Morphology, habitats and distribution of species of the Jaera albifrons group (Isopoda, Janiridae) in Finland

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Jaera specimens of the *albifrons* group (*J. marina* (Fabr.)) are common in the seas surrounding Europe and on the east coast of North America, where they are found in shallow water under stones and among seaweeds. They are frequently reported in bottom samples too (p. 311). FORSMAN (1949) divided *J. albifrons* Leach into four distinctive races: *J. a. albifrons*, *J. a. ischiosetosa*, *J. a. praehirsuta*, and *J. a. posthirsuta*. BOCQUET (1950) described two additional races *J. a. syei* (the Baltic form of *J. a. albifrons*, the characteristics of which FORSMAN (1949) had already observed), and *J. a. forsmani*, finally elevating the species *J. albifrons* to the rank of a superspecies and the subspecies (races) to species. BOCQUET retained the trinominal specific names, but a leaning towards the binominal form is to be seen in the recent study of BOCQUET & PRUNUS (1963). Because at least some of these forms are sympatric, they will be regarded here as sibling species. The systematic position of *J. a. syei* seems, however, to be somewhat obscure (LÉCHER 1964, NAYLOR & HAAHTELA 1965), and it will be regarded here as a subspecies of *J. albifrons* (*J. a. albifrons* in BOCQUET 1953). A comparable situation arose when SEGERSTRÅLE (1947) and SPOONER (1947, 1951) split the amphipod species *Gammarus zaddachi* Sexton into three (see KINNE 1954). It might be useful to indicate the close systematic affinity of these forms by creating a higher taxonomic category to separate them from the remaining species of the genus *Jaera* (see KESSELYÁK 1938, MARGALEF 1952, SCHULZ 1954) but this is outside the scope of this paper.

Prior to the present research, *J. a. syei* and *J. praehirsuta* had been reported from Tvärminne (FORSMAN 1949) and *J. ischiosetosa* from Ulkokrunni (HAAHTELA 1964). There are several records of the *Jaera albifrons* group along the Finnish coast (Fig. 4). In order to obtain further information on the occurrence of the species in Finland, I examined all available museum samples. Unfortunately, these consisted mainly of females, so, since the identification of the species is based on males, additional collections were also made.

The aim of the present paper is to present basic information, while more material is being collected for further study.

Identification

The species may be identified by the secondary sexual characters on the male peraeopods. The adult males are clearly smaller than the females. The abdomen of a female is more pointed or curved than that of a male (Fig. 1). Beneath the pleotelson, the first pair of pleopods join to form a T-shaped praeoperculum in the male. The female does not possess this first pair of pleopods, but the second pair forms a broad operculum (Fig. 2). The praeoperculum is an important systematic character. All species of the *J. albifrons* group have similar praeopercula, but they differ from all the other species of the genus, and these respectively from each other, in the shape of this organ (see KESSELYÁK 1938).

A key to the Finnish species (♂♂) is as follows:

1 (2) Peraeopods I – IV with many curved hairs on pro-, carpo- and meropodites. Peraeopods VI and VII unmodified, but the main carpopodial spine of peraeopod VI shorter than that of peraeopod VII (Fig. 3 A, B) ..... *J. praehirsuta* Forsman 1949

2 (1) Peraeopods I – IV without curved hairs (Fig. 3 C). Peraeopods VI and VII with a bristled lobe on the carpopodite or long curved hairs on the ischiopodite 3

3 (4) The carpopodite of peraeopods VI and VII enlarged to a high but narrow lobe that forms a comb of about 15 or more stout, curved bristles on its posterior margin (Fig. 3 D) .. *J. albifrons* ssp. *syei* Bocquet 1950

4 (3) The carpopodite of peraeopods VI and VII unmodified, but the inner margin of the ischiopodite bearing a distinctive row of long and slender, curved bristles (Fig. 3 C) ..... *J. ischiosetosa* Forsman 1949

