

Two New Species of Chaetognatha from the Waters off Peru

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SINCE FEBRUARY, 1958, the Consejo de Investigaciones Hidrobiológicas of Peru has been making regular cruises to investigate the biological and hydrographic conditions off the coast of Peru. Through the kindness of Dr. Z. Popovici, I have been able to examine the Chaetognatha from plankton tows taken in the course of these investigations. The tows were made at the sur-

face, using 1/2-meter nets.

The first specimens of the two new species reported were noted in a plankton sample taken on March 5, 1958, near the entrance to the Port of Talara, Peru. Inspection of other samples taken during the expedition (cruise 5802) revealed numerous individuals of one of the new species, *Sagitta peruviana*; but none of the second species, *Sagitta popovicii*, was noted (Fig. 1). The descriptions of the new species are based on specimens preserved in formalin.

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Sagitta peruviana n. sp.

Fig. 2A-L

Holotype, 1 specimen, USNM no. 29921

Paratypes, 10 specimens, USNM no. 29922

Body rigid, opaque, hispid. Tail segment 23-29 per cent of total length. Anterior fins completely rayed, start at posterior end of ventral ganglion. Posterior fins separate from anterior fins, completely rayed, reach posteriorly to seminal vesicles; greatest portion on tail segment, widest behind tail septum, about same length as anterior fins, posterolateral margin somewhat concave. Caudal fin triangular with rounded lateral apices; in contact with seminal vesicles. Anterior teeth 4-9; posterior teeth 10-21; hooks 7-9. Seminal vesicles, when mature, with expanded anterolateral corner. Ovaries may extend to neck; ovaries with ova not filling body cavity, ova in two dorsoventrally placed rows. Collarette conspicuous, extends posteriorly to approximately 1/2 distance between head and ventral ganglion. Corona ciliata extends from between eyes to about 2/3 distance from head to ventral ganglion. Intestinal diverticula absent. Eye pigment dense, apparent shape quadrangular, with elongate extension arising medially from center of median side of pigmented area.

BODY LENGTH IN MM.	TAIL SEGMENT % TOTAL	HOOKS	ANTERIOR TEETH	POSTERIOR TEETH	MATURITY STAGE	LENGTH OF OVARY IN MM.
13.2	24.0	8	9	21	IV	7.1
12.8	24.2	8	9	19-21	II-III	2.1
11.9	24.4	7	9	15-18	I(?)	1.1
11.4	24.5	7	—	17-18	III	1.3
11.3	25.7	8	—	—	III-IV	4.1
10.9	25.7	8	8	20	III	4.1
10.5	25.7	7	—	—	II-III	1.2
10.4	24.0-25.0	7-8	7-8	16	III-IV	2.5-2.7
10.1	25.7	8	6	19	III	2.9
9.8	23.0	8	6	12	III-IV	3.0
9.1	24.2	7	5	13	III	2.7
8.4	25.0	8	8	15	Juv.	—
7.2	26.4	8	5	13	Juv.	—
6.8	25.0	8	5	12	Juv.	—
5.8	29.3	9	4-6	10-11	Juv.	—
5.3	26.4	8	4	10	Juv.	—

