



Collembola of North Bull Island – new records for the Irish coast

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Abstract: A study of the Collembola from the marine littoral habitats on North Bull Island, which is a nature Man and the Biosphere Nature Reserve in Ireland, revealed 43 species of which 9 are new to the Irish fauna. Several rare species, known only from a few localities in Europe, *Willemia multilobata*, *Friesea* cf. *baltica*, *Protaphorura pseudocellata* and *Isotomodes sotoensis* were found.

Key words: Collembola, marine littoral habitats, Irish seashore

INTRODUCTION

Wetlands and sandy soils are important from a conservation point of view. This is particularly so in Ireland, yet with the exception of a study by Healy (1975) and, to a certain extent, Purvis (1982), very little is known of the collembolan fauna of such systems. This paper reports on a faunistic study of the Collembola of some coastal habitats in Ireland.

Collembola are common in the marine littoral environment. In such habitats many ecological factors, such as salinity, food, wave action, sand-grain angularity, can determine the distribution and species composition of Collembola (Joesse 1976, Christian 1989, Hopkin 1997). In Europe, the coasts of the Baltic Sea, North Sea, Western Mediterranean Sea and Adriatic shores have been well studied (Christian 1989, Sterzyńska & Ehrnsberger 1997) but the current knowledge on the distribution and biogeography of Collembola in the marine littoral zone is still fragmentary and insufficient.

The main goal of this work is to describe some new records of Collembola from the Irish coast and to review the present knowledge of the marine littoral Collembola from Ireland.

STUDY SITES

The investigations were carried out in nature reserve on North Bull Island, Dublin Bay. The North Bull Island Nature Reserve lies in the estuary of River Liffey and vegetation complexes, characteristic of European shorelines near river mouths, have developed (Jeffery et al. 1977). During the study two major habitats: a dune complex and a salt marsh with two zones: intertidal and supralittoral were sampled.

MATERIAL AND METHODS

Material was collected during 1995–2002 using commonly accepted quantitative methods (10 soil cores with diameter of 5.5 cm² to 10 cm depth). Additionally, the qualitatively samples from different type of marine algae wrack accumulations and sandy dune habitats were taken. All the material was extracted in Macfadyen high gradient apparatus excepts, samples from sandy habitats where floatation was used and specimens were up from the water surface under stereomicroscope.

RESULTS AND DISCUSSION

43 Collembola species were found in the littoral and supralittoral zones of the North Bull Island (Table 1).

Table 1. Check list of Collembola of the marine littoral habitats, North Bull Island Reserve. Species marked with an asterisk (*) are firstly recorded for Irish coast and those marked with two asterisks (**) are new records for Ireland according to Bolger (1986).

No.	Occurrence of species	Type of habitat	
		Salt marsh	Dune complex
1	2	3	4
	Hypogastruridae		
1	<i>Ceratophysella denticulata</i> (Bagnall, 1941)	+	
2	<i>Willemia multilobata</i> Gers & Deharveng, 1985**	+	
3	<i>Xenylla grisea</i> Axelson, 1900*		+
4	<i>Xenylla maritima</i> Tullberg, 1869	+	
	Neanuridae		
5	<i>Brachystomella parvula</i> (Schäffer, 1896)*		+
6	<i>Friesea mirabilis</i> (Tullberg, 1871)	+	
7	<i>Friesea truncata</i> Cassagnau, 1958**	+	
8	<i>Friesea</i> cf. <i>baltica</i> Szeptycki, 1967**		+
9	<i>Micranurida pygmaea</i> Börner, 1901*	+	
10	<i>Anurida maritima</i> (Guérin, 1839)		
	Onychiuridae		
11	<i>Protaphorura armata</i> (Tullberg, 1869) Gisin, 1960	+	
12	<i>Protaphorura pseudocellata</i> (Naglitsh, 1962)*	+	
13	<i>Protaphorura</i> sp.	+	
14	<i>Thalassophorura debilis</i> (Moniez, 1890)	+	
15	<i>Onychiurus ambulans</i> (Linnaeus, 1758) sensu Stach, 1934*		+
16	<i>Mesaphorura pongoi</i> Rusek, 1982**	+	+
17	<i>Mesaphorura petterdassi</i> (Fjellberg, 1988)**	+	+
18	<i>Mesaphorura critica</i> Ellis, 1976**		+
19	<i>Mesaphorura krausbaueri</i> Börner, 1901	+	+
20	<i>Mesaphorura macrochaeta</i> Rusek, 1979**	+	+
21	<i>Mesaphorura</i> sp.	+	
	Isotomidae		
22	<i>Hemisotoma thermophila</i> (Axelson, 1900)*		+
23	<i>Folsomia quadrioculata</i> (Tullberg, 1871)*	+	
24	<i>Folsomia sexoculata</i> (Tullberg, 1871)	+	
25	<i>Archisotoma</i> sp.*	+	
26	<i>Isotomodes sotoensis</i> Simon et. al., 1994*		+
27	<i>Isotoma anglicana</i> Lubbock 1862*	+	+
28	<i>Isotoma viridis</i> Bourlet, 1839	+	
29	<i>Halisotoma maritima</i> Tullberg, 1871	+	
30	<i>Parisotoma notabilis</i> (Schäffer, 1896)*	+	
31	<i>Desoria tigrina</i> (Nicolet, 1842)**	+	
32	<i>Desoria</i> sp.*	+	
33	<i>Isotomurus palustris</i> (Müller, 1776)*	+	
	Tomoceridae		
34	<i>Pogonognathellus longicornis</i> (Müller, 1776)*	+	

