

A NEW THAI *ENHYDRIS* (SERPENTES: COLUBRIDAE: HOMALOPSINAE)

John C. Murphy and Harold K. Voris

Division of Amphibians and Reptiles, Field Museum of Natural History,
1400 South Lake Shore Drive, Chicago, Illinois 60605, USA
Email: hvoris@fieldmuseum.org (HKV)

ABSTRACT. – A new species, previously misidentified in museum collections and the literature as *E. jagorii*, is described. All specimens of the new taxon with specific locality data are from the vicinity of metropolitan Bangkok. It can be distinguished from other *Enhydris* with 21-23 scale rows at mid-body by the presence of 21 scale rows on the neck, 110-122 ventrals, and a distinctive pattern of small dorsal spots.

KEY WORDS. – Homalopsinae, water snakes, *Enhydris*, new taxon, Thailand.

INTRODUCTION

The Oriental-Australian rear-fanged water snakes in the colubrid snake subfamily Homalopsinae were reviewed by Gyi (1970) who recognized 10 genera and 34 species. The genus *Enhydris* was the most speciose (22 species). *Enhydris* species usually use freshwater habitats with muddy substrates, feed on fish and anurans, can attain high population densities, and have a distribution that extends in a northwest-southeast axis from Pakistan's Indus River to eastern Queensland, Australia. Two species (*E. enhydris* and *E. plumbea*) have broad geographical distributions, while others are restricted to particular islands, river basins and coastlines (Murphy & Voris, 1994; Murphy et al., 1999; Stuart et al., 2000; Voris & Murphy, 2002).

During the examination of museum specimens and the literature it became clear that the identity of *Hypsirhina jagorii* Peters, 1863, was confused by Günther (1864) as well as all subsequent workers (Morice, 1875; Tirant, 1885; Boulenger, 1896; Flower, 1899; Mocquard, 1907; Cochran, 1930; Bourret, 1934, 1936; Smith, 1943; Deuve, 1970; Gyi, 1970; St. Girons, 1972a, b). Museum material labeled *Enhydris jagorii* was composed of two species. Neither of these species were conspecific with the type of *Hypsirhina jagorii* Peters, and this problem will be resolved in a separate paper. The confusion resulted from similar meristic characteristics. Five species of *Enhydris* that occur in Thailand and the Indochinese Peninsula and have 21 scale rows at mid-body are compared in Table 1.

MATERIALS AND METHODS

Museum material was compared to written descriptions and

illustrations. A total of 144 specimens were examined (Appendix 1). Scales were counted following Peters (1964). Scale measurements were made using dial calipers to the nearest 0.1 mm. Body measurements were made to the nearest millimeter using a meter stick; snout-vent length (SVL) and total length (LOA) were collected. Bilateral scale counts are listed as left/right sides. Sex was determined by the presence or absence of hemipenes, tail shape, and probing. Scale arrangements and specimens were photographed using a Sony Cybershot DSC-S85 digital camera. Sarah Drasner illustrated the paratype in Fig. 2.

Specimens examined are housed in the following institutions: American Museum of Natural History (AMNH), New York; British Museum of Natural History (BMNH), London; California Academy of Sciences (CAS), San Francisco; Field Museum of Natural History (FMNH), Chicago; Louisiana State Museum of Zoology (LSUMZ), Baton Rouge; Museum National d'Histoire Naturelle (MNHN), Paris; Muséum of Zoology (CUMZ), Bangkok; Museum of Zoology, University of Michigan (UMMZ), Ann Arbor; National Museum of Natural History (USNM), Washington; National Science Museum (THNHM), Bangkok; Queen Saovabha Memorial Institute, Thai Red Cross Society (QSMI), Bangkok; Zoologisches Museum, Universität Humboldt (ZMB), Berlin.

RESULTS

Enhydris jagorii can be distinguished from most other species of *Enhydris* with 21-23 scale rows at mid-body by its low ventral (117-127) and subcaudal (48-54 in females and 53-68 in males) scale counts; the anterior pair of chin shields are longer than the second pair (or rarely the same length),

Table 1. A comparison of six species of *Enhydris* with 21 scale rows at mid-body. LOA indicates total length of body and tail.