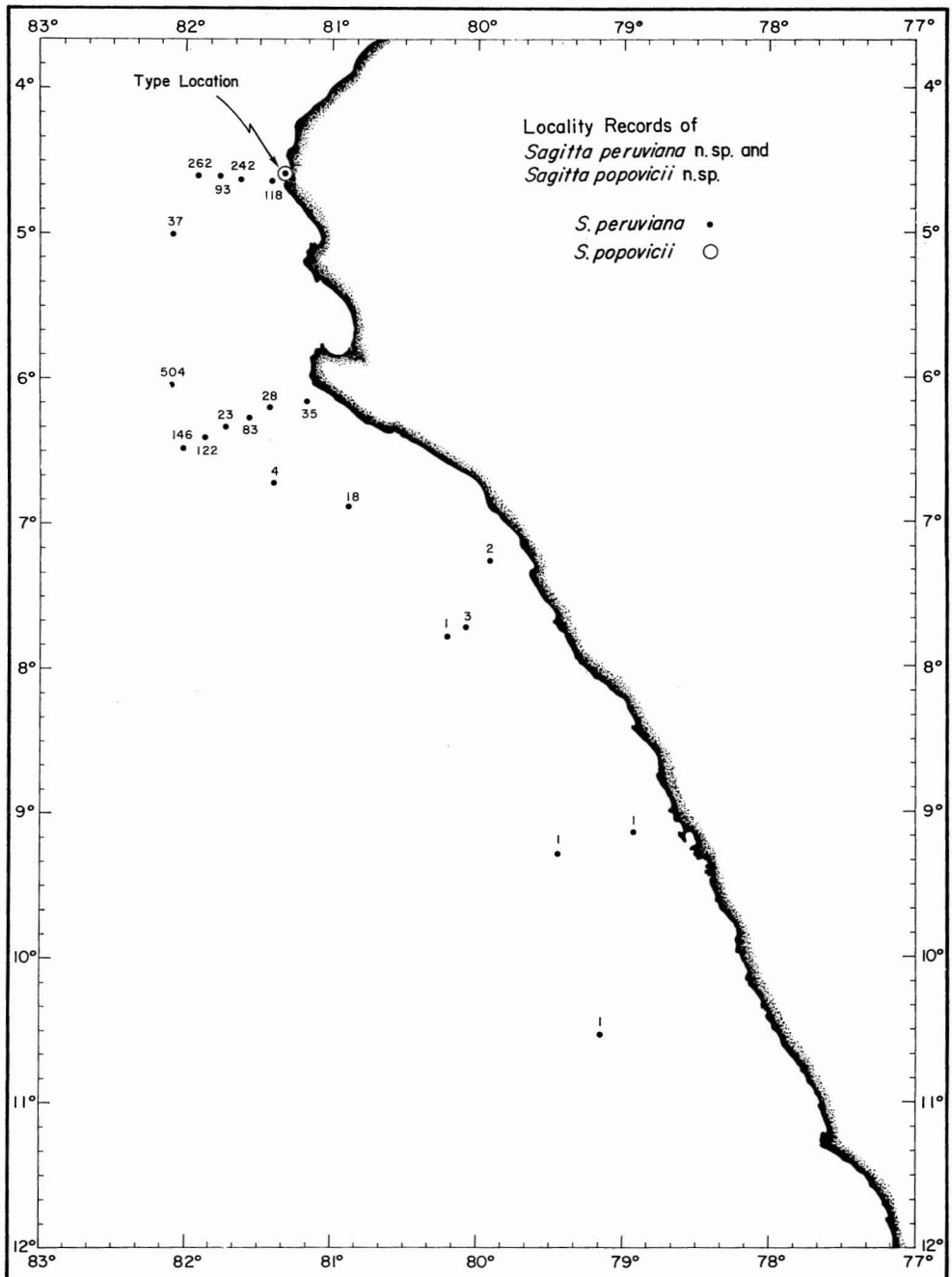


FIG. 1. Locality records of *S. peruviana* and *S. popovicii*. Figures indicate number of specimens present in sample.

