

Indications of garfish *Belone belone* reproducing in Southern Finland

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On August 21, a small school (five individuals) of garfish juveniles (length c. 10 cm) was caught with a beach seine net deployed from the shore of the island Iso-Kuusinen, in the middle of the archipelago of SW Finland (Fig. 1) in the northern Baltic Sea. The maximum depth of the haul was about two meters. The garfish were caught together with a few broadnosed pipefish *Syngnathus typhle*. The site (60.291833 N, 21.833722 E) is a shallow sandy tombolo beach area with a mean depth of c. two meters. The sampling location was on the western side of the tombolo, exposed to wind and surf from NW. The bottom substrate in the near shore area is bare sand, except for small areas covered by common reed *Phragmites australis*. On greater depth, the bottom is covered with vegetation (e.g. *Potamogeton* sp. and *Myriophyllum* sp.) with <50 % average coverage (Gagnon et al. 2107). Washed ashore *Zostera marina* indicates that it might oc-

cur at or near the site. The sandy beach is surrounded by rocky shores dominated by bladderwrack *Fucus vesiculosus*.

On August 22, a juvenile garfish (length 9 cm, weight 0.9 g) was caught with similar methods in the western part of the Åland Islands (60.164387 N, 19.53097 E, Eckerö, Hinder-Bengtsviken). The maximum depth of the haul was about two meters. The seine net also contained hundreds of lesser sand eels *Ammodytes tobianus*, a few adult three-spined sticklebacks *Gasterosteus aculeatus*, juveniles of European flounders *Platichthys flesus* and Eurasian perch *Perca fluviatilis*. The bay area is sandy and shallow, with a mean depth of c. 2.5 meters. The area is exposed to wind and surf from the open sea in SSW. The substrate is mostly sand. The near shore area, to about 1.5 meters depth, is bare sand without vegetation. On greater depth, to about 5 meters, the bottom is covered with a macrophyte meadow dominated by *Zostera marina* and *Stuckenia pectinata*. To our knowledge, this is the largest occurrence of *Zostera marina* in the western part of the Åland Islands. According to Boström and Bonsdorff (2000), the average shoot density of *Zostera marina* in the area is about 250 m⁻².

