DESCRIPTION OF *ANATONCHUS FRANCOLAMBERTII* SP. N. FROM IRAN

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Summary. *Anatonchus francolambertii* sp. n. collected from the vicinity of the Caspian Sea, Iran, is described and illustrated. It is characterized by having 2.15-2.58 mm long body, large globular buccal cavity measuring 52-55 × 42-55 µm, pharyngo-intestinal junction with prominent tubercles, amphidelphic female genital system, prominent pre- and post-vulval papillae, elongate-conoid tail, well developed caudal glands with a terminal opening, and males having 91-98 µm long spicules, 11-12 ventromedian supplements.

Keywords: Description, Mononchida, new species, taxonomy.

During our studies on Mononchida, soil samples collected from around the roots of tea plants at Lahijan, near the Caspian Sea, Iran, yielded a new species of the genus *Anatonchus* (Cobb, 1916) De Coninck, 1939. It has been described and illustrated in detail here as *A. francolambertii* sp. n.

MATERIAL AND METHODS

The nematodes were extracted from soil samples by a sieving and decanting method. Specimens obtained in water were killed and fixed in hot 4% FA, dehydrated in glycerol-alcohol by the slow method and mounted on slides in anhydrous glycerin. Measurements were taken using an ocular micrometer and drawings were made using drawing tube attached to a Nikon Optiphot-2 microscope.

DESCRIPTION

ANATONCHUS FRANCOLAMBERTII **sp. n.**
(Figs 1 and 2; Table 1)

Measurements. See Table I

Female. Body throughout anterior three-fourths of its length almost straight, posterior quarter gradually curved when fixed. Cuticle (outer and inner) smooth, 4-5 µm thick at mid body, 3-4 µm at tail. Lateral chords about one-third of body width at mid-body. Lip region marked off, distinctly wider than adjoining body, about three times as wide as high. Amphids cup-shaped, their apertures at 21-27 µm from anterior end. Buccal cavity wide, globular and massive; walls formed by two sets of strongly cuticularized plates: a vertical set of three plates each bearing a large tooth at its upper part, the apex lying at 31-39 µm or 57-65% from base of stoma. Below this lies a set of three oblique plates. All three teeth, sharply pointed, identical in shape and size, located at same level and directed posteriorly. Pharynx cylindrical, slightly expanded at extremities, but narrowing slightly at nerve ring. Width of pharynx 37-47 µm or about half of corresponding body width. Orifices of pharyngeal glands located as follows: dorsal at 270-305 µm from anterior end of body; first pair of subventral at 84-111 µm from orifice of dorsal gland and second pair 140-167 µm from first pair (n = 5). Pharyngeal lumen strongly cuticularized and thickened, broader at base of stoma. Pharyngo-intestinal junction tuberculate. Nerve ring at 123-161 µm from anterior end of body. Excretory pore at 175-193 µm from anterior end. Intestine nearly of the same width along the body, its lumen wide. Rectum 31-34 µm, slightly less than one anal body width. Vulva transverse. Pre- and post-vulval papillae present, their numbers variable: two to five pre- and two to four post-vulval. In holotype two pre- and two post-vulval present. Vagina thick-walled with distinct *pars refringens* appearing as four squarish pieces in lateral view. Genital system amphidelphic; both branches almost equally developed. Ovaries reflexed, measuring 44-74 µm (anterior) and 44-56 µm (posterior) with 10-15 oocytes. Oviduct joining ovary subterminally, anterior 106-196 µm and posterior 122-189 µm long. Uterus a wide tube, anterior 164-174 µm and posterior 145-170 µm. Distinct sphincter at oviduct-uterus junction. Tail elongate conoid, ventrally arcuate, gradually tapering, 7-8 anal body widths long; caudal glands well developed with their ducts leading to a terminal outlet. Caudal papillae one pair on each side.

Male. Similar to females in general morphology except for the posterior region being more strongly curved because of the presence of copulatory muscles. Buccal cavity massive, globular with strongly thickened walls; apex of dorsal tooth lying at 23-25 µm or 48-57.5%

