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Four new species and new subspecies of the genus *Homungella* Timm, 1966 (Rhabditida: Drilonematoidea) from Laos and Viet Nam

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Summary. Four new *Homungella* species are described from the coelomic cavity of Indochina earthworms of the genus *Pheretima*. *Homungella kishonense* sp. n. is characterized by a thin-walled hook, amphidial opening connected to head armature and smooth egg-shell; *H. laotense* sp. n. is distinguished by a slight development of the head armature, which does not engulf the amphidial opening, and slightly mammillated egg-shells; *H. mekongianum* sp. n. has a large cephalic hook, strongly armoured head end and the egg-shell is densely covered with rod-like projections; *H. seponense* sp. n. is characterized by the amphidial opening incorporated in the thick cuticular belt of head armature, curved thick-walled hook and rod-like projections on the egg-shell. Specimens of *H. ornithorhynchum* Ivanova & Spiridonov, 1987 (nom. emend.), previously described from Viet Nam were found in Laos. These are described as representatives of a new subspecies for this species. A dichotomous key for identification of *Homungella* species is presented.

Key words: new species, *Homungella*, Homungellidae, Drilonematoidea, earthworm hosts, South-East Asia, identification key, sub-species.

The genus *Homungella* was established by Timm (1966) for parasitic nematodes from earthworms, collected in Thailand and Burma, which posess a single dorsally oriented hook on the head end. Representatives of the genus are further characterized by a slightly developed sexual dimorphism (unlike the family Ungellidae Chitwood, 1950, another family of hook-bearing nematodes from the earthworm coelom), circular suckers with large chambers in both sexes, absence of spicular apparatus and by presence of flagellate and setiform copulatory sensillae. The two species of *Homungella* were described by Timm (1966) and a third species was described from North Viet Nam (Ivanova & Spiridonov, 1987). Now four new species of *Homungella* were found in a collection of nematodes recovered from earthworm coeloms by Dr. Thai Tran Bai from Hanoi Teachers' college. The description of these species accompanied with an analysis of the taxonomy of the genus *Homungella* are presented below.

MATERIALS AND METHODS

All earthworms were collected in Indochina by Dr. Thai Tran Bai and Mr. Samphon and dissected in Hanoi by Dr. Thai Tran Bai after field fixation in formalin. The nematodes were sent to Moscow, where they were mounted in glycerol and drawings and measurements were obtained using a camera lucida.

In addition to De Man indices the value Ex is presented in descriptions and refers to the distance between the anterior end and the excretory pore. Representatives of the genus *Homungella* have slender, yellowish or colourless bodies, a thin cuticular covering on the head and tail, one large nucleus in the basal part of the oesophagus, one large nucleus in the excretory cell and oblique bundles of muscle fibers are present in the male tail. All of these features can be omitted in species descriptions to avoid repetition. Female morphology frequently coincides with that of the male therefore these characters are omitted in description of females. The mean value, one standard deviation and

the range in parenthesis are presented for all measurements. The data for the holotypes were included in the calculations for the mean and standard deviations for all specimens.

DESCRIPTIONS

Homungella kishonense sp. n. (Fig. 1)

Holotype male : L = 1317 μm, a = 42.5, b = 4.1, c = 20.6, Ex = 288 μm.

Paratype males (n=2): L = 1275 ± 261 (995-1512) μm, a = 38.2 ± 6.1 (31.1-42.5), b = 4.6 ± 0.6 (4.1-5.0), c = 20.9 ± 6.9 (14.2-28.0). Ex = 288 μm (one measurement only).

Paratype female: L = 1330 μm, a = 41.6, b = 5.7, c = 5.6, Ex = 202 μm, V = 46%, Eggs 45 x 22 μm.

Male. Cephalic hook with slightly curved 10 mm blade. Hook walls thinning toward the distal end. Mouth tube (cuticular envelope of stomatal opening) 1-2 μm long, united with hook into single cuticular 15 μm long piece. Amphidial opening almost round, 10 μm dia., with thickened (up to 1 μm) cuticular margin connected with cuticular ridges to head armature. Oesophagus corpus 40 μm long and 8 μm dia. Corpus containing transversal muscle fibers which absent in basal three quarters of oesophagus of 21 μm dia. close to cardia. Excretory pore 4 μm wide. Excretory gland 250 μm long with nucleus of 15 μm diameter. Excretory duct 90 μm long, 1-2 μm wide. Testis reflexed 197-232 μm from anterior end, containing round spermatocytes 4 μm dia. Near mid-body the testis lumen is filled with rod-like 4-5 μm long cells. Vas deferens walls filled with dark globules 4-7 μm dia. Tail curved ventrally, with three pairs of flagellate sensillae (thin thread less than 1 μm thick on short 3-4 μm high conical base) in precloacal region which originate on lateral line. One pair of setiform sensillae (gradually tapering from base to tip). Four pairs of copulatory sensillae in caudal region: one pair close to sucker, two pairs of ventrally directed flagellate sensillae behind the sucker and one pair of dorsally directed sensillae on tail terminus. Sucker in central part of caudal region, with 8 μm wide opening without prominent radiate ring. Two channels visible along the tail reaching the tail terminus.

Female. Excretory pore 2 μm dia. Prominent tubular receptaculum seminis 375 μm from anterior end, filled with 2-3 μm dia. oviform spermatozoa. Only one fully formed egg-shell in uterus, without any type of surface ornamentation. Cytoplasm of zygote with lipid globules and numerous small vacuoles. Female gonad reaching the level of the anus. Elliptical, transversally elongated, caudal suckers with 16x11 μm opening. Underlaying tissue of sucker 18 μm dia. Tail long, gradually tapering to filiform terminus.

Type host and locality. Infected *Pheretima dangi* Thai, 1984 found in Muong Long, in the mountainous region of Ky Son - the western region of the Vietnamese province of Nghe An which borders with Laos, December 26, 1989.

Type material. Holotype male (Jc 381) deposited in the collection of Moscow State University Zoological Museum. Paratypes deposited in the collection of the Institute of Parasitology, Russian Academy of Sciences, Moscow.

