A NEW SPECIES OF *SPIRONTOCARIS* WITH NOTES ON OTHER SPECIES FROM THE ATLANTIC COAST.

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A study of the group of shrimps contained in this genus has been undertaken to determine the systematic relationships of the species, and it has seemed desirable to publish, as a preliminary report, a description of one new species together with some notes on other Atlantic species. These notes are in part records of hitherto unpublished variations and in part an extension of published ones.

I wish to express my indebtedness to Prof. A. G. Huntsman not only for an introduction to the subject and the provision of the major portion of the material, but also for much direction and assistance.

SPIRONTOCARIS ZEBRA, sp. nov., Pl. II, figs. 1-4; Pl. III, fig. 5-9.

Rostrum rather short reaching the distal end of the first protopodite of the antennule in three of the specimens examined, and to the middle of the first protopodite in the other two. In three cases there are three dorsal rostral spines and in the other two there are two dorsal spines. In all five specimens there is only one ventral spine. The rostrum ends anteriorly in a spine which points slightly downward. The anterior rostral spine is smaller than the others and is somewhat closer to the second dorsal spine than it is to the anterior extremity of the rostrum. In the specimens where there are three dorsal spines the posterior two are equal in size and their distance apart equals the distance from the anterior extremity of the rostrum to the second dorsal rostral spine. The ventral spine is on the ventro-anterior edge of the rostrum and it equals the posterior dorsal spines in size and is situated just anterior and ventral to the first or anterior dorsal spine. Just ventral to the tip of the second dorsal spine there is a slight angle in the ventral surface of the rostrum due to the axis of the anterior part of the rostrum rotating downward from the horizontal. The orbit is slightly behind the posterior dorsal rostral spine. The dorsal surface of the carapace is highest about one-third its length from the anterior end or at the point where the second dorsal spine of the carapace is situated. It is about equal in size to the second dorsal rostral spine and points forward. Halfway between

this second dorsal carapace spine and the posterior rostral spine is the first carapace spine, which is hooklike and more slender than the second.

Directly ventral to the first carapace spine is the base of the supraorbital spine. Seen laterally this spine appears wide at the posterior end where it is one-half the depth of the rostrum at the orbit. It is cut off anteriorly in such a way as to end in a sharp spine but the dorsal edge is straight. Seen from above the supraorbital spine is needle shaped, just reaching to the posterior part of the base of the posterior carapace spine.

Suborbital spine strong, pointed, base just ventral to anterior end of supraorbital spine, and its anterior end ventral to the anterior end of the third dorsal rostral spine. At the ventro-anterior angle of the carapace is a sharp stout pterygostomial spine which points slightly downward. It is directly ventral to the suborbital and at a distance from it equal to that between the suborbital and the dorsal side of the rostrum. Pterygostomial spine smaller than suborbital. Carapace convex between them.

Passing posteriorly from the pterygostomial spine the depth of the carapace increases till at the level of the second dorsal carapace spine it is 0.6 of the length of the carapace. Posteriorly the ventral border rises slowly while the dorsal edge falls. In the posterior one-fifth of the carapace the dorsal surface rises, then suddenly falls producing a rounded flange at the dorso-posterior end of the carapace. Posterior to this the dorsal and ventral edges meet in a rounded portion of the carapace which is overlapped by the first abdominal segment.

The first abdominal segment has the ventral edge well rounded, and is wider at the dorsal than at the ventral border, and is overlapped ventrally by the second segment. There are a few setae on the ventral edges of all the segments. The second segment overlaps the first and third and its ventral expansion is almost circular and without a spine. The ventral edge of the third segment is rounded; this segment is very large; its posterior border is almost regularly concave and meets the dorsal convex (in posterior part), overhanging the fourth segment. The fourth segment is not so deep as the third; its posterior border slopes first anteriorly (straight) and then posteriorly (rounded) so producing a ventro-posterior wing that ends in a spine which lies along the ventral edge of the fifth segment. The fifth segment is much like the fourth in shape, but is smaller with a ventro-posterior wing and spine. The sixth segment is stout and short, its dorsal border is straight; at the posterior end is a well developed lateral spine. The dorsal border is longer than the ventral due to a concavity of the ventro-posterior edge producing a dorso-posterior wing ending in a small spine.

The telson is 0.18 of the length of the specimen. It bears six terminal spines, the outer pair (one on each side) are short and stout, the intermediate pair are four times as long as the outers and the median pair do not reach quite to the distal end of the intermediates. On the dorso-lateral surface of the telson there are in three specimens four and in the other two five pairs of stout equidistant spines. The dorsal surface has many long setae scattered over it.

The squame of the antenna extends to the middle of the large flagellum of the antennule and is widest at about its middle. The end of the squame is rounded and serrate. Its inner border bears long setae. The spine of the squame is stout and straight and reaches just to the distal end of the squame. The first endopodite is large, its end being triangular with its point in the middle of the second endopodite. The distal end of the second endopodite is also triangular and its medial side bears setae. The third endopodite is stout and bears many distal setae. Distal end of exopodite bears one long anteriorly pointing spine. Flagellum about 30 mm. long.

First protopodite of antennule split down two-thirds of its length, the lateral spine so formed reaching the distal end of the second protopodite ending in a long tapering spine that points slightly laterally. The main portion of the protopodite bears at its distal end four (two specimens) or three (three specimens) heavy spines. These spines reach the middle of the second protopodite, the most lateral one is needle shaped, the next is like an equilateral triangle, and the remainder are needle shaped. The second protopodite is stout, its disto-lateral spine is sharp and points somewhat laterally reaching the middle of the third protopodite. The third protopodite consists of two triangular pieces overlapping, the median one being more sharply pointed than the other. The flagellum consists of about twenty segments, and narrows gradually to the end, bearing on its medial surface many long setae. The small flagellum is about five mm. long.

