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Diversity and Distribution of Mites (Acari: Ixodida, Mesostigmata, Trombidiformes, Sarcoptiformes) in the Svalbard Archipelago

Anna Seniczak [1,*], Stanisław Seniczak [2], Marla D. Schwarzfeld [3], Stephen J. Coulson [4,5] and Dariusz J. Gwiazdowicz [6]

1 Department of Natural History, University Museum of Bergen, University of Bergen, Postboks 7800, 5020 Bergen, Norway
2 Department Evolutionary Biology, Faculty of Biological Sciences, Kazimierz Wielki University, J.K. Chodkiewicza 30, 85-064 Bydgoszcz, Poland; stseni@ukw.edu.pl
3 Canadian National Collection of Insects, Arachnids and Nematodes, Agriculture and Agri-food Canada, 960 Carling Avenue, Ottawa, ON K1A 0C6, Canada; marla.schwarzfeld@canada.ca
4 Swedish Species Information Centre, Swedish University of Agricultural Sciences, SLU Artdatabanken, Box 7007, 75007 Uppsala, Sweden; stephen.coulson@slu.se
5 Department of Arctic Biology, University Centre in Svalbard, P.O. Box 156, 9171 Longyearbyen, Norway
6 Faculty of Forestry, Poznań University of Life Sciences, Wojska Polskiego 71c, 60-625 Poznań, Poland; dariusz.gwiazdoswicz@up.poznan.pl
* Correspondence: Anna.Seniczak@uib.no

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Abstract: Svalbard is a singular region to study biodiversity. Located at a high latitude and geographically isolated, the archipelago possesses widely varying environmental conditions and unique flora and fauna communities. It is also here where particularly rapid environmental changes are occurring, having amongst the fastest increases in mean air temperature in the Arctic. One of the most common and species-rich invertebrate groups in Svalbard is the mites (Acari). We here describe the characteristics of the Svalbard acarofauna, and, as a baseline, an updated inventory of 178 species (one Ixodida, 36 Mesostigmata, 43 Trombidiformes, and 98 Sarcoptiformes) along with their occurrences. In contrast to the Trombidiformes and Sarcoptiformes, which are dominated in Svalbard by species with wide geographical distributions, the Mesostigmata include many Arctic species (39%); it would thus be an interesting future study to determine if mesostigmatid communities are more affected by global warming then other mite groups. A large number of new species (42 spp.) have been described from Svalbard, including 15 that have so far been found exclusively there. It is yet uncertain if any of these latter species are endemic: six are recent findings, the others are old records and, in most cases, impossible to verify. That the Arctic is still insufficiently sampled also limits conclusions concerning endemicity.

Keywords: checklist; Astigmata; Endeostigmata; Oribatida; Prostigmata; climate change; Arctic; Svalbard

1. Introduction

The invertebrate fauna of the Svalbard archipelago is amongst the best known for any region in the Arctic [1]. However, the inventory has been collated from studies over a period of 150 years and has never been subjected to a critical review and taxonomic revision. Without an improved understanding of the current fauna it is not possible to understand the current terrestrial ecosystem or determine its response to on-going environmental change.

The dramatic environmental changes that we see today may be most discernable in polar regions, which possess both a unique flora and fauna and are undergoing the greatest rates of climate change. A particularly interesting area to study this is the Svalbard archipelago that is located at 78° N, isolated, and with a distinctive and diverse flora and fauna that are poorly studied [2]. Svalbard is currently experiencing one of the fastest temperature increases and one of the highest rates of sea ice loss in the Arctic [3]. During the past 50 years, the mean air temperature in Svalbard has increased by 4 °C, the winter mean air temperature has increased by 7 °C, the snow season duration has decreased by 20 days, and precipitation has increased by 65% [4]. For example, at Svalbard airport in 2018, the mean annual temperature was −1.8 °C, winter temperature was −5.3 °C, and annual precipitation was 252.5 mm [5]. These factors, as well as others that are tightly connected to the climate (e.g., faster melting of glaciers, changes in permafrost, landslides, avalanches, and flooding), affect the ecosystems in different manners. Even though a few species benefit from a warming climate, for example vertebrates, most Arctic species in Svalbard are experiencing negative effects in the warming environment [6].

Just south of Svalbard, two sea currents meet, a northern branch of the warm North Atlantic Drift and the southerly flowing cold Arctic Current, with consequences for the local climates on the east and west coasts of the archipelago [7] and potentially for species immigration histories, thus affecting species communities. A good example is the distinctive acarofauna of Edgeøya in the east of the archipelago compared to that observed on the west coast [8] and which includes an oribatid species new to science and not so far recorded elsewhere [9].

As a consequence of the increasing temperatures and changes in precipitation patterns, many glaciers are receding and revealing new land surfaces for primary succession. Therefore, regions such as Svalbard offer a unique opportunity to identify the pioneer species that first colonize barren post-glacial habitats and to analyze long-term processes of change, e.g., in invertebrate community assembly [10].

The diversity and richness of the environment is much more than simply lists of species occurring in a given area; it is also the regional specificity of these species, for example, those species that are considered to be typically High Arctic. Changing climatic conditions that determine and stimulate changes in habitats also affect the ranges of some mite species. Several studies have considered changes in mite communities in Svalbard in space and time; their dispersal abilities [11–17], as well as their emergence in new areas or retreat from previously occupied locations [10,18–20]. The uniqueness of polar areas, with their characteristic climates and isolated island distribution that often restricts dispersal processes, limits the range of some species. In this context, knowledge of zoogeography (ranges of occurrence of species) is extremely valuable because this suggests not only the migration routes, but also the ability of selected species to colonize new areas. Nonetheless, the climate of Svalbard is changing fast. These changes will undoubtedly provide opportunities for new species to colonise the region with difficult to foresee outcomes. The consequences of human introductions of invasive and alien species (IAS) have been described in the Antarctic [21] and there are examples of similar introductions in Svalbard [18].

Understanding mite ecology is also important since mites are excellent bioindicators of environmental changes and their presence, or changes in their communities, can be used in biological monitoring of naturally occurring processes as well as the consequences of human impacts, for example, those related to industrial activities in Svalbard's natural environment [20,22].

We here present a review of the mite fauna of Svalbard. These results can be the basis for further analyzes of the acarofauna (e.g., zoogeographic, ecological, taxonomic, and parasitological).

2. Material and Methods

The data were extracted from 104 papers published between 1871 and 2020. The localities presented in Figure 1 are based on Table 1. Distribution of *Ixodes uriae* White, 1852, the only representative of the order Ixodida in Svalbard, follows [23]. The nomenclature and arrangement of the Mesostigmata

families follows [24,25], while the species nomenclature follows [26] with a few modifications [27,28]. Distribution of the families follows [27–30].

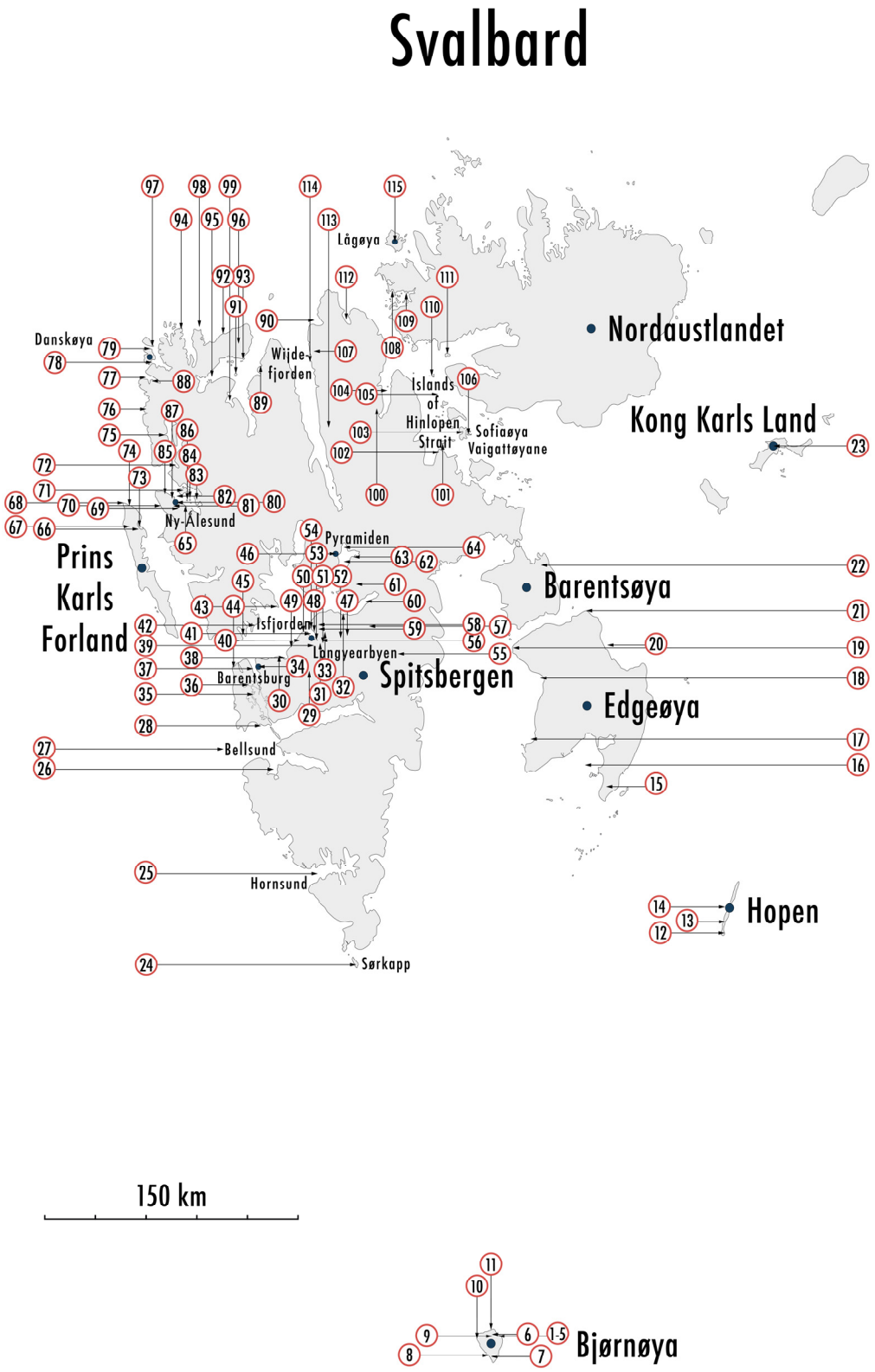

Figure 1. *Cont.*

Figure 1. Localities in Svalbard where mites were found.

The arrangement of the Trombidiformes families follow [31] with the exception of the Eriophyidae that is included in the Endeostigmata, as suggested by [32,33]. Names and distributions of the Bdellidae follow [34]; Cunaxidae—[35]; Cocceupodidae and Eupodidae—[36,37] for nomenclature, and [38,39] for distributions; Penthaleidae—[40]; Penthalodidae—[41]; Rhagidiidae—[42–44]; Halacaridae—[45]; Triophtydeiidae—[46] for taxonomy, and [47,48] for distribution; Tydeidae—[49,50]; Iolinidae—[51,52]

for taxonomy, and [47,53] for distributions; Sperchontidae—[48,54,55]; Trombidiidae—[56]; Syringophilidae—[57]; Stigmaeidae—[58]; Tetranychidae—[59,60]; and Pygmephoridae—[61].