Differential diagnosis. *H. kishonense* sp. n. is characterized by a delicate thin-walled cephalic hook which resembles only the hook in the type species *H. siamense* Timm, 1966 (Fig. 4. E). The distribution of cuticular ridges on the cephalic armature is different in these two species. The egg-shells are finely punctated in *H. siamense*, but smooth in the Laotian species. *H. kishonense* sp. n. also has a prominently larger oesophagus than the type species (e.g. in males 304-318 *vs.* 142-172 μm).

Homungella laotense sp. n. (Fig. 2)

Holotype male: L = 1665 μm, a = 36.2, b = 7.2, c = 27.8, Ex = 313 μm.

Paratype males (n = 7): L = 1599 ± 98 (1465-1710) μm, a = 35.2 ± 1.6 (31.4-36.2), b = 6.7 ± 0.4 (6.2-7.2), c = 22.7 ± 2.8 (20.0-27.8), Ex = 298 ± 30 (250-325) μm.

Paratype females (n = 5): L = 1924 ± 212 (1699-

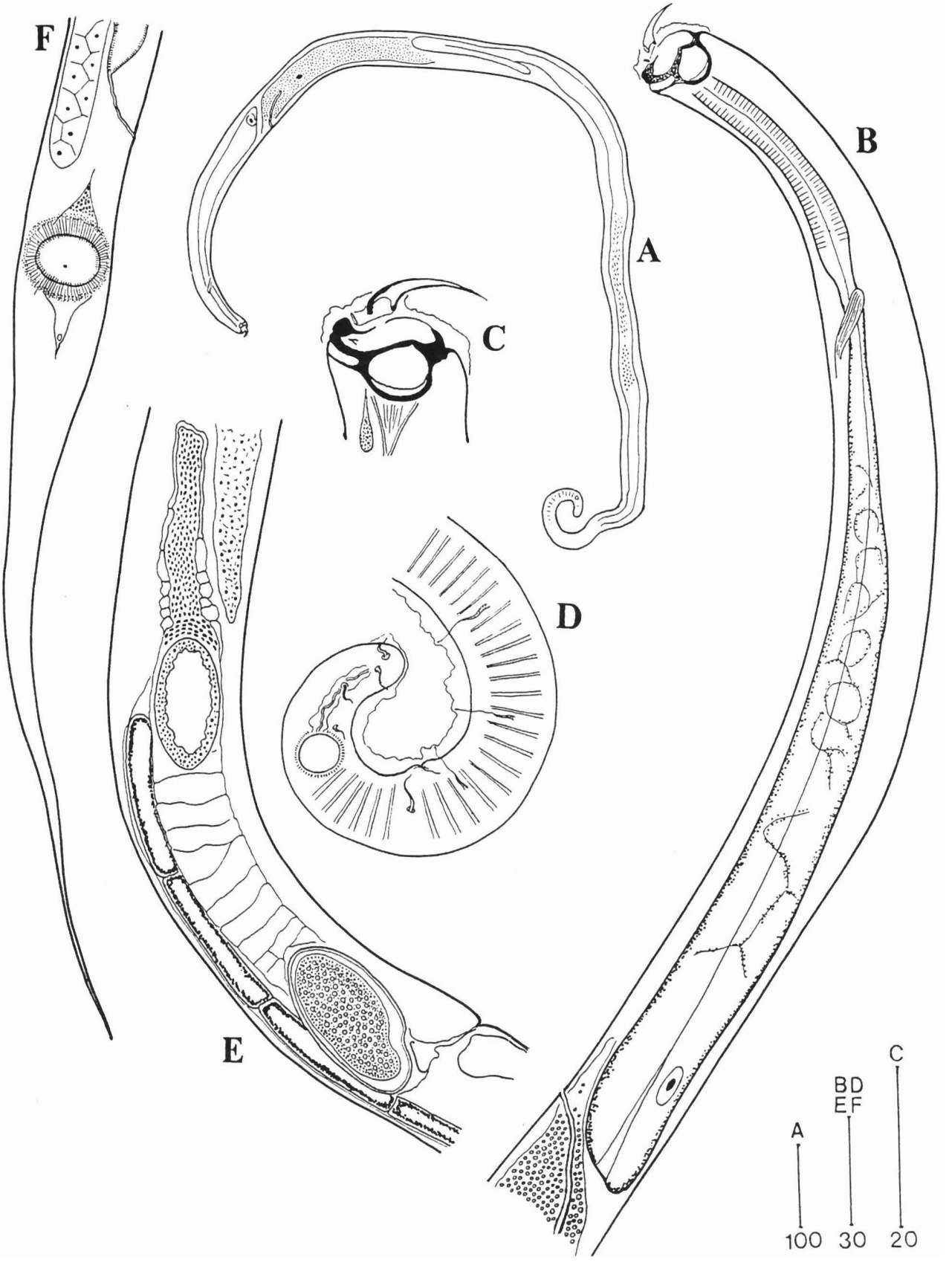

Fig. 1. *Homungella kishonense* sp. n. A: Male, total view; B: Male anterior end, laterally; C: Male head end, laterally; D: Male tail, laterally; E: Female, uterus region, laterally; F: Female tail, laterally. Bars in μm.

