



## Key to the species of Tortanidae Tortanus occurring in the China Seas

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REVIEW-TAXONOMIC INDEX

# Key to the Species of Tortanidae *Tortanus* Occurring in the China Seas

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*Tortanus* (*Atortus*) *brevipipes* (30a/f), *digitalis* (31a/34a/f), *erabuensis* (21a/26a/f), *murrayi* (22a/27a/f), *recticaudus* (26c/f), *ryukyuensis* (29a/33a/f), *scaphus* (23a/26b/f), *sinicus* (21b/24a/f), *taiwanicus* (32a/35a/f), *tumidus* (23b/27b/f), *vietnamicus* (32b/35b/f), *Tortanus* (*Eutortanus*) *derjugini* (12b/16b/f), *dextrilobatus* (12a/16a/f), *sheni* (11a/15a/f), *spinicaudatus* (10a/14a/f), *vermiculus* (9a/13a/f), *Tortanus* (*Tortanus*) *barbatus* (4a/6a/f), *forcipatus* (5a/7a/f), *gracilis* (5b/7b/f)

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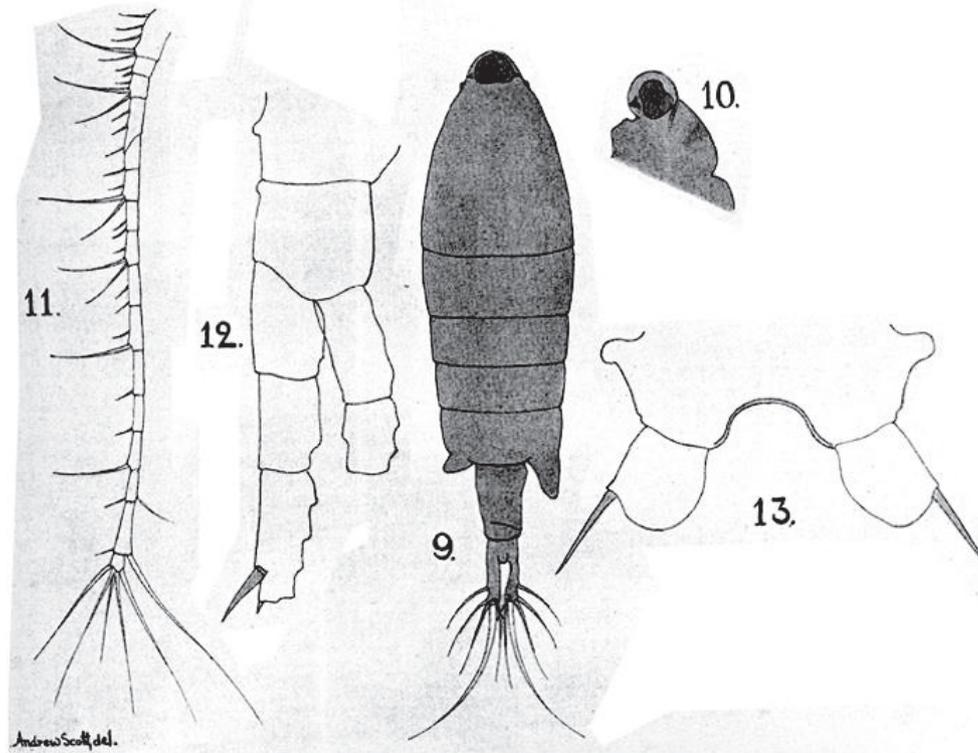
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*Tortanus (Atortus) brevipes* A. Scott, 1909 (Size: female, 2.30 mm; male, unknown)



*Tortanus (Atortus) brevipes* A. Scott, 1909

Scott, 1909: pl. 56. *Tortanus (Atortus) brevipes* A. Scott, 1909, Female. 9. habitus (dorsal); 10. forehead (lateral); 11. antnule; 12. leg 1; 13. leg 5.

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 21 2020].

*Tortanus (Atortus) digitalis* Ohtsuka & Kimoto, 1989 (Size: female, 2.74–2.84; male, 1.82–1.96 mm)

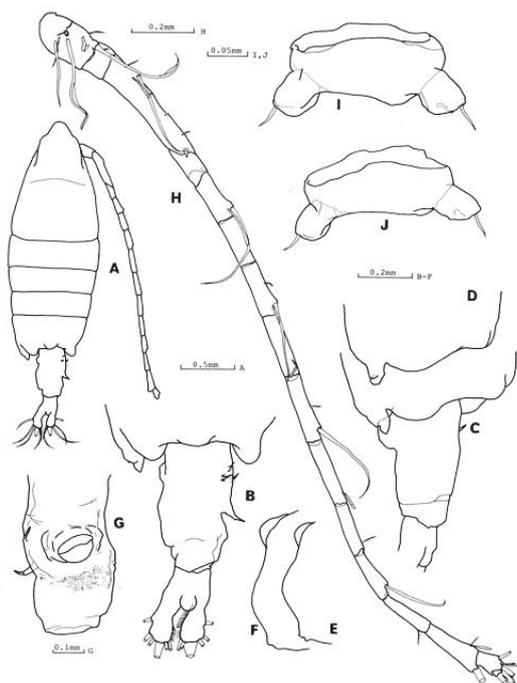


Fig. 5

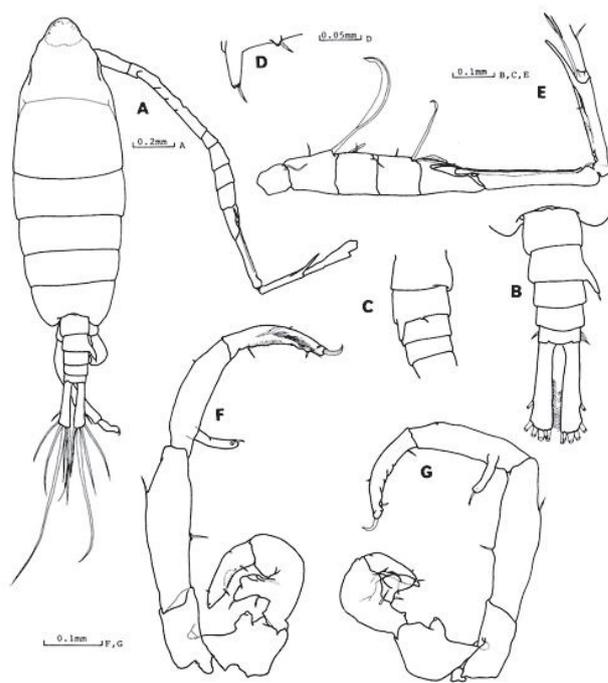


Fig. 6

*Tortanus (Atortus) digitalis* Ohtsuka & Kimoto, 1989

Ohtsuka & Kimoto, 1989: fig. 5. *Tortanus (Atortus) digitalis* Ohtsuka & Kimoto, 1989, Female. A. habitus (dorsal); B/C. pediger 5 & urosome (dorsal/lateral); D/E/F. pediger 5 (lateral left/right/right); G. genital double-somite (ventral); H. antennule; I/J. leg 5 (posterior). Fig. 6. *Tortanus (Atortus) digitalis* Ohtsuka & Kimoto, 1989, Male. A. habitus (dorsal); B. pediger 5 & urosome (dorsal); C. urosome (ventral); D. 2 processes of urosomite 2; E. right antennule, segments 13–21; F/G. leg 5 (anterior/posterior).

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 23 2021].

*Tortanus (Atortus) erabuensis* Ohtsuka, Fukuura, Go, 1987 (Size: female, 2.42–2.44 mm; male, 2.04–2.20 mm)

