

A REVIEW OF THE GENUS *AMBIDEXTER* (CRUSTACEA: DECAPODA: PROCESSIDAE) IN PANAMA¹

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ABSTRACT

Three species of the processid shrimp genus *Ambidexter* are reported from Panama. *Ambidexter symmetricus* Manning & Chace, 1971, was collected from *Thalassia* grass flats on the Caribbean coast. Two new species are described from the eastern Pacific in the Bay of Panama, one of which is also known from California. One species was collected from intertidal tidepools and the other from small burrows in the mid-intertidal zone of sand-mud beaches. These three are the only species of the genus known to date.

INTRODUCTION

Processid shrimps with both first pereopods chelate were recognized by Rathbun (1904). She was aware of the possibility that the specimens represented a new genus, but, because of the presence of typical processids (first pereopods asymmetrically chelate) in the same collection, she decided that this variation was attributable to dimorphism. Manning & Chace (1971) recognized this form as a distinct genus and described the western Atlantic populations under the name *Ambidexter symmetricus*. This species was collected on the Caribbean coast of Panama during a biological survey undertaken by the Smithsonian Tropical Research Institute. Two additional species, both undescribed, were collected in the Bay of Panama (eastern Pacific) during a survey of the decapod crustaceans of Panama (Abele, in press). One species was collected from tidepools in the rocky intertidal zone; the other species was collected from small burrows in the mid-intertidal zone on sand-mud beaches.

The abbreviation *cl* refers to carapace length measured from the posterior margin of the orbit to the posterior margin of the carapace at the midline; *tl* refers to the total length measured from the apex of the rostrum to the posterior margin of the telson; AHF refers to the Allan Hancock Foundation, Los Angeles, California; LM refers to the Rijksmuseum van Natuurlijke Historie, Leiden, The Netherlands; STRI refers to the Smithsonian Tropical Research Institute; UPRC refers to the University of Panama Reference Collection, Panama, Republic of Panama; and USNM refers to the National Museum of Natural History, Washington, D. C.

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Ambidexter symmetricus Manning & Chace, 1971

Processa canaliculata: Rathbun, 1904: 110 (in part: material from Cedar Keys, Florida) [not *Processa canaliculata* Leach].

Processa sp. Tabb & Manning, 1961: 598 (listed: specimen from Flamingo, Florida).—Rouse, 1970: 140 (listed: in part).

Ambidexter symmetricus Manning & Chace, 1971: 3. figs. 1, 2.

Material.—1 ovigerous female; *tl* 15 mm; Panama; Caribbean coast; Galeta Island; *Thalassia* grass flat; STRI collections; 2 October 1970; deposited in the Rijksmuseum van Natuurlijke Historie, Leiden.

Distribution.—Tamaulipas, Mexico; Louisiana; Florida; Puerto Rico; Trinidad. This is the first report of this species from Panama.

Remarks.—Specimens have been collected in depths of less than 1 meter on both *Diplanthera* and *Thalassia* flats with sand or mud substrate (Manning & Chace, 1971). The present specimen was collected on a shallow *Thalassia* flat.

Discussion.—This species has been treated in detail by Manning & Chace (1971) although the reference of Rathbun (1904) was overlooked.

The bopyrid isopod *Urobopyrus processae* Richardson, 1904, has been reported from *A. symmetricus* (referred to as Processidae n. gen., n. sp.) by Bourdon (1968), Hutton (1964) and Hutton & Sogandares-Bernal (1960). The latter two papers referred to the isopod as *Urobopyrus* sp. (n. sp.) and it was Bourdon who identified this American material with the European species of isopod.

Ambidexter swifti, n. sp.

Material.—HOLOTYPE: male, *cl* 3.0 mm, *tl* 13 mm; Panama, Panama Province, Pacific coast, Punta Paitilla; intertidal area toward low-water mark, lava-flow substrate, tidepool with coarse sand bottom, 0.5 m depth, green algae present; 1 July 1969; L. G. Abele, J. B. Graham; Coll. No. LGA 69-64; USNM 137912.

ALLOTYPE: female (ovigerous), *cl* 6.0 mm, *tl* 26 mm; locality data as for holotype; USNM 137913.

PARATYPES: 2 males, *cl* 2.8, 3.0 mm; locality data as for holotype; UPRC 91.—1 male, *cl* 2.1 mm, 1 female (ovigerous), *cl* 3.7 mm; locality data as for holotype; deposited in the Rijksmuseum van Natuurlijke Historie, Leiden.—4 males, 1 female (ovigerous); locality data as for holotype; USNM 137914.—1 male, 1 female (ovigerous); locality data as for holotype; AHF. 17 males, *cl* 2.3 mm to 3.0 mm, *tl* 8.3 mm to 10.07 mm, 7 females (ovigerous), *cl* 4.4 mm, *tl* 16 mm (largest specimen), 16 females (nonovigerous), *cl* 2.0 mm to 7.4 mm; Panama, Panama Province, Venado Beach area; 1 July 1969; L. G. Abele, J. B. Graham; Coll. No. LGA 69-65; USNM 137915.

