Brennan, 1952 – ex Richardson’s Ground Squirrel (*Urocitellus richardsonii* (Sabine, 1822)) (Brown & Brennan 1952)
Euschoengastia criceticola Brennan, 1948 – ex Peromyscus maniculatus osgoodi, Manyberries, AB (Brown & Brennan 1952)

Euschoengastia oregonensis (Ewing, 1929) – ex Richardson’s Ground Squirrel (Urocitellus richardsonii (Sabine, 1822)), Lomond, AB (Brown & Brennan 1952)

Euschoengastia sciuricola (Ewing, 1925) – ex Yellow Pine Chipmunk (Eutamias amoneus), Lake Louise, Saskatchewan River Crossing, Banff National Park, AB; Western Heather Vole (Phenacomys intermedius), Banff National Park, AB (Brown & Brennan 1952)

Hyponeocula arenicola (Loomis, 1954) – (Brennan & Beck 1955 – as Trombicula)

Hyponeocula montanensis (Brennan, 1946) – ex Richardson’s Ground Squirrel (Urocitellus richardsonii (Sabine, 1822)), House Mouse (Mus musculus), Lomond, AB (Brown & Brennan 1952 – as Trombicula)

Leptotrombidium myotis (Ewing, 1929) – ex Peromyscus leucopus, Elkwater, Cypress Hills, AB (Brown & Brennan 1952 - as Trombicula)

Neotrombicula microti (Ewing, 1928) – ex Yellow Pine Chipmunk (Eutamias amoneus), Deer Mouse (Peromyscus maniculatus), Southern Red-backed Vole (Myodes gapperi), and Microtus sp. – widespread in AB (Edmonton, Lac la Biche, Faust) (Brown & Brennan 1952 – as Trombicula)

Trombicula sp. ex Richardson’s Ground Squirrel (Urocitellus richardsonii (Sabine, 1822)) Brooks, Irvine, AB (Brown & Brennan 1952)

Superfamily Trombidioidae
Microtrombidiidae Thor, 1935

Diagnostic characters: Gnathosoma not retractable, cheliceral digit blade-like and curved, palptibia with claw and adjacent spine-like seta(e), other spinose setae in conspicuous rows, 1 pair of prodorsal trichobothria, 2 pairs of eyes present and conspicuous. Larva with scutellum bearing setae c1 and scutum with trichobothria and 3 pairs of setae, palp genu with 1 seta, femur II with 5 branched setae, genu II with microseta κ, coxal setae 1b, 2b, 3b setiform.

Overview:
Unidentified genus sp. – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Subcohort Stygothrombiae
Superfamily Stygothrombidioidae
Stygothrombidiidae Thor, 1935
Overview: The relationship of this family to other Parasitengonina has not been resolved. Adults and nymphs live in interstitial waters and larvae parasitize nympha! and adult Plecoptera (stoneflies).

Stygotrombium sp. – Elbow River at Bragg Creek; Oldman River at Brocket

Subcohort Hydracarina (Hydrachnidiae) – Water Mites

Overview: More than 6000 species of water mites have been described from around the World and more than 100 species are known to occur in Alberta. Adults and nymphs are usually predators of insects, their eggs, or crustaceans in fresh water and larvae attach to the cuticle of aquatic insects, but nymphs and adults of some species of Unionicola (Unionicolidae) are commensals in sponges or parasites in freshwater mussels.

The following list was prepared by Professor Heather Proctor (HCP, University of Alberta) in consultation with Dr Ian Smith (Canadian National Collection). Localities are listed when available.

Superfamily Arrenuroidea

Acalyptonotidae Walter, 1911

Acalyptonotus sp.

Arrenuridae Thor, 1900

Arrenurus americanus (slough Saint Alberta), auris (Cameron Lake), capillatus, compactilis (slough Saint Alberta, Vermilion River at Vegreville), couleensis (near Syncrude, Bigoray River), galwayensis (Bigoray River ponds), hungerfordi (Pembina River Pembina Provincial Park), interpositus (lagoon near Big Lake, slough Saint Alberta, pond near Dinosaur Provincial Park (DEW)), invaginatus, krameri, lacrimatus (Wagner Natural Area), lautus, morrisoni (Bigoray River), planus (lagoon near Big Lake), prominilus (ponds near Grande Cache, slough 22 km E Grande Cache, Bigoray River, pond RB Miller Biological Station, RB Miller Biological Station), siegasianus (near Syncrude), solifer (Bigoray River), sp. 1 HCP (Bigoray River), sp. 2 HCP (near Syncrude, slough Saint Alberta, pond 14 km S Edmonton), Arrenurus (Micruracarus) sp. MP1 HCP (Moose Pasture Research Site (DEW)) 8 km W Chipman, AB

Athienemanniidae Viets, 1922

Chelomideopsis sp.

Platyhydracarus sp.

Chappuisididae Motas & Tanasachi, 1946

Morimotacarus sp.
Laversiidae Cook, 1955

*Laversia* sp.

Mideidae Thor, 1911

*Midea alaris* - Bigoray River

Mideopsidae Koenike, 1910

*Mideopsis americana* (Bigoray River ponds), *crassipes* (University of Calgary collection), *robusta* (Bigoray River ponds)

*Paramideopsis* sp.

Momoniidae Viets, 1926

*Stygomomonia* sp.

Nudomideopsidae

*Paramideopsis* sp.

Superfamily Eylaoidea

Limnocharidae

*Limnocharis americanus* – Long Island Lake, Bigoray River, Moose Pasture Research Site (DEW) 8 km W Chipman, AB lake

Eylaidae Leach, 1815

*Eylais* (at least 5 species) – widespread in standing water

Superfamily Hydrovolzioidea

Hydrovolziidae Thor, 1905

*Hydrovolzia* sp. – creek at Kananaskis Field Station (Kananaskis Biogeosciences Institute)

Superfamily Hydrachnoidea

Hydrachnidae Leach, 1815

*Hydrachna canadensis*, *comosa*, *conjecta* (near Syncrude, pond near Dinosaur Provincial Park (DEW)), *cruenta* (Lesser Slave Lake, Heart Lake, Bigoray River, Coal Lake), *hesperia*, *hungerfordi* (Bigoray River), *leegei*, *miliaria* (near Syncrude, lagoon near Big Lake, Bigoray River ponds, pond near Dinosaur Provincial Park (DEW)), *stipata* (Bigoray River ponds), sp. 1 HCP (pond near Dinosaur Provincial Park (DEW), RB Miller Biological Station), *magniscutata*
Superfamily Hydryphantoidea

Hydryphantidae Piersig, 1896

*Hydryphantes dispar*, *ruber* (pond near Dinosaur Provincial Park (DEW), spring-fed slough at Cardston), sp. 1 HCP (Bigoray River ponds)

*Albertathyas* sp.

*Notopanisus* sp.

*Panisopsis gorhami* (stream between Jacques & Beaver Lakes Jasper National Park), sp. 1 HCP (Gold Creek at Frank)

*Panisus* sp.

*Protzia* sp. – Pembina River at Pembina Provincial Park

*Pseudohydryphantes* sp.

*Thyas pachystoma* (pond near Dinosaur Provincial Park (DEW)), *stolli*

*Thyopsella* sp.

*Thyopsis cancellata* – Moose Pasture Research Site (DEW) 8 km W Chipman, AB Lake

*Wandesia* sp. 1 HCP – larvae on stonefly near Grande Cache

Hydrodromidae Viets, 1936

*Hydrodroma americanus* – widespread in standing water, e.g. Dapp Creek at Dapp, ponds near Grande Cache, lagoon near Big Lake, Bigoray River ponds, Dead Man’s Hole Jasper National Park

Superfamily Hygrobatoidea

Aturidae Thor, 1930

*Aturus* sp. - Dyson Creek

*Brachypoda* sp.

*Estellacarus* sp.

*Ljania* sp. - University of Calgary collection

*Neoaxonopsis unguitarsus*

*Woolastookia* sp.

Feltriidae Viets, 1926

*Feltria* spp. – widespread in running water

Hygrobatidae CL Koch, 1842

*Atractides spinipes* – near Syncrude, Shunda Creek Nordegg, Dyson Creek

*Corticacarus* sp. – Oldman River at Brocket

*Hygrobas calliger, exilis* (North Saskatchewan River Edmonton, Shunda Creek Nordegg), *longipalpis* (St Mary’s River Cardston), *multiporos* (Stauffer Creek), *neooctoporus* (Burleigh Creek, pit 22 km E Grande Cache, Pinto Lake, RB Miller Biological Station, St Mary’s River Cardston)
Limnesiidae Thor, 1930

*Limnesia fulgida*, *maculata*, *marshallae* (Wagner Bog Natural Area), *paucispina* (lagoon near Big Lake, slough Saint Alberta), *undulata* (widely distributed), sp. 1 HCP, sp. 2 HCP

*Tyrrellia* sp. – Moose Pasture Research Site (DEW) 8 km W Chipman, AB lake

Pionidae Thor, 1930

*Forelia lilacea* – near Syncrude

*Hydrochoreutes ungulatus*

*Nautarachna* sp.

*Neotiphys* sp.

*Piona americana* (pond near Dinosaur Provincial Park (DEW)), *carnea* (widespread), *clavicornis*, *conglobata* (pit 22 km E Grande Cache, pond RB Miller Biological Station), *constricta* (Bigoray River), *inconstans*, *loda* (near Syncrude, Bigoray River), *lutescens*, *medius*, *napio* (Stauffer Creek), *neumani* (widespread), *nodata*, *pinguipalpis* (Stauffer Creek), *reighardi*, *rotunda* (canal between Grande Cache & Victor Lakes), *setiger*, *spinulosa* (canal between Grande Cache & Victor Lakes, ponds near Grande Cache), *uncata* (widespread), *variabilis*, *washingtonensis* (canal between Grande Cache & Victor Lakes, Bigoray River), sp. 1 HCP (slough 22 km E Grand Cache)

*Pionopsis* sp. – Moose Pasture Research Site (DEW) 8 km W Chipman, AB lake

*Pseudofeltria* sp.

*Tiphys diversus*, *simulans*, *torris*

Unionicolidae Oudemans, 1909

*Unionicola crassipes* (widely distributed), *formosa* (Narrow Lake)

*Neumania* spp.

Wettinidae Cook, 1956

*Wettina* sp.

Superfamily Lebertioidea

Anisitsiellidae Koenike, 1910

*Bandakia* sp.

*Utaxatax* sp.

Lebertiidae Thor, 1900

*Lebertia* spp. – widespread in both running and standing water

Oxidae Viets, 1926

*Frontipoda americana* – Dapp Creek at Dapp, Burleigh Creek Grande Cache, Bigoray River ponds

*Frontipoda* sp. 1 HCP – Moose Pasture Research Site (DEW) 8 km W Chipman, AB lake

*Oxus* sp. 1 HCP - Pinto Lake
Sperchontidae Thor, 1900
*Sperchon crassipalpus* - St Mary’s River Cardston
*Sperchonopsis verrucosa*, sp. 1 HCP (near Syncrude)

Teutoniidae Koenike, 1910
*Teutonia lunata* – Bigoray River, Shunda Creek Nordegg, University of Calgary collection

Torrenticolidae Piersig, 1902
*Monoatractides* spp.
*Testudacarus* sp.
*Torrenticola* spp. – widespread in running water

Supercohort Eleutherengonides
Cohort Raphignathina

Superfamily Cheyletoidea
Cheyletidae Leach, 1815

**Diagnostic characters:** Gnathosomal capsule present with peritreme; stylet-like chelicerae; palp tibial claw well developed, palps often with comb-shaped setae; legs I with or without claws; genu I with solenidion; eyes present or absent; hysterosoma with or without a dorsal plate; body oval to elongate.

**Overview:** Many cheyletid mites are free-living ambush predators of small arthropods, some are insect associates, others are parasites of birds. Genera known from Alberta include *Cheyletus* Latreille, 1796, *Cheletacarus* Volgin, 1961, and *Hemicheyletia* Volgin, 1969.

*Cheletacarus cf raptor* Volgin, 1961 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Cheyletus eruditus* (Schrank, 1781) - ex granaries (Liscombe & Watters 1962)

*Cheyletus trouessarti* (Oudemans, 1903) – CNC record

*Cheyletus trux* Rohdendorf, 1940 – CNC record

*Hemicheyletia lindquisti* Thewke & Enns, 1979 – 2.5 mi SE Kananaskis Forest Experiment Station from bracket fungi on a spruce (*Picea* sp.) log (also treated as *Cheletomimus* Oudemans, 1904).

*Hemicheyletia wellsi* (Baker, 1949) – CNC record (also treated as *Cheletomimus* Oudemans, 1904).

*Mexecheles virginiensis* Baker, 1949 – CNC record (a bark beetle associate)
Paracheyletia pyriformis Banks, 1904 – CNC record

Demodecidae Nicolet, 1855

Diagnostic characters:

Overview: Demondecid mites live in the skin of mammals. Species of Demodex Owen, 1843, may occur on most mammals in Alberta, but to date I have only these records:

Demodex bovis Stiles, 1892 – ex cattle (Kennedy & Kralka 1986)
Demodex brevis Akbulatova, 1963 – sebaceous glands of people
Demodex folliculorum (Simon, 1842) – hair follicles of people

Harpirhynchidae Dubinin, 1957

Diagnostic characters: Chelicerae fused into stylophore, but separate from subcapitulum; stylet-like chelicerae; palp tibial claw absent; genu I without solenidion; tarsi of legs I-II with empodial tenent hairs, claws present or absent; tarsi III and IV (when present) lacking claws; body oval.

Overview: Harpirhynchid mites are skin parasites of birds and reptiles.

Neharpyrhynchus pilirostris (Berlese & Trouesart, 1889) – Edmonton ex House sparrow

Myobiidae Mégnin, 1877

Diagnostic characters:

Overview: Myobiid mites are fur mites of a great diversity of mammals currently represented by about 50 genera and almost 500 described species. Recent treatments place the Myodiidae in its own superfamily.

Radfordia cf arvicolae Fain & Lukoschus – Southern red-backed vole (Myodes gapperi), Strathcona County AB, May-July 2001.

Psorergatidae Dubinin, 1955

Diagnostic characters:

Overview: Psorergatid mites are skin parasites mostly of ungulates, but also of carnivores, bats, rodents, and primates. Infestation can lead to severe mange.

Psorobia bos Johnston, 1964 – ex cattle (Kennedy & Kralka 1986)
Syringophilidae Lavoipierre, 1953

Diagnostic characters: Gnathosomal capsule present with peritreme; stylet-like chelicerae; palp tibial claw absent; genu I with solenidion; body elongate.

Overview: Syringophilids are parasites of birds that live within the quill of the feathers.

*Syringophiloidus minor* (Berlese, 1887) – Edmonton ex quills of house sparrow feathers

Superfamily Raphignathoidea

Barbutiidae Robaux, 1975

Diagnostic characters:

Overview: Only a single genus, *Barbutia* Oudemans, 1927, of these minute, soft-body predators characteristic of dryland soil has been described.

*Barbutia* sp.– from Rough Fescue Prairie in the Porcupine Hills near Stavely (Clapperton et al. 2002 – as ‘Barbitulidae, p. 502)

Camerobiidae Southcott, 1957

Diagnostic characters:

Overview: Seven genera and over 130 species of these small, round-bodied mites with very long legs have been described. As far as is known, they are predators of small insects (including scale insects) and mites on plants and in the upper layers of soil. Only one undescribed species in *Neophyllobius* Berlese, 1886, is currently known from Alberta.

*Neophyllobius* sp. 1 DEW – Dinosaur Provincial Park (DEW)

Caligonellidae Grandjean, 1944

Diagnostic characters:

Overview: Members of the five genera in this family are small, soft-bodied mites. They are assumed to be predators and are characteristic of dry soils and exposed habitats (shrubs, tree bark, bird nests) in temperate to sub-tropical areas. This may be the first record of the family in Alberta. Members of the genus *Neognathus* Willmann, 1952, are common in grassland, desert, and pine forest soils in western North America, but this is the first record for Alberta.

*Neognathus* sp. 1 DEW – Dinosaur Provincial Park (DEW)
Cryptognathidae Oudemans, 1902

Diagnostic characters:

Overview: Unlike most raphignathine mites, which are soft-bodied, cryptognathids are encased in armour and their mouthparts can be withdrawn into the body (the family name means ‘hidden jaw’). Three genera and about 55 species have been described worldwide (about a dozen from North America). They may be ambush predators, but can occur in mosses in great numbers and may feed on mosses as do some stigmaeid mites in the genus Eustigmaeus. The Dinosaur collection appears to be the first record of the family for Alberta.

Favognathus sp. 1 DEW – Dinosaur Provincial Park (DEW)

Dasythyreidae Walter & Gerson, 1998

Diagnostic characters:

Overview: Dasythyreus hirsutus Atyeo, 1961, is the only described species in the genus.

Dasythyreus sp. 1 DEW – on logs at George Lake, AB.

Homocaligidae Wood, 1969

Diagnostic characters:

Overview: Only a few species have been described in Homocaligus Berlese, 1910, including Homocaligus muscorum Habeeb, 1962, from the USA; H. amphibius Vainstein, 1975, from Russia, H. scapularis (CL Koch, 1838) from Germany, and H. crassipus Fan, 1997 from China.

Homocaligus sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Stigmaeidae Oudemans, 1931

Diagnostic characters:

Overview: Most stigmaeid mites are predators of small insects and mites and some are important biological control agents of pests in orchards. Species of Eustigmaeus, however, feed on mosses or are parasitic on adult flies that they use for transport.

Eustigmaeus frigida (Habeeb, 1958) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB; urban yard, Edmonton

Eustigmaeus gersoni (Wood, 1972) – Dinosaur Provincial Park (DEW)
Eustigmaeus segnis (CL Koch, 1836) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Mediolata pini Canestrini, 1889 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Stigmaeus comatus Summers, 1962 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Stigmaeus glabrisetus Summers, 1962 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Stigmaeus sphagneti (Hull, 1918) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB; Dinosaur Provincial Park (DEW)

Superfamily Tetranychoida
Linotetranidae Baker & Pritchard, 1953

Diagnostic characters: Mouthparts formed as a capsule that can be withdrawn into the body and with whip-like cheliceral digits that form a feeding tube for stabbing individual plant cells; narrow, colourless, blind; palps with thumbclaw process; tarsi I-II with peg-like to bulbous solenidia; prodorsum with 4 pairs of setae; segment C with 4 pairs of setae.

Overview: Linotetranids are tiny (0.3-0.4 mm long as adults), colourless, and blind mites associated with the roots and crowns of grasses, mosses, and tree bark. They are closely related to spider mites and flat mites – families that include many agricultural pests – and probably feed on the grasses. Four genera and about a dozen species have been described worldwide, but only a single species *Linotetranus cylindricus* Berlese, 1910 has been reported from North America, although this appears to be a complex of species. *Linotetranus* species are common in shortgrass prairie in Colorado. My one specimen from Dinosaur Provincial Park (DEW) appears to represent an undescribed species.

*Linotetranus* sp. 1 DEW – Dinosaur Provincial Park (DEW); also prairie grasslands in southern Alberta (Lindquist 1979).

Tenuipalpidae Berlese, 1913

Diagnostic characters: Mouthparts formed as a capsule that can be withdrawn into the body and with whip-like cheliceral digits that form a feeding tube for stabbing individual plant cells; mostly flattened, green to red mites with 2 pairs of eyes; palps linear, without thumbclaw process; tarsi I-II with peg-like to bulbous solenidia; prodorsum with 3 pairs of setae; segment C with a maximum of 3 pairs of setae.

Overview: Tenuipalpids are plant parasites and include significant pests.

*Brevipalpus* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB
Tetranychidae Donnadieu, 1876

**Diagostic characters:** Mouthparts formed as a capsule that can be withdrawn into the body and with whip-like cheliceral digits that form a feeding tube for stabbing individual plant cells; mostly brown, green or red mites with 2 pairs of eyes; palps with thumbclaw process; tarsi I-II lacking peg-like to bulbous solenidia, but usually with elongate hair-like solenidia sharing an insertion with a seta (duplex seta); prodorsum with 3 pairs of setae; segment C with a maximum of 3 pairs of setae.

**Overview:** Spider mites and their relatives (clover mites) include some of the most significant pests of agriculture and forestry.