The nomenclature and arrangement of the Sarcoptiformes families follow [62,63]. For the Endeostigmata, the nomenclature and arrangement of families follow [63,64]. The distribution of Nanorchestidae follow [65]; Alicorhagiidae—[66]; and Eriophyidae—[67]. The species names of the Oribatida (without Astigmata) follow [68] with a few exceptions [69,70] and their distribution is given after [9,68,71,72]. The Astigmata species (families Acaridae, Alloptidae, and Avenzoariidae) follow [73,74] and their distribution is according to [75].

Full names of species are provided in Table 1, while in other tables and figures abbreviations are used. The species within families are organized alphabetically. The names of localities follow in alphabetical order (Table 1).

3. Results

3.1. Ixodida

Only one species, the seabird tick (*Ixodes uriae*), is known from Svalbard. This species has a wide geographical distribution (Table 1) but in Svalbard has been found only recently on Bjørnøya and Spitsbergen [76–78].

3.2. Mesostigmata

Thus far, 36 species of Mesostigmata from 13 families have been found in Svalbard (Table 1). Amongst these families, the richest in species is the Ascidae (12 spp.), followed by the Zerconidae (6 spp.); these two families contribute almost 50% of mesostigmatic alpha diversity in Svalbard (Figure 2).

The peculiarity of the mesostigmatic mite communities of Svalbard compared to other mite groups is manifested by the description of one new genus (*Arctoseius*) and seven species [*Halolaelaps coulsoni* Gwiazdowicz & Teodorowicz, 2017; *H. gerlachi* Hirschmann, 1966; *Antennoseius* (*Vitzthumia*) *oudemansi* (Thor, 1930); *Arctoseius laterincisus* Thor, 1930; *Proctolaelaps parvanalis* (Thor, 1930); *Neoseiulus grumantensis* Kolodochka & Gwiazdowicz, 2014; and *N. magnanalis* (Thor, 1930)], all first described from the largest island of the archipelago—Spitsbergen. Moreover, based on recently collected samples from this island, redescriptions of several species have been published: *Zercon solenites* Haarløv, 1942; *Antennoseius* (*Vitzthumia*) *oudemansi*; *Arctoseius haarlovi* Lindquist, 1963; *Proctolaelaps parvanalis*; *Neoseiulus ellesmerei* (Chant & Hansell, 1971); and *N. magnanalis* [27–29,79,80].

Table 1. List of mites of the Svalbard archipelago.

No.	Taxon	Distribution	Localities
	IXODIDA		
	Ixodidae		
1.	*Ixodes uriae* White, 1852	Afrotropical, Australasian, Neotropical, Holarctic	Bjørnøya [77]; Spitsbergen: Ossian Sarsfjellet [76–78]
	MESOSTIGMATA		
	Dinychidae		
2	*Uroseius acuminatus* (C.L. Koch, 1847)	Palearctic	Spitsbergen [81,82]
	Zerconidae		
3.	*Zercon andrei* Sellnick, 1958	Palearctic	Bjørnøya: Alfredfjellet, "Birds colony", Teltvika [29,30,83]; Spitsbergen: Hornsund [84]
4.	*Z. curiosus* Trägårdh, 1910	Palearctic	Spitsbergen: Longyearbyen [85]
5.	*Z. forsslundi* Sellnick, 1958	Palearctic	Edgeøya: Diskobukta, Kapp Heuglin, Kapp Lee, Negerdalen, Russebukta [8]; Hopen: Koefoedodden, Norwegian Meteorological Institute Station [86]; Nordaustlandet: Kinnvika [30,87]; Spitsbergen: Adventdalen, Billefjord, Bjørndalen, Endalen, Hornsund, Ny-Ålesund, Ossian Sarsfjellet, Petuniabukta, Storholmen, Trygghamna [10,20,30,85,88–90]
6.	*Z. solenites* Haarløw, 1942 **	Arctic	Edgeøya: Diskobukta, Kapp Lee [8]; Hopen: Koefoedodden, Norwegian Meteorological Institute Station [86]; Nordaustlandet: Kinnvika [29,87]; Spitsbergen: Adventdalen, Bjørndalen, Blomstrandhalvøya, Endalen, Fjortende Julibukta, Grønfjorden, Magdalenefjorden, Petuniabukta, Storholmen, Vårsolbukta [20,27,30,89,90]
7.	*Z. triangularis* C.L. Koch, 1836	Palearctic	Spitsbergen: Adventdalen, Barentsburg, Hanaskogdalen, Hjorthhammn [91]
8.	*Z. zelawaiensis* Sellnick, 1944	Palearctic	Bjørnøya: Alfredfjellet [88]; Spitsbergen: Hornsund [83]
	Parasitidae		
9.	*Paragamasus* (*Aclerogamasus*) *insertus* (Micherdzinski, 1969)	Palearctic	Spitsbergen: Barentsburg [18,19]
10.	*Vulgarogamasus immanis* (Berlese, 1904)	Palearctic	Spitsbergen: Barentsburg [92]
11.	*V. remberti* (Oudemans 1912)	Palearctic	Spitsbergen: Barentsburg [18,19]
	Digamasellidae		
12.	*Dendrolaelaps foveolatus* (Leitner, 1949)	Palearctic	Spitsbergen: Pyramiden [20]
	Halolaelapidae		
13.	*Halolaelaps coulsoni* Gwiazdowicz & Teodorowicz, 2017 *,†	Arctic	Spitsbergen: Pyramiden [93]
14.	*H. gerlachi* Hirschmann, 1966 *,†	Arctic	Spitsbergen: Ny-Ålesund [94]
15.	*Saprosecans baloghi* Karg, 1964	Palearctic	Edgeøya: Diskobukta [8]

Table 1. *Cont.*

No.	Taxon	Distribution	Localities
	Ologamasidae		
16.	*Gamasellus borealis* (C.L. Koch, 1879)	Palearctic	Spitsbergen: Dirksbukta [7]
	Eviphididae		
17.	*Thinoseius spinosus* (Willmann, 1939)	Palearctic	Spitsbergen: Longyearbyen, Storholmen [90,95]
	Macrochelidae		
18.	*Macrocheles muscaedomesticae* (Scopoli, 1772)	Palearctic	Spitsbergen: Barentsburg [84]
	Ascidae		
19.	*Antennoseius* (*Vitzthumia*) *oudemansi* (Thor, 1930) *,**	Arctic	Bjørnøya: "Birds colony" [83]; Edgeøya: Diskobukta, Kapp Lee, Russebukta [8]; Hopen: Koefoedodden, Norwegian Meteorological Institute Station [86]; Nordaustlandet: Kinnvika [30,79,87]; Spitsbergen: Adventdalen, Barentsburg, Bjørndalen, Endalen, Florabukta, Hiorthhamn, Magdalenefjorden, Petuniabukta, Pyramiden, Storholmen, Vestpynten [19,20,22,30,79,85,88–91]
20.	*Arctoseius babenkoi* Makarova, 1999	Palearctic	Spitsbergen: Hornsund, Pyramiden [20,84,96]
21.	*A. cetratus* (Sellnick, 1940)	Holarctic	Spitsbergen [96]
22.	*A. haarlovi* Lindquist, 1963 **	Arctic	Bjørnøya: "Birds colony" [83]; Edgeøya: Diskobukta, Kapp Lee, Negerdalen, Russebukta [8]; Hopen: Koefoedodden, Norwegian Meteorological Institute Station [86]; Spitsbergen: Adventdalen, Barentsburg, Bjørndalen, Endalen, Hornsund, Longyearbyen, Magdalenefjorden, Mushamna, Ny-Ålesund, Petuniabukta, Pyramiden, Storholmen, Vestpynten [10,19,20,22,30,80,89,90,97]
23.	*A. laterincisus* Thor, 1930 *,†	Arctic	Spitsbergen: Adventdalen, Barentsburg, Hanaskogdalen, Hjorthhamn [91]
24.	*A. multidentatus* Evans, 1955	Arctic	Edgeøya: Blåbukta, Diskobukta, Kapp Heuglin, Kapp Lee, Negerdalen, Russebukta [8]; Hopen: Koefoedodden, Norwegian Meteorological Institute Station [86]; Nordaustlandet: Florabukta, Kinnvika [30,87]; Spitsbergen: Adventdalen, Barentsburg, Billefjorden, Endalen, Grønfjorden, Hornsund, Magdalenefjorden, Mushamna, Ny-Ålesund, Petuniabukta, Pyramiden, Storholmen, Sørkapp, Vårsolbukta [10,19,20,30,88–90,96]
25.	*A. ornatus* Lindquist, 1961	Holarctic	Spitsbergen [96]

Table 1. *Cont.*

No.	Taxon	Distribution	Localities
26.	*A. tajmyricus* Petrova & Makarova, 1991	Palearctic	Bjørnøya: Alfredfjellet [83]; Spitsbergen: Hornsund [88,96]
27.	*A. tschernovi* Makarova, 2000	Arctic	Edgeøya: Blåbukta, Kapp Heuglin, Negerdalen [8]; Nordaustlandet: Kinnvika [30,87]; Spitsbergen: Adventdalen, Endalen, Hornsund [30,89]
28.	*A. weberi* Evans, 1955	Arctic	Bjørnøya: Alfredfjellet, „Birds colony" [83]; Edgeøya: Kapp Heuglin, Kapp Lee, Negerdalen, Russebukta [8]; Spitsbergen: Adventdalen, Bjørndalen, Endalen, Ossian Sarsfjellet, Petuniabukta, Vestpynten, Vårsolbukta [20,22,30,88,89,96]
29.	*Zerconopsis labradorensis* Evans & Till, 1960	Arctic	Bjørnøya: Alfredfjellet, "Birds colony" [83]; Spitsbergen [84]
30.	*Z. muestairi* (Schweizer, 1949)	Palearctic	Bjørnøya: Teltvika [29,30]
	Melicharidae		
31.	*Proctolaelaps parvanalis* (Thor, 1930) *,**	Arctic	Bjørnøya: Alfredfjellet, "Birds colony" [83]; Edgeøya: Blåbukta, Diskobukta, Kapp Lee, Russebukta [8]; Spitsbergen: Adventdalen, Bjørndalen, Endalen, Hiorthhamn, Longyearbyen, Mälardalen, Ny-Ålesund, Petuniabukta [10,20,22,29,30,85,89,91]
	Phytoseiidae		
32.	*Neoseiulus ellesmerei* (Chant & Hansell, 1971) **	Arctic	Edgeøya: Russebukta [8,28]; Spitsbergen: Adventdalen, Endalen, Longyearbyen [28]
33.	*N. grumantensis* Kolodochka & Gwiazdowicz, 2014 *,†	Arctic	Spitsbergen: Longyearbyen, Petuniabukta [28]
34.	*N. magnanalis* (Thor, 1930) *,**,†	Arctic	Spitsbergen: Adventdalen, Hiorthhamn, Mälardalen, Ny-Ålesund, Petuniabukta [10,20,22,28,30,85,89,91]
	Dermanyssidae		
35.	*Dermnanyssus hirundinis* (Hermann, 1804)	Holarctic	Edgeøya: Blåbukta [8]; Spitsbergen: Longyearbyen, Ny-Ålesund [90,98]
	Laelapidae		
36.	*Haemogamasus ambulans* (Thorel, 1872)	Holarctic	Bjørnøya [99]; Spitsbergen: Adventdalen, Endalen, Grumantbyen, Fjortende Julibukta, Ossian Sarsfjellet, Storholmen [90,91,100]
37.	*Laelaps hilaris* C.L. Koch, 1836	Holarctic	Spitsbergen: Grumantbyen [100]
	TROMBIDIFORMES		
	Prostigmata		