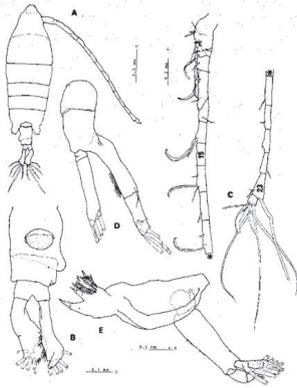


Fig. 1

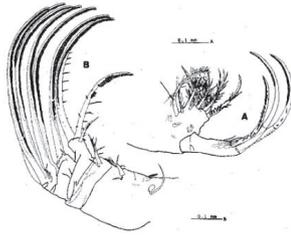


Fig. 2

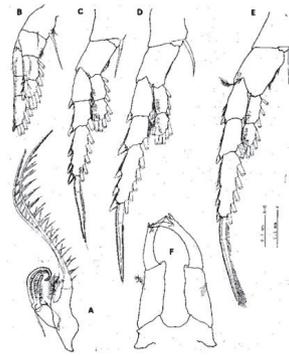


Fig. 3

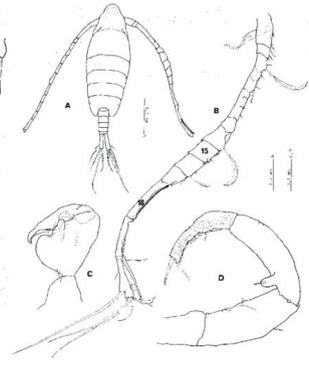


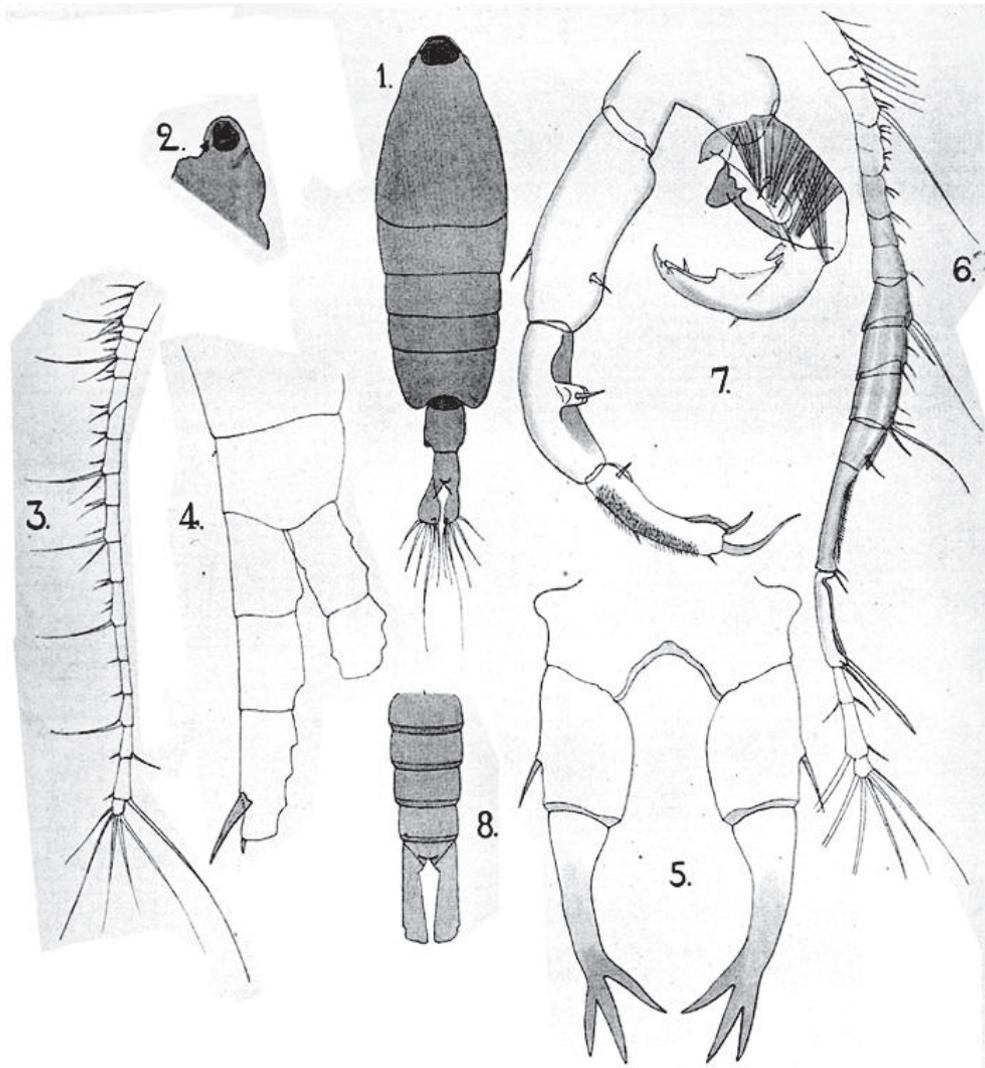
Fig. 4

*Tortanus (Atortus) erabuensis* Ohtsuka, Fukuura, Go, 1987

S. Ohtsuka et al., 1987. Fig.1. Female (from Honmura Bay, Kuchinoerabu Is.): Female: A, habitus (dorsal); B, urosome (ventral); C, antennule; D, antenna; E, mandible. Fig.2. Female: A, maxilla; B, maxilliped. Fig.3. Female: A, maxilliped; B, leg 1; C, leg 2; D, leg 3; E, leg 4; F, leg 5. Fig.4. Male: A, habitus (dorsal); B, right antennule; C, right leg 5; D, left leg 5.

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 26 2021].

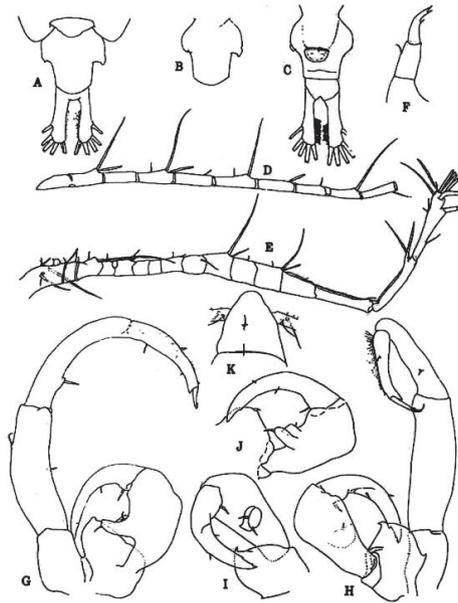
*Tortanus (Atortus) murrayi* A. Scott, 1909 (Size: female, 2.50–2.65 mm; male, 2.25 mm)



*Tortanus (Atortus) murrayi* A. Scott, 1909

Scott, 1909: pl. 56. *Tortanus (Atortus) murrayi* A. Scott, 1909, Female. 1. habitus (dorsal); 2. forehead (lateral); 3. antennule; 4. leg 1; 5. leg 5. Male. 6. right antennule; 7. leg 5 (posterior); 8. urosome (dorsal).

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 23 2021].

*Tortanus (Atortus) recticaudus* (Giesbrecht, 1889)*Tortanus (Atortus) recticaudus* (Giesbrecht, 1889)

Bowman, 1986: fig.1. Female from United Arab Emirates). A. urosome (dorsal), B. genital double-somite of another female (dorsal), C. urosome (ventral), D. antennule (portion), F. leg 5, K. head (dorsal). Male, E. right antennule, G/H. leg 5 (anterior/posterior); I-J, right leg 5 (from different aspects).

*Tortanus (Atortus) ryukyuensis* Ohtsuka & Kimoto, 1989 (Size: female, 2.08–2.26 mm; male, 1.66–1.88 mm)

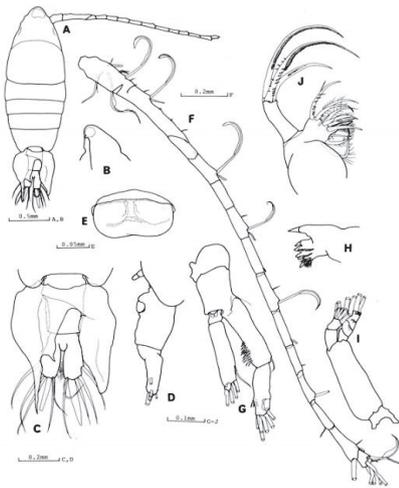


Fig. 2

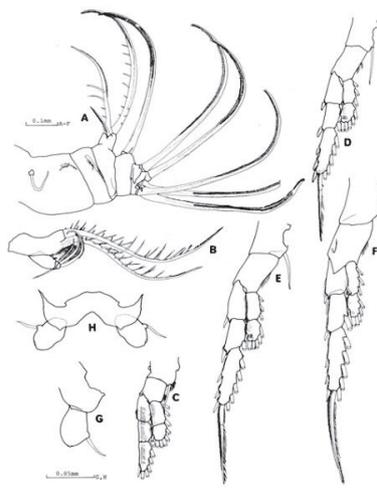


Fig. 3

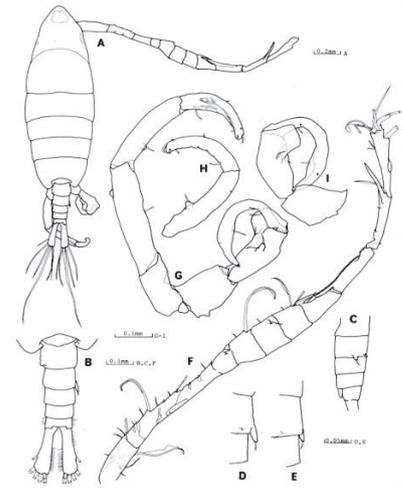


Fig. 4

*Tortanus (Atortus) ryukyuensis* Ohtsuka & Kimoto, 1989

Ohtsuka & Kimoto, 1989: fig. 2. *Tortanus (Atortus) ryukyuensis* Ohtsuka & Kimoto, 1989, Female. A. habitus (dorsal); B. eye protuberance (lateral view); C/D. pediger 5 and urosome (dorsal/lateral left side, spermatohore omitted); E. genital operculum (ventral); F. antennule; G. antenna; H. Mandible (cutting edge); I. mandible (mandibular palp); J. maxillule. Fig. 3. Female. A. maxilla; B. maxilliped; C–F. legs 1–4; G–H. leg 5. Fig. 4. Male. A. habitus (dorsal); B. pediger 5 and urosome (dorsal); C. urosome (lateral right side); D–E, lateral process of urosomite 2 (lateral right side); F. right antennule; G. leg 5 (anterior); H. terminal two segments of left leg 5 (posterior); I. right leg 5 (posterior).