*Bryobia* sp 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Eotetranychus* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Oligonychus ununguis* (Jacobi, 1905) – Spruce Spider Mite

*Monoceronychus* sp. – Milk River Valley (Lindquist 1979)

*Neopetrobia* sp. – Milk River Valley (Lindquist 1979)

*Tetranychus* sp. – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Tetranychus sinhai* Baker, 1962 – infests barley, wheat & rye

*Tetranychus urticae* CL Koch, 1836 – Two-spotted Spider Mite

Cohort Heterostigmatina

Superfamily Pyemotoidea

Acarophenacidae Cross, 1965

**Diagostic characters:** Gnathosoma a capsule, palps not distinct, chelicerae stylet-like. Body covered by series of sclerotized plates; prodorsum with anterior stigmatal openings, sensillum absent; legs I with strong claw opposed to hypertrophied seta.

**Overview:** Parasitoids of insects. Two genera are currently known from Alberta including a parasitoid of *Ips* bark beetles.

*Aethiophenax* sp. nr. *ipidarius* (Redikorzev, 1947) – ex *Ips pini*, Calgary

*Paracarophenax* sp 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB ex rotting oyster mushroom
Pyemotidae Oudemans, 1937

**Diagnostic characters:** Gnathosoma a capsule, palps not distinct, chelicerae stylet-like. Body covered by series of sclerotized plates; prodorsum with anterior stigmatal openings, sensillum present; legs I with strong claw.

**Overview:** Parasitoids of insects.

*Pyemotes* sp. (*scolyti* group) – ex *Ips pini*, Calgary

Superfamily Pygmephoroidea

**Overview:** Pygmephorooids are primarily fungivores and often have dimorphic adult females: a free-living morph and one that has legs I modified for clinging to the hairs of a larger animal (phoretomorph). Insects, especially flies, beetles, and social hymenopterons, are often the carriers of the phoretomorphs, but other more unusual arthropods include beach hoppers, aradid bugs, mygalomorph spiders, and red velvet mites. Species of *Pygmephorus* are associated with the nests of small mammals and are phoretic in the fur of their hosts.

Several schemes for superfamily and family-level taxa are currently in use for the Pygmephoroidea-Scutacaroidea. *The Manual of Acarology 3rd Edition* (Krantz & Walter 2009) recognises both superfamilies and 4 families. More recently, Khaustov & Ermilov (2011) argue that only a single clade is involved, that Siteroptidae is a junior synonym of Pygmephoridae, and that an additional family, Neopygmephoridae should be recognised. The key below attempts to integrate the two schemes using Cross (1965), Savulkina (1981), Camerik et al. (2006), and other recent studies for generic characters.

**Key to Pygmephoroidea (+Scutacaroidea) in or near Alberta based on adult females** (modified from Khaustov & Ermilov 2011)

1. Tergite C expanded to cover prodorsum and with striate, horseshoe-shaped margin; spine-like process lateral to bothridium; claws present or absent on tarsus I and IV ....................................................... Scutacaridae Oudemans, 1916

   - Tergite C not expanded, or if somewhat expanded then without free, striate, horseshoe-shaped margin; spine-like process lateral to bothridium absent; all tarsi with claws......................2

2. Femur I with 4 setae (if 5 setae, see *Trochometridium*); prodorsum usually with 3 pairs of setiform setae *v1, v2, sc2* and club-shaped *sc1*; coxisternal plates I with 3 (rarely 1-2) pairs of setae *1a-c; cupule im present; eupathid *p’* present on tarsus I; tarsus and tibia I free or fused .. Pygmephoridae Cross, 1965 (including Siteroptidae) 3

   - Femur I with ≤ 3 setae; prodorsum usually with 1-2 pairs of setiform setae *v2, sc2* and club-shaped *sc1*; coxisternal plates I with 2 pairs of setae *1a-b; cupule im absent; eupathid *p’* absent from tarsus I; tarsus and tibia I fused into tibiotarsus .................................................................7

   **Pygmephoridae Cross, 1965 (including Siteroptidae)**

3. Tibia and tarsus I separate ...........................................................................................................4
4. Coxisternal plates II with 2 pairs of setae; stigmata elongate, medially interrupted V-shaped; genu II with 2-3 setae ....................................................... *Siteroptes* Amerling, 1861

- Coxisternal plates II with 3 pairs of setae; stigmata tear-drop-shaped, almost approximate mesally; genu II with 3 setae; non-phoretic form ................................................................. *Pediculaster* Vitzthum, 1931

5. Femur I with one modified seta longer than the segment, directed posteriad, usually spoon-shaped; phoretic form ................................................................................................. *Pediculaster* Vitzthum, 1931

- Femur I with one modified seta shorter than the segment, thickened, hamate (hooked at tip); phoretic form ............................................................................................................................

6. Coxisternal plates I-II with 6 pairs of setae; genu IV usually with 1 seta; tarsus I pincer strongly ribbed; often in mammal nests ........................................ *Pygmephorus* Kramer, 1877

- Coxisternal plates I-II each with 5 pairs of setae (2+3); genu IV nude; apodemes in coxisternal regions III-IV almost completely absent; tarsi II-III often with setae p, r thorn-like; associated with bark beetles (Scolytinae) ................................................................. *Elatoma* Mahunka, 1969

**Setation:** femur I = 3; prodorsum = 1-2 pairs; coxisterna I = 2 pairs; fused tibiotarsus

7. Prodorsum with a single pair of setiform setae sc2 and club-shaped sc1, alveolus of seta v2 rarely present; dorsal seta d on femur I simple.......................... *Microdipsidae* Cross, 1965

- Prodorsum with a 1-2 pairs of setiform setae v2, sc2 and club-shaped sc1; dorsal seta d on femur I usually hook-like or spatulate ........................................ *Neopygmephoridae* Cross, 1965

8. Prodorsum with a 2 pairs of setiform setae; dorsal seta d on femur I thick and hook-like, l’ setiform; only two p-setae present on posterior ....................................................................................... *Allopygmephorus* Cross, 1965

- Prodorsum with a 1 pair of minute setiform setae anterior to bothridia; dorsal seta d on femur I thick and hook-like, seta l’ slender and hooked at tip; only two p-setae present on posterior

9. Leg I slightly shorter or subequal to leg II and of similar shape; tarsus IV shorter than combined length of femur+genu+tibia .....................................................................................

- Leg I shorter and stockier than leg II; tarsus IV usually longer than combined length of femur+genu+tibia; often associated with ants ....................................................................... *Petalomium* Cross, 1965

10. Two pairs of dorsal gnathosomal setae (ch1-2); posterior margin of coxisternal plate IV entire to weakly tripartite; posterior margin of tergites C and D usually straight or convex.
........................................................................................................................................ *Bakerdania* Sasa, 1961

- One pair of dorsal gnathosomal setae (ch2); posterior margin of coxisternal plate IV with strongly produced tegula overlapped by lateral lobes; posterior margin of tergites C and D usually deeply concave ......................................................................................... *Kerdabania* Khaustov, 2009

**Pygmephoridae Cross, 1965 (sensu Khaustov & Ermilov 2011)**

**Diagnostic characters:** Gnathosoma a capsule, palps not distinct, chelicerae stylet-like. Body covered by series of sclerotized plates; prodorsum with anterior stigmatal openings, sensillum present; legs I with single claw that may be enlarged; femur I of females with
modified seta d; femur I with 4 setae; prodorsum usually with 3 pairs of setiform setae v1, v2, sc2 and club-shaped sc1; coxisternal plates I with 3 (rarely 1-2) pairs of setae l a-c; cupule im present; eupathid p’ present on tarsus I; tarsus and tibia I free or fused

**Overview:** Pygmephorid mites feed on fungi and some species are pests in mushroom houses. Often two forms of the adult female occur, one of which is modified to cling to the hairs of the insects used for transport. Species of *Bakerdania* are widespread (>120 species have been described) and occur in soil, mammal burrows, bird nests, and the nests of social insects. Species of *Pygmephorus* are often associated with small, ground-nesting mammals.

*Ellatoma* sp. 1 DEW – ex *Ips pini*, Calgary

*Pygmephorus erlangensis* Krczal, 1959 - ex Richardson’s Ground Squirrel (*Urocitellus richardsonii*), Columbian Ground Squirrel (*Urocitellus columbianus*) (Hilton & Mahrt 1971)

**[Siteroptidae Mahunka, 1970]**

**Overview:** Siteroptid mites feed on fungi and are found in soil and on plants, especially grasses. Some species of *Siteroptes* Amerling, 1861 carry fungal spores on the surface of their bodies and others carry them in special pouches. *Siteroptes cerealeum* Kirchner is a vector of the plant-pathogenic fungus *Fusarium poae*.

*Siteroptes* (*Pediculaster*) *mesembrinae* (R. Canestrini, 1881) - ex *Onthophagus taurus* (Scarabaeidae), Lethbridge (K. Floate)

*Siteroptes* (*Pediculaster*) sp. nr. *ignotus* (Krczal, 1959) - ex Richardson’s Ground Squirrel (*Urocitellus richardsonii*) (Hilton & Mahrt 1971)

*Siteroptes* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Siteroptes graminum* (Reuter, 1900) – associated with sliver top of grasses [=*Pediculopsis graminum* (Reuter, 1900)]

**Neopygmephoridae Cross, 1965 (sensu Khaustov & Ermilov 2011)**

**Diagnostic characters:** Gnathosoma a capsule, palps not distinct, chelicerae stylet-like. Body covered by series of sclerotized plates; prodorsum with anterior stigmatal openings, sensillum present; legs I with fused tibiotarsus lacking eupathid p’ and single claw that may be enlarged; prodorsum usually with 2 pairs of setiform setae v2, sc2 (but v2 may be absent) and club-shaped sc1; dorsal seta d on femur I usually hook-like or spatulate, rarely elongate-serrate cupule im absent.

**Overview:** Neopygmephorid mites feed on fungi and some species are pests in mushroom houses. Often two forms of the adult female occur, one of which is modified to cling to the hairs of the insects used for transport. Species of *Bakerdania* are widespread (>120 species have been described) and occur in soil, mammal burrows, bird nests, and the nests of social insects. Species of *Petalomium* are often associated with ants.

**Taxonomy:** *Neopygmephorus* Cross, 1965, is a junior synonym of *Bakerdania* Sasa, 1961, but the family name remains valid. Khaustov (2009) proposed a new genus, *Kerdabania* (an
anagram of *Bakerdania*) for species previously included in *Bakerdania*, *Pseudopygmephorus*, and *Pygmephorus*

*Allopygmephorus* sp. 1 DEW – 190 long; dorsal and ventral sclerites and legs evenly microtuberculate. Prodorsum nearly covered by plate C and with sc2 apparently absent; v2 (5) minute, thick, inserted anterior to bothridium; peritrematal chamber (4-5) spherical with short basal tube. Tibiotasus I rounded distally, tc’ sessile, claw small; ω1 (10) thickened, cylindrical; ω2 (3-4) minute club; φl-2 (6) subequal. Venter with 1a-b subequal (20), both strongly tapered, lightly barbed; 2a-b similar; coxisternal field II with parallel longitudinal folds; 4a-b (~45) subequal, strongly tapering, barbed, not approaching posterior margin of body; p1, 3 widely separated, p2 absent. C without rim but with some marginal striations as in Scutacaridae; dorsal setae (40-65) barbed, tapering, longer laterally and posteriorly, h1-2 (60-65) longest, slightly broadened. Ex thorax hydrophilid beetle (*Enochrus* sp.), Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Bakerdania* sp. 1 DEW – 280 long; dorsal and ventral sclerites and legs evenly microtuberculate. Prodorsum with sc2 (50) strongly barbed, inserted posteriad bothridium; v2 (7) minute, inserted just anterior to bothridium; peritrematal chamber (10) spherical with short distal nipple and basal tube. Tibiotasus I recessed behind small claw; ωl (21) thickened, bent parallel to axis of tibiotarsus; ω2 (20) slender, arched; φl (10) bat-shaped; φ2 (7) more club-like. Venter with 1a-b subequal, both densely barbed distally; 2a-b subequal, densely barbed distally; coxisternal field II with parallel longitudinal folds; 4a (~70), barbed, whip-like, extending well past insertion of 4b (90) similar, extending to near (20) margin of body; p1 (20) slender, barbed, p2-3 (12) very slender, barbed. Dorsal setae (40-65) barbed, tapering, longer laterally and posteriorly, h1-2 (60-65) longest, slightly broadened. Ex Aspen Litter, Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Petalomium* sp. 1 DEW – 220 long; dorsal and ventral sclerites and legs evenly microtuberculate. Prodorsum with sc2 (10) short, inserted anterolaterad bothridium; v2 (3) minute, inserted just anterior to sc2; peritrematal chamber (4-5 diameter) spherical with basal tube (10) extending to short (7) oval, longitudinal chamber. Tibiotasus I with strong distodorsal process, slender claw; ωl (10) flame-shaped; ω2 (15) slender, arched; φl-2 (5-7) subequal, closely inserted, club-like. Venter with 1a-b subequal, both densely barbed distally; 2a-b subequal, densely barbed distally; 4a (~75), barbed, whip-like, extending well past insertion of 4b (75) similar, extending past margin of body; p1 (20) slender, barbed, p2-3 (12-14) smooth or perhaps lightly barbed. Dorsal setae mostly short, smooth, slender, posterior setae longer, barbed. Ex Aspen Litter, Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Bakerdania* sp. – Dinosaur Provincial Park (DEW)

*Kerdabania sellnicki* (Krczal, 1958) [ as *Bakerdania* (*Pseudopygmephorus*) *sellnicki* (Krczal, 1958)] - ex Richardson’s Ground Squirrel (*Urocitellus richardsonii*) (Hilton & Mahrt 1971)

*Neopygmephorus bavaricus* (Krczal, 1959) - ex Richardson’s Ground Squirrel (*Urocitellus richardsonii*) (Hilton & Mahrt 1971)
Scutacaridae Oudemans, 1916

Diagnostic characters: Gnathosoma a capsule, palps not distinct, chelicerae stylet-like. Body of female usually oval or circular in outline and covered by series of sclerotized plates; hidden under a hypertrophied plate C; legs I with or without single claw that may be enlarged; femur I of females with seta d short, stout, usually branched; leg IV with 4-5 segments, with or without a pretarsus.

Overview: Scutacarid mites are generally considered fungivores, but many species have associations with insects and some of these may be associated with fungi that kill the host bees. Ants, bees, wasps, and carabid beetles may carry phoretic scutacarids.

Key to Genera of Scutacaroidea in or near Alberta based on adult females

1. Leg IV with 5 free segments and tarsus usually with claws and empodium........................3
   - Leg IV 4-segmented, tibia and tarsus fused, pretarsal claws and empodium absent........2

2. Tibiotarsus I with claw ......................................................Scutacarus (Scutacarus) Gros, 1845
   - Tibiotarsus I without claw ..............................................................Variatipes group Jacot, 1938

3. Tarsus IV elongate, tapering; pretarsus shorter than tarsus............................................................Archidipsus Karafiát in Stammer, 1959, 1959
   - Tarsus IV broad at base, abruptly narrowed distally; pretarsus as long as tarsus................Imparipes Berlese, 1903

Imparipes cf parapicola Delfinado, Baker & Abbatiello, 1976 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Scutacarus (Scutacarus) sp nr curtus Delfinado, Baker & Abbatiello, 1976 – very similar except less plumose but in length h3~h1-2, not minute. Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Scutacarus (Scutacarus) cf fimentarius Delfinado, Baker & Abbatiello, 1976 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Scutacarus (Scutacarus) notabilis Delfinado, Baker & Abbatiello, 1976 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Scutacarus (Scutacarus) cf pectinatus Delfinado, Baker & Abbatiello, 1976 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Scutacarus (Variatipes) sp nr jacoti Delfinado, Baker & Abbatiello, 1976 – leg IV 4-segmented, without claws; tarsus I without claws; seta 4a anterior to 4b; 6 setae on tibiotarsus IV; same pattern of pectinate, blade-like, and filiform setae on venter, but 4a much shorter, h2 filiform, h3 minute; also e2, f2, f1 much shorter. Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Scutacarus (Variatipes) sp. 1 DEW – Dinosaur Provincial Park (DEW)
**Scutacarus (Variatipes) sp. nr. affinis** Delfinado & Baker, 1976 – Dinosaur Provincial Park (DEW)

Superfamily Trochometridioidea

**Trochometridiidae**

**Diagnostic characters:** Gnathosoma a capsule, palps distinct, chelicerae stylet-like. Body of female covered by series of sclerotized plates; sensilla present; legs I with single claw that may be enlarged; femur and genu I each with 5 setae; leg IV with 5 segments, with pretarsus.

**Overview:** Parasites of ground nesting bees, these mites carry fungal spores in special pouches. Females enter a cell, kill the egg or young larva, and inoculate the fungus on which she and her offspring will feed. Adult mites are phoretic on bees or their parasites (e.g. velvet ants).

*Trochometridium* sp. 1 DEW – Dinosaur Provincial Park (DEW). A species in this genus has been reported from a halictid bee in the Okanagan Valley of British Columbia.

Superfamily Tarsonemoidea

**Podapolipidae Ewing, 1922**

**Diagnostic characters:** Gnathosoma a capsule, palps reduced, chelicerae stylet-like. Body of female covered by series of sclerotized plates; sensilla present or absent; legs I with single claw that may be enlarged; leg IV usually absent.

**Overview:**

*Dorsipes balli* Husband & Husband, 2010 – a subelytral parasite of *Carabus taedatus* Fabricius (Coleoptera: Carabidae)

Tarsonemidae Kramer, 1877

**Diagnostic characters:** Gnathosoma a capsule, palps reduced, chelicerae stylet-like. Body of female covered by series of sclerotized plates; sensilla present or absent; legs I with single claw that may be enlarged; leg IV with 3 segments, lacking a pretarsus, and ending in 1-2 long, thread-like hairs.

**Overview:** The Tarsonemidae includes plant parasites such as the Broad Mite (*Polyphagotarsonemus latus* (Banks)) and the Cyclamen Mite (*Phytonemus pallidus* (Banks)), parasitoids of bark beetle eggs such as *Iponemus* species, and the cause of Isle of Wight disease in honeybees, *Acarapis woodi* (Rene, 1921). However, most species of *Tarsonemus*, including those associated with bark beetles appear to be fungivores.
Acarapis woodi (Rennie, 1921) – a parasite that lives within the tracheal system of the honeybee


Iponemus spanus Lindquist, 1969 – ex Ips woodi in Pinus flexilis: Red Rock, Waterton Lakes


Phytonemus pallidus (Banks, 1899) – a greenhouse pest of ornamental plants and a pest of strawberries

Polyphagotarsonemus latus (Banks, 1904) – a greenhouse pest, especially of peppers

Tarsonemus ips Lindquist, 1969 - Alberta. 10 April 1886 (Bean Collection), elytral declivity of Ips pini (Say).

Tarsonemus subcorticalis Lindquist, 1969 - Alberta. 10 April 1886 (Bean Collection), elytral declivity of Ips pini (Say).

Back to Table of Contents
Superorder Parasitiformes
Order Ixodida Leach, 1815

Diagnostic characters: Gnathosoma head-like (capitulum) with hypostome covered in retrorse teeth; palps with 4 free segments; tarsus I with pit-capsule Haller’s organ; scutum present (Ixodidae) or absent in post-larval stages (Argasidae).

Overview: Ticks are obligate, blood-sucking parasites of vertebrates and important vectors of disease in humans, livestock, and wildlife.

