

A new *Scabrotrophon* (Gastropoda: Muricidae) from Hawaii and discussion about the generic classification of *Boreotrophon kamchatkanus* Dall, 1902, a related species

Roland Houart¹

Institut royal des Sciences naturelles de Belgique
Rue Vautier, 29, 1000 Bruxelles
BELGIUM
roland.houart@skynet.be

Robert Moffitt

National Oceanic and Atmospheric Administration (NOAA)
National Marine Fisheries Service
Pacific Islands Fisheries Science Center (PIFSC)
2570 Dole Street
Honolulu, HI 96822 USA
robert.moffitt@noaa.gov

ABSTRACT

A small muricid collected at 414 m off the Hawaiian Island of Oahu is described and compared, on the basis of shell characters only, with a syntype and two other specimens of *Scabrotrophon kamchatkanus* (Dall, 1902) (new combination) from the Northern Pacific. SEM images of the operculum, radula, and of the penis are illustrated for the new species.

Genus *Scabrotrophon* McLean, 1996

Type species by original designation: *Trophon maltzani* Kobelt and Kuster, 1878, Northeastern Pacific.

Scabrotrophon hawaiiensis new species
Figures 1–4, 14–17

Boreotrophon truncatus (Strom, 1768) look alike—Moffitt, 2008: 7, text-fig.

INTRODUCTION

The discovery of a small muricid found with a sediment collector retrieved from 414 m in the Makapuu precious coral bed, situated in the channel between the islands of Oahu and Molokai in the Hawaiian Archipelago led to a note by Moffitt (2008: 16) and the search of its true identity. The species was first illustrated as “*Boreotrophon truncatus* (Strom, 1768) look alike”, but further investigations proved it to be a new species closely related to *Scabrotrophon kamchatkanus* (Dall, 1902), an uncommon species from the North Pacific.

Abbreviations and Text Conventions: IP: Infra-sutural primary cord (primary cord on sutural ramp); P1: Shoulder cord; P2–P6: Primary cords of the convex part of the teleoconch whorl; s1–s6: Secondary cords of the convex part of the teleoconch whorl; example: s1 = secondary cord between P1 and P2; s2 = secondary cord between P2 and P3, etc.; USNM: National Museum of Natural History, Smithsonian Institution, Washington, DC, USA; RH: collection of Roland Houart.