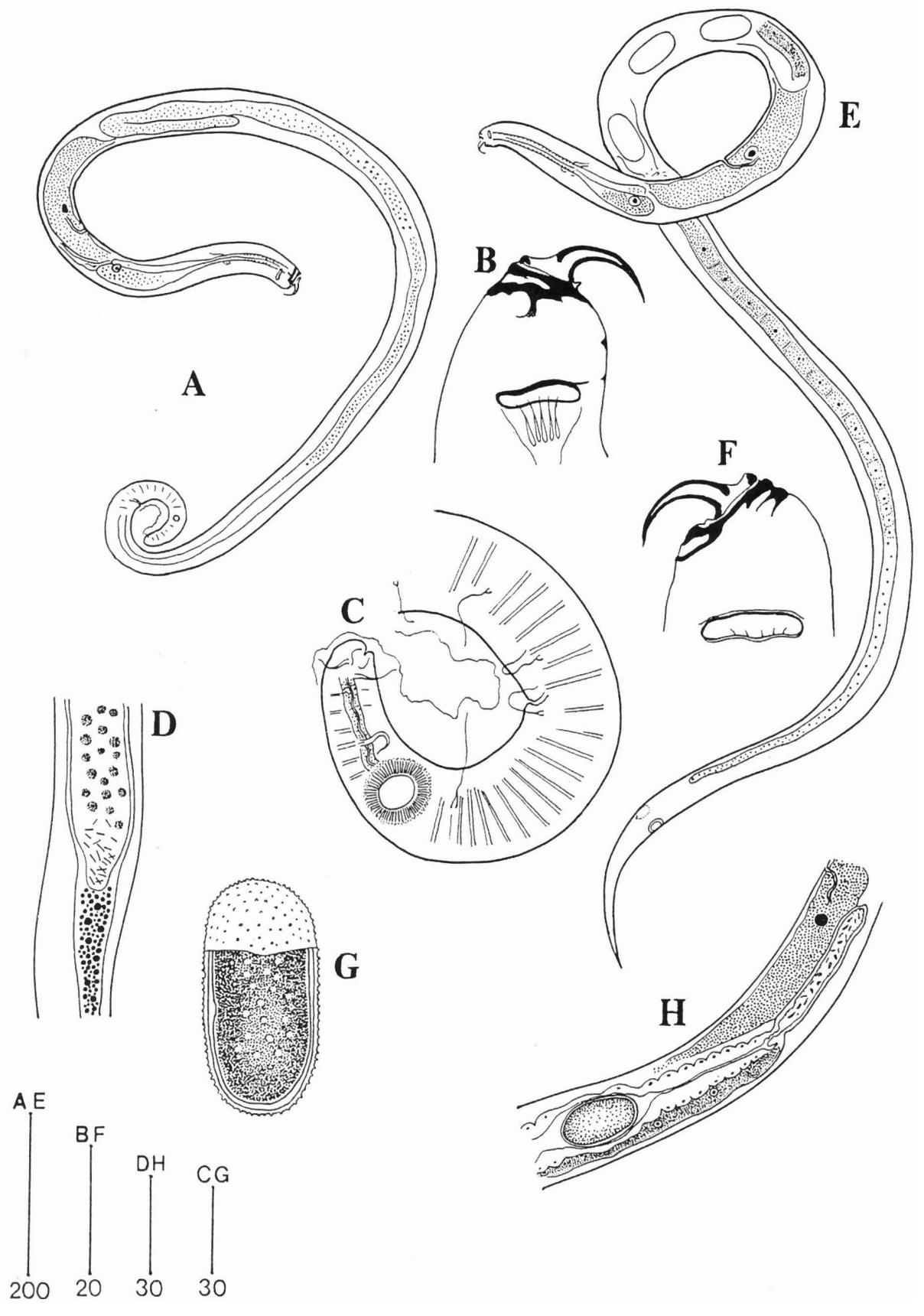

Fig. 2. *Homungella laotense* sp. n. A: Male, total view; B: Male head end, laterally; C: Male tail, laterally; D: Rod-like cells in testis; E: Female, total view; F: Female head end, laterally; G: Eegg-shell structure; H: Receptaculum seminis and excretory gland, laterally. Bars in μm.

2240) μm, a = 35.2 ± 7.4 (26.1-46.0), b = 8.7 ± 0.7 (7.9-9.3), c = 5.9 ± 0.2 (5.8-6.3), Ex = 280 ± 67 (252-300) μm, V = 39-47%, Eggs 53-65 x 25-33 μm.

Male. Cephalic hook sickle-shaped 16-18 μm long, fused with 2 μm long mouth tube into cuticular piece of 20-21 μm length. Amphidial opening slit-like or elliptical transversally elongated, 12-15 x 2-4 μm. Developed cuticular ridges on cephalic armature only on apical part of head-end close to hook base, not present on the 0.5 μm thick margin of the amphidial opening. Oesophagus with 60-70 μm long and up to 12 μm wide corpus, basal part gradually enlarging up to 35 μm close to cardia. Dorsal sector of oesophagus basal part swollen more strongly than subventral sectors, containing 6 μm dia. nucleus. Excretory pore 1 μm wide, duct 30 μm long x 1 μm wide. Nucleus of 10 μm dia. in 350 μm long excretory gland. Testis reflexed 250-325 μm from anterior end. Vas deferens walls filled with dark granules 4-7 μm dia. Three pairs of precloacal flagellate sensillae and two pairs of flagellate sensillae of smaller length between cloaca and sucker. Three pairs of setiform sensillae behind the sucker: two pairs ventrally directed and one pair, close to tail terminus, dorsally directed. Sucker with almost circular opening 8-9 μm dia. with 4-6 μm wide ring of radial striations.

Female. Excretory pore 0.5 μm wide, duct 1 μm wide, 30 μm long. Narrow tubular 120 μm long receptaculum seminis, 252-300 μm from anterior end, filled with oviform and rod-like 2-4 μm long spermatozoa. Up to three fully formed eggs in uterus. Egg-shell covered with many rounded projections less than 1 μm high. Zygote cytoplasm filled with lipid globules and few vacuoles. Female gonad beginning anterior to anus level. Caudal suckers circular with the 12-14 μm openings and with 19 μm dia. radiate ring. Tail conically elongated.

Type host and locality. Infected *Pheretima bucculenta* Gates, 1935 collected in Muonghum, on hill Khaokhoai, Laos, August 10, 1987.

Type material. Holotype male (Jc 382) deposited in Zoological Museum of Moscow State University. Paratypes deposited in German Nematode Collection (DNST) in Munster (N 540, 159-1-1) and British Museum (Natural History) collection of parasitic nematodes (1993-5171). Other paratypes deposited in the collection of the Institute of Parasitology, Russian Academy of Sciences, Moscow.

Differential diagnosis. Comparatively thin-walled hooks similar to those described here for *H. laotense* sp. n. were reported previously for *H. siamense* Timm, 1966, the type species of the genus. The latter species is characterized by the presence of a straighter hook than the one in our species, only curved close to the distal end. Another similarity between these two species is the finely mamillated egg-shells, though eggs are larger in the Laotian species. The concentration of cuticular ridges on the head armature around the hook base are a unique feature of *H. laotense* sp. n.

Homungella mekongianum sp. n. (Fig. 3)

Holotype male: L = 1800 μm, a = 28.6, b = 9.5, c = 17.1. Ex = 282 μm.

Paratype males (n = 2): L = 1826 ± 187 (1654-2025) μm, a = 30.0 ± 3.3 (27.6-33.8), b = 9.8 ± 1.2 (8.8-11.3), c = 16.6 ± 2.0 (14.4-18.4), Ex = 270 ± 11.2 (260-282) μm.