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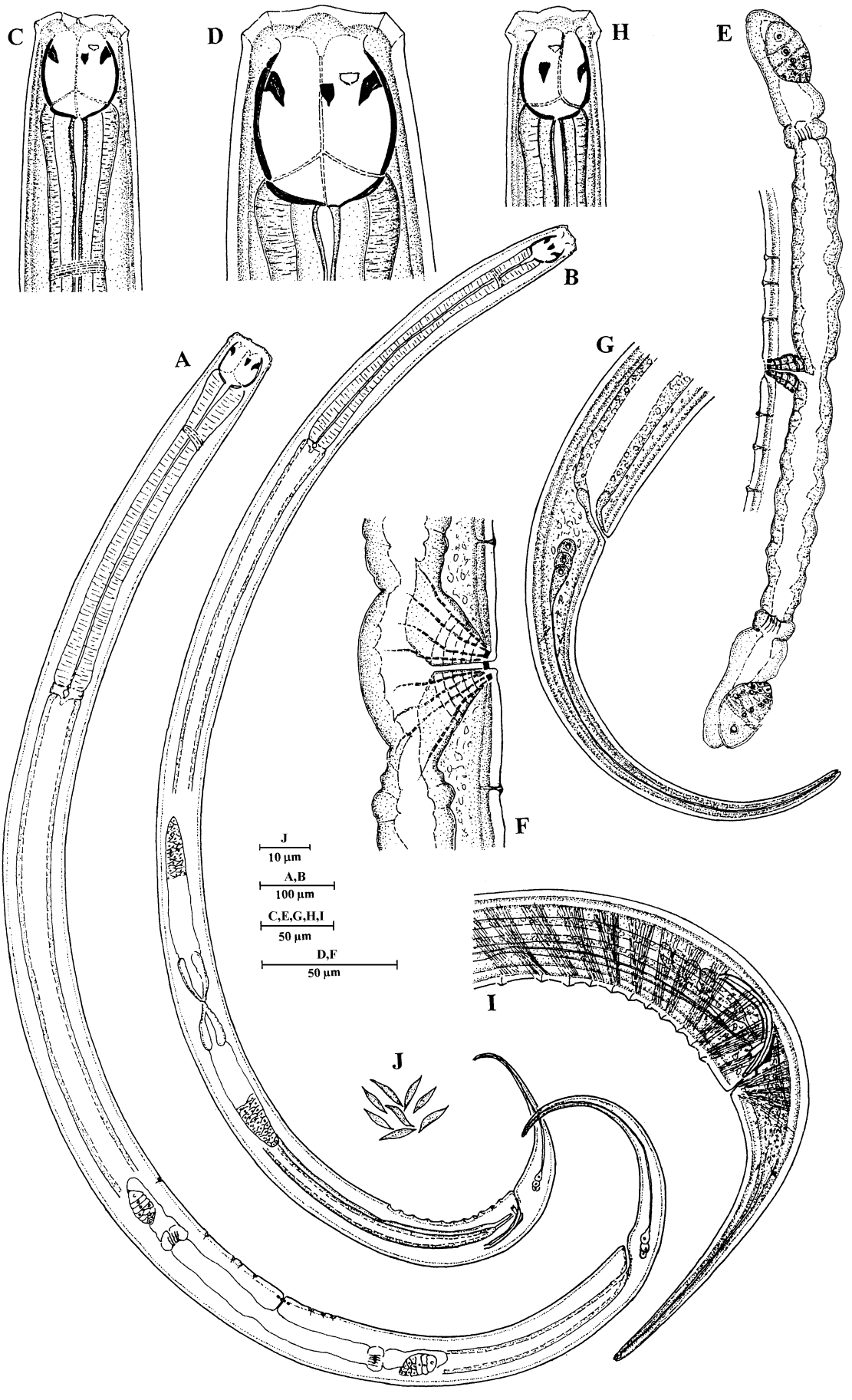

Fig. 1. *Anatonchus francolambertii* sp. n. A, entire female; B, entire male; C and D, anterior region of female; E, female gonads; F, vulval region; G, female tail; H, anterior region of male; I, male tail; J, spermatozoa.