1	2	3	4
	Entomobryidae		
35	<i>Entomobrya lanuginosa</i> (Nicolet, 1841)*	+	
36	<i>Lepidocyrtus cyaneus</i> Tullberg, 1871*	+	
37	<i>Lepidocyrtus lignorum</i> (Fabricius, 1775)*	+	
	Sminthuridae		
38	<i>Sphaerida pumilis</i> (Krausbauer, 1898)*	+	
39	<i>Dicyrtomina minuta</i> (O.Fabricius, 1783)*	+	
40	<i>Dicyrtomina ornata</i> (Nicolet, 1841)*	+	
41	<i>Sminthurinus aureus</i> (Lubbock, 1862)*	+	
42	<i>Sminthurinus elegans</i> (Fitch, 1863)*	+	
43	<i>Sminthurinus albifrons</i> (Tullberg, 1871)*		+

Healy (1975) studied Collembola of the marine littoral zone of the North Bull Island and she recorded only 9 species in the intertidal zone (*Xenylla maritima*, *Friesea mirabilis*, *Anurida maritima*, *Thalassophorura debilis*, *Mesaphorura krausbaueri s. lato*, *Halisotoma maritima*, *Isotoma viridis*, *Isotomiella minor*, *Folsomia sexoculata*). During recent studies in 1995–2002, the a further 36 species were recorded (Table), including 9 species new to Ireland. Some of them are known only from a few localities in Europe: *Willemia multilobata*, *Friesea baltica*, *Protaphorura pseudocellata* or from type locality *Isotomodes sotoensis*.

The majority of species in the marine littoral habitats of North Bull Island are typical representatives of coastal habitats (seashore dwellers). The intertidal zone and in supralittoral dunes are habitats for intertidal species (*Halisotoma maritima*, *Folsomia sexoculata*, *Thalassophorura debilis*, *Archisotoma* sp.) and interstitial species (*Friesea baltica*, *Mesaphorura pongoi*, *M. petterdassi*, *M. critica*, *Hemisotoma thermophila*, *Isotomodes sotoensis*). From a biogeographic viewpoint the following records are of special importance:

Willemia multilobata Gers & Deharveng, 1985. This species has only been recorded from a single location in Denmark where it was found in grazed dry meadows (Fjellberg, 1998). In Ireland we found it in wrack material in the intertidal zone.

Friesea cf baltica Szeptycki, 1967. This species was described from the Baltic seashore (Poland) by Szeptycki (1964). There are only a few records from Denmark and the southern coasts of Norway and Sweden (Fjellberg, 1998). The species is found in sandy meadows and dunes along the seashore. In Ireland it was recorded from a dune complex¹.

Protaphorura pseudocellata (Naglitsh, 1962). This species has been reported from Poland and Germany. *P. pseudocellata* dwells in warm, dry sandy places in mountains, highlands and lowlands. It has been collected in sandy dune near sea shore, in sandy soil covered limestone rocks and in dry soil with roots of grass and other plants (Pomorski, 1998). In Ireland we recorded it from salty meadows in the intertidal zone on Bull Island Reserve.

Mesaphorura pongoi Rusek, 1982. This has been recorded from Denmark and the southern parts of Sweden and Norway. It commonly dwells in sandy dunes and sea meadows with *Ammophila arenari* and *Elymus arenarius*. In Ireland it was recorded from fixed dunes with plant communities *Tortulo-Phleetum* plant communities and from wrack material.

Mesaphorura petterdassi (Fjellberg, 1988). Fjellberg (1998) classified this as a widely distributed species, recorded from meadows and forest soils, in Norway, often collected in damp habitats alongside inland lakes and streams. On North Bull Island it was found in the low

¹ The species found on the Irish coast differ from the material described originally in the chaetotaxy of Th. 3-4, where the m₃ chaeta is present and on Abd 4 chaeta a₂ is present.

intertidal zone with plant communities *Juncetum gerardii* and in dune complex where *Tortulo-Phleetum* plant communities occur.

Isotomodes sotoensi (Simon et al., 1994). This species has only been previously recorded from its type locality (Potapow, 2001). On North Bull Island it was found in supralittoral zone on the primary dune ridge colonised by *Ammophila arenaria* and *Elymus arenarius*.

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STRESZCZENIE

[*Collembola* rezerwatu biosfery “North Bull Island” – nowe stwierdzenia dla wybrzeży morskich Irlandii]

W trakcie badań faunistycznych rezerwatu „North Bull Island” położonego w ujściu rzeki Liffey do zatoki Dublińskiej (Irlandia) stwierdzono występowanie 43 gatunków *Collembola*, w tym 9 gatunków nowych dla fauny Irlandii. Praca zawiera wykaz gatunków dotychczas stwierdzonych w zalewanej strefie litoralowej i supralitoralowej oraz komentarz do gatunków cennych z punktu widzenia zoogeografii, m. innymi: *Willemia multilobata*, *Friesea* cf. *baltica*, *Protaphorura pseudocellata*, *Mesaphorura pongoi*, *M. petterdassi* and *Isotomodes sotoensis*.

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