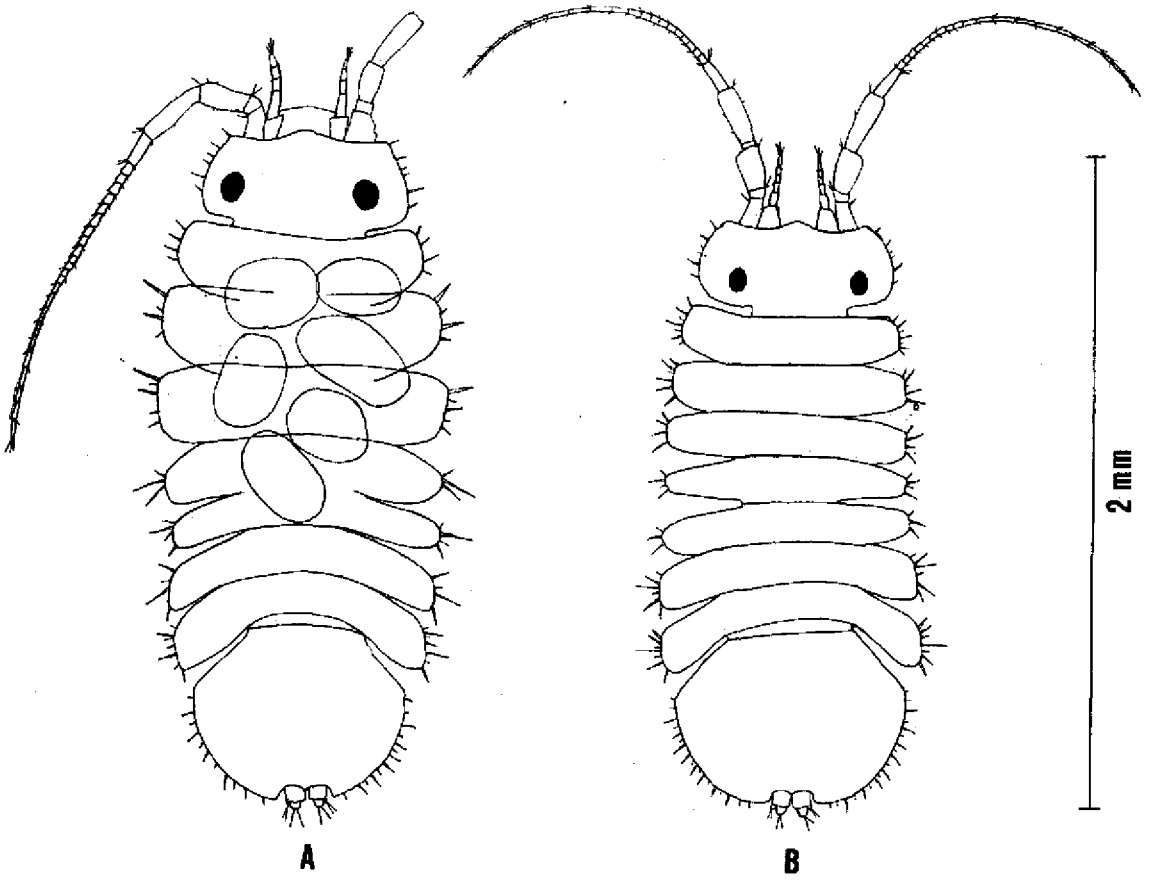

Fig. 1. *Jaera ischiosetosa* Forsman from Rymättylä. A = young ovigerous female, B = adult male.

In the Finnish samples of *J. ischiosetosa* I found that the morphological characters always corresponded well with the descriptions of Forsman (1949) and Bocquet (1953). In *J. a. syei* the carpopodial lobe of peraeopods VI and VII often had only about 15 bristles, the maximum being 22. For four males ($1.9 < L < 2.1$ mm) from three localities the average number of these bristles was 19 (ranging from 17 to 22). Bocquet (1953) has counted the respective number of bristles for a group ranging in length from 1.4 to 1.6 mm in a Kiel population, and in general, the number of bristles was there related to the size of the animal. There may be remarkable differences in the populations of *J. a. syei* of the Baltic area, since Lécher (1964) has shown that the European populations of *J. a. syei* by the North Sea, the Channel and the Atlantic are regulated according to a chromosomal cline. In *J. praehirsuta* the carpopodial spine of peraeopod VI was often almost as long as that of peraeopod VII. In France (Bocquet 1953) and Britain (Naylor & Haahtela 1965) in specimens of that species the carpopodial spine of peraeopod VI is much shorter than that of peraeopod VII, a character which in those areas distinguishes *J. praehirsuta* from *J. forsmani* with certainty.

