

*TONOCOTE INTROFLEXIDUS*, A NEW SPECIES OF  
MARINE AMPHIPOD FROM ARGENTINA  
(CRUSTACEA: GAMMARIDEA: AMPHIPODA)

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*Abstract.* — A new species of marine zobrachoid amphipod, *Tonocote introflexidus*, is described from the Magellan Strait. It differs from the type-species, *T. magellani*, in the presence of a long, inwardly pointing hook on epimeron 3, 11 (versus 8) spines on the outer plate of maxilla 1, and is otherwise much better armed on pereopods 3–7 and uropods 1–2. The new species slightly intermediates *Tonocote* with the Australian *Prantinus* but *Tonocote* continues to demonstrate valid generic characters.

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References used in the identification process are: Clark & Barnard (1986) and Barnard & Drummond (1978, 1982). Methods of morphological description follow those of Barnard & Drummond (1978).

Zobrachoidae Barnard &  
Drummond, 1982

*Diagnosis.* — Rostrum well developed (for haustorioids), cheek poorly developed. Antenna 1 variable, article 1 short (typical) or elongate (apomorphic), articles 2–3 progressively shorter (typical) or elongate (apomorphic), flagella elongate (typical) or not (apomorphic), articles of peduncle weakly (typical) to strongly geniculate. Antenna 2 of haustorius form, article 4 expanded (plesiomorphic) or weakly so (apomorphic), article 5 shorter and narrower than article 4, at least article 4 furnished with 1 or more longitudinal rows of facial armaments, ventral margin of article 4 with at least 3 kinds of setae: (1) elongate plumes, (2) shorter and stiffer glassy spines (often set in clusters) and, (3) bulbous-based penicillate setules; flagellum longer than article 4 of peduncle. Prebuccal complex massive, upper lip usually dominant. Mandibles bearing elongate strongly toothed incisors, rakers almost simple and numerous (4 or more), molar large, strongly extended, not triturative but

with several strong cusps, usually 1 of these forming accessory chopper; palp 3-articulate, article 3 with numerous outer setae, setae awned (apomorphic) or not (typical and plesiomorphic). Lower lip with fleshy, fused inner lobes, mandibular extensions of outer lobes well developed. Maxilla 1 with uniarticulate palp, inner plate with more than 3 setae. Maxilla 2 ordinary, inner plate with poorly developed oblique facial row of setae. Maxillipeds with unexpanded bases, normally enlarged plates, outer medially spinose; palp 4-articulate, article 2 expanded, article 4 almost unguiform, at least 2+ setae apically. No baler lobes on maxillae or maxillipeds.

Coxa 2 small to medium, larger than coxa 1 and forming stepped intergrade between coxa 1 and coxa 3, coxa 4 dominant, coxa 3 lacking deep posteroventral lobe. Coxal gills on segments 2–6 or 2–5. Brood plates slender.

Gnathopods feeble, subchelate, grossly alike in proportions, carpi elongate, article 3 short. Article 5 of pereopods 3–4 broad, slightly expanded, not deeply lobate; dactyls of pereopods 3–5 well developed, those of pereopods 6–7 variable; pereopod 5 of haustorius form, articles 2, 4, 5 and 6 expanded, articles 5–6 with extensive facial rows of spines, pereopods 6–7 alike, article 4 broad-



er than 6, articles 4–5 weakly expanded; no pereopod with underslung articulation.

Pleopod 2 usually inferior in size, number of articles, or setation; peduncles of pleopod not longer than wide, inner rami inferior, coupling hooks paired on each pleopod, usually inner rami bearing one basal cloth-spin spine. Epimeron 1 moderately to strongly developed; epimeron 2 dominant in setation, often dominant in size.

Urosomites ordinary, though often furnished with lateral teeth. Rami of uropods 1–2 linguiform, setose (not spinose); uropod 3 of ordinary gammarid-phoxocephalid kind, outer ramus dominant, 2-articulate, peduncle short, flat, expanded; rami poorly setose apically.

Telson variable in length, deeply cleft. Sexual dimorphism weak.

*Variables.*—Right and left laciniae mobiles not alike, right, if present, not distinct from raker row (*Zobracho* and *Tonocote*), outer setae of palp article 3 awned (apomorphic) or not (typical and plesiomorphic). Maxillipedal palp article 4 multisetose or with main nail and 2 setules (*Prantinus*). Article 5 of pereopods 3–4 with thick posterior spines or only distal spines present.

*Type genus.*—*Zobracho* Barnard, 1961.

*Composition.*—*Bumeralius*, *Prantinus*, *Tonocote*.

*Relationship.*—Differing from the Urohaustoriidae in the well developed side plate (epimeron) of pleonite 1.