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 24 2021].

*Tortanus (Atortus) scaphus* Bowman, 1971 (Size: female, 1.94–2.80 mm; male, 1.98–2.40 mm)

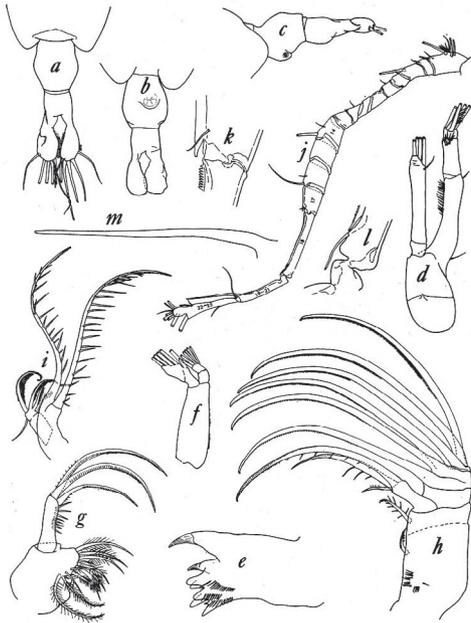


Fig. 1

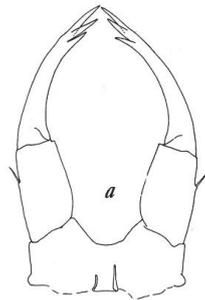


Fig. 3

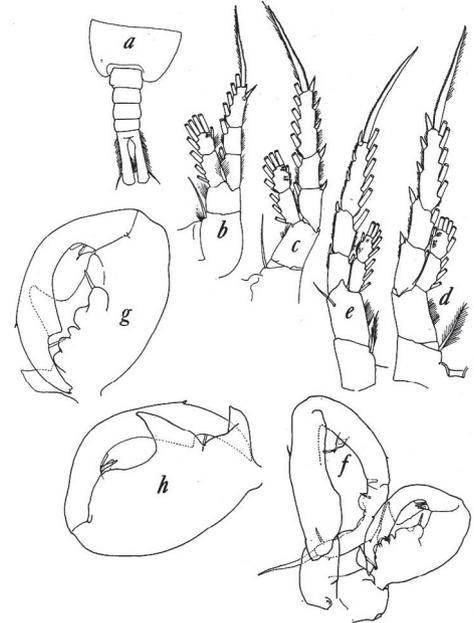


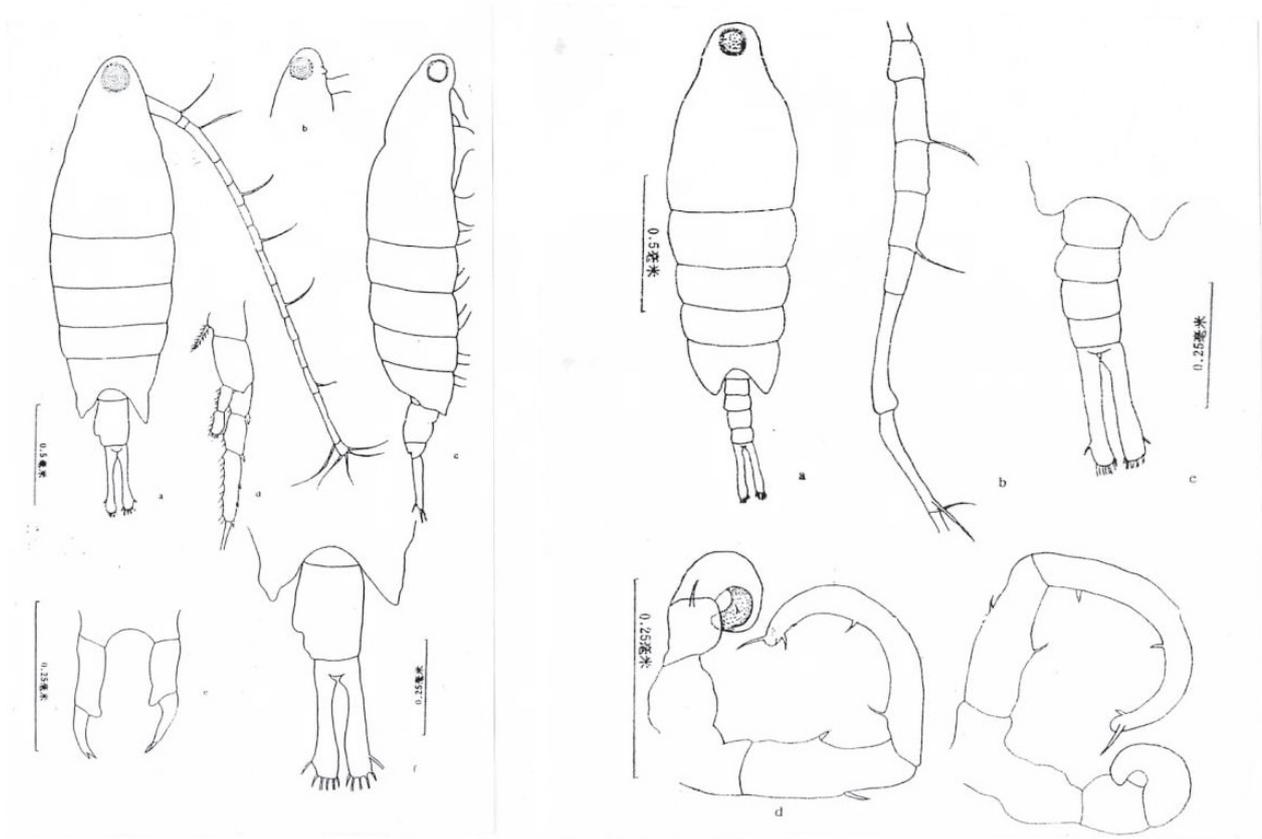
Fig. 2

*Tortanus (Atortus) scaphus* Bowman, 1971

Bowman, 1971: fig. 1. *Tortanus (Atortus) scaphus* Bowman, 1971, Female. a/b/c. posterior prosome and urosome (dorsal/ventral/lateral); d. antenna (only four of the six apical setae of endopod shown); e. right mandible (masticatory edge; outer surface); f. mandible (mandibular palp); g. maxillule (medial); h. maxilla (medial); i. maxilliped (medial). Fig. 3. Female. a. leg 5. Fig. 2. Female. b/c/d. legs 1/2/3 (anterior). Male. a. posterior prosome & urosome (dorsal); e. leg 4 (posterior); f. leg 5 (anterior); g/h. right leg 5 (anterior/posterior).

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 24 2021].

*Tortanus (Atortus) sinicus* Chen, 1983 (Size: female, 1.57 mm; male, 1.46 mm)



*Tortanus (Atortus) sinicus* Chen, 1983

Chen, 1983: fig. 1. Female. a/c. habitus (dorsal/lateral); b. forehead (lateral); d. right leg 4 (posterior); f. pediger 5 & urosome (dorsal). Fig. 2. Male. A. habitus (dorsal); b. right antennule; c. pediger 5 & urosome (dorsal); d/e. leg 5 (posterior/anterior).

*Tortanus (Atortus) taiwanicus* Chen & Hwang, 1999 (Size: female, 2.00–2.10 mm; male, 1.40–1.75 mm)