Table 1. *Cont.*

No.	Taxon	Distribution	Localities
	Bdellidae		
38.	*Bdella longicornis* (Linnaeus, 1758)	Holarctic, Neotropic, Indomalayan	Bjørnøya: south [99,101]; Prins Karls Forland: MacKenziedale, Richardlaguna almost to Carmichaelpynten, Silene Hill [99,101]; Spitsbergen: Adventfjorden, Bellsund, Billefjorden, Bohemanneset, Brucebyen, Dirksbukta, Eremitten, Gipsdalen, Hiorthhamn, Sorgfjorden, Station Islands at Liefdefjorden, Salmon Lake at Dirksbukta [7,91,99,101,102]
39.	*B. semiscutata* Thor, 1930 *	Palearctic	Spitsbergen: Engelskhytta, Hiorthfjellet, Longyearbyen [91,103]
40.	*Odontoscirus lapidaria* (Kramer, 1881)	Cosmopolitan	Bjørnøya [104]; Spitsbergen: Barentsburg [91]
41.	*Cyta latirostris* (Hermann, 1804)	Cosmopolitan	Bjørnøya: Ellasjøen, south [99,101,105]; Prins Karls Forland: MacKenziedale, Silene Hill [99,101]; Spitsbergen: Adventfjorden, Barentsburg, Billefjorden, Brucebyen, Engelskhytta, "Großer Trichter", Grønfjorden, Longyearbyen, Magdalenefjorden, Salmon Lake at Dirksbukta, [7,91,99,101,103]; Svalbard [106]
42.	*Neomolgus capillatus* (Kramer, 1881)	Palearctic, Australasian	Spitsbergen: Hiorthhamn [91]
43.	*N. littoralis* (Linnaeus, 1758)	Holarctic	Bjørnøya: south [99,101,104,105]; Prins Karls Forland: Silene Hill [99,101]; Islands of Hinlopenstretet: Fosterøyane, Gyldénøyane, Vaigattøyane including Von Otterøya and Nordenskiöldøya [7]; Spitsbergen: Adventfjorden, Billefjorden, Bohemanneset, Brucebyen, Eremitten, Grønfjorden, between Hiorthhamn and Advent City, Isfjorden, Liefdefjorden, Ny-Friesland, Salmon Lake at Dirksbukta, Sassenfjorden, Sorgfjorden, south side of Reinsdyrflya [7,91,99,101,102,105]
44.	*N. pallipes* (C.L. Koch, 1879)	Holarctic	Spitsbergen: Adventfjorden, Billefjorden, Brucebyen, south side of Reinsdyrflya [7,99,101]
	Cunaxidae		
45.	*Cunaxoides croceus* (C.L. Koch, 1838)	Holarctic	Spitsbergen: "Großer Trichter" [103]
	Cocceupodidae		
46.	*Cocceupodes mollicellus* C.L. Koch 1838	Holarctic	Spitsbergen: "Großer Trichter", Hiorthhamn, Longyearbyen, Magdalenefjorden [91,103,106]
	Eupodidae		
47.	*Eupodes variegatus* C.L. Koch, 1838	Holarctic, Afrotropical	Bjørnøya: Engelskelva, Fugleodden [91]; Spitsbergen: Hanaskogdalen, Hiorthhamn, Longyearbyen? [91,103,106]
48.	*Neoprotereunetes borneri* (Thor, 1934) *,[1]	Holarctic	Spitsbergen: "Großer Trichter", Magdalenefjorden, Tempelfjorden [66,103]

Table 1. *Cont.*

No.	Taxon	Distribution	Localities
	Penthaleidae		
49.	*Penthaleus maior* (Dugès, 1834)	Cosmopolitan	Bjørnøya [102]; Spitsbergen: Hiorthhamn, Longyearbyen, Magdalenefjorden, Reinsdyrflya–Liefdefjorden, Station Islands at Liefdefjorden [7,91,103]
	Penthalodidae		
50.	*Penthalodes ovalis* (Dugès, 1834)	Holarctic	Bjørnøya [105]; Spitsbergen: Barentsburg, Hiorthhamn, Liefdefjorden, Longyearbyen, south side of Reinsdyrflya [7,91,103]
	Rhagidiidae		
51.	*Coccorhagidia clavifrons* (Canestrini, 1886)	Cosmopolitan	Spitsbergen: "Großer Trichter", Hiorthhamn, Tempelfjorden [91,103]
52.	*Rhagidia gelida* Thorell, 1872 *	Holarctic	Bjørnøya [101,102,104,105], south [99]; Spitsbergen: Adventfjorden, Bellsund, Billefjorden, Brucebyen, Dirksbukta, Eremitten, "Großer Trichter", Hiorthhamn, Lomfjorden, Reinsdyrflya-Liefdefjorden, Salmon Lake at Dirksbukta, south side of Reinsdyrflya [7,91,99,101–103,105]
	Halacaridae		
53.	*Bradyagaue alberti* (Trouessart, 1902) *	Arctic	Spitsbergen: north [107]; Hopen [107]
54.	*Copidognathus poucheti* (Trouessart, 1893) *	Atlantic Ocean, Arctic	Spitsbergen: western coast [81]; expedition to Spitsbergen: Bellsund, Isfjorden, and Prins Karls Forland [108]
55.	*C. reticulatus* (Trouessart, 1893) *	Atlantic Ocean, Arctic	Spitsbergen: western coast [81]; expedition to Spitsbergen: Bellsund, Isfjorden, and Prins Karls Forland [108], Hinlopenstretet [107]
56.	*C. richardi* (Trouessart, 1902) *	Atlantic Ocean, Arctic	Spitsbergen: north [107]; Hopen [107]
57.	*Halacarellus subterraneus* Schulz, 1933	Atlantic Ocean, Arctic, Palearctic	Spitsbergen [45]
58.	*H. subcrispus* Bartsch, 1978	Atlantic Ocean, Arctic	Spitsbergen [45]
59.	*Halacarus borealis* Trouessart, 1893 *	Atlantic Ocean, Arctic	Spitsbergen: western coast [81]; expedition to Spitsbergen: Bellsund, Isfjorden, and Prins Karls Forland [108]
60.	*Isobactrus levis* (Viets, 1927)	Atlantic Ocean, Arctic	Spitsbergen: Grønfjordbreen [109]
61.	*Rhombognathides spinipes* (Viets, 1933)	Atlantic Ocean, Arctic	Spitsbergen: Grønfjordbreen [109]
62.	*Rhombognathus subtilis* Bartsch, 1975	Atlantic Ocean, Arctic	Spitsbergen [45]
63.	*Thalassarachna coeca* (Trouessart, 1902) *	Arctic	Hopen [107]
64.	*T. princeps* (Trouessart, 1902) *	Arctic	Hopen [107]
	Triophtydeidae		
65.	*Triophtydeus pinicolus* (Oudemans, 1929) [2]	Holarctic, Australasian	Spitsbergen: Magdalenefjorden [103]

Table 1. *Cont.*

No.	Taxon	Distribution	Localities
	Tydeidae		
66.	*Tydeus langei* Thor, 1934 [3,*,†]	Arctic	Spitsbergen: "Großer Trichter", Magdalenefjorden, Tempelfjorden [103]
67.	*T. svalbardensis* Thor, 1932 [3,*,†]	Arctic	Bjørnøya: Engelskelva, Fugleodden [91,110]; Spitsbergen: "Großer Trichter", Hanaskogdalen, Hiorthhamn, Longyearbyen, Magdalenefjorden, Tempelfjorden [91,103]
	Iolinidae		
68.	*Tydaeolus globifer* (Thor, 1931)	Arctic	Spitsbergen: "Großer Trichter", Magdalenefjorden, Tempelfjorden [103]; Svalbard [47]
69.	*T. tenuiclaviger* (Thor, 1931)	Palearctic	Spitsbergen: Tempelfjorden [103]; Svalbard [47]
70.	*Microtydeus constans* Thor, 1931	Arctic	Spitsbergen: "Großer Trichter", Magdalenefjorden [103]; Svalbard [47]
	Sperchontidae		
71.	*Sperchon brevirostris* (Koenike, 1895)	Holarctic	Bjørnøya: Ellasjøen, Engelskelva, Hellevatnet, Mosevatnet, Stevatnet [91,99,111]
	Trombidiidae		
72.	*Podothrombium bicolor* (Hermann, 1804)	Palearctic	Spitsbergen: Hiorthhamn [91]
73.	*P. curtipalpe* (Thor, 1900) *	Holarctic	Spitsbergen: Hiorthhamn [91]
74.	*P. svalbardense* Oudemans, 1930 *,†	Arctic	Spitsbergen: Hiorthhamn [91]
	Syringophilidae		
75.	*Chenophila nanseni* Skoracki & Zawierucha 2016 *,†	Arctic	Spitsbergen: Nissenfjella [57]
	Stigmaeidae		
76.	*Eustigmaeus oudemansi* (Thor, 1930) *,†	Arctic	Spitsbergen: Hiorthhamn [91]
77.	*E. pulchellus* (Thor, 1930) *,†	Arctic	Spitsbergen: Hiorthhamn [91]
	Tetranychidae		
78.	*Bryobia borealis* Oudemans, 1930 *	Holarctic	Spitsbergen: "Großer Trichter", Tempelfjorden [103]; Svalbard [106,112]
79.	*B. praetiosa* C.L. Koch 1836	Cosmopolitan	Bjørnøya [105]; Spitsbergen: Salmon Lake at Dirksbukta, south side of Reinsdyrflya [7]
	Pygmephoridae		
80.	*Kerdabania arctica* (Thor, 1934) [4,*,†]	Arctic	Spitsbergen: Templefjorden [103]
	SARCOPTIFORMES		
	Endeostigmata		