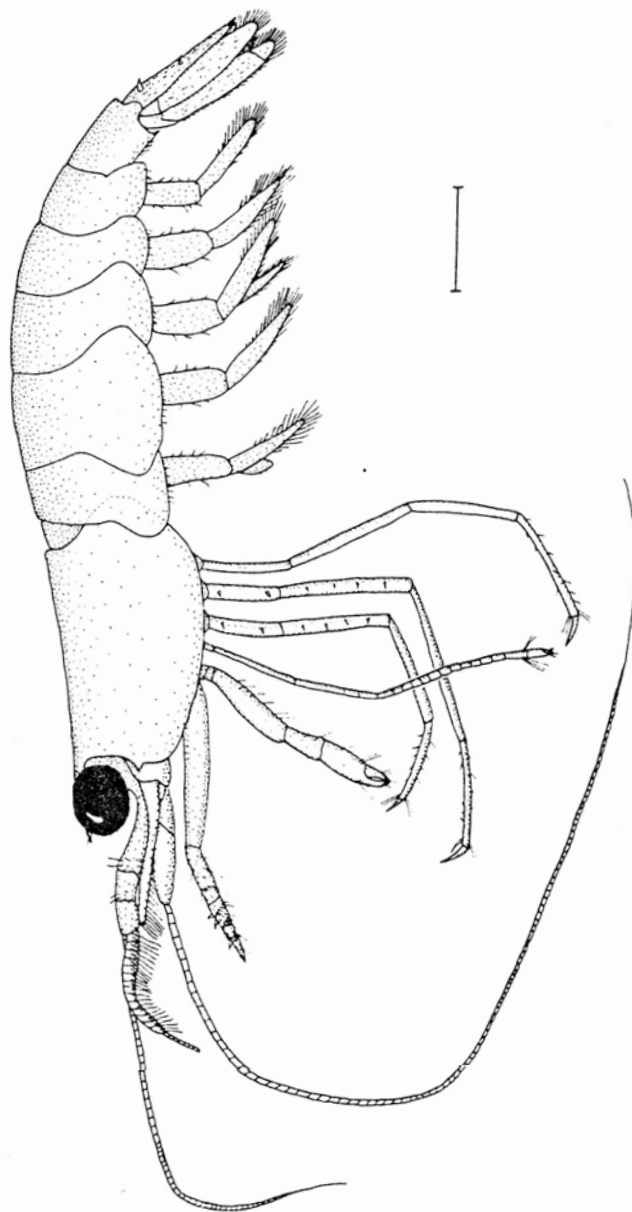


FIGURE 1. *Ambidexter swiftii*, n. sp., male holotype. (Scale = 1 mm.)

Diagnosis.—Rostrum with apex bifid, extending well beyond midpoint of eye. Stylocerite of antennule with lateral spinule. Second pereopods symmetrical; merus with four, carpus with 12-13 articles.

Description.—The rostrum (Fig. 2,A) is compressed, unarmed, and directed slightly downwards. It extends slightly beyond the anterior margin of the eye. The apex is bifid with the lower tooth distinctly longer than the upper. There are a few setae in the bifurcation which extend beyond the lower tooth. The distal margins of the rostrum are straight while the proximal margins are slightly convex. A sharply defined ridge is present on that portion of the carapace forming the posterior margin of the orbit. An obtuse lobe is present on the anterior margin of the carapace slightly ventral to the midpoint of the portion forming the orbital margin. A strong antennal spine is present at the lower margin of the orbit. The anterolateral angle of the carapace is broadly rounded. The carapace is smooth and no other spines are present.

The abdomen (Fig. 2, B) is smooth. The pleura are lined ventrally with short setae. The first through fifth pleura are rounded posterolaterally, although the fifth ends in a bluntly angled lobe. The sixth somite is about 1.3 times as long as the fifth with the pleuron armed with an acute posterolateral spine. The posterolateral angle above the articulation of the uropod is unarmed. There is a median carina on the ventral surface of the fifth and sixth somites which is stronger in the males. The telson (Fig. 2, E) is about 1.7 times as long as the sixth segment. The length of the telson is about 2.7 times its greatest width. Two pairs of strong dorsal spines, placed mesial to the lateral margin, are present. The first pair is located about one-seventh of the distance from the anterior margin and the second pair is located a little more than half the distance from the anterior margin. A transverse row of setae is present between the anterior pair. The posterior margin of the telson (Fig. 2, F) is produced into a sharp median point and is armed with two pairs of lateral spines. The mesial pair is longer and stronger than either the median point or the lateral pair. The lateral pair is about subequal to the median point. There is a pair of long plumose setae and two pairs of simple setae adjacent to the median point.