The mandible has two prominent cusps separated by a deep groove. The medial one shows slight indentations; palpus is stout, narrowing toward end with external side longest. Teeth are very small. Exopod is two jointed, second joint is rounded and bears setae; it is a little shorter than the palp.

Eye reaches distal quarter of rostrum, fascetted part almost globular, stalk longer than broad.

Exopod of first maxilla bears two spines, outer one small, and the other stout. Sides of endopodite almost parallel giving a squarish appearance not seen in other species. Medio-distal end bears three to four rows of spines, disto-lateral edge and rest of medial with long plumose setae.

Second maxilla much the same as in *S. fabricii*, the protopodites being somewhat higher and the exopodite more slender with the anterior end somewhat rounded.

First and second maxillipedes like those in *S. fabricii*.

Third maxillipede bears small hooked epipodite but no exopodite. The first segment is about equal to the third in length; it is slightly hollowed out laterally at the proximal end. The second segment is one-quarter the length of the third and bears a distal ring of setae. Distally the third segment has, in two specimens ten spines, in one nine spines, and in another nine spines on the left maxillipede and eight on the right. Of these spines the proximal two are small. There are about ten circles of setae on the third segment. The length is about 11 mm.

The first pereiopod has an epidodite. End is chelate. Dactyl cleft at end and one-quarter length of merus; bears distal groups of setae. Propodus stout and three-quarters of the length of the merus; bears scattered setae. Carpus two-fifths length of merus and with setae on a Y-shaped area on lateral side. Merus stout, proximo-laterally bears five strong setae. Ischium, basis, and coxa each one-third length of merus. Length 10 mm.

Second pereiopod with an epipodite, chelate, with dactyl one-sixth length of merus and having a terminal group of setae, with propodus stout and two-fifths length of merus. Carpus slender, seven jointed; third joint longest, equaling first and second together; first, second, fourth and seventh equal; and the fifth and sixth shorter than these. Merus slender, with few setae. Ischium slender, one and one-quarter times the length of the merus, bearing five proximo-lateral spines. Basis one-ninth length of merus. Coxa one-quarter length of merus. Length 13 mm.

Third pereiopod bears an epipodite. Dactyl stout, curved, one-fifth the length of the merus, bears six (three specimens) or five (two specimens) spines which increase in size distally. Propodus one and one-quarter times length of merus; bears about seventeen pairs of spines, the distal ones being the largest. Carpus one-third length of merus; distal lobe which projects over propodus well developed; Merus stout; bears five spines (three specimens) or four (two specimens) on the distal half, the distal one being the largest and the proximal one the smallest. Ischium is stout, one-third length of merus. Coxa one-twelfth length merus; posterior end deeply indented. Basis one-eighth of length of merus. Length 15 mm.

Fourth pereiopod much the same as the third but lacks epipodite. Propodus with twelve pairs of spines. Merus with two spines in two specimens, five in two others and six in the remaining one. Length 15 mm.

Fifth pereiopod much like the fourth also without epipodite. Propodus with seven pairs of spines. Merus with one spine in four specimens, and two in the other. Length 12 mm.

First pleopod (female) with stout protopodite; exopodite slender but not blunt; endopodite two-thirds length of exopodite, stout, tapering from distal third to a point. Length 3 mm.

Remaining pleopods like those of *S. fabricii*. Lengths of pleopods two to five are five, five, four and one-half, and three mm.

Protopodite of uropod with one very blunt spine on the long outer lobe; no inner lobe. Two latero-posterior spines on the exopodite, one behind the other, the anterior being the smaller.

Colour.—In general the body is banded by bright brownish red to orange stripes which run dorso-ventrally. Those of the cephalothorax and the three anterior abdominal segments run somewhat obliquely, the ventral end being the more anterior. On the cephalothorax the areas between these stripes have a bluish tinge; on the rest of the body these areas are whitish. The appendages have alternating bands of white and orange; the bands on the coxa, basis and ischium of the pereiopods are purplish. The edges of all the abdominal segments, except the anterior edge of the second, the lateral edge of the antennal squame, the anterior lateral edge of the first protopodite of the antenna, and the edges of the lateral spine of the first protopodite of the antennule are defined by a sharp red line. The flagellum of the antenna is all red. Ventrally on the cephalothorax are two horizontal orange bands.

Very similar to *Spirontocaris washingtoniana* Rathbun (Rathbun 1902, page 895. Rathbun 1910, page 76) and to *S. profunda* Rathbun (Rathbun 1906, page 914). The rostrum is almost identical with that of the latter, but differs from *S. profunda* in having shorter third maxillipedes, reaching only to the distal end of the squame of the antenna; in having a longer lateral spine (basal scale) on the first protopodite of the antennule; and in having the second pereiopod with a seven jointed carpus. It differs from *S. washingtoniana* in that the rostrum is shorter, and with only one tooth on the ventral edge; in having a longer lateral spine on the first protopodite of the antennule; and in having shorter third maxillipedes.

Dimensions.—All were females and the lengths were 49, 41, 38, 37 and 32 millimetres.