Table 1. *Cont.*

No.	Taxon	Distribution	Localities
	Nanorchestidae		
81.	*Nanorchestes arboriger* (Berlese, 1904) [5]	Palearctic	Spitsbergen: "Großer Trichter", Hiorthhamn, Magdalenefjorden [91,103]
	Alicorhagiidae		
82.	*Alicorhagia clavipilus* (Thor, 1931) *	Arctic	Spitsbergen: "Großer Trichter", Hiorthhamn [103,113]
83.	*A. plumipilis* (Thor, 1931) *	Palearctic	Spitsbergen: "Großer Trichter" [103]
	Eriophyidae		
84.	*Aceria saxifragae* (Rostrup, 1900)	Holarctic	Spitsbergen: Hornsund [67]
85.	*Cecidophyes siedleckii* Kiedrowicz, Szydlo & Skoracka, 2016 *,†	Arctic	Spitsbergen: Hornsund [67]
	Oribatida		
	Brachychthoniidae		
86.	*Brachychthonius laetepictus* Berlese, 1910	Palaearctic	Spitsbergen: Magdalenefjorden, Pyramiden [20,103]
87.	*Eobrachychthonius borealis* Forsslund, 1942	Holarctic	Bjørnøya [83]; Spitsbergen: Barentsburg, Longyearbyen, Recherchefjorden [14,114]
88.	*E. latior* (Berlese, 1910)	Holarctic	Danskøya: Virgohamna [115]; Spitsbergen: Bockfjorden, Fivelflyene, Flathuken, "Großer Trichter", Helvetiadalen, Hiorthhamn, Isdammen, Longyearbyen, Magdalenefjorden, Reinsdyrflya, Sassendalen, Sven Olssonodden, Sørgattet [91,103,115,116]
89.	*E. oudemansi* Hammen, 1952	Holarctic, Neotropical, Indomalayan, Antarctic	Edgeøya: Kapp Lee, Russebukta [8] Spitsbergen: Longyearbyen, Pyramiden, Recherchefjorden [20,114,116]
90.	*Liochthonius alpestris* (Forsslund, 1958)	Palearctic	Spitsbergen: Hornsund [88]
91.	*L. brevis* (Michael, 1888)	Holarctic	Spitsbergen: Adventdalen, Barentsburg, Fivelflyene, Flathuken, Hiorthhamn, Isdammen, Reinsdyrflya, Worsleyneset [19,91,115,116]
92.	*L. clavatus* (Forsslund, 1942)	Palaearctic	Edgeøya: Blåbukta, Kapp Heuglin [8]
93.	*L. lapponicus* (Trägårdh, 1910)	Holarctic	Bjørnøya [83]; Spitsbergen: Barentsburg, Hornsund, Longyearbyen, Midtre Lovénbreen, Ny-Ålesund, Recherchefjorden [10,14,15,88,114,117,118]
94.	*L. muscorum* Forsslund, 1964	Palaearctic	Spitsbergen: Barentsburg, Hornsund [19,88]
95.	*L. neglectus* Moritz, 1976	Palearctic	Spitsbergen: Kongsfjorden [119]; based on Hodkinson's material stored in Liverpool [120]

Table 1. *Cont.*

No.	Taxon	Distribution	Localities
96.	*L. sellnicki* (Thor, 1930) *	Holarctic	Bjørnøya [83]; Hopen: Koefoedodden, Hopen radio [86]; Spitsbergen: Barentsburg, "Großer Trichter", Hiorthhamn, Longyearbyen, Magdalenefjorden, Petuniabukta, Pyramiden, Recherchefjorden, Vestpynten [14,19,20,22,91,103,105,114]
97.	*L. strenzkei* Forsslund, 1963	Holarctic	Edgeøya: Blåbukta, Kapp Heuglin, Kapp Lee, Negerdalen, Russebukta [8]
98.	*L. tuxeni* (Forsslund, 1957)	Palaearctic	Spitsbergen: Midtre Lovénbreen [10]
99.	*Neoliochthonius piluliferus* (Forsslund, 1942)	Holarctic	Edgeøya: Kapp Heuglin [8]
	Eniochthoniidae		
100.	*Eniochthonius minutissimus* (Berlese, 1903)	Cosmopolitan	Spitsbergen: Petuniabukta [22]
	Phthiracaridae		
101.	*Atropacarus striculus* (C.L. Koch, 1835)	Holarctic, Oriental, Neotropical, Australian	Spitsbergen: Barentsburg, Grønfjordenbreen, Isfjorden, Longyearbyen, Midtre Lovénbreen [10,13,14,16]
	Crotoniidae		
102.	*Camisia anomia* Colloff, 1993	Arctic	Bjørnøya [83]; Spitsbergen: Endalen, Kolhaugen, Kongsfjorden [121–129]
103.	*C. biverrucata* (C.L. Koch, 1839)	Holarctic	Edgeøya: Blåbukta, Kapp Heuglin [8]; Spitsbergen: Longyearbyen [103]
104.	*C. borealis* (Thorell, 1871) *	Holarctic	Danskøya: Virgohamna [115]; Spitsbergen: Barentsburg, Hornsund, Isfjorden, Longyearbyen, Recherchefjorden [14,16,102,114,115,130]
105.	*C. dictyna* Colloff, 1993	Holarctic	Svalbard [71]; Spitsbergen: Midtre Lovénbreen [10]
106.	*C. foveolata* Hammer, 1955	Holarctic	Bjørnøya [83]; Edgeøya: Blåbukta, Kapp Heuglin, Negerdalen, Russebukta [8]; Hopen: Hopen radio, Koefoedodden [86]; Spitsbergen: Aldegondabreen, Grønfjordenbreen, Hornsund, Kiærstranda, Knudsenheia, Midtre Lovénbreen [10,88,109,131]
107.	*C. horrida* (Hermann, 1804)	Holarctic, Oriental, Ethiopian, Neotropical	Bjørnøya [91]; Edgeøya: Diskobukta, Kapp Lee, Russebukta [8]; Spitsbergen: Barentsburg, "Großer Trichter", Hiorthhamn, Hiorthfjellet, Longyearbyen, Magdalenefjorden, Kongsfjorden, Reinsdyrflya, Recherchefjorden, Vestpynten, Petuniabukta, Pyramiden [20,22,91,103,105,114,115,132]
108.	*C. invenusta* (Michael, 1888)	Palaearctic	Svalbard [71]
109.	*C. lapponica* (Trägårdh, 1910)	Holarctic	Spitsbergen: Barentsburg, Hornsund, Longyearbyen [14,16,88]
110.	*C. spinifer* (C.L. Koch, 1836)	Holarctic, Oriental, Neotropical	Spitsbergen: Tempelfjorden [103]
111.	*Capillonothrus capillatus* (Berlese, 1914)	Holarctic	Spitsbergen: Arctowskifjellet [115]
112.	*Platynothrus peltifer* (C.L. Koch, 1839)	Holarctic, Oriental, Australian	Spitsbergen: Recherchefjorden, Sassendalen [114,115]
113.	*P. punctatus* (L. Koch, 1879)	Palaearctic	Spitsbergen: Barentsburg, Grønfjordenbreen, Isfjorden, Longyearbyen, Petuniabukta, Vestpynten [13,14,16,22]

Table 1. *Cont.*

No.	Taxon	Distribution	Localities
	Hermanniidae		
114.	*Hermannia reticulata* Thorell, 1871 *	Holarctic	Bjørnøya: Fugleodden, Tunheim [83,91,105,133]; Edgeøya: Blåbukta, Russebukta [134]; Prins Karls Forland: Silene Hill [99,101]; Spitsbergen: Barentsburg, Bellsund, Endalen, "Großer Trichter", Kongsfjorden, Longyearbyen, Magdalenefjorden, Midtre Lovénbreen, Ny-Ålesund, Observasjonsholmen, Recherchefjorden, Petuniabukta, Tempelfjorden, Vestpynten [10,12,15,22,91,102,103,114,121–123,125,129,132–134]
115.	*H. scabra* (L. Koch, 1879)	Holarctic	Bjørnøya [83,105]; Edgeøya: Kapp Lee [135]; Prins Karls Forland: Fuglehuken fyr [135]; Spitsbergen: Kapp Laila, Petuniabukta [135]
	Malaconothridae		
116.	*Malaconothrus monodactylus* (Michael, 1888)	Palaearctic	Spitsbergen: Barentsburg, Grønfjordenbreen, Isfjorden, Longyearbyen [13,14,16]
	Nanhermanniidae		
117.	*Nanhermannia sellnicki* Forsslund, 1958	Palearctic	Spitsbergen: Barentsburg, Longyearbyen [14]
	Nothridae		
118.	*Nothrus palustris* C.L. Koch, 1839	Holarctic	Spitsbergen: Barentsburg, Grønfjordenbreen, Isfjorden, Longyearbyen [13,16]
	Damaeidae		
119.	*Damaeus onustus* (C.L. Koch, 1844)	Palaearctic, Afrotropical	Spitsbergen: Barentsburg, Longyearbyen [16]
120.	*Kunstidamaeus arcticus* Miko & Monson, 2013 *,†	Svalbard	Bjørnøya [83]; Spitsbergen [72]
121.	*Subbelba montana* (Kulczynski, 1902)	Palearctic	Bjørnøya: Austervåg [91]
	Peloppiidae		
122.	*Ceratoppia bipilis* (Hermann, 1804)	Holarctic, Oriental, Neotropical	Prins Karls Forland: Silene Hill [99,101]; Spitsbergen: Kongsfjorden, Storholmen [7,12]
123.	*C. hoeli* Thor, 1930 *	Arctic	Bjørnøya: Tunheim [91]; Spitsbergen: Barentsburg, Bockfjorden, "Großer Trichter", Grønfjordenen, Hiorthfjellet, Hiorthhamn, Isdammen, Kolhaugen, Kongsfjorden, Longyearbyen, Magdalenefjorden, Recherchefjorden, Worsleyneset [91,103,114,115,121–125,127]
124.	*C. sphaerica* (L. Koch, 1879)	Palaearctic	Bjørnøya [83]; Edgeøya: Kapp Lee, Russebukta [8]; Hopen: Hopen radio, Koefoedodden [86]; Spitsbergen: Barentsburg, Hornsund, Longyearbyen, Petuniabukta, Pyramiden, Vestpynten [14–16,20,22,130]

