

# A New Species of *Chelodina* (Testudines: Chelidae) from Southwestern New Guinea (Papua, Indonesia)

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**Abstract.** The recent discovery of snake-necked turtles in the Mimika District of western Papua, Indonesia, represents a new distribution record for the genus *Chelodina*; leading here to the description of a morphologically distinct species, *Chelodina gunaleni* sp. nov. This new species appears to be biogeographically isolated (allopatric) from all previously known snake-necked turtle populations in New Guinea. A formal description and diagnosis are given herein.

**Key words:** Turtle, Pleurodira, chelid, *Chelodina gunaleni* sp. nov., Irian Jaya, Papua, Indonesia, New Guinea.



Extant species of side-necked turtles (Pleurodira Cope, 1864) are assigned to three families: Chelidae Gray, 1825, Podocnemidae Cope, 1868, and Pelomedusidae Cope, 1868. Within the family Chelidae, the genus *Chelodina* Fitzinger, