

Supplementary file for: Zawierucha K., Smykla J., Michalczyk Ł., Gołdyn B. & Kaczmarek Ł. 2015. Distribution and diversity of Tardigrada along altitudinal gradients in the Hornsund, Spitsbergen (Arctic). *Polar Research* 34. Correspondence: Krzysztof Zawierucha, Department of Animal Taxonomy and Ecology, Faculty of Biology, A. Mickiewicz University in Poznań, Umultowska 89, PL-61-614 Poznań, Poland. E-mail: k.p.zawierucha@gmail.com.

Supplementary Table S1. List of sampling sites, their geographic coordinates, plant type, total dry weight, substratum type and altitude along the transect on the Arie kammen slope (A1-A11) and the Rotjesfjellet slope (R1-R9).

Site code	Coordinates	Sample type	Dry weight (g)	Substratum	Altitude (m a.s.l.)
A1	77°01'10"N; 15°31'16"E	4 × moss	10.17	rock	524
A2	77°01'04"N; 15°31'11"E	2 × moss	1.73	rock	450
A3	77°00'58"N; 15°31'10"E	2 × moss 1 × lichen	8.10	rock	400
A4	77°00'48"N; 15°30'58"E	2 × moss 1 × liverwort 1 × lichen	7.89	rock	350
A5	77°00'55"N; 15°32'15"E	1 × liverwort 2 × lichen	10.69	rock	338
A6	77°00'47"N; 15°31'12"E	2 × lichen 2 × moss	9.18	rock	300
A7	77°00'43"N; 15°31'16"E	1 × lichen 1 × moss	4.67	rock	250
A8	77°00'40"N; 15°31'21"E	1 × lichen 1 × moss	8.47	rock	200
A9	77°00'36"N; 15°31'10"E	2 × lichen 2 × moss	10.32	rock	150
A10	77°00'31"N; 15°31'43"E	1 × lichen 2 × moss	5.55	rock	50
A11	77°00'18"N; 15°32'01"E	1 × moss 1 × lichen	7.08	rock	14
R1	77°00'40"N, 15°22'20"E	3 × moss	6.13	rock	437
R2	77°00'35"N, 15°22'58"E	3 × moss	15.17	rock	399
R3	77°00'35"N, 15°22'58"E	1 × moss	3.08	rock	350

Site code	Coordinates	Sample type	Dry weight (g)	Substratum	Altitude (m a.s.l.)
R4	77°00'40"N, 15°23'21"E	2 × mixed (moss/lichen/soil) 2 × moss	15.45	soil	301
R5	77°00'29"N, 15°23'35"E	2 × moss	6.84	soil	250
R6	77°00'26"N, 15°23'42"E	2 × moss	6.88	soil	201
R7	77°00'22"N, 15°23'45"E	2 × moss	9.24	soil	150
R8	77°00'19"N, 15°23'55"E	2 × moss	7.80	soil	100
R9	77°00'16"N, 15°24'02"E	2 × moss	10.89	soil	50

Supplementary Table S2. List of all species found in the present study with information on previous records from Svalbard and basic zoogeographic and taxonomic remarks. Only species found in the Arie kammen transect (A1-A11) are included. For the species found in the Rotjesfjellet transect see Kaczmarek et al. (2012).

Species	Previous records in Svalbard according to Zawierucha et al. (2013)	Present study (localities: number of specimens + eggs found)	Remarks
<i>Adropion belgicae</i> Richters, 1911	Spitsbergen, Bjørnøya, Hopen	A9: 1 specimen	Cosmopolitan (McInnes 1994).
<i>Adropion prorsirostre</i> Thulin, 1928	Spitsbergen	A11: 1 specimen, A8: 1	The <i>Adropion prorsirostre</i> complex is cosmopolitan (McInnes 1994); however, most records needs to be verified. This is the second report of this species from Svalbard.
<i>Adropion scoticum</i> Murray, 1905	Spitsbergen, Prins Karls Forland, Hopen, Edgøya, Barentsøya	A10: 1	The <i>Adropion s. scoticum</i> complex is cosmopolitan (Kaczmarek et al. 2014); however, most records needs to be verified.