Figure T1: Major features used to identify hard ticks (Ixodidae)

Superfamily Ixodoidea
Key to Tick Families in Alberta

1. With three pairs of legs (larvae) ........................................................................................................2
   - With four pairs of legs (nymphs and adults) ................................................................................3

2. Scutum (Fig. T1, T2A) present on anterior body behind mouthparts; soft cuticle smoothly plicate................................................................................................................................................Ixodidae
   - Anterior scutum absent, but small, circular plate usually present in mid-dorsal region; soft cuticle densely tuberculate ............................................................................................................Argasidae
3. Scutum present, either restricted to the anterior region of the body (Fig. T2A: nymphs, females) or covering the entire body (Fig. T2B: males); capitulum visible in dorsal view; spiracular plate present posterior to hind legs; soft cuticle plicate..............................**Ixodidae**

- Scutum absent; capitulum hidden under fold of body; spiracular plate dorsolateral to coxae III-IV; soft cuticle densely tuberculate ..........................................................**Argasidae**

**Figure T2: Scutum in female and nymphal vs male hard ticks (Ixodidae)**

**Key to Adults of Genera of Hard Ticks (Ixodidae) in Alberta**

1. Scutum (the hard dorsal plate) with a pair of small, simple eyes (=ocelli) (Fig. T3A), each on anterior lateral margin about the level of the second pair of legs..............................................3

- Ocelli absent (Fig. T3B).............................................................................................................2

**Figure T3: Female scutum with and without ocelli.**
2. Anal groove extending anterior to and around anus; festoons absent; palps without lateral projection (Fig. T4A); usually on small mammals (especially rodents), but also on larger mammals (including people) and birds ....................... *Ixodes* Latreille, 1795 (at least 6 species)

- Anal groove not extending anterior to anus; festoons present; 2nd palpal segment with lateral projection (Fig. T4B); usually on birds, rabbits, hares.......................................................... .................................................................

.............................. *Haemaphysalis* CL Koch, 1844 (2 species)

![Figure T4: Dorsal capitulum and posterior ventral region](image)

3. Base of capitulum with strong lateral angles, appearing hexagonal in dorsal view (Fig. T5A); inornate; usually on dogs, rarely bites people .................................................................

................. *Rhipicephalus* CL Koch, 1844 (one species: *R. sanguineus* Latreille, 1806)

- Base of capitulum more or less rectangular in dorsal view, without lateral angles (Fig. T5B); ornate; usually on larger mammals, especially deer and their relatives, but also on rabbits, carnivores (including dogs), and people................. *Dermacentor* CL Koch, 1844 (2-3 species)

![Figure T5: Dorsal capitulum.](image)
Ixodidae Dugès, 1834

Overview: Most hard ticks require three hosts to complete development: the larva, nymph, and adult each attach to a host, engorge, and then drop off and must find a new host after moulting (nymph, adult) or a spot to lay eggs after mating (which may occur on the host). In contrast, Winter Tick colonize their host as a larva and remain on the host until the female drops off to lay her eggs. In addition to the species recorded below, *Ixodes hearlei* Gregson, 1941; *Ixodes ochotonae* Gregson, 1941; *Ixodes rugosus* Bishop, 1911; *Ixodes soricis* Gregson, 1942; *Ixodes texanus* Banks, 1909 may be present in Alberta.

Male Winter Tick *Dermacentor albipictus* (Packard, 1869)

**Key to Species of *Dermacentor* in or near Alberta**

1. Spiracular plate with dorsal lobe-like process (Fig. D1A); goblet cells small or large............2

- Spiracular plate more or less oval, without dorsal lobe, plate nearly filled with large goblet cells (Fig. D1B).........................................................................................*Dermacentor albipictus* (Packard, 1869)

![Figure D1: Spiracular plates.](image)
2. Dorsal lobe of spiracular plate narrow; goblet cells around spiracle large, becoming smaller on margin and on lobe (Fig. D2A) ........................................... *Dermacentor andersoni* (Stiles, 1908)
- Dorsal lobe of spiracular plate broader; goblet cells small, numerous (Fig. D2B)..........................
..........................................................*Dermacentor variabilis* (Say, 1821)

*Figure D2: Spiracular plates.*

*Dermacentor albipictus* (Packard, 1869) – Winter Tick (also Moose Tick) is a one-host tick. They are occasionally found wandering on dogs (DEW record, male on dog ex Devon 3 January 2012) and people (DEW has records for larvae and one adult male), but are not known to attach to humans. Members of the Cervidae (deer, elk, moose, woodland caribou) are considered the primary hosts, with moose especially severely affected, but records exist for other wildlife. Larvae hatch from eggs in the soil in late summer and early autumn and seek a host (sometimes wandering on people, but not attaching). Moose may harbour large populations and suffer significant winter mortality (Samuel 2004, 2007). The ticks may carry a tularemia-like bacterium (Leo et al. 2010).

*Dermacentor andersoni* (Stiles, 1908) – Rocky Mountain Wood Tick is a three-host tick: larvae and nymphs usually attach to rodents or rabbits; adults seek larger mammals including people. Adult ticks are active in spring. Wood Ticks are known vectors of Rocky Mountain Spotted Fever, Tularemia, and Colorado Tick Fever and may cause paralysis in wildlife, livestock, and pets.

**Key to Species of *Haemaphysalis* in Alberta**

1. Venter of capitulum with subtriangular processes; hypostomal teeth coarse, 3/3 (Fig. H1A)......
..........................................................*Haemaphysalis leporispalustris* Packard, 1869
- Venter of capitulum without pair of subtriangular processes (cornua); hypostomal teeth fine, numerous, 5/5 (Fig. H1B).................................*Haemaphysalis chordeilis* Packard, 1869
Haemaphysalis chordeilis Packard, 1869 – the Bird Tick is a three host tick that has been collected near Medicine Hat in southern Alberta (Brown & Kohls, 1950). Grouse and turkeys may be heavily infested.

Haemaphysalis leporispalustris Packard, 1869 – the Rabbit Tick (also Grouse Tick) is a three-host tick. Larvae and nymphs feed on snowshoe hares, other small mammals, or some birds such as Ruffed Grouse, White-throated Sparrow, Swainson’s Thrush (Morshed et al. 2005). Adults prefer rabbits or hares. Adult populations peak during the summer. Rabbit Ticks rarely bite people, but are considered vectors of tularemia among lagomorphs.

Key to Sexes of *Ixodes* in Alberta

1. Scutum restricted to anterior portion of dorsum; pair of porose areas present on base of capitulum .............................................................................................................................. Adult female

- Scutum covers most of dorsum; pair of porose areas absent .......................................... Adult male

*Ixodes angustus* Neumann, 1899 – the Rodent Tick is usually found in nests and burrows of small mammals such as Deer Mice (*Peromyscus maculatus*) and Red-backed Voles (*Clethrionomys gapperi*) (Sorensen & Moses 1998, Lausen 2005). Although technically a three host tick, the association with nests restricts the ability of the tick to feed on a variety of hosts. Strickland Museum (2011) records extend across the lower 2/3rds of Alberta.

*Ixodes kingi* Bishop, 1911 – the Rotund Tick typically infests mice and ground squirrels, but will attached to people, pets, and a diversity of other mammals (Salked et al. 2006). The Strickland Museum (2011) has numerous records from Edmonton south in Alberta.

*Ixodes pacificus* Cooley & Kohls, 1943 – the Western Black-legged Tick is a three host tick that has been reported from migratory songbirds in Alberta (Morshed et al. 2005). In other parts of North America larvae and nymphs of this tick prefer lizards, ground foraging birds, and small mammals; adults will feed on dogs, deer, rabbits, and people.
Ixodes scapularis Say, 1821 – the Black-legged Tick is a three host tick that has been reported from migratory songbirds in Alberta (Morshed et al. 2005). In other parts of North America, larvae and nymphs feed on small mammals and adults on larger animals such as white-tailed deer, horse, livestock, and people. It is an important vector of babesiosis, tularemia, and numerous rickettsial diseases.

Ixodes sculptus Neumann, 1904 – the Sculpted Tick typically infests ground squirrels [ex Richardson’s Ground Squirrel (Urocitellus richardsonii), Franklin’s Ground Squirrel (Poliocitellus franklinii) (Hilton & Mahrt 1971)], but will attached to people, pets, and a diversity of other mammals (Salked et al. 2006). The Strickland Museum (2011) has numerous records from the southern third of Alberta.

Ixodes spinipalpis Hadwen & Nuttall, 1916 – the Mouse Tick has been reported from a shrew and a bushy-tailed wood rat in Alberta (Shemanchuk & Kiceniuk 1970). These ticks tend to remain in nests and burrows and are potential vectors of disease.

Rhipicephalus sanguineus Latreille, 1806 – the Brown Dog Tick has been recorded in Alberta, but probably does not survive out of doors (CNC record, FAHS). Dogs are the preferred host for all stages and this tick rarely bites people.

Argasidae CL Koch, 1844

Overview: Soft ticks in the genus Carios spend relatively little time on hosts and most of their time in or around nests and burrows. They may feed on several hosts during development. Members of the genus Otobius, however, are single host ticks and attach and engorge as larvae and nymphs (adults do not feed). The soft tick body is leathery and the scutum characteristic of hard ticks is absent (except as a remnant in larvae). In addition to the species recorded below, the Spinose Ear Tick Otobius megnini (Dugès, 1883) is known from British Columbia and the northern United States and may be present in Alberta.

Carios concanensis (Cooley & Kohls, 1941) – (previously in Ornithodoros) Wilkinson et al. (1980) report this tick from Prairie Falcon (Falco mexicanus) in Alberta, but a number of other birds are known hosts in the USA. The tick can be found on the hosts or in cracks and crevices in rock ledges or caves near host nests and will feed on bats.

Carios kelleyi (Cooley & Kohls, 1941) – The Bat Tick (previously in Ornithodoros) has been reported from five species of bats (Eptesicus fuscus, Myotis lucifugus, Myotis ciliolabrum, Myotis evotis, and Myotis volans) in south eastern Alberta (Lausen 2005). It would be expected in and around areas where bats rest.

Otobius lagophilus Cooley & Kohls, 1940 – the Rabbit Spinose Ear Tick has been reported from southern Alberta (Brown & Kohls 1950). This is a one host tick and rabbits and hares (jackrabbits) are the preferred hosts; but pikes, ground squirrels, and cats have also been reported to be infested. Larvae and a single nymphal stage attach inside the ears or on other parts of the body and engorge. Adults have poorly developed mouthparts and do not feed; eggs are laid off the host.

Otobius megnini (Dugès, 1883) – Spinose Ear Tick is a one-host tick that infests the ears of cattle, horses, and sheep and is a known vector of Q-fever. Wildlife, dogs, and rarely
people may be infested. Spinose Ear Tick is known to be on bighorn sheep in British Columbia, but in Alberta there is only one record from a mountain goat in Banff National Park (FAHS).

**Order Mesostigmata G. Canestrini, 1891**

**Overview:** The Mesostigmata currently consists of three suborders of mostly predatory or parasitic mites (a few are fungivores or feed on pollen and nectar) and includes such well known pests as the poultry red mite and varroa. Of the three suborders currently recognised, only two are known to occur in Alberta and one of these, Sejida, is restricted to a single, apparently undescribed species.

**Suborder Sejida**

**Superfamily Sejoidea**

**Sejidae Berlese, 1913**

**Diagnostic characters:** Dorsal shielding fragmented; av4, pv4 present on intercalary sclerite on tarsus IV; posterior with long, horn-like projections bearing long seta in Alberta species.

**Overview:** Sejid mites are predators and most diverse in the tropics and in association with dead wood habitats. However, at least one species of *Sejus* is common in aspen litter in Alberta. About 46 species have been described in five genera.

*Sejus* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB; Meanook

**Suborder Trigynaspida**

**Cohort Antennophorina**

**Superfamily Antennophoroidea**

**Antennophoridae Berlese, 1892**

**Diagnostic characters:** Large brown mites with elongate legs I found on ants.

**Overview:** Species of *Antennophorus* Haller, 1887, are kleptoparasites of ants.

*Antennophorus* sp.– Cypress Hills associated with *Formica* ants (Lindquist 1979)

**Suborder Monogynaspida**

**Cohort Uropodina**

**Superfamily Polyaspidoidae**
Trachytidae Trägårdh, 1943

Diagnostic characters:
Overview: About 108 species have been described to date in seven genera. These are free-living mites of unknown ecology, but probably predators of soft-bodied invertebrates.

*Polyaspinus* sp. 1 DEW – Dinosaur Provincial Park (DEW)
*Trachytes* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Superfamily Uropodoidea

Dinychidae Vitzthum, 1931

Diagnostic characters:
Overview: About 34 species have been described from the one known genus of the family.

*Dinychus* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Oplitidae Johnston, 1968

Diagnostic characters:
Overview: About 163 species in 8 genera have been described to date. Oplitid mites are associated with ants and probably feed on ant brood.

*Oplitis* sp. 1 DEW – Dinosaur Provincial Park (DEW)

Trachyuropodidae Berlese, 1917

Diagnostic characters:
Overview: About 100 species in 17 genera have been described to date. Trachyuropid mites are associated with ants and probably feed on ant brood.

*Trachyuropoda kinsella* Kontschan, Newton & Proctor, 2010 – Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W); Dinosaur Provincial Park (DEW)

Trematuridae Berlese, 1917

Diagnostic characters:
Overview: Over 400 species in 13 genera have been described to date.
Ipiduropoda sp. nr. polytricha (Vitzthum, 1923) – CNC record
Trichouropoda moseri Hirschmann, 1972 – Calgary

Urodinychidae Berlese, 1917

Diagnostic characters:

Overview: About 270 species in 13 genera have been described

Uroobovella sp. nr. obovata (G. Canestrini & Berlese, 1884) – CNC record

Uropodidae Berlese, 1917

Diagnostic characters:

Overview: Over 260 species in 9 genera have been described, including 84 species in Uropoda Latreille, 1806. Bajerlein & Błoszyk (2004) collected deutonymphs of this mite from 25 species of coprophilus beetles in Poland.

Uropoda orbicularis (Müller, 1776) - ex Onthophagus taurus (Scarabaeidae), Lethbridge (K. Floate)

Infraorder Gamasina
Cohort Arctacarina
Superfamily Arctacaroidea
Arctacaridae Evans, 1955

Diagnostic characters:

Overview: Only two genera and 6 species of this basal gamasine family have been described to date

Proarctacarus canadensis Makarova, 2003 – Rocky Mountains near Seebe Village (51°06’ N, 115°04’ W), in litter under Pinus contorta (type); ABMI 1262 NE west of Torrens River, 13 June 2011, (52.799728N, -116.950195W); ABMI 1029 NW, south of Cardinal River, 1 June 2011, (54.254326N, -120.041786W)

Cohort Zerconina
Superfamily Zerconoidea
Zerconidae Berlese, 1892

Diagnostic characters:

Overview:

*Boreozeron emendi* Díaz-Aguilar & Ujvári, 2010 – EMEND (56° 46' 13'' N, 118° 22' 28'' W)

*Mixozercon* sp. 1 DEW – Beef Cattle Research Ranch, near Kinsella, Alberta (53°01'27'' N, 111°33'17'' W), Dinosaur Provincial Park (DEW)

*Mixozercon albertaensis* Díaz-Aguilar & Ujvári, 2010 - EMEND (56° 46' 13'' N, 118° 22' 28'' W)

*Mixozercon borealis* Díaz-Aguilar & Ujvári, 2010 - EMEND (56° 46' 13'' N, 118° 22' 28'' W); Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Mixozercon jasoniana* Díaz-Aguilar & Ujvári, 2010 - EMEND (56° 46' 13'' N, 118° 22' 28'' W)

*Parazercon radiatus* (Berlese, 1910) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Skeironozercon tricavus* Blaszak, 1982 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Zercon alaskensis* Sellnick, 1957 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Zercon* sp. 2 DEW – Dinosaur Provincial Park (DEW), Moose Pasture Research Site (DEW) 8 km W Chipman, AB, Beef Cattle Research Ranch, near Kinsella, Alberta (53°01'27'' N, 111°33'17'' W)

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Cohort Parasitina

Superfamily Parasitoidea

Parasitidae Oudemans, 1901

Diagnostic characters:

Overview:

*Gamasodes* sp. 1 DEW – 1 DN ex ABMI Wetlands 1222

*Gamasodes bispinosus* (Halbert, 1915) – CNC record

*Gamasodes* sp. nr. *micherdzinskii*, Davydova, 1973 – CNC record

*Paramblyseius* sp. nr. *teutonicus* Willmann, 1956 – Dinosaur Provincial Park (DEW)

*Parasitellus hobbsi* (Richards, 1976) – ex nest or adult *Bombus bifarius, californicus, frigidus, huntii, occidentalis*
Parasitellus favus (Richards, 1976) - ex nest or adult Bombus bifarius, frigidus, huntii, insularis, occidentalis, rufocinctus, vagans

Parasitellus inquilinobombus (Richards, 1976) - ex nest or adult Bombus appositus, bifarius, californicus, frigidus, mixtus, occidentalis, rufocinctus

Parasitellus pertheatus (Richards, 1976) - ex nest or adult Bombus appositus, bifarius, californicus, flavifrons, frigidus, nevadensis, occidentalis

Parasitus coleoptratorum (Linnaeus, 1758) – CNC record; ex Onthophagus taurus (Scarabaeidae), Lethbridge (K. Floate)

Parasitus consanguineus Oudemans & Voight, 1904 – ex Onthophagus taurus (Scarabaeidae), Lethbridge (K. Floate)

Parasitus fimetorum (Berlese, 1904) – ex soil, rarely in bumblebee nests (Richards 1976); ex Onthophagus taurus (Scarabaeidae), Lethbridge (K. Floate)

Parasitus neglectus (Berlese, 1903) – CNC record

Pergamasus longicornis (Berlese, 1906) – cottonwood litter Dinosaur Provincial Park (DEW)

Pergamasus norvegicus (Berlese, 1906) – CNC record

Parasitus sp. - ex Onthophagus taurus (Scarabaeidae), Lethbridge (K. Floate)

Poecilochirus necrophori Vitzthum, 1930 – CNC record

Schizosthetus cf. lyriformis (McGraw & Farrier, 1969) – ex Dendroctonus ponderosae (Mori et al. 2011); CNC record

Vulgarogamasus sp. nr. kraepelini (Berlese, 1904) – CNC record

**Cohort Gamasina**

**Superfamily Veigaioidea**

**Veigaioidea Oudemans, 1939**

**Diagnostic characters:**

**Overview:**

*Veigaia cerva* (Kramer, 1876) – Edmonton, urban yard

*Veigaia cf. kochi* (Trägårdh, 1901) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB; CNC record

*Veigaia nemorensis* (CL Koch, 1836) – CNC record

*Veigaia serrata* Willmann, 1935 – ex litter Highway 22 near Pincher

**Superfamily Rhodacaroidea**
Digamasellidae Evans, 1957

Diagnostic characters:

Overview: About 261 species of digamasellid mites have been described in 13 genera. Species of *Dendrolaelaps* are predators found in soil and litter or associated with bark beetles or rarely on other insects that live in dead wood.

*Dendrolaelaps* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Dendrolaelaps* sp 2 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Dendrolaelaps* cf *neodisetus* Hurlbutt, 1967 – ex *Chrysis* sp., Strathcona Co., NW of Bruderheim NA, W Tract, 53°51’1”N, 113°1’41”W, 11 Jun 2010, sand, 1-yr. burn site, yellow pans, Buck & Widen

*Dendrolaelaps quadrisetosimilis* (Hirschmann & Rühm, 1955) – *Pityokteines minutus*

*Dendrolaelaps quadrisetus* (Berlese, 1920) – CNC record

*Dendrolaelaps* sp. nr. *varipunctatus* Hurlbutt, 1967 – 1 DN ex *Crossocerus maculipennis* (male), AB, Strathcona Co., NW Bruderheim NA, W Tract, 53°51'1"N, 113°1'41"W, 11 Jun 2010, sand, 1-yr. burn site, M. Buck

Halolaelapidae Karg, 1965

Diagnostic characters:

Overview: Approximately 80 species have been described in 4 genera. Halolaelapids are associated with water, especially coastal areas, but also rivers and lakes.

*Halolaelaps* sp. 1 DEW – Lake Wabamun; EMEND (phoretic on *Eutrichota* sp. [Diptera, Anthomyiidae])

*Halolaelaps* sp. 1 EEL – ex *Onthophagus taurus* (Scarabaeidae), Lethbridge (K. Floate)

*Halolaelaps* sp. 2 EEL [near *sexclavatus* (Oudemans)] - ex *Onthophagus taurus* (Scarabaeidae), Lethbridge (K. Floate)

Ologamasidae Ryke, 1962

Diagnostic characters:

Overview: About 355 species of ologamasid mites have been described in 45 genera, mostly from the southern continents (Australia, South America, Africa, Antarctica). Those species that have been studied are predators of small invertebrates.

*Gamasellus* sp. 1 DEW (FD=6, setae long, curled) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB; Dinosaur Provincial Park (DEW) (sp. nr. *vibrissatus* Emberson, 1967)
Euryparasitus maseri Whitaker & Klompen, 2005 - Alberta, Bow Island, 49°52'N, 111°22'W, ex Onychomys sp. (Muridae) (GSJ1307), 11 Aug 1972, coll. Jones

Rhodacaridae Oudemans, 1902

Diagnostic characters:

Overview: About 150 species of rhodacarid mites have been described in 15 genera. Those species that have been studied are predators on nematodes, springtails, and small mites.

Rhodacarellus cf silesiacus Willmann, 1936 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB ex dry soil; Dinosaur Provincial Park (DEW)

Rhodacarellus sp. nr. subterraneus Willmann, 1935 – Beef Cattle Research Ranch, near Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W), Alberta (53°01′27″ N, 111°33′17″ W)

Rhodacarellus sp. – cropped prairie soil near Lethbridge Research Centre (49°48°N, 112°54°W) (Osler et al. 2008)

Superfamily Ascoidea

Ameroseiidae Evans, 1961

Diagnostic characters:

Overview: About 150 species in 10 genera of ameroseiid mites have been described. Several genera are found in flowers where they feed on nectar and pollen, but the known Albertan genera are fungivores found in soil/litter habitats, mammal burrows, and stored products. An unidentified species has been reported from cropped prairie soil near Lethbridge Research Centre (49°48°N, 112°54°W) (Osler et al. 2008).

Ameroseius sp. 1 DEW – (coarsely foveolate, setae massive, j1 inflated, spinose) Moose Pasture Research Site (DEW) 8 km W Chipman, AB; Dinosaur Provincial Park (DEW)

Ameroseius sp. 2 DEW – (beaded-reticulate, setae slender, j1 setiform) Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Epicriopsis sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Ascidae Voigts & Oudemans, 1905

Diagnostic characters:

Overview: The Ascidae consists of about 325 described species and 18 genera. The species that have been studied are predators of nematodes, springtails, and small mites. Species of Arctoseius are phoretic on nematoceran Diptera; species of Antennoseius are phoretic on
ground beetles (Coleoptera: Carabidae). An unidentified species of *Arctoseius* (misspelled *Arcteoseius*) has been reported from cropped prairie soil near Lethbridge Research Centre (49°48’N, 112°54’W) (Ösler et al. 2008).

*Antennoseius (Antennoseius)* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB (j1-4, z2 conical; cheliceral digits small)

*Antennoseius (Antennoseius)* sp. 2 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB (j1 flabellate; va pustulate with JV1-2)

*Antennoseius (Vitzthumia) janus* Lindquist & Walter, 1989 – Cypress Hills Provincial Park (5 km south Elkwater) (Lindquist & Walter 1989)

*Antennoseius (Vitzthumia) perseus* Beaulieu, Dechene & Walter, 2008 – EMEND (Chisholm 54°56’N, 114°7’W), from under the elytra of *Sericoda quadripunctata* (DeGeer) and *S. bembidioides* Kirby (Beaulieu et al. 2008)

*Antennoseius (Vitzthumia) pyrophilus* Beaulieu, Dechene & Walter, 2008 – EMEND (Chisholm 54°56’N, 114°7’W), from under the elytra of *Sericoda quadripunctata* (DeGeer), *S. bembidioides* Kirby, *Calathus ingratus* Dejean, and *Agonum placidum* (Say) (Beaulieu et al. 2008)

*Arctoseius cetratus* (Sellnick, 1940) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB, Dinosaur Provincial Park (DEW)

*Arctoseius idiodactylus* Lindquist, 1961 – CNC record

*Arctoseius* sp. s DEW (=sculptilis Lindquist dissertation) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB. This species has not yet been formally described.

*Asca cf piloja* Hurlbutt, 1963 – Beef Cattle Research Ranch, near Kinsella, Alberta (53°01’27” N, 111°33’17” W), Dinosaur Provincial Park (DEW), ABMI 1436

*Asca garmani* Hurlbutt, 1963 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB; this is a widely distributed all-female parthenogenetic species.

*Asca nesoica* Athias-Henriot, 1961 – Beef Cattle Research Ranch, near Kinsella, Alberta (53°01’27” N, 111°33’17” W), Dinosaur Provincial Park (DEW)

*Gamasellodes vermivorax* Walter, 1987 – Beef Cattle Research Ranch, near Kinsella, Alberta (53°01’27” N, 111°33’17” W),

*Iphidozercon* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Neojordensia cf laevis* (Oudemans & Voigts, 1904) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Protogamasellus* sp. - cropped prairie soil near Lethbridge Research Centre (49°48’N, 112°54’W) (Ösler et al. 2008)

*Zerconopsis* sp. 1 DEW – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

**Melicharidae Hirschmann, 1962**
Diagnostic characters:

Overview: About 200 species of melicharid mites are known in 12 genera. Many of these mites live in flowers, feed on nectar and pollen, and use hummingbirds for transport, but the Alberta species are phoretic on insects including bark beetles, and are primarily predatory (some also feed on fungi).


*Proctolaelaps* sp. – ex Comandra Blister Rust (Powell 1971)

*Proctolaelaps* sp. nr. *fiseri* Samšiňák, 1960 – Edmonton on nitidulid beetle *Glischrochilus siepmanni*? 24 April 2005

*Proctolaelaps longisetosa* (Postner, 1951) – CNC record

*Proctolaelaps pomorum* (Oudemans, 1929) – CNC record

*Proctolaelaps robustus* (Evans & Till, 1966) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB (aspen litter under snow).

*Proctolaelaps subcorticalis* Lindquist, 1971 – Grovedale, 19 August 1964 on *Trypodendron lineatum* (Oliver) in *Picea glauca*; ex *Dendroctonus ponderosae* Grand Prairie (Mori et al. 2011).

*Proctolaelaps* sp. nr. *xyloteri* Samšiňák, 1960 – CNC record

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Superfamily Phytoseioidea

Blattisociidae Garman, 1948

Diagnostic characters:

Overview: The Blattisociidae used to be treated as a subfamily of the Ascidae, but is currently placed in the Phytoseioidea because of the similarity of the sperm access system to other phytoseioids and because of a consistent sister-group relationship with the Phytoseiidae in phylogenetic analyses. Currently, about 310 species have been described in 13 genera. Most species are predators of small invertebrates, but some tropical species inhabit flowers and use hummingbirds for transport. Species of *Cheiroseius* are found in damp to wet habitats (moist forest litter, lake margins) and some are known to be phoretic on crane flies and mosquitoes (Diptera: Tipulidae, Culicidae). Species of *Platyseius* are found in marshes and lake and river margins. About a third of all of the described species in the Blattisociidae belong to the genus *Lasioseius*; some are phoretic on bark beetles.

*Lasioseius confusus* Evans, 1958 - Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Lasioseius* n. sp. – Dinosaur Provincial Park (DEW)

*Lasioseius muricatus* (CL Koch, 1839) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB
Lasioseius ometes (Oudemans, 1903) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Lasioseius porulosus DeLeon, 1963 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB


Cheiroseius cf. cassiteridium (Evans & Hyatt, 1960) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Cheiroseius sp. 1 DEW (short tibia I) - Moose Pasture Research Site (DEW) 8 km W Chipman, AB, Lake Wabamun

Cheiroseius sp. 2 DEW (incised dorsal shield) - Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Cheiroseius sp. neocorniger group (near serratus) - Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Cheiroseius sp. - cropped prairie soil near Lethbridge Research Centre (49°48′N, 112°54′W) (Osler et al. 2008)

Platyseius italicus (Berlese, 1905) - Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Platyseius spinivertex Lindquist, 2003 – ABMI Wetlands 444

Platyseius subglaber (Oudemans, 1903) - Moose Pasture Research Site (DEW) 8 km W Chipman, AB, Lake Wabamun

Phytoseiidae Berlese, 1916

Diagnostic characters: Adults with less than 20 pairs of setae on dorsal shield and 1-2 pairs or marginal setae.

Overview: The Phytoseiidae consists of more than 2300 described species in 90 genera. Most species are associated with vegetation where they feed on mites (including many pest species), small insects, wind-blown pollen, and honeydew. Most of the successful mite biological control organisms belong to this family.

Amblyseius sp. – Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W)

Amblyseius sp. ovalitectus subgroup – Moose Pasture Research Site (DEW) 8 km W Chipman, AB 5 Aug 2007;

Amblyseius meridionalis Berlese, 1914 - Dinosaur Provincial Park (DEW)

Amblyseius sp. nr. chilicotti Chant & Hansell, 1971 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB 5 Aug 2007; Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W)

Amblyseius isuki Chant & Hansell, 1971 – Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W); Dinosaur Provincial Park (DEW)

Arrenoseius morgani (Chant, 1957) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB 5 Aug 2007; 9 Sept 2007

Arrenoseius timagami (Chant & Hansell, 1971) – Dinosaur Provincial Park (DEW)

Chelaseius tundra (Chant & Hansell, 1971) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB, aspen litter under snow; Dinosaur Provincial Park (DEW)

Metaseiulus (Metaseiulus) columbiensis (Chant, 1959) – (Chant et al. 1974)

Neoseiulus arcticus (Chant & Hansell, 1971) – possible AB (Chant & Haskell, 1971)


Neoseiulus cucumeris (Oudemans, 1930) – used in greenhouses for cucumber production

Neoseiulus hanselli (Chant & Yoshida-Shaul, 1978) - Lake Louise, Alberta, Canada, on willow.

Neoseiulus inak (Chant & Hansell, 1971) - spruce, 4600 ft Eisenhower Biological Camp, Alberta

Neoseiulus iroquois (Chant & Hansell, 1971) – ground wheat Sterling, AB; Dinosaur Provincial Park (DEW)

Neoseiulus salish (Chant & Hansell, 1971) - Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W)

Neoseiulus sp nr shanksi Congdon, 2002 - Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W)

Neoseiulus vallis (Schuster & Pritchard, 1963) – Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W)

Phytoseius canadensis Chant, 1965 - Moose Pasture Research Site (DEW) 8 km W Chipman, AB, Heather’s Meadow ex Labrador Tea leaf, 4 Aug 2008

Phytoseius delicatus Chant, 1965 – (Chant 1965)

Proprioseiopsis borealis (Chant & Hansell, 1971) - under a log at 4500 ft, biological camp, Mt. Eisenhower, Alberta, August, 1955; dry, open litter and grass, Point Proctor 3 June 2007; Dinosaur Provincial Park (DEW)

Proprioseiopsis hudsonianus (Chant & Hansell, 1971) – Dinosaur Provincial Park (DEW)

Typhlodromus (Anthoseius) bakeri (Garman, 1948) – (Chant et al. 1974)


Typhlodromus (Anthoseius) singularis Chant, 1957 - (Chant et al. 1974)
Superfamily Eviphidoidea
Eviphididae Berlese, 1913

Diagnostic characters:

Overview: Eviphidid mites are associated with patchy resources (e.g. dung, compost, beach wrack) and use insect carriers to get from patch to patch. About 110 species in 19 genera have been described.

*Alliphis* sp. 1 DEW (sp nr *halleri*) – Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W); Dinosaur Provincial Park (DEW)

*Alliphis* sp. nr. *siculus* (Oudemans, 1905) – CNC record

*Copriphis* sp. 1 DEW – Dinosaur Provincial Park (DEW)

*Scarabaspis inexpectatus* (Oudemans, 1903) – ex *Onthophagus taurus* (Scarabaeidae), Lethbridge (K. Floate)

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Macrochelidae Vitzthum, 1930

Diagnostic characters: Adults with single dorsal shield; peritreme recurved at stigma.

Overview: About 470 species in 20 genera of macrochelid mites have been described. Basal groups (e.g. *Geholaspis*) tend to be free-living in mesic to moist litter habitats, but the bulk of the described species are associated with various beetles, especially members of the Scarabaeoidea, or flies on which they are phoretic. Like eviphidid mites, macrochelids are typically found in patchy habitats including dung, carrion, and bark beetle killed trees where they feed on insects, insect eggs, and nematodes. One Albertan species is associated with bumblebees (Hymenoptera: Apidae: *Bombus*).

*Geholaspis* (*Geholaspis*) *longispinosus* (Kramer, 1876) – Edmonton, urban yard

*Geholaspis* (*Longicheles*) *hortorum* (Berlese, 1904) – Edmonton, urban yard

*Macrocheles glaber* (Müller, 1860) – Lake Wabamun; Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Macrocheles* sp. nr. *insignitus* Berlese, 1918 – CNC record

*Macrocheles* sp. nr. *matrius* Hull, 1925 – ex Richardson’s Ground Squirrel (*Urocitellus richardsonii*), Columbian Ground Squirrel (*Urocitellus columbianus*) (Hilton & Mahrt 1971)

*Macrocheles* sp. nr. *perglaber* Filipponi & Pegazzano, 1962 – ex *Onthophagus taurus* (Scarabaeidae), Lethbridge (K. Floate)

*Macrocheles praedafimetorum* Richards & Richards, 1977 – Prairie Bluff ex nests of *Bombus frigidus, B. occidentalis, B. ternarius*
Macrocheles schaeferi Walter, 1988 – ex Dendroctonus Boyd Mori, Dinosaur Provincial Park (DEW), Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W); ABMI 1438 SW, west of Pollockville, AB.

Macrocheles sp. (“nicrophoraphila”) – CNC record

Macrochelid - Southern red-backed vole (Myodes gapperi), Strathcona County AB, May-July 2001.

Pachyraelapidae Berlese, 1913

Diagnostic characters:

Overview: Most pachylaelapid mites resemble the other members of the Eviphidoidea in their associations with patchy habitats and insect carriers. *Zygoseius furciger*, however, tends to be common in forest litter. Some pachylaelapids are inquilines, and perhaps parasites, of ants.

*Pachyraelaps* sp. – Edmonton ex soil under rhubarb

*Zygoseius furciger* Berlese, 1916 – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

Superfamily Dermanysoidea

Dermanyssidae Kolenati, 1859

Diagnostic characters:

Overview: Only two genera and 26 species of Dermanyssidae have been described. They are primarily blood-sucking parasites of birds (including the Poultry Red Mite *Dermanyssus gallinae* (De Geer, 1778), but will bite mammals, including people.

*Dermanyssus* sp. – ex house sparrow Edmonton

*Dermanyssus gallinae* (De Geer, 1778) – infesting hospital in southern Alberta (Brown 1953); yoga studio, Edmonton, June 2007; poultry barn near Camrose, April 2011.

*Dermanyssus hirundris* (Hermann, 1804) – CNC record

*Dermanyssus triscutatus* Krantz, 1959 – CNC record

Halarachnidae Oudemans, 1906

Diagnostic characters:

Overview: These parasites live in the nasal and respiratory passages of mammals.
Pneumonyssus s.l. - ex Richardson’s Ground Squirrel (*Urocitellus richardsonii*) (Hilton & Mahrt 1971)

**Laelapidae Berlese, 1892**

**Diagnostic characters:**

**Overview:** About 1300 species in 82 genera of Laelapidae have been described including many parasites of vertebrates and insects. Most of the known Alberta species are free-living predators or associated with ant colonies.

*Androlaelaps casalis* (Berlese, 1887) – ex house sparrow Edmonton (DEW); ex cockroach culture Edmonton (DEW); ex Comandra Blister Rust (Powell 1971)

*Androlaelaps fahrenholzi* (Berlese, 1911) - ex Richardson’s Ground Squirrel (*Urocitellus richardsonii*), Columbian Ground Squirrel (*Urocitellus columbianus*), Franklin’s Ground Squirrel (*Poliocitellus franklinii*) (Hilton & Mahrt 1971)

*Cosmolaelaps* sp. claviger group – Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W), Dinosaur Provincial Park (DEW)

*Cosmolaelaps* cf neocuneifer (Evans and Till, 1966) – Nook Knoll, 5 July 2008, moss around moose wallows

*Cosmolaelaps* n. sp. cuneifer group – Dinosaur Provincial Park (DEW)

*Cosmolaelaps* sp.1 DEW vacua group – Moose Pasture Research Site (DEW) 8 km W Chipman, AB

*Cosmolaelaps* sp. ss DEW vacua group – (very short setae) - Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W)

*Euaandrolaelaps karawaiewi* (Berlese, 1904) – Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W), Dinosaur Provincial Park (DEW)

*Eulaelaps stabularis* (CL Koch, 1839) – ex unidentified vole, Edmonton HCP record

*Gaeolaelaps aculeifer* (Canestrini, 1884) – Edmonton ex compost

*Gaeolaelaps* sp. W DEW (womersleyi group) – Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W), Moose Pasture Research Site (DEW) 8 km W Chipman, AB


*Laelaspis* sp. 1 DEW (nr. mumai) – Moose Pasture Research Site (DEW) 8 km W Chipman, AB
Ololaelaps veneta (Berlese, 1903) – Beef Cattle Research Ranch, near Kinsella, Alberta (53°01′27″ N, 111°33′17″ W), Moose Pasture Research Site (DEW) 8 km W Chipman, AB, Dinosaur Provincial Park (DEW)

Ondatralaelaps multispinosus (Banks, 1901) – ex road killed muskrat, Edmonton

Pneumolaelaps longanalis Hunter & Husband, 1973 – ex Bombus, AB

Pneumolaelaps sinhai Hunter & Husband, 1973 – ex Psithyrus suckleyi Prairie Bluff Mountain; Bombus spp.

Pneumolaelaps richardsi Hunter & Husband, 1973 – ex Bombus bifarius, B. ternarius, Prairie Bluff Mountain; Bombus spp.

Pseudoparasitus sp. 1 DEW - Dinosaur Provincial Park (DEW)

Stratiolaelaps scimitus (Womersley, 1956) – Edmonton (ex potted plants, millipede culture)

Macronyssidae Oudemans, 1936

Diagnostic characters:

Overview: About 235 species distributed across 34 genera are currently described. Many are parasites of birds, but some feed on the blood of rodents or bats. People are sometimes bitten.

Ornithonyssus sylviarum (G. Canestrini & Fanzago, 1877) – Northern Fowl Mite ex house sparrow (DEW record), Corvus brachyrhynchos Brehm, Cyanocitta cristata (L.), Picoides pubescens (L.), Picoides villosus (L.), Sphyrapicus varius (L.), and Vermivora peregrina (Wilson), Edmonton, AB (Knee & Proctor 2007); ex Perisoreus canadensis (L.), Slave Lake; ex Quiscalus quiscula (L.), Devon, AB; ex Accipiter striatus Vieillot, Pheucticus ludovicianus (L.), Zonotrichia leucophrys (Forster), Carpodacus purpureus (Gmelin), Empidonax alnorum Brewster, and Colaptes auratus (L.), Barrhead, AB (Knee & Proctor 2007); ex Sialia currucoides (Bechstein) and Turdus migratorius Linnaeus, Ministik Hills, AB (Knee & Proctor 2007); ex Pandion haliaetus (L.), Falco columbarius L., Spizella passerina (Bechstein), Euphagus cyanocephalus (Wagler), Sturnella neglecta Audubon, and Asio otus (L.), AB (no location) (Knee & Proctor 2007).

Rhinonyssidae Trouessart, 1895

Diagnostic characters:

Overview: About 510 species of nasal parasites of non-ratite birds distributed across 8 genera are currently known. The family is closely related to the Macronyssidae. the following records are from Knee et al. (2008).

