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Some aquatic Tardigrada from Bjørnøya (Svalbard)

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Samples collected from the littoral zone of some freshwater bodies near Norskehamna, showed 8 species of Tardigrades. Of these, 7 are new records for Bjørnøya and 2 are new for Svalbard.

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1. INTRODUCTION

The Tardigrade fauna of Bjørnøya (74°30'N, 19°E) Svalbard is still very poorly known. Murray (1907), Richters (1904, 1911) and Summerhayes & Elton (1923) recorded 13 species and 1 variety, in a series of unlocalized moss samples, bird nests of Kittiwake and Glaucous Gull, and a freshwater pond near Russehamna.

The present contribution is based on plankton samples and samples of permanently submerged mosses and algae from a series of lakes and ponds we visited on 7.9.1985 on the occasion of a biological expedition of the Antwerp University to Svalbard.

Six waterbodies near Norskehamna, on the South-western part of the island were sampled. The Tardigrada were obtained from the plankton, collected with a planktonnet (40 μm mesh width) by a horizontal haul from the shore, and from permanently submerged mosses and algae by squeezing a handful of material.

More details about the sampling localities, some geological information and results of the physico-chemical analyses of the water can be found in De Smet (1988).

2. ANNOTATED SPECIES LIST

Locality	78		79		80		81		82		83		Nr of	Nr of
Nature of sample	P	A	P	M	P	M	P	M	P	A	P	M	samples	individuals
Amphibolidae														
Amphibolus weglarskae	-	-	-	-	-	-	-	2	-	-	-	-	1	2
Hypsibiidae														
Hypsibius dujardini	-	-	-	2	1	1	-	5	2	25	2	44	8	82
Isohypsibius granulifer	11	13	9	39	2	4	6	32	10	18	3	22	12	169
Isohypsibius papillifer bulbosus	-	-	-	6	-	-	-	1	-	-	-	-	2	7
Diphascon alpinum	-	-	-	-	-	-	-	4	-	-	-	-	1	4
Diphascon spitzbergense	1	-	1	-	-	-	-	-	-	-	-	-	2	2
Macrobiotidae														
Dactylobiotus ambiguus	1	1	1	-	-	-	-	-	1	-	-	-	4	4
Macrobiotus hufelandi	-	-	-	-	-	-	-	-	-	-	1	-	1	1
Number of species	3	2	3	3	2	2	1	5	3	2	3	2		
Number of individuals	13	14	11	47	3	5	6	44	13	43	6	66		271

