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Darren Yeo 28/11/97

On a new genus of riverine crab (Crustacea: Decapoda: Brachyura: Potamidae) from northwestern Thailand, with descriptions of two new species

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Abstract

A new genus, *Tomaculamon*, is set up for two new species of potamid river crabs. *Tomaculamon stenixys*, new species, and *T. pygmaeus*, new species, are both from northwestern Thailand. The new genus is closest to *Potamon* Savigny, 1816, but is immediately distinguished by distinct gonopodal characters.

Introduction

Among a collection of freshwater crabs recently obtained from northwestern Thailand were two unusual species of potamids. Externally, both species resemble members of the genus *Potamon* Savigny, 1816. However, their gonopod structures are quite different from any known *Potamon* species, effectively excluding them from that genus. It would thus be more appropriate to place them in a new genus, here named *Tomaculamon*. The two species, *Tomaculamon stenixys*, new species, and *T. pygmaeus*, new species, are easily differentiated from each other by morphological characters. This report serves to describe the new genus and two new species.

Materials and methods

The following abbreviations are used: G1 for male first pleopod, G2 for male second pleopod. Measurements are of carapace width and length respectively. Terminology used follows Ng (1988a). All measurements are in millimetres. Specimens are deposited in the Zoological Reference Collection (ZRC), School of Biological Sciences, The National University of Singapore.

Taxonomy

FAMILY POTAMIDAE ORTMANN, 1896

Tomaculamon, new genus

Diagnosis. – Carapace gently convex transversely and longitudinally; frontal region sparsely granulose; epigastric cristae separated from postorbital cristae by shallow groove, distinct, rugose, not sharp, with the latter breaking up into low, granules laterally before reaching epibranchial tooth; external orbital angle separated from epibranchial tooth by distinct cleft; anterolateral margin serrated, cristate. Exopod of third maxilliped with well developed flagellum reaching beyond width of merus. Ambulatory legs normal. Male abdomen narrowly triangular; tip of telson reaching beyond imaginary line joining anterior edges of cheliped bases. G1 terminal segment with varying degrees of longitudinal torque, with weakly produced dorsal fold at proximal part. G2 longer than G1; distal segment longer than half-length of basal segment, well developed, stout, cylindrical, tip rounded with distinct acute, conical distal projection.

Type species. – *Tomaculamon stenixys*, new species, by present designation.

Etymology. – The genus name is derived from ‘*tomaculum*’, Latin for sausage, alluding to the sausage-shaped