Size

Forsman (1944) has concluded that the lifespan of a female *J. albifrons* is about two years, and that of a male about half a year less. Breeding begins in the Southern Baltic and South Sweden in March – April, ceasing in October (Sye 1887, Forsman 1944). The samples from Finland collected from September to May include only non-breeding specimens. Sexual maturity is reached in about two months (Forsman 1944).

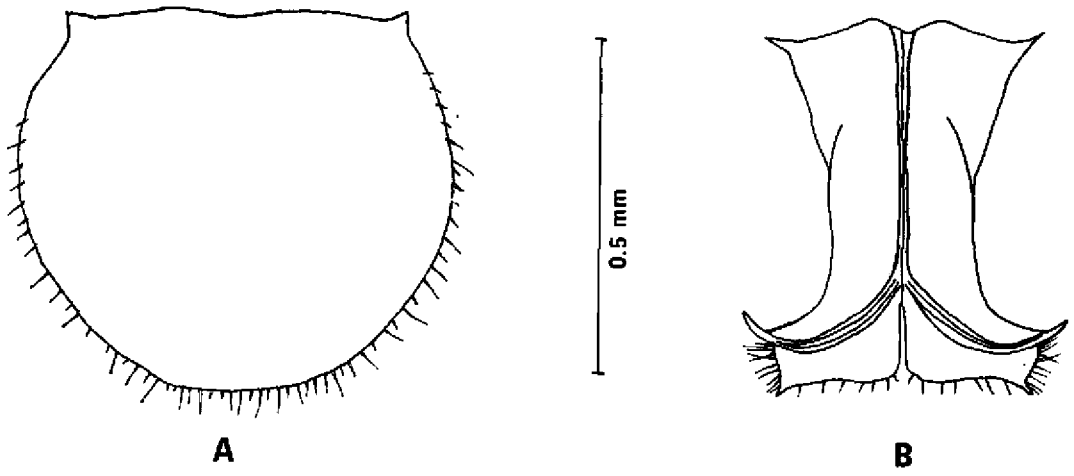

Fig. 2. *Jaera ischiosetosa* Forsman from Rymättylä. A = female operculum, B = male praeoperculum.

Thus at the beginning of the summer the population comprises relatively numerous young, small individuals among the larger adults. Towards the autumn the former attain adult size, and represent a group uniform in size, since the old individuals have apparently died. This could be seen in the Finnish material too.

The measurements thus far carried out (from the anteriormost visible margin of the head to the posterior margin of the pleotelson), showed that the species did not differ much in size. The mean length of *J. a. syei* ♂♂ from Rymättylä, in August 1964, was 2.0 mm (12 spec., ranging from 1.6 to 2.4 mm). *J. ischiosetosa* ♂♂ of the same sample measured 1.7 mm (104 spec., 1.4 – 2.0 mm), and from Pyhtää commune, in August 1955, 1.8 mm (21 spec., 1.6 – 2.0 mm). *J. praehirsuta* ♂♂ from Maakrunni, in January 1964, measured 2.1 mm (6 spec., 1.6 – 1.4 mm), and from Pyhtää commune, Harvasaari, in August 1955, 1.7 mm (8 spec., 1.6 – 1.9 mm).

In a pure *J. ischiosetosa* population from Espoo, Lehtisaari, in June 1889, the mean length of the ovigerous ♀♀ was 3.2 mm (37 spec., 2.8 – 3.8 mm), in the sample of *J praehirsuta* from Harvasaari mentioned above 2.7 mm (7 spec., 2.5 – 3.0 mm).