Characters n=	<i>E. enhydris</i> 60	<i>E. chanardi</i> 15	<i>E. jagorii</i> 10	<i>E. innominata</i> 18	<i>E. longicauda</i> 41
LOA males (mm)	154-741 (\bar{x} =505)	166-425 (\bar{x} =281)	317-471 (\bar{x} =412)	233-470 (\bar{x} =397)	327-669 (\bar{x} =560)
LOA females (mm)	203-714 (\bar{x} =565)	234-547 (\bar{x} =461)	290-515 (\bar{x} =387)	215-650 (\bar{x} =486)	317-809 (\bar{x} =560)
Tail/LOA males	0.15-0.29 (\bar{x} =0.22)	0.21-0.23 (\bar{x} =0.22)	0.22-0.25 (\bar{x} =0.24)	0.19-0.25 (\bar{x} =0.21)	0.2-0.26 (\bar{x} =0.24)
Tail/LOA females	0.16-0.26 (\bar{x} =0.21)	0.15-0.18 (\bar{x} =0.17)	0.15-0.2 (\bar{x} =0.19)	0.15-0.19 (\bar{x} =0.16)	0.17-0.26 (\bar{x} =0.22)
Dorsal scale rows on neck	21-27 (\bar{x} =23.8)	20-23 (\bar{x} =21.1)	23-25 (\bar{x} =24.0)	23-25 (\bar{x} =23.5)	23-26 (\bar{x} =24.1)
Dorsal scales rows mid-body	21-23 (\bar{x} =21.2)	21 (\bar{x} =21.0)	21-23 (\bar{x} =21.4)	21 (\bar{x} =21.0)	21 (\bar{x} =21.0)
Dorsal scales rows post-body	19-21 (\bar{x} =20.3)	19-21 (\bar{x} =20.4)	19-20 (\bar{x} =19.7)	19-21 (\bar{x} =20.3)	19-21 (\bar{x} =20.1)
Dorsal scale ornamentation	striated	smooth	smooth	smooth	smooth
Ventrals - males	153-174 (\bar{x} =160)	110-121 (\bar{x} =118)	117-127 (\bar{x} =120)	108-117 (\bar{x} =113)	124-133 (\bar{x} =128)
Ventrals - females	153-170 (\bar{x} =157)	116-122 (\bar{x} =120)	117-120 (\bar{x} =123)	111-116 (\bar{x} =112)	124-135 (\bar{x} =127)
Subcaudals - males	64-83 (\bar{x} =71)	44-60 (\bar{x} =53)	53-68 (\bar{x} =61)	49-56 (\bar{x} =52)	64-73 (\bar{x} =69)
Subcaudals - females	57-76 (\bar{x} =65)	38-49 (\bar{x} =44)	50-54 (\bar{x} =51)	42-49 (\bar{x} =46)	53-76 (\bar{x} =63)
Number of pairs of chin shields	2 (3 rarely)	2	2	2	2
Shape of anterior chin shields	elongate	flared	flared	flared	flared
Longest pair of chin shields	2	2	1	1	1
Labials touching loreal	first 3				
Temporal scales	plate-like	plate-like	small	variable	small
Pattern on scale rows 1-3	stripe	stripe	blotched	blotched	blotched
Pattern on scale rows 5-7	stripe or uniform	spots 2-3 scales	blotches, 4-5 scales	blotches, 4-5 scale	s blotches, 4-5 scales
Pattern on edges of ventrals	solid or serrated stripe	zig-zag stripe	uniform	uniform	uniform, some spots
Mid-ventral pattern posterior	stripe	uniform	uniform	uniform	uniform
Eye diameter to nasal diameter	equal	equal or less	diameter equal	diameter less	diameter equal
Distribution	widespread	Bangkok endemic	Bangkok endemic	Vietnam endemi	Tonlé Sap endemic

and they are flared; the lateral-dorsal pattern of dark blotches (about five scale rows long) extends onto the ventral scales. See Table 1 and Fig. 1 for further comparisons to other taxa. Fifteen specimens labeled *E. jagorii* in several different collections did not fit this description and represent the new taxon described below.