Distribution.—New Brunswick; one specimen from Passamaquoddy bay (48 mm.) at 30 metres: one from Joe's point, St. Croix river (41 mm.): two from Head Harbour, Campobello island, the 37 mm. specimen from 10 metres of water and the 32 mm. one from kelp at low tide. Nova Scotia; one from St. Mary's bay (38 mm.).

SPIRONTOCARIS FABRICII (Kröyer). Pl. IV, fig. 10.

Colour.—Spotted over a whitish ground, the spots being a very deep bright red. There is one exception to this, namely on the basis and coxa of the third to fifth pereiopods where the colour is purple. An area of very fine red dots on either side of the posterior dorsal carapace spines and mixed with these larger spots. Larger scattered spots ventrally and also posteriorly on the cephalothorax. Small dots just posterior to the orbit. Anterior end of rostrum spotted. Also antennae and antennules—the antennal flagellum with five red bands near its end and the edge of each antennal joint with a faint red line. Abdominal segments with scattered spots and on the third segment an area with small dots postero-ventrally. Basal joint of the third maxillipede entirely red, penultimate segment with a few dots, and the terminal segment with two equidistant red rings. Merus of first pereiopod with one red ring, and of the remaining pereiopods with two; propodus of pereiopods three to five with one ring. Protopodite of gonopod with one band of red, and of the remaining pleopods with four spots.

Variations.—An examination of one hundred and forty-eight individuals did not reveal the presence of an epipodite on the second pereiopod in any case. The first pereiopod always had an epipodite. The following table gives the variations in the number of spines on the various parts. The figures indicate numbers of individuals.

No. spines	1	2	3	4	5	6	7	8	9
Dorsal carapace.....	1	81	84						
Dorsal rostrum.....	75	82	1						
Ventral rostrum.....	1	25	114	14	2				
Lateral telson.....			2	43	43	2			
Merus third pereiopod.....			1	4	21	22	12	2	1
Merus fourth pereiopod....		5	18	28	10				
Merus fifth pereiopod.....	19	30	14	2					

In all cases but one there were six terminal spines on the telson, in this one case there were nine.

Dimensions.—The males vary in length from 36 to 19 mm., the females from 53 to 22 mm.

Distribution.—New Brunswick; Joe's point, St. Croix river: Head Harbour, Campobello island: Passamaquoddy bay, 'Prince' Sta. 4: Bay of Fundy, 'Prince' Sta. 5. Newfoundland; Bay of Islands, C.G.S. '33' Stations 55 and 56. Maine; Eastport.

SPIRONTOCARIS GAIMARDII (Milne-Edwards).

Variations.—Eight specimens were examined and the following variations in the number of spines found.

No. spines	2	3	4	5	6
Dorsal carapace	4	3	1		
Dorsal rostrum		5	3		
Ventral rostrum		4	4		
Lateral telson (2 broken)			1	4	1

Dimensions.—The females varied in length from 56 to 17 mm., and the males from 39 to 15 mm.

Distribution.—Newfoundland; Port au Port, C.G.S. "33" Sta. 65. Nova Scotia; Brier island.

SPIRONTOCARIS POLARIS (Sabine). Pl. V, fig. 12.

Colour.—Scattered orange red areas over the cephalothorax and abdomen, the colour being due to closely placed minute dots. The major portion of the colouration is on the dorsal surface. Postero-ventrally to the posterior dorsal carapace spine the colour is due to much larger spots. Ventral to these larger spots are several small areas of small dots which have a sulphur yellow tinge. Rostrum with scattered orange spots and its ventral edge bright red. Antennules, antennae, third maxillipedes, and first and second pereiopods with a few scattered spots. Pereiopods three to five with orange band on coxa and basis, two bands on merus, and two on propodus. Protopodite of pleopods two to five with two to three spots, the postero-distal one of which is the largest, and which in pleopods three to five is of a very dark orange colour. The posterior border of the fifth and sixth abdominal segments is defined by a bright red line.

Variations.—There is considerable variation in the numbers of spines on the various parts as is shown in the following table. The figures indicate numbers of individuals.

No. spines	1	2	3	4	5	6	7	8	9	10
Dorsal carapace		20	2							
Dorsal rostrum		6	8	4	3					
Ventral rostrum	1	9	5	3	3					
Lateral telson				8	3	4	3	1		
Merus third pereiopod					2	6	6	3	5	1
Merus fourth pereiopod	1			3	6	4	3	2	2	
Merus fifth pereiopod	9	3	3	3	1		1			

The number of terminal spines on the telson is subject to some variation being usually six or eight but occasionally five.

Dimensions.—Females vary in length from 58 to 21 mm., and males from 49 to 9 mm.

Distribution.—New Brunswick; Bay of Fundy, 'Prince' Sta. 5 and Sta. 120: Grand Harbour, Grand Manan: Green Islands, Grand Manan.

SPIRONTOCARIS GROENLANDICA (Fabricius, J. C.). Pl. IV, fig. 11.