Paratype females (n = 8): L = 2016 ± 152 (1901-2267) μm, a = 28.4 ± (25.2-30.2), b = 10.9 ± 1.4 (9.8-14.0), c = 6.2 ± 0.7 (5.1-7.1), Ex = 253 ± 27 (220-302) μm, V = 41-48%, Eggs 58-63 x 30-37 μm.

Male. Cephalic hook 23-26 μm long with granules filling the inner lumen, fused with 2-3 μm long mouth tube. Oral opening 5 μm wide. Total length of hook and mouth tube about 35 μm. Ventral side of head end is strongly cuticularized. Cuticular ridges run from the ventral side to the dorsal side. Amphidial opening with 1 μm thick margin, which is convoluted on inner side in some specimens. Posterior edge of amphidial opening occasionally connected with the dorsal thickening of the cuticle by a separate, very thin, ridge, but amphid always situated behind the prominent

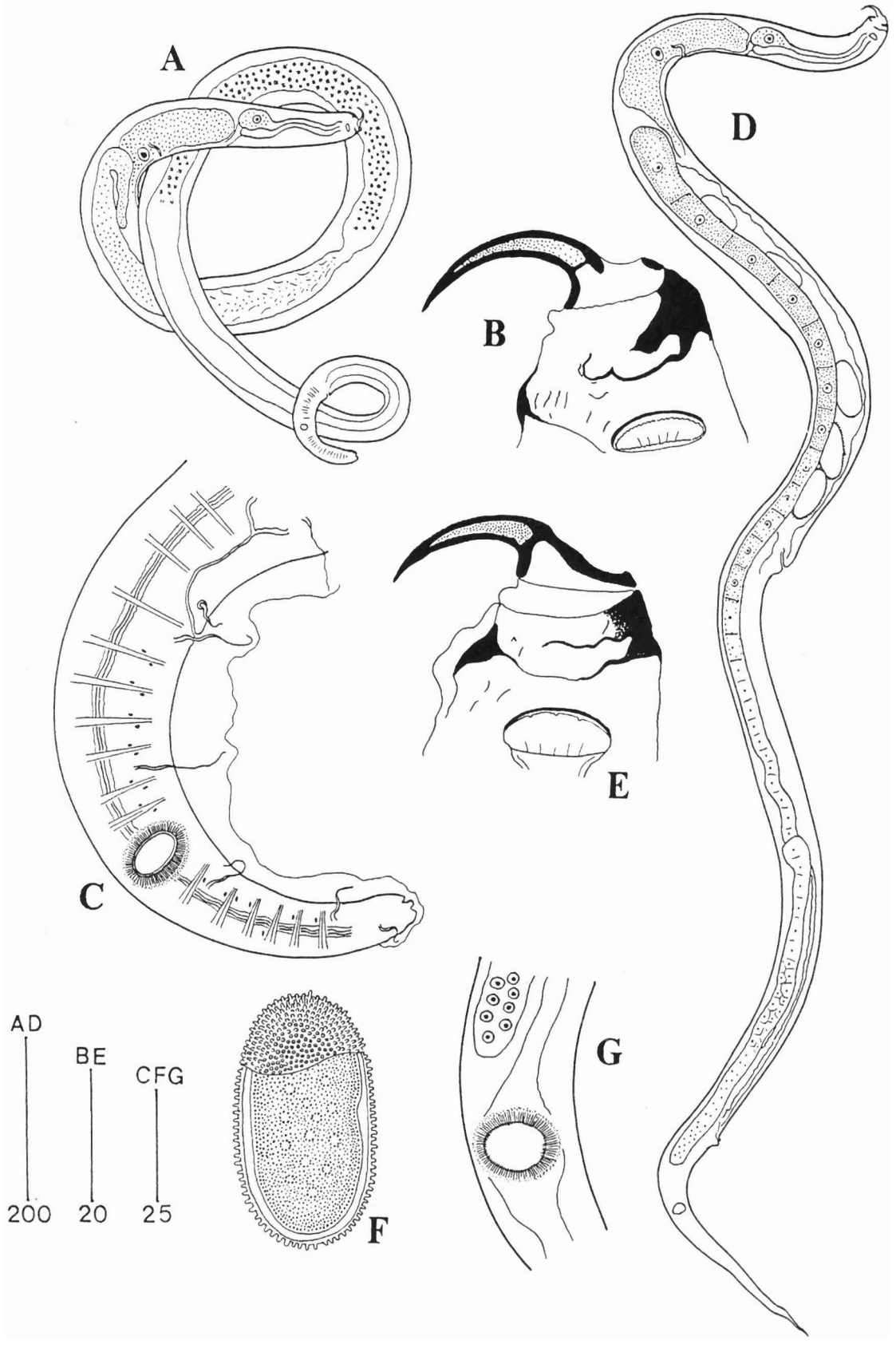

Fig. 3. *Homungella mekongianum* sp. n. A: Male, total view; B: Male head end, laterally; C: Male tail, laterally; D: Female, total view; E: Female head end, laterally; F: Egg-shell structure; G: Female sucker, laterally. Bars in μm.

cuticular structures of the head armature. Oesophagus corpus 12-14 μm wide, 100 μm long. Basal part of oesophagus, widening to 35 μm close to cardia, containing a 5 μm dia. nucleus. Dorsal sector of oesophagus bulb strongly swollen and filled with fine granular material. Excretory pore 1 μm wide, duct 2-3 μm wide x 30-35 μm long; excretory gland nucleus 15 x 8-10 μm. Testis reflexed 246-322 μm from anterior end, filled with round 5-6 μm dia. cells. Rod-like cells not visible up to vas deferens. Walls of vas deferens filled with 4-9 μm dia dark globules. Tail coiled ventrally, with up to six pairs of flagellate sensillae in precloacal region. One pair of short setiform papillae at level of cloaca and a pair of longer setiform sensillae posterior to cloaca. Two pairs of ventrally directed flagellate sensillae behind the sucker, and one pair near terminus directed dorsally. Sucker 30-35 μm behind anus, with a circular (6-8 μm) or transversally elongated opening (9-10 x 5-6 μm) surrounded by a 4 μm wide ring radially striated. Longitudinal channel inside the tail.