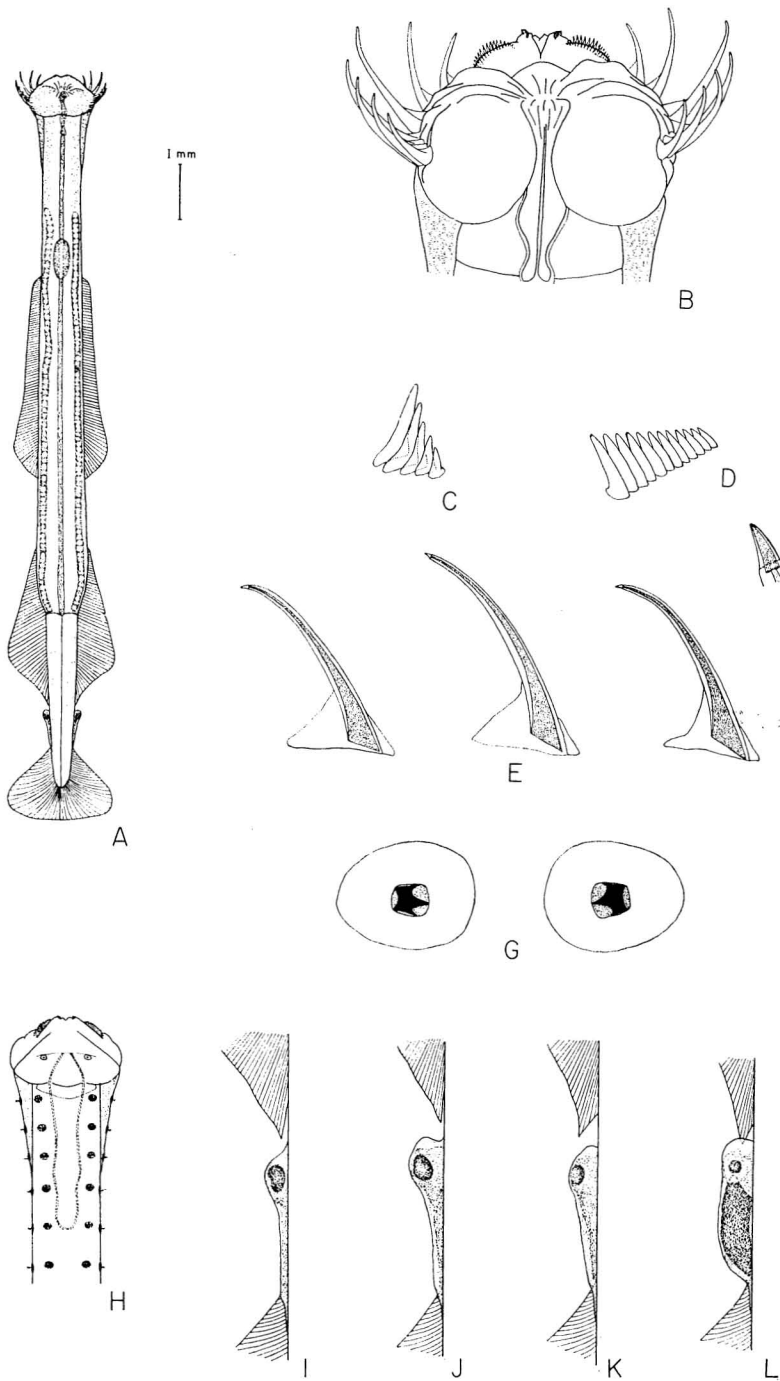


FIG. 2. *Sagitta peruviana* n. sp. A, Entire animal, ventral view; B, ventral view of head; C, anterior teeth; D, posterior teeth; E, typical hooks; F, detail of tip of hook; G, eyes, showing pigment distribution; H, dorsal view of anterior end of animal; I-L, stages of development of seminal vesicle.

FORMULA: The body form and general shape of the lateral fins is reminiscent of *S. bipunctata* Quoy et Gaimard 1827 and *S. hispida* Conant 1895. But the fact that the posterior and caudal fins of *S. peruviana* both are in such close proximity to the seminal vesicles distinguishes it from either of these two species.

The seminal vesicles in the later stages of development resemble those of *S. neglecta* Aida 1897 and *S. friderici* Ritter-Zahony 1911. Features that separate *S. peruviana* from *S. neglecta* and *S. friderici* are the robust body form, length of ovary, size of ova, shape of the lateral fins, and shape of the eye pigment.

The fact that the new species has no intestinal diverticula separates it from both *S. neglecta* and *S. hispida*.

Table 1 compares the features of the species discussed above.

Sagitta popovicii n. sp.

Fig. 3A-F

Holotype, 1 specimen, USNM no. 29923

Paratype, 1 specimen, USNM no. 29924

Body short, translucent, rigid; constriction at tail septum inconspicuous. Anterior fins start at posterior end of ventral ganglion, completely rayed, slightly tapered, widest near posterior end. Posterior fins separated from anterior fins by short but distinct interval, wider than anterior fins, widest posterior to septum, completely rayed, reach seminal vesicles. Caudal fin with rounded posterior margin, reaching seminal vesicle. Anterior teeth 3-4; posterior teeth 6-10; hooks 6-7. Seminal vesicle large, opaque, very conspicuous. Ovaries reach posterior region of anterior fins. Ova large, filling body cavity; up to 9 or 10 ova in a single row. Collarette present, small. Intestinal diverticula absent. Corona ciliata not observed. Pigmented area of eyes with an elongate extension arising from median side.

The above description is from four specimens, three of which were in such condition that the armature formulae and measurements could be determined. All four specimens were fully mature. The one specimen for which the measurements and formula were not made was found preserved in a distorted position.

FORMULA:

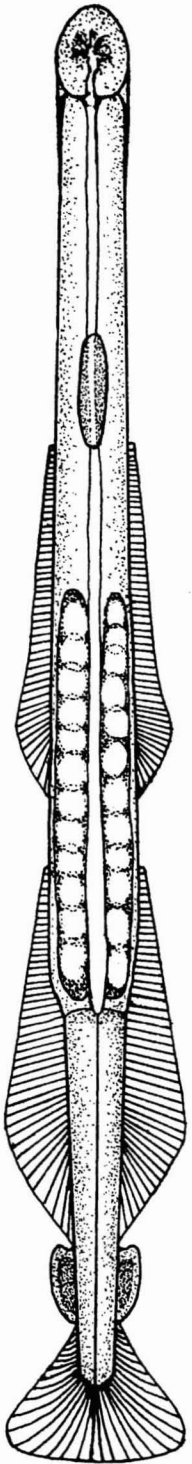
BODY LENGTH IN MM.	TAIL SEGMENT % TOTAL	HOOKS	ANTERIOR TEETH	POSTERIOR TEETH	MATURITY STAGE	LENGTH OF OVARY IN MM.
5.8	32.8	7	3	6-7	IV	1.1
5.9 (2 indiv.)	26.3-28.6	6-7	3-4	9-10	IV	1.1