P = plankton, A = algae, M = mosses

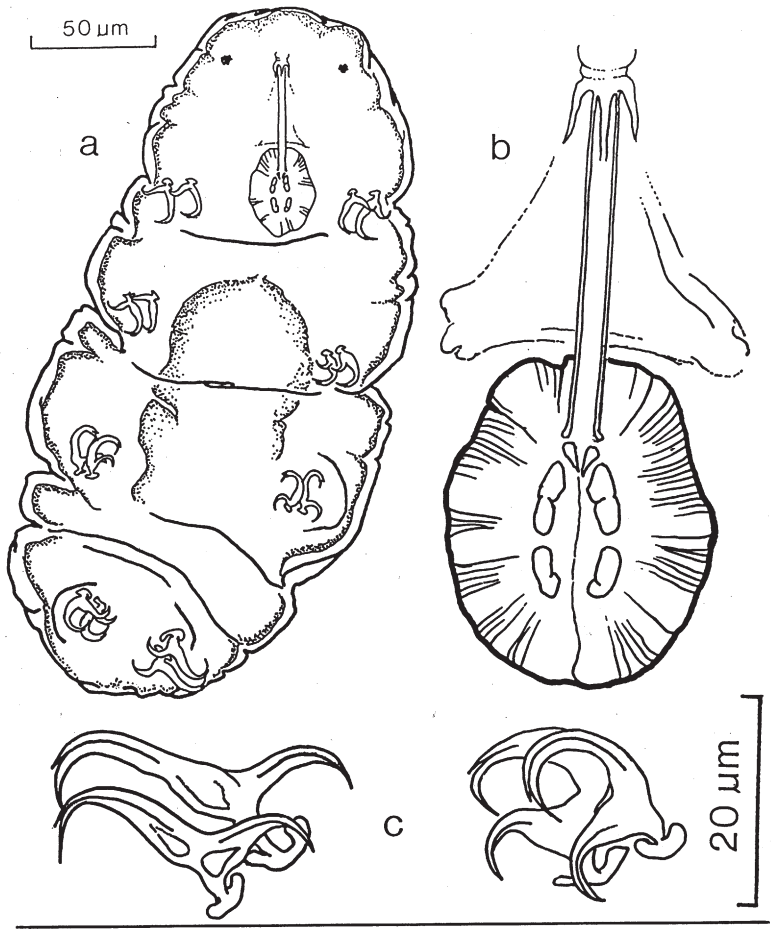

Fig. 1 *Amphibolus weglarskae.* a: habitus, b: bulbus and pharyngeal tube, c: claws of the fourth pair of legs.

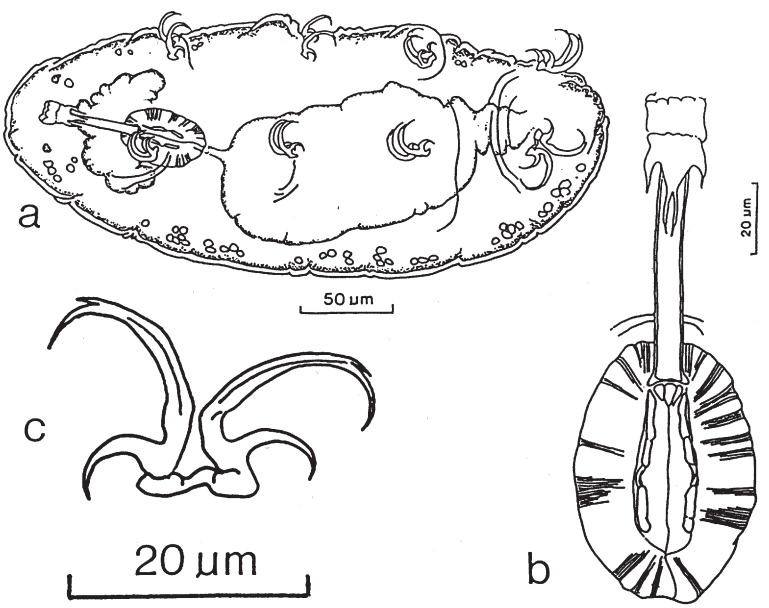

Fig. 2 *Dactylobiotus ambiguus.* a: habitus, b: bulbus and pharyngeal tube, c: claws of the fourth pair of legs.

3. COMMENTS ON SPECIES

Amphibolus weglarskae (Dastych, 1972) Fig. 1

Robust animal with distinct eyespots; oval bulbus with apophyses and 3 broad macroplacoids, of which the two first are so closely fused together that it seems there is only one with a incision in the middle. The third macroplacoid is somewhat longer than the other two, and shows a typical incision at the end of its innerside; no microplacoid. Pharyngeal tube straight. Big doubleclaws of the *Isohypsibius* type with well curved, slender tips. Principal arms with two long accessory spines. Lunulae of the claws of legs IV larger than those of the other claws; lunula of the external claw of leg IV larger than those of the inner claw.

Dimensions: body le 290—300 μm; bulbus le: 32 μm, diam 25 μm; pharyngeal tube le: 33 μm; diam 2.5 μm.

Dactylobiotus ambiguus (J. Murray, 1907) Fig. 2

Large animals with distinct eyespots. Oval bulbus with 2 macroplacoids, the first twice as long as the second and divided in the middle; a distinct connection between the first and second microplacoid. All animals seen with large claws, each doubleclaw having a broad chitinous bar between.

Dimensions: body le 375—506 μm; bulbus (specimen of 375 μm) le: 72 μm, diam 52 μm; pharyngeal tube (specimen of 375 μm) le: 84 μm, diam 7.5 μm.