Female. Body narrowing sharply in posterior half: prevulvar diameter 65-80 μm, but only 60-74 μm behind the vulva. Cephalic hook larger than in males (23-29 μm). Excretory pore 2 μm wide, duct 3-4 μm wide x 40 μm long. Excretory cell gland up to 10 μm dia. Poorly developed, 40 μm long, conical receptaculum seminis, 290-375 μm from anterior end. Up to five fully formed eggs in uterus. Egg-shell with dense array of 3 μm high, rod-like projections approximately 2 μm dia. Female gonad starts behind the level of the anus close to sucker. Sucker with circular opening 15-16 μm dia. Anal opening is limited from behind by the presence of a 4-5 μm high swelling. Tail gradually tapering to terminus.

Type host and locality. Infected *Pheretima campipapillata* Thai & Samphon, 1988 collected in Laos near Savannakhet in the small village Noongphu, August 28, 1987. Male and female *H. mekongianum* sp. n. were found in *Pheretima campipapillata* collected in forest near Thapha, Laos, August 27, 1987.

Type material. Holotype male deposited in the collection of Moscow State University Zoological Museum (Jc 383). Paratypes deposited in German Nematode Collection (DNST) in Munster (N 539, 159-2-1) and British Museum (Natural History) collection of parasitic nematodes (1993-5170). Other paratypes deposited in the collection of the Institute of Parasitology, Russian Academy of Sciences, Moscow.

Differential diagnosis. *H. mekongianum* sp. n. have very large cephalic hooks - up to 29 μm, not previously reported for other *Homungella* species. Another characteristic feature of *H. mekongianum* sp. n. is the egg-shell which is densely covered with comparatively large projections. The structure of the head armature and the thick-walled hook with a granular filling are also unique features distinguishing *H. mekongianum* sp. n. from other species.

Homungella seponense sp. n. (Fig. 4)

Holotype male: L = 1474 μm, a = 29.5, b = 7.6, c = 15.0, Ex = 271 μm.

Paratype male: L = 1518 μm, a = 26.2, b = 7.3, c = 14.6, Ex = 288 μm.

Paratype female: L = 1811 μm, a = 25.5, b = 10.0, c = 6.1, Ex = 286 μm, V = 51 %, Eggs 58-65 x 30-34 μm.

Male. Cephalic hook thick-walled, sickle-shaped, with 14-15 μm long blade fused with mouth tube into a cuticular piece 19-22 μm long. Amphidial opening elliptical, 10 x 5 μm, with 1-1,5 μm thick margins, incorporated in the belt of folded cuticle embracing the head end. Oesophagus corpus 100 μm x 12-14 μm. Basal part of oesophagus widens to 28 μm close to cardia because of a dorsal sector swelling, which contains a 10 μm nucleus. Muscle fibers in oesophagus up to the basal part. Excretory pore less than 1 μm wide, duct 2-3 μm wide, about 40 μm long. Large 9 μm dia. nucleus in excretory cell. Testis reflexed, 228-246 μm from anterior end, filled anteriorly with 2-3 μm dia. spermatocytes. No rod-like or thread-like cells in testis lumen. Dark globules up to 10 μm wide in vas deferens walls. Tail curved ventrally, with two pairs of precloacal flagellate sensillae. One pair of setiform sensillae close to cloacal opening. All postcloacal sensillae are flagellate: one pair between cloaca and