Colour.—Both the shade of colour and the pattern vary much in this species. The colour is usually a brownish red but may show all stages between this and a dull brownish green. The greater part of the animal is coloured. On the cephalothorax there are usually the following non-coloured portions—a small area just posterior to the eye, one dorsal to the pterygostomial spine, one running ventrally from the second dorsal carapace spine, one just posterior to the fourth dorsal spine and several scattered smaller areas, which with the exception of five along the posterior half of the ventral edge vary considerably in position. On the abdomen the principal non-coloured areas are—one running across the first segment on its dorso-lateral surface, several scattered ones on the second segment, one on the dorsal surface of the third segment at its anterior end, one on the dorsal surface of the fourth segment, a narrow band running across the fifth segment which is continued into the sixth for a short distance and which is continuous with that of the fourth segment anteriorly. The ventral edges of the abdominal segments are red. The rostrum, antennules and antennae with scattered dots of colour; the flagella of the antennules and antennae with bands of colour, these not being complete in the case of the larger flagellum of the antennule. Terminal joint of the third maxillipede with two coloured bands, the penultimate with two and the basal joint with one at its distal end. First and second pereiopods with several bands; third to fifth with two bands on merus and propodus and one on carpus and dactyl as well as some colouring on the basal joints. The proximal half of the lateral surface of the protopodites of the pleopods coloured.

Variations.—The rostrum varies considerably, in some being very stout and in others rather slender; the latter condition obtains in the case of the males to a greater extent than in the females. In the males, too, the abdominal segments are not as wide compared to their dorso-ventral length as they are in the females.

The following table gives the variations in the number of spines. The figures indicate numbers of individuals.

No. spines	0	1	2	3	4	5	6	7	8	9
Dorsal rostrum	1	3	26	15	2					
Ventral rostrum		2	16	22	7					
Lateral telson						6	21	12	1	
Merus third pereiopod				4	1	3	14	21	3	
Merus fourth pereiopod			1	2	3	6	17	10	2	1
Merus fifth pereiopod		4	5	9	9	11	4	1		

The number of spines on the ventral edges of the abdominal segments varies much; usually there are two on the first, third, fourth and fifth segments, and one on the second and sixth; in about 25% there is only one on the third, in about 5% the fourth also has but one spine, and two specimens were examined where the fifth had only one spine. On the other hand there may be an increase in the number of spines as the fourth and fifth segments sometimes have three spines and in one case the second had two spines on one side but only one on the other.

Dimensions.—The females varied in length from 65 to 24 mm., and the males from 48 to 29 mm.

Distribution.—New Brunswick; Bay of Fundy, 'Prince' Sta. 5: Head Harbour, Campobello island: Grand Harbour, Grand Manan.

SPIRONTOCARIS SPINA (Sowerby).

Variations.—There is much variation in the form and number of teeth on the rostrum. The rostrum may be concave at its anterior end or pointed depending on the length of the ventral spines. The number of dorsal spines varied from 9 to 33, with an average at 18 to 20. The number of ventral spines varies from 2 to 5. There is a great deal of variation in the size of the dorsal spines especially. There are usually four dorsal carapace spines but occasionally there are five or six.

The telson usually has four, but sometimes five, lateral spines. The spines on the meri are as follows, the figures indicating numbers of individuals.

No. spines	1	2	3	4	5	6	7
Merus third pereiopod				3	2		1
Merus fourth pereiopod			1	3	2		
Merus fifth pereiopod	3	2	1				

The dactyls of the third to fifth pereiopods show considerable diversity of form. They tend to be rather longer and more slender than is typically the case in *Spirontocaris* and the longer they are the weaker

the spines become. In one specimen the dactyls were almost as long as in *S. macilenta*, but were much stouter than they are in that species; in this case the spines had almost disappeared.

Dimensions.—Females varied in length from 59 to 31 mm., and but a single male 27 mm. long was examined.

Distribution.—New Brunswick; Bay of Fundy, 'Prince' Sta. 5: Passamaquoddy bay, 'Prince' Sta. 4. Maine; Eastport.

SPIRONTOCARIS MACILENTA (Kröyer).

Variations.—The variations in the number of spines is given in the following table, the figures indicating numbers of individuals.

No. Spines	0	1	2	3	4	5	6	7
Dorsal carapace	4	5	16	8				
Ventral rostrum		8	11	7	6			
Lateral telson				33	2			
Merus third pereiopod				3	4	13	2	
Merus fourth pereiopod				1	3	16	5	
Merus fifth pereiopod	1		2	2	4	9	7	1

For the dorsal spines of the rostrum the numbers are as follows—

No. Spines	11	12	13	14	15	16
No. specimens	2	4	8	9	8	3

The dactyls of the third to fifth pereiopods are long and usually devoid of spines but in many cases one or sometimes two very small spines were observed near the base of the dactyl.

Dimensions.—The females varied in length from 68 to 38 mm., and the males from 54 to 45 mm.

Distribution.—Newfoundland; Bay of Islands, C.G.S. "33" Stations 57 and 56a.

SPIRONTOCARIS PHIPPSI (Kröyer). Pl. VI, fig. 13.

Colour.—Rather large brownish red spots distributed generally over the whole body and its appendages. The background is not so white as it is in *S. fabricii*, having a more yellowish tinge. Spots more closely packed on the upper half and on the anterior and posterior ends of the cephalothorax than on the rest of it. Also grouped on the dorso-posterior border of the third abdominal segment and on the uropods.

Rostrum, antennules, antennae, third maxillipedes and first and second pairs of pereiopods evenly sprinkled with colour; pereiopods three to five with a group of spots on the coxa and basis, one on the ischium, two on the merus, two or three spots on the carpus and one group on the propodus. Protopodites of the pleopods with from four to six groups of spots and a few on the exopodites.