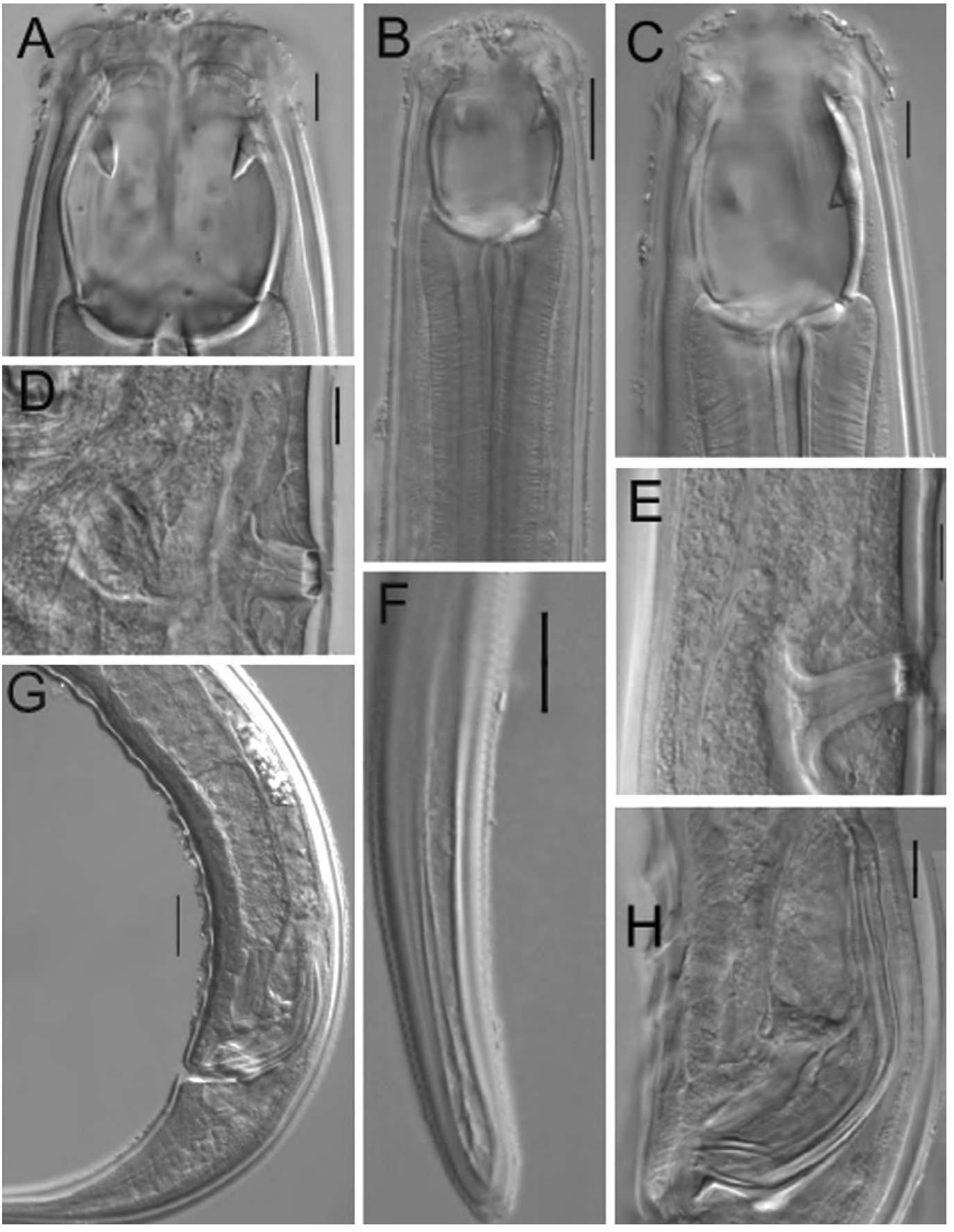

Fig. 2. *Anatonchus francolambertii* sp. n. (A-F). A and B, anterior region of female; C, anterior region of male; D and E, vulval region; F, female tail; G, male tail (ejaculatory glands); H, spicules. (Scale bars = 10 mm).

Table I. Measurements of *Anatonchus francolambertii* sp. n. All measurements in µm.

Character	Holotype female	Paratype females (n = 4)	Paratype males (n = 2)
Body length (L)	2157	2428-2588 (2502±80.67)	2140, 2335
Body width at midbody	66	70-85 (78±8)	61, 74.5
Body width at anus	43.5	43.5-48.5 (46.2±2.44)	52.5, 58.0
a	32.8	30.3-34.7 (32.1±2.33)	30.2, 31.3
b	3.97	4.3-4.5 (4.4±0.12)	4.6, 4.8
c	6.5	6.4-7.2 (6.75±0.40)	8.0, 8.3
c'	7.5	7.3-8.6 (8.0±0.66)	4.4, 5.0
V/T	63.2	60-62.5 (61.5±1.41)	39%, 29% ; 46%, 26%
G1	344	262-460(373.33±101.27)	
G2	291	235-435(347.66±101.70)	
Lip region width	56	51.5-69.5 (61.5±9.42)	42.5, 48.5
Lip region height	16.5	16.5-19.5 (18.5±1.68)	16.5, 21.0
Amphid aperture	6.5	5.8-7.7 (7.1±0.56)	7.0, 7.5
Position of amphid aperture from anterior end	21	21-27 (24.2±2.91)	19.5, 27.0
Position of amphid aperture from base of buccal cavity	46.5	43.5-53.5 (48.5±4.85)	34, 37
Buccal cavity length	51.5	51.5-55.0 (53.8±1.68)	43.5, 48.5
Buccal cavity width	41.5	43.5-55.0 (50.5±6.05)	31, 39
Dorsal tooth from base of buccal cavity	33	31-39 (35.5±4.03)	23, 25
Percentage of dorsal tooth from base of buccal cavity	64	57.0-64.5 (60.6±3.73)	48.0, 57.5
Neck length	543	528-591 (557±31.50)	460, 485
Nerve ring from ant. end	123	130-164 (151±18.59)	139, 155
Base of pharynx to vulva	819	873-970 (927±49.66)	-
Vulva to anus	465	562-611 (587±24.51)	-
Anterior genital branch	334	262-460 (373±101.28)	-
Vulva from anterior end	1364	1492-1621 (1564±65.79)	-
Posterior genital branch	291	236-435 (347±101.84)	-
Vagina depth	24	17.5-24.0 (22±3.92)	-
Rectum length	34	31-34 (32.6±1.48)	-
Tail length	330	356-378 (369±11.61)	257, 291
Spicules length			91, 98
Gubernaculum length			27, 29
Ventromedian supplements			11, 12
Lateral accessory piece			13, 15