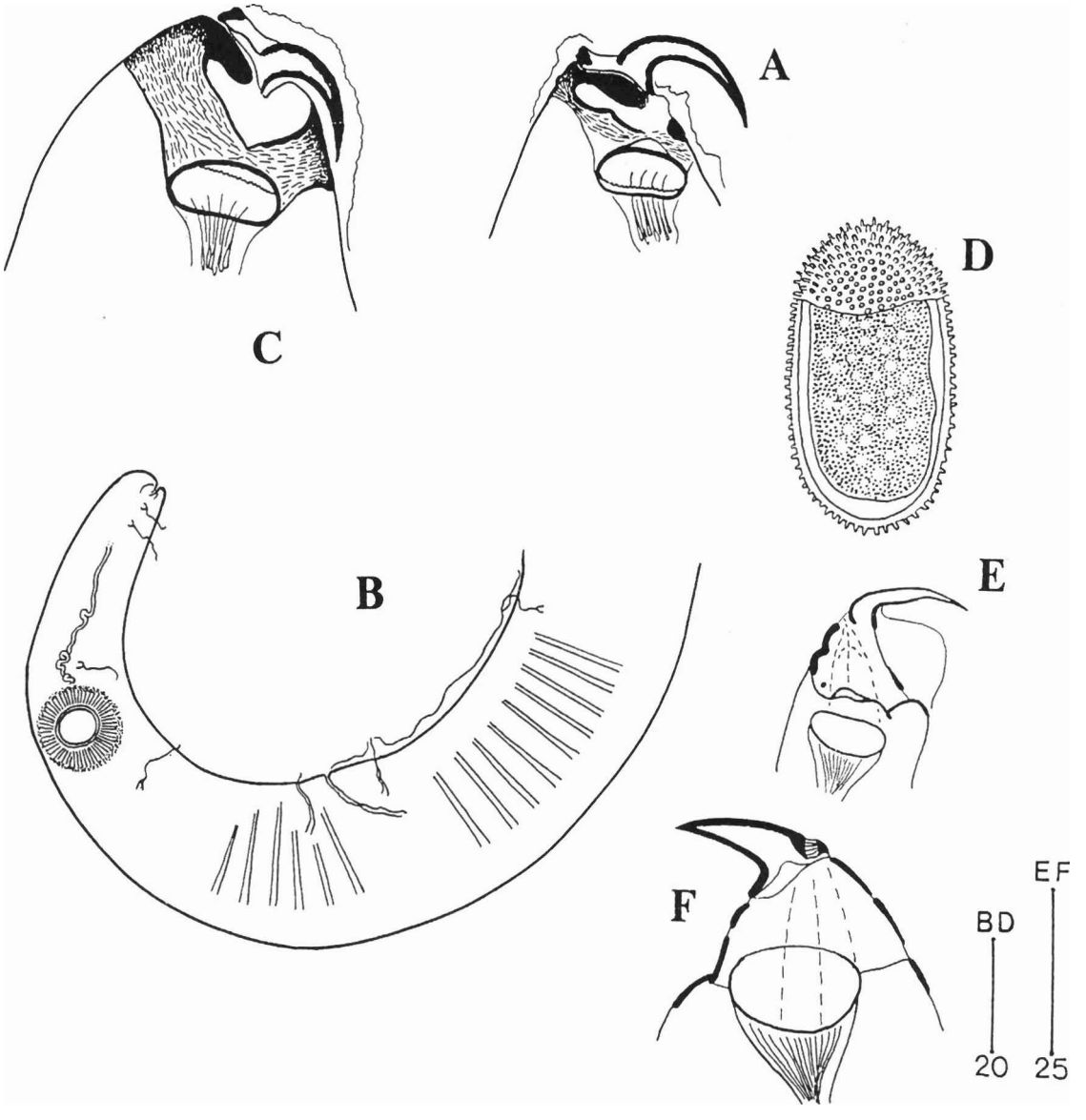

Fig. 4. *Homungella seponense* sp. n. and *Homungella* species described by Timm. A: Male head end, laterally; B: Male tail, laterally; C: Female head end, laterally; D: Egg-shell structure; E: *H. siamense* female head end, laterally (redrawn from Timm, 1966); F: *H. monodontium* female head end, laterally (redrawn from Timm, 1966). Bars in μm.

sucker and three pairs directed ventrally behind the sucker. Sucker 32 μm behind the cloaca with 7-8 μm opening; total diameter of radiate ring around sucker chamber about 12-14 μm. Two channels run along the tail region up to terminus.

Female. Amphidial opening up to 15 x 7 μm. Large (160 x 25 μm) receptaculum seminis, 224 μm from anterior end. Egg-shell with dense rod-like projections 1.5 μm high and 1 μm dia. Zygote cytoplasm with lipid globules and a few small vacuoles. Gonad starts at level of sucker. Tail gradually tapering to club-like mucron. Large circular suckers with 13 x 18 μm opening, and a 26 μm dia. radiate ring. One prominent thread in sucker chamber.

Type host and locality. Infected *Pheretima choana* Thai & Samphon, 1988 were found near the stream in the valley close to hill Cho, Sepon, Laos, August 28, 1987.

Type material. Holotype male deposited in the collection of Moscow State University Zoological Museum (Jc 384). Paratypes deposited in the collection of the Institute of Parasitology, Russian Academy of Sciences, Moscow.

Differential diagnosis. The amphidial opening incorporated into the belt of thickened, folded cuticle represents a unique feature of *H. seponense* sp. n. In all other species of *Homungella*, separate cuticular ridges are present on the head-end, forming the head armature. These ridges are substituted in *H. seponense* sp. n. by a broad cuticular belt. The shape of the hook and the presence of rod-like projections on the egg-shells also help to differentiate this new species from others in the genus.

Homungella ornithorhynchum Ivanova & Spiridonov, 1987 (emend. *H. ornithorhyncha* Ivanova & Spiridonov, 1987) ssp. *samphoni* subspec. nov. (Fig. 5)

Two males and a single female belonging to the genus *Homungella* found in a Laotian earthworm were very similar to *H. ornithorhynchum*, a species previously described from Viet Nam. Head morphology was identical, however some minor morphological differences were observed e.g. body size, value of De Man indices. A description of these specimens is presented below, accompanied with some additional data for the Vietnamese *H. ornithorhynchum* which were used for comparison with the new specimens.

Having established a new subspecies *H. ornithorhynchum samphoni* subspec. nov. for *H. ornithorhynchum* we designated a voucher specimen. This is deposited in the collection of the Moscow State University Zoological Museum (Jc 385).

Male (voucher specimen): L = 1507 μm, a = 30.0, b = 5.8, c = 26.0, Ex = 275 μm.

Other male: L = 1373 μm, a = 27.5, b = 4.7, c = 30.5, Ex = 322 μm.

Female: L = 1586 μm, a = 29.4, b = 6.1, c = 14.8, Ex = 296 μm, V = 53%, Eggs = 62 x 25 μm.

Male. Comparatively short body. Thick-walled, curved hook with 19 μm blade fused with 2 μm long mouth tube into a 22 μm long single cuticular piece. Strongly cuticularized dorsal and ventral sides of head end with cuticular ridges running across lateral sides. Amphidial opening semielliptical (13 x 8 μm) in one male, and elliptical (9 x 3 μm) in another. Margin of amphidial opening 1 μm thick, connected by ridges with the dorsal and ventral cuticular thickenings. Oesophagus with 90-100 μm long corpus, gradually widening up to 10 μm, and basal part widening in cardia region up to 33 μm. All sectors of basal part of oesophagus equally swollen. Excretory pore 3 μm wide, duct 2.5 - 3 μm wide, 90 μm long. Excretory gland 220 μm long, with 5 μm dia. nucleus. Testis reflexed, 493-500 μm from anterior end, containing 3 μm dia. spermatocytes. Close to mid-body testis filled with long filiform cells. Vas deferens walls tightly packed with 2-3 μm globules. At least three pairs of precloacal flagellate sensillae. In postcloacal region two pair of flagellate sensillae anterior to sucker, and two pairs posterior, all directed ventrally. One pair of setiform sensillae close to level of cloaca. Sucker 40 μm behind the cloaca, with 4 μm dia. opening. Total diameter of radiate ring around the sucker chamber