***Enhydris chanardi*, new species**
(Figs. 1A, 2)

Hypsirhina jagorii – Günther, 1864: 282; Nicholson, 1874: 62; Boulenger, 1896: 6; Flower, 1899: 676; Bourret, 1936: 278 (part) (not *Hypsirhina jagorii* Peters, 1863).

Enhydris jagorii – Cochran, 1930: 31; Smith, 1943: 384 (part); Gyi, 1970: 92, Fig. 10; Campden-Main, 1970: 77; Cox, 1991: 190, Pl. 57 (colour photograph); Cox et al., 1998: 41 and unnumbered photograph (not *Hypsirhina jagorii* Peters, 1863).

Material Examined. – Holotype - USNM 67516 female, Bangkok (13°45'N 100°31'E), Thailand, coll. Hugh M. Smith, 1 May.1928.

Paratypes – BMNH Bangkok 98.11.830-1,1969.1884-1885, 1968.780-781; Chanthaburi, Thailand 1987.1786; Siam 59.7.1.9, 65.4.28.5, 78.2.14.14; Takhamen 97.10.8.28. CAS 135735, rice fields of Bangkok. LSUMZ 16922, skin only, purchased in Bangkok market; UMMZ 65336, near Bangkok; USNM 83431 Ban Pan, Sikuk River, coll. Hugh M. Smith, 25 Nov.1923.

Diagnosis. – *Enhydris chanardi* can be distinguished from all other *Enhydris* in the Indochinese Peninsula that have 21 scale rows at mid-body by the following characteristics: 116-125 ventrals, 38-60 subcaudals (53-60 in males and 38-49 in females); two pairs of chin shields with the second pair longer in length; an interocular distance that is greater than the length of the frontal; scales that are longer than tall on rows 7-15; lateral spots on rows 4-5 or 4-6 (Fig. 1); and a stripe on scale row three. See Fig. 1A and Table 1 for a comparison to other taxa.

Description of Holotype. – Head is depressed and distinct from neck; the body cylindrical at midpoint, strongly compressed immediately in front of vent; tail strongly

compressed. Female total length 435 mm, 96 mm tail (22.1%). Rostral scale pentagonal shallowly notched, and about twice as broad than tall. Nasal scales in contact, valvular nare located in center of nasal scale, nasal groove contacts first labial on each side. Left nasal completely divided, nasal groove contacts suture with right nasal, nasal scale diameter slightly greater than eye diameter. Hexagonal internasal single, posterior to nasals, contacts loreal on each side. Prefrontal scales contact loreal; diameter greater than eye diameter, posterior edges over lap the frontal. Frontal pentagonal, length less than interocular distance, width equal to orbit diameter. Paired parietals pentagonal, about 1.3 times longer than frontal (Fig. 2A). Quadrangular loreal longer than tall, in contact with first three upper labials. Ocular ring: a supraocular, a preocular, two postoculars; dorsal postocular about twice the size of lower postocular; subocular scales absent; fourth upper labial enters the orbit. Temporal formula 1+2+3, third row indistinguishable from the occipital scales. Upper labial scales number eight; tallest upper labial number seven (Fig. 2B). Lower labials number 10 on both sides; number six largest; first five lower labials contact first pair of chin shields. Two pairs of chin shields, anterior pair about equal to posterior pair, anterior pair has greater area; pair of smaller scales separates posterior pair of chin shields (Fig. 2C). Seven rows of gular scales between chin shields and anterior ventral scale. Scale rows 22-21-20. Scales in the first row at mid-body are 1.2 times taller than those in the second row. First six rows of dorsal scales very ovate; scales in row seven become more quadrangular. Ventrals are rounded, at mid-body about 3.5 times wider than nearby dorsal scale.

Ventral scales number 119, have rounded edges, and are 3.5-4.0 times the height of a nearby dorsal scale. Subcaudal number 43/42; tail ends in terminal spine. Scales on the crown have scattered spots of pigment on a grey-brown background.

Specimen faded from light and preservatives. Face and upper labials mottled with yellow and grey-brown, lower edges of upper labials yellow. Lower labials mottled with dark pigment on yellow background, chin uniform yellow. Outer edges of

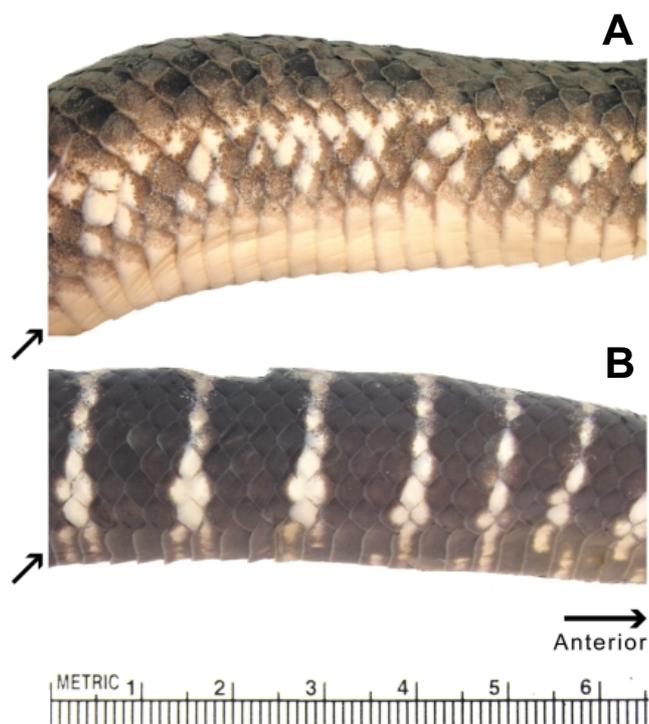
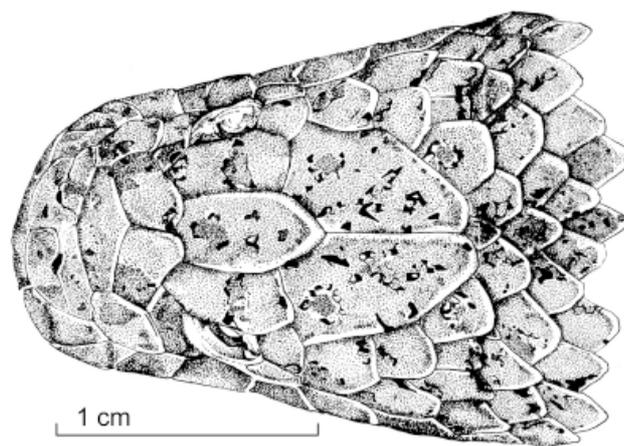
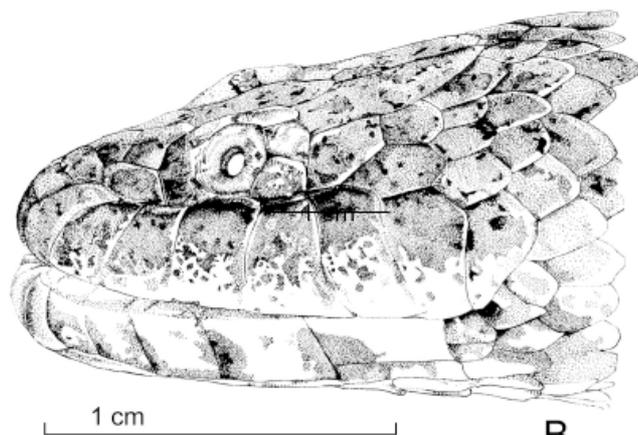


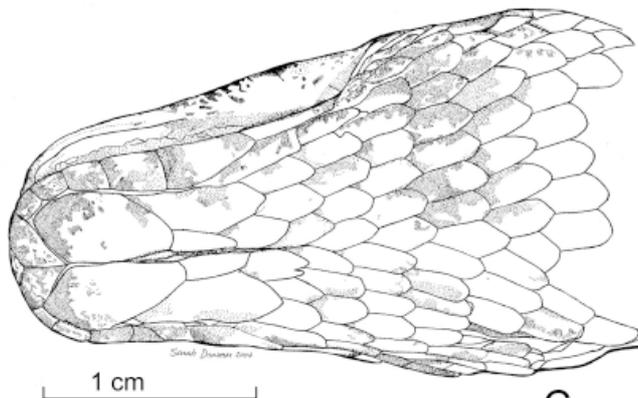
Fig. 1. A comparison of the lateral patterns on the body of *Enhydris chanardi* (A) UMMZ 65336 and *Enhydris jagorii* (B) ZMA 4746. The specimen of *Enhydris jagorii* (ZMA 4746) in the photograph is the type specimen. The small arrows indicate the ventral scale row in each photograph.