Svalbard records: Edgeøya (De Smet et al. 1988b), Prins Karls Forland (Murray 1907 sub *Macrobiotus ambiguus* Murr.).

Diphascon alpinum J. Murray, 1906. Fig. 3

The specimens show the typical features of the species.

Dimensions: body le: 101—129 μm; bulbus (specimen of 125 μm) le 20 μm, diam 15 μm; pharyngeal tube (specimen of 125 μm) le 47 μm, diam 1 μm.

Svalbard records: Edgeøya (De Smet et al. 1988b), Prins Karls Forland (Murray 1907), Spitsbergen (Weglarska 1965 sub *Hypsibius alpinus* Murr.).

Diphascon spitzbergense Richters, 1903. Fig. 4

The specimens show the typical features of the species; ring annulations of the pharyngeal tube distinct.

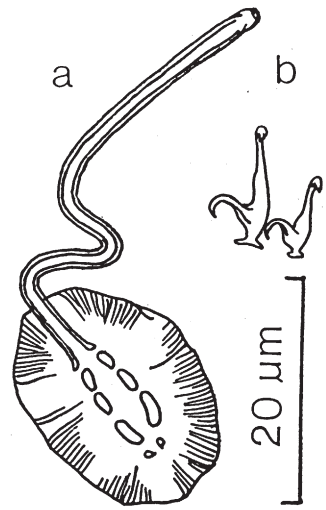

Fig. 3 *Diphascon alpinum.* a: bulbus and pharyngeal tube, b: claws of the fourth pair of legs.

Dimensions: body le 216—297 μm; bulbus (specimen of 216 μm) le 55 μm, diam 23 μm; pharyngeal tube (specimen of 216 μm) le 72 μm, diam 4 μm.

Svalbard records: Edgeøya (De Smet et al. 1988b), Prins Karls Forland (Murray 1907), Spitsbergen (Murray 1907, Richters 1903, 1904; Weglarska 1965 sub *Hypsibius (D) spitzbergensis* (Richt.)).

Hypsibius dujardini (Doyère, 1840). Fig. 5

Hyaline animals showing a bulbus with

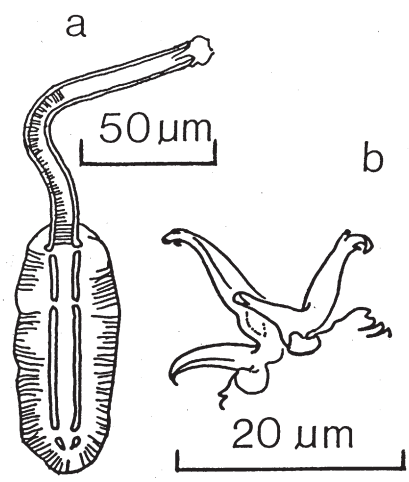

Fig. 4 *Diphascon spitzbergense.* a: bulbus and pharyngeal tube, b: claws of the fourth pair of legs.

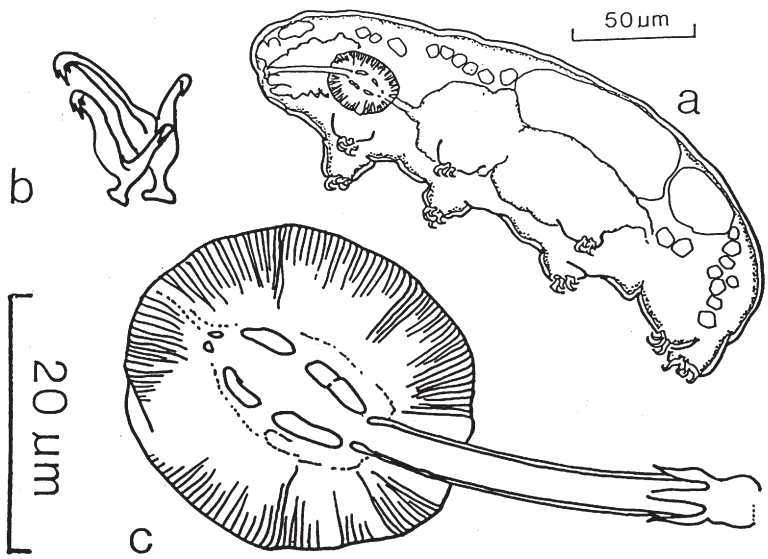

Fig. 5 *Hypsibius dujardini.* a: habitus, b: bulbus and pharyngeal tube, c: claws of the fourth pair of legs.