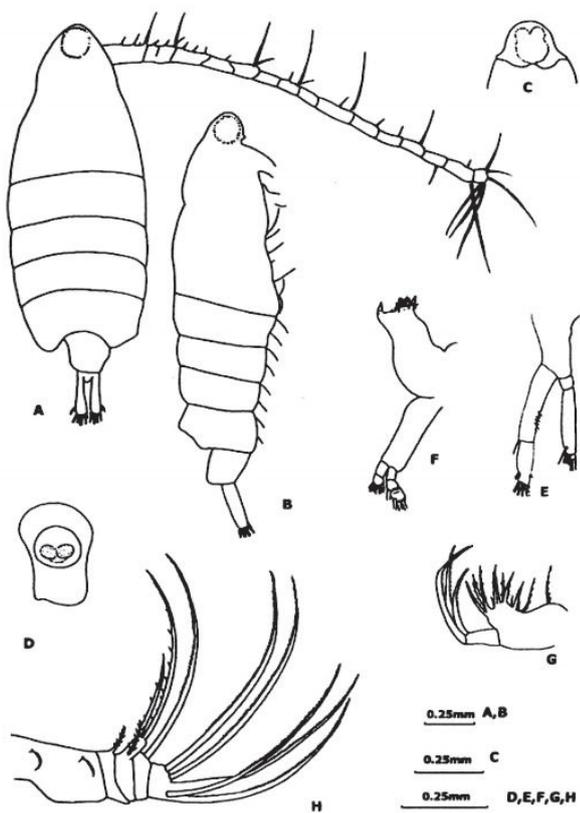


Fig. 1

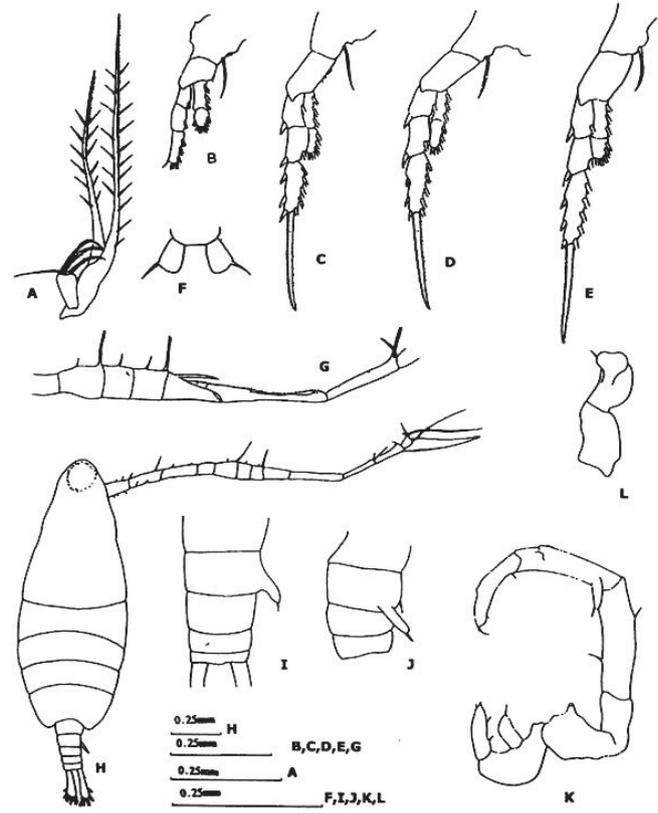
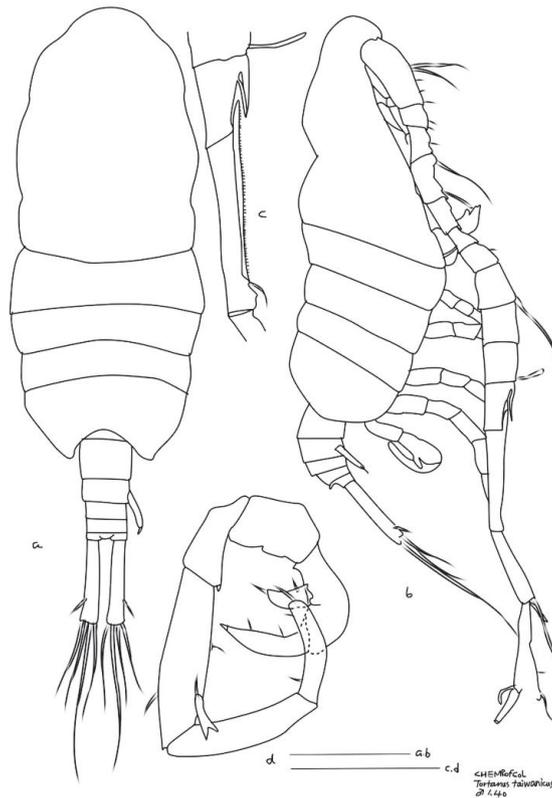


Fig. 2

*Tortanus (Atortus) taiwanicus* Chen & Hwang, 1999

Chen & Hwang, 1999: fig. 1. *Tortanus (Atortus) taiwanicus* Chen & Hwang, 1999, Female (from Hualien, eastern Taiwan). A/B. habitus (dorsal/lateral); C. forehead (ventral); D. genital double-somite (ventral); E. antenna; F. mandible; G. maxillule; H. maxilla. Fig. 2. Female. A. maxilliped; B–F. legs 1–5 (posterior); Male: G. geniculate portion of right antennule (dorsal); H. habitus (dorsal); I/J. urosome (dorsal/lateral); K. leg 5 (posterior); L. basipod and 1st exopod segment 1 of right leg 5 (anterior).

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 16 2021].

*Tortanus (Atortus) taiwanicus* Chen & Hwang, 1999*Tortanus (Atortus) taiwanicus* Chen & Hwang, 1999

Original. *Tortanus (Atortus) taiwanicus* Chen & Hwang, 1999, Male, 1.40 mm, East of Taiwan (23°46'N, 121°34'E, off Hualien): a/b. habitus (dorsal/lateral); c. segments 17 and 18 of right antennule, d. leg 5 (posterior). Scales: a, b = 0.2 mm; c, d = 0.2 mm.

*Tortanus (Atortus) tumidus* Chen, Hwang & Yin 2004 (Size: female, 2.65–2.75 mm; male, 2.25–2.40 mm)

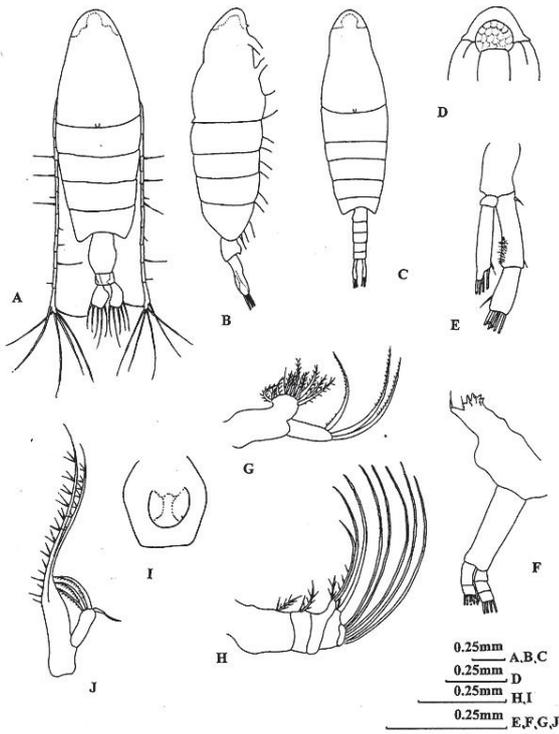


Fig. 1

*Tortanus (Atortus) tumidus* Chen, Hwang & Yin 2004

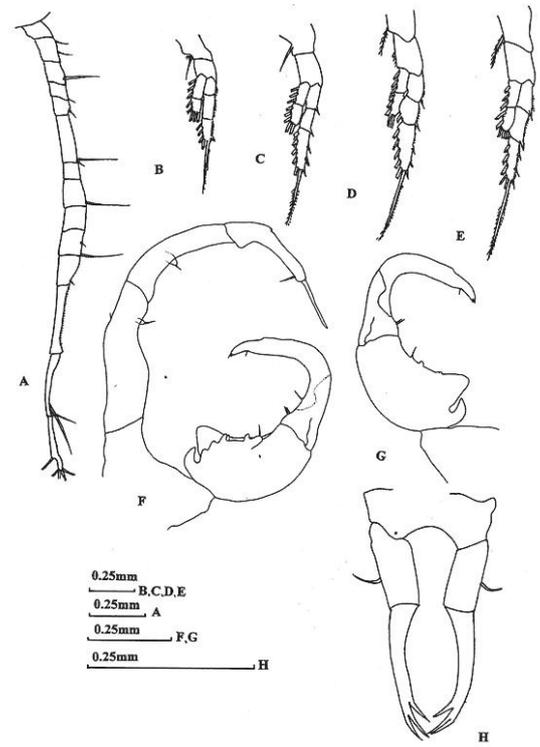


Fig. 2

Chen et al., 2004: fig. 1. *Tortanus (Atortus) tumidus* Chen, Hwang & Yin 2004, Female (from South China Sea). A/B. habitus (dorsal/lateral); D. forehead (ventral); E. antenna; F. mandible; G. maxillule; H. maxilla; I. genital operculum (ventral); J. maxilliped. Male. C. habitus (dorsal). Fig. 2. Female. B-E. legs 1–4; H. leg 5 (posterior). Male. A. left antennule; F/G. leg 5 (anterior/posterior).

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 26 2021].