The eyes (Fig. 1) are large and the cornea is well pigmented. The width of the cornea is about equal to the length of the cornea and the eyestalk combined.

The antennular peduncle (Fig. 2, C) extends beyond the rostrum by one-third of the basal segment. The basal segment is over four times as long as the penultimate which is slightly longer than the ultimate segment. There is a small spine present on the ventral surface of the basal segment just over half the distance from the base. The stylocerite is broad with a small lateral spinule present. The distal margin is broadly rounded and

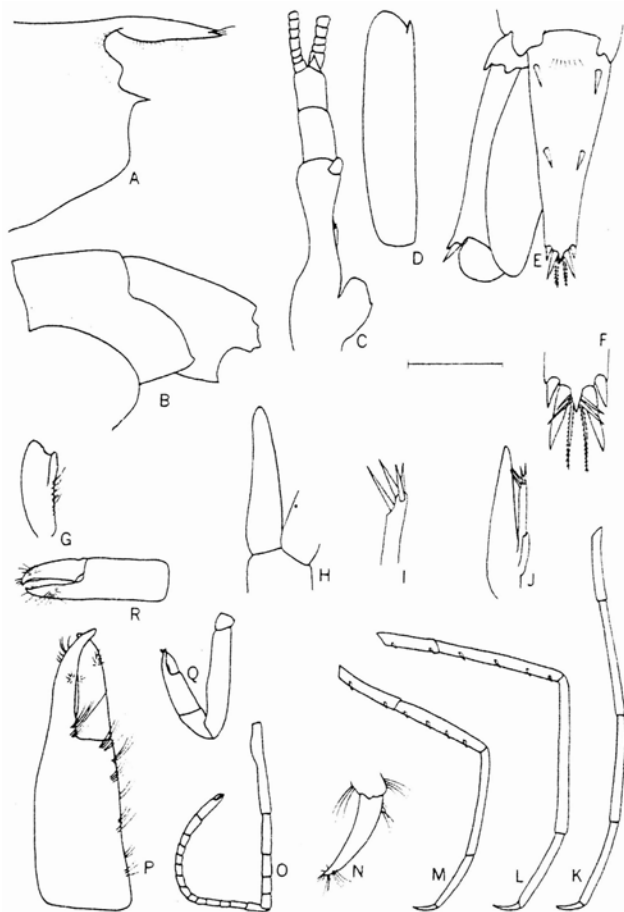


FIGURE 2. *Ambidexter swifti*, n. sp.: A, anterior portion of carapace; B, last three abdominal segments; C, antennule; D, scaphocerite; E, telson and left pair of uropods; F, distal portion of telson; G, endopod of first male pleopod; H, endopod of first female pleopod; I, apex of male appendix masculina; J, endopod of second male pleopod with appendix masculina and appendix interna; K, fifth pereiopod; L, fourth pereiopod; M, third pereiopod; N, dactylus of third pereiopod; O, second pereiopod; P, chela of first pereiopod; Q, first pereiopod; R, chela of second pereiopod. (G, I, J, male holotype; others, female allotype. Scale = 2 mm for K, L, M, O, Q; 1 mm for A-E; 0.5 mm for F, G, H, J, N, P, R; 0.125 mm for I.)

extends well beyond the lateral spinule. The inner flagellum is about twice the carapace length, with the segments increasing in length distally. The outer flagellum is slightly over half the carapace length. The thickened setigerous portion consists of 12 or 13 segments and the slender portion consists of 9 or 10 segments.

The scaphocerite (Fig. 2, D) extends to, or slightly beyond, the distal margin of the ultimate segment of the antennular peduncle. The length is about five times the width. The distal margin is rounded and extends beyond the strong anterolateral tooth. The base of the scaphocerite is unarmed. The flagellum is distinctly longer than the body.

The mandible (Fig. 3, A) is simple, lacking both a palp and an incisor process. The lower distal margin is armed with about 14 small teeth. Perpendicular to this row of teeth at the distal end are about 8 stronger teeth. The maxillula (Fig. 3, D) lacks the lower endite. The palp is strongly curved distally with a large obtuse lobe slightly proximal to the apex giving an expanded hooklike appearance to the distal portion. The maxilla (Fig. 3, F) has the lower endite reduced and partially fused to the upper endite. The two lobes of the upper endite are represented by two very small lobes tufted with setae. The palp is distinct. The first maxilliped (Fig. 3, E) has the endites fused. A palp is present and the caridean lobe is broad. A large bilobed epipod is present. The second maxilliped has a long exopod. The second maxilliped (Fig. 3, G) is robust, typical in shape, with an epipod present. The third maxilliped (Fig. 3, B, C, H) extends beyond the scaphocerite by the length of the ultimate segment. The antepenultimate segment is slightly longer than the combined length of the penultimate and ultimate segments. The distal half of the ultimate segment is laterally compressed. This compressed portion is armed with six short strong spines along the laterally compressed margin. Slightly below this ridge between the proximal second and third spines is a very large strong spine. The proximal half of the segment is almost circular and is armed with two strong spines in the distal portion. The penultimate segment is armed with two long narrow spines on the distal outer margin. A well-developed exopod and epipod are present.