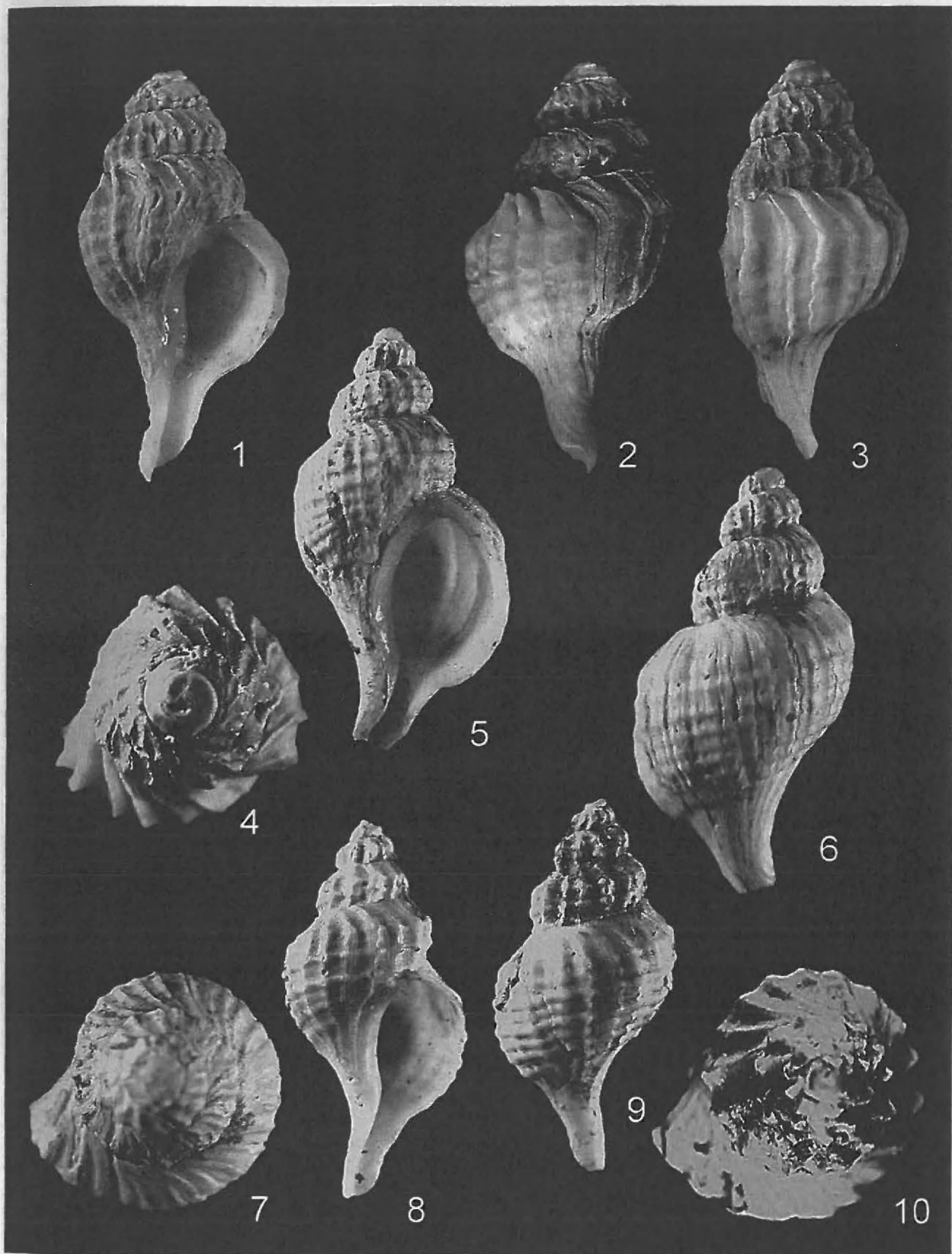
SYSTEMATICS

Family Muricidae Rafinesque, 1815
Subfamily Trophoninae sensu lato Cossmann, 1903

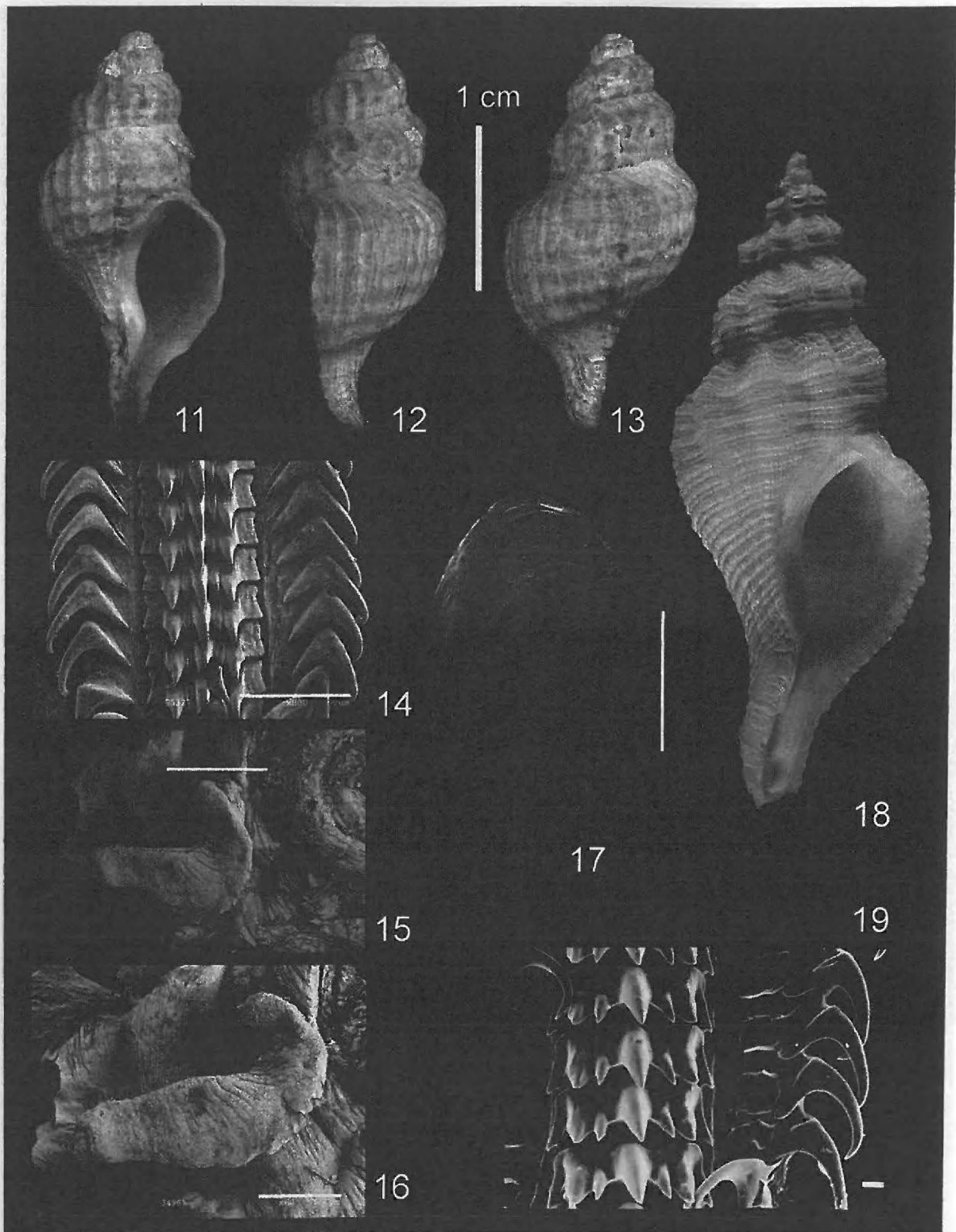
¹ Research Associate

Description: Shell medium-sized for the genus, holotype 18 mm in length. Width to length ratio 1.9:1. Biconical, broad, heavy, lamellose. Shoulder strongly sloping, straight or weakly concave. Shell grayish-white, aperture glossy white. Spire high (teleoconch whorls 1 and 2 missing.) Axial sculpture of last teleoconch whorl consisting of 17 irregular, moderately high, strong, narrow lamellae, more strongly developed at sutural ramp, particularly near suture. Penultimate and ante-penultimate whorls with same number but lower, more regular lamellae. Previous whorl eroded, other whorls missing. Spiral sculpture of 6 low, weak, primary cords, more obvious on axial sculpture. Ontogeny unknown. Low IP, only visible at last portion of last teleoconch whorl. Penultimate and antepenultimate whorls with P1 and P2. Sutural ramp smooth except axial lamellae. Aperture large, rounded-ovate. Columellar lip narrow, smooth, rim completely adherent. Outer lip of aperture smooth within. Siphonal canal moderately long, 36% of shell length, narrow, weakly abaxially bent at tip, broadly open. Operculum (Figure 17) inverted tear-shaped with apical nucleus and numerous concentric ridges. Radula (Figure 14) with a rachidian tooth bearing a long, central cusp, a narrow, short, lateral denticle and a long, broad, lateral cusp. The lateral denticles are separated. Lateral cusp weakly broader and shorter than central cusp. Lateral teeth sickle-shaped with broad base. Penis small, broad, flattened, approximately 2 mm in length (Figures 15, 16).

Type Material: Holotype USNM 1137634



Figures 1–10. *Scabrotrophon* species. 1–4. *Scabrotrophon hawaiiensis* new species, Makapuu Precious Coral Bed, 21°17.639' N, 157°31.966' W, with sediment collector. 414 m, 18 mm, Holotype USNM 1137634 5–10. *Scabrotrophon kamchatkanus* (Dall, 1902). 5–7. California, off Trinidad, North of Eureka, 41°4' N, 124°9' W, dredged at 100–200 fms (183–366 m), 21.3 mm, coll. RH. 8–10. California, off Eureka, 16.1 mm, coll. RH



Figures 11–19. *Scabrotrophon* species. 11–13. *Scabrotrophon kamchatkanus* (Dall, 1902). Southeast coast of Kamchatka, 29 m. 25 mm, illustrated syntype USNM 109178 (photo courtesy Y. Villacampa, USNM). 14–17. *Scabrotrophon hawaiiensis* new species (SEM courtesy A. Warén). 14. Radula. Scale bar = 50 μ m. 15–16. Penis. Scale bars: Figure 15 = 1 mm; Figure 16 = 500 μ m. 17. Operculum (scale bar 2 mm). 18–19. *Scabrotrophon maltzani* (Kobelt and Kuster, 1878). 18. British Columbia, Egmont, dredged 31 m, coll. RH. 19. Radula (scale bar 10 μ m) (SEM A. Warén)

Type Locality: Makapuu Precious Coral Bed, 21°17.639' N, 157°31.966' W, collected with a sediment collector retrieved on Hawaii Undersea Research Laboratory PISCES V submersible dive P5-687, 414 m.

Distribution: Currently only known from the type locality.