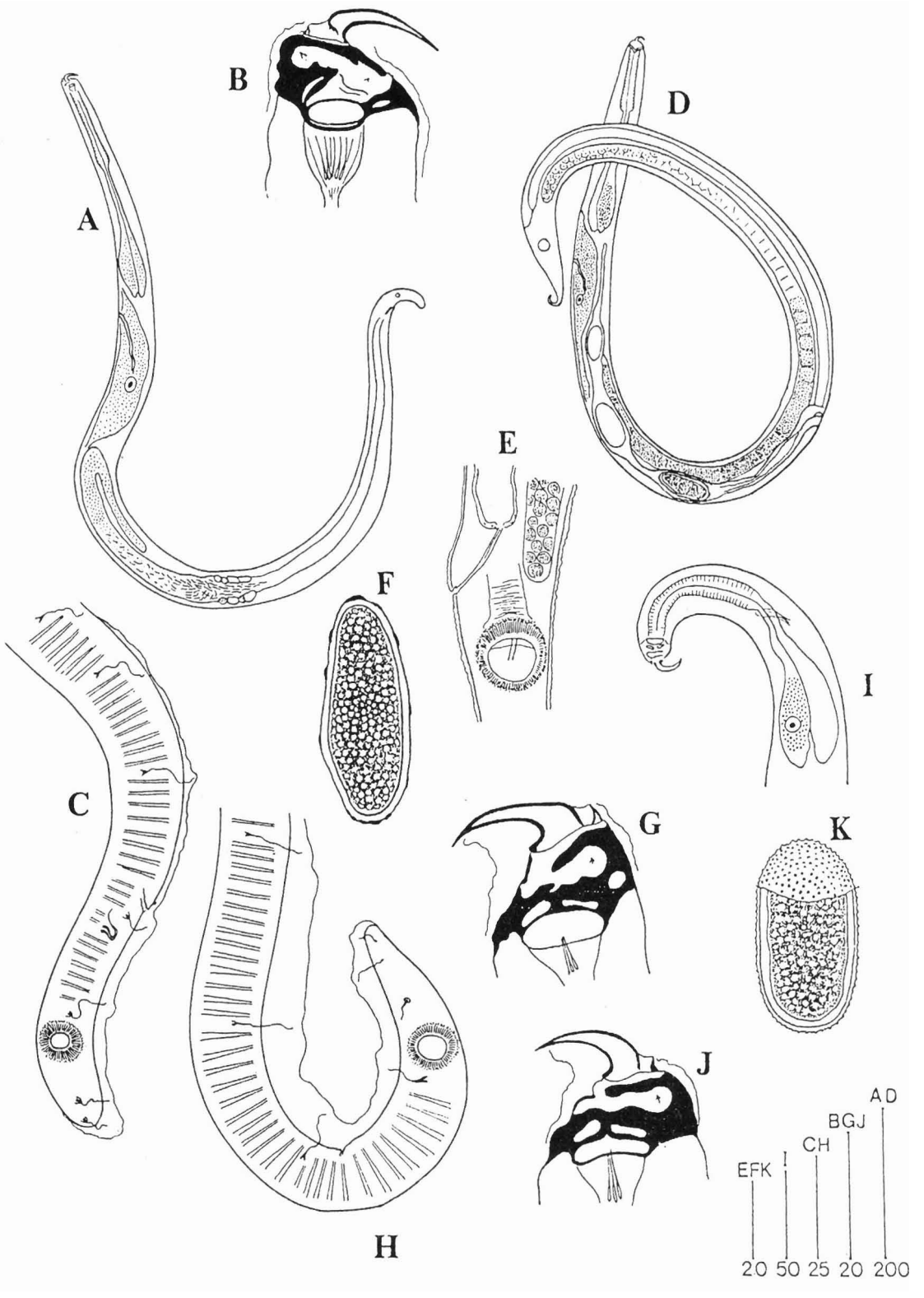

Fig. 5. *Homungella ornithorhynchum* Ivanova & Spiridonov, 1987 (Laotian specimens - ssp. *samphoni* and Vietnamese paratypes). A: Male, Laos, total view; B: Male, Laos, head end, laterally; C: Male, Laos, tail, laterally; D: Female, Laos, total view; E: Female, Laos, sucker, laterally; F: Egg-shell, Laos; G: Male, Viet Nam, head end, laterally; H: Male, Viet Nam, tail, laterally; I: Male, Viet Nam, oesophagus, laterally; J: Female, Viet Nam, head end, laterally; K: Egg-shell, Viet Nam. Bars in μm.

about 10 μm. No longitudinal channels observed.

Female. Oesophageal corpus slightly thicker than in males (12-14 μm). Receptaculum seminis a wide, 80 μm long sac, 386 μm from head end. Only one egg in uterus, with irregular thickenings on the surface. Female gonad starts near the anus. Sucker 26 μm behind the level of the anus, with 9 μm wide opening, and 15 μm radiate ring around the chamber. Two threads in sucker chamber. Tail short, coiled near the terminus.

Origin of material. Infected *Pheretima munghumensis* Thai & Samphon, 1988 collected on the hill Khaokhoai in Muonghum, Laos, August 2, 1987.

Taxonomic remarks. The body size proportions are different in the above described Laotian homungellids when compared with the type specimens of *H. ornithorhynchum*. The type specimens were found in *Pheretima mucrorima* collected near Hanoi in Cucphuong National Park. Other important differences are: egg-shell without any mammillate structure, and the presence of a set of copulatory sensillae on the male tail in the Laotian specimens. However, the differences in the size and structure of the egg-shell surface may be attributed to the immature state of the single egg found in a female from Laos. The copulatory sensillae of *Homungella* are very thin and inconspicuous, therefore differences in their number and appearance can not be considered a reliable taxonomic characteristic. Despite the different shape of the head end in Vietnamese and Laotian nematodes (more conical in the former, and more rounded in the latter), the principal organization of the head armature is the same in both. The general resemblance is obvious even in males with a slightly reduced additional cuticular ridge bordering the amphidial opening on the dorsal side. Also, the size of the amphidial opening and hook are identical in both populations. The shape of the oesophagus also is similar in specimens from Laos and Viet Nam. As it is not possible to differentiate between Laotian and Vietnamese specimens using the head-end morphology it is considered appropriate to describe the Laotian nematodes as a new subspecies of *H. ornithorhynchum* Ivanova & Spiridonov, 1987 - *H. ornithorhynchum samphoni* subspec. nov. This is named after Mr. Samphon who specialises in Laotian earthworms. The specimens originally described as *H. ornithorhynchum* Ivanova & Spiridonov, 1987 from *Pheretima mucrorima* in Viet Nam are reclassified as representatives of *H. ornithorhynchum ornithorhynchum*.

The ending of the specific name for *H. ornithorhyncha* is changed to *H. ornithorhynchum* to correspond with the neutral gender of the generic name. Neutral gender for *Homungella* (though *Ungella* was feminine for Cobb, as can be seen from *Ungella secta*), should be implemented after the use by Timm (1966) of the specific names *siamense* and *monodontium*, both of which are neutral.