Species	Previous records in Svalbard according to Zawierucha et al. (2013)	Present study (localities: number of specimens + eggs found)	Remarks
<i>Bryodelphax parvulus</i> Thulin, 1928	Spitsbergen	A3: 8 specimens	Cosmopolitan (McInnes 1994) species but many reports need to be confirmed. This is the second record of this species from Svalbard.
<i>Calohypsibius ornatus</i> (Richters, 1900)	Spitsbergen, Bjørnøya, Amsterdamøya	A1: 1 specimen, A6: 1	Cosmopolitan (McInnes 1994).
<i>Diphascon pingue pingue</i> (Marcus, 1936)	Spitsbergen, Hopen, Barentsøya	A1: 11 specimen, A5: 1, A9: 7	The <i>pingue</i> group of species is cosmopolitan (Kaczmarek et al. 2014); however, most records need to be verified (Fontoura & Pilato 2007).
<i>Diphascon tenue</i> Thulin, 1928	Spitsbergen	A6: 1 specimen, A9: 1	Holarctic species, recorded from sparse localities in Europe and North America (McInnes 1994).
<i>Echiniscus blumi blumi</i> Richters, 1903	Spitsbergen	A9: 2 specimens	Palaeartic (McInnes 1994).
<i>Echiniscus capillatus</i> Ramazzotti, 1956	Spitsbergen	A3: 2 specimens	Species with rather disjunct distribution, known from the Palaeartic, Neotropic and the polar regions (McInnes 1994).
<i>Echiniscus merokensis merokensis</i> Richters, 1904	Spitsbergen	A1: 15 specimens, A5: 22, A7: 1	Palaeartic (McInnes 1994).
<i>Echiniscus wendti</i> Richters, 1903	Spitsbergen	A1: 15 specimens, A2: 2, A3: 125, A4: 7, A5: 16, A6: 8, A7: 17, A8: 1, A10: 22, A11: 1	Cosmopolitan (McInnes 1994).

Species	Previous records in Svalbard according to Zawierucha et al. (2013)	Present study (localities: number of specimens + eggs found)	Remarks
<i>Hebesuncus conjungens</i> (Thulin, 1911)	Spitsbergen, Barentsøya	A1: 2 specimens, A4: 2, A6: 6, A7: 1, A10: 2.	Cosmopolitan (McInnes 1994).
<i>Hypsibius microps</i> Thulin, 1928	Spitsbergen	A1: 9 specimens, A3: 4, A9: 1	A possible species complex which can be confused with the <i>Hypsibius convergens-dujardini</i> complexes (Kaczmarek et al. 2014) and most records need to be verified (Kaczmarek & Michalczyk 2009).
<i>Hypsibius pallidus</i> Thulin, 1911	Spitsbergen	A2: 3 specimens, A6: 1, A8: 11, A10: 114+11 exuvium, A11: 1	Cosmopolitan (Kaczmarek et al. 2014) (but see also comments to <i>H. microps</i>).
<i>Isohypsibius coulsoni</i> Kaczmarek et al. 2012	Spitsbergen, Prins Karls Forland	A3: 2	So far known only from Svalbard. This is the second record of the species.
<i>Isohypsibius prosostomus prosostomus</i> Thulin, 1928	Spitsbergen	A3: 4 specimens, A5: 2,	Cosmopolitan (McInnes 1994).
<i>Isohypsibius sattleri</i> (Richters, 1902)	Spitsbergen	A11: 1	Questionable cosmopolitan distribution (Kaczmarek et al. 2014).
<i>Macrobiotus crenulatus</i> Richters, 1904	Spitsbergen, Prins Karls Forland, Edgøya, Hopen, Amsterdamøya	A8: 1 specimen, 3 eggs, A10: 22, 18	Holarctic (Kaczmarek et al. 2014). Specimens correspond perfectly to the description by Binda (1988).
<i>Macrobiotus harmsworthi harmsworthi</i> Murray, 1907	Spitsbergen, Prins Karls Forland, Edgøya, Hopen, Kong Ludvigøyanne	A1: 20 specimens, 3 eggs, A4: 1, A7: 1, A8: 5, A9: 6,	The <i>harmsworthi</i> group of species is cosmopolitan (Kaczmarek et al. 2014); however, most records need to

Species	Previous records in Svalbard according to Zawierucha et al. (2013)	Present study (localities: number of specimens + eggs found)	Remarks
		A10: 7, 12, A11: 6,1.	be verified (Kaczmarek et al. 2011).
<i>Macrobiotus harmsworthi obscurus</i> Dastych, 1985	Spitsbergen	A1: 16 specimens, 5 eggs, A2: 5, 1, A3: 1, A4: 2, A6: 30, 12, A7: 4, 5, A9:9, 1, A10: 6, 8.	Known only from Spitsbergen and Russia (Ural Mts.) (McInnes 1994).
<i>Macrobiotus hufelandi hufelandi</i> Schultze, 1834	Spitsbergen, Prins Karls Forland, Bjørnøya, Edgøya, Hopen	A3: 1 egg, A8: 2 eggs, A10: 22 specimens, 2, A10: 26, 22 .	The <i>hufelandi</i> group of species is cosmopolitan (Kaczmarek et al. 2014); however, most records need to be verified (Bertolani & Rebecchi 1993).
<i>Macrobiotus islandicus islandicus</i> Richters, 1904	Spitsbergen, Prins Karls Forland, Edgøya, Nordaustlandet	A1: 12 specimens, 6 eggs, A3: 1 egg, A4: 2, 2 eggs, A6: 29, 11, A7: 18, A8: 3, A9: 6, A10: 47, 26, A11: 7, 13	Holarctic (McInnes 1994).
<i>Milnesium asiaticum</i> Tumanov, 2006	Spitsbergen	A1: 1 + 1, A3: 2 + 3, A5: 1, A6: 2 + 1	Previously known only from two localities: Kyrgyzstan (Tumanov 2006) and Revdalen (Kaczmarek et al. 2012). This is the second record of this species from Svalbard and the first ever in which males were identified (see Suppl. Table S3 for morphometrics).