two macroplacoids of about equal length, the first one sometimes constricted medially. All our specimens have a distinct microplacoid and generally well developed eyes, except one without eyespots.

Dimensions: body le 107—253 µm; bulbus (specimen of 253 µm) le 29 µm, diam 24 µm; pharyngeal tube (specimen of 253 µm) le 31 µm, diam 2.5 µm.

Svalbard records: Edgeøya (De Smet et al. 1988b), Spitsbergen (De Smet et al. 1988a, Richters 1911 sub *Makrobiotus Murrayi,* Weglarska 1965).

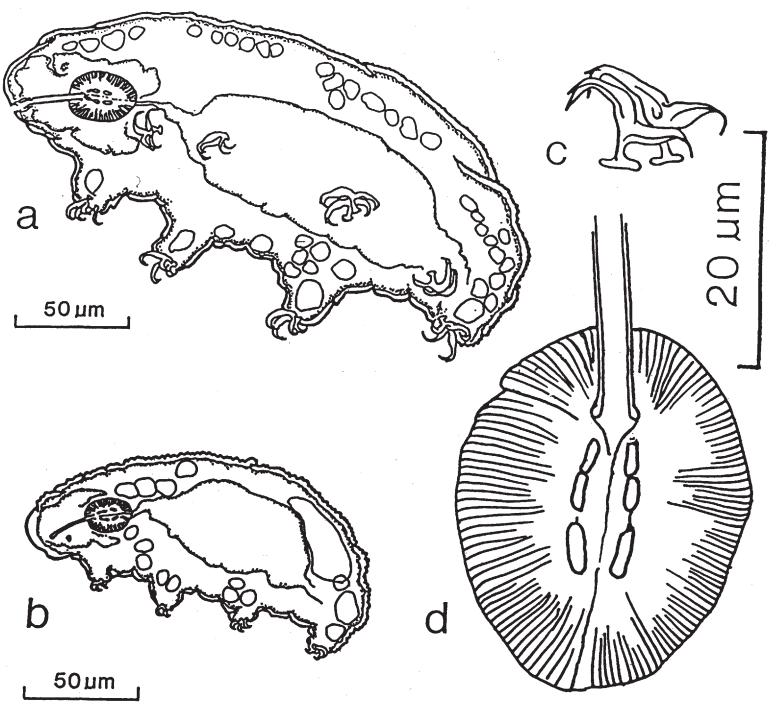

Fig. 6 *Isohypsibius granulifer.* a: habitus of individual with fine granulation, b: habitus of individual with big tubercles, c: bulbus, d: claws of the fourth pair of legs.