REMARKS: The present new species is similar in size and certain characteristics to *S. bedfordii* Doncaster 1903 (redescribed by Tokioka, 1942, and considered by him as synonymous with *S. pseudoregularis*, Tokioka, 1942 and 1952), *S. sp.* Tokioka 1954, and *S. pseudoregularis* Oye 1918. The differences and similarities are readily compared in tabular form. Inspection of Table 2 clearly illustrates that *S. popovicii* differs significantly enough from the other species to justify its designation as a new species. The name, *Sagitta popovicii*, is given in honor of Dr. Zacarias Popovici.

REFERENCES

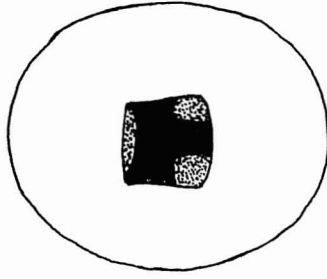
- TOKIOKA, T. 1942. Systematic studies of the plankton organisms occurring in Iwayama Bay, Palao, III. Chaetognaths from the Bay and adjacent waters. Palao Trop. Biol. Sta. 2(3): 527-548.
- 1952. Chaetognaths of the Indo-Pacific. Annot. Zool. Jap. 25(1-2): 307-316.

FIG. 3. *Sagitta popovicii* n. sp. A, Entire animal, ventral view; B, eyes, showing pigment distribution; C, anterior teeth; D, posterior teeth; E-F, stages of development of seminal vesicle.

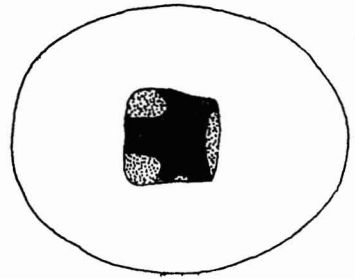


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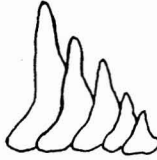
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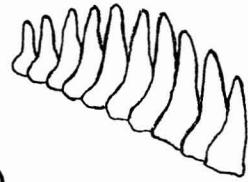
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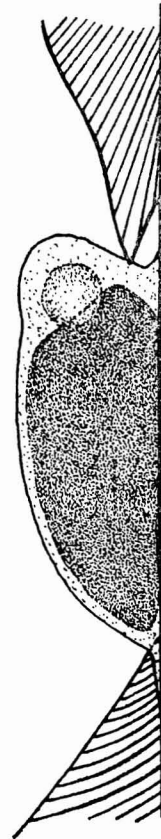
C