Species	Previous records in Svalbard according to Zawierucha et al. (2013)	Present study (localities: number of specimens + eggs found)	Remarks
<i>Milnesium eusrystomum</i> Maucci, 1991	Spitsbergen	A7: 1 specimen	Species with disjunct distribution, known only from Greenland, Portugal, Spitsbergen and USA (Maucci 1996; Guil 2008; Kaczmarek et al. 2012; Land et al. 2012; Johansson et al. 2013).
<i>Paramacrobiotus areolatus</i> (Murray, 1907)	Spitsbergen, Hopen	A1: 2 specimens, 8 eggs	Cosmopolitan (Kaczmarek et al. 2014).
<i>Pilatobius recamieri</i> (Richters, 1911)	Spitsbergen, Prins Karls Forland, Edgøya, Hopen	A8: 2	Holarctic species, recorded from sparse localities in Europe, Asia and North America (McInnes 1994).
<i>Platicrista angustata</i> (Murray, 1905)	Spitsbergen, Prins Karls Forland	A7: 1 specimen, A10: 2	Holarctic (McInnes 1994).
<i>Pseudechiniscus suillus</i> (Ehrenberg, 1853)	Spitsbergen, Prins Karls Forland, Edgøya, Hopen, Barentsøya, Nordaustlandet	A1: 4 specimens, A3: 2	The <i>suillus</i> group of species is cosmopolitan but distribution of the nominal species is unknown (Fontoura & Morais 2011; Kaczmarek et al. 2014).
<i>Pseudechiniscus victor</i> (Ehrenberg, 1853)	Spitsbergen, Kong Ludvigøya, Svenskøya, Ryke Yseøya	A7: 1 specimen.	Holarctic (McInnes 1994).
<i>Richtersius coronifer</i> (Richters, 1903)	Spitsbergen	A1: 2 specimens, 2 eggs, A4: 1.	Cosmopolitan (McInnes 1994).
<i>Testechiniscus spitsbergensis</i> (Scourfield, 1897)	Spitsbergen, Bjørnøya, Edgøya, Hopen, Barentsøya, Nordaustlandet	A1: 3 specimens, A3: 2	Holarctic (McInnes 1994).

Supplementary Table S3. Measurements and ratios (expressed as a percentage) of the length of a given structure to the length of the buccal tube (pt) of selected morphological structures of two males of *Milnesium asiaticum* Tumanov, 2006 found in the Arieekammen transect. Question marks indicate that the trait is not suitably oriented for measurement.

Character	Male 1		Male 2	
	µm	pt	µm	pt
Body length	580	1289	503	1321
Peribuccal papillae length	6.0	13.3	5.7	15.0
Lateral papillae length	8.3	18.4	7.5	19.7
Buccal tube				
Length	45.0	–	38.1	–
Stylet support insertion point	27.3	60.7	24.4	64.0
Anterior width	14.5	32.2	13.1	34.4
Standard width	10.8	24.0	10.5	27.6
Posterior width	10.8	24.0	12.5	32.8
Standard width/length ratio	24%	–	28%	–
Posterior/anterior width ratio	74%	–	95%	–
Claw 1 lengths				
External primary branch	? ^a	?	18.3	48.0
External base + secondary branch	17.0	37.8	15.9	41.7
External spur	?	?	?	?
Internal primary branch	20.1	44.7	19.1	50.1
Internal base + secondary branch	17.1	38.0	17.4	45.7
Internal spur	?	?	?	?
Claw 2 lengths				
External primary branch	25.8	57.3	20.5	53.8
External base + secondary branch	18.0	40.0	14.2	37.3
External spur	?	?	4.7	12.3
Internal primary branch	26.1	58.0	20.9	54.9
Internal base + secondary branch	18.7	41.6	?	?
Internal spur	3.0	6.7	?	?
Claw 3 lengths				
External primary branch	26.4	58.7	19.8	52.0
External base + secondary branch	18.1	40.2	14.0	36.7
External spur	3.9	8.7	?	?
Internal primary branch	25.6	56.9	21.3	55.9
Internal base + secondary branch	18.4	40.9	16.0	42.0
Internal spur	4.3	9.6	?	?
Claw 4 lengths				
Anterior primary branch	26.6	59.1	?	?
Anterior base + secondary branch	?	?	?	?
Anterior spur	?	?	?	?
Posterior primary branch	?	?	?	?

Posterior base + secondary branch	20.8	46.2	?	?
Posterior spur	4.2	9.3	?	?

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