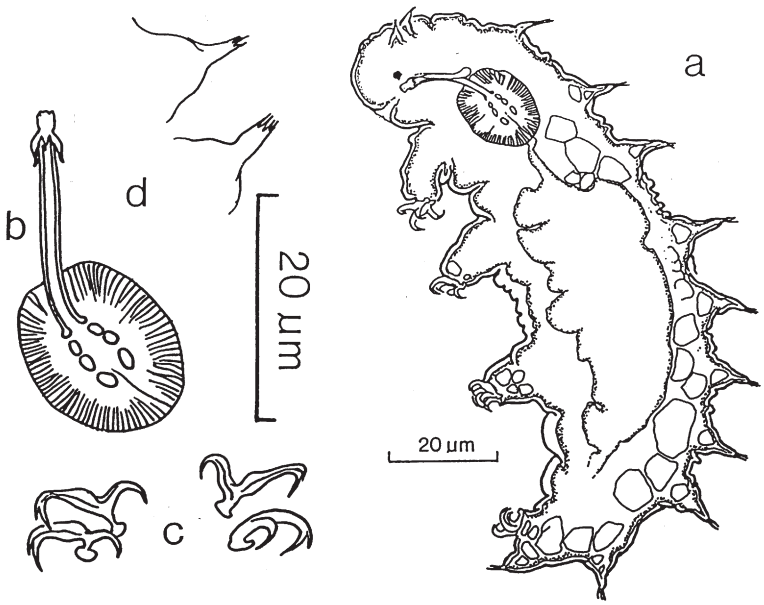

Fig. 7 *Isohypsibius papillifer bulbosus.* a: habitus, b: bulbus and pharyngeal tube, c: claws of the fourth pair of legs, d: hemispherical papillae with stiff hairs.

Isohypsibius granulifer Thulin, 1928. Fig. 6

The cuticula of the animal is covered with granulations, varying from very small granules or tubercles to distinct rounded papillae of different size, and not arranged in regular rows. The granules are more and more pronounced to the back end.

Bulbus with three macroplacoids, the first two mostly equal in size and closely together, the third a little longer. The second and the third macroplacoid often with a threadlike connection in larger animals.

In our samples we found a correlation between the thickness of the tubercles and the length of the individuals. Large specimens mostly show finer granulations than the smaller ones ($t=2,58$, $df=80$, $p<0,02$). Moreover we observed that animals with big tubercles have proportionally smaller claws than those with fine granulations. This could point to mixed populations of genetically distinct groups.

Dimensions: specimens with big tubercles: body le 112—176 µm; bulbus (specimen of 171 µm) le 18 µm, diam 15 µm; pharyngeal tube (specimen of 171 with big tubercles) le 21 µm, diam 1 µm; specimens with fine granulations 106 to 268 µm; bulbus (specimen of 268 µm) le 29 µm, diam 22 µm; pharyngeal tube (specimen of 268 µm) le 31 µm, diam 1.2 µm.

Svalbard records: Edgeøya (De Smet et al. 1988b).

Isohypsibius papillifer bulbosus (Marcus, 1928). Fig. 7

Small animals with black eyespots and papillae, both conical with broad hemispherical swellings at their base, arranged in transverse and longitudinal rows. A big hemispherical papilla on the fourth leg. Head with two small lateral conical processes placed closely together and beyond the eyes. All the processes of our specimens have a conical top which ends in 2—4 stiff hairs. Similar hairlike structures are not mentioned in the description of Marcus (1936), Morgan & King (1976) or Ramazzotti & Maucci (1983). It is not likely that these authors overlooked this character and it therefore seems possible that our individuals belong to a local variety. Between the papillae and swellings a series of very small tubercles without hairs can be present. Oval bulbus with three oval macroplacoids, their size increasing from the first to the third; the first and second often close together, sometimes touching each other. Microplacoid absent. Doubleclaws with the internal and external claw not very different in shape and length. We found one animal with two oval smooth eggs (44 µm x 26 µm) in the cast of the skin.

Dimensions: body le 204—336 µm; bulbus (specimen of 336 µm) le 41 µm, diam 31 µm; pharyngeal tube (specimen of 336 µm) le 45 µm, diam 2.5 µm.

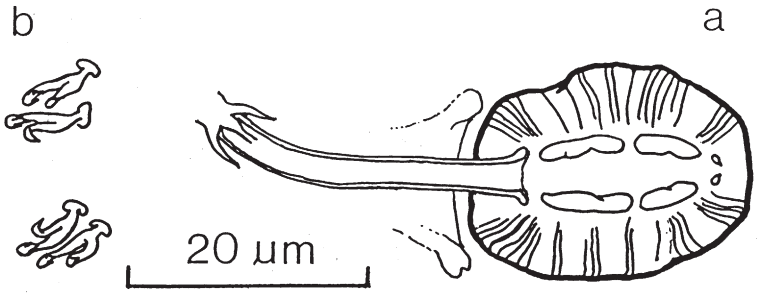

Fig. 8 *Macrobiotus hufelandi.* a: bulbus and pharyngeal tube, b: claws of the fourth pair of legs.