Key to the Genera of Zobrachoidae (Males)

- 1. Antenna 1 of urothoe form ..... 2
- Antenna 1 of haustorius form ..... 3
- 2. Antenna 2 article 4 broad, epimeron 2 much smaller than 3 .....  
..... *Tonocote* Clark & Barnard, 1986
- Antenna 2 article 4 slender, epimeron 2 as large as 3 .....  
..... *Prantinus* Barnard & Drummond, 1982
- 3. Telson elongate, rami of uropods 1–2 with many medial setae, no ba-

- soventral setae .....  
..... *Zobracho* Barnard, 1961
- Telson short, rami of uropods 1–2 lacking medial setae, bearing baso-ventral setae .....  
.. *Bumeralius* Barnard & Drummond, 1982

*Tonocote* Clark & Barnard, 1986

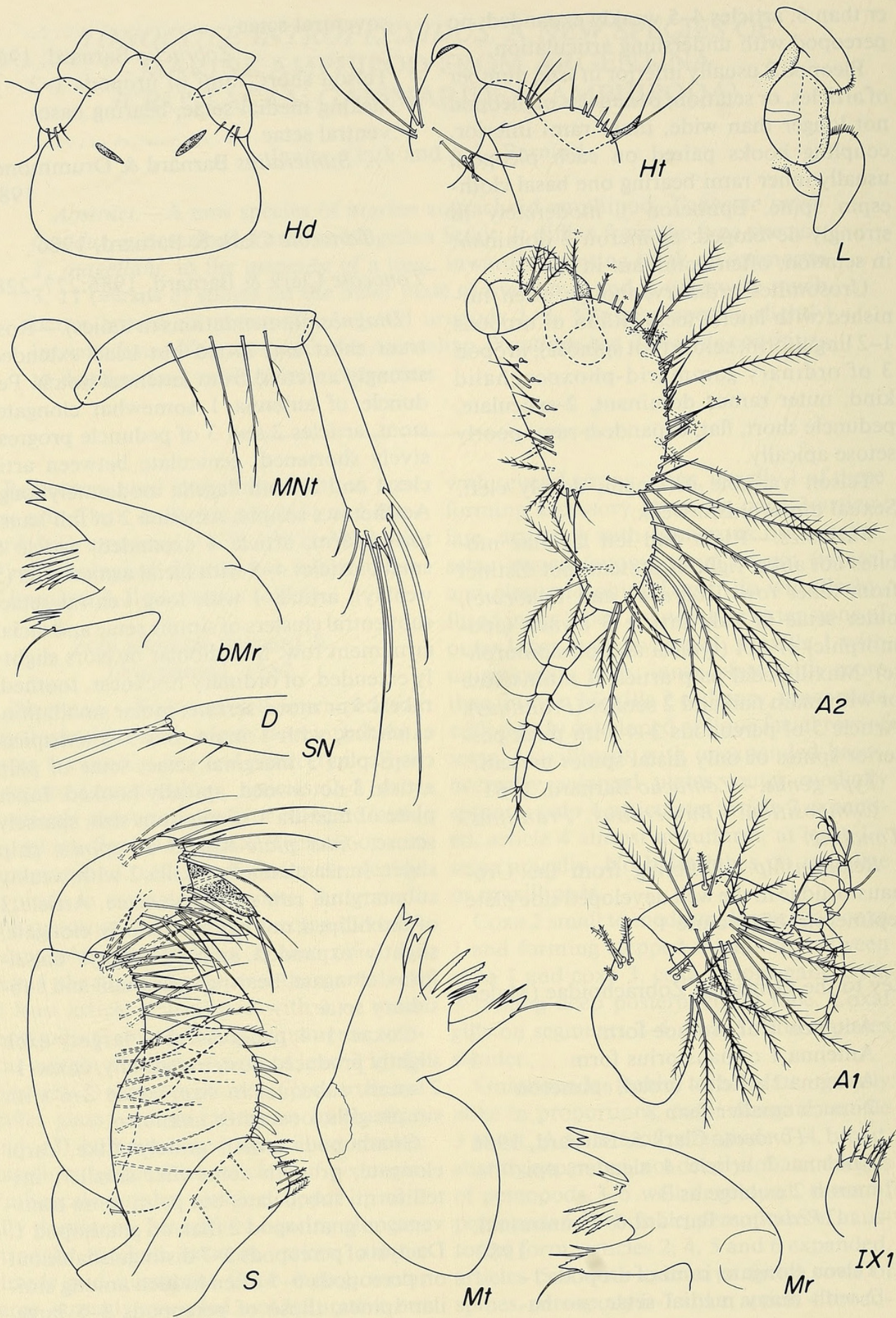
*Tonocote* Clark & Barnard, 1986:227–228.

*Diagnosis* (emendations in italics).—Rostrum short and broad but head extended strongly anteriad from antennal notch. Peduncle of antenna 1 somewhat elongate, stout, articles 2 and 3 of peduncle progressively shortened, geniculate between articles 1 and 2, both flagella moderately long. Aesthetascs simple. Antenna 2 of full haustorius form, article 4 expanded, article 5 small, articles 4–5 with facial armaments (5 weakly), article 4 with long ventral setae, subventral clusters of simple setae and facial armament row. Mandibular incisors slightly extended, of ordinary thickness, toothed; rakers 5 or more, serrate; molar small, thin, extended, with 1 main and 3–5 subapical cusps plus 3 marginal setae; setae of palp article 3 not awned, apically hooked. Inner plate of maxilla 1 of medium size, sparsely setose, *outer plate with 8–11 spines*, palp short. Inner plate of maxilla 2 with weakly submarginal row of sparse setae. Article 3 of maxilliped not extraordinarily elongate, slightly expanded apically, dactyl unguiform, elongate, bearing apical nail and subsidiary setae.

Coxae 1–4 progressively larger, each slightly produced posteroventrally, coxae 1–2 small, subequal in size; coxae 2–6 with simple gills; oostegites unknown.