Table 1. *Cont.*

No.	Taxon	Distribution	Localities
	Carabodidae		
125.	*Carabodes labyrinthicus* (Michael, 1879)	Holarctic	Spitsbergen: Barentsburg, Longyearbyen [14]
126.	*C. marginatus* (Michael, 1884)	Palearctic	Spitsbergen: Barentsburg, Longyearbyen [16]
	Autognetidae		
127.	*Autogneta kaisilai* Karppinen, 1967 *	Arctic	Spitsbergen: Biskayerhuken [115]
128	*Conchogneta dalecarlica* (Forsslund, 1947)	Palearctic	Spitsbergen: Midtre Lovénbreen [10]
	Oppiidae		
129.	*Dissorhina ornata* (Oudemans, 1900)	Holarctic	Bjørnøya: Fugleodden, Mosevatnet [91]; Spitsbergen: Adventdalen, Barentsburg, Biskayerhuken, Fivelflyene, Hiorthhamn, Isdammen, Longyearbyen, Magdalenefjorden, Petuniabukta, Pyramiden [14,20,22,91,103,115]
130.	*Lauroppia fallax* (Paoli, 1908)	Holarctic, IndoMalayan, Australian, Neotropical	Spitsbergen: Magdalenefjorden [103]
131.	*Microppia minus* (Paoli, 1908)	Cosmopolitan	Spitsbergen: Hornsund [136]
132.	*Moritziella microdentata* Gordeeva & Grishina, 1991	Palearctic	Spitsbergen: Hornsund [137]
133.	*Moritzoppia splendens* (C.L. Koch, 1841)	Holarctic	Bjørnøya [83]; Spitsbergen: Barentsburg, Grønfjordenbreen, Isfjorden, Longyearbyen [13,14,16]
134.	*M. unicarinata* (Paoli, 1908)	Holarctic	Edgeøya: Negerdalen [8]; Spitsbergen: Barentsburg, Longyearbyen [14,16]
135.	*Oppiella neerlandica* (Oudemans, 1900)	Holarctic	Edgeøya: Kapp Heuglin [8]; Spitsbergen: Barentsburg, "Großer Trichter", Hanaskogdalen, Hiorthhamn, Kongsfjord, Longyearbyen, Magdalenefjorden, Midtre Lovénbreen, Vestpynten [10,14,19,22,91,103,125]
136.	*O. nova* (Oudemans, 1902)	Cosmopolitan	Spitsbergen: Adventdalen, Barentsburg, Grønfjordenbreen, Hornsund, Isdammen, Isfjorden, Kongsfjorden, Longyearbyen, Petuniabukta, Reinsdyrflya, Worsleyneset [13,14,16,19,22,115,121,123,136]
137.	*O. translamellata* (Willmann, 1923)	Holarctic	Edgeøya: Diskobukta, Kapp Lee, Russebukta [8]; Hopen: Hopen radio, Koefoedodden [84]; Spitsbergen: Adventdalen, Arctowskifjellet, Barentsburg, Bockfjorden, Fivelflyene, Grønfjordenbreen, Hornsund, Isfjorden, Kolhaugen, Longyearbyen, Magdalenefjorden, Petuniabukta, Recherchefjorden, Reinsdyrflya, Stuphallet, Vestpynten, Worsleyneset [13,14,16,22,103,114,115,124,136,138]

Table 1. *Cont.*

No.	Taxon	Distribution	Localities
	Suctobelbidae		
138.	*Suctobelba hammerae* Krivolutsky, 1965	Holarctic	Spitsbergen: Barentsburg, Grønfjordenbreen, Isfjorden, Longyearbyen [13,14,16]
139.	*Suctobelbella sarekensis* (Forsslund, 1941)	Holarctic	Spitsbergen: Adventdalen, Fivelflyene [115]
140.	*S. subcornigera* (Forsslund, 1941)	Holarctic, Oriental, Australian	Spitsbergen: Barentsburg, Biskayerhuken, Grønfjordenbreen, Isfjorden, Longyearbyen, Reinsdyrflya, Worsleyneset [13,14,16,22,115]
	Tectocepheidae		
141.	*Tectocepheus alatus* Berlese, 1913	Palearctic	Spitsbergen: Recherchefjorden [114]
142.	*T. knuellei* Vanek, 1960	Palearctic	Spitsbergen: Barentsburg, Longyearbyen [14,16]
143.	*T. sarekensis* Trägårdh, 1910	Palearctic	Spitsbergen: Adventdalen, Blomstrandhalvøya, Bockfjorden, Isdammen, Kongsfjorden, Reinsdyrflya, Worsleyneset [115]
144.	*T. velatus* (Michael, 1880)	Cosmopolitan	Bjørnøya [83]; Edgeøya: Diskobukta, Kapp Lee, Russebukta [8]; Spitsbergen: Barentsburg, Hiorthhamn, Kolhaugen, Kongsfjorden, Longyearbyen, Midtre Lovénbreen, Petuniabukta, Pyramiden, Vestpynten [10,14,16,19,20,22,91,103,105,124,125]
	Ameronothridae		
145.	*Ameronothrus lineatus* (Thorell, 1871) *	Palaearctic	Bjørnøya: Engelskelva, Fugleodden, Tunheim [83,88,99,101,103,105,132,133,139]; Lågøya: [7]; Prins Karls Forland: MacKenziedale, Richardlaguna almost to Carmichaelpynten [99,101]; Spitsbergen: Adventdalen, Barentsburg, Bockfjorden, Colesbukta, Grønfjordenbreen, Kolhaugen, Liefdefjorden, Nordenskiöld Land, Ny-Ålesund, Observasjonsholmen, Reinsdyrflya, Smeerenburg, Worsleyneset [7,12,91,102,109,115,124,132,133,140–145]
146.	*A. nidicola* Sitnikova, 1975	Palaearctic	Spitsbergen: Hornsund [88]
147.	*A. nigrofemoratus* (L. Koch, 1879)	Palearctic	Bjørnøya [83]
	Micreremidae		
148.	*Micreremus brevipes* (Michael, 1888)	Palearctic	Spitsbergen: Recherchefjorden [114]
	Scutoverticidae		
149.	*Scutovertex minutus* (C.L. Koch, 1835)	Palearctic	Spitsbergen: Bockfjorden, Recherchefjorden [114,115]
	Achipteriidae		
150.	*Achipteria punctata* (Nicolet, 1855)	Holarctic	Spitsbergen: Barentsburg, Grønfjordenbreen, Isfjorden, Longyearbyen, Vestpynten [13,14,16,22]

Table 1. *Cont.*

No.	Taxon	Distribution	Localities
151.	Tegoribatidae *Scutozetes clavatosensillus* Ermilov, Martens & Tolstikov, 2013	Palearctic	Spitsbergen: Mosselbukta [146]
152.	Oribatellidae *Oribatella arctica* Thor, 1930 *	Holarctic	Edgeøya: Diskobukta, Kapp Lee [8,147]; Spitsbergen: Barentsburg, Hiorthhamn, Longyearbyen, Mälardalen, Petuniabukta, Recherchefjorden [15,22,91,103,114]
153.	Oribatulidae *Oribatula exilis* (Nicolet, 1855)	Holarctic	Bjørnøya: Fugleodden, Mosevatnet, Tunheim [91]; Prins Karls Forland: Silene Hill [99,101]; Spitsbergen: Adventdalen, Barentsburg, Engelskhytta, Hanaskogdalen, Hiorthhamn, Isfjord radio, Longyearbyen [14,91]
154.	*O. tibialis* (Nicolet, 1855)	Holarctic	Bjørnøya [83]; Edgeøya: Diskobukta, Kapp Lee, Russebukta [8]; Spitsbergen: Barentsburg, Longyearbyen, Observasjonsholmen, Petuniabukta, Storholmen, Vestpynten [12,14,15,19,22]
155.	*O. venusta* Berlese, 1908	Holarctic	Bjørnøya [83]; Spitsbergen: Adventdalen, Fivelflyene, "Großer Trichter", Longyearbyen, Magdalenefjorden, Recherchefjorden, Reinsdyrflya, Worsleyneset [103,114,115]
156.	*Phauloppia lucorum* (C.L. Koch, 1841)	Palearctic	Spitsbergen: Bellsund, Isfjorden [81,133]
157.	Scheloribatidae *Liebstadia similis* (Michael, 1888)	Holarctic, Indomalayan, Australian	Spitsbergen: Barentsburg, Grønfjordenbreen, Isfjorden, Longyearbyen [13,14,16]
158.	Ceratozetidae *Ceratozetes spitsbergensis* Thor, 1934 *	Palearctic	Edgeøya: Blåbukta, Kapp Heuglin, Negerdalen [8]; Kong Karls Land [148]; Spitsbergen: Arctowskifjellet, Barentsburg, "Großer Trichter", Kolhaugen, Longyearbyen, Magdalenefjorden, Pyramiden, Reinsdyrflya, Worsleyneset [14,20,103,115,124]

Table 1. *Cont.*

No.	Taxon	Distribution	Localities
159.	*Diapterobates notatus* (Thorell, 1871) *	Holarctic	Bjørnøya: Fugleodden, Tunheim [14–16,83,91,99,101,105,133]; Barentsøya [130]; Edgeøya: Blåbukta, Diskobukta, Kapp Heuglin, Kapp Lee, Negerdalen, Russebukta, Tjuvfjorden [8,146]; Hopen: Hopen radio, Koefoedodden [86]; Prins Karls Forland: Fuglehuken, MacKenziedale, Silene Hill [99,101,146]; Sofiaøya [146]; Spitsbergen: Adventfjorden, Barentsburg, Bellsund, Billefjorden, Blomstrandhalvøya, Bohemanneset, Dirksbukta, Endalen, Engelskhytta, "Großer Trichter", Grønfjordenen, Hiorthfjellet, Hiorthhamn, Hornsund, Isfjorden, Kolhaugen, Krykkjefjellet, Liefdefjorden, Longyearbyen, Magdalenefjorden, Midtre Lovénbreen, Ossian Sarsfjellet, Petuniabukta, Recherchefjorden, Reinsdyrflya, Sven Olssonodden, Storholmen, Vestpynten, Worsleyneset [7,10,12,14–17,19,22,91,99,101–103,114,115,121–125,129,130,132,133,146,148]
160.	*Edwardzetes edwardsi* (Nicolet, 1855)	Holarctic	Spitsbergen: Tempelfjorden; possibly from the North Cape [103]
161.	*Fuscozetes coulsoni* A. & S. Seniczak, 2020 *,†	Arctic	Edgeøya: Negerdalen [9]
162.	*Iugoribates gracilis* Sellnick, 1944	Holarctic	Spitsbergen: Kongsfjorden [119]; based on Hodkinson's material stored in Liverpool [120]
163.	*Oromurcia lucens* (L. Koch, 1879)	Holarctic	Barentsøya [130]; Spitsbergen: Vestpynten [22]
164.	*Svalbardia paludicola* Thor, 1930 *	Holarctic	Spitsbergen: Hanaskogdalen, Hiorthhamn, Hornsund, Reinsdyrflya, Ringhorndalen, Sørkapp [91,139,146]
165.	*Trichoribates berlesei* Jacot, 1929	Holarctic	Spitsbergen: Hornsund, Storholmen [12,88]
166.	*T. novus* (Sellnick, 1928)	Holarctic	Spitsbergen: Hornsund [88]
167.	*T. setiger* (Trägårdh, 1910)	Palaearctic	Bjørnøya [83]; Spitsbergen: Recherchefjorden [114]
	Chamobatidae		
168.	*Chamobates birulai* (Kulczynski, 1902) *	Palaearctic	Spitsbergen [133]
169.	*C. borealis* (Trägårdh, 1902)	Palaearctic	Spitsbergen: Hornsund [88]
	Punctoribatidae		
170.	*Mycobates bicornis* (Strenzke, 1954)	Palaearctic	Spitsbergen: Midtre Lovénbreen [10]
171.	*M. parmeliae* (Michael, 1884)	Holarctic	Spitsbergen: Barentsburg, Longyearbyen, Midtre Lovénbreen [10,14,16]

