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An Arctic char observed in a glacial Spitsbergen river

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ABSTRACT. An anadromous Arctic char (male) was recorded in southwestern Spitsbergen, in a very muddy glacial river, in August 2008. This is apparently the first specimen of this species observed in such an unfavourable habitat in Svalbard.

Arctic char (*Salvelinus alpinus*), the only freshwater native fish in Svalbard, is rather common (occurring in more than 100 lakes and watercourses) and is differentiated into two forms: stationary and anadromous (Overrein and Prestrud 2006).

In southern Spitsbergen (south of Van Keulenfjorden), the Arctic char ecology is well investigated and described. There are several papers on this fish in the water bodies of Wedel Jarlsberg Land, north of the Hornsund fjord (for example: Gullestad 1975, Witkowski and others 2008).

The Svartvatnet lake (0.8 km²), connected with the sea by the Lisbetelva river 3.5 km long, is considered to be the only habitat of the Arctic char in Sørkapp Land, the southernmost peninsula of Spitsbergen (south of Hornsund). It was known to the trappers before the establishment of the South Spitsbergen National Park in 1973 as is evidenced by remains of their fishing activity found on the lake in 1982, and recognized by researchers (Gullestad and Klemsten 1997, Kuznierz and others 2008). However, apart from Svartvatnet, the fish was observed by the author in a small lake on the Sergeevskaret pass between the Sergeevfjellet and Lidfjellet mountains, with the water-table at an altitude of ca. 150 m, in the summer seasons 1983 and 1984. This fish does not exist in any other water body of Sørkapp Land, according to observations made during nine summer seasons in the period from 1982 to 2008.

Hence, it appeared extraordinary to discover, on 8 August 2008, that it was also present in the glacial Bungeelva river. A single fish was seen in a very shallow lateral bed and was caught by hand, after walking across this very muddy (silted up) and braided river 250 m from its mouth on the Greenland Sea during low tide. It was a male 46 cm long, completely dazed

because of a huge amount of suspended material in the river water (Figs. 1–4). Two colleagues of the author, Justyna Dudek and Jan Niedzwiecki, were witnesses.

Undoubtedly, the (anadromous) fish had mistaken its way to its maternal stream for spawning during a high tide because the thaw-lakes within the marginal zone of the Bungebreen glaciers (from which the Bungeelva exits) are extremely muddy and making fish life impossible.

According to opinions expressed by some biologists in my discussion, the event described above is a very interesting observation of a natural way of animal colonisation (expansion) to new potential habitats which can appear as a result of glaciers' recession under climate warming. Of course, this unintended trial made by our fish was unsuccessful because the Bungebreen glacier still exists (in spite of shrinking) filling its valley and delivering a huge amount of the suspended material to the new water bodies in its marginal zone and fore-field.

However, even there, the situation could be changed in future, after transformation of today's extensive valley glacier into a smaller new cirque or slope glacier (or glaciers) and thus cleaning the river water. Such a transformation is very probable in the case of further climate warming or stabilising at the present temperature level during the next few decades (Ziaja 2004, 2011a, 2011b).

A more difficult question is what a water body the fish wanted to swim into. According to the cited literature, the nearest habitat of the anadromous Arctic char is in the Revvelva river basin (with the Revvatnet lake) north of Hornsund. However, the thesis that the Svartvatnet lake can not contain any anadromous form of the fish because the Listelva river is 'impassable to ascending fish' due to 'the steep rise in the lower part of the stream' located 'about 50 m before entering Hornsund' (Gullestad and Klemsten 1997) or 'numerous waterfalls' (Kuznierz and others 2008) is rather doubtful in the light of the author's geomorphological and hydrological observations of the river. Moreover, the specimen from Bungeelva (Fig. 2) is very similar to specimens 'from the landlocked population of (...) Svartvatnet' and not to the anadromous ones from Revvatnet (Figs. 3 and 4 in: Kuznierz and others 2008). In addition, the fish from Bungeelva is practically identical with 7–8 male fish caught by the author in Svartvatnet during mid-August 1983, 1984, and 1986. Nevertheless, no fish have been observed in the lower part of Lisbetelva (which is very clean non-glacial river) despite careful explorations during six summer seasons (1982, 1983, 1984, 1986, 2000, and 2008).