Gnathopods small, grossly alike, carpi elongate, propodi somewhat smaller, mittelliform, subchelate, but palm more transverse on gnathopod 2 than on gnathopod 1. Dactyls of pereopods 3–7 distinguishable but on pereopods 6–7 often hidden among similar spines, those of pereopods 3–5 large,







those of pereopods 6–7 very small; dactyl of pereopod 5 blade-like, lacking spines. Article 2 of pereopods 5–7 expanded but less strongly on pereopod 6 than on 5 and 7; distal articles of pereopod 6 moderately widened, 7 more expanded; pereopods 6–7 otherwise similar, dominating pereopod 5.

Pleopod 2 slightly inferior, inner rami shorter than outer. Epimeron 2 dominantly setose, epimeron 3 dominant in size. Urosomites weakly produced and weakly setose ventrally. Rami of uropods 1–3 evenly sublinguiform, *each outer ramus bearing 2–3 apical plumose setae, each inner ramus bearing 1–2 apical plumose setae*; peduncles weakly setose. Uropod 3 inner ramus with one basomedial seta. Telson short, broader than long.

*Description* (emendations in italics).—Eyes weak, ocular ganglia visible. Dorso-lateral surface of article 1 on antenna 1 furnished with small, poorly organized group of setae; article 2 moderately setose dorso-laterally; article 3 poorly setose. Article 3 of antenna 2 short, sparsely setose, flagellum much longer than article 4 of peduncle. No calceoli observed.

*Right lacinia mobilis, if present, slender, small, bifid or not, left slender, bifid.* Lower lip lacking cones. Inner plate of maxilla 1 with sparse apical and medial setae; several spines on outer plate bifid. Inner plate of maxilliped with 3 stout apical spines.

*Coxa 1 poorly to very setose, coxae 2–3 poorly setose, coxae 4 moderately setose.* Gills forming stepped intergrades with gill 2 dominant. Gnathopod 2 lacking surficial buttons.

Pereopods 3–4 lacking extensive postero-proximal spines on article 5.

Uropods with sparse dorsal setae, medial margins of peduncles sparsely setose.

*Type species.*—*Tonocote magellani* Clark & Barnard, 1986.

*Composition.*—*Tonocote introflexidus*, new species.

*Relationship.*—Despite a few convergences towards *Prantinus* Barnard & Drummond (1982) as represented in our new species, *Tonocote* continues to differ from *Prantinus* in: (1) the small and weakly setose epimeron 2; (2) the sharp posteroventral corner of epimeron 3; (3) the poor medial setation of the inner plate on maxilla 2 in adults; (4) the much stouter antennae 1–2; and (5) the narrow and mitelliform propodi of gnathopods 1–2. A principal character no longer differentiating the two genera is the extensive posteroproximal spination on article 5 of pereopods 3–4 formerly limited to *Prantinus*; our new species and especially one aberrant female, has this spination well or better developed than heretofore observed in the type-species of *Tonocote*.

*Tonocote introflexidus*, new species  
Figs. 1–5

*Diagnosis.*—Epimeron 3 with large posteroventral hook curled inward; outer plate of maxilla 1 with 11 spines; armaments on pereopods 3–7 much denser than in type-species.

*Description of male.*—Holotype male “d,” 4.74 mm; head about 90 percent as long as

Fig. 1. *Tonocote introflexidus*, unattributed figures = holotype, male “d” 4.74 mm (USNM 195180); b = female “b” 6.43 mm (USNM 235030). Upper case letters refer to parts; lower case letters to left of uppercase letters refer to specimens noted in legends; lower case letters to right of uppercase refer to adjectival modifications in list: A, Antenna; C, Coxa; D, Dactyl; E, Epimeron(a); G, Gnathopod; H, Head; I, Inner plate or ramus; J, Pleopodal coupling hooks; L, Labium; M, Mandible; N, Palp; O, Outer plate or ramus; P, Pereopod; R, Uropod; S, Maxilliped; T, Telson; U, Labrum; W, Pleon; X, Maxilla; Y, Pleopod; Z, Gill; a, Anterior; d, Dorsal; p, Posterior; r, Right; s, Setae removed; t, Left.