D



E



F

TABLE 1

	<i>S. bipunctata</i>	<i>S. hispida</i>	<i>S. neglecta</i>	<i>S. friderici</i>	<i>S. peruviana</i>
Body	Firm, opaque, length to ca. 12 mm.	7-11 mm. total length when mature. Hispid, numerous tactile prominences with sensory hairs.	Length to ca. 7 mm., firm, semi-opaque.	Strong, rigid, ca. 13 mm.	Rigid, opaque, hispid, length to ca. 13 mm.
Collarete	Present, conspicuous.	Conspicuous.	Present, not well developed.	Relatively narrow and short, reaching approximately $\frac{1}{2}$ length corona.	Conspicuous, extends to $\frac{1}{2}$ distance between head and ventral ganglion.
Anterior fins	Start at posterior end of ventral ganglion, completely rayed.	Long, rather slender, broadest in posterior part, extend near ventral ganglion level to posterior of center of total length.	Begin at posterior end of ventral ganglion. Semi-elliptical.	Completely rayed, narrow, broadening a little towards posterior, starting immediately behind the ventral ganglion.	Completely rayed, start at level of posterior end of ventral ganglion.
Posterior fins	Wider and slightly longer than anterior fins, do not reach seminal vesicles, widest behind tail septum, completely rayed.	Always broader than anterior; broadest in posterior part. Separated from anterior, situated more on caudal than on body segment.	Separate from anterior fins, longer, extending to middle of caudal segment. Semi-elliptical.	Completely rayed, only a little longer and broader than anterior, lying a little more on tail than on trunk, narrowed down in posteriormost part.	Separate from anterior, completely rayed, reach seminal vesicles, widest behind tail septum, posterolateral margin concave.
Corona ciliata	Extends from anterior to eyes to $\frac{2}{3}$ the distance from head to ventral ganglion.	Extends from point anterior to eyes almost to level of ventral ganglion. Narrow and sinuous.	Long, like that of <i>S. bipunctata</i> , lies wholly on trunk.	2-3 times length of head, slightly indented, starting immediately behind brain.	Extends from between eyes to $\frac{2}{3}$ distance from head to ventral ganglion.
Intestinal diverticula	Absent.	Present, well marked.	Present.	Absent.	Absent.
Tail segment, % total length	21-28	$\frac{1}{3}$ total length.	27-31	24-27 of total length.	23-29
No. hooks	5-10	8-9	6-8	Usually 8, seldom 9.	7-9
Anterior teeth	4-7	4-5	4-7	Up to 9, covering each other almost completely, brick-fashion.	4-9
Posterior teeth	8-14	8-14 or 15	10-17	Up to 22.	10-21
Ovary	Ovaries with ova not filling body cavity.	May extend beyond anterior extremity of anterior fins.	Reaches upper end of posterior fins.	Bulb-shaped, relatively short.	May extend to neck, ovaries with ova not filling body cavity; ova in 2 dorsoventrally placed rows.
Seminal vesicle	Separate from posterior fin, joined by caudal fin.	With cap as in <i>S. bipunctata</i> ; divided by incomplete longitudinal septa.	Separate from caudal fin, in contact with posterior fins; large, rounded.	Elongate, with thickened anterior end, touching both posterior and caudal fins.	In contact with posterior and caudal fins; when mature, with expanded anterolateral corner.

TABLE 2

	<i>S. bedfordii</i>	<i>S. sp.</i>	<i>S. pseudoregularis</i>	<i>S. popovicii</i> , n. sp.
Body	Sturdy, opaque, uniform width; length ca. 3.5 mm.	Robust, opaque, uniform width; length ca. 4 mm.	Small, slender, not strong; length ca. 3 mm.	Short, rigid, translucent; length ca. 6 mm.
Collarette	Reaches level of posterior end of ventral ganglion.	"Practically absent," found very faintly around neck.	Voluminous, reaches to ventral ganglion; broadest at neck.	Small, but conspicuous, not reaching ventral ganglion.
Anterior fins	Begin at posterior end of ventral ganglion, completely rayed.	Begin at posterior end of ventral ganglion, completely rayed.	Very small, often inconspicuous, sparsely rayed, removed from ventral ganglion by $\frac{1}{4}$ distance ventral ganglion to septum.	Begin at posterior end of ventral ganglion, completely rayed, slightly tapered, widest near posterior end.
Posterior fins	About $2\times$ length of anterior fin; more on tail than on trunk, widest behind tail septum, completely rayed.	$\frac{1}{2}$ as long as anterior fin, lie more on tail than on trunk, broadest behind septum, completely rayed.	Wide, rounded, with rays except at anterior and posterior ends, about $\frac{2}{3}$ on tail.	Wider than anterior fin, widest posterior to septum, completely rayed, reaching seminal vesicle.
Corona ciliata	Short, elliptical, with slight depression on each side, begins at anterior end of trunk and stretches posteriorly to middle of distance between neck and ventral ganglion.	Type C, from behind eyes stretching on trunk nearly $\frac{1}{2}$ length of head; depressions on each side.	Short, limited to head.	Not observed.
Intestinal diverticula	Very conspicuous.	Distinct.	Present.	Absent.
Tail segment, % total length	34-38	34.9	30-38	26-33
Number hooks	9-12	10	10-12	6-7
Anterior teeth	2-3, longer than posterior teeth.	4	2-3, long, sharp-pointed.	3-4
Posterior teeth	1-3	5	1-3, smaller than anterior teeth, overlapping.	6-10
Ovary	Reaches ventral ganglion, large ova, usually 10.	Immature.	Rod-shaped, reaching to $\frac{1}{2}$ distance between ventral ganglion and septum.	Reaches posterior region of anterior fin. Ova large, fill body cavity, to 9-10 in a single row.
Seminal vesicle	Near posterior fin, apart from caudal fin. Similar to that of <i>S. regularis</i> .	Immature.	Elongate, becoming thicker posterior to anterior, approaching posterior fin, separated from caudal fin by $\frac{1}{2}$ its length.	Large, opaque, in contact with caudal fin, near posterior fin. Of " <i>S. bedoti</i> " type.