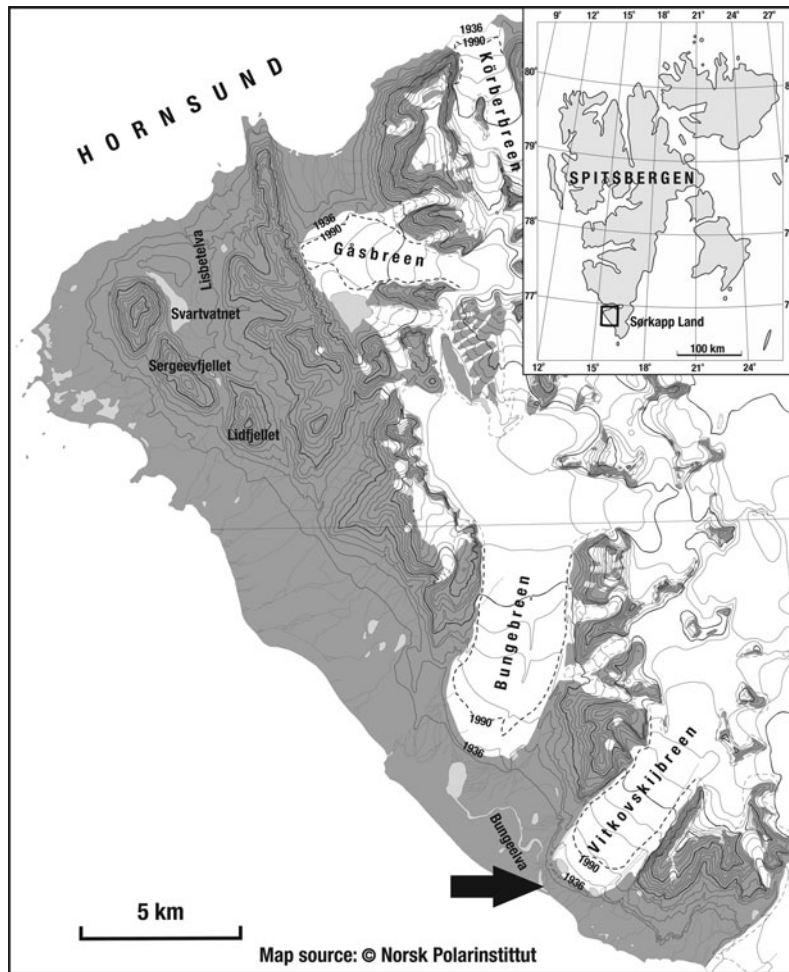


Fig. 1. Location of the site where the single Arctic char was caught by hand in the Bungeelva river on 8 August 2008 (marked with the arrow), and the Arctic char populations habitats in Sørkapp Land (lakes: Svartvatnet, and the small unnamed lake between Sergeevfjellet and Lidfjellet).



Fig. 2. Arctic char, male, 46 cm long, caught by hand in the Bungeelva river on 8 August 2008. Photo: J. Niedzwiecki.



Fig. 4. One of the muddy lakes at the Bungebreen glacier's front, from which the Bungeelva river flows out. Photo: J. Dudek.



Fig. 3. Lower course of the Bungeelva river from its mouth during the lowest tide, just after catching the fish on 8 August 2008. The Bungebreen glacier is in the background. The site of catching the fish is marked with the arrow. Photo: J. Niedzwiecki.

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Benjamin Leigh Smith, 1828–1913

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The centenary of the passing of Benjamin Leigh Smith (Fig. 1) was marked by a two day event, 27–28 September 2013, organised by his great-great-grand niece Charlotte Moore, guardian of the family archive at her home in Sussex. In five expeditions he plotted the north east limits of Svalbard and more than a hundred miles of the coast line of Zemlya Frantsa-Iosifa (Franz Josef Land), where he was marooned in 1881. In an epic voyage he and his companions sailed some 500 miles in four open boats, using table cloths for sails! They reached Matochkin Shar, the strait that divides Novaya Zemlya, in August 1882 meeting with a relief party almost immediately after making landfall.

Some 60 descendants and their spouses, and a handful of researchers and historians, enjoyed an exhibition at the Scott Polar Research Institute (SPRI) comprising photographic albums, letters and a bust of the explorer lent by the family. This was displayed along with material from the Institute's own collections, and relics of Smith's from Zemlya Frantsa-Iosifa retrieved by F.G. Jackson in 1897. They heard talks by P.J. Capelotti, author of the recent biography of Leigh Smith (Capelotti 2013) and Professor J. Dowdeswell, Director of SPRI, before a dinner at Jesus College, Cambridge, Smith's *alma mater*.

On the second day the group attended the churchyard at Brightling, near Battle, Sussex, where Smith is buried, for the dedication of a new grave marker, a traditional Sussex rail, to replace the original which had suffered decay and was no longer legible. The rail was carved by Bill Sutton, great-great-grandson of Smith's sister Bella and the ceremony was conducted by another family member the Rev. Meriel Oliver, great-great-granddaughter of Benjamin's brother Willy. Appropriate hymns were sung and a reading from a poem by George Crabbe, which included the words 'but nearer land you may the billows



Fig. 1. Portrait of Benjamin Leigh Smith by Reginald Eves RA (SPRI).

trace, as if contending in their watery chase'. Then followed another talk within the parish church, by P.J. Capelotti, and finally tea and cakes in the village hall with the opportunity to see another exhibition of photographs and artefacts, including a narwhal tusk brought back on one of the expeditions. Capelotti signed copies of his book, as did Charlotte Moore of her book 'Hancox' which recounts the history of the Smiths and their kinsmen (Moore 2010).

It was a delightful event and it is hoped that along with the book it will encourage a wider appreciation of the achievements of a modest and reticent man. He made significant advances to our knowledge of the Arctic, including important observations on the temperature layering in northern waters, entirely on his own initiative and at his own expense.

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