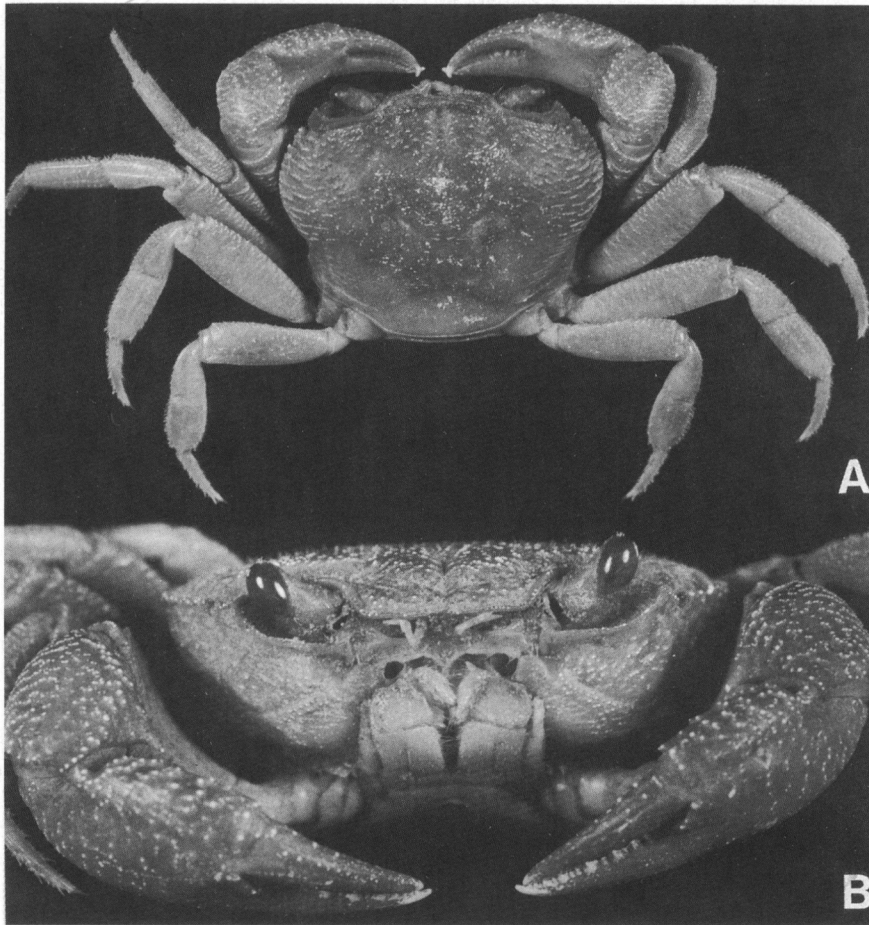


Figure 1. *Tomaculamon stenixys*, new species. Holotype male (24.5 by 18.9 mm)(ZRC 1997.324). A, dorsal view; B, frontal view.

G2 distal segment, together with the latter part of the name 'Potamon'. Gender neuter.

Remarks. – *Tomaculamon*, new genus, most closely approaches the genus *Potamon* (sensu Alcock, 1910; Bott, 1970; Naiyanetr & Ng, 1990; Ng & Naiyanetr, 1993), in possessing a well developed flagellum on the third maxilliped exopod. In addition, the broad, relatively flat, granular to rugose carapace and distinct, rugose postorbital cristae that weaken and disperse into low, granules laterally, also closely ally the two genera.

Tomaculamon, however, differs from *Potamon*, Savigny, 1816, and all other Southeast Asian genera, most noticeably, in the structures of both pairs of male reproductive appendages. The terminal segment of the G1 of *Tomaculamon*, has varying degrees of longitudinal torque and is relatively variable in shape, ranging from being almost conical to being fairly complex

in shape (versus no twist and generally cylindrical to tapered shape in *Potamon*). The distal segment of the G2 of *Tomaculamon*, is unlike any potamid known from Southeast Asia, being cylindrical and stout in appearance with an acute conical distal projection (versus slender and tapering, without distal projection in *Potamon*).

The only other Southeast Asian potamid genus known to have such twisting in the G1 is *Allopotamon tamberanense*, (Rathbun, 1905) (see Ng, 1988b). However, the overall structure of the G1 of *Tomaculamon*, new genus, differs greatly from *Allopotamon* Ng, 1988, in that only the terminal segment shows twisting, while the subterminal segment is normal in appearance (versus the whole G1 being strongly twisted). Furthermore, the G2 of *Allopotamon* is of the typical slender, tapering form and its dorsal carapace is swollen (versus relatively flat to gently convex).



Figure 2. *Tomaculamom pygmaeus*, new species. Holotype male (18.8 by 14.4 mm)(ZRC 1997.325). A, dorsal view; B, frontal view.

Recent studies on Thai potamid crabs (Naiyanetr & Ng, 1990; Ng & Naiyanetr, 1993) followed Alcock's (1910) system of classification of the Potamidae because Bott's (1966, 1970) generic classification of the Potamidae posed problems with a number of the genera. Pending a revision of the genus *Potamon* sensu stricto, the above action is also followed in the present paper, and *Potamon* Savigny, 1816, is thus regarded as a 'catch-all' genus. Because of this, many species whose affinities are questionable and have not been confirmed, have been tentatively referred to *Potamon* sensu lato (see Ng & Naiyanetr, 1993). Examples of such species, whose placement in the genus are based

on the presence of the well developed flagellum on the third maxilliped exopod, include *Potamon adriatretum* Alcock, 1909, *P. lophocarpus* Kemp, 1913, *P. superciliosum* Kemp, 1913, *P. brousmichei* Rathbun, 1904, *P. kanchanaburiense* Naiyanetr, 1992, *P. maesotense* Naiyanetr, 1992, and *P. lipkei* Ng & Naiyanetr, 1993 (see Ng, 1992; Ng & Naiyanetr, 1993). The different G1 forms of such species would indicate that they belong to separate genera, however, other than the form of the G1, no other strong diagnostic generic characters are immediately available to support the case for splitting the genus (Ng, 1992; Ng & Naiyanetr, 1993). In recent years, however, redescription of type spec-

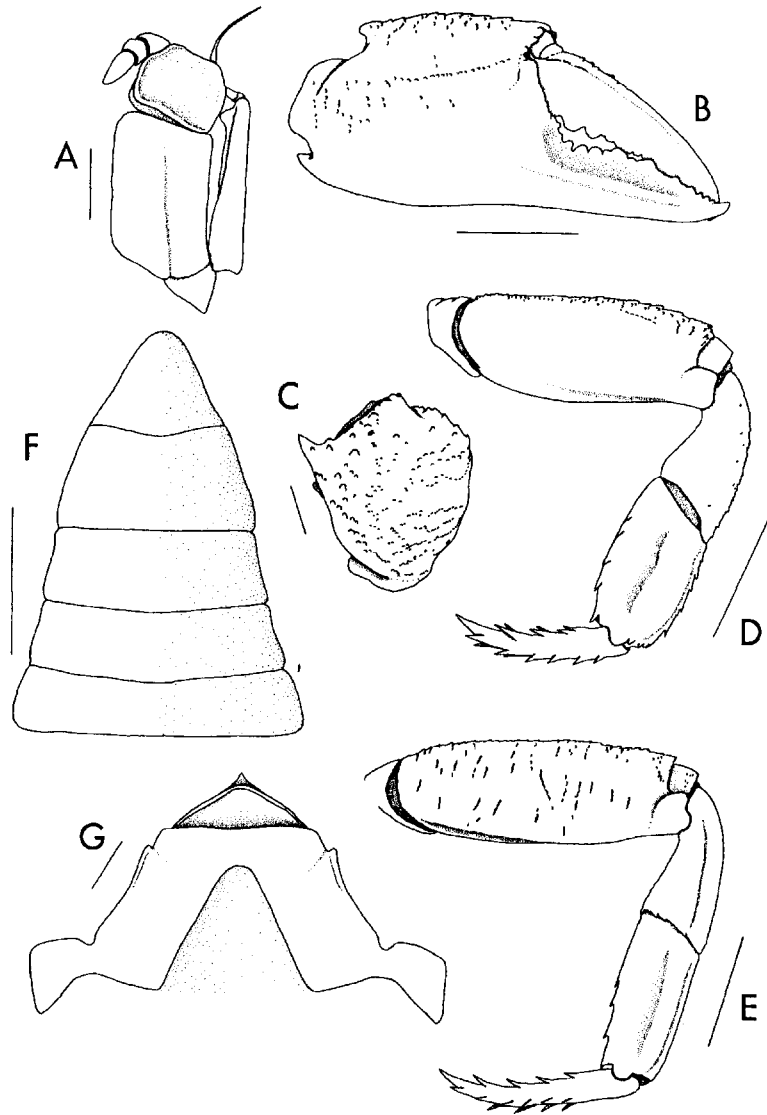


Figure 3. *Tomaculamom stenixys*, new species. Holotype male (24.5 by 18.9 mm)(ZRC 1997.324). A, left third maxilliped; B, right chela; C, carpus of right cheliped; D, right fourth ambulatory leg; E, right second ambulatory leg; F, abdominal segments 3-7, G, anterior thoracic sternites. Scales = 2.0 mm in A, C, G; 5.0 mm in B, D-F.

imens of poorly known *Potamon* species, have led to the subsequent assignment of several taxa into separate genera based on other strong and consistent characters supporting diagnostic G1 structures (see Ng, 1986, 1996a, 1996b; Ng & Naiyanetr, 1993, 1995).

In line with the above rationale, the assignment of the present two species to a genus of their own is based on the distinctive G1 form and is strongly supported by at least one other diagnostic generic character, in this

case, the form of the G2.

Distribution. – *Tomaculamom*, new genus, is so far known only from Tak and Phitsanulok Provinces in northwestern Thailand. A third undescribed species is known from also known from Tak Province (P. Naiyanetr, pers. com.). The distribution of the genus is thus relatively localized in lower half of northwestern Thailand.

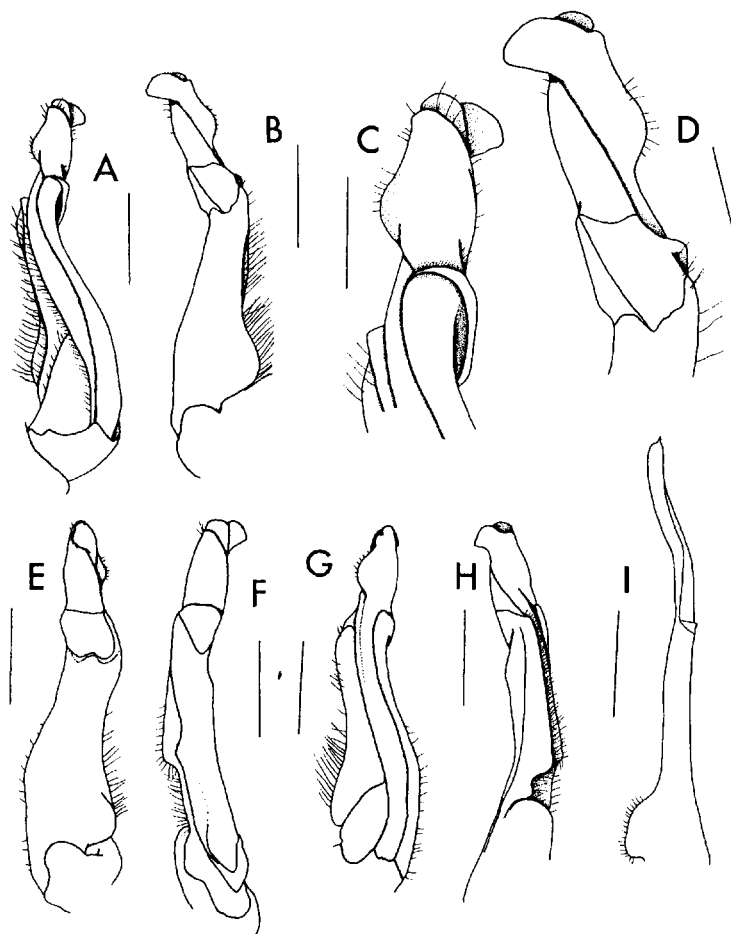


Figure 4. *Tomaculamom stenixys*, new species. Holotype male (24.5 by 18.9 mm)(ZRC 1997.324). A-B, E-H, left G1; C-D, left G1 terminal segment; I, left G2. A, C, ventral view; B, D, dorsal view; E, dorsolateral view; F, lateral view; G, ventromedial view; H, medial view. Scales = 2.0 mm in A-B, E-I; 1.0 mm in C-D.

Tomaculamom stenixys, new species (Figures 1, 3 and 4)

Material examined. – Holotype male (24.5 by 18.9 mm)(ZRC 1997.324), Mae Nam Moi, Phop Phra District, Tak Province, northwestern Thailand, coll. S. H. Tan et al., 19 Mar. 1996.

Description. – Carapace longer than broad, posterior half distinctly narrower than anterior half; dorsal surface rugose and granulose in anterior half and lateral regions, with numerous scattered short hairs, smooth in central part of posterior half, gently convex laterally and longitudinally; regions poorly demarcated, cervical groove shallow, reaching shallow H-shaped depression (Figure 1A). Epigastric cristae distinct, rugose,

not sharp, slightly anterior of postorbital cristae, separated by shallow but distinct inverted V-shaped groove which reaches mesogastric region; postorbital cristae distinct, rugose, not sharp, not confluent with epibranchial tooth, breaking up into granules laterally and above epibranchial tooth, separated from epigastric cristae by shallow but distinct groove (Figures 1A, B). Frontal margin sinuous, lined with short hairs; frontal region deflexed downwards, granulose; supra- and infraorbital margins straight to very weakly sinuous, weakly cristate, lined with short hairs; eyes normal (Figures 1A, B). External orbital angle acutely triangular, sharp; outer margin almost straight, weakly serrated; epibranchial tooth distinct, granular, margins not clearly defined, separated from external orbital angle by distinct cleft; anterolateral margin weakly

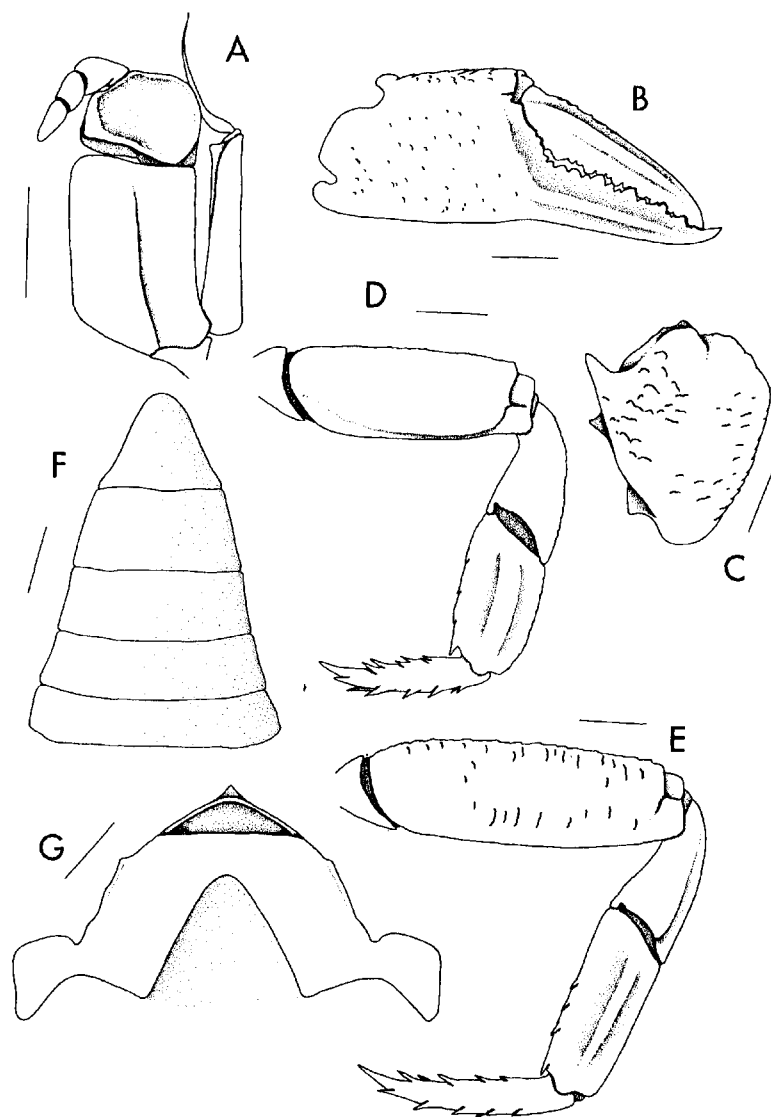


Figure 5. *Tomaculamon pygmaeus*, new species. Holotype male (18.8 by 14.4 mm)(ZRC 1997.325). A, left third maxilliped; B, right chela; C, carpus of right cheliped; D, right fourth ambulatory leg; E, right second ambulatory leg; F, abdominal segments 3-7; G, anterior thoracic sternites. Scales = 2.0 mm.

serrated, strongly cristate, distinctly convex, not running inwards posteriorly, clearly distinguished from straight posterolateral margin by a 'waist'; anterolateral region covered with strong, distinct striae and granules; posterolateral margin entire, almost straight, confluent with anterolateral margin, almost parallel to very weakly converging posteriorly; posterolateral region lined with oblique striae (Figure 1A). Epistome with anterior margin almost straight; posterior margin with median triangular tooth (Figure 1B).

Ischium of third maxilliped rectangular, ca. 1.8 times longer than broad, with distinct, narrow, longitudinal median sulcus; merus squarish, about half as long as ischium, with concave outer surface; palp normal; exopod long, slender, reaching midpoint of merus, inner margin of distal part produced as a blunt, acute tooth, with well developed flagellum reaching beyond width of merus (Figure 3A).

Chelipeds subequal, right side slightly larger, outer surfaces of merus, carpus and palm rugose to granulose; fingers slightly shorter than palm, tips hooked

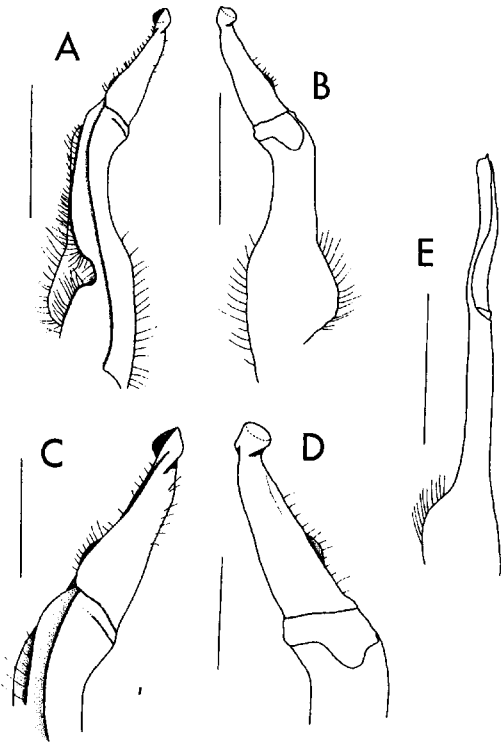


Figure 6. *Tomaculamom pygmaeus*, new species. Holotype male (18.8 by 14.4 mm)(ZRC 1997.325). A-B, left G1; C-D, left G1 terminal segment; E, left G2. A, C, ventral view; B, D, dorsal view. Scales = 2.0 mm in A-B, E; 1.0 mm in C-D.

and overlapping, movable finger with two parallel rows of low, rounded granules, three in outer row, four in inner row; carpus with strong, obliquely directed, subdistal spine on inner margin; merus without subterminal spine, with outwardly directed inner subdistal low, sharp spine (Figures 3B, C).

Ambulatory legs covered with scattered short hairs, second leg longest; dactylus slender, elongate; propodus and carpus with low, barely visible, broad ridge; merus rugose, with gently serrated dorsal margin, without distinct subdistal spine (Figures 3D, E).

Suture between sternites 2 and 3 complete, distinct, very gently concave; suture between sternites 3 and 4 not clearly discernible, except for shallow clefts at lateral edges of sternum; male abdominal cavity exceeding imaginary line joining clefts separating sternites 3 and 4 (Figure 3G). Male abdomen narrowly triangular; telson subequal in length to sixth segment, lateral margins very weakly concave, tip rounded, proximal margin gently concave; segment 6 with median length about half of proximal margin, proximal margin

straight, lateral margins weakly convex, lateral margins of segments 4 and 5 gently concave, lateral margins of segment 3 gently convex (Figure 3F).

G1 slender, gently sinuous, inner margin and groove for G2 lined with setae; terminal segment clearly separated from subterminal segment, ca. 0.3 times length of subterminal segment, appears twisted along longitudinal axis, dorsal fold weakly produced as a median flap in proximal half and continues as a subdistal dorsolaterally protruding flap, groove for G2 visible distally; subterminal segment with large, distinct, bluntly triangular synovial membrane (Figures 4A-H). G2 ca. 1.1 times length of G1 subterminal segment; distal segment well developed, stout in appearance, cylindrical, ca. 12.5 times as long as broad, relatively long, ca. 0.8 times length of basal segment, distinct dorsal fold becomes acute, conical distal projection (Figure 4I).

Remarks. – The diagnostic generic characters of *Tomaculamom stenixys*, new species, clearly distinguish it from any *Potamon* species with similarly granulose to rugose carapace. In addition, *T. stenixys* is immediately recognizable by the ‘waist’ at the confluence of the distinctively convex anterolateral and more or less parallel posterolateral carapace margins. Ng & Naiyanetr (1993) noted the ‘waist-like’ carapace of *Potamon lipkei* Ng & Naiyanetr, 1993. However, the carapace of *P. lipkei* is much more transverse in appearance, with the posterolateral margins being distinctively converging posteriorly. *Tomaculamom stenixys* differs from the only other member of its genus, *T. pygmaeus*, new species, in many other aspects of external morphology, as well as in the structure of its G1 (See Table 1).

Etymology. – The specific epithet is derived from combining the Greek words, *stenos* and *ixys*, meaning narrow and waist respectively, alluding to the unique ‘waist’ in the carapace lateral margin. Used as a noun in apposition.

Tomaculamom pygmaeus, new species (Figures 2, 5 and 6)

Material examined. – Holotype male (18.8 by 14.4 mm) (ZRC 1997.325), Wang Thong District, Phitsanulok Province, northwestern Thailand, coll. S. H. Tan et al., 21 Mar. 1996.

Paratypes 2 males, 3 females (largest male 19.1 by 15.0 mm) (ZRC 1997.326 - 330), same data as holo-

Table 1. Summary of differences between *Tomaculamon stenixys*, new species, and *T. pygmaeus*, new species.

Character	<i>T. stenixys</i>	<i>T. pygmaeus</i>
Dorsal carapace	Covered with scattered short hairs, rugose to granulose in anterior half and lateral regions.	Glabrous, comparatively smooth posteriorly to epigastric and postorbital cristae.
Frontal margin	Sinuuous, lined with short hairs.	Very gently sinuous, glabrous.
Frontal region	Deflexed downwards, appears narrow from dorsal view.	Very gently deflexed, appears broader from dorsal view.
External orbital angle	Acutely triangular, sharp; outer margin almost straight.	Broadly triangular; outer margin slightly convex.
Epibranchial tooth	Distinct, granular, margins not clearly defined.	Low, blunt, not granular, with entire margin.
Anterolateral margin	Strongly cristate, distinctly convex, not running inwards posteriorly, confluent with but clearly distinguished from straight posterolateral margin by a waist.	Cristate, convex, running obliquely inwards posteriorly, not confluent with posterolateral margin.
Posterolateral margin	Almost straight, confluent with anterolateral margin, almost parallel to very weakly converging posteriorly.	Straight, anteriorly meeting midpoint of anterolateral margin, converging posteriorly.
Anterolateral region	Covered with strong, distinct striae and granules.	Granulose to sparsely rugose.
Third maxilliped exopod	Inner margin of distal part produced as a blunt, acute tooth.	Inner margin of distal part produced as a triangular tooth.
Chela	Fingers slightly shorter than palm (movable finger ca. 0.9 times length of palm).	Fingers slightly longer than palm (movable finger ca. 1.1 to 1.2 times length of palm).
	Fingers more stout (movable finger ca. 2.9 times longer than basal width).	Fingers more slender (movable finger ca. 3.6 to 4.2 times longer than basal width).
Sternum	Suture between sternites 2 and 3 gently concave; suture between sternites 3 and 4 not clearly discernible, except for shallow clefts at lateral edges of sternum.	Suture between sternites 2 and 3 straight, more obvious at the edges; suture between sternites 3 and 4 not discernible.
G1 terminal segment	Proportionately shorter, ca. 0.3 times length of subterminal segment.	Proportionately longer, ca. 0.5 times as long as subterminal segment.
	Appears longitudinally twisted along entire length.	Only distal part twisted longitudinally, forming upward-facing, cup-like structure.
	Complicated shape, with dorsal fold weakly produced as a median flap in proximal half and continues as a subdistal dorsolaterally protruding flap.	Conical, distally tapering shape, with dorsal flap produced as low, gentle hump on proximal third of inner margin.
G2	Proportionately shorter, ca. 1.1 times length of G1 subterminal segment.	Proportionately longer, ca. 1.4 times length of G1 subterminal segment.

type.

Description. – Carapace longer than broad; dorsal surface glabrous, appears slightly inflated; regions not well demarcated, cervical groove shallow, reaching H-shaped depression (Figure 2A). Epigastric cristae distinct, rugose, not sharp, slightly anterior of postorbital cristae, separated by very narrow groove which widens and becomes shallower posteriorly; postorbital

cristae distinct, low, rugose, not sharp, not reaching epibranchial tooth, breaking up into low, forward-pointing granules laterally, separated from epigastric cristae by shallow groove (Figures 2A, B). Frontal margin very gently sinuous; frontal region very gently deflexed, sparsely granulose to granulose; supra-orbital margin straight, very weakly cristate, sparsely lined with hairs; eyes normal (Figures 2A,B). External orbital angle broadly triangular; outer margin slight-

ly convex, weakly serrated, cristate; epibranchial tooth low, blunt, separated from external orbital angle by distinct cleft; anterolateral margin serrated, cristate, convex, running obliquely inwards posteriorly; anterolateral region granulose to sparsely rugose; posterolateral margin entire, straight, anteriorly meeting midpoint of anterolateral margin, converging posteriorly; posterolateral region lined with oblique striae (Figure 2A). Epistome with anterior margin almost straight; posterior margin with median triangular tooth (Figure 2B).

Ischium of third maxilliped rectangular, ca. 1.6 times longer than broad, with distinct, narrow, longitudinal median sulcus; merus squarish, about 0.8 times as long as broad, half as long as ischium, with concave outer surface; palp normal; exopod long, slender, reaching midpoint of merus, inner margin of distal part produced as a triangular tooth, with well developed flagellum reaching beyond width of merus (Figure 5A).

Chelipeds subequal, right side slightly larger; outer surface of palm sparsely granulose, fingers slightly longer than palm, tips slightly hooked and overlapping, movable finger with two parallel rows of low, rounded granules, with more on the inner row than outer; carpus with strong, obliquely directed, subdistal spine on inner margin, outer surface rugose; merus without subterminal spine, with outwardly directed inner subdistal low, sharp spine, outer surface rugose (Figures 5B, C).

Second ambulatory leg longest; dactylus slender, elongate; propodus and carpus with low ridge; merus rugose, with gently serrated dorsal margin, without distinct subdistal spine (Figures 5D, E).

Suture between sternites 2 and 3 complete, distinct, straight, more obvious at the edges; suture between sternites 3 and 4 not discernible; male abdominal cavity exceeding imaginary line joining midpoint of cheliped bases (Figure 5G). Male abdomen narrowly triangular; telson ca. 1.2 times length of sixth segment, lateral margins weakly concave, tip rounded, proximal margin gently concave; segment 6 with median length about half of proximal margin, proximal margin almost straight, lateral margins of segments 3–6 almost straight (Figure 5F).

G1 slender, gently sinuous, inner margin and groove for G2 lined with hairs; terminal segment clearly separated from subterminal segment, about half as long as subterminal segment, conical, tapering distally, with dorsal flap produced as low, gentle hump on proximal third of inner margin, outer margin sinuous, distal part twisted longitudinally, forming upward-facing, cup-like structure; subdistal part of outer margin of subterminal segment with broad, blunt, shallow cleft

(Figures 6A–D). G2 ca. 1.4 times length of G1 subterminal segment; distal segment well developed, stout in appearance, cylindrical, ca. 10.5 times as long as broad, ca. 0.6 times length of basal segment, distinct dorsal fold becomes acute, conical distal projection (Figure 6E).

Remarks. – *Tomaculamom pygmaeus*, new species, bears some resemblance to members of the genus *Potamon* by virtue of its external morphology. However, as is the case for *T. stenixys*, new species, the twist in the G1 terminal segment and cylindrical G2 distal segment differentiate this species from any *Potamon* species. The differences between *T. stenixys* and *T. pygmaeus* have already been covered in the *Remarks* for the previous species and Table 1.

Tomaculamom pygmaeus is one of the smallest known potamids from Thailand, with the largest male specimen (ZRC 1997.326) available measuring about 19.1 by 15.0 mm. The smallest male specimen (ca. 12.8 by 9.7 mm, ZRC 1997.327) has well-developed G1 and G2 structures which are chitinized and setose, and that occupy most of the abdominal cavity. It should be noted, however, that the specimens in the present series have not attained full adult size. This is evident by the fact that the largest female specimen (ca. 18.0 by 13.8 mm, ZRC 1997.328), despite having well-developed and setose pleopods, does not have a fully expanded abdomen.

Etymology. – The species name, ‘*pygmaeus*’, is Latin for pygmy, in allusion to its small adult size, and is used here as a noun.

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