Remarks: Another species of Trophoninae sensu lato, *Trophonopsis kayae* Habe, 1981, was described from deep water in Hawaii but it is not related to *S. hawaiiensis* new species and is more akin to *T. polycyema* Kuroda, 1953, from Japan and Fiji (Houart and Héros, 2008: 466). To our knowledge, only one species, living in the northeastern Pacific, *Scabrotrophon kamchatkanus*, is closely related. However, in *S. kamchatkanus* the spiral cords are comparatively broader and more strongly developed, obviously crossing the low axial lamellae. There are 5 primary spiral cords on the last teleoconch whorl in the holotype (P1–P5) with some secondary cords in other specimens examined [P1, s1, P2, s2, P3, (s3), P4, P5]. The penultimate and ante-penultimate whorls bear 3 or 4 cords, probably P1, s1, P2, (s2), the shoulder ramp is more slightly sloping in all specimens, and narrower. The axial lamellae in *S. kamchatkanus* are lower, occasionally almost indistinct, and the siphonal canal is shorter relatively to the height of the last teleoconch whorl. The operculum is less triangular, having a more ovate outline. The radula morphology and the penis are unknown in *S. kamchatkanus*.

Scabrotrophon kamchatkanus (Dall, 1902) **new combination**
Figures 5–10, 11–13

Boreotrophon kamchatkanus Dall, 1902: 541; Kosuge, 1972: pl. 8, fig. 6 (illustrated syntype).

Neptunea kamchatkana—Dall, 1921: 111, pl. 10, fig. 7 (syntype).

Trophonopsis kamchatkanus (var.)—Kuroda, 1953: 189; Tiba and Kosuge, 1985: 29, figs 1 (illustrated syntype), 2.

Trophonopsis kamchatkana—Higo et al.: 1999: 203; 2001: 62, fig. G2223 (illustrated syntype); Tsuchiya, 2000: 401, fig. 190.

Type Material: Illustrated syntype USNM 109178 (Figures 11–13); other syntypes USNM 635673 (Kantor and Sysøev, 2006: 148).

Type Locality: Dredged by the U.S. Fish Commission steamer *Albatross* on the southeast coast of Kamchatka, at station 3644, in 96 fms, shelly bottom, temperature 33°F (=0.6°C, Dall, 1902: 542). The depth of St. 3644 is erroneous. In checking the original publication, the depth was listed as 96 feet (which is 16 fathoms). This was transcribed as 96 fms on a label that had depth pre-printed in fathoms. It seems now clear that the correct depth for St. 3644 is 96 ft (= 16 fms or 29 m) (Harasewych, in litt.).

Other Material Examined: California, off Trinidad, North of Eureka, 41°4' N, 124°9' W, dredged at 100–200

fms (183–366 m), ex. R. Talmadge coll., coll. RH (Figures 5–7); off Eureka, ex. R. Talmadge coll., coll. RH (Figures 8–10).

Distribution: The Sea of Kashima-nada, Japan to the Bering Sea (Tsuchiya, 2000) and off Eureka, California (coll. RH), in 29–183 m. The maximum depth of 1495 m given by Tsuchiya (2000: 401) seems doubtful for living specimens.

DISCUSSION

The decision to include both species in *Scabrotrophon* is based on the shell morphology and the comparison with the type species of *Scabrotrophon* (Figures 18–19), a genus restricted to the Northern Hemisphere. As stated by McLean (1996: 93), the genus *Boreotrophon* is characterized by a dominant axial sculpture and the spiral sculpture (however rarely present in *Boreotrophon*) does not override the axial ribs. *Trophonopsis* has dominant axial sculpture in early whorls and the very prominent axial ribs of the type species *Trophonopsis muricatus* (Montagu, 1803) are overridden by spiral cords that form beads at intersection with the axial sculpture. Moreover the outer apertural lip is strongly denticulate in *Trophonopsis*. The generic allocation of other Northeastern "*Boreotrophon*" or "*Trophonopsis*" species probably needs to be reviewed.

ACKNOWLEDGMENTS

We are most grateful to M.G. (Jerry) Harasewych and Yolanda Villacampa (National Museum of Natural History, Smithsonian Institution) for the photographs of the syntype of *S. kamchatkanus*, to J. Harasewych for having solved the "mystery" of the depth of station 3644 (type locality). We are also most indebted to Anders Warén (Natural History Museum, Stockholm, Sweden) for preparation and SEM photographs of the radula, operculum, and penis of the new species. We also thank Dr. Frank Parrish (NOAA, PIFSC) who was the principal investigator on the PISCES V dive P5-687 as well as the Hawaii Undersea Research Laboratory and the staff and crews of the PISCES V and R/V KA'IMIKAI-O-KANALOA, without whom this species would not have been collected. Finally we are very thankful to Yuri I. Kantor (Severtsov Institute of Ecology and Evolution of Russian Academy of Sciences, Moscow, Russia) for his useful remarks.

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Sponsored in part by the State of Florida, Department of State, Division of Cultural Affairs, the Florida Arts Council and the National Endowment for the Arts.



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