DISCUSSION

A single cephalic hook is the principal diagnostic feature for the family Homungellidae Timm, 1966. The cuticular connection between the hook and body cuticle is quite thin, which results of the hook in some specimens being torn off and lost, or attached only by a narrow strip of the cuticle. In intact specimens of one species the hook can be observed in different positions on the apical surface of the head end. It appears that the hook represents a mobile structure. It is uncertain if this organ moves actively by pressure from the muscular oesophageal corpus attached to the mouth tube or passively because of body movements. Also the function of this sharpened cuticular projection has not been determined. The two cephalic hooks in the associated family Ungellidae Chitwood, 1950 apparently have a different origin. The cuticular base of these paired hooks is embedded deeply in the head end and the mouth opens between the bases of the hook blades, not in a separate cuticular tube. The similarity between *Homungella* and *Perodira* Baylis, 1943 was reported previously (Ivanova & Spiridonov, 1987). The tail morphology in both sexes are almost identical in these genera, as are the structure of the reproductive systems, egg-shells and oesophagi. The oral opening in *Perodira* is enclosed in the thick cuticular tube.

Spike-like projections are located on the dorsal and ventral sides of this ring. The dorsal spike may be considered as homologous to the hook in *Homungella* species. The diagnosis of Homungellidae Timm, 1966 was modified to accommodate *Perodira* as the second genus in the family.

The position of the family Homungellidae in the superfamily Drilonematoidea is obscure. The presence of comparatively large males (not dwarf males adapted to permanent copulation, which is characteristic for the Ungellidae), a coiled male tail filled with numerous bundles of oblique muscle fibers and circular suckers make this family similar to the Drilonematidae Chitwood, 1950. Other features which are characteristic for the Ungellidae are absence of spicular apparatus, an oesophagus with a narrow corpus and a swollen glandular basal end. Many of these features are probably apomorphic in the Drilonematoidea, whereas these are plesiomorphic features which unite the homungellids with the Drilonematidae.

Despite the comparative diversity of *Homungella* morphology, only a few morphological features can be used to differentiate species. Therefore, the disposition and structure of caudal copulatory sensillae in the male tail are probably different in each species. However, the small size of these structures, which are frequently obscured by coelomic cells in the host and by folds of cuticular membrane covering the nematodes limit the taxonomic value of this feature. Timm (1966) did not accurately record the number of these sensillae for the two *Homungella* species he described. Structures such as the receptaculum seminis or swollen basal part of the oesophagus can be readily observed in some specimens, but are inconspicuous in others. The egg shell structure differs considerably in *Homungella* species and reliable observation information can only be made with female specimens with several eggs in the uterus. The application of egg-shell surface structures in the taxonomy of these nematodes should be used with caution. Additional observations are also required before using the female gonad tip cell position as a diagnostic feature for the *Homungella*. The shape of the cephalic hook is a very stable character and a convenient taxonomic feature, even though its perception depends on the orientation of the nematode specimen. Also, the disposition of cuticular ridges on the head end and the size of the cuticularized mouth tube are satisfactory taxonomic characteristics for the *Homungella*. Timm (1966) reported the different position of the amphidial opening relative to the posterior «sclerotized border» on the anterior end as a useful taxonomic feature. The following key is provided as an aid for the identification of the species in the genus *Homungella*.

Key for identification of *Homungella* species

1. Amphidial opening situated behind the posteriormost cuticular ridge on the head armature 2

- Amphidial opening incorporated into the head armature, situated before the posteriormost cuticular ridge 5

2. Very large cephalic hook (23 - 29 μm), egg-shell with rod-like 2-3 μm high projections along the surface .....*H. mekongianum* sp. n.

- Smaller cephalic hooks 3

3. Cephalic hook with 19-20 μm long blade, with thick walls. Egg-shell finely mammillated with scattered round knobs of no more than 1 μm high ....*H. ornithorhynchum* Ivanova & Spiridonov, 1987.

- Hook with thin walls and 16-18 μm long blade 4

4. Roundly curved, sickle-shaped hook. Amphidial opening separated from head armature by a gap larger than its length. Egg-shell finely mammillated ..... *H. laotense* sp. n.

- Hook curved only near distal end. Amphidial opening separated from the head armature by a gap shorter than its length. Egg-shell finely punctated... ..... *H. siamense* Timm, 1966 (Fig. 4. E).

5. Cephalic hook with thin walls, curved. Amphidial opening nearly round. Egg-shell smooth..... ..... *H. kishonense* sp. n.

- Cephalic hook with thick walls 6

6. Cephalic hook straight. Amphidial opening elliptical. Egg-shell smooth..... ..... *H. monodontium* Timm, 1966 (Fig. 4. F).

- Cephalic hook roundly curved. Amphidial opening crescent-shaped, encircled by a belt of thickened folded cuticle. Egg-shell with rod-like 1-1.5 μm high projections ..... *H. seponense* sp. n.

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Спиридонов С. Э. Четыре новых вида и новый подвид рода *Homungella* Timm, 1966 (Rhabditida: Drilonematoidea) от дождевых червей Лаоса и Вьетнама.

Резюме. Четыре новых вида *Homungella* описаны из полости тела дождевых червей рода *Pheretima* из Индокитая. *Homungella kishonense* sp. n. отличается тонкостенным головным крюком, амфидиальным отверстием, края которого соединяются с кутикулярными ребрами головного конца, и гладкими оболочками яиц. *H. laotense* sp. n. характеризуется слабым развитием кутикулярных ребер на головном конце, не охватывающими амфидиальное отверстие, оболочками яиц с немногочисленными округлыми выступами. *H. mekongianum* sp. n. имеет самые крупные в роде головные крюки, мощное развитие кутикулярных ребер на головном конце и оболочки яиц, покрытые многочисленными, плотно расположенными палочковидными выступами. *H. seponense* sp. n. отличается амфидиальным отверстием, расположенным внутри пояса из утолщенной складчатой кутикулы, серповидно изогнутым крюком и палочковидными выступами на оболочке яйца. В Лаосе были обнаружены также экземпляры *H. ornithorhynchum* Ivanova & Spiridonov, 1987 (nom. emend.) описанного ранее из Вьетнама и отнесенные к новому подвиду, отличающемуся многими морфометрическими и морфологическими признаками таксономическая ценность которых, однако, пока не ясна. Предложен ключ для определения видов рода *Homungella*, основывающийся, главным образом, на строении головного конца и оболочек яиц.