Variations.—The normal number of supraorbital spines is two, but in a 19 mm. male specimen only one, with no trace of a second, was found. The variations in the number of spines are as follows:

No. spines	1	2	3	4	5	6	7	8	9
Dorsal carapace	1		4	1					
Dorsal rostrum						2		3	1
Ventral rostrum		1	2	4					
Lateral telson				7					
Merus third pereiopod		1	1	3					
Merus fourth pereiopod		3		2					
Merus fifth pereiopod	3	2							

Dimensions.—Females range in length from 25 to 18 mm., only one male was examined, it being 19 mm. in length.

Distribution.—New Brunswick; Head Harbour, Campobello island: Green Islands, Grand Manan: Station 113, Grand Manan.

SPIRONTOCARIS PUSIOLA (Kröyer). Pl. VI, fig. 14.

Colour.—Only a few deep red to orange red spots scattered over a whitish background. They are evenly spread over the cephalothorax and the first two abdominal segments. The third abdominal segment with five or six scattered spots; and the fourth to sixth segments with only two or three spots on their postero-ventral surface, the postero-ventral edges of these segments being defined by a sharp red line.

Rostrum without colour. A few spots scattered on antennules and antennae; edges of the segments of the small flagellum of the former red; lateral edges of squame of antenna red, as are the edges of the joints of the antennal flagellum. Third maxillipedes and second and third pereiopods with scattered spots. Third to fifth pereiopods with spots on coxa and basis, three or four in two groups on the merus, one on the carpus, and one group on the propodus. Protopodite of pleopods with one to four spots. Protopodite of uropod with one. Edges of uropods red.

Variations.—There are the following variations in the number of spines:

No. spines	0	1	2	3	4	5
Dorsal carapace		13	8	1		
Dorsal rostrum		9	13			
Ventral rostrum	21		1			
Lateral telson					9	1
Merus third pereiopod		3				
Merus fourth pereiopod	1	2				
Merus fifth pereiopod		2				

Dimensions.—The females varied in length from 28 to 11 mm., and the males from 18 to 12 mm.

Distribution.—New Brunswick; St. Andrews: Head Harbour, Campobello island. Maine; Eastport.

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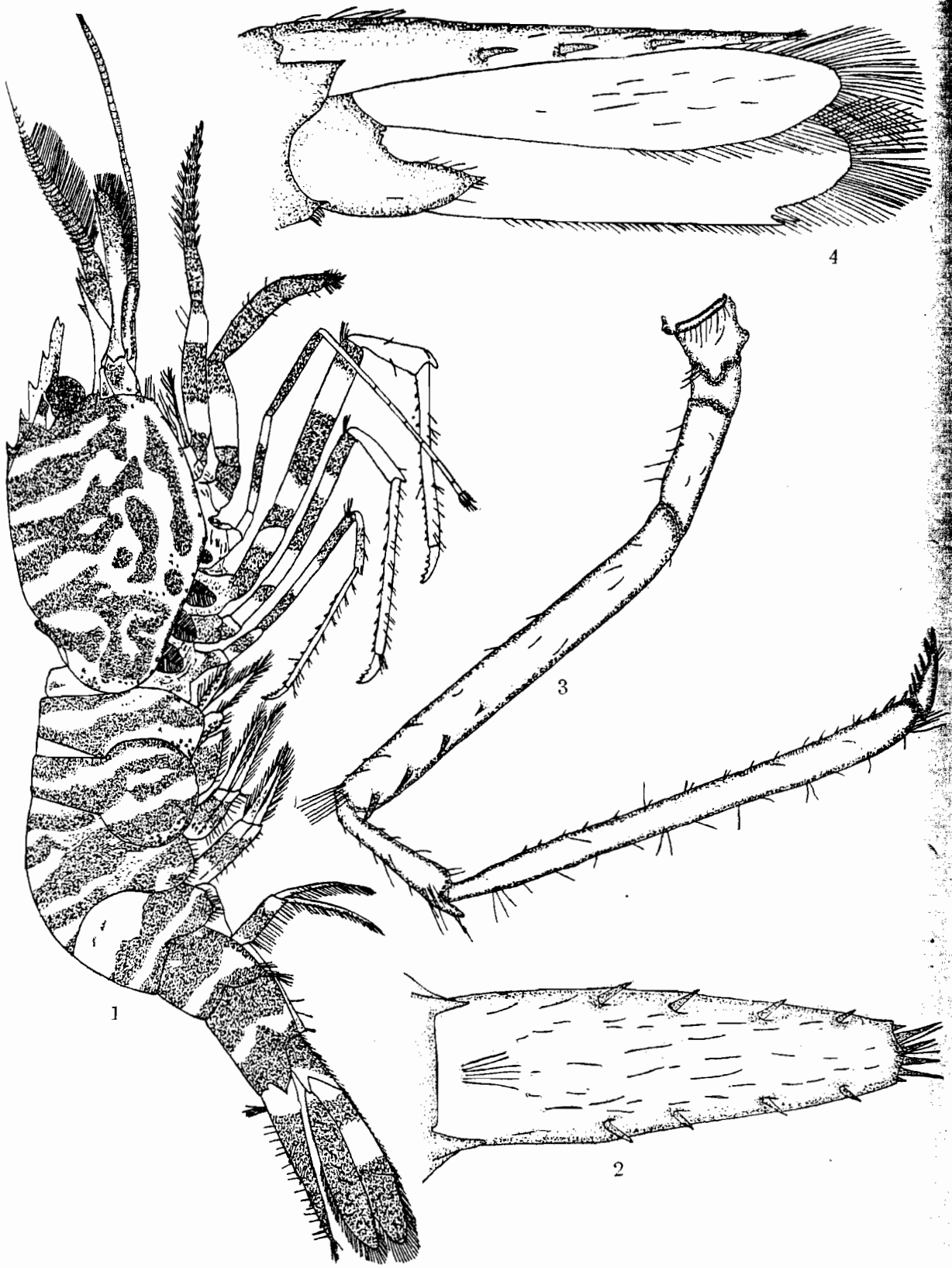