Ptilonyssus bombycillae Fain – ex Bombycilla cedrorum, B. garrulus

Ptilonyssus calvariia Knee – ex Spizella passerina

Ptilonyssus carduelis Fain – ex Carduelis flammea, Loxia leucoptera
Ptilonyssus coccothraustis Fain & Bafort - Coccothraustes vespertinus
Ptilonyssus echinatus Berlese & Trouessart – ex Hirundo rustica (barn swallow)
Ptilonyssus eurotardi Fain & Hyland – ex Dumetella carolinensis
Ptilonyssus icteridius (Strandtmann & Furman) - ex Agelaius phoeniceus, Euphagus cyanocephalus, Icterus galbula, Molothrus ater, Quiscalus quiscula
Ptilonyssus japuibensis Castro – ex Pheucticus ludovicianus, Molothrus ater
Ptilonyssus morofskyi Hyland – ex Carduelis flammea, C. tristis
Ptilonyssus perisorei George – ex Perisoreus canadensis
Ptilonyssus pinicola Knee – ex Pinicola enucleator
Ptilonyssus plesiotypicus Knee – ex Carpodacus purpureus
Ptilonyssus sairae Castro – ex Vermivora celata
Ptilonyssus sp. – ex Pheucticus melanoccephalus, Ph. nivalis
Ptilonyssus tyrannus (Brooks & Strandtmann) – ex Contopus sordidulus
Rhinonyssus rhinolethrum (Trouessart) – ex Anas platyrhynchos
Ptilonyssus troglodytis Fain – ex Troglodytes troglodytes (house wren)
Rhinoeicus brikinboricus Butenko – ex Asio otus
Rhinoeicus cooremani Strandtmann – ex Strix nebulosa
Rhinoeicus grandis Strandtmann – ex Bubo virginianus
Rhinoeicus sp. – ex Asio flammeus
Sternostoma cryptorhynchum Berlese & Trouessart – ex Pinicola enucleator
Sternostoma lanorium Fain – ex Catharus ustulatus
Sternostoma loxiae Fain – ex Sialia currucoides
Sternostoma porteri Hyland – ex Colaptes auratus
Sternostoma sialiphilus Hyland & Ford – ex Riparia riparia
Sternostoma technauli Vitzthum – ex Turdus migratorius (robin)
Tinaminyssus columbae (Crossley) – ex Columba livia (pigeon)

Spinturnicidae Oudemans, 1902

Diagnostic characters:

Overview:

Spinturnix globosus (Rudnick, 1960) – ex Mysotis lucifugus 52°29’ N, 112°11’ W; 54°01’ N, 110°54’ W; 54°10’ N, 110°56’ W; 54°11’ N, 110°48’ W (Smith 1981)
Varroidae Delfinado & Baker, 1974

Diagnostic characters:

**Overview:** Only two genera and 6 species are described and all are parasites of bees in the genus *Apis* or *Bombus*.

*Varroa destructor* Anderson & Trueman, 2000 – a parasite of honeybee brood

[Back to Table of Contents]
Glossary of Acarological Terms

Aa – the anterior tubercle of the prodorsal enantiophysis that spans a transverse or paired groove at midlength of the prodorsum.

abaxial - away from the axis of the body (midline), e.g. the outer or lateral face of a chelicera (also antiaxial).

abjugal plane (furrow) - a mostly theoretical division between the podosoma and gnathosoma.

acanthoides - eupathidia

acetabulum - a concave cavity in the body wall where a leg or other structure is inserted; in brachypyline oribatids they may be cavities where the trochanter articulates with the coxae (which are fused to the body wall) and may contain tracheal stigmata; the genital opening and papillae of acariform mites are contained within an acetabulum; also, the concave portion of a ball and socket joint.

acinose, aciform - resembling a cluster of grapes.

actinopilin - optically active component of the core of birefringent setae in acariform mites that is resistant to maceration in lactic acid. The actinopilin core is surrounded by an isotropic layer that forms the outer surface. Actinopilin may occur in true setae (typical mechanoreceptors and trichobothria) and the eupathidia and famuli which have a protoplasmic core. Solenidia do not have actinopilin. (Also actinochitin).

Actinotrichida - the Acariformes; those mites having setae containing actinopilin. (see Anactinotrichida).

acuminate - coming to a point.

ad 1-3 - designations for the setae of the adanal segment in Acariformes (see Grandjean system).

AD - adanal segment in acariform mites; added on the deutonymph, see anamorphosis. (See Grandjean system.)

Ad – the dorsosejugal porose area

adanal plate (or region) - sclerites or sclerotized fields laterad the anal region; usually used in oribatid mite taxonomy and bearing adanal setae.

adanal setae - setae on the adanal plate or region in acariform mites; paranal setae in Mesostigmata

adaxial - towards the axis of the body (midline), e.g. the inner face of a chelicera (also paraxial).

adjacent - in reference to structures next to one another, contiguous; as opposed to separated.

adoral - referring to setae distal on the subcapitulum of acariform mites (designations ao1, ao2)
aff. (also affin.) - affinis (L. related to, adjacent to), used for uncertain species designations (e.g. Cosmolaelaps aff. vacua (Michael)), meaning 'similar to', and implying that the specimen referred to may represent a new species (see nr., sp. nr., and cf.).

ag - a designation used for aggenital or pregenital setae in the Acariformes, e.g. ag1-3.

aggenital (also adenital) plate (or region) - sclerites or sclerotized fields on either side of the genital opening.

Ah – one of the two possible humeral porose areas on the subhumeral region of the ventral plate (see Am)

Aj – the humerosejugal porose area of the prodorlum

Al – the sublamellar porose area of the prodorlum

alveolus - a setal socket (also a single depression in alveolate ornamentation).

Am – one of the two possible humeral porose areas on the subhumeral region of the ventral plate (see Ah)

ambulacrum - the claws and empodium of the apotele or pretarsus (technically including the ambulacral stalk [confusingly sometimes also called 'pretarsus'] and apotele [empodium and claws]).

AN - anal segment in acariform mites; added on the protonymph, see anamorphosis. (See Grandjean system.)

anal seta - any seta on an anal valve or ascribed to the anal region; pseudanal setae ps1-3 in spider mites; true anal setae may be present in acariform mites that add segment AN.

anal valve (shield, plate) - a shield protecting the anal opening.

anamorphosis - the addition of body segments (and their structures) during ontogeny; in Acariformes, additions occur behind the anal opening (pseudanal segment in the larva): anal (AN) in the protonymph, adanal (AD) in the deutonymph, peranal (PA) in the tritonymph.

anarthric - an unjointed subcapitulum without a labiogenal suture or scissure.

annulus (pl. annuli) - a ring like structure or ornamentation.

anogetal region - the ventral region encompassing the genital, aggenital, anal and adanal sclerites in oribatid mites.

anteriad - to the front (do not use with the preposition 'to' since this is part of the meaning of the word), e.g. 'setae ro are usually inserted anteriad setae le'.

anterior - the front part of the body or towards that region in comparison, e.g. 'anterior to'.

anterolaterals (a) - a pair of ventral setae between the subunguinal seta and the primiventrals on the tarsi of acariform mites (see whorl).

antiaxial - away from the axis of the body (midline), e.g. the outer or lateral face of a chelicera (also abaxial).

Ap – the posterior tubercle of the prodorsal enantiophysis that spans a transverse or paired groove at midlength of the prodorlum.
apical - at the tip of a structure.
apobasic – with a covered or sheathed base
apodeme - sclerotized invagination of the cuticle, often at the margin of a plate, that serves as attachment site for muscles.
apophysis - a projection from the body wall, often bearing a seta (similar to tubercle in some uses).
apotele - (Gr apotelein = to complete) - the terminus of an appendage; the most distal leg segment, often consisting of an empodium (which is claw-like in Oribatida or rarely absent) and a pair of claws. The chelicerae are also an appendage and terminate in the movable digit.
approximate - close together, near, adjacent.
arborescent - branched like a tree, tree-like, dendritic.
area porosae (porose areas) - usually round to oval aggregations of pore-like areas of the cuticle; usually referring to the octotaxic system of the Oribatida. See also saccules.
armored mite - any mite encased in armor, but especially members of the Oribatida and Uropodoidea.
articulation - a region of differentiated cuticle joining two parts of an exoskeleton; a joint, scissure or furrow.
aspidosoma - the anterior dorsal region of the prosoma in acariform mites.
astegasime - having the chelicerae exposed dorsally: the rostral tectum is reduced or absent (see stegasime), as in many Prostigmata, Astigmata and some early derivative oribatids.
Astigmata - an obsolescent name used for the suborder of acariform mites having no apparent stigmatal openings. Astigmatans are usually associated with (and often parasitic on) larger animals including insects and vertebrates; many species are pests in stored products. Astigmata appears to have been derived within the Oribatida and is no longer given subordinal rank (see Astigmatina).
Astigmatina - the cohort of Sarcoptiformes containing astigmatic mites; a group of oribatid mites without bothridial sensillae [sic], usually soft-bodied, and often producing a heteromorphic deutonymph (hypopus). (See Astigmata.)
atelebasic rutellum - large rutellum with the apex expanded, toothed, and with a paraxial lobe as in Desmonomata and some Brachypylina.

B [Back to start of Glossary]
bacilliform – rod-shaped, shaped like a bacillus
basad - towards the base of a structure.
basal - towards the base of a structure; on a limb, towards the insertion on the body.
basal article - the most basal of the maximum of three segments of the chelicera; usually absent or obscure in Acariformes.

base - the usually columnar basal part of the tritosternum; sometimes expanded and rectangular or otherwise modified; the most basal part of any structure.

basifemur - a basal subdivision of the femur of the leg or palp.

bayonet-like - resembling a long, sharp blade used for stabbing, as in some corculi; sword-like.

bicuspidd - having two points or cusps, e.g. the gnathotectum of some Mesostigmata.

biflagellate - with two whip-like processes as in many mesostigmatan tritosterna.

bifurcate - split into two distally or with two projections.

bipectinate - a seta or other process having comb-like teeth on two sides (see pectinate).

birefringent – glowing under polarized light, e.g. the plate-like cerotegument of Malaconothridae.

biserrate - with saw-like teeth on two sides (see serrate).

bivalved - with two longitudinal plates or valve-like coverings.

bo – the seta that emerges from the bothridium; the sensillus, bothridial sensillum, pseudostigmatic organ; also ss

body - the idiosoma of mites.

body divisions - apparent subdivisions of the idiosoma in Acariformes.

bothridial sensillum (= sensillus) - an often elaborately modified seta set in a cup-like base; forms include filiform, ciliate, pectinate or variously thickened or clubbed (bat-like to globose to capitate); bo, ss.

bothridial seta - prodorsal seta bo in Oribatida; the sensillus, bothridial sensillum or trichome.

bothridium - the cup-like structure from which the sensillus originates.

box mites - oribatid mites that exhibit ptychoidy, the ability to withdraw their limbs and close-up like a box.

brachypyline - having separate genital and anal plates surrounded by a large ventral plate (composed of aggenital and adanal elements); usage usually restricted to traditional oribatid mites (see macropyline).

brachytracheae - thick, relatively short porose tube-like invaginations in the cuticle of some oribatid mites.

bruststiele - see Claparède's organ, urstigma

C [Back to start of Glossary]

c - a designation used for setae on segment C in the Acariformes, e.g. c1-4. (See Grandjean system.)

C - a designation used for the anterior region (apparent segment) of the hysterosoma in Acariformes. (See Grandjean system.)
camerostome - a recess under the rostral tectum that allows retraction of the chelicerae and palps of oribatid mites and that is sealed by the subcapitulum when retracted; a deep recess containing the gnathosoma in Uropodina.

capitate - with a terminal knob or head-like swelling; clavate; globose.

capitulum (pl. capitula) (= gnathosoma) - the anteriormost part of a mite, composed of the cheliceral and pedipalpal segments and separated from the body (idiosoma) by a ring of soft cuticle. Sometimes called the rostrum, infracapitulum, or hypostome.

carina - a longitudinal ridge.

caudal bend - the posteroventral curvature of the opisthosoma that results in the anal opening being ventral in most mites. Opilioacarida have a terminal anus (the presumed primitive condition) and others have secondarily terminal or even dorsal anal openings.

caudally - in reference to the rear end.

cepheid - a member of the brachypoline oribatid family Cepheidae, the nymphs of which often carry elaborate scalps.

cement layer - the outermost layer of the cerotegument; often produced in an ornamental pattern.

cerotegument - the outer layers of the epicuticle, including the wax and cement layers; often thin and inconspicuous, but sometimes very thick, ornamented, and obscuring the underlying cuticle; thick ceroteguments often can be peeled off to expose a very different-looking mite.

cf. - confer (L. conferre - refer or compare to) used for uncertain species designations (e.g. *Cosmolaelaps cf. vacua* (Michael)), roughly meaning 'see or compare to', and implying that the specimen referred to may represent a new species or may simply be an unusual form of the attributed species (see nr., sp. nr., and aff.).

chaetome - a complement of setae; the setal array present on a stage or body part.

chaetotaxy - the use of setal position and form in taxonomy; see Lindquist-Evans system, Grandjean system, Rostral-lamellar system, etc.

chambered - a structure with discrete compartments.

chelate - pincer-like, as in a crab's claws, a scorpion's pedipalps or many chelicerae; in water mites (Hydrachda), chelate palps have a dorsal palptibial process opposed to a ventral movable palptarsus (opposed to uncate).

chelate-dentate - pincer-like chelicerae with teeth.

chelicera - a limb on the presumed first body segment in chelicerate arthropods, the primary mouthparts. In mites the chelicerae are primitively chelate-dentate, but may be modified into almost unrecognizable forms. In Acariformes, the chelicerae usually appear 2-segmented, but a remnant of the supposed trochanter is recognizable in some lower Sarcoptiformes.

cheliceral - of or pertaining to the chelicera.

cheliceral seta - any seta on the chelicera of a mite.
chelicerate - a member of the arthropod lineage Chelicerata that includes the horseshoe crabs, scorpions, spiders, mites and their relatives.

circumcapitular furrow - the flexible articulation joining the capitulum (gnathosoma) to the body (idiosoma).

circumgastric scissure (furrow) - the flexible articulation that joins the notogaster to the ventral plate in brachypylane oribatid mites.

circummarginal furrow – U-shaped depression near the margin of the notogaster

Claparède's organ - an osmoregulatory organ located between legs I-II in the prelarvae and larvae of many acariform mites; s (= urstigma, also urpores, bruststiele). The serially homologous genital papillae are present in nymphs and adults whose larvae have Claparède's organ (Oudemans's Rule). Tydeid mites may retain the urstigmata beyond the larval stage. [Back to Top]

claw-like - having a distal hook; resembling a claw.

clavate - with a terminal knob or swelling; club-shaped; globose; capitate.

cng – a depression or pit-like cavity on the notogaster as in Veloppia.

coalesced - uted, grown together, as for example, the genital and anal regions when not separated by a band of cuticle.

cohort - a taxon of mites between the subordinal and superfamily levels.

collar traechae - obsolescent term used for the peritremes in spider mites and their relatives.

colluculate - having a pattern resembling fish scales.

compaon seta - a seta closely associated with a solenidion, sometimes sharing the same insertion.

condylophore - (Gr kondylos = knuckle + phor = to carry) - in Acariformes, a pair of internal sclerotized structures involved in the articulation of the empodial and lateral claws.

costula - a longitudinal ridge or set of ridges on the prodorsum of some oribatid mites, similar to lamellae but without a projecting edge or cusp.

coxa - the basal segment of the leg, articulating with (Parasitiformes) or fused to (Acariformes) the body wall.

coxal fields - the venter of acariform mites where the coxae have fused to the body wall covering the sternal region.

coxisternal plate - a sclerotized plate in the coxisternal region.

coxisternal seta - a seta in or between the coxisternal plates and numbered from coxa I-IV e.g. 1a-c, 2a-c, 3a-c, 4a-c

coxisternum - floor of the podosoma that serves to support the legs, composed of the fused coxae (epimere I-IV).

crista - a complex of a tubercle and a crest-like ridge on the notogaster, especially the pair of such on some oppioid oribatid mites.

Cryptostigmata - (Gr kryptos = hidden) an obsolete term for the Oribatida.
cuneate - ending in a wedge-shaped process.
cuneiform - wedged-shaped, as in ancient writing systems that used wedge-shaped characters.
cuticular lobes - the pattern of minute, raised processes that ornament the plicate ridges in the cuticles of many mites.

D [Back to start of Glossary]

d - a designation used for setae on segment D in the Acariformes, e.g. d1-2. (See Grandjean system.)
D - a designation used for the second region (apparent segment) of the hysterosoma in Acariformes. (See Grandjean system.)
deficient - in relation to setae, reduced from a presumed holotrichous number.
dendritic - branching like a tree or bush, aborescent. [Back to Top]
denticles - small tooth-like processes, e.g. on the subcapitula of ticks and many mesostigmatans.
denticulate - bearing small, sharp processes, e.g. the hypostome of ticks.
deutonymph (also deuteronymph) - the second nymphal stage or instar.
deutosternum - the sternum of the second body segment (pedipalps); the basis capitulum in parasitiform mites.

DEW – David Evans Walter
di – discidium, a spine-like projection between legs III-IV in some oribatid mites
diarthric - a subcapitulum with a more or less transverse articulation that reaches the lateral margin at the base of the palp.
dichoid - a body appearing to be divided between legs II-III by a flexible sejugal furrow (Acariformes).
dichoidy - having the body articulated between legs II-III by a flexible sejugal (protero-hysterosomatic) furrow (Acariformes). (See also trichoidy, ptychoidy, holoidy). [Back to Top]
digitus fixus - see fixed digit.
discidium - a spine-like projection between legs III-IV in some oribatid mites
disjugal plane (furrow) - the plane separating the ancestral prosoma and opisthosoma, usually not clearly present in mites and often confounded with the sejugal furrow.
distad - towards the free end of an appendage; the part of a leg or palp segment farthest from the body.
distal - towards the free end of an appendage.

DKK – Derrick K. Kanashiro
dorsal - relating to the upper or back side; opposed to ventral.
dorsal seta - any seta on the dorsum.
dorsophragmata – the more median of the two pairs of apodemes on which the cheliceral muscles insert in the Brachypylina; sometimes partly or completely fused
dorso-sejugal suture (dorsosejugal groove) - a suture marking the fusion of the prodorsum and notogaster; the anterior portion of the circumgastric scissure. NB - this term is often misapplied to a flexible juncture or furrow.
dorsum - the upper or back side; opposed to venter.
duplex setae - a pair of setae or a seta and a solenidion sharing the same insertion.

dorsum - the upper or back side; opposed to venter.
duplex setae - a pair of setae or a seta and a solenidion sharing the same insertion.

E [Back to start of Glossary]

e - a designation used for setae on segment E in the Acariformes, e.g. e1-2. (See Grandjean system.)

E - a designation used for the third region (apparent segment) of the hysterosoma in Acariformes. (See Grandjean system); also for tubercles on the epimeral margins of oribatid mites

edentate - with out teeth; usually referring to chelicerae.
elattostase (adj. elattostatic) - one of the abnormal stases recogzed by Grandjean where the mouthparts are not functional but the legs are, e.g. prelarvae of some Anystina and Nanorchestidae; the deutonymph in Astigmata.
elbowed - bent as in the arm at the elbow; geniculate.
Eleutherengonides (also Eleutherengoda, Eleutherengona) - a taxon in the Prostigmata comprised of the Raphignathina and the Heterostigmata. The Eleutherengonides includes many of the most important plant-parasitic mites (e.g. spider mites, broad mite, cyclamen mite).

emergent - rising above, projecting.
empodium (empodia) - an unpaired structure arising between the tarsal claws.
enantiophysis – two tubercular processes opposed to each other across a furrow or articulation. See prodorsal enantiophysis (Aa, Ap), lateral enantiophysis (La, Lp), and humeral enantiophysis.

entire - a shield or sclerite with a continuous margin without incisions.

ep - the epicoxal of the palpcoxa in acariform mites.

ep1 - the epicoxal seta of coxa I in acariform mites.

epicoxal seta - a minute, usually peg-like seta on the dorsal face of the palpcoxa (ep) or coxae of legs I (ep1) in some acariform mites.

epimera (also epimeron) – see epimere

epimere (pl. epimeres) - in oribatid mites, a sclerotized coxal field where one of the pairs of coxae have fused to the body wall.

epimorphic - possessing the definite number of segments on hatching. Opposed to anamorphic.
e (epsilon) - designation for the famulus on the tarsi of some acariform mites.
eugetal setae - setae originating within the genital vestibule (Acariformes).
eupathidia - see eupathidion
eupathidion (pl. eupathidia) - an optically active but hollow seta with a pore at its tip and found on the palptarsus or leg I-II (rarely III) tarsus of many acariform mites; designation = zeta (ζ). (Also acanthoides, pseudacanthoides). Eupathidia have been hypothesized to be mechanoreceptors, but in spider mites (Tetranychidae) the palptarsal eupathidium functions are the spinneret.
eupathidium - commonly used formation for eupathidion.
euryxec (-ous) - using a broad range (e.g. of habitats or hosts); a host or habitat (etc.) generalist.
ex, ex1-2 – the exobothridial setae of the prodorsum
exa, exp – the anterior and posterior exobothridial setae of the prodorsum
excrecence - sp. a brush-like, dendritic or otherwise elaborated processes.
exuviae (pl. exuviae) - the outer layer of skin not recycled during a molt; empty exuviae are a sign of previous mite development on a substrate; some oribatid mites retain the dorsal notogastral portion of exuviae as a pagoda-like pile of scalps. (NB: the use of 'exuvia' as a singular makes no more sense than 'cloth' for 'clothes'.)