*Tortanus (Atortus) vietnamicus* Nishida & Cho, 2005 (Size: female, 2.12–2.22 mm; male, 1.82–1.95 mm)

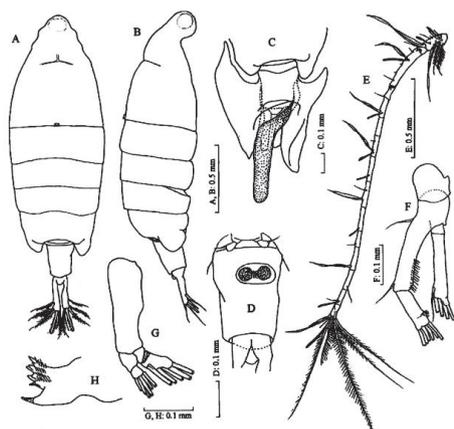


Fig. 1

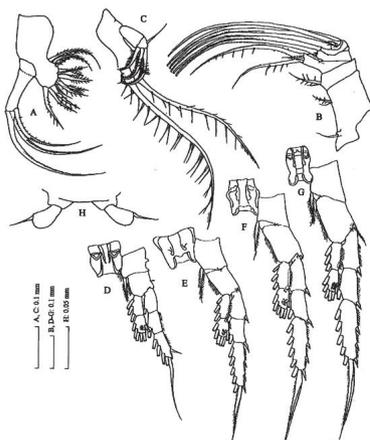


Fig. 2

*Tortanus (Atortus) vietnamicus* Nishida & Cho, 2005

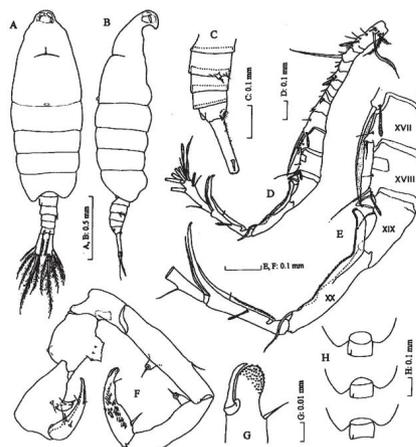
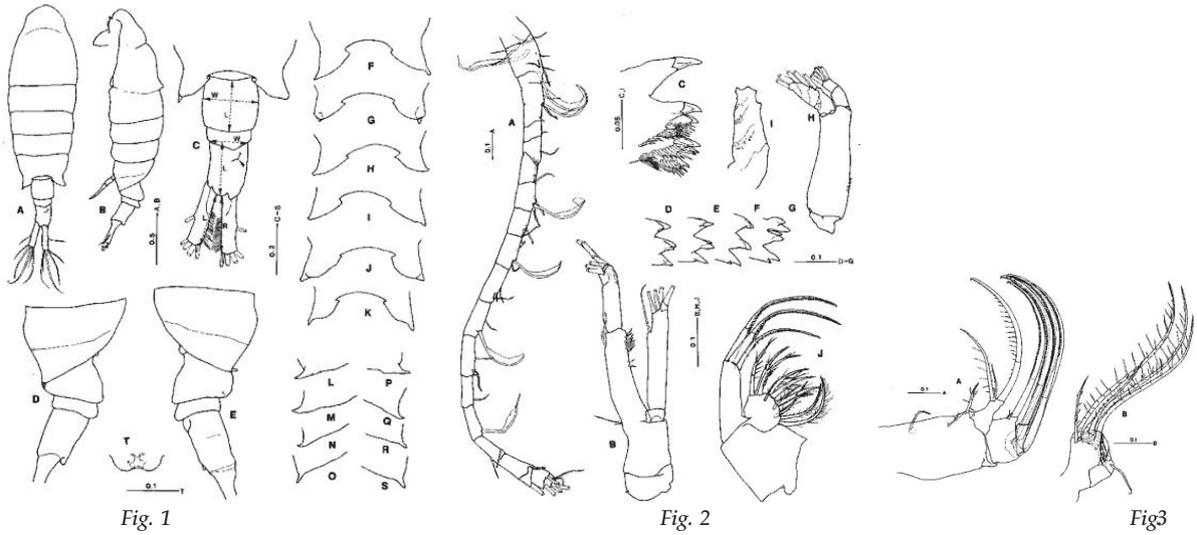


Fig. 3

Nishida & Cho, 2005: fig. 1. Female. A/B. habitus (dorsal/lateral); C. genital double-somite with spermatophore and coupler (dorsal); D. leg 5 and genital complex (ventral) showing leg 5 and genital operculum; E. antennule; F. antenna; G. mandible (mandibular palp); H. mandible (gnathobase). Fig. 2. Female. A. maxillule; B. maxilla; C. maxilliped; D-H legs 1–5 (anterior). Fig. 3. Male. A/B. habitus (dorsal/lateral); C. urosome (lateral); D. right antennule; E. right antennule (Roman numerals denote ancestral segment numbers); F. leg 5 (anterior); G. left leg 5 (tip of distal exopod); H. pediger 5 and urosomite 1 from 3 specimens (dorsal), showing asymmetry of pediger 5 with left side slightly more acute and posteriorly produced than right.

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 26 2021].

*Tortanus (Eutortanus) derjugini* Smirnov, 1935 (Size: female, 1.71–2.36 mm; male, 1.40–2.09 mm)



*Tortanus (Eutortanus) derjugini* Smirnov, 1935

Ohtsuka et al., 1995: fig. 1. *Tortanus (Eutortanus) derjugini* Smirnov, 1935, Female, A/B. habitus (dorsal/lateral); C/D/E. posterior prosome & urosome (dorsal/lateral left/lateral right); F–K. variability of posterolateral corners of prosome; L–O. variability of left posterolateral corner of prosome; P–S. variability of right posterolateral corners of prosome; T. posterior margin of genital operculum. Fig. 2. Female. A. antennule; B. antenna; C. mandible (cutting edge); D–G. variability of central and dorsal teeth on mandibular cutting edge; H. mandibular palp; I. mandible (setae omitted); J. maxillule. Scales in mm. Fig. 3. Female: A. maxilla; B. maxilliped. Scales in mm.

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 16 2021].

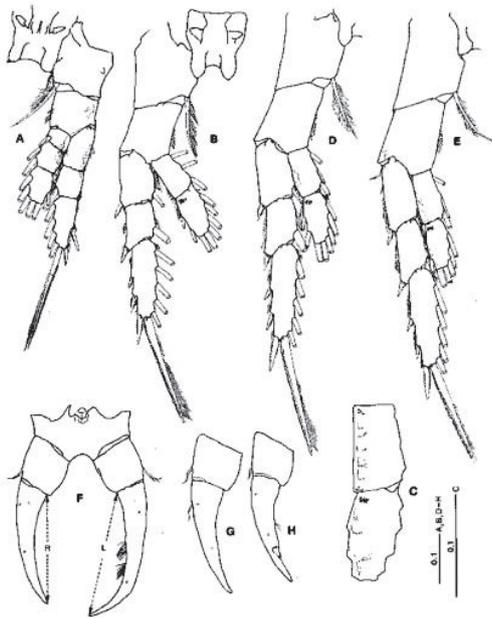
*Tortanus (Eutortanus) derjugini* Smirnov, 1935

Fig. 4

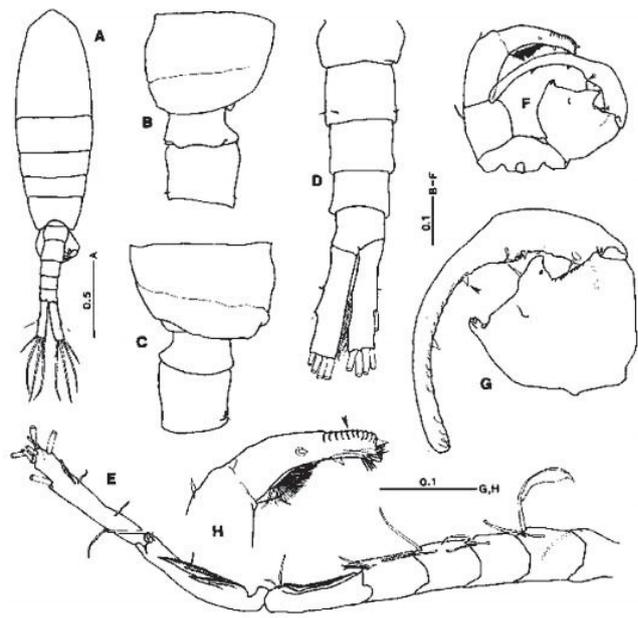


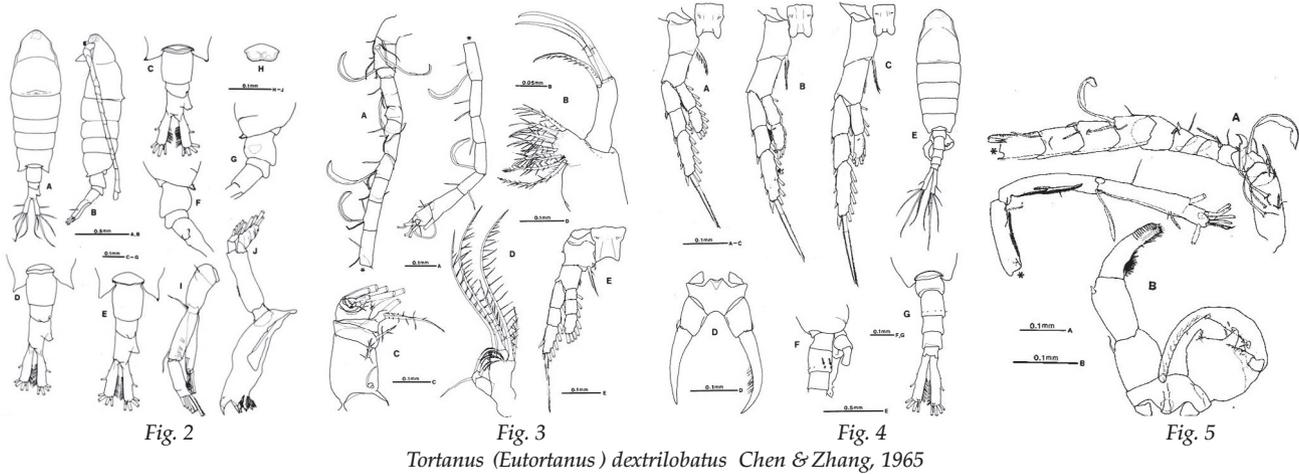
Fig. 5

*Tortanus (Eutortanus) derjugini* Smirnov, 1935

Ohtsuka et al., 1995: Fig. 4. Female. A/B. legs 1/2 (anterior); C. leg 2 endopod (setae omitted); D-F. legs 3–5 (anterior); G-H, variability of right leg 5 exopod; Scales in mm. Fig. 5. Male. A. habitus (dorsal); B/C. posterior prosome and urosomites 1/2 (lateral left/right side); D. urosome (ventral); E. right antennule; F. leg 5 (anterior). G. left leg 5 terminal exopod segment. Scales: mm.