Table 1. *Cont.*

No.	Taxon	Distribution	Localities
172.	*M. sarekensis* (Trägårdh, 1910)	Holarctic	Bjørnøya [91]; Edgeøya: Kapp Lee, Russebukta [8,149]; Spitsbergen: Adventdalen, Arctowskifjellet, Bockfjorden, Engelskhytta, Fjortende Julibukta, "Großer Trichter", Hiorthfjellet, Hiorthhamn, Hornsund, Isdammen, Kongsfjorden, Longyearbyen, Magdalenefjorden, Mosselbukta, Recherchefjorden, Sassendalen, Signehamna, Storholmen, Sørkapp, Vestpynten [22,91,103,114,115,121,123,125,149]
173.	*M. tridactylus* Willmann, 1929	Holarctic	Spitsbergen: Barentsburg, Longyearbyen [14]
174.	*Punctoribates punctum* (C.L. Koch, 1839)	Holarctic, Oriental, Australian	Spitsbergen: Barentsburg, Longyearbyen, Petuniabukta [14,16,22]
	Galumnidae		
175.	*Pergalumna nervosa* (Berlese, 1914)	Holarctic	Spitsbergen: Hornsund [136]
	Acaridae		
176.	*Sancassania mycophagus* (Mégnin, 1874)	Cosmopolitan	Spitsbergen: Hornsund [91]
	Alloptidae		
177.	*Alloptes* (*Sternalloptes*) *stercorarii* Dubinin, 1952	Arctic	Spitsbergen: Ny-Ålesund [74]
	Avenzoariidae		
178.	*Zachvatkinia isolata* Mironov, 1989	Arctic, Neotropical, Australian, Afrotropical	Spitsbergen: Ny-Ålesund [74]

Note: *—new to science; **—redescription on the base of material from Svalbard; †—so far found only on Svalbard. [1] [150] proposed the genus *Neoprotereunetes* for those species of "*Protereunetes*" that remained in the Eupodidae after the type specimen of *Protereunetes* (*P. agilis* Berlese, 1923) was transferred to *Ereynetes* [66]. It is implied that this new genus includes *Protereunetes borneri* Thor, 1934, but the combination was not published. [2] Identity and generic affiliation of this species is questionable [46]; possible record from Greenland with inconclusive identification [48]. [3] Species not included in [50], *species inquierenda*? [4] Inadequately described, not included in key to species [61]. [5] Although specimens from Svalbard were apparently examined, this species was not confirmed from Svalbard [65].

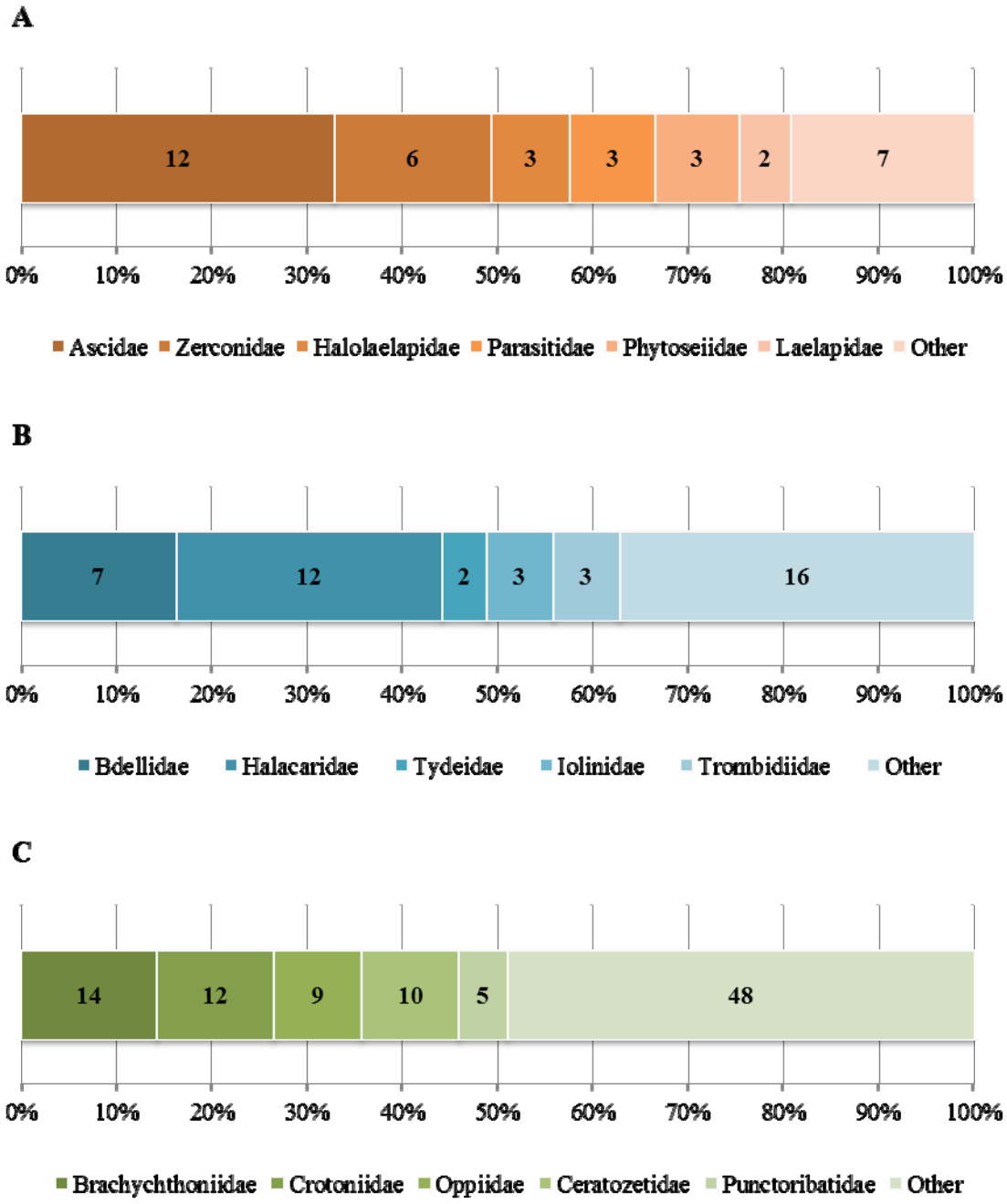

Figure 2. Diversity of the mite families in Svalbard: (**A**) Mesostigmata; (**B**) Trombidiformes; (**C**) Sarcoptiformes. The number of species occurring in Svalbard is presented on bars. No figure was made for the Ixodida, which is represented in Svalbard by one family only.

More than a half of the Mesostigmata species known from Svalbard have been recorded there only once (Table 2). The majority of these are recent findings, but four were reported only in the first half of the last century, including *Arctoseius laterincisus*, which has an Arctic distribution. Four other records come from the second half of the last century, including another species with an Arctic distribution—*Halolaelaps gerlachi*.

Table 2. Mite species found on Svalbard only once (or by the same author at a similar time).

Until 1950	1951–2000	After 2001	Reference
Mesostigmata			
U. acuminatus			[81]
		Z. curiosus	[85]
Z. triangularis			[91]
		P. (A.) insertus	[18]
		V. immanis	[92]
		V. remberti	[18]
		D. foveolatus	[20]
		H. coulsoni *	[93]
	H. gerlachi *		[94]
		S. baloghi	[8]
G. borealis			[7]
		M. muscaedomesticae	[84]
	A. cetratus		[96]
A. laterincisus *			[91]
	A. ornatus		[96]
		N. grumantensis *	[28]
	L. hilaris		[100]
Trombidiformes			
B. semiscutata *			[91,103]
N. capillatus			[91]
C. croceus			[103]
		A. saxifragae	[67]
P. borneri *			[103]
P. maior			[102]
C. clavifrons			[91,103]
B. alberti *			[107]
C. poucheti *			[81]
C. reticulatus *			[107]
C. richardi *			[107]
		H. subterraneus	[45]
		H. subcrispus	[45]
H. borealis *			[81]
		I. levis	[109]
		R. spinipes	[109]
		R. subtilis	[45]
T. coeca *			[107]
T. princeps *			[107]
T. globifer *			[103]
T. tenuiclaviger *			[103]
M. constans *			[103]
T. langei *			[103]
P. bicolor			[91]
P. curtipalpe *			[91]
P. svalbardense *			[91]
E. oudemansi *			[91]
E. pulchellus *			[91]
		C. nanseni *	[57]
K. arctica *			[103]

Table 2. *Cont.*

Until 1950	1951–2000	After 2001	Reference
Sarcoptiformes			
A. clavipilus *			[103,113]
A. plumipilis *			[103]
		C. siedleckii *	[67]
	L. alpestris		[88]
		L. clavatus	[8]
		L. neglectus	[119]
		L. tuxeni	[10]
C. spinifer			[103]
	C. capillatus		[115]
		N. sellnicki	[14]
		D. onustus	[16]
S. montana			[91]
		C. labyrinthicus	[14]
		C. marginatus	[16]
	A. kaisilai *		[115]
		C. dalecarlica	[10]
L. fallax			[103]
	M. minus		[136]
	S. sarekensis		[115]
	T. alatus		[114]
	T. sarekensis		[115]
	A. nidicola		[88]
		A. nigrofemoratus	[83]
		S. clavatosensillus	[146]
E. edwardsi			[103]
		F. coulsoni *	[9]
		I. gracilis	[119]
	T. novus		[88]
	C. birulai *		[133]
	C. borealis		[88]
		M. bicornis	[10]
	P. nervosa		[136]
S. mycophagus			[91]
		A. stercorarii	[74]
		Z. isolata	[74]

Note: *—new to science.

Most of the Mesostigmata species known from Svalbard have a Palaearctic distribution (Figure 3). Arctic species are also abundant and comprise nearly 40% of Svalbards total mesostigmatic diversity, while Holarctic species are less numerous. Five species have so far been found only in Svalbard (Table 1), including recent records (*Halolaelaps coulsoni* and *Neoseiulus grumantensis*) and historic records (*Halolaelaps gerlachi*, *Arctoseius laterincisus* and *Neoseiulus magnanalis*). Mesostigmata have been recorded from five islands in the Svalbard archipelago (Figure 1). Although most of the species are known from Spitsbergen, *Saprosecans baloghi* Karg, 1964, is known only from Edgeøya and *Zerconopsis muestairi* (Schweizer, 1949) has been found exclusively on Bjørnøya (Table 1).