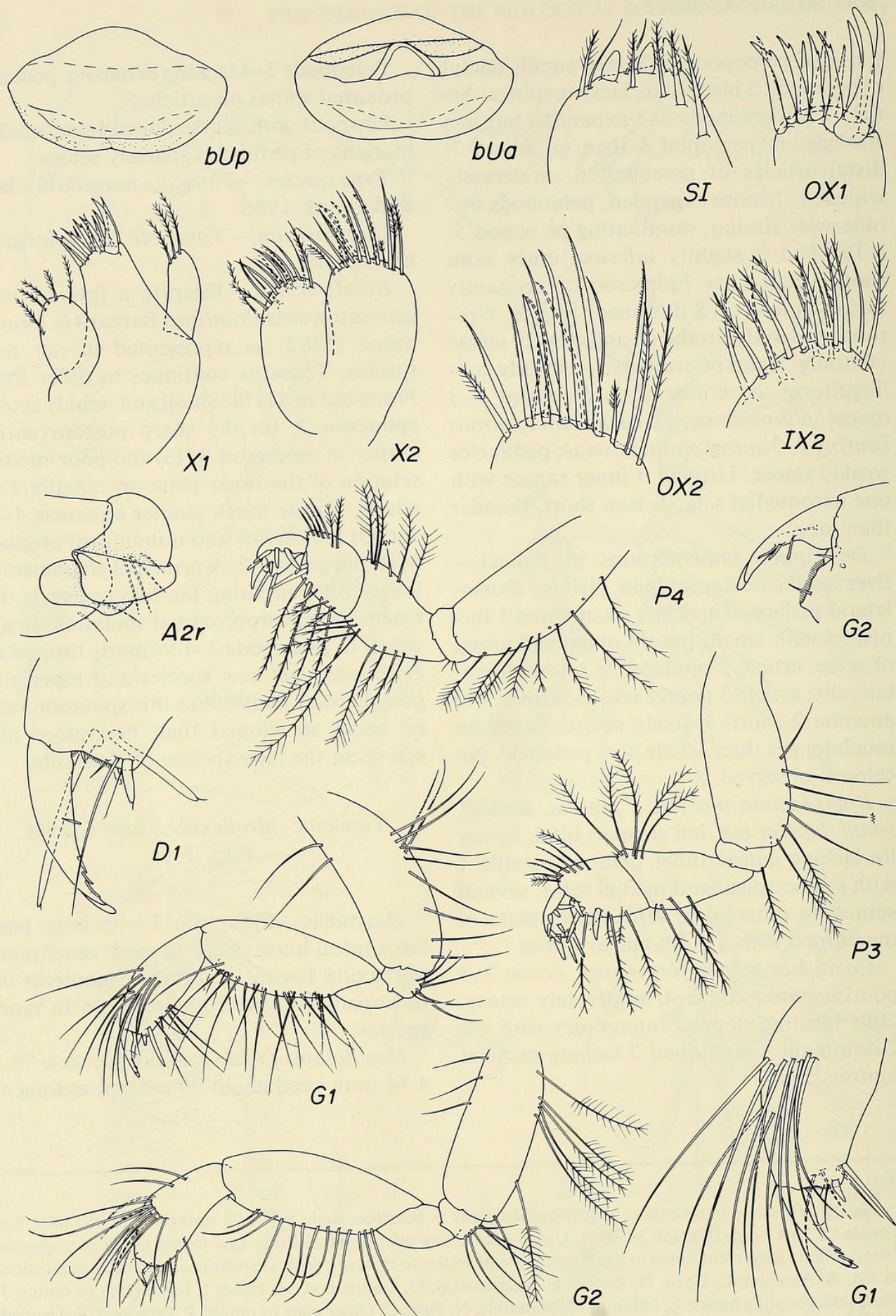


Fig. 2. *Tonocote introflexidus*, unattributed figures = holotype, male "d" 4.74 mm; b = female "b" 6.43 mm. Letter codes, refer to Fig. 1.