The largest specimens were collected from a depth of 38 m at Lohm, Korppoo (see below) in May 1960. The sample consisted of six females from 3.8 to 4.7 mm in length. They were relatively broad and the hairs on the body margin were long, but, having no males in the sample, I could not identify the species. KUNKEL has recorded specimens of the *J. albifrons* group as much as 7 mm long (according to KESSELYÁK 1938), but these are exceptions. Usually 5 mm is considered the maximum length (KESSELYÁK 1938, GRUNER 1962, 1965).

Habitats and geographical distribution

With a few exceptions the samples studied by the author originated from the S and SW coasts of Finland, usually from under stones in shallow water. There were some records of *Jaera* from depths below 10 m, the deepest being at 38 m from Korppoo (BAGGE *et al.* 1965). Recently LAAKSO (1965) has found specimens from depths between 18 and 24 m, but considers that thy might have drifted there in algae from shallow water. In the Skagerrak specimens belonging to the *J. albifrons* group have been recorded at 55 m (GRUNER 1962, 1965). With such records it is very difficult to conclude whether the animals are actually from weeds or from the substratum itself.

J. ischiosetosa was very abundant under stones at depths of less than 0.5 m, the populations usually consisting of that species only. HAAHTELA (1964) has found one specimen at 23 m near Ulkokrunni in the Bothnian Bay. *J. tischiosetosa* was only occasionally found amongst weeds. The preference for stones along the beach has been reported by FORSMAN (1949, 1956), BOCQUET (1953), and NAYLOR & HAAHTELA (1965). The two latter studies mention the