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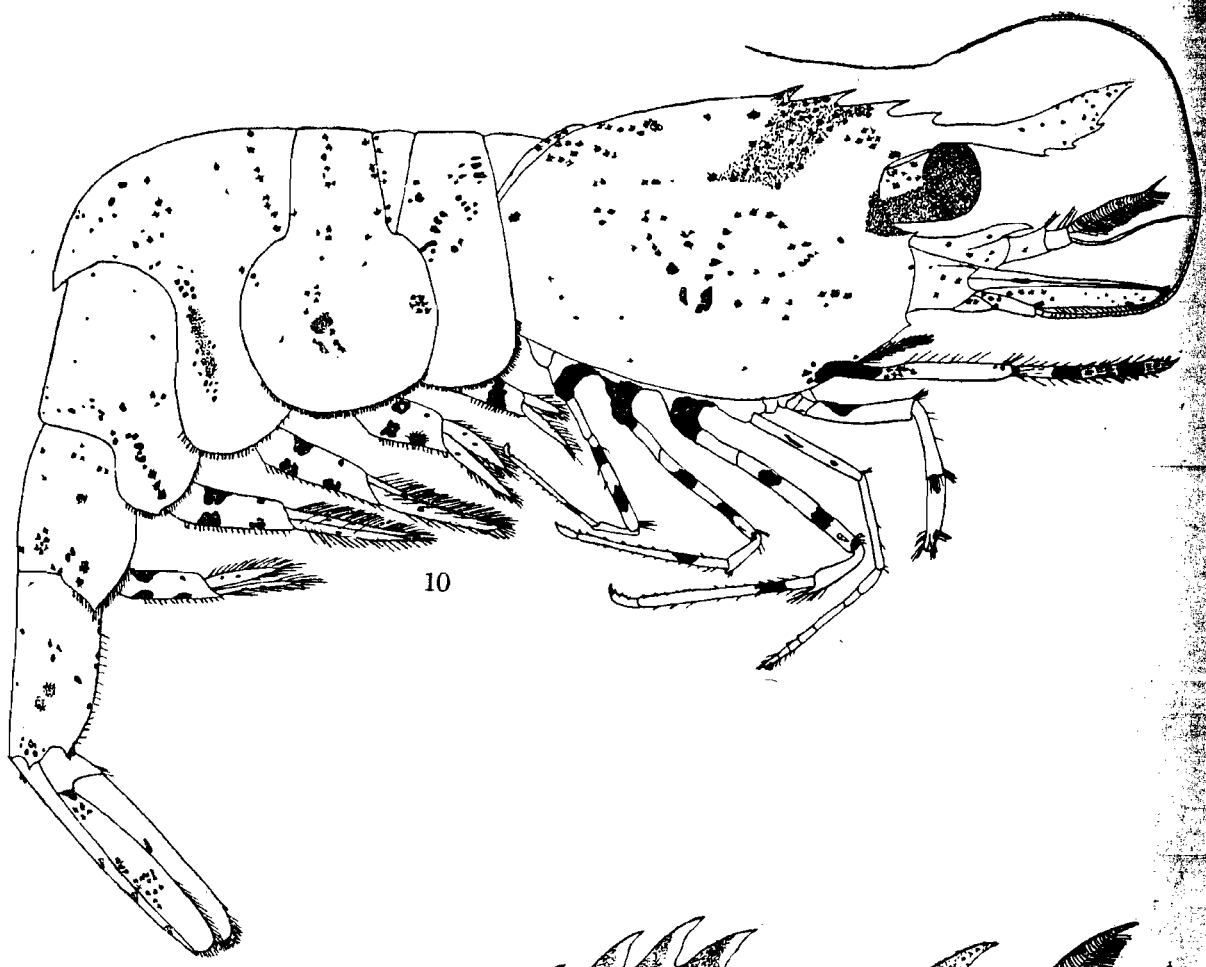