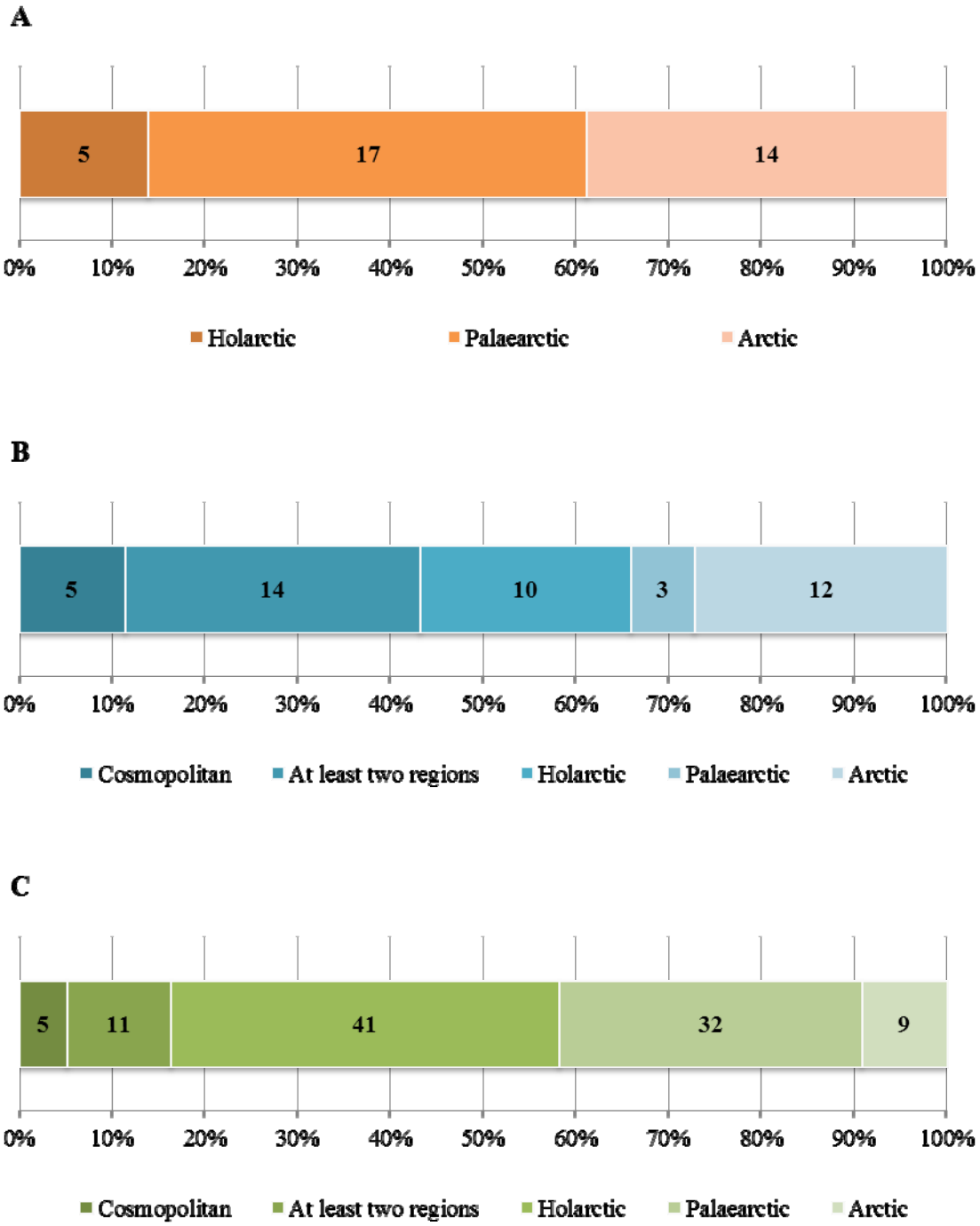

Figure 3. Distribution of mite species occurring in Svalbard: (**A**) Mesostigmata; (**B**) Trombidiformes; (**C**) Sarcoptiformes. No figure was made for the Ixodida, which are represented in Svalbard by one species with a distribution in "at least two regions" (see Table 1 for details).

3.3. Trombidiformes

The order Trombidiformes is represented in Svalbard only by the suborder Prostigmata with 17 families and 43 species recorded. The most diverse are the marine Halacaridae (12 spp.), followed by the terrestrial Bdellidae (7 spp.); these two families together comprise 44% of all the Trombidiformes known from Svalbard (Figure 1).

A strikingly large number of new species (19) have been described from Svalbard; i.e., nearly half of all Trombidiformes known from this archipelago: *Bdella semiscutata* Thor, 1930; *Neoprotereunetes borneri* (Thor, 1934); *Rhagidia gelida* Thorell, 1872; *Bradyagaue alberti* (Trouessart, 1902); *Copidognathus*

poucheti (Trouessart, 1893); *C. reticulatus* (Trouessart, 1893); ***C.** richardi* (Trouessart, 1902); *Halacarus borealis* Trouessart, 1893; *Thalassarachna coeca* (Trouessart, 1902); *T. princeps* (Trouessart, 1902); *T. langei* Thor, 1934; *T. svalbardensis* Thor, 1932; *Podothrombium curtipalpe* (Thor, 1900); *P. svalbardense* Oudemans, 1930; *Chenophila nanseni* Skoracki & Zawierucha, 2016; *Eustigmaeus oudemansi* (Thor, 1930); *E. pulchellus* (Thor, 1930); *Bryobia borealis* Oudemans, 1930; and *Kerdabania arctica* (Thor, 1934). Moreover, 85% of the new species described from Svalbard have been recorded only once and mostly from early studies of the mite fauna (Table 2).

Species with wide geographical distributions predominate; cosmopolitan and Holarctic species, and those present in at least two zoogeographic regions (except that the Holarctic is treated as one unit) together comprise 66% of all the Trombidformes (Figure 2). Arctic species are also abundant representing 27% of the recorded species, while the fewest number of species have Palaearctic distributions. There are seven species which have only been recorded from Svalbard (Table 1), but these are mostly single old records of Sig Thor, including *Tydeus langei*, *T. svalbardensis*, *Podothrombium svalbardense*, *Eustigmaeus oudemansi*, *E. pulchellus*, and *Kerdabania arctica*. The one exception is the recently described *Chenophila nanseni*.

Trombidiformes have been found on five islands/island groups, predominantly on Spitsbergen (40 species), with others collected from Bjørnøya (11), Prins Karls Forland (6), Hopen (4), and a single species on the small islands of the Hinlopenstretet. A large number of species (27) have been found exclusively on Spitsbergen, one species [*Sperchon brevirostris* (Koenike, 1895)] only on Bjørnøya and two others (*Thalassarachna coeca* and *T. princeps*) only on Hopen (Table 1).

3.4. Sarcoptiformes

In Svalbard, 98 species of Sarcoptiformes from two suborders (Endeostigmata with 5 species and Oribatida with 93 species) have been recorded (Table 1). They represent 33 families; the richest in species is the Brachychthoniidae (14 spp.), followed by the Crotoniidae (12 spp.), Ceratozetidae (10 spp.), Oppiidae (9 spp.), and Punctoribatidae (5 spp.). Together, these five families comprise 51% of the species diversity of Sarcoptiformes in Svalbard (Figure 1). Some families are represented by only 1–4 species, yet this constitutes a significant share of their known global diversity. For example, 22% of the species belonging to the endeostigmatid family Alicorhagiidae occur in Svalbard. The oribatid families Eniochthoniidae, Peloppiidae and Tectocepheidae are also represented by large proportions of their total known species diversity, with 17%, 27%, and 24%, respectively.

Sixteen new species of Sarcoptiformes have been described from Svalbard: *Alicorhagia clavipilus* (Thor, 1931); *A. plumipilis* (Thor, 1931); *Cecidophyes siedleckii* Kiedrowicz, Szydlo & Skoracka, 2016; *Liochthonius sellnicki* (Thor, 1930); *Camisia borealis* (Thorell, 1871); *Hermannia reticulata* Thörell, 1871; *Kunstidamaeus arcticus* Miko & Monson, 2013; *Ceratoppia hoeli* Thor, 1930; *Autogneta kaisilai* Karppinen, 1967; *Ameronothrus lineatus* (Thorell, 1871); *Oribatella arctica* Thor, 1930; *Ceratozetes spitsbergensis* Thor, 1934; *Diapterobates notatus* (Thorell, 1871); *Fuscozetes coulsoni* A. & S. Seniczak, 2020; *Svalbardia paludicola* Thor, 1930; and *Chamobates birulai* (Kulczynski, 1902).

Species with wide geographic ranges together form 58% (cosmopolitan, 5%; Holarctic, 42%; and those found in at least two regions, 11%) of the sarcoptiform species (Figure 2). Species with a Palaearctic distribution also make up a substantial proportion (33%), with the remaining species having an Arctic distribution. Two of these Arctic species have only been found in the north of Spitsbergen: *Autogneta kaisilai* in Biskayerhuken and *Scutozetes clavatosensillus* Ermilov, Martens & Tolstikov, 2013, in Mosselbukta; and *Fuscozetes coulsoni* exclusively on Edgeøya (Table 1, Figure 3). Three species have been recorded only from Svalbard and these are all recently described new species (Table 1).

Sarcoptiformes have been recorded from ten islands in the Svalbard archipelago, but not on Nordaustlandet. The most commonly collected species is *Diapterobates notatus* (Table 1) found on seven islands and at nearly all collecting localities. Five species [*Camisia foveolata* Hammer, 1955; *Hermannia reticulata, H. scabra* (L. Koch, 1879); *Ceratoppia sphaerica* (L. Koch, 1879); and *Ameronothrus lineatus* (Thorell, 1871)] have been found on four islands and another seven other species [*Camisia horrida*

(Hermann, 1804); *Mycobates sarekensis* (Trägårdh, 1910); *Ceratozetes spitsbergensis*; *Oppiella translamellata* (Willmann, 1923); *Tectocepheus velatus* (Michael, 1880); *Oribatula exilis* (Nicolet, 1855); and *O. tibialis* (Nicolet, 1855)] on three islands. All of these species also have a wider distribution on Spitsbergen (Table 1, Figure 3).

Some species have been found exclusively on one island (Table 1), including 57 found only on Spitsbergen, four [*Liochthonius clavatus* (Forsslund, 1942); *L. strenzkei* Forsslund, 1963; *Neoliochthonius piluliferus* (Forsslund, 1942); and *Fuscozetes coulsoni*] on Edgeøya, and two [*Subbelba montana* (Kulczynski, 1902) and *Ameronothrus nigrofemoratus* (L. Koch, 1879)] from Bjørnøya.

Approximately one third of the sarcoptiform species have been recorded in Svalbard only once (Table 2). Seven of them were found in the first half of the last century and, 12 others, in the second half of the last century, including the descriptions of four new species.

4. Discussion

The acarofauna of the Svalbard archipelago is diverse with 178 recorded species comprising one Ixodida, 36 Mesostigmata, 43 Trombidiformes, and 98 Sarcoptiformes. However, compared with other regions of the Arctic (Alaska, Greenland, Iceland, and Taimyr), the species diversity is lower [151]. This paucity is likely to be explained by a combination of the small area of Svalbard (60% covered by permanent snow or glaciers) [4], the greater geographic isolation, and in some cases, the more northerly locality and harsher climate. As an example, from Iceland there are 428 species of mites known, with eight Ixodida, 131 Mesostigmata, 101 Trombidiformes, and 188 Sarcoptiformes [151–153]. Although Iceland has an area only 1.5 times greater than Svalbard, the island lies at a lower latitude (between 63° and 66° north latitude), glaciers cover only 11% of its area, and it lies in the path of the North Atlantic Current, which results in a more ameliorated climate. The diversity of mites in Svalbard is also much poorer in comparison to mainland Norway: Ixodida comprise 8% here with Mesostigmata—15%, Trombidiformes—13%, and Sarcoptiformes—30% [154–157]. However, these differences are not unexpected considering that the Svalbard archipelago is situated 900 km from the northern border of mainland Norway and has an area of only one fifth of that of mainland Norway [158].

The geographical isolation of islands, as a rule, results in reduced biodiversity [159], but, on the other hand, nurtures unique endemic species [160]. Svalbard has a unique flora and fauna, including endemic invertebrates: three rotifers, four tardigrades, and two aphids [86]. Fifteen mite species have been found exclusively in Svalbard, six of them being recent observations. The remaining are single historic records (i.e., from the first half of the last century) and it is consequently uncertain if any of these are endemic to Svalbard or the result of taxonomic confusion. Finding and studying the types or neotypes in Svalbard, along with more extensive sampling in the Arctic and including molecular studies, could help resolve this question.