F [Back to start of Glossary]
f - a designation used for setae on segment F in the Acariformes, e.g. f1-2. (See Grandjean system.)
F - a designation used for the fourth region (apparent segment) of the hysterosoma in Acariformes. (See Grandjean system.)
FAHS - Felix A.H. Sperling
falcate - curved and more or less sickle-shaped.
famulus - a hollow and optically active seta-like structure located near the base of the dorsum of tarsus I or II in acariform mites, often recessed; designation = ε (epsilon).
fastigals (ft) - the most basal pair of dorsal tarsal setae on the tarsi of acariform mites (see whorl).
femur (pl. femora) - major leg segment between trochanter and genu; often subdivided into a basifemur and a telofemur.
filiform - thread-like; long and narrow.
fissure - a narrow slit of soft cuticle or line of juncture in a sclerotized shield or leg segment.
fixed digit – often used for the middle article of the chelicera in toto, but more properly the distal extension of the middle article that usually bears teeth and a distal hook and is opposed to the movable digit in chelate-dentate forms; in Mesostigmata the fixed digit may bear the pilus dentilis. The fixed digit is regressed in some parasitic Mesostigmata and in many Prostigmata.
foliose - leaf-like; usually describing flattened, oval to rectangular setae with or without other ornamentation.
fossa (pl. fossae) - a pit or recessed area in the integument (also see pedofossa).
fova pedales (pl. = foveae pedales) - a pedofossa, a pit in the cuticle into which the legs can be withdrawn in some Mesostigmata, especially Uropodidae.

fovea (pl. foveae) – a pit in the cuticle, usually relatively large.

foveolate - ornamented with large circular depressions.

fragmented - broken up, composed of several discrete parts rather than of a single unit.

ft - designation for the fastigals, the most basal pair of dorsal tarsal setae on the tarsi of acariform mites (see whorl).

fundamental (as in fundamental chaetome) - a seta or other structure present in the larval stage.

G [Back to start of Glossary]

g - a designation used for genital setae, e.g. g1.

gaster - the idiosomal venter.

genae – the part of the subcapitulum anterior to the mentum and that bears the rutella

genal notch – a notch in the lateral corner of the rostrum

genal tooth – a tooth-like region of the rostrum produced by the genal notch

geniculate - with an elbow- or knee-like bend.

genital acetabulum (pl. acetabula) - an invagination containing the getalia.

genital aperture - the genital opening or acetabulum.

genital disc - see genital papillae.

genital papillae - 1-3 pairs of extrusible finger-like to button-like projections, usually retracted into in the genital vestibule of acariform mites; sometimes formed as sessile disks around the genital opening; thought to be osmoregulatory structures; modified or multiplied and dispersed over the body in many freshwater mites. Genital papillae are absent in the larva, but may be added ontogethenically: protonymphs have one pair, deutonymphs two pairs, and tritonymphs (and adults) three pairs. The tritonymphal pair of papillae is often lost. The serially homologous Claparède's organ is usually present in the larvae (and prelarvae) of mites exhibiting genital papillae in nymphs and adults (Oudemans's Rule).

genital seta - a seta on a genital shield or valve.

genital shield - a shield or shields covering the genital opening [Back to Top]

genital valves - sclerites covering the genital opening; usually referring to small sclerites (larger ones are usually called 'shields' or 'plates'.

genital vestibule - the ventral chamber containing the genital papillae and genital opening and closed by a pair of genital valves.

genu (pl. genua) (= patella) - the 4th leg segment, between the femur and tibia.

gestalt - the overall form or concept; the whole animal, habitus; usually used to describe how one knows the identity of a mite even if they can't specify the diagnostic characters (German = ge'shtait).
gland - usually referring to a glandular opening in the cuticle such as the lateral opisthonotal glands in the Sarcoptiformes, hypertrophied openings that produce defensive secretions.
globose - spherical.
gnathosoma (= capitulum) - - the anteriormost part of a mite or ricinuleid, composed of the cheliceral and pedipalpal segments and separated from the body (idiosoma) by a ring of soft cuticle.
Gr - abbreviation used for 'Greek' in this Glossary.
Grandjean chaetotaxy systems - systems for the designation of setae in the Acariformes. In the holotrichous condition there are 16 pairs of hysterosoma setae assigned designations based on their hypothesized segments (anterior to posterior: C, D, E, F, H, PS [pseudanal], AD [adanal], AN [anal] and PA [peranal]; 'G' is not used to avoid confusion with the genital segment, which is treated separately). Setae are designated from the midline to the sides from 1-x, e.g. c1, c2, c3, c4 (also cp). When one or more of the setae were absent and homologies for some of the dorsa and lateral setae were ambiguous, Grandjean devised two alternative systems of chaetotaxy: the unideficient (maximum of 15 pairs setae) and the multideficient (10 pairs of setae or less) systems. In current usage, the multideficient system is discouraged. Below is one hypothesis about the unideficient system (modified from Weigmann 2006).

<table>
<thead>
<tr>
<th>Holotrichous (16 pairs)</th>
<th>‘Unideficient’ (&lt;15 pairs)</th>
<th>Multideficient (&lt;10 pairs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>c1</td>
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<tr>
<td>c2</td>
<td>c2</td>
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<td>c3</td>
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<td>cp (c4, d3)</td>
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<td>f2</td>
<td>lp</td>
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<td>h1</td>
<td>h1</td>
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<td>h2</td>
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<td>h3</td>
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<td>p1 (ps1)</td>
<td>p1 (ps1)</td>
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<td>p2 (ps2)</td>
<td>p2 (ps2)</td>
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<tr>
<td>p3 (ps1)</td>
<td>p3 (ps1)</td>
<td>p3</td>
</tr>
</tbody>
</table>
H - a designation used for setae on segment H in the Acariformes, e.g. h1-3 (see Grandjean system).

H - a designation used for the fifth region (apparent segment) of the hysterosoma in Acariformes. (NB - H comes after F and before PS, ‘G’ is not used to avoid confusion with the genital region). (See Grandjean system.)

Ha – anterior tubercle, often projecting posteriorly from the bothridial rim and forming an enantiophysis with Hp, a tubercle in the humeral portion of the notogaster

habitus - a view of the entire animal.

hair - usually referring to a seta; considered an imprecise and misleading term for seta.

HCP – Professor Heather C. Proctor, University of Alberta

hemispherical - roughly half a sphere; used to describe the habitus of some mites.

heterodactyly - having claws of different size or form.

heteromorphic - having different morphological forms.

hexapod - with three pairs of legs (i.e. 6 legs), as in the larvae of mites or the larviform stages of others.

holoid - lacking flexible cuticle between legs II-III.

holotrichous - adjectival form of holotrichy.

holotrichy - having the complete complement of setae thought to have been present in the ancestor of a group (Gr holos = entire + trich = hair); opposed to neotrichy (new hairs) or hypertichy (too many hairs).

horn - any horn-like process.

Hp – posterior tubercle, often projecting anteriorly in the humeral portion of the notogaster and forming an enantiophysis with Ha

humeral enantiophysis – tubercles on the bothridial wall and the humeral region of the notogaster that span the sejugal furrow

humeral process (projection) - any fixed projection in the humeral region; sometimes confused with pteromorphs in oribatid mites.

humeral seta - a seta in the humeral ('shoulder') region, often projecting at a more or less right angle to the body; usually seta r3 (rarely r4) in Mesostigmata and H or c3 (rarely c4 = cp) in Acariformes.

hyaline - transparent, membranous, e.g. a hyaline sheath.

hyperphoresy - a phoretic mite transported on another phoretic organism.

hypertrichous - having more than the number of setae normally found in a group (Gr hyper = above + trich = hair); a more neutral term than neotrichy, which implies that the additional hairs have been added during the evolution of the group. (see also hypotrichous, holotrichous).
hypertrichy - the condition of being hypertrichous.

hypotrichous having fewer than the number of setae normally found in a group (Gr hypo = below + trich = hair), e.g. phytoseiid mites (Mesostigmata) have 20 or fewer pairs of dorsal setae. (see also hypertrichous, holotrichous).

hysterosoma - idiosoma behind the sejugal furrow (plane) between legs II-III; opposed to the proterosoma.

hysterosomal (hysterosomatic) - adjectival form of hysterosoma.

hysterosomatic (hysterosomal) - adjectival form of hysterosoma.

I [Back to start of Glossary]

ia - designation for the anteriormost pair of cupules in acariform mites; typically lateral and associated with the border of segments C-D.

iad - designation for the posteriormost pair of cupules in acariform mites; typically ventral and associated with segment AD.

idionotal - on the dorsum of the body (idiosoma).

idionymic - structures or stages that differ in discontinuous surface characters.

idiosoma - (Gr idios = distinct + soma = body) the main body tagma of mites, containing the opisthosoma and part of the prosoma.

idiosomal (idiosomatic) - adjectival form of idiosoma.

idiosomatic (idiosomal) - adjectival form of idiosoma.

ih - designation for a pair of cupules in acariform mites; typically lateral and associated with segment H.

im - designation for second anteriormost pair of cupules in acariform mites; typically lateral and associated with segment E.

in – the interlamellar seta

incised - cut into, e.g. a dorsal shield composed of podonotal and opisthonomal shields fused medially but free laterally.

infracapitulum - the capitulum or gnathosoma (sometimes used to indicate only the subcapitulum).

infundibulum - a depression in the cuticle associated with the opening of a gland.

instar - (L = form) - an immature mite or other arthropod between molts (or from apolysis to apolysis for some authors), or between egg hatching and the first molt. Mites mostly have determinate growth and do not molt after reaching the adult stage; therefore, the adult is not considered an instar.

ip - designation for a pair of cupules in acariform mites; typically lateral and associated with segment F.

ips - designation for the penultimate pair of cupules in acariform mites; typically lateral and associated with segment PS.
literals (it) - a pair of dorsal tarsal setae between the prorals and the tectals on the tarsi of acariform mites (see whorl).

intercoxal - between the coxae. In Oribatida, no sternal region is present and the coxae of the legs are fused to the venter and usually meet medially; genital openings are postcoxal.

J

K

L [Back to start of Glossary]

L - abbreviation used for 'Latin' in this Glossary

La – anterior lateral enantiophysis

la – anterior lateral notogastral seta in unideficient system

labiogenal articulation - a flexible juncture on the venter of the subcapitulum that allows the paired anterior sections (genae) to articulate with the base (mentum); see anarthric, stenarthric, diarthric.

labium - the sternal plate of the third body segment (tritosternum); the term is not generally used in acarology (see mentum).

labrum - an unpaired membranous and denticulate process thought to be an extension of the dorsal pharyngeal wall that lies above and between the chelicerae.

lamella (pl. lamellae) - a longitudinal projection on the prodorsum of many oribatid mites that protects legs I when they are retracted; lamellae usually arise near the base of the bothridia and terminate with a projecting lamellar seta (often on a free cusp). Lamellae may be connected by a translamella.

lamellar cusp - the projecting anterior portion of some lamellae.

lanceolate - shaped like the head of a lance; suboval and coming to a point at one end.

larva - the second instar in acariform mites having a complete ontogenetic sequence, but the first instar in mites lacking a prelarva; hexapod (unless adults have less than 6 legs, as in Eriophyoidea) and usually active; may be feeding or non-feeding.

laterad - to the side (do not use with the preposition 'to' since this is part of the meaning of the word) (L latus = side + ad = toward. [Back to Top]

lateral - referring to the side or away from the midline.

lateral enantiophysis (La, Lp) – tubercles that span the sejugal furrow laterally

lateral opisthonotal (opisthosomatic) glands (also lateral abdominal glands, oil glands) - in Sarcoptiformes, a pair of glands with large openings (solenostomes) on the opisthosoma that are often surrounded by a purple, red, browsh or yellow color if the cuticle is lightly sclerotized.

le – the lamellar seta
lenticulus (pl. lenticuli) - an unpaired light receptive structure (often with a lens) at the median anterior margin of the notogaster of some oribatid mites.

linea (pl. lineae) - a line, a line-like ornamentation on a shield, usually caused by a ridge.

lm (= e2?) – middle lateral notogastral seta in the unideficient system

Lp – posterior lateral enantiophysis

lp (= f2?) – posterior lateral notogastral seta in unideficient system

lyrifissure - a cuticular proprioreceptor (deformation sensing) structure; under light microscopy these structures may look like slits or compressed-T's in hardened cuticle, or a round pit (cupule) in soft cuticle.

macropyline - having separate adgenital and aggenital (adanal) plates and genital and anal shields such that most of the post-coxal venter is occupied by the two paired series of shields; usage usually reserved to traditional oribatid mites (see brachypyline).

median - the midline of the body or towards the midline a comparison, e.g. 'the j-series is median to the z-series'.

mental tectum - a projection of the mentum on some oribatid mites with diarthric subcapitula.

mentum (pl. menta) - the basal section of the subcapitulum in oribatid mites with a labiogenal articulation; probably homologous with the labium of other arachnids.

microarthropod - a minute arthropod, typically used to refer to soil-inhabiting arthropods with bodies under some arbitrary length (e.g. 1 cm, 5 mm, or 0.3 mm).

microtrichia (pl. microtrichiae) - small hair- or tooth-like processes.

microtubercle - a minute tubercle or tooth-like process.

middle article - the middle of the maximum of three segments of the chelicera; often the basal segment in Acariformes.

midline - a hypothetical line running down the middle of a bilateral animal.

monobasic (=monotypic) - a taxon based on a single representative, e.g. a genus with only one known species.

monotypic (=monobasic) - a taxon based on a single representative or type, e.g. a genus with only one known species.

movable digit - the most distal article of the chelicera, the cheliceral apotele; usually bearing teeth and a distal hook and opposed to the fixed digit in chelate-dentate forms, but when the fixed digit is regressed, the movable digit may be saw-like, kfe-like or needle-like to stylet-like.

ms (= lp, f2?) – the median notogastral seta in the multideficient system

mucro - a small spine or spur; in Mesostigmata, a spine-like process on the venter of the movable digit, e.g. in Proctolaelaps.

mucronate - coming to a point, with a distal mucro or spine.
multideficient system – see Grandjean chaetotaxy systems

N [Back to start of Glossary]
NA – the anterior notogastral plate in Enarthronotides

naso - a unpaired, nose-like protrusion of the idiosomal in the rostral region that projects over the chelicerae in early derivative Acariformes and may bear a pair of setae (ro) dorsally and some times a median eye(s) ventrally; possibly homologous to the rostral tectum.

neck (neck-like) - a narrow constricted region joining the capitulum to the idiosoma.

neotrichous - having setae not present in the ancestral condition, 'new setae'; often a highly subjective assessment.

NM – the median notogastral plate in Enarthronotides with 2 scissures

notch - a subrectangular to v-shape incision or similar form on the margin of a sclerite.

notogaster - the dorsal hysterosoma, or in a more specific sense, the shield covering the dorso-lateral aspects of the hysterosoma in many oribatid mites.

notogastral - referring to the notogaster. [ Back to Top]

notum - the dorsal idiosoma.

nr. - near, for uncertain species designations (e.g. Cosmolaelaps nr vacua (Michael)), meaning 'similar to', and implying that the specimen referred to may represent a new species (see cf., sp. nr., and aff.).

O [Back to start of Glossary]
ocellus (pl. ocelli) - a simple eye.

octotaxic system - the set of four pairs of porose or sacculate dermal glands on the notogaster of poronotic brachypyline oribatid mites.

oil glands - usually referring to the lateral opisthonotal glands of sarcoptiform mites. These often have large openings (solenostomes) surrounded by a purple, red, brownish or yellow color if the cuticle is lightly sclerotized.

ω (omega) - designation for solenidia on the tarsus of acariform mites (φ (phi) on the tibia, and ζ (sigma) on the genu, theta (θ) on the femur).

opisthonotal - dorsal opisthosoma.

opisthotnotal glands - see oil glands

opisthonotal shield - the posterior shield in mesostigmatans with divided dorsal shields.

opisthosoma (= abdomen) - the posterior body division in arachnids; usually not distinct in mites because of the fusion of the opisthosoma with part of the prosoma to form the idiosoma.

opisthosomal (opisthosomatic) - adjectival form of opisthosoma.

opisthosomal glands - see oil glands. [Back to Top]

opisthosomatic (opisthosomal) - adjectival form of opisthosoma.
oribatid (+ mite) - a member of the sarcoptiform suborder Oribatida (=Cryptostigmata, Oribatei); some academics consider the use of 'oribatid' as a noun to be low class, but others consider that attitude pedantic.

Oribatei - an obsolete name for the paraphyletic concept of Oribatida.

Oribatida - (origin obscure, but possibly from the Greek mountain [oreo] and I tread [bat]) in a monophyletic sense, the suborder of Sarcoptiformes that includes the traditional oribatid mites and the cohort Astigmatina; more commonly used in a paraphyletic sense that excludes the Astigmatina. See also Cryptostigmata.

oviparity - laying eggs.

ovipositor - an extrusible organ for laying eggs. Female oribatids have a well developed ovipositor that ends in three finger-like projections. Ovipositors are less well developed or absent in other mites.

ovoviviparity - laying eggs in an advanced state of development such that hatching occurs soon after laying or within the mother's body (see also viviparity).

P [Back to start of Glossary]

p - a proral seta (see whorl).

p1-3 – the setae of the pseudanal segment; also ps1-3

pa - designation for setae on the peranal segment in acariform mites (see Grandjean system) or for the paranal setae in Mesostigmata.

PA - peranal segment in acariform mites; added on the tritonymph, see anamorphosis. (See Grandjean system.)

calp (= pedipalp) - the second pair of limbs in arachnids, used in feeding and originating on either side of the chelicerae. In mites, the palps may be vestigial, with only a few segments, or have a maximum of 5 freely articulating segments (rarely the femur is subdivided) and a distal or subdistal apotele.

pantalebasic rutellum - large rutellum with the apex toothed and meeting medially as in many Brachypylina.

parabolic ventral suture - the converging ventral suture characteristic of adults of species of Eulohmana (Oribatida).

paraxial - against the axis of the body (also adaxial), e.g. the inner face of the chelicera.

PD – the prodorsum

pectinate - a seta or other process having comb-like teeth on one side (see bipectinate).

pedipalp (= palp, which see) - the second pair of limbs in arachnids.

pedofossa (pl. pedofossae) (= fossae pedales, foveae pedales) - recesses into which the legs can be withdrawn.

pedotectum (pl. pedotecta) - a scale-like tectum arising around the insertion of legs I or II in some armored oribatid mites that covers the insertion of the leg and sometimes forms a
protected space into which the legs can be withdrawn; not to be confused with the pedofossae. (Also tectopedium).

pecillate - resembling a brush or a bundle of long, slender processes.

peritreme - a modification of the surface that connects to a stigmatal opening.

peritrematal (peritrematic) - of or referring to the peritreme; adjectival form of peritreme.

peritrematic (peritrematal) - of or referring to the peritreme; adjectival form of peritreme.

pharate - a mite or other arthropod between apolysis and ecdysis; the fully formed instar before it breaks through the previous cuticle.