A



B



C

Fig. 2. Drawing of *Enhydris chanardi*, USNM 83431. A. dorsal view of head; B. lateral view of head; C. ventral view of head. Drawings by Sarah Drasner.

each ventral contain grey pigment which extends onto dorsal scale rows 1-2, and forms a stripe that runs the length of the body. Dorsal scale row three and the lower portion of scale row four have predominantly yellow pigment that forms a yellow stripe bordering the lower gray stripe. Yellow pigment occasionally intrudes into the more ventral gray stripe. Rows 5-7 contain black spots that involve 2-4 scales and are spaced 1-2 scale rows apart; spots number 47 on the right side and 45 on the left side. The dorsum is a grey-brown with a series of spots similar to those on rows 5-7; spots follow the vertebral line and number 37. The subcaudal scales have anterior dark pigment and posterior light pigment.

Variation. – The largest specimen measured was a female with a total length 544 mm and an 84 mm tail (15.4%). The smallest specimen, a male neonate, had a total length of 166 mm with a 39 mm tail (23.5%). A male from Chanthaburi, Thailand (BMNH 1987.1786) has the lowest ventral and subcaudal counts (110 and 44 respectively). All specimens examined had eight supralabials, the tallest of which could be number five (19%), six (50%), or seven (31%). The first 4-5 infralabials touch the anterior chin shields. The infralabials on 18 sides usually numbered 10 (67%), but some had 11 (22%), or 12 (11%). The largest infralabial was usually number six (80%), but occasionally number seven (20%). The temporal formula is usually 1+2+4, but two specimens show 1+2+3 on one side.

Etymology. – We are pleased to name this new species after our friend and colleague, Thai herpetologist, Mr. Tanya Chanard, who, like this newly recognized snake, is native to the Bangkok area.

Distribution. – Most of the specimens of this snake come from Bangkok or the surrounding area. Flower (1899) obtained three specimens in Bangkok and one (BMNH 97.10.8.28) at “Takhamen.” Presumably this location is Ta Kam (13°38'N 100°27'E) (also spelled Takam) just west of Bangkok. The locality for a specimen collected by H. M. Smith at Ban Pan on the Sikuk (or Sikut River) could not be found. BMNH 1987.1786 from Chanthaburi (12°36'N 10°29'E) in the Coastal Ranges to the southeast of Bangkok suggests the species is more widespread than the immediate Bangkok metropolitan area.

Natural History and Conservation. – Relatively little is known about the habitat, food habits, and reproduction of this species. Most known localities lie within freshwater environments of metropolitan Bangkok. The specimen USNM 83431 is a female with 14 well-developed embryos. We have not yet found an extant population, although the Chanthaburi specimen was collected in the past 20 years. Efforts should be undertaken to locate existing populations.

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APPENDIX 1. Comparative Material

- Enhydris enhydris* – Borneo: ANSP 26401-02; Cambodia: FMNH 259359-67, 259372-73, 259375, 259377; India: ANSP 5091-94; FMNH 154593, 161446, 165097-102; Myanmar: KU 92471, 92476, 92478-80, 92482-83, 92485-86, 92488, 92491, 92557; Sri Lanka: CAS 12767; Vietnam: FMNH 259093-100.
- Enhydris innominata* – Vietnam: BMNH 1938.1.13.1; FMNH 259101-07; 259247-54; ROM 37891, 37893.
- Enhydris jagorii* – Thailand: BMNH 1928.12.18.1, 1930.1.1.3, 1948.1.2.27; FMNH 179114; THNHM 0924-0927, THNHM no number Bangkok; ZMA 4746.
- Enhydris longicauda* – Cambodia: FMNH 259255-281; MNHN 1948.96, 1970.526-540.