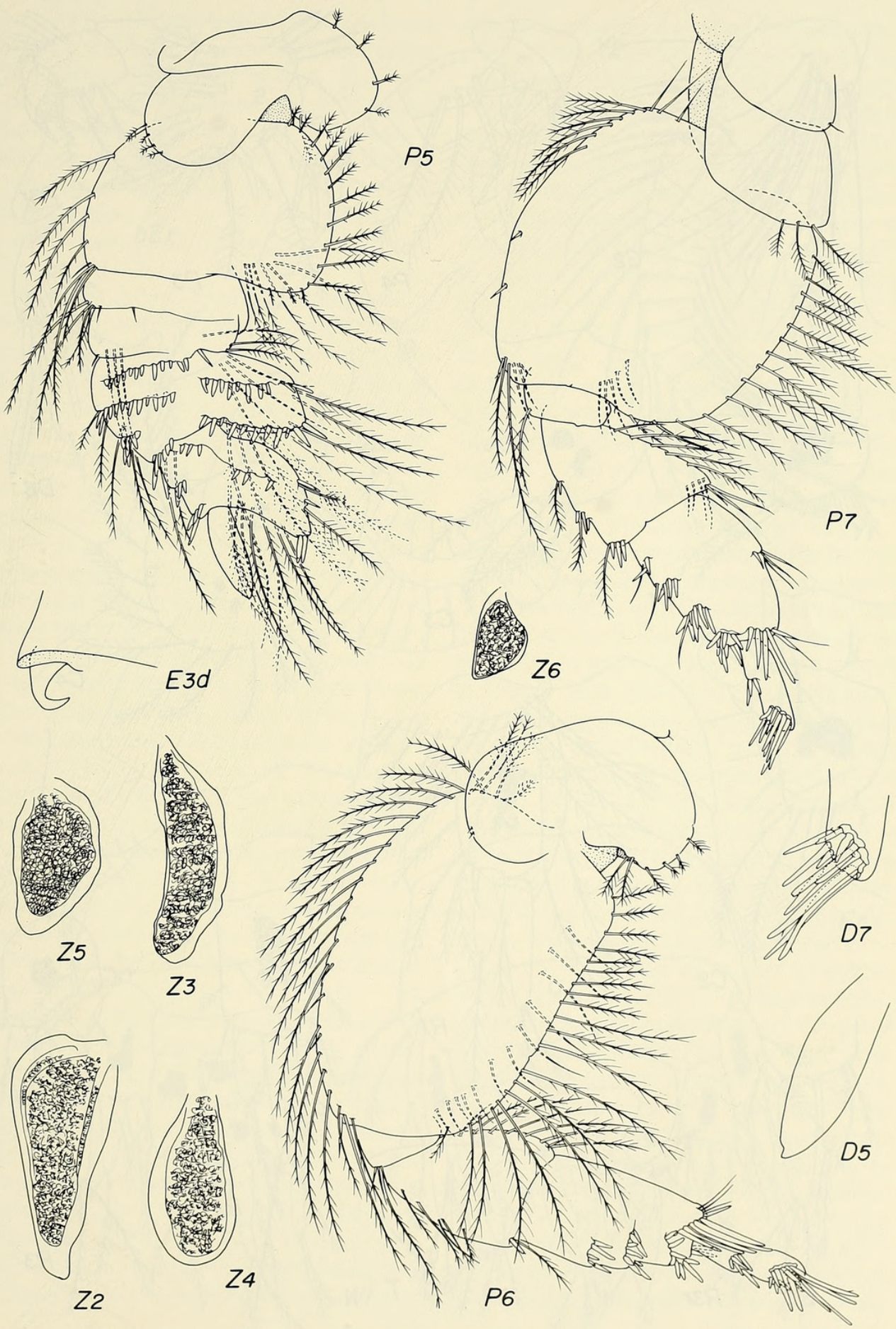


Fig. 3. *Tonocote introflexidus*, holotype. Letter codes, refer to Fig. 1.



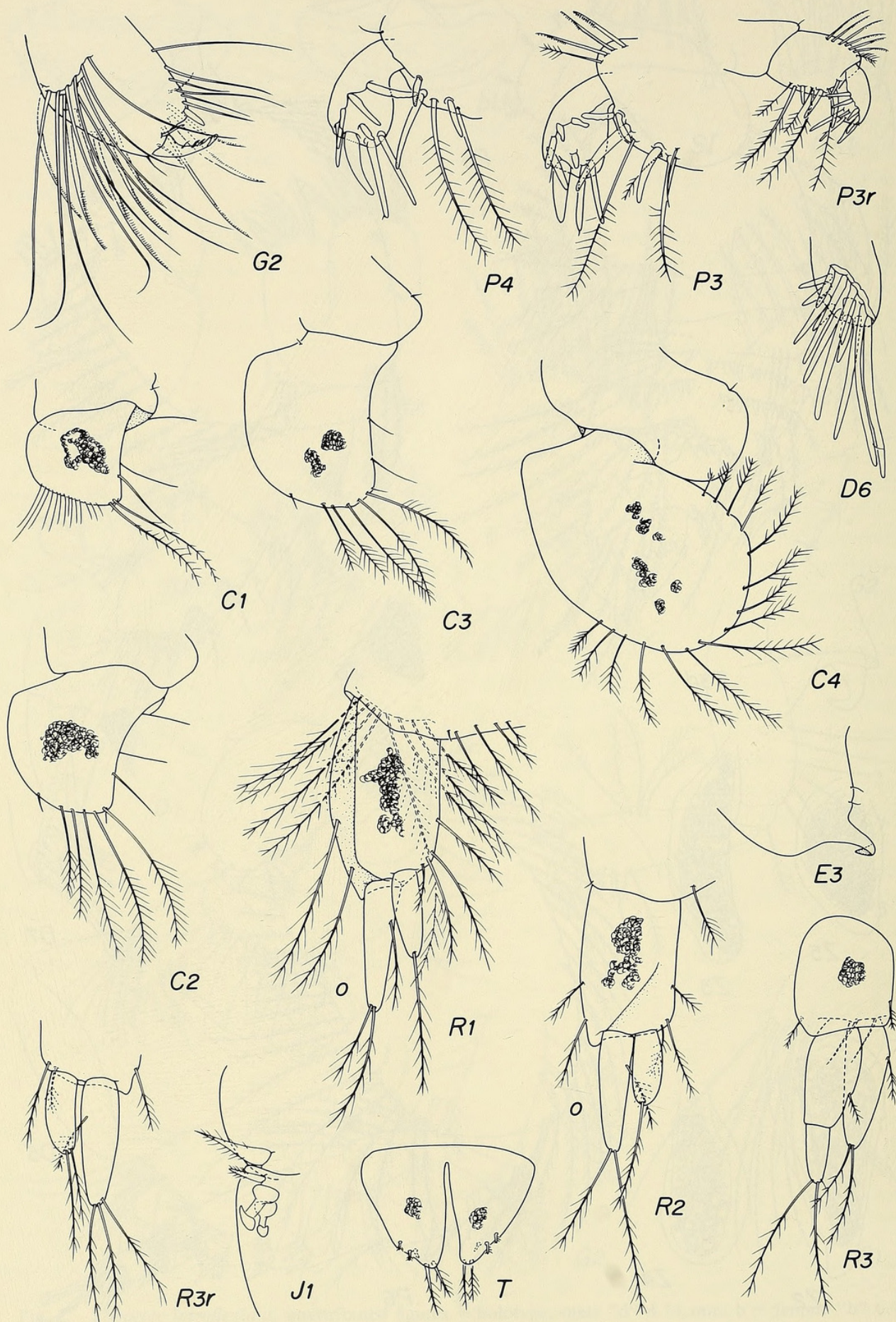


Fig. 4. *Tonocote introflexidus*, holotype. Letter codes, refer to Fig. 1.