from base of stoma. Gonads diorchic, each testis thin-walled containing many immature germ cells and elongated spindle-shaped spermatozoa, 7-8 µm long. The two testes join to form a common *vas deferens* which leads to the ejaculatory duct. Ejaculatory glands distinct, six pairs. Rectal glands indistinct. Both *vas deferens* and *ductus ejaculatoris* are thick-walled and granular in appearance. Spicules a little less than two anal body widths long, gubernaculum a quarter to a third of spicule length and lateral accessory pieces a seventh to a sixth of spicule length. Supplements 11-12. Tail elongate conoid, ventrally arcuate, gradually tapering, 4-5 anal body widths long.

Type habitat and locality. Soil around roots of tea plants *Camellia sinensis* (L.) Kuntze, tea gardens, Lahijan, near the Caspian Sea, Iran.

Type material. Holotype female on slide *A. francolambertii* sp. n. Iran 81/1; paratype females on slide *A. francolambertii* sp. n. Iran 81/2&3; paratype males on slide *A. francolambertii* sp. n. Iran 81/4 deposited in the Nematode collection of Department of Zoology, Aligarh Muslim University, Aligarh, India.

Diagnosis and relationships. *Anatonchus francolambertii* sp. n. is characterized by having 2.1-2.5 mm long body, wide lip region, cup-shaped amphids, buccal cavity wide, globular and massive, 52-55 × 42-55 µm, amphidelphic gonads, well developed pre-and post-vulval papillae, elongate conoid tail in both sexes and males having 91-98 µm long slender spicules, 27-29 µm long gubernaculum and 11-12 ventromedian supplements.

The new species appears to be closely related to *A. tridentatus* (de Man, 1876) De Coninck, 1939. *Ana-*

tonchus tridentatus has been recorded from several countries and a thorough survey of the published data indicates that they probably do not refer to a single species. The original description by de Man (1876) which was reproduced by Cobb (1917), as well as a re-study of the type material by Loof (1961) indicated a rather barrel-shaped buccal cavity with comparatively long proparietalia and the teeth slightly anterior to the middle of the buccal cavity. Andrassy's (1994) material from Hungary and that of Peneva *et al*. (1999) from Bulgaria also fit these descriptions and are in our opinion true *A. tridentatus*. What Mulvey (1961) described as *A. tridentatus* from California has a rather globular buccal cavity and a shorter proparietalia and these possess comparatively larger teeth. The Californian specimens clearly differ from European specimens in the shape of the buccal cavity. Our specimens from Iran, with a globular buccal cavity and small proparietalia do not fit into the true definition of *A. tridentatus*. In specimens from Europe, the proparietalia are 52-63% as long as interparietalia, (Fig. 7A of Andrássy (1994) and Fig. 4A, B and H of Peneva *et al.* (1999)), whereas in *A. francolambertii* sp. n. proparietalia are only about 20% as long as interparietalia. Further, in the European population the tail length does not exceed 300 µm (150-290 µm), whereas in the present population from Iran it is always more than 350 µm (c = 6.4-7.2 *vs* 7-12). Based on the above differences we are confident that the Iranian specimens are different from *A. tridentatus* and they are described here as *A. francolambertii* sp. n. in memory of the late Prof. Franco Lamberti who had himself collected this material from Iran in 2002 and one of us (MSJ) had accompanied him on this trip.

The new species also closely resembles *A. sympathicus* Andrássy, 1994, but differs from it in having comparatively larger buccal cavity (52-55 × 42-55 *vs* 48-51 × 33-34 µm) in having transverse vulva (*vs* longitudinal), in the nature of *pars refringens* and in having a longer tail (tail 330-378 µm, c = 6.4-7.2, c'=7.3-8.6 *vs* tail 225-250 µm, c = 8.7-9.1, c' = 5.4-5.6).

The buccal cavity in *A. francolambertii* sp. n. shows distinct sexual dimorphism. In the females, the size of the buccal cavity ranges from 52-55 × 42-55 µm with apex of the dorsal tooth at 31, 31, 33, 37, 39 µm from the base of the buccal cavity. In two males the size of the buccal cavity is 44 × 31 µm and 49 × 39 µm with apex of the dorsal tooth at 23 and 25 µm from the base of the buccal cavity.

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