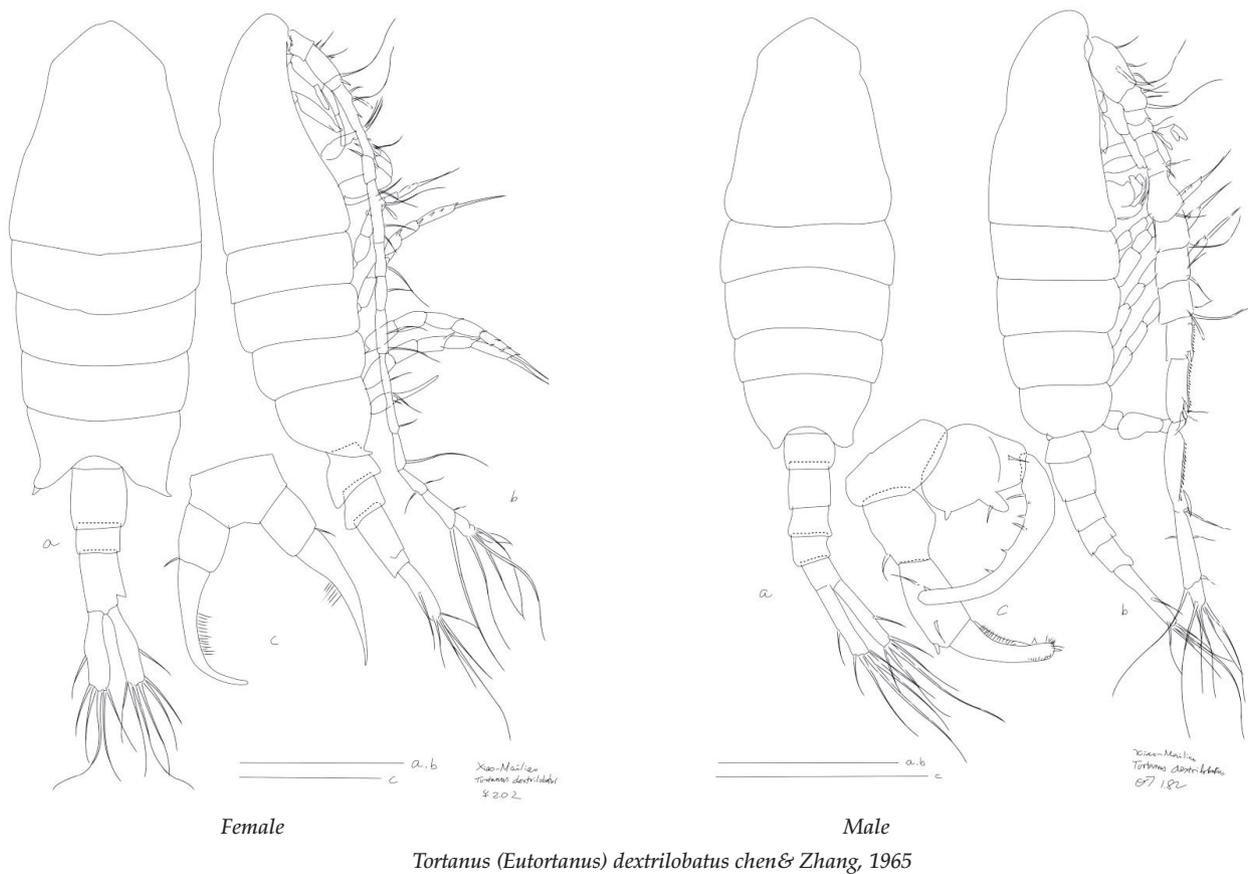
Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 26 2021].

*Tortanus (Eutortanus) dextrilobatus* Chen & Zhang, 1965 (Size: female, 1.54–2.25 mm; male, 1.53–2.05 mm)



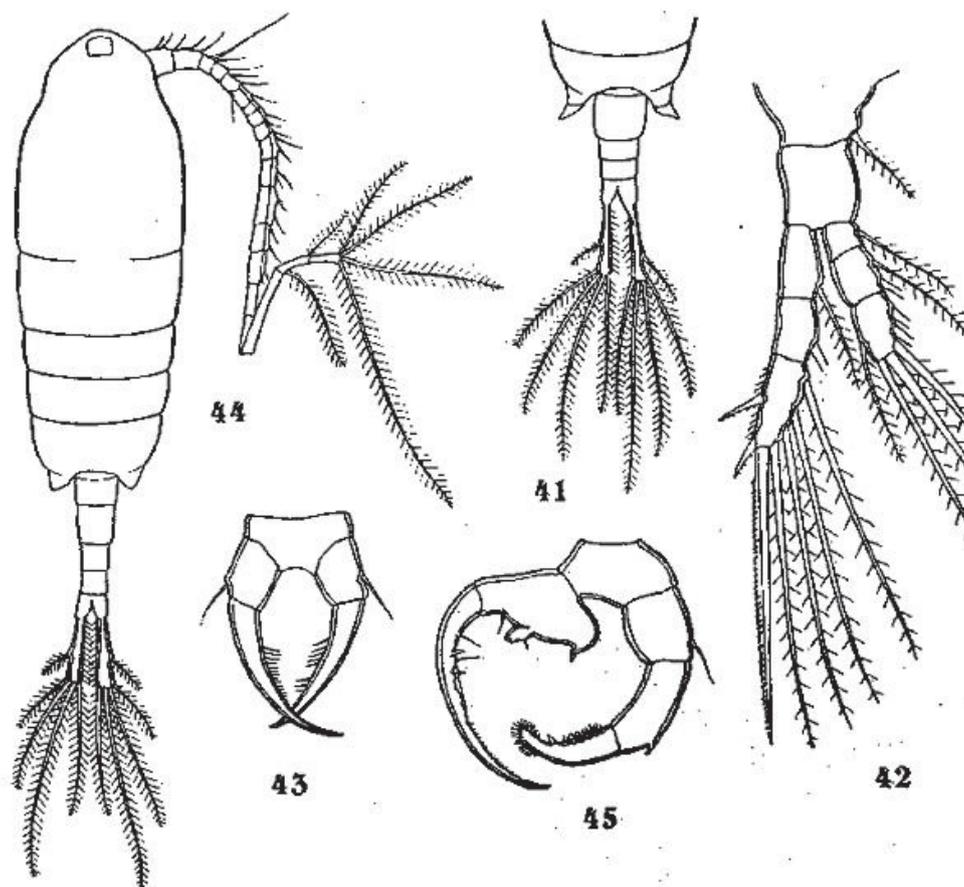
Ohtsuka et al., 1992: *Tortanus (Eutortanus) dextrilobatus* Chen & Zhang, 1965, fig. 2. A/B. habitus (dorsal/lateral); C-E. pediger 5 & urosome (dorsal); F/G. pediger 5 & urosome (lateral right/left); H. genital operculum; I. antenna; J. mandible. Fig. 3. Female. A. antennule; B. maxillule; C. maxilla; D. maxilliped; E. leg 1. Fig. 4. Female. A-D. legs 2–5 (anterior). Male. E. habitus (dorsal); F/G. pediger 5 & urosome (lateral/dorsal). Fig. 5. Male. A. right antennule; B. leg 5 (anterior).

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 16 2021].

*Tortanus (Eutortanus) dextrilobatus* Chen & Zhang, 1965

Original. Female, 2.02 mm, Taiwan Strait (23°50'N, 120°10'W): a/b. habitus dorsal/lateral); c. leg 5, posterior. Scales: a, b = 0.5 mm; c = 0.2 mm. Male, 1.82 mm, Taiwan Strait (23°50'N, 120°10'W): a/b. habitus (dorsal/lateral); c. leg 5. (posterior). Scales: a, b = 0.5 mm; c = 0.2 mm.