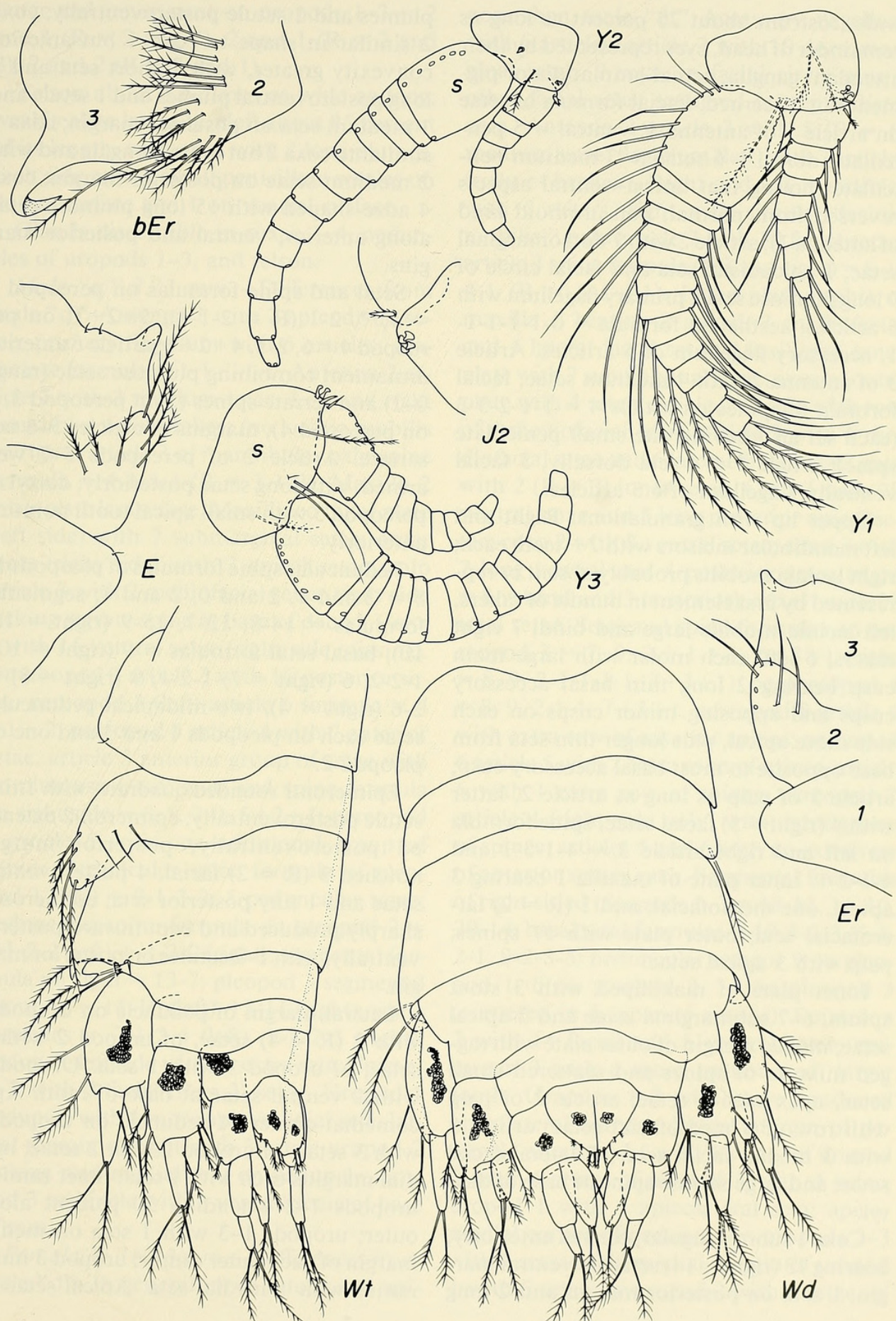


Fig. 5. *Tonocote introflexidus*, unattributed figures = holotype; b = USNM 235030. Letter codes, refer to Fig. 1.



wide, rostrum about 25 percent as long as remainder of head, eyes represented by their attendant ganglia, actual ommatidia or pigment not discerned. Facial formula of setae on article 1 of antenna 1, ventral = 5 penicillate, dorsal = 6 setae + 3 medium penicillate (noting that dorsal-ventral aspects reversed from normal, non-urothoid kind of antenna 1); article 2 with 7 dorsomarginal setae, 1 apicodistal seta and facial circle of 9 long plumose setae; primary flagellum with 6 articles, aesthetasc formula = 0-1-1-1-1-1, accessory flagellum of 5 articles. Article 3 of antenna 2 with 4 medium setae; facial formula of spines on article 4 = 1-1-2-3-3 (each set also having one small penicillate spine); article 5 = 4 seta dorsally, 5 facial ventrally; flagellum of 6.5 articles.

Upper lip with granulations. Right and left mandibular incisors with 2+ teeth each; right lacinia mobilis probably absent or represented by first element in bundle of rakers, left lacinia mobilis large and bifid; 7 right rakers, 6 left; each molar with large main cusp bearing 2 long thin basal accessory cusps and apposing minor cusps on each side more apical, plus longer thin seta from base opposite to most basal accessory cusp; article 3 of palp as long as article 2, latter with 4 (right = 5) facial setae, spine formula on left and right article 3 = 4-1-3-1 and 4-1-2-1. Inner plate of maxilla 1 bearing 3 apical, one medifacial, and 1 (R = 2) laterofacial seta; outer plate with 11 spines; palp with 3 apical setae.

Inner plate of maxilliped with 3 stout spines, 6-7 submarginal setae and 2 apical setae; medial margin of outer plate with ragged mixture of spines and scattered small setae, apex with 2 setae; article 2 of palp with row of 3 medifacial setae; article 3 with 3 medial facial setae, 2 lateral facial setae, and large serrate spine at base of dactyl.

