

A NEW SPECIES OF *FALCAUSTRA* (NEMATODA: KATHLANIIDAE) IN *NACTUS PELAGICUS* (SQUAMATA: GEKKONIDAE) FROM TANNA ISLAND, VANUATU

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ABSTRACT: *Falcaustra tannaensis* n. sp. (Ascaridida: Kathlaniidae) from the large intestine of *Nactus pelagicus* (Squamata: Gekkonidae) is described and illustrated. *Falcaustra tannaensis* represents the first species from Oceania to be assigned to the genus and is distinguished from other species of *Falcaustra* by the distribution pattern of caudal papillae (8 precloacal, 2 adcloacal, 10 postcloacal, and 1 median), length of spicules (2.43–2.68 mm), and presence of a pseudosucker.

During the necropsy of geckos collected 8–22 September 2005 on Tanna Island, Vanuatu, 6 specimens of the pelagic gecko, *Nactus pelagicus* Duméril, 1858, were found to harbor a total of 19 (8 males, 11 females) nematodes of an undescribed species of *Falcaustra* Lane, 1915. *Nactus pelagicus* is a medium-sized, forest floor gecko, actually, a complex of unisexual and bisexual populations, widely distributed on the islands of Oceania and the southwest Pacific (Zug and Moon, 1995). There are, to our knowledge, no previous reports of helminths from this lizard. Species of *Falcaustra* Lane, 1915 occur in the digestive tracts of fish, amphibians, and reptiles. Of the 86 nominal species (Bursey, Goldberg, and Bauer, 2009; Bursey and Rivera, 2009; Hasegawa and Nishikawa, 2009), none has been identified from South Pacific Islands. The purpose of this paper is to describe the 87th species assigned to *Falcaustra*.

MATERIALS AND METHODS

Geckos were killed within 12 hr of capture, preserved in 10% formalin, and stored in 70% ethanol. The body cavity was opened by a longitudinal incision and the digestive tract was removed and opened. The esophagus, stomach, and small and large intestines were examined for helminths, using a dissecting microscope. Helminths were placed on a glass slide in a drop of glycerol and a coverslip was added; identification was made from these temporary wet mounts. Drawings were made with the aid of a microprojector (Model 358B, Bausch and Lomb, Rochester, New York). Measurements are given in micrometers unless otherwise stated, with mean \pm 1 SD and range in parentheses. Geckos were deposited in the Louisiana State University Museum of Zoology (LSUMZ 90545, 90584–90586, 90622, 90626).

DESCRIPTION

Falcaustra tannaensis n. sp.

(Figs. 1–9)

General: Nematodes with cylindrical body tapering anteriorly and posteriorly. Thin cuticle with fine, regular striations; depending upon depth of focus, both transverse striations of the cortical zone and longitudinal striations of the basal zone can be seen (Fig. 9). Mouth opening triangular, surrounded by 3 large lips, each with 2 papillae, amphidial pore at lateral edge of each subventral lip. Lip support lightly sclerotized. Cervical papillae slightly posterior to nerve ring, inconspicuous. Esophagus with ovoid isthmus, spherical bulb. Excretory pore at level of isthmus. Tail conical, pointed in both sexes.

Male (based on holotype and 4 paratypes): Length 13.0 \pm 1.6 mm (11.0–14.5 mm); width at level of esophageal–intestinal junction 559 \pm 36