*Tortanus (Eutortanus) sheni* Hülsemann, 1988 (Size: female, 1.57 mm; male, 1.46 mm)



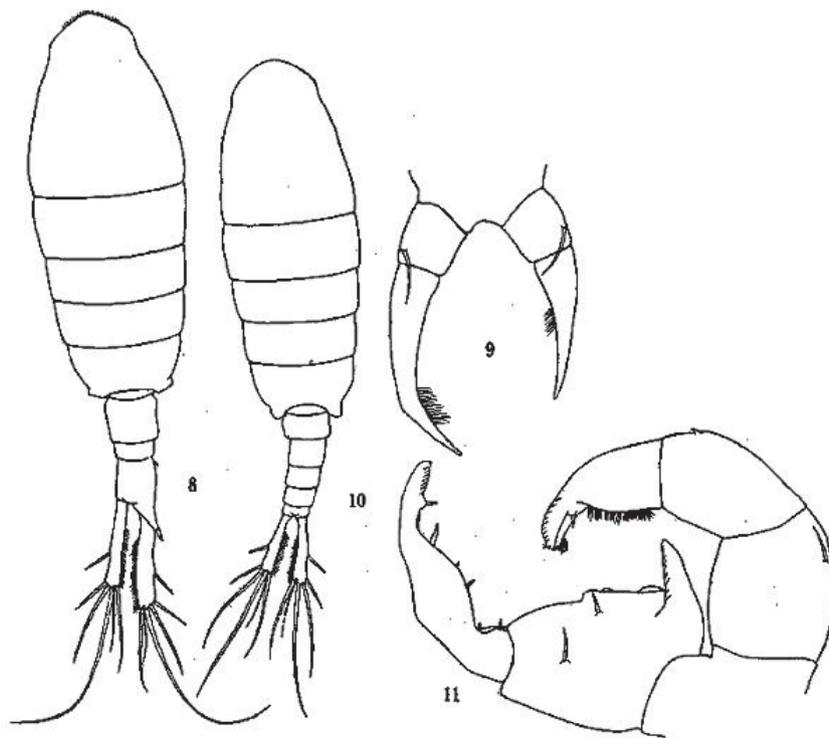
Shen & Lee, 1983

*Tortanus (Eutortanus) sheni* Hülsemann, 1988

Shen & Lee, 1983: figs. 41–45. *Tortanus (Eutortanus) sheni* Hülsemann, 1988, Female (South China Sea: northern Luichow Peninsula, Guangdong Province). 41. pediger 5 and urosome (dorsal); 42. leg 1; 43. leg 5. Male. 44. habitus (dorsal); 45. leg 5 (anterior).

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 26 2021].

*Tortanus (Eutortanus) spinicaudatus* Shen & Bai, 1956 (Size: female, 1.44–2.17 mm; male, 1.30–1.80 mm)

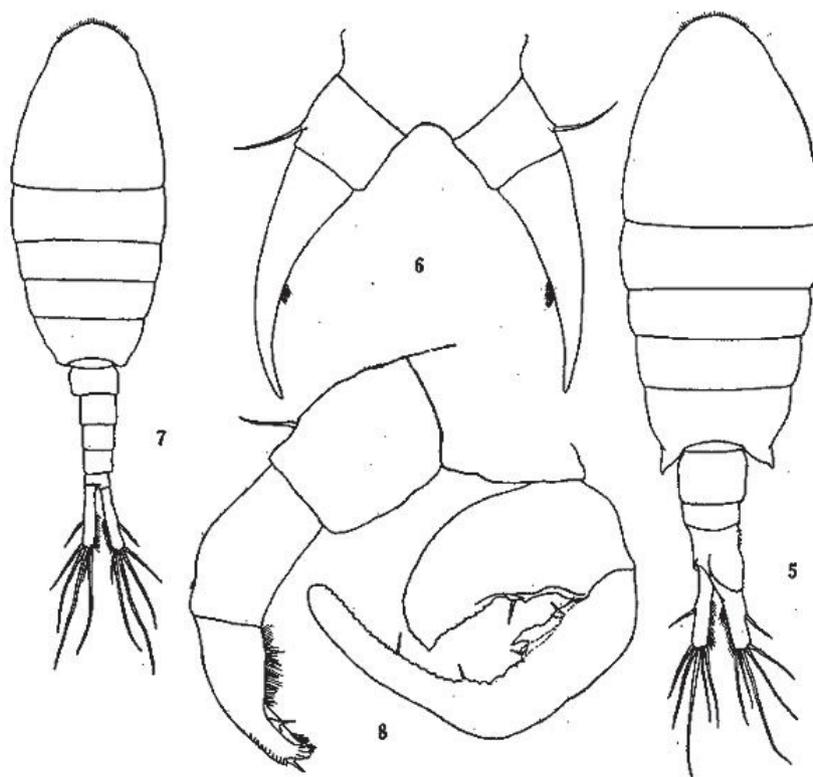


*Tortanus (Eutortanus) spinicaudatus* Shen & Bai, 1956

Chen & Zhang, 1965: pl. 51. *Tortanus (Eutortanus) spinicaudatus* Shen & Bai, 1956, Female (from East China Sea). 8. habitus (dorsal); 9. leg 5 (posterior); *Tortanus (Eutortanus) spinicaudatus* Shen & Bai, 1956, female 10. habitus (dorsal); 11. Leg 5 (posterior).

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 16 2021].

*Tortanus (Eutortanus) vermiculus* Shen, 1955 (Size: female, 1.83–2.40 mm; male, 1.85–2.00 mm)



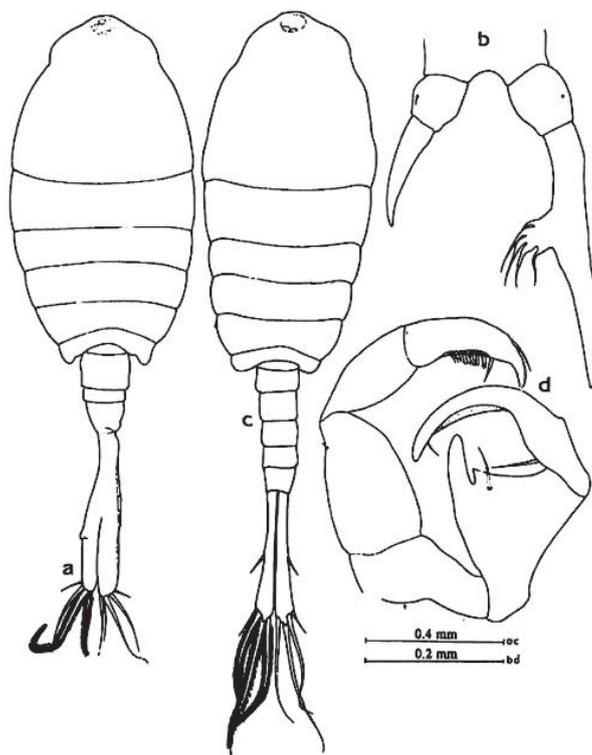
Chen & Zhang, 1965

*Tortanus (Eutortanus) vermiculus* Shen, 1955

Chen & Zhang, 1965: pl. 52. *Tortanus (Eutortanus) vermiculus* Shen, 1955, Female (from East China Sea). 5. Habitus (dorsal); 6. Leg 5 (posterior). Male. 7. Habitus (dorsal); 8. Leg 5 (posterior).

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 16 2021].

*Tortanus (Tortanus) barbatus* (Brady, 1883) (Size: female, 1.32–2.10 mm; male, 1.05–1.22 mm)

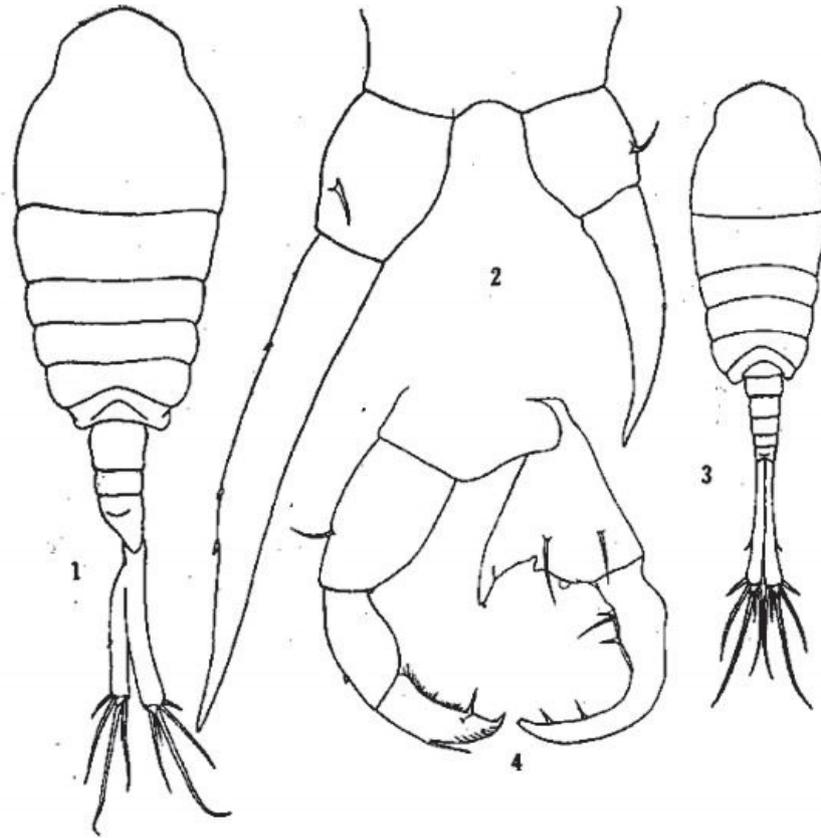


*Tortanus (Tortanus) barbatus* (Brady, 1883)

Mulyadi, 2004: fig. 91. *Tortanus (Tortanus) barbatus* (Brady, 1883), Female (from Java). a. habitus (dorsal); b. leg 5 (anterior). Male. c. habitus (dorsal); d. leg 5 (anterior).