Coxa 1 subrectangular, convex anteriorly, bearing 13 (right = 14) setae on ventral margin, 1 seta on posterior margin and 2 long

plumes and 1 setule posteroventrally; coxa 2 similar in shape to coxa 1 but anterior convexity greater, with 1 short seta and 5 long posteroventral plumes and 1 setule and 1 medium seta on posterior margin; coxa 3 similar to coxa 2 but more elongate and with 2 medium setae on posterior margin, coxa 4 adze-shaped with 15 long plumose setae along anterior, ventral and posterior margins.

Setal and spine formulas on pereopod 3 = 5, 7, 2-1 (R = 2-1-1), 5+2+1; on pereopod 4 = 6, 2-1, 4+2+1; article 5 anterior armament combining plumose setae (range 0-2) and serrate spines (5 on pereopod 3, 6 on pereopod 4); margins of articles 5-6 not serrate. Article 2 of pereopods 5-7 well armed, with long setae posteriorly; dactyl of pereopod 5 with small apical tooth pointing anteriorly.

Peduncular spine formulas of pleopods 1-3 = 2 and 1, 2 and 0, 2 and 1; segmental formulas = 14-8, 12-7, 15-9 (right = 15-10); basal setal formulas = 9 (right = 10)-1-2-2, 6 (right = 7)-1-2-1, 9 (right = 8)-1-2-6 (right = 4), two midapical peduncular setae each on pleopods 1 and 3 and one on pleopod 2.

Epimeron 1 rounded quadrate, with 1 tiny setule posteroventrally; epimeron 2 extended posteroventrally, posterior margin notched 3 (R = 2) facial, 4 posteroventral setae and 1 tiny posterior seta; epimeron 3 sharply produced and bent inward posteroventrally, with 1-2 setules on posterior margin.

Lateral margin of peduncle on uropod 1 with 2 (R = 4) setae, of uropod 2 with 2 setae, of uropod 3 with 1 seta. Uropod 3 with 2 ventral setae at base of rami. Apicomedial corner of peduncle on uropod 1 with 3 setae, of uropod 2 with 2 setae; medial margins each with 1 seta; inner rami of uropods 1-2 extending 50 percent along outer; uropods 1-3 with 1 seta on medial margin of each outer ramus; uropod 3 inner ramus with 1 medial seta. Apical setae of



outer and inner rami on uropods 1–3 = 2 and 1 (R = 2 and 2), 2 and 1 (R = 2 and 3), 2 and 2 (R = 2 and 1).

Telson about 1.5 times as wide as long, weakly alate laterally, cleft about 85 percent of its length, each apex with 2 long plumes, each side with 2 small penicillate setules on dorsal surface and 1 on ventral surface.

Glands discernible in coxae 1–4, peduncles of uropods 1–3, and telson.

*Male "a," 3.73 mm.*—Differences from male "d": Antenna 1 with 2 apicodistal setae; primary flagellum with 6 articles; aesthetasc formula = 1-1-1-1-1. Antenna 2 article 3 with 3 medium setae. Left and right mandibles with 5 rakers (no lacinia mobilis on right); article 3 of mandibular palp spine formula = 4-1-4-1 (R = 3-1-3). Maxilla 2 inner plate less setose. Maxilliped inner plate (left side) with 7 submarginal setae; outer plate (right side) with 3 apical setae; palp article 3 with 2 mediofacial setae; right side lacking serrate spine at base of dactyl. Coxa 1 with 16 ventral setae (right side missing). Gnathopod 2 article 5 with 16 posterior setae; pereopod 3 (left) article 6 formula = 4 + 1 + 2; pereopod 4 article 4 with 7 anterior setae, article 5 anterior group of setae with no plumose setae; setal and spine formula on right side = 6, 5, 2-0, 5+2+1; pereopod 6 article 5 with one additional group of spines. Peduncular spine formula of pleopod 1 (left) = 9-1-3-2; 5 peduncular setae; peduncular spine formula on pleopod 2 = 7-1-2-2 (left), 6-1-2-2 (right), segmental formula on right = 13-7; pleopod 3 segmental formulas = 15-10 (left), 15-11 (right); spine formulas = 7-1-2-4 (left), 9-2-2-3 (right); peduncle left side with an extra seta. Epimera 2 with 2 facial (R = 3) setae. Uropod 1 peduncle with 1 more apicomедial seta, lateral margin of right with 3 setae; uropod 2 lacking mid-medial seta on peduncle; uropod 3 peduncle with 3 ventral setae at base of rami.

*Female "b," 6.43 mm.*—Differences from male "d": In general more setose and spi-