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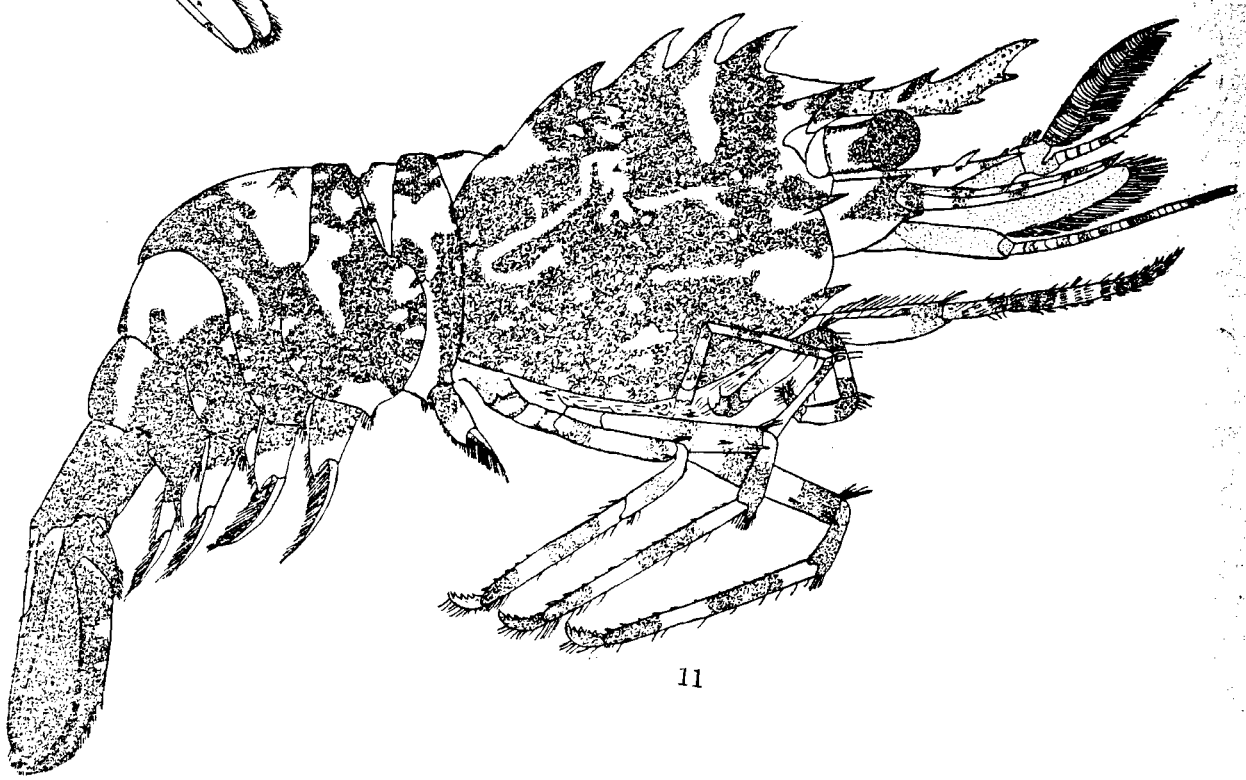

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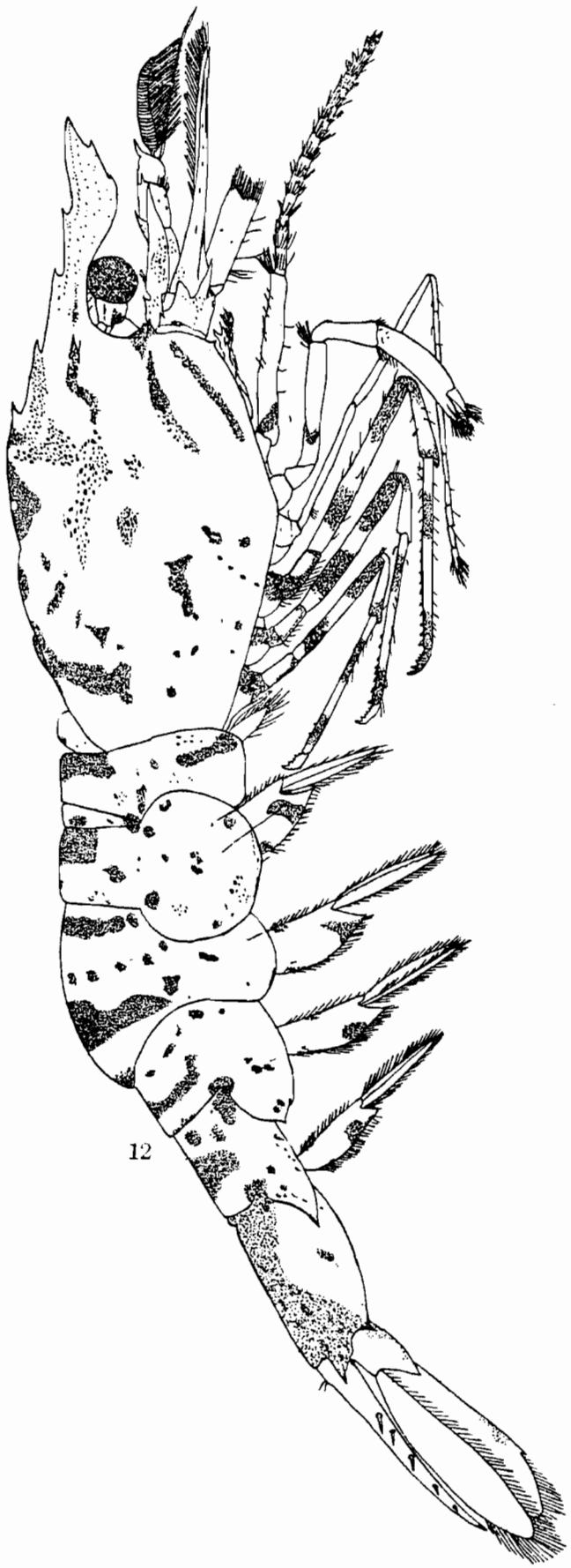
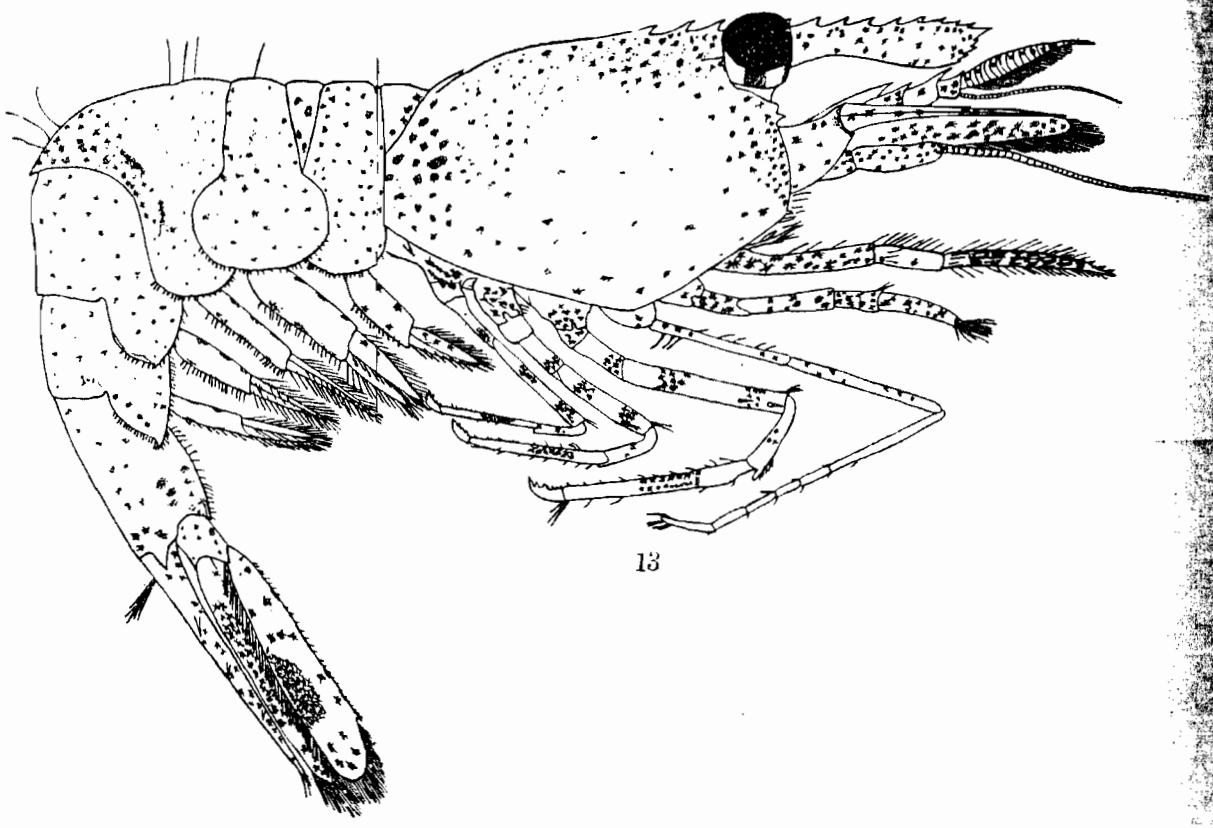