(510–599). Pharynx 120 \pm 5 (116–128) long, corpus 1,668 \pm 225 (1,403–1,913) long, isthmus 179 \pm 3 (177–183) long and 128 \pm 4 (122–134) wide, bulb 178 \pm 5 (171–183) long and 204 \pm 13 (189–220) wide. Nerve ring 297 \pm 17 (285–323), excretory pore 1,869 \pm 114 (1,792–2,048) from anterior end, respectively. Tail 383 \pm 16 (370–408) long, conical, pointed tip. One ellipsoid pseudosucker present; center of pseudosucker approximately 2.4 mm from posterior end of body. Caudal musculature divided into 2 groups: approximately 40 (39–42) pairs of obliquely directed muscle bands in posterior group and approximately 24 (22–26) pairs in anterior group attached to pseudosucker lip. Single median papilla approximately 30 anterior to cloacal meatus. Ten pairs of caudal papillae, 4 pairs precloacal, 1 pair adcloacal, 5 pairs postcloacal (2 lateral, 3 ventral). Phasmids situated laterally on tail midway between lateral pairs of postcloacal papillae. Vas deferens parallel to spicules. Testis long, tapering, extending anteriorly into first third of body before turning posteriorly to terminate slightly posterior to midbody. Spicules similar, 2,560 \pm 97 (2,432–2,688) in length, strongly curved, pointed, alate; gubernaculum weakly sclerotized, 234 \pm 7 (226–244) in length.

Female (based on allotype and 4 paratypes): Length 16.2 \pm 2.4 mm (14.2–20.2 mm); width at level of esophageal–intestinal junction 640 \pm 82 (510–714). Pharynx 124 \pm 11 (110–140) long, corpus 1,948 \pm 200 (1,785–2,295) long, isthmus 207 \pm 5 (201–214) long and 133 \pm 3 (128–137) wide, bulb 186 \pm 7 (178–195) long and 213 \pm 14 (195–232) wide. Nerve ring 344 \pm 38 (306–408) and excretory pore 2,158 \pm 227 (1,964–2,550) from anterior end. Tail 857 \pm 69 (765–944) long. Vulva transverse slit, slightly salient, 5.1 \pm 0.8 mm (4.5–6.6 mm) from posterior end; ovjector with weakly developed muscular walls, 1,785 \pm 97 (1,658–1,913) in length, directed anterodorsally and giving rise to 2 opposing uteri. Uteri lying within second and third quarters of body. Eggs oval, 50 \pm 4 (43–55) \times 44 \pm 2 (40–49), thick shelled, in early stages of cleavage.

Taxonomic summary

Type host: The pelagic gecko, *Nactus pelagicus* Duméril, 1858. Symbiotype LSUMZ 90585, collected 15 September 2005.

Type locality: Tanna Island (19°30'58"S, 169°26'04"E), Vanuatu.

Site of infection: Large intestine.

Type specimens: Holotype male, USNPC 102768; allotype female, USNPC 102769; paratypes 1 male, 1 female, USNPC 102770.

Etymology: The new species is named for the geographic area of collection.

Remarks

The structure of the esophagus of *F. tannaensis* n. sp. allows its assignment to Kathlaniidae Lane, 1914, subfamily Kathlaniinae Lane, 1914. *Falcaustra* was established by Lane (1915) when he redescribed *Oxysoma falcatum* Linstow, 1906, a nematode from the intestine of the Indian black turtle, *Nicorina trijuga* (Schweigger, 1812) (currently *Melanochelys trijuga*), but then discovered *Oxysoma* to be preoccupied. Chabaud (1978) characterized *Falcaustra* as having simple lips, a pharynx, and a generally spherical isthmus immediately anterior to the esophageal bulb. Lane (1915) described the posterior portion of the esophagus to be hour-glass shaped, while Chitwood and Chitwood (1974) stated that the isthmus in kathlaniid nematodes is “subspherical.” These characters are evident in *F. tannaensis* n. sp. (Fig. 1), although “ovoid” might be a more apt description in this case.

Species of *Falcaustra* are distinguished on the basis of characteristics of the male, i.e., number and arrangement of caudal papillae, length of