nose than male "d." Accessory flagellum with 6 articles; article 2 with 10 dorsomarginal setae, 9 setae in facial circle plus 7 other facial setae scattered in ventrodistal area. Antenna 2 article 3 with 5 (R = 6) medium setae; flagellum (left) with 7 articles (right = broken). Right and left mandibles with 6 rakers, right with simple "lacinia mobilis"; palp article 2 with 10 facial setae, article 3 spine formula (left and right) = 6-1-4-1 (R = 5-1-4-1). Inner plate (right) of maxilla 1 bearing 2 apical, 1 mediofacial and 4 lateral facial setae. Maxilliped inner plate with 7 submarginal setae; apex of outer plate with 4 setae; article 2 of palp with row of 4 mediofacial setae; article 3 with 6 mediofacial setae and 6 lateral facial setae; palp with 2 (R = 3) inner setae. Coxa 1 with 29 ventral setae and 3 long posterior apical setae; coxa 2 with 8 ventral setae; coxa 3 with 7 long ventral and 4 posterior setae (right = 8 ventral and 3 posterior); coxa 4 with 23 total setae. Setal and spine formulas on pereopod 3 = 7, 9, 2-1-1-1-1, 6+3+1 (right = 8, 9, 2-1-1-1-1, 7+3+1); on pereopod 4 = 8, 9, 2-1-1, 7+3+1; pereopod 5 article 6 with extra row of anterior spines; pereopod 6 article 5 with 2 extra rows of spines, article 6 with 1 extra row of spines; pereopod 7 article 4 (right side only) with extra group of spines; articles 5 and 6 with an extra row of anterior spines each. Segmental formulas of right sided pleopods 1–3 = 18-11, 16-10, 20-14; basal setal formulas = 10-3-3-3, 6-2-2-1, 9-2-3-5; peduncular setae = 9 on pleopod 1, 6 on pleopod 2, 14 on pleopod 3 (scattered in 5 separate groups). Epimeron 2 with 14 facial and 5 ventral setae; epimeron 3 with a more pronounced, larger tooth. Uropods 1–3 with more produced apicolateral corners; lateral margin of peduncle on uropod 1 with 6 setae, of uropod 2 with 4 setae, of uropod 3 with 3 setae; uropod 1 with 1 apicolateral seta; apicomедial corner of peduncle on uropods 2–3 with 3 setae each; medial margin of uropod 1 with 5 setae, or uropod 2 with 3 setae, of



Table 1.—Variability in setation of uropods 1, 2, 3.

	U1	U2	U3
Apical setae: outer ramus/inner ramus			
Male D	2/1 (R = 2/2)	2/1 (R = 3/2)	2/2 (R = 2/1)
Male A	2/1	2/1	2/1
Male C	2/2 (R = 2/1)	2/1	2/1 (R = 2/2)
Female B	2/2	2/2	2/1
Juvenile E	2/1	2/1	2/1
Medial setae: outer ramus/inner ramus			
Male D	1/0	1/0	1/1
Male A	1/0	1/0	1/2
Male C	1/0	1/0	1/2
Female B	2/1	2/1	1/3
Juvenile E	0/0	0/0	0/1

uropod 3 with 4 setae; inner rami of uropods 1–2 extending 75 percent along outer; uropods 1–2 outer rami with 2 medial setae each; uropod 3 outer ramus with 1 medial seta; inner ramus of uropods 1–2 with 1 seta each, uropod 3 with 3; apical setae of outer and inner rami on uropods 1–3 = 2 and 2, 2 and 2, 2 and 1. Telson with 4 apical setae.

*Discussion.*—Our new species always has all of the right raker spines clumped together; in the holotype the first raker is bifid but in the other specimens it is not. We do not know if the first raker is a lacinia mobilis or not. In *T. magellani* the first spine was figured as similar to the other rakers.

The apicoanterior setae of article 5 on pereopods 3–4 are diverse, some being plumose and others serrate. In the past, Barnard & Drummond (1978, 1982) and Clark & Barnard (1986) have not discriminated between kinds of armaments in a cluster in the formula originally proposed by Barnard & Drummond (1978). These setal forms are quite variable in the 5 specimens of our new species because some specimens lack the plumose members in the clusters.

Female “b” is exceptional in our 5 specimens in having full posteroproximal spination on article 5 of pereopods 3–4 like *Prantinus*. This destroys a former generic

distinction between *Tonocote* and *Prantinus*.

*Relationship.*—This species differs from *T. magellani* in the presence of 11 spines (versus 8) on the outer plate of maxilla 1 as in *Prantinus*; the large hook on epimeron 3; the denser facial spines on articles 5–6 of pereopod 5 (on article 5 there are 32 spines versus 12 on the type, on article 6 there are 9 spines versus 4); the denser marginal armaments on pereopods 6–7; an added 1–2 posterior spines on articles 5–6 of pereopods 3–4, but, except in female “b” (see above), not as extensively spinose as in *Prantinus*; inner ramus of uropods 1–2 with either 1 or 2 apical setae (versus 1 in *T. magellani* and *Prantinus*); outer ramus of uropod 2 with up to 3 setae (versus 1 in the other taxa).

*Illustrations.*—Complete setosity not shown on pleopods.

*Holotype.*—Deposited in the National Museum of Natural History (USNM), Washington, D.C., USNM 195180, male “d,” 4.74 mm (illustrated).

*Type locality.*—Eastern Straits of Magellan, 52°33.5'S, 68°57.5'W, 11 m, 9 Apr 1976, coll. Dr. Victor A. Gallardo.

*Paratypes.*—From the type locality: male “a,” 3.73 mm (USNM 235032); female “b,”



6.43 mm (USNM 235030); male “c,” 4.74 mm (USNM 235031); juvenile “e,” 2.32 mm (USNM 235033).

*Etymology.*—*introflexidus*, Latin, prefix “intro,” within, inward; “flectere, flexum” to bend, to turn; suffix “idus,” in a state or condition, referring to the inward turning epimeron 3.

*Distribution.*—Straits of Magellan, 11–16 m.

Acknowledgments

We thank Dr. Victor A. Gallardo of Universidad de Concepción, Chile, for making this material available; Linda B. Lutz of Vicksburg, Mississippi, for inking our drawings; and Lori A. Jackintell for laboratory assistance.

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Clark, Janice and Barnard, J. Laurens. 1988. "Tonocote introflexidus, A New Species Of Marine Amphipod From Argentina." *Proceedings of the Biological Society of Washington* 101, 354–365.

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