Macrobiotus hufelandi Schultze, 1833. Fig. 8

One large animal with distinct eyespots; cuticle with pore-like punctuations; bulbus and doubleclaws typical for the species.

Dimensions: body le 775 µm; bulbus le 23 µm, diam 17—18 µm; pharyngeal tube le 27 µm, diam 2 µm.

Svalbard records: Bjørnøya (Summerhayes & Elton 1923 sub *Macrobiotes hufelandi),* Hopen (Richters 1911), Spitsbergen (Richters 1903, 1904, 1911, Scourfield 1877 sub *M. hufelandii).*

4. CONCLUDING REMARKS

Eight species of Tardigrada have been found in samples from aquatic habitats. Five occurred in plankton and six were present in submerged moss or algae. The number of species in each sample is low and varies from 1—3 for the plankton and 2—5 for the vegetation samples. Only one species, *Isohypsibius granulifer,* was present in all samples. The two most abundant species, *Isohypsibius granulifer* and *Hypsibius dujardini,* together account for 93% of the total number of individuals collected.

Allmost all species are cosmopolitan or widespread, while *Amphibolus weglarskae* is hitherto only known from moss in the Tatra mountains, Poland (Dastych, 1972) and some localities, also in fresh water, in Italy (Ramazzotti & Maucci 1983). All species except *Macrobiotus hufelandi* are new for Bjørnøya. *Amphibolus weglarskae* and *Isohypsibius papillifer bulbosus* are new to the faunal list of Svalbard.

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5. REFERENCES

Dastych, H. 1972. *Isohypsibius weglarskae* sp. n. A new species of Tardigrada from Poland. *Bull. Acad. Poln. Sci.* Cl. II. 20: 761—762.

De Smet, W.H. 1988. Rotifers from Bjørnøya (Svalbard), with the description of *Cephalodella evabroedi* n.sp. and *Synchaeta lakowitziana arctica* n. subsp.. *Fauna norv. A9:* this vol.

De Smet, W.H., Van Rompu, E.A. & Beyens, L. 1988a. Rotifera, Gastrotricha en Tardigrada uit Shetland, Faroër en Spitsbergen. *Natuurwet. Tijdschr. 69:* 81—102.

De Smet, W.H., Van Rompu, E.A. & Beyens, L. 1988b. Contribution to the Rotifera and aquatic Tardigrada of Edgeøya (Svalbard). *Fauna norv. A9:* this volume.

Marcus, E. 1936. Tardigrada. *Das Tierreich* 66: 338 pp. Walter de Gruyter & Co. Berlin.

Morgan, C.I. & King, P.E. 1976. *British Tardigrades. Tardigrada. Keys and Notes for the Identifications of the Species.* Academic Press, London, 133 pp.

Murray, J. 1907. Arctic Tardigrada, collected by Wm. S. Bruce. *Trans. Roy. Soc. Edinburgh* 45: 669—681.

Ramazzotti, G. & Maucci, W. 1983. II Philum Tardigrada III.ed. *Mem. Ist. Ital. Idrobiol.* 41: 1—1012.

Richters, F. 1903. Nordische Tardigraden. *Zool. Anz.* 27: 168—172.

Richters, F. 1904. Arktische Tardigraden. *Fauna Arctica* 3: 494—509.

Richters, F. 1911. Faune des mousses. Tardigrades. *Duc d'Orleans. Campagne arctique de 1907.* Impr. Sci. C. Bulens, Bruxelles, 1—20, pl. I—III.

Scourfield, D.J. 1897. Contributions to the nonmarine fauna of Spitsbergen. Part I. Preliminary notes, and reports on the Rhizopoda, Tardigrada, Entomostraca, & C. *Proc. Zool. Soc., London* 1897: 784—792.

Summerhayes, V.W., Elton, C.S. 1923. Contributions to the ecology of Spitsbergen and Bear Island. *J. Ecol.* 11: 214—286.

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