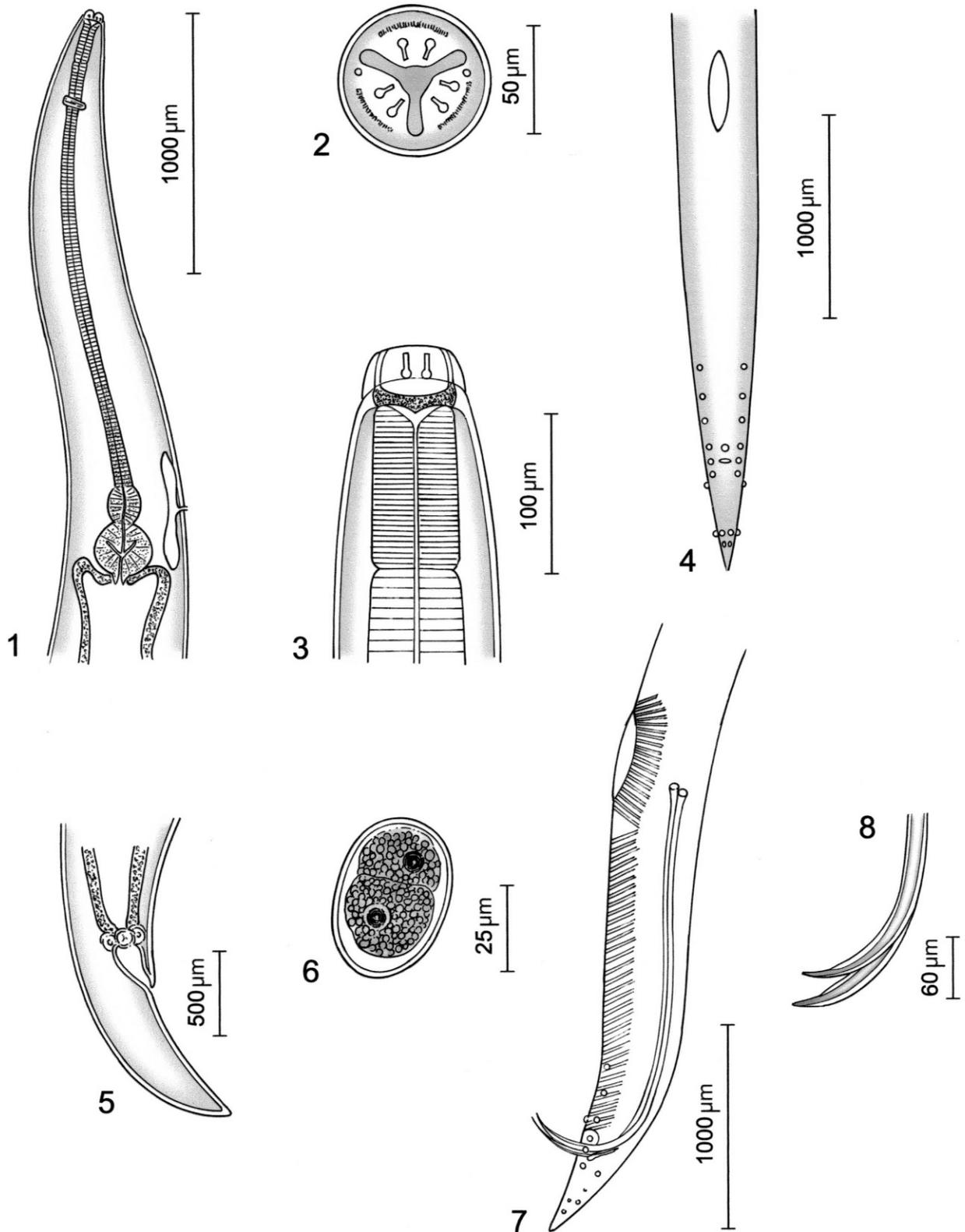
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FIGURES 1–8. *Falcaustra tannaensis* n. sp. (1) Female, anterior end, lateral view. (2) Female, end face view. (3) Female, anterior end, dorsal view. (4) Male, posterior end ventral view (diagrammatic). (5) Female, posterior end, lateral view. (6) Egg. (7) Male, posterior end, lateral view. (8) Male, spicules, distal ends.