The branchial formula is:

	Maxillipeds			Pereiopods				
	1	2	3	1	2	3	4	5
Pleurobranch	-	-	-	1	1	1	1	1
Arthrobranch	-	-	-	-	-	-	-	-
Podobranch	-	-	-	-	-	-	-	-
Epipod	1	1	1	-	-	-	-	-
Exopod	1	1	1	-	-	-	-	-

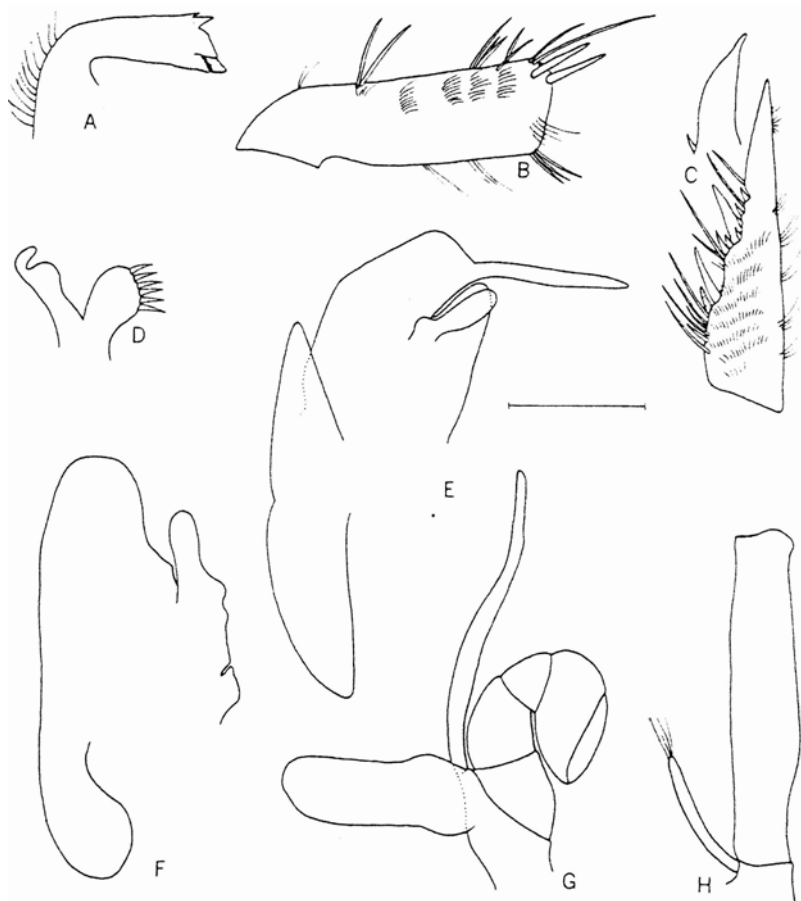


FIGURE 3. *Ambidexter swifti*, n. sp., allotype female: A, mandible; B, penultimate segment of third maxilliped; C, ultimate segment of third maxilliped with lateral view of apex; D, maxillula; E, first maxilliped; F, maxilla; G, second maxilliped; H, antepenultimate segment of third maxilliped. (Scale = 1 mm for H; 0.5 mm for A-G.)

The first pereiopods (Fig. 2, Q) are subequal, symmetrical, and both chelate. They extend to the distal fourth of the scaphocerite. The palm is about $1\frac{1}{2}$ times as long as the fingers. The chela (Fig. 2, P) is about $1\frac{1}{2}$ times as long as the carpus and the merus is slightly longer than the chela and carpus combined. The second pereiopods (Fig. 2, O) are equal