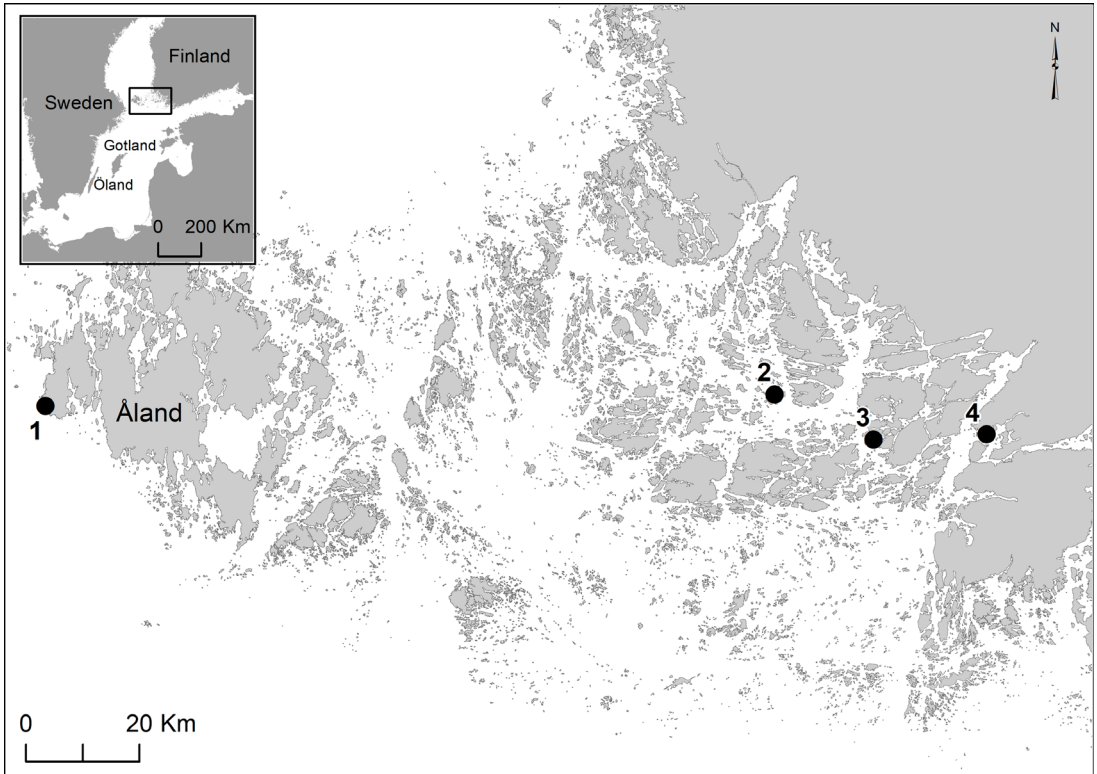


Fig. 1. The four sites with caught and verified juvenile garfish in the Åland Islands and the archipelago of SW Finland. 1 = Hinder-Bengtsviken, 2 = Iso-Kuusinen, 3 = Lillmälö and 4 = Karuna. Juvenile garfish were caught in August 2019 at sites 1 and 2.

The garfish observations from the archipelago of SW Finland and from the Åland Islands were announced in social media sites of both institutes. This aroused interest in the local broadcast company YLE-Turku, which made a brief story about the garfish findings. Soon after publishing, Seili research station was contacted by local inhabitants and summer cottage owners who reported findings of juvenile garfish during the past 2–4 years from the inner and middle parts of the archipelago of SW Finland. The lengths of these garfish were between 4–10 centimeters. Altogether five announcements were received, of which two had photographs of the fishes. One of these had GPS coordinates of the site (Fig.1). From these two we were able to confirm that the findings were accurate. Both sites (Lillmälö and Karuna) and are located adjacent to sandy beaches.

According to Ottelind (1985) spawning garfish, or garfish ready to spawn, have been observed near Öland and Gotland, but not farther

to the north. This seems to be the only published note related to spawning garfish in northern parts of the Baltic Sea. This information is also found in field guides (e.g. Curry-Lindahl 1985) and on Internet sites, such as Artdatabanken (www.artdatabanken.se). It is also referred to in e.g. Ojaveer and Kalejs (2005). According to Urho and Lehtonen (2008) there are, however, indications that the garfish may occasionally spawn in the south coast of Finland, but detailed information, such as locations, seems lacking in the scientific literature. In the autumn of 1990 juvenile garfish were caught at Tvärminne Zoological Station (Urho, 1999). According to Urho (1999), the nearest spawning site for garfish in the Gulf of Finland is located in the west coast of Estonia. Larval dispersal and drift from Estonia caused by strong winds was given as the explanation for this abnormal distribution.

According to Ottelind (1985), adult garfish appear to the south coast of Sweden in May from

their wintering areas in the waters to the west of the British Islets. As a rule, the garfish are ready to spawn immediately after reaching Öresund in the Baltic in May and June (Ottelind 1985). The spawning occurs in very shallow waters (Ottelind, 1985). The results from spawning experiments conducted by Polte & Asmus (2006) in the Wadden Sea strongly suggest that garfish spawning migration is distinctly directed towards seagrass habitats, because eggs were attached to any suitable structure, as long as it was located inside the *Zostera noltii* bed. Garfish release relatively large eggs (\varnothing 3 mm) covered by numerous filaments, which facilitate attachment to the substrate (Polte & Asmus 2006). Garfish grow rapidly, and lengths are about 10 cm in August, and later in the autumn about 20 cm (Ottelind 1985).

The now reported juvenile garfish have with certainty hatched in spring 2019. The spawning has apparently occurred locally as the eggs attach to the vegetation and are not pelagic. The distances to known spawning grounds are long (e.g. Iso-Kuusinen – Gotland c. 300 km). It is very unlikely that the currents would bring juveniles to the shallow inner parts of the archipelago of SW Finland, or to the site in western Åland where the sea currents mainly run southwards along the Swedish east coast (Maslowski and Walczowski 2002). This supports our idea that reproduction of garfish has occurred in Finland in 2019. Based on our findings, we suggest that also earlier sporadic juvenile garfish caught in Finland have hatched here.

Acknowledgments. We thank the students who participated in the two field courses for excellent fieldwork and successful fishing. Archipelago Research Institute of University of Turku: Emmi Alander, Tiia Karpela, Aarne Lauerma, Maria Perkkola, Paula Rasila, Heidi Rintanen and Ronja Saarinen, and Husö Biological Station: Sophie Doktor, Wiljam Eklund, Anna Holmberg, Christoffer Johansson, Ronja Kaplin, Trine Lindström, Ida Lintala, Jenni Rosnell, Sofia Pettersen, Anton Ringbom, Tommy Sulkakoski and Lina Wilson.

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