LEIM ON SPIRONTOCARIS.



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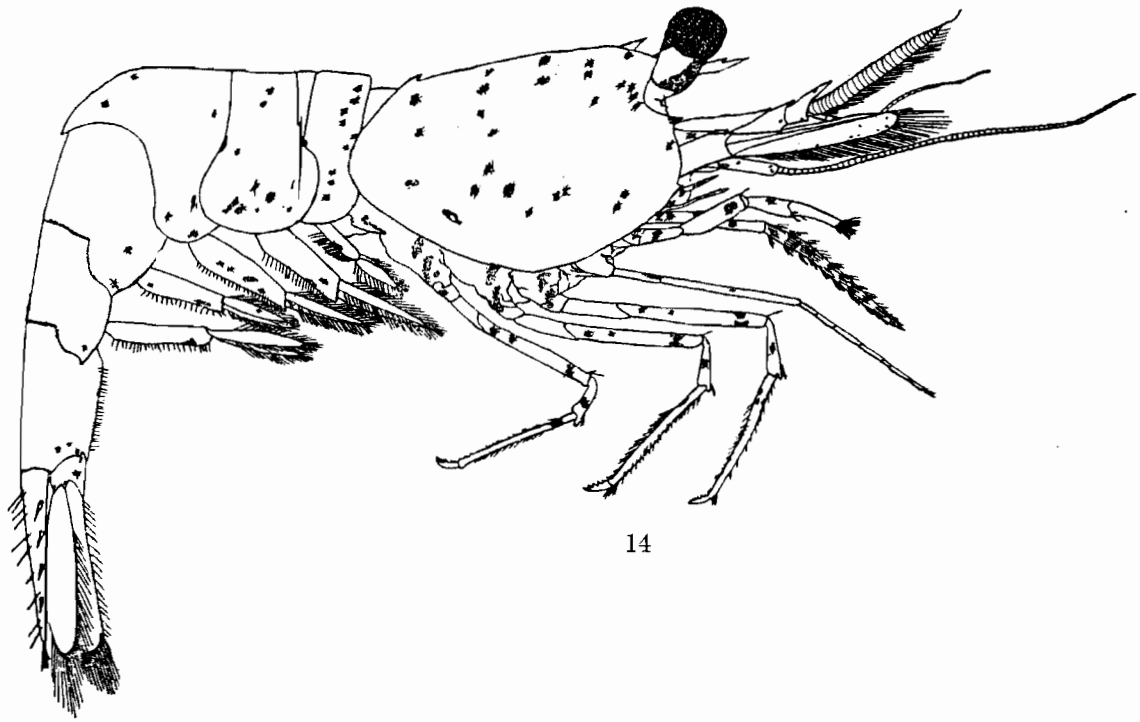

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LEIM ON SPIRONTOCARIS.