and symmetrical and extend beyond the scaphocerite by half the length of the carpus. The palm is about 1.4 times the length of the fingers. The carpus and chela (Fig. 2, R) combined are as long as the merus and ischium combined. The ischium is slightly longer than the merus. The movable finger is armed with a tooth proximally. There is a carina present on the cutting edge of the immovable finger, which fits into a narrow cavity on the cutting edge of the movable finger. The tips of both fingers are strongly curved. The carpus is subdivided into 12 or 13 segments. The merus is divided into four segments. On some specimens, including the holotype, the subdivisions are indistinct and quite difficult to see. On others the divisions are quite distinct. This does not seem to be correlated with size or sex. The ischium is undivided. The third through the fifth pereopods (Fig. 2, K, L, M) are long and slender. The third pereopod (Fig. 2, M) extends beyond the scaphocerite by the length of the propodus. The ischium is three-fourths as long as the merus. The merus is slightly more than four-fifths as long as the carpus. The propodus is slightly more than three-fifths as long as the merus and about three times as long as the dactylus (Fig. 2, N). The ischium is armed with two movable spines on the outer surface, one at each end of the segment. The merus is armed with four or five subequally spaced movable spines on the outer surface. The fourth pereopod (Fig. 2, L) is the longest and extends beyond the scaphocerite by half the length of the carpus. The ischium is half as long as the merus. The merus is about three-fourths as long as the carpus. The propodus is half as long as the carpus and $2\frac{1}{2}$ times as long as the dactylus. The ischium is armed with two movable spines, one at each end of the segment. The merus is armed with four (eight on the opposite leg of the holotype, but usually only four) movable spines about equally spaced. The fifth pereopod (Fig. 2, K) extends beyond the scaphocerite by three-fourths of the length of the propodus. The ischium is about three-fifths as long as the merus. The merus is slightly longer than the carpus. The propodus is about four-fifths as long as the merus and about three times as long as the dactylus. The ischium and merus are unarmed.

The endopod of the female first pleopod (Fig. 2, H) is saber-shaped and slightly over half as long as the exopod. It lacks an appendix interna. The endopod of the male first pleopod (Fig. 2, G) is slightly over half as long as the exopod. The tip is obliquely truncate with several small protuberances on the truncate edge. The appendix interna is indistinctly fused to the endopod. An appendix masculina (Fig. 2, J) is present on the second pleopod of the male. It is about five-sixths as long as the endopod, over twice as long as the appendix interna and is armed with four strong setae distally (Fig. 2, I): two are located on the distal edge; one is located between these, but set in from the edge; the fourth is set in a distinct emargination adjacent to the two distal setae. The uropods (Fig. 2, E)

extend beyond the distal margin of the telson. The lateral branch of the uropod has the lateral margin slightly convex proximally. It ends in an acute fixed tooth with a longer and stronger movable spine adjacent to the immovable spine. A diarsis begins at the base of this emargination and extends across the exopod. A blunt, narrow, transparent lobe is present at each end of the diarsis, which cannot be seen unless the distal portion of the exopod is folded. The mesial branch of the uropod is elongate with the distal margin evenly rounded.

The eggs are small and numerous, being about 0.28-0.3 mm in diameter.

The animals in life were transparent, with scattered red-brown chromatophores.

Distribution.—This species was collected from tidepools at Punta Paitilla and Venado Beach in the Bay of Panama.

Remarks.—*Ambidexter swifti* was the most abundant shrimp collected from the rocky intertidal in the Bay of Panama. Approximately 50 specimens were collected from two tidepools. One pool was about 0.2 m deep, 1 m in diameter, with a coarse sand-mud substrate and was located above the midintertidal zone. The other pool was about 1 m deep, 3 m in diameter, with a lava substrate, some coarse sand on the bottom, green algae on the sides, and was located towards the low intertidal zone.

Discussion.—There was little variation in the available material of *A. swifti*. The branchial formula of this species, *A. symmetricus*, and the following species are identical. This contrasts with the situation in the genus *Processa*, in which the presence or absence of an arthrobranch on the first pereopod is diagnostic for some species.

Etymology.—It is an honor and a pleasure to name this species for Dr. Camm C. Swift, of the Los Angeles County Museum, who has contributed to our knowledge of the crustaceans through his careful field observations and subsequent care of the specimens.

Ambidexter panamensis, n. sp.

Figs. 4, 5

Processa canaliculata: Rathbun, 1904: 110 (in part: specimens from San Diego, California) [not *Processa canaliculata* Leach].

Material.—HOLOTYPE: male, *cl* 3.24 mm, *tl* 12 mm; Panama, Canal Zone, Pacific coast, Ft. Amador, Naos Island; from burrow on sand-mud beach adjacent to Smithsonian Tropical Marine Laboratory; 28 January 1971; L. G. Abele, T. A. Biffar; Coll. No. LGA 71-7; USNM 137916.