ϕ (phi) - designation for solenidion the tibia of acariform mites, ω (omega) on the tarsus; ζ (sigma) on the genu, theta (θ) on the femur).

phoresy - a type of migration where mites board larger animals (usually insects or other arthropods) and cease or otherwise alter normal behaviors (e.g. feeding, reproduction, movement) until some cue elicits the departure from the animal and the resumption of normal behavior. Phoresy usually results in the dispersal of populations, but may result in reaggregation, especially for mites using highly specialized habitats (e.g. pitcher plants and other phytotelmata).

pilose - with a covering of hairs or hair-like processes.

plastron-like – cuticular modifications that serve as an incompressible plastron from mites living in wet habitats. [Back to Top]

platytracheae – large, flat lamelliform and porose pouch-like invaginations in the cuticle of some oribatid mites.

pleurophragmata – the more lateral of the two pairs of apodemes on which the cheliceral muscles insert in the Brachypylina

plicate - with a pattern of raised, narrowly aligned ridges like a fingerprint; used to describe the soft cuticle of many mites.

plications - the fingerprint-like pattern of raised ridges that often ornaments the soft cuticle of mites.

podocephalic canals - a pair of gutters to tubular ducts on the anterior margin of acariform mites, typically running from between the chelicerae posteriorly above the insertion of the legs; often confused with tracheae.

podomere - one of the segments of a leg or palp.

podo-opisthosomatic articulation - the well developed postpedal furrow in some oribatid mites (e.g. Elliptochthous). (See trichoidy.)

podosoma - region of the idiosoma bearing the legs (body segments III–VI); according to currently accepted theory, in acariform mites the dorsal portion of this division has regressed and only the leg bases are included.

pore - a pore-like opening or structure in the cuticle.

postcoxal - posterior to the coxae.
posteriad - to the rear (do not use with the preposition 'to' since this is part of the meaning of the word), e.g. 'setae le are usually inserted posteriad setae ro'.

posterior - the back part of the body or towards that region in comparison, e.g. 'posterior to'.

postpedal furrow (constriction, suture) - a constriction or articulation of the idiosoma behind legs IV. (See podo-opisthosomatic articulation).

prelarva (also deutovum, prolarva) - the first instar in acariform mites having a complete ontogenetic sequence, often retained within the egg shell or just extruding from it, and usually inactive; hexapod or apodous.

pregenital - in front of (anterior to) the genital opening.

primilaterals (pv) - the most basal pair of ventral (ventrolateral) setae on the tarsi of acariform mites (see whorl). On the ventral tarsus behind the unguinals is the seta (s), followed by the anterolaterals (a), primiventrals (pv), and primilaterals (pl).

primiventrals (pv) - a pair of ventral setae between the anterolaterals and the primilaterals on the tarsi of acariform mites (see whorl).

procurved - a curved suture or line of dehiscence that arches anteriorly; opposed to recurved.

prodorsal enantiophysis - (Aa, Ap) spans a transverse or paired groove at midlength of the prodorsum.

prodorsal setae - the setae on the prodorsum of acariform mites.

prodorsal shield - a shield on the anterior dorsal surface of acariform mites.

prodorsum - the dorsal surface of the propodosoma.

progetal valves - the genital valves in acariform mites.

prolamellar – a narrow ridge running from the anterior terminus of the lamella towards the margin of the rostrum

prorals (p) - the most distal pair (at base of ambulacrum) of dorsal setae on the tarsus of acariform mites (see whorl).

propodosoma - a subdivision of the podosoma bearing legs I-II.

prosoma (= cephalothorax) - the anterior body region in arachnids; usually not distinct in mites.

proterosoma - the body anterior to the sejugal plane (suture); complementary to the hysterosoma and only used in Acariformes.

protero-hysterosomatic articulation (furrow) - a flexible juncture between legs II-III in some acariform mites. (See dichoidy, trichoidy).

protonymph - the first nymphal stage or instar, usually octopod.

proximad - towards the base of a structure. [Back to Top]

proximal - towards the base of a structure; on a limb, towards the insertion on the body; sometimes also = approximate.

ps - designation used for the setae in the PS region, e.g. ps1-2. (See Grandjean system); p1-3 is now preferred.
PS - pseudanal segment in acariform mites; 'anal' segment in the larva, see anamorphosis. (See Grandjean system.)

pseudacanthoides – eupathidia.

pseudanal - referring to the setae or other structures on segment PS in acariform mites.

pseudostigmatic organ - an obsolete term for the bothridial sensillum or trichobothrium, especially in oribatid mites.

pteromorph - wing-like to shelf-like lateral extensions of the body in oribatid and tarsenemid mites.

ptychoidy - the ability of some oribatid mites to withdraw the legs between two body regions like a penknife being closed or a box being closed (hence box mites), and resulting in a seed-like appearance. A derived form of dichoidy.

pubescent - covered with fine hairs; mossy.

PY – the pygidial plate in Enarthronotides that bears the f and posterior rows of notogastral setae.

pulvillus - a membranous, pad-like structure associated with the claws.

punctate - usually referring to ornamentation on shields resembling a dense array of needle punctures; with a granular appearance.

pusticulate - ornamented with small mound-like structures; covered with pustules.

pustule - a raised mound-like structure.

pygidial - the back end of the idiosoma.

Q [Back to start of Glossary]

quiescent - at rest, usually referring to an inactive developmental stage, e.g. the inactive immatures of acariform mites during the intermolt period.

R

r1-3 (=h1-3) – designations for the h-series of notogastral setae in the unideficient system.

rake-like - a limb with more or less parallel projecting setae or spines resembling the tines of a rake.

ramus - a branch of a structure

RAN – Roy a. Norton

recurved - a curved suture or line of dehiscence that arches posteriorly; opposed to procurved.

reflexed - recurved, curved back on.

regressed - reduce from normal.

reticulate - having a net-like structure; usually referring to ornamentation on shields composed of irregular, angular cells.

reticulate-foveate - having a net-like ornamentation composed of irregular, rounded cells.

retrorse teeth or denticles - backwardly directed tooth-like projections.
rostral seta, the most anterior seta on the prodorsum of acariform mites, usually inserted on the side of the rostrum, but sometimes dorsal and on a naso in some early derivative oribatids; may be geeculate.

Rostral-lamellar system - a system of designations for the prodorsal setae in Acariformes based on Grandjean's system as applied to the Oribatida. These setae are not added ontogenetically; therefore, homologies are based on position and subject to various interpretations. Each pair of setae may represent one of the 6 presumed prosomal segments; however, Grandjean believed that the dorsal podosoma and their setae were lost in acariform mites, in which case the prodorsal setae would derive from only cheliceral and pedipalpal segments. The designations are: rostral (ro), lamellar (le), bothridial (bo or ss), interlamellar (in), and a pair of exobothridial setae variously designated exal/ exp, e1/ e2, x1/ x1, x2/ x2, or if only one seta is present, ex. Two pairs of exobothridial setae are present only in some of the lower oribatids: Nothrina and Brachypylina lack one pair or both pairs. When present, setae bo are usually expressed as trichobothria, but exceptions occur.

rostral seta (ro) - the anteriormost pair of prodorsal setae; when a naso is present, it often carries the rostral setae; sometimes geniculate in form (i.e. bent).

rostral tectum (also rostrum) - a prodorsal tectum that projects over at least the base of the chelicerae in acariform mites, often covering most of the capitulum.

rostrum - In the Oribatida, the anteriormost dorsal portion of the idiosoma, especially when it projects over the bases of the chelicerae (L rostrum = beak).

rutellum (pl. rutella) - In Sarcoptiformes, the hypertrophied setae on the hypostome, often toothed; not to be confused with a corniculus (although possibly a homologue). Various forms of rutella are recogzed, including the atelebasic and pantelebasic.

saccule (sacculus) - invaginated porose organs resembling small sacks and opening to the surface by a small pore (see octotaxic system).

scalps - notogastral portions of exuviae retained by some oribatid mites, often as a pagoda-like pile of larval through tritonymphal exuviae, although one or more of these may fall off during handling of specimens. Scalp is also used to indicate the macerated cuticle of a mite that has been cleared and mounted on a microscope slide.

scissure – an band of soft cuticle separating two or more plates, e.g. the circumgastric scissure separates the notogaster from ventral plates. The notogaster may have three types of transverse scissures: a simple band of soft cuticle (Type E), two bands of soft cuticle that demarcate an intercalary sclerite bearing setae (Type S), and a band of soft cuticle covered by a tectum (Type L).

scutella (pl. scutellae) - small shields or platelets.

scutum (pl. scuta) - the podonotal shield in ticks (Ixodida).

segmentation - in mites distinct external segments have been lost but remnants of segmentation may be represented by hysterosomal folds or transverse arrays of setae and other cuticular sense organs. In theory, all chelicerates have a prosoma composed of 6 segments.
cheliceral, pedipalpal, and four leg-bearing segments = body segments I-VI). Ventrally the positions of the prosomal segments can be identified by the insertions of their appendages, but dorsally they are obscured. The opisthosoma is thought to comprise an additional 12-13 segments (body segments VII-XVIII or XIX), but appears to be somewhat to much reduced in most mites, except possibly Opilioacarida. In early derivative Acariformes (e.g. many Endeostigmata), hysterosomal folds are thought to represent segmentation and in the Grandjean system are designated (from the sejugal furrow to the anus): C, D, E, F, H, PS AD, AN, PA. There is disagreement in the literature over the origin of 'segments' C and D. Adherents of Grandjean consider them to be opisthosomatic (with C probably representing a fusion of the pregenital [body segment VII] and genital [VIII] segments). Others believe that C and D are the dorsal regions of the last two prosomal segments that bear legs III and IV (i.e. body segments V & VI).

sejugal suture (or plane) - a division cutting the acariform mite idiosoma between legs II-III.
sensillum (pl. sensilla) (also sensilla, sensillae; 'sensillus' is incorrect) - a sensory structure; sensilla is often used for the bothridial seta in Acariformes.

sensillus – the bothridial sensillum, bo, ss
serrate - with closely set teeth that resemble the cutting edge of a saw.
seta (pl. setae, from L. = bristle) - cuticular process composed of a hollow shaft (sometimes filled with a refractive material) produced from a membranous socket (the alveolus); the hair-like, spine-like, branched or variously expanded structures on the surfaces of the legs and body. Most setae function as mechanoreceptors, but others (e.g. solenidia) are chemoreceptors or have unknown or ambiguous functions.

setal - of or pertaining to a seta.
setule - a small, seta-like cuticular process, typically on the pretarsal empodia or claws.
sigilla - muscle insertions ('scars'), usually visible as depressed and / or striate regions ("scars") on plates, oval or irregular in shape and often in clusters.
sigillotaxy - the use of cuticular muscle insertions as taxonomic characters (designation = sg).
sigla - designations for setae.
ζ (sigma) - designation for solenidion the genu of acariform mites, (φ (phi) on the tibia; ω (omega) on the tarsus, theta (θ) on the femur).
simple - unadorned; simple setae are needle-like and without hairs or pectins.
sinuate - with a winding, snake-like, or wave-like form.
slit sense organ - a lyrifissure; a stretch receptor.
soil-encrusted - mites with an adherent layer of soil particles; probably a tactile camouflage.
soil mite - any mite found in the soil-litter or decomposition subsystem.
solenidion (pl. solenidia) - a hollow, optically inactive chemosensory seta on the limbs of acariform mites appearing to have transverse rows of minute pores (actually pore canals) under light microscopy, (the transverse pattern is often not apparent in SEM); often bulbous or otherwise modified; sometimes associated with a compaon seta. Solenidia are
designated with Greek letters by leg segment: $\omega$ (omega) on the tarsus, $\varphi$ (phi) on the
tibia, and $\varsigma$ (sigma) on the genu.
solenostome - the external opening of a gland or gland-like internal structure (e.g. the sperm
induction pore in sperm access systems).
spathulate - (L. spatula = spoon) flat at the base and enlarged at the apex; spatulate and spatulate
are often used interchangeably. [Back to Top]
spatulate - (L. spatula = spoon) spatula-shaped; variously interpreted, but usually referring to
setae that are flattened and somewhat expanded distally.

spermatophore - any structure that carries a packet of sperm, including complex stalks deposited
on substrate by male acariform mites and flask-like structures carried on the chelicerae of
male mesostigmatans.
spinae adnatae - a pair of tooth-like projections on the anterior margin of the notogaster of
damaeid oribatids.
spine-like - a seta or other structure that resembles a thorn or spine; spiform.
spiniform -with the form of a tapering, spine-like process, tubercle or seta.
spinule - a small, spine-like cuticular process.
sp. nr. - species near, used for uncertain species designations (e.g. Cosmolaelaps sp. nr. vacua
(Michael)), implying that the specimen referred to may represent a new species (see aff.,
nr., and cf.); a less nebulous use of this formation is 'n. sp. nr.', i.e. new species near, and
indicates that the taxonomist is convinced that the specimen represents an undescribed
species related to the attributed species.
spur - a projection, usually tooth- or spine-like, from the body or limbs.
ss – the bothridial seta; also bo
stage - a distinct developmental form, e.g. the egg, larval, nymphal and adult stages. Since mite
instars are usually morphologically distinct, they are also stages (and see stase). Some
authors, however, insist that instar should be apolysis to apolysis and stage ecdysis to
ecdysis. Since apolysis can be a discontinuous process and, in any case, is difficult to
determine, in practice the difference between a stage and an instar is abstract and of
importance only if you have a contentious referee.
stalked - raised up or otherwise produced on a stalk.
stase - one of the successive, morphologically distinguishable forms exhibited by a mite during
development. A stase is equivalent to an instar in mites; but theoretically, if no setal or
other morphological changes occur across a molt, then several instars may occur in one
stase. Mostly used by Grandjean and his followers as a theoretical concept.
stegasime - having the chelicerae protected dorsally by a rostral tectum (see astegasime), as in
most oribatid mites.
stellate - star-like.
stenerarthric - a subcapitulum with a triangular mentum and oblique labiogenal sutures; probable
primitive condition in Acariformes.
stenoxenic (-ous) - using a narrow range (e.g. of habitats or hosts); more or less host specific, habitat specific, etc.

stigma - the opening to the tracheal system.

striae - the raised, narrowly aligned cuticular ridges, often like a fingerprint or plicate pattern; striations.

striations - a pattern of raised, narrowly aligned cuticular ridges, often like a fingerprint or plicate pattern.

stylet (L. stylus = pricker) - a narrow, pointed structure, typically referring to a mouthpart in the Acari.

stylet-like - referring to chelicerae or movable digits that are slender, elongate, and usually acuminate.

styletiform - stylet-like.

styliform - stylet-like.

sub- - as prefix used to indicate sp. under (see subcapitulum) or (2) not quite, e.g. subrectangular = not quite rectangular; subtriangular = not cleanly triangular.

subcapitular plate - an apodeme that supports the chelicerae ventrally and to which the muscles of the labrum are attached.

subcapitulum (also infracapitulum) - the venter of the capitulum; the ventral faces of the fused palpcoxae; apparently formed independently in the two superorders of mites.

subcheliceral plate - the internal sclerotized plate on which the chelicerae rest.

subtriangular - more or less triangular.

subunguinal seta (s) - an unpaired seta between the unguinal and anterolateral pairs on the tarsi of acariform mites (see whorl).

suctorial - in reference to mouthparts that appear to be used to suck-up fluids, although in most cases this has not been demonstrated and may not be true. Typically the chelicerae are stylet-like and the subcapitulum is modified anteriorly into a tube that supports the stylets, e.g. in the oribatid family Suctobelbidae.

supercohort - a taxon above cohort, usually consisting of two or more cohorts.

supernumerary - more than there are supposed to be; stages or structures thought to have been added to the basic number.

supracoxal seta - an often inflated or otherwise elaborated dorsal coxal seta in astigmatans associated with the supracoxal gland opening; minute peg-like seta (ep) on the dorsal palp coxa or coxa of legs I in acariform mites.

suture - an inflexible juncture between two body parts; line of fusion between two formerly separate body parts or regions. This term is often misused for flexible articulations.

T [Back to start of Glossary]

tapering - drawn out or with margins converging.
tarsal apotele (= pretarsus) - the most distal segments of legs and palps bearing the claws and empodium. also pretarsus.

tarsal appendages - the tarsal apotele.

tarsus (pl. tarsi) - the subdistal leg segment between the tibia and the pretarsus (apotele).

tectals (tc) - a pair of dorsal tarsal setae between the iterales and the fastigals on the tarsi of acariform mites (see whorl).

tectomentum – the collar-like rim of the ventral plate that protects the base of the mentum in some oribatid mites.

tectopedium (pl. tectopedia) - shelf of cuticle protecting the base of the leg of an oribatid mite (see pedotectum)

tectum (pl. tecta) - any shelf-like projection of the cuticle. In oribatid mites these tecta often project over and protect areas of soft cuticle, such as the articulation between two plates. See also anterior notogastral tectum, posterior notogastral tectum, mentotectum, and tectomentum.

telofemur (pl. telofemora) - a distal division of the femur.

tenent hair - a seta or seta-like process with a flattened tip that resembles the head of a nail; usually used for hair-like processes on the claws or empodium of acariform mites, but at least some oribatid mites have true tenent hairs, i.e. modified setae.

tere - having the form of a smoothly tapering cylinder. [Back to Top]

thanatosis - playing dead; usually involves pulling in the legs and palps against the body and avoiding movement for extended periods.

thelytokous - exhibiting all female parthenogenesis (thelytoky).

thelytopy - all-female pathenogenesis.

(θ) theta - designation for a solenidion on the femur of an acariform mite (ς (sigma) on the genu, φ (phi) on the tibia; ω (omega) on the tarsus).

tibia (pl. tibiae) - the leg segment between the genu and the tarsus.

tong-like - resembling a pair of ice tongs; helicerae that resemble opposed hooks, usually edentate or at most with small teeth.

tracheae - the long, filamentous tubes that ramify through the body of some mites for the exchange of gases.

Tragardh's organ - a flat, finger-like paraxial projection on the chelicerae of some oribatid mites; usually difficult to see unless the chelicerae are dissected out.

translamella - a transverse ridge or tectum joining the lamellae on the prodorsum of some oribatid mites.

tricarinate - having three longitudinal ridges.

trichoidy - having a body divided into three as in some lower Oribatida.

tricuspid - having three points or cusps, e.g. the gnathotectum of some Mesostigmata.
trifurcate - split into three distally.

trichobothrium (pl. trichobothria) (= bothridial sensillum) - an often elaborately modified seta set in a cup-like base; forms include filiform, ciliate, pectinate or variously thickened or clubbed (bat-like to globose or capitate).

trichoidy - acariform mites with the body divided into three regions by a protero-hysterosomatic and a podo-opisthosomatic articulation. (See dichoidy, ptychoidy.)

trichome - a seta.

tridactyly - having three claws.

trifurcate - a structure having three prongs or tines.

tritonymph - the third, and final, nymphal stage or instar present in Opilioacarida, Holothyrida, Argasidae, and many Acariformes.

trochanter - the leg segment between the coxa and the femur.

tuberculate - ornamented with raised processes; covered with tubercles.

tutorium (pl. tutoria) - a ridge on the lateral prodorsum of oribatid mites, ventral and more or less parallel to the lamella and protecting legs I when retracted; often with a free distal cusp.

U [Back to start of Glossary]

unctate - pincer-like; in water mites (Hydrachda), uncate palps have a ventral palptibial process opposed to a dorsal movable palptarsus (opposed to chelate).

unctinate - hook-like

unguinals (u) - and the distalmost ventral pair of setae at the base of the ambulacrum on the tarsi of acariform mites (see whorl).

unideficient - lacking one seta from the assumed holotrichous condition.

unideficient system – see Grandjean chaetotaxy systems

uropore - anus.

urstigma (pl. urstigmata) - the presumed homologue of the genital papillae found between legs I-II in the prelarvae and larvae of many acariform mites; osmoregulatory organs (= Claparède's organ, also urpores, bruststiele).

V [Back to start of Glossary]

Va – an anterior tubercle in the epimeral region of oribatid mites

Van der Hammen's organ - a respiratory organ in some intertidal Oribatida (e.g. Fortuya spp.) composed of cuticular tubercles and the overlying cerotegument.

VBP – Valerie Behan-Pelletier

ventral - relating to the lower or under side; opposed to dorsal.
ventral plate - a sclerotized plate covering the ventral region of the opisthosoma in brachypyline oribatid mites and separated from the notogaster by the circumgastric scissure; also any plate in the ventral region.

venter - the lower or under side; opposed to dorsum.

verruca (pl verrucae) - a wart-like process.

verrucate - ornamented with irregular raised tubercles; covered with wart-like structures.

vertex - an anterior extension of the idiosoma.

verticil - a whorl of setae around a region of a leg segment used in determining setal designations.

vesicle - a sack-like structure.

viviparity - live birth; emergence of prelarval (prelarviparity), larval (larviparity), nymphal or adult (see physogastry) mites from their mother's body after the internal hatching of the eggs (technically, most mites are actually ovoviviparous).

viviparous - exhibiting viviparity (live birth, rather than egg laying).