Nevertheless, the Svalbard acarofauna is unique due to its specific Arctic elements. Amongst the Svalbard Mesostigmata in particular there are many species with an Arctic distribution (which make up nearly 40% of this group) and are similar to that observed on Greenland [151]. By contrast, the Sarcoptiformes in Svalbard are predominated by species with wide geographical ranges extending beyond the Arctic, as also seen with the Sarcoptiformes species known from Greenland [151] and northern Russia [161]. This difference between the two orders may be explained by the younger geological age of the Mesostigmata and their faster evolution rate [162]. Similarly, the Trombidiformes, which are also an ancient group [163], are dominated in Svalbard by species with wide geographic distributions. Nonetheless, Arctic species seem to be abundant among the Trombidiformes of Svalbard, comprising 27% of the species recorded, but these data should be treated with caution because they are mostly based on historic records that need to be confirmed.

Another characteristic feature of the Svalbard acarofauna is the large number of species new to science described from this region—they form approximately 25% of all mite species known from Svalbard. Seven of these species belong to the Mesostigmata, 19 to Trombidiformes, and 16 to

Sarcoptiformes. However, many of these new species were found only once and early in the study of the mite fauna of Svalbard. These species include one mesostigmatid species, 18 Trombidiformes species (i.e., 90% of all new species from this group), and two Sarcoptiformes species. Confirming these identifications is complicated by outmoded descriptions, incomplete, or too general drawings, and by the unavailability of most type material. These species require special attention in future studies. They are possibly rare or have been wrongly identified but the possibility cannot be excluded that they have disappeared from Svalbard due to environmental changes or that they were introduced and their populations have not established in Svalbard.

Out of 36 mite species found in Svalbard only once by early workers, the majority of species (24) were collected by Sig Thor, including one new species of Mesostigmata, eight new species of Trombidiformes, and two new species of Sarcoptiformes (Table 2). Despite the widespread belief that the collection of Thor along with all his valuable type material was destroyed in accordance with Thor's wishes (see, e.g., remark 2 on page 1308 in [148]), this collection exists and is kept at the Natural History Museum in Oslo, Norway [164]. However, it is in a very poor condition and it is not certain whether the Svalbard material is in a suitable condition for re-examination.

Fortunately, some of Thor's species have been found by later sampling campaigns and redescribed, for instance, *Antennoseius* (*Vitzthumia*) *oudemansi*, *Neoseiulus magnanalis*, *Proctolaelaps parvanalis*, and the specimens obtained deposited in zoological collections as neotypes [28,79]. In addition, six new species of mites have been found recently in Svalbard, including two Mesostigmata—*Neoseiulus grumantensis* and *Halolaelaps coulsoni* [28,93], one Trombidiformes—*Chenophila nanseni* [57], and three Sarcoptiformes—*Cecidophyes siedleckii*, *Kunstidamaeus arcticus*, and *Fuscozetes coulsoni* [9,67,72].

Recently, the first species of Ixodida, the seabird tick (*Ixodes uriae*), was discovered in Svalbard [76–78]. This tick is a major parasite of seabirds breeding at high latitudes and has the most extensive geographical distribution of all tick species [23], being also common throughout mainland Norway [165]. Its increasing occurence in Svalbard may be related to warming winters (the tick overwinters at the breeding sites of the seabirds) [78] as was similarly observed in Iceland with another tick species, *I. ricinus* Linnaeus, 1758, and which has become more common in recent years [153].

Studies conducted during the past 20 years have also added 16 species of Mesostigmata [8,18,20,27,28,30,85,92,93,95,98,166] and 36 species of Sarcoptiformes to the Svalbard fauna [8–10,67,71,72,74,146,167]. This indicates that despite the relatively long history of mite studies for a region in the Arctic, our knowledge remains surprisingly poor. It is striking, however, that the Trombidiformes have been much less studied in Svalbard than other mite groups (Table 1). The reference list presented here includes only 18 papers referring to the Trombidiformes (vs. 72 papers on Sarcoptiformes and 34 on Mesostigmata), most of which were published at the end of the 19th and first half of the 20th centuries. Only three come from the present century. Therefore, it is clear that in future studies this group in particular should receive more attention.

There are also some species in Svalbard that have extraordinary disjunct distribution patterns: they occupy mainly the Arctic and parts of the subarctic regions, but are also found in some distant localities, in harsh conditions. One example is an oribatid species, *Ceratozetes spitsbergensis*, which has been assumed to be an Arctic species, present in Svalbard, Alaska [148], northern Canada [168,169] and the Nordic Arctic of the Russian Far East [148,170], but was found also in the Altai Mountains in Mongolia, at an altitude of 2800–3200 m a.s.l. [171] and in the Alps in Austria, at an altitude of 3300 m a.s.l. [172]. Since it was not found at lower elevations and/or lower latitudes, its presence in the Alps was explained by one of these theories: relict distribution [a cold-adapted species that was widely distributed in Europe during the Last Glacial Maximum (LGM), but when conditions became warmer it retreated to very restricted areas at high altitudes], or the nunatak hypothesis (survival of species on ice-free refuges) [172]. Some studies suggest that parts of Svalbard, e.g., Amsterdamøya (north-west of Svalbard), remained ice-free during the LGM [173]. It is thus possible that some invertebrates survived the LGM *in situ* in these glacial refugia, although, due to the harsh conditions prevailing over an

extended period of time, it seems likely that most biota could probably not survive on nunataks [86]. Another oribatid mite with an interesting distribution is *Scutozetes clavatosensillus*, which has been found only in Svalbard and in Nepal (Dhaulagiri massif, 3200–3600 m a.s.l.); its distribution may also be related to glacial history. Similarly to *S. clavatosensillus*, the mesostigmatic species, *Paragamasus* (*Aclerogamasus*) *insertus*, may also be a glacial relict since it is known only from the Gory Stolowe Mtns., Poland [174,175], where it occurred in rock crevices in very extreme conditions with long-lasting snow cover, and recently collected in Svalbard [18].

The composition of the present acarofauna of Svalbard likely results mostly from postglacial immigration [86]. The mites, being wingless, have rather low dispersal abilities. However, phoresy with migrating birds [13–17] or insects [18,95], and transport on driftwood or even direct dispersal in or on seawater with ocean currents [11], are possible dispersal pathways from the mainland to, or between, remote islands such as the Svalbard archipelago. Humans may also play a role in the dispersal of mites; as with the import of fertile agricultural soils transported from southern Russia and contemporary Ukraine to the Russian settlements on Spitsbergen (Barentsburg and Pyramiden) to enrich the soils of the greenhouses and grass lawns [18,19]. Mite communities in such transformed microhabitats differ noticeably from those of the adjacent Arctic tundra. Moreover, manure from abandoned cow sheds provided specific ameliorated environmental conditions enabling the survival of terrestrial invertebrate species not yet recorded elsewhere in Svalbard [18–20]. Introduction of new species to islands can be deleterious since the island communities may be disrupted, often resulting in the extinction of their endemic species [176–178].

Reconstructing the colonization of Svalbard after the LGM may be attempted by observing primary succession before retreating glaciers. For example, at the Midtre Lovén glacier foreland, two oribatid species, *Camisia foveolata* and *Tectocepheus velatus*, were the first colonizers. Mesostigmata appeared later, *Proctolaelaps parvanalis* being the first species recorded at this glacier foreland [10]. All these species are widely distributed in different parts of the archipelago (see Table 1). *Tectocepheus velatus* was also the earliest colonizer on a glacier foreland in southern Norway [179], while *Camisia foveolata* was one of the first colonizers on geothermally active lava fields in Iceland [180]. Oribatida are mainly saprophagous but species that are fungivores, bacteriovores, algivores, or omnivores, such as *T. velatus*, can find the appropriate food on seemingly baren ground [181]. In turn, the development of the first animal communities provides prey to the predatory Mesostigmata.

As shown in the present review, acarological studies of Svalbard are heavily geographically biased since most sampling has been carried out on the largest island—Spitsbergen; 90% of papers refer to this island and 90% of species have been found there (see Table 1). Almost 20% of papers refer to Bjørnøya and 25% of the species total for the archipelago have been found there, while 7% of papers refer to Edgeøya and 17% of the species are known from there. Nine other islands and island groups have been studied to a much lesser extent, with single records from other locations. It needs to be emphasized that some mites have been found exclusively on one island, other than Spitsbergen: five species on Edgeøya (*Saprosecans baloghi*, *Liochthonius clavatus*, *L. strenzkei*, *Neoliochthonius piluliferus*, and *Fuscozetes coulsoni*), four on Bjørnøya (*Zerconopsis muestairi*, *Sperchon brevirostris*, *Subbelba montana*, and *Ameronothrus nigrofemoratus*), and two on Hopen (*Thalassarachna coeca* and *T. princeps*), including three species new to science. It is unclear why these species have not been collected from Spitsbergen despite the more comprehensive sampling efforts on this island. The importance of further studies in different parts of the Svalbard archipelago is highlighted, in particular since the archipelago is extremely diverse geographically and climatically.

In natural conditions, the species composition and abundance of mites depends mainly on the vegetation [89], which, in turn, depends largely on the climate. For example, a relatively high mesostigmatid diversity is present along the western coast of Spitsbergen (about 30 species) [86], which experiences a comparatively mild climate for the latitude, in contrast to the polar deserts, where only five species were recorded [30]. Within the same climatic conditions, the densities of the mites also vary greatly according to the vegetation types [22,30,88,89,136].

Since mites are connected in different ways with other parts of the ecosystem, it would be particularly interesting to apply a multi-disciplinary approach to trace the effect of climate change in Svalbard. For example, one of the understudied mite groups is the family Eriophyidae. This family includes phytophagous species of great economic importance and with high invasive potential, and could be very useful for ecological studies on the effects of a changing climate at Svalbard [67]. Another poorly known group is the hyperorder Astigmata, parasitizing birds [74]. It is well-documented that climatic changes are affecting the diversity of seabirds by changing their foraging and breeding ecology, as well as increasing the abundance of temperate species [6], which could in turn affect bird-associated Astigmata.

Attention should also be paid to the least known mite order in Svalbard, the Trombidiformes, which is extremely diverse with respect to their feeding preferences (this taxon includes algivores, bacterivores, fungivores, predators, and parasites), and occupies terrestrial, freshwater, and marine habitats [182], but has not been studied at all from an ecological perspective in Svalbard.

Acarological research in the Arctic has developed rapidly in the last 20 years, markedly contributing to the knowledge of the mite communities and increasing somewhat our understanding of the factors determining these communities. Nonetheless, little is understood about the physical and morphological adaptations of mites, their adaptations to the extreme Arctic environment, or the genetic biodiversity of these isolated populations. Moreover, research has focused on the larger and more easily accessible regions of the archipelago to the detriment of the more environmentally extreme eastern and northern regions. There has also been a focus on the Sarcoptiformes and Mesostigmata while the Trombidiformes have been neglected. These areas will remain the subject of our research in the forthcoming years.

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