PARATYPES: female (ovigerous), *cl* 5.0 mm, *tl* 16.8 mm; locality data as for holotype; USNM 137919.—1 damaged male; locality data as for

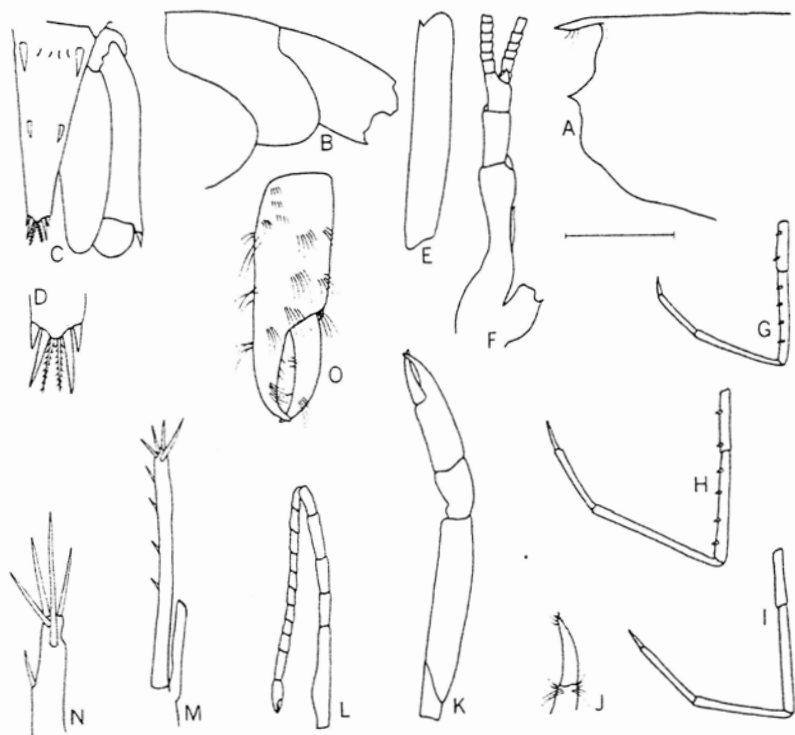


FIGURE 4. *Ambidexter panamensis*, n. sp.: A, anterior portion of carapace; B, last three abdominal segments; C, telson and right pair of uropods; D, distal portion of telson; E, scaphocerite; F, antennule; G, third pereiopod; H, fourth pereiopod; I, fifth pereiopod; J, dactylus of third pereiopod; K, first pereiopod; L, second pereiopod; M, appendix masculina and appendix interna of male; N, apex of appendix masculina; O, chela of first pereiopod. (A-L, paratype female; M, N, holotype male. Scale = 2 mm for G, H, I; 1 mm for A-F, K, L; 0.5 mm for J, M, O; 0.125 mm for N.)

holotype; June 1969; D. Dexter; USNM 137917.—1 male; locality data as for holotype; 12 June 1969; L. G. Abele; USNM 137918.

OTHER MATERIAL: 2 specimens, *cl* 6.47, 6.3 mm, *tl* 22, 21 mm; California, San Diego; 1880; D. S. Jordan; USNM 28406.

Diagnosis.—Rostrum with apex acute, not bifid, not extending to midpoint of eye. Stylocerite of antennule with a lateral spinule. Second pereiopods symmetrical; merus with four, carpus with 10 articles.

Description.—The rostrum (Fig. 4, A) is short, compressed, unarmed, and directed very slightly downwards. It extends to about one-fourth to one-third of the length of the eyestalk. The apex is acute, not bifid. About three setae are present on the lower margin of the rostrum. The rostrum is deepest near midlength. A clearly defined ridge is present on that portion of the carapace forming the posterior margin of the orbit. A strong, slightly downwardly directed antennal spine is present at the lower margin of the orbit. The anterolateral angle of the carapace is evenly rounded. The carapace is smooth, and no other spines are present.

The abdomen (Fig. 4, B) is smooth and compressed laterally. The pleura are lined ventrally with a few scattered setae. The first through the fifth pleura are rounded posterolaterally. The sixth is about 1.15 times as long as the fifth, and the pleuron is armed with an acute posterolateral spine. There is an acute median carina on the ventral surface of the fifth somite of both sexes, but it is much reduced in females. The telson (Fig. 4, C) is about 1.6 times as long as the sixth segment. The length of the telson is about 2.7 times its greatest width. Two pairs of strong dorsal spines, placed mesial to the lateral margins, are present. The first pair is located about one-tenth of the distance from the anterior margin, and the second pair is located about one-half the distance from the anterior margin. A transverse row of setae is present between the anterior pair. The posterior margin (Fig. 4, D) of the telson is produced into a blunt median lobe armed with two pairs of lateral spines. The mesial pair is longer and stronger than either the median lobe or the lateral pair of spines, which is longer than the median lobe. A long plumose seta is present on either side of the median lobe.

The eyes are large and the cornea is well pigmented. The corneal width is equal to the length of the cornea and eyestalk combined.

The antennular peduncle (Fig. 4, F) extends beyond the eye by the distal third of the basal segment. The basal segment is about 5 times as long as the ultimate and about 3.5 times as long as the penultimate. There is a strong spine present on the ventral surface of the basal segment located about five-sevenths of the distance from the base. The stylocerite is broad, with the distal margin truncate. A strong spinule is present on the anterolateral angle. The thickened setigerous portion of the outer flagellum consists of about 12 segments.