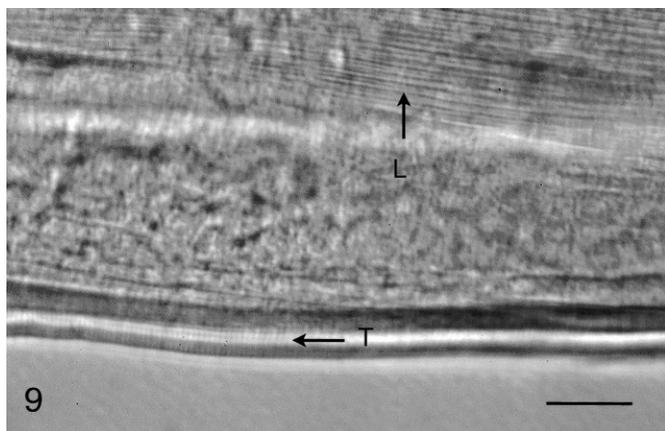


FIGURE 9. *Falcaustra tannaensis* n. sp. Cuticular striations. Transverse striations of the cortical zone (T), longitudinal striations of the basal zone (L). Bar = 20 μ m.

spicules, and presence or absence of a pseudosucker (see Table I of Bursey and Rivera, 2009). Two species should be added to that table, i.e., *Falcaustra desilvai* Bursey, Goldberg and Bauer, 2009, type host *Cnemaspis tropidogaster*, Sri Lanka, body length 6.3–8.0 mm, spicule length 0.96–1.05 mm, papillae pattern 12:2:10 + 1, pseudosucker absent, and *Falcaustra odaiensis* Hasegawa and Nishikawa, 2009, *Onychodactylus japonicus*, Japan, body length 7.5–12.5, spicule length 0.54–0.74 mm, 3–5 pseudosuckers present. Of the nominal species, *F. tannaensis* is most similar to *F. annandalei* (Baylis and Daubney, 1922), *F. chelydrae* Harwood, 1932, *F. kaveri* (Karve and Naik, 1951), *F. kempfi* (Baylis and Daubney, 1922), *F. manouriacola* Bursey and Rivera, 2009, *F. purvisi* (Baylis, 1933), and *F. simpsoni* (Johnston and Mawson, 1944) in that these 8 species have spicules at least 2 mm in length and 1 pseudosucker (see Table I, Bursey and Rivera, 2009). However, *F. chelydrae* and *F. manouriacola* have spicules greater than 3 mm in length; *F. kaveri* has 11 pairs of caudal papillae; *F. kempfi* has 9 pairs of caudal papillae. The remaining species have 10 pairs of caudal papillae: *Falcaustra annandalei* and *F. simpsoni* have no adcloacal papillae and *F. purvisi* has 3 pairs of adcloacal in contrast to the 1 pair of adcloacal papillae in *F. tannaensis*. Additional differences include 6 precloacal papillae in *F. annandalei* in contrast to 4 precloacal in *P. tannensis* and a pear-shaped isthmus in *F. simpsoni* in contrast to the ovoid isthmus in *P. tannensis*. The new species should be added to Table I of Bursey and Rivera (2009): *F. tannensis*, type host, *Nactus pelagicus*, Vanuatu, spicule length 2.43–2.69 mm, papillae pattern 8–2–10 + 1, and a single pseudosucker.

DISCUSSION

A number of reports of gastrointestinal helminths of lizards from Oceania are available (Goldberg and Bursey, 1991; Hanley et al., 1995; Bursey and Goldberg, 1996a, 1996b; Dailey et al., 1998; Goldberg et al., 1998; Bursey and Goldberg, 1999, 2000; Goldberg et al., 2000; Bursey and Goldberg, 2001; Goldberg and Bursey, 2002; Goldberg et al., 2005). However, this is the first report of a species of *Falcaustra* from islands of the South Pacific region. The closest congener would be an Australian species. Little is known about the lifecycle of species of *Falcaustra*: Bain and Philippon (1969) reported kathlaniid-type larvae in the Malpighian tubules of black flies, Moravec et al. (1995) identified larvae from fish as *Falcaustra* spp., and Bartlett and Anderson (1985) described third-stage larvae of *Falcaustra* sp. in the tissues of freshwater snails. These reports led Anderson (2000) to conclude that kathlaniids in the lower vertebrates possibly develop to the third stage outside a host and then invade various invertebrates, which serve as paratenic hosts.

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