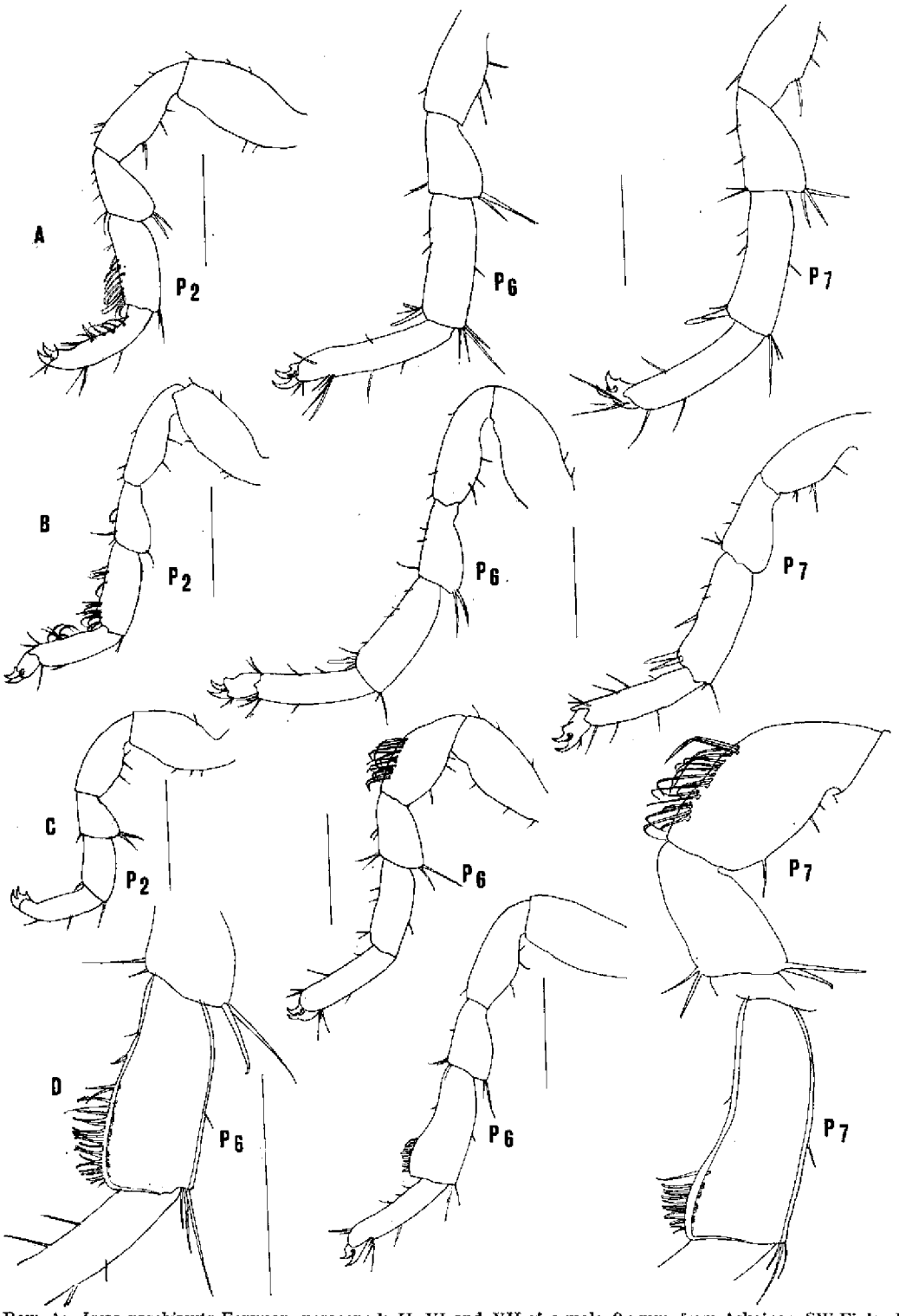

Fig. 3. Row A: *Jaera praehirsuta* Forsman, peraeopods II, VI and VII of a male, 2.6 mm, from Askainen, SW Finland. – Row B: *Jaera praehirsuta* Forsman, peraeopods II, VI and VII of a male, 2.0 mm, from Maakrunni, NW Finland. – Row C: *Jaera ischiosetosa* Forsman, peraeopods II, VI and ischio- and meropodite of peraeopod VII of a male, 1.9 mm, from Rymättylä, SW Finland. – Row D: *Jaera albifrons* ssp. *syei* Bocquet, carpopodite of peraeopod VI of a male, 2.1 mm, from Rymättylä, SW Finland (left); peraeopod VI (middle) and carpopodite of peraeopod VII (right) of a male, 2.1 mm, from Tvärminne, SW Finland. – The length of each scale line is 0.2 mm.

preference for the upper tidal zone. In rock-pools *J. ischiosetosa* has been recorded in weeds only (FORSMAN 1951).

J. ischiosetosa occurs along the south coast of Finland, and in addition there is one record from the Bothnian Bay (see p. 309) (Fig. 4). FORSMAN (1956), BOCQUET (1953) and NAYLOR & HAAHTELA (1965) consider the species to be very euryhaline. Thus its occurrence in a very diluted medium (see HAAHTELA 1964) is not surprising. General distribution: Finland, Sweden, Norway, Russia, Poland, Germany, France and Britain.

J. a. syei was seldom found at depths of less than 0.5 m, but the deepest record was from 3 m only. FORSMAN (1956) has found *J. a. syei* in Sweden at a depth of 15 m. Rather than stones it preferred weeds, especially *Fucus vesiculosus* and some red or green algae. On the Baltic coast of Sweden *J. a. syei* lives both in algae and under stones along the beach (BOCQUET 1953, FORSMAN 1956). BOCQUET (1953) has explained that the wide range of microhabitats of *J. a. syei* results from lack of competition with closely related species; such species are absent from the areas where *J. a. syei* occurs. In Finland, however, there are several records of it with *J. ischiosetosa* and *J. praehirsuta* in the same sample, usually in algae, but sometimes from under stones, too.

All records of *J. a. syei* were from the south coast of Finland (Fig. 4). The record near Kotka, where the salinity is about 4 ‰, suggests that as far as salinity is concerned, *J. a. syei* might be found in the Gulf of Bothnia as well. General distribution: The Baltic (Finland, Sweden, Poland, Germany). *J. a. syei* has only recently been recorded from the Atlantic side of Europe: Britain (NAYLOR, SLINN & SPOONER 1961), Norway (HUSSEY 1964), Germany, the Netherlands, France and the east coast of North America (LÉCHER 1964).