The scaphocerite (Fig. 4, E) extends to about the distal third of the ultimate segment of the antennular peduncle. The length is slightly less than six times the width. The distal margin is rounded and extends beyond the anterolateral tooth. The base of the scaphocerite is unarmed.

The mouthparts (Fig. 5) are figured and are similar to those of *A. swifti*. The third maxilliped (Fig. 5, F, G, H) extends beyond the scaphocerite by the distal fifth of the penultimate segment. The ultimate

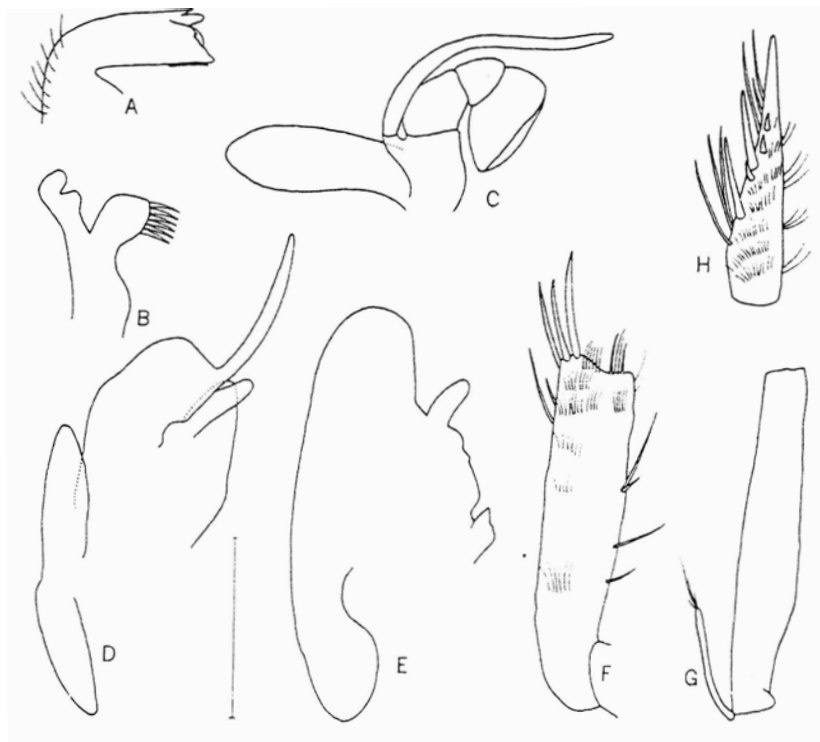


FIGURE 5. *Ambidexter panamensis*, n. sp., paratype female: A, mandible; B, maxillula; C, second maxilliped; D, first maxilliped; E, maxilla; F, penultimate segment of third maxilliped; G, antepenultimate segment of third maxilliped; H, ultimate segment of third maxilliped. (Scale = 1 mm for G; 0.5 mm for A-F, H.)

segment is slightly shorter than the penultimate, and the basal segment is about 2.6 times as long as the penultimate. The ultimate segment is rounded in the proximal third and compressed in the distal two-thirds. It is armed with one large spine at the distal end of the rounded portion. The compressed portion is armed with three short and one long spine in the proximal portion. The penultimate segment is armed with three long narrow spines on the lateral margin. The branchial formula is identical to that of *A. swifti*.

The first pereiopods (Fig. 4, K) are subequal, symmetrical, and both chelate. They extend to the distal half of the scaphocerite. The fingers are slightly shorter than the palm. The chela (Fig. 4, O) is about twice as long as the carpus. The carpus is constricted in the proximal portion

on the ventral surface. The emargination fits against the distal margin of the merus when the chelipeds are folded. The second pereopods (Fig. 4, L) are slender, symmetrical, and barely extend to the distal margin of the scaphocerite. The palm is very slightly longer than the fingers. The carpus is subdivided into 10 segments. It is about 1.3 times as long as the merus and about 1.8 times as long as the ischium. The merus is subdivided into four segments. The third through the fifth pereopods (Fig. 4, G, H, I) are long and slender. The third pereopod (Fig. 4, G) extends beyond the scaphocerite by half the length of the propodus. The ischium is armed with two movable spines, one at each end of the segment on the exterior surface. The ischium is over half as long as the merus. The merus is armed with four subequally spaced movable spines on the exterior surface. It is subequal in length to the carpus, which is about 1.75 times as long as the propodus. The fourth pereopod (Fig. 4, H) is the longest and extends beyond the scaphocerite by the length of the distal third of the carpus. The ischium is armed with two movable spines, one at each end of the segment on the external surface. It is slightly over half as long as the merus. The merus is armed with four subequally spaced movable spines on the external surface. It is four-fifths as long as the carpus. The carpus is slightly less than twice as long as the propodus, which is slightly over twice as long as the dactylus. The fifth pereopod (Fig. 4, I) extends beyond the scaphocerite by almost the full length of the propodus. The ischium is unarmed and is slightly over half as long as the merus. The merus is unarmed and is slightly longer than the carpus. The carpus is about 1.4 times as long as the propodus, which is over twice as long as the dactylus.