Vp – a posterior tubercle in the epimeral region of oribatid mites

\[W\] [Back to start of Glossary]

ω (omega) - designation for solenidion the tarsus of acariform mites (φ (phi) on the tibia, and ζ (sigma) on the genu).

whip-like - long, slender and sinuous as in the posterior setae of some phytoseiid mites (Mesostigmata) or the stylets of spider mites and their relatives (Prostigmata: Tetranychoidea).

whorl - one of the whorls or verticils of birefringent setae on the leg segments of acariform mites. Setae are named based on their segment, position on the segment, position relative to the body axis [' = paraxial; " = antiaxial], and relationship to other setae in the whorl, e.g. for the genua and tibiae of oribatid mites with 5 setae per whorl: dorsal (d), anterolateral (al'), anteroventral (v'), posteroventral (v") and posterolateral (pl'); 7 setae per whorl: dorsolateral (ls'), anterior ventrolateral (li'), anterior subtibial (st'), posterior subtibial (st"), posterior ventrolateral (li") and posterior dorsolateral (ls"). The designations for tarsal setae are even more complex and have acquired names as well as designations. The two most distal pairs (at base of ambulacrum) are the dorsal prorals (p) and the ventral unguinals (u); On the dorsal tarsus behind the prorals moving basally are the iterales (it), tectals (tc), and fastigials (ft). On the ventral tarsus behind the unguinals is the subunguinal seta (s), followed by the anterolaterals (a), primiventrals (pv), and primilaterals (pl). Some of these setae may be modified into eupathidia (ζ). Various other designations occur in the Oribatida and Astigmata. Additionally, a hollow birefringent seta called the famulus [ε (epsilon)] may be present, as well as, optically inactive chemosensory solenidia.

wing-like - projecting from the body or other structures like the wings of insects.

\[X\] [Back to start of Glossary]
xylophage - feeding on wood. Some oribatid mites are xylophagous.

$\text{Y}$

$\zeta$ (zeta) - designation for eupathidia on the legs of acariform mites.
ZL – Zœe Lindo
zoorhria - the use of animals for migration (see phoresy).
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Back to Table of Contents
## Index of Genera

### A

Abrolophus, 71, 152  
Acalyptonotus, 73, 152  
Acarapis, 88, 89, 152  
Acarus, 43, 44, 46, 47, 48, 50, 60, 152  
Acenia, 66, 145, 152  
Acotheydon, 43, 152  
Aethiophenax, 82, 152  
Albertathyas, 75, 152  
Alliih, 108, 152  
Alliphis, 50, 152  
Allicosmesis, 63, 152  
Alycus, 61, 152  
Amblyseius, 106, 107, 152  
Amorodectes, 54, 152  
Amoroseius, 103, 106, 152  
Amphialycus, 62, 152  
Analges, 50, 52, 152  
Analloptes, 57, 152  
Androlaelaps, 110, 152  
Angustsonella, 71, 152  
Anhimalges, 50, 152  
Anotus, 44, 48, 152  
Antennophorus, 97, 152  
Antennoseius, 103, 104, 142, 144, 152  
Anystis, 70, 152  
Aphelacarus, 11, 152  
Arctoseius, 103, 104, 152  
Arrenoseius, 107, 152  
Arrenurus, 73, 152  
Asca, 104, 152  
Atopochthoni, 11, 152  
Atractides, 75, 152  
Aturus, 75, 152  
Avenzoaria, 51, 52, 152

### B

Bakerdania, 85, 86, 152  
Baladustium, 71, 152  
Bandakia, 76, 152  
Barbutia, 79, 152  
Bdella, 64, 152  
Bdellodes, 64, 152  
Bdellorhynchos, 51, 152  
Berladectes, 54, 152  
Bisculus, 64, 152  
Bocharia, 71, 152  
Bonnetella, 52, 152  
Bonomia, 48, 152  
Bonzia, 65, 152  
Boreozoncon, 100, 152  
Boydaia, 68, 69, 152  
Brachychochthoni, 14, 15, 19, 20, 21, 152  
Brachychthoni, 14, 15, 16, 17, 18, 19, 20, 21, 153  
Brachypoda, 75, 153

### C

Carios, 96, 144, 153  
Carpoglobin, 47, 153  
Cassioopia, 34, 153  
Cecidophyes, 66, 153  
Cheilodactylus, 47, 153  
Cheiroseius, 105, 106, 153  
Chilalseius, 107, 153  
Cheletacarus, 77, 153  
Chelomideopsis, 73, 153  
Cheyletus, 77, 153  
Choriptes, 60, 153  
Coccocpherdia, 67, 153  
Coleoscrus, 65, 153  
Copriphous, 108, 153  
Corticacarus, 75, 153  
Cosmozoncon, 12, 13, 153  
Cosmocephalus, 43, 153  
Cosmolaelaps, 110, 115, 118, 129, 136, 153  
Crabrovidia, 49, 153  
Crameria, 58, 153  
Ctenoglyphus, 46, 153  
Cunaxa, 65, 153  
Cunaoideus, 65, 153  
Cyta, 64, 153

### D

Dactyloscrus, 65, 153  
Damaeosoma, 23, 153  
Dasythreus, 80, 153  
Demodex, 78, 153  
Dendrolaelaps, 102, 153  
Dermacarus, 46, 153  
Dermacentor, 93, 94, 144, 153  
Dermicrichus, 50, 51, 52, 53, 55, 56, 58, 59, 153  
Dermanyssus, 109, 153  
Dermatophagoides, 56, 153  
Dermoglyphus, 53, 153  
Dinychus, 98, 153  
Diplophthalmium, 71, 153  
Dolichodectes, 54, 153  
Dorsipes, 88, 144, 153

### E

Eberhardia, 44, 153  
Eobrachychthoni, 21, 153  
Eotetranychus, 82, 153  
Epicicopia, 103, 153  
Epidermoptes, 53, 153
Hydryphantes, 66, 154
Eremaeus, 30, 154
Ereynetes, 68, 69, 154
Estellacarus, 75, 154
Euandrolaelaps, 110, 154
Eulaeapals, 154
Eupodes, 66, 154
Euryparasitus, 103, 143, 154
Euschoengastia, 71, 72, 154
Eustigmæus, 80, 81, 154
Evadorhagia, 67, 154
Eylais, 74, 154

F
Fainalges, 57, 154
Favognathus, 80, 154
Feltria, 75, 154
Forelia, 76, 154
Fosseremus, 22, 23, 154
Foveacheles, 67, 154
Freyana, 58, 154
Frontipoda, 76, 154

G
Gabucinia, 58, 154
Gaeolaelaps, 110, 154
Gamse Lilus, 102, 154
Gamasodes, 100, 154
Glycyphagus, 46, 47, 154
Grallobia, 59, 154
Gymnalloptes, 57, 154

H
Haemaphysalis, 94, 95, 154
Halolaelaps, 102, 154
Hammenia, 67, 154
Haplochthonius, 13, 154
Hemicheyletia, 77, 154
Hericia, 47, 154
Hirstionyssus, 110, 154
Histigaster, 44, 154
Histiodoma, 48, 154
Homocaligus, 80, 154
Homopus, 46, 154
Hybalicus, 64, 154
Hydrachna, 74, 154
Hydrochoreutes, 76, 154
Hydrodroma, 75, 154
Hydrovolzia, 74, 154
Hydryphantes, 75, 154
Hygrobas, 75, 154
Hypochthonius, 13, 14, 16, 18, 154
Hypochthonius rufulus Cl. Koch, 1835, 83, 87
Hyponoeula, 72, 154
Hytopus, 43, 48, 154

I
Imparipes, 87, 154
Ingrassia, 57, 154
Insculptioppia, 27, 34, 154
Iphidobercon, 104, 155
Ipidoopoda, 99, 155
Iponemus, 88, 89, 155
Ixodes, 93, 95, 96, 145, 146, 155

K
Kennethiella, 49, 155
Kouchibouguaciana, 67, 155
Kramerella, 58, 155
Kuzinia, 43, 44, 155

L
Laelaspis, 110, 155
Lalmopppia, 27, 34, 155
Lardoglyphus, 45, 144, 155
Lasioseius, 105, 106, 155
Laversia, 74, 155
Lebertia, 76, 155
Lepidoglyphus, 46, 155
Leptotrombidium, 72, 155
Leptus, 71, 155
Licneremaus, 23, 24, 155
Lincobelia, 24, 155
Linccephus, 24, 155
Lincnomaus, 23, 155
Limnesia, 76, 155
Limnochares, 74, 155
Linopodes, 66, 155
Linotetranus, 81, 155
Liochthonius, 15, 16, 17, 19, 155
Ljania, 75, 155
Lorrya, 69, 155

M
Macrocheles, 108, 109, 155
Mediolata, 81, 155
Megninia, 50, 51, 52, 57, 155
Megniniiella, 51, 155
Mesalgoides, 56, 155
Metanalges, 51, 155
Metaparotectes, 54, 155
Metaseilus, 107, 155
Metingrassia, 57, 155
Mexecheles, 77, 155
Microlichus, 53, 54, 155
Micropropia, 25, 28, 155
Microtydeus, 69, 155
Midea, 74, 155
Mideopsis, 74, 155
Mixochthonius, 18, 155
Mixozzercon, 100, 155
Monoatractides, 77, 155
Monoceronymius, 82, 155
Almanac of Alberta Acari Part II

Morimotacarus, 73, 155
Morizziella, 26, 29, 155
Moritzziella, 26, 29, 143, 155
Multiophippia, 26, 30, 155
Mycolaelaps, 105, 156
Myianoeus, 48, 156
Myoplophotes, 60, 156

N
Nanorchestes, 62, 156
Nautarcha, 76, 156
Neharpyrhyynchus, 78, 156
Neocotyledon, 44, 156
Neoxonopsis, 75, 156
Neobydaia, 68, 69, 156
Neodermation, 52, 53, 156
Neognathus, 79, 156
Neojordensia, 104, 156
Neolichus, 18, 19, 156
Neopetrobia, 82, 156
Neophyllolobius, 79, 156
Neopteronyxus, 55, 156
Neopygmephorbus, 86, 156
Neoscirula, 65, 156
Neoseius, 107, 156
Neotiphys, 76, 156
Neotrombicula, 72, 156
Neumania, 76, 156
Notaspis, 35, 36, 156
Notopanisus, 75, 156
Nycteridocaicus, 54, 156

O
Oakvillea, 69, 156
Odontoscris, 64, 156
Oehserchestes, 62, 156
Oligonychus, 82, 156
Ololaelaps, 111, 156
Ondatralaestus, 111, 156
Oplitis, 98, 156
Oppia, 26, 28, 29, 30, 34, 156
Oppiella, 26, 30, 31, 32, 33, 143, 156
Orinhyphus, 111, 144, 156
Orycterexenus, 46, 156
Otoius, 96, 156
Otoptodes, 60, 156
Oxus, 76, 156

P
Pachydaetalaps, 109, 156
Pandizonacarus, 52, 156
Panisopsis, 75, 156
Panisus, 75, 156
Paracarophenax, 82, 156
Paracheylela, 78, 156
Paralges, 53, 156
Paralichthonius, 18, 19, 156
Parambyseius, 100, 156

Q
Quadroopia, 35, 157

R
Ramusella, 27, 34, 157
Ragida, 68, 158
Rhinoecius, 112, 158
Rhinonyssus, 112, 158
Rhipicephalus, 96, 158
Rhodacarellus, 103, 158
Robustochelus, 68, 158
Rubroscinus, 65, 158

S
Sancassania, 44, 158
Sarcoptes, 60, 158
Scarabaspis, 108, 158
Schizostethus, 101, 158
Schwiebea, 44, 158
Scutacarpos, 87, 88, 158
Scutogeotrichus, 52, 158
Sejus, 97, 158
Sellnickochthonius, 19, 20, 158
Shibaia, 68, 158
Siteroptes, 85, 158
Skeironozzercon, 100, 158
Sokoloviana, 60, 158
Speleorchestes, 62, 158
Sperchon, 77, 158
Sperchonopsis, 77, 158
Sphaerotrichus, 13, 158
Spinibella, 64, 65, 158
Spinumix, 112, 146, 158
Sternostoma, 112, 158
Stigmaeus, 81, 158
Stratiaeelaps, 111, 158
Strelokvoicaros, 51, 158
Sturnotrogus, 55, 158
Stygomonomia, 74, 158
Stygorthomium, 73, 158
Subiasella, 25, 34, 158
Suctobelba, 35, 36, 143, 158
Suctobelbella, 36, 37, 38, 39, 40, 41, 42, 145, 158
Symbiotes, 53, 158
Synchthonius, 21, 158
Syringophiloidus, 79, 158

T
Tarsonemus, 88, 89, 158
Tepoztlana, 71, 158
Terpancarus, 63, 158
Testudacaros, 77, 158
Tetranychus, 82, 158
Tetraolichus, 59, 158
Tetrochthonius, 13, 158
Teutonia, 77, 158
Thionbellia, 65, 158
Thyas, 75, 158
Thyopis, 75, 158
Tinaminyssus, 112, 158
Triphys, 76, 159
Torrenticola, 77, 159

2 February 2012 draft

Tortonia, 45, 159
Trachytes, 98, 159
Trachyuropod, 98, 159
Trichodactylus, 47, 159
Trichoecius, 60, 159
Trichotarsus, 45, 159
Trichoureopod, 99, 143, 159
Triphyteyes, 69, 159
Trochometridium, 88, 159
Trombicula, 72, 145, 159
Trouessartia, 56, 159
Turbinoptes, 56, 57, 159
Tydeus, 70, 159
Typhlodromus, 107, 159
Tyrannidectes, 54, 159
Tyrannophyllopides, 55, 159
Tyroglyphus, 43, 44, 159
Tyrophagus, 44, 45, 159
Tyrrellia, 76, 159

U
Unionicola, 73, 76, 159
Uroobovella, 99, 159
Uropoda, 99, 143, 159
Utaxatax, 76, 159

V
Varroa, 113, 159
Veigaia, 101, 159
Veloppia, 22, 119, 145, 159
Verachthonius, 21, 159
Vidia, 49, 159
Vitzthumia, 104, 142, 159
Vulgarogamasus, 101, 159

W
Wandesia, 75, 159
Wettina, 76, 159
Woolastokia, 75, 159

X
Xenoryctes, 46, 159
Xolalgoides, 57, 159

Z
Zachvatkinia, 52, 159
Zercon, 100, 159
Zerconopsis, 104, 159
Zibethacaros, 46, 47, 159
Zygoseius, 109, 159
Abrolophus
Acalyptonotus
Acarapis
Acarus
Acenla
Acotyledon
Aethiophenax
Albertathyas
Alliphis
Alloptes
Alycosmesis
Alycus
Amblyseius
Amerodectes
Ameroseius
Amphialycus
Analgnes
Analloptes
Androlaelaps
Angustsonella
Anhemialges
Anoetus
Antennophorus
Antennoseius
Anystis
Aphelacarus
Arctoseius
Arrenoseius
Arrenurus
Asca
Atopochthonius
Atractides
Aturus
Avenzoaria
Bakerdania
Balaustium
Bandakia
Barbutia
Bdella
Bdellodes
Bdellorhynchus
Berladectes
Biscirius
Bochartia
Bonnetella
Bonomoia
Bonzia
Boreozzercon
Boydaia
Brachychochthonius
Brachychthonius
Brachypoda
Bregetovia
Brevipalpia
Brevipalpus
Bryobia
Bychovskiata
Carios
Carpoglyphus
Cassioppia
Cecidophyes
Chaetodactylus
Cheiroseius
Chelaseius
Cheletacarus
Chelomideopsis
Cheyletus
Choriocetes
Coccorhagidia
Coleoscirrus
Copriphus
Corticacarus
Cosmochthonius
Cosmoglyphus
Cosmolaelaps
Crabrovidia
Crameria
Ctenoglyphus
Cunaxa
Cunaxoides
Cyta
Dactyloscirrus
Damaeosoma
Dasythyreus
Demodex
Dendrolaelaps
Dermacarus
Dermacentor
Dermalichus
Dermanyssus
Dermatophagoides
Dermoglyphus
Dinychus
Diplothrombium
Dolichodectes
Dorsipes
Eberhardia
Eobrachychthonius
Eotetranychus
Epiciroplus
Epidermoptes
Epitrimerus
Eremaeus
Ereynetes
Estellacarus
Euandrolaelaps
Eulaepals
Eupodes
Euryparitus
Euschoengastia
Eustigmaeus
Evadorhagia
Eylais
Fainalges
Favognathus
Feltria
Forelia
Fosseremus
Foveacheles
Freyana
Frontipoda
Gabucinia
Gaeolaelaps
Gamaseillus
Gamasodes
Glycyphagus
Grallobia
Gymnalloptes
Haemaphysalis
Halolaelaps
Hammenia
Haplochthonius
Hemicheyletia
Hericia
Hirstionyssus
Histigaster
Histiostoma
Homocaligus
Homopus
Hybalicus
Hydrachna
Hydrochoreutes
Hydrodroma
Hydrovolzia
Hydryphantes
Hygrobes
Hypochthonius
Hyponeocula
Hypopus
Imparipes
Ingrassia
Insculptoppia
Iphidozercon
Ipiduropoda
Iponemus
Ixodes
Kennethiella
Kouchibouguaia
Kramerella
Kuzinia
Laelaspis
Lalmoppia
Lardoglyphus
Lasioseius
Laversia
Lebertia
Lepidoglyphus
Leptotrombidium
Leptus
Licneremaeus
Licnobelba
Licnocepheus
Licnodamaeus
Limnesia
Limnochares
Linopodes
Linotetranus
Liochthonius
Ljania
Lorryia
Macrocheles
Mediolata
Meginia
Megniniella
Mesalgoides
Metanalges
Metapterodectes
Metaseiulus
Metingrassia
Mexeches
Microlichus
Microppia
Microtydeus
Midea
Mideopsis
Mixochthonius
Mixozzercon
Monoattractides
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Morimotacarus
Moritziella
Moritzoppia
Multioppia
<table>
<thead>
<tr>
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<tbody>
<tr>
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Parasitellus
Parasitus
Paratydaeolus
Parazercon
Parhypochthonius
Passeroptes
Pelzneria
Penthaeleus
Pergamasus
Petitota
Phytonemus
Phytoseius
Piona
Pionopsis
Platyphydracarus
Platyseius
Pneumolaelaps
Pneumonyssus
Poeicilochirus
Poeicilochthonius
Poeicilophysis
Polyaspinus
Polyphagotarsonemus
Porohalacarus
Porolohmannella
Proaposolenidia
Proarctacarus
Proctolaelaps
Proctophyllodes
Promyialges
Proprioseiopsis
Protogamasellus
Protzia
Pseudalloptinus
Pseudavenzoaria
Pseudofeltria
Pseudohydropyphantes
Pseudolichus
Pseudoparasitus
Psilobrephosceles
Psorobia
Pterochthonius
Pterodectes
Pterolichus
Pteronyssus
Ptilonyssus
Ptiloxenus
Pyemotes
Pygmephorus
Quadroppia
Ramusella
Rhagidia
Rhinoecius
Rhinonyssus
Rhipicephalus
Rhodacarellus
Robustocheles
Rubroscirus
Sancassania
Sarcoptes
Scarabaspis
Schizosthetus
Schwiebea
Scutacarus
Scutomegninia
Sejus
Sellnickochthonius
Shibaia
Siteroptes
Skeironozercan
Sokoloviana
Speleorchestes
Sperchon
Sperchonopsis
Sphaerochthonius
Spinibdella
Spintumix
Sternostoma
Stigmaeus
Stratiolaelaps
Strelkoviacarus
Sturnotrogus
Stygomomonia
Stygothrombium
Subiasella
Suctobelba
Suctobelbella
Symbiotes
Synchthonius
Syringophiloidus
Tarsonemus
Tepoztlana
Terpanacarus
Testudacarus
Tetranychus
Tetraolichus
Tetrochthonius
Teutonia
Thoribdella
Thyas
Thyopsis
Tinaminyssus
Tiphys
Torrenticola
Tortonia
Trachytes
Trachyuropodida
Trichodactylus
Trichoecius
Trichotarsus
Trichouropoda
Triophytydeus
Trochomertridium
Trombicula
trouessartia
Turbinoptes
Tydeus
Typhlodromus
Tyrannidectes
Tyranniphylloides
Tyrogyphas
Tyrophagus
Tyrellia
Unionicola
Urobovella
Uropoda
Utaxatax
Varroa
Veigaia
Veloppia
Verachthonius
Vidia
Vitzthumia
Vulgarogamasus
Wandesia
Wettina
Woolastookia
Xenoryctes
Xolalgoides
Zachvatkinia
Zercon
Zerconopsis
Zibethacarus
Zygoseius