J. praehirsuta was found at the same depths as the previous species and in similar weeds. The deepest record was at a depth of 3 m. The species seldom occurred under stones. FORSMAN (1956) has recorded *J. praehirsuta* at a depth of more than 30 m and exclusively among algae. BOCQUET (1953) has confirmed the preference for algae, and has found the species only in the lower part of the intertidal zone. In estuarine conditions in South Wales a wider range has been observed (NAYLOR & HAAHTELA 1965).

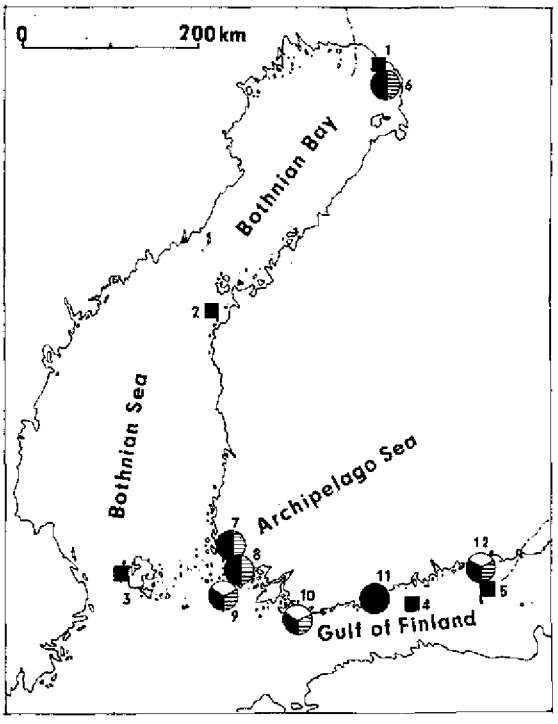

Fig. 4. The outermost localities of finds of the entire *Jaera albifrons* group (squares) and all those of the species (circles): *J. a. syei* (white), *J. ischiosetosa* (black) and *J. praehirsuta* (hatched) in Finland. The sectors in the circles do not indicate abundance. 1. Ykskivi (NORDQVIST 1890), 2. Rönnskär (K. M. Levander), 3. Eckerö (HELLÉN & EHRSTRÖM 1919), 4. Söderskär (SJÖBLOM 1955), 5. Haapasaari commune (SUOMALAINEN 1939), 6. Ulkokrunni (HAAHTELA 1964), and Maakrunni (T. Valtonen), 7. Askainen (L. von Haartman), 8. Rymättylä (I. Haahtela), 9. Korppoo (P. Tulkki), 10. Tvärminne (FORSMAN 1949 and Anon. coll.), 11. Espoo (K. M. Levander), and Helsinki (A. Nordman), 12. Kymi and Pyhtää commune (T. Ulvinen).

J. praehirsuta is common on the south coast of Finland. The record in the Bothnian Bay at Maakrunni is the northernmost in the Baltic, and marks a new distribution area (Fig.4). This record is not surprising, because the species is regarded as very euryhaline (BOCQUET 1953, FORSMAN 1956, NAYLOR & HAAHTELA 1965). General distribution: Finland, Sweden, Norway, Germany, Britain, W Greenland and the east coast of North America.

In general, the data are too scanty to give a conclusive idea of the distribution of the species. There are only a few samples from waters more than a few metres deep or from other than sheltered shores. The salinity and temperature requirements of the species of the *J. albifrons* group also need much more investigation.

Summary

Three forms of the *Jaera albifrons* group, viz. *J. ischiosetosa* Forsman, *J. albifrons* ssp. *syei* Bocquet and *J. praehirsuta* Forsman, have been recorded in Finland. The morphological features of the first-mentioned species correspond well to those presented by other authors, but the remaining two show a reduction in the number of certain spines or bristles characterizing them. The species do not differ much in size, but it should be noted that the mean size of members of a population changes rapidly, owing to the short life-span and breeding season. *J. ischiosetosa* was usually recorded at depths of less than 0.5 m under stones, with one exceptional deep-water specimen. *J. a. syei* and *J. praehirsuta* were both generally found below a depth of 0.5 m and preferred weeds to stones. All three species are common on the south and southwest coast of Finland, *J. ischiosetosa* and *J. praehirsuta* also occurring in the northern part of the Bothnian Bay.

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