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 16 2021].

*Tortanus (Tortanus) forcipatus* Giesbrecht, 1889 (Size: female: 1.09–2.00 mm; male, 0.94–1.17 mm)

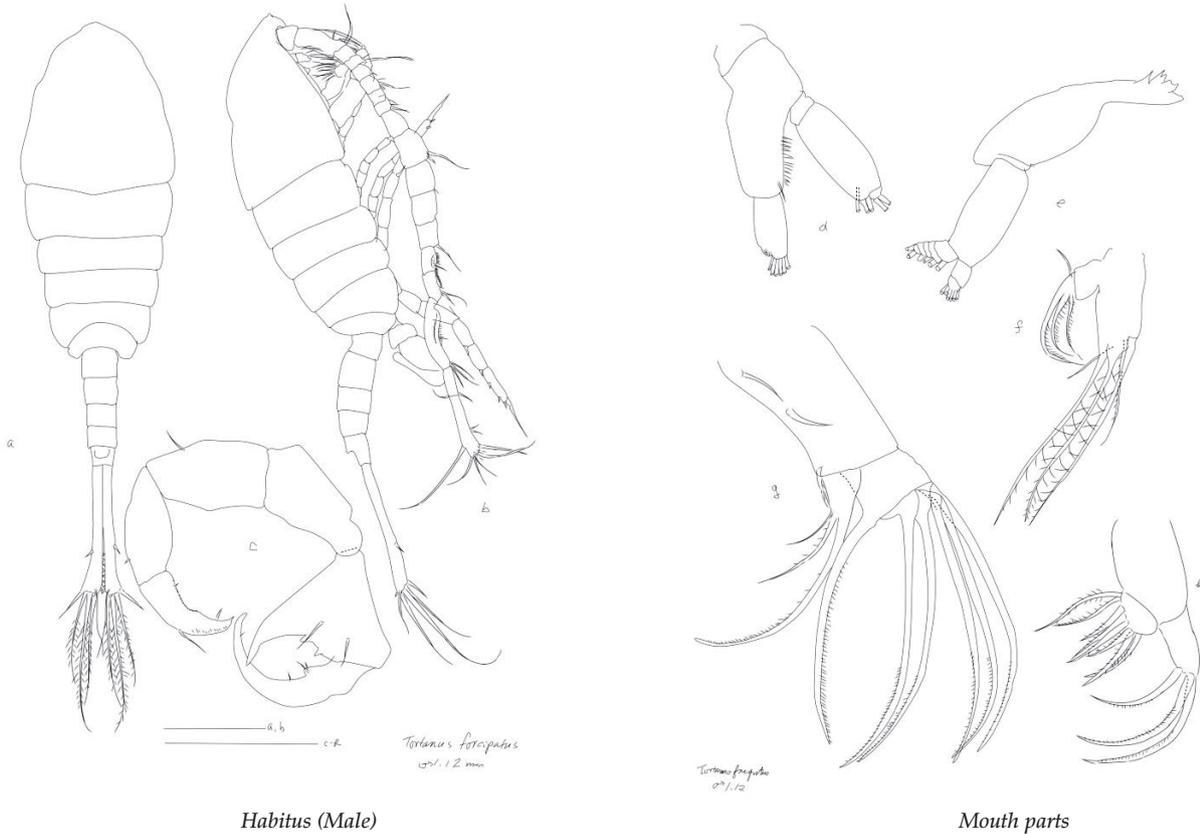


*Tortanus (Tortanus) forcipatus* Giesbrecht, 1889

Chen & Zhang, 1965: pl. 52. *Tortanus (Tortanus) forcipatus* Giesbrecht, 1889, Female (from East China Sea). 1. habitus (dorsal); 2. leg 5 (posterior). Male. 3. habitus (dorsal); 4. leg 5 (posterior).

Adapted from Razouls C., de Bovée F., Kouwenberg J. and Desreumaux N., 2005–2020. Diversity and Geographic Distribution of Marine Planktonic Copepods. Sorbonne University, CNRS. Available at <http://copepodes.obs-banyuls.fr/en> [Accessed May 16 2021].

*Tortanus (Tortanus) forcipatus* Giesbrecht, 1889 (Size: female, 1.09–2.00 mm; male, 0.94–1.17 mm)



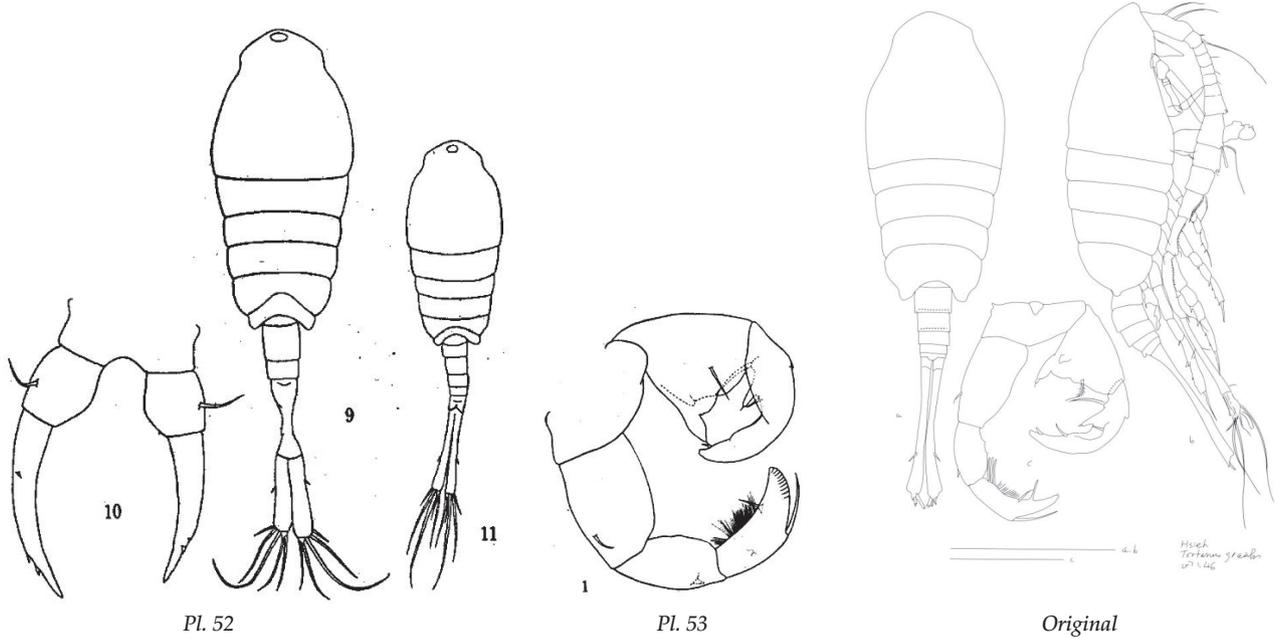
Habitus (Male)

Mouth parts

*Tortanus (Tortanus) forcipatus* Giesbrecht, 1889

Original. Male, 1.12 mm, Taiwan Strait. a/b. habitus (dorsal/lateral); c. leg 5 (posterior); Mouth parts. d. antenna. e, maxillule; f. maxilla; g. maxilla; h. maxilliped. Scales: a, b = 0.2 mm; c-h = 0.2 mm.

*Tortanus (Tortanus) gracilis* (Brady, 1883) (Size: female, 1.52–2.10 mm; male, 1.35–1.80 mm)



Pl. 52

Pl. 53

Original

*Tortanus (Tortanus) gracilis* (Brady, 1883)

Chen & Zhalng, 1965: pl. 52. *Tortanus (Tortanus) gracilis* (Brady, 1883), Female (from East China Sea). 9. Habitus (dorsal); 10. Leg 5 (posterior). Male. 11. Habitus (dorsal). Pl. 53. Male. 1. Leg 5 (posterior)

Original. *Tortanus (Tortanus) gracilis* (Brady, 1883), Male, 1.46 mm, Taiwan Strait (26°10'N, 120°15'E): a/b. habitus (dorsal/lateral); c. leg 5 (posterior). Scales: a, b = 0.5 mm; c = 0.2 mm.