The endopod of the first female pleopod is similar to that of *A. swifti*. The endopod of the first male pleopod is also similar to that of *A. swifti*, except that it is more rounded distally. An appendix masculina (Fig. 4, M) is present on the second pleopod of the male. It is well over twice the length of the appendix interna. The tip of the masculina (Fig. 4, N) is truncate and is armed with four setae: two are located on the distal edge; one is located between these, but is placed proximal to the distal margin; the fourth is set proximal to the third seta, adjacent to a shallow emargination on the lateral margin. Proximal to these distal strong setae are four weaker lateral setae subequally spaced from the distal tip of the appendix interna. The uropods (Fig. 4, C) extend beyond the distal margin of the telson. The lateral branch has the outer margin slightly convex proximally. It ends in an acute fixed tooth with a longer and stronger movable spine adjacent to it. There is a shallow, narrow emargination adjacent to the movable spine. A diarsis is present at the base of this emargination and extends across the lateral branch. The mesial branch of the uropod is elongate and evenly rounded.

The eggs are small and numerous, being about 0.31 mm in diameter. The animals in life were transparent.

Distribution.—This species was collected from Naos and Culebra islands on Ft. Amador, Canal Zone, on the Pacific coast of Panama. The islands are small, adjacent to each other, and connected to the mainland at the entrance to the Panama Canal by a road about a mile in length. Two specimens were collected in San Diego, California, by D. S. Jordan in 1880.

Remarks.—The specimens from Panama were collected at the entrances of small burrows about 15 mm in diameter. There is no indication concerning habitat in the data with the specimens from San Diego. The burrows were on a stable, sand-mud beach located in the midintertidal. Many burrows were sampled, and those with *A. panamensis* were examined for additional inhabitants. Only one specimen of *A. panamensis* was taken from each burrow, and in only one burrow was another animal found, a polychaete worm. On the same beaches, in burrows, specimens of three species of *Callianassa*, a species of *Pinnixa*, a single specimen of a juvenile caridean, a specimen of a juvenile *Callinectes arcuatus* Ordway, a few polychaetes, and many stomatopods were present. *Albunea lucasia* (Saussure) and *Emerita rathbunae* Schmitt were common at the water line. This habitat seems to be unique among the processids.

Etymology.—The specific name *panamensis* refers to the locality of collection.

Discussion.—The three known species of the genus *Ambidexter* may be distinguished as follows:

- | | |
|--|--------------------|
| 1. Stylocerite with lateral spinule | 2 |
| Stylocerite without lateral spinule | <i>symmetricus</i> |
| 2. Rostrum with apex bifid, extending beyond midpoint of eye | <i>swifti</i> |
| Rostrum with apex simple, not extending to midpoint of eye | |
| | <i>panamensis</i> |

Manning & Chace (1971), in separating processids from other shrimps of the Alpheoidea (Hippolytidae, Ogyrididae, Alpheidae), utilized the fact that the only species then known of *Ambidexter* had the rostrum bifid. With the discovery of the present species, this character can no longer be used. Combinations of characters, such as those given in the familial definition of the Processidae by Manning & Chace, can be used to distinguish processid shrimps from others of the Alpheoidea.

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of their then-unpublished manuscript on the processids of the western Atlantic. Dr. Deborah Dexter, of San Diego State College, kindly allowed me to study some material which she collected in Panama. Drs. Amada Reimer and Peter Glynn of the Smithsonian Tropical Research Institute permitted me to report on the specimen of *A. symmetricus*. Drs. Fenner A. Chace, Jr., and Lipke B. Holthuis read portions of the manuscript. The Smithsonian Tropical Research Institute and the University of Panama provided facilities during my stay in Panama.

SUMARIO

UNA REVISIÓN DEL GÉNERO *Ambidexter* (CRUSTACEA: DECAPODA: PROCESSIDAE) EN PANAMÁ

Se reportan en Panamá tres especies de camarones del género *Ambidexter*. *Ambidexter symmetricus* Manning & Chace, 1971, fue colectado en bajos de hierba de *Thalassia* en la costa del Caribe. Se describen dos especies nuevas procedentes de la Bahía de Panamá en el Pacífico oriental, una de ellas también vive en California. De las dos especies, una se encontró en charcos de marea en la zona litoral y la otra en pequeñas madrigueras en la zona medio-litoral en playas fango-arenosas. Estas son las únicas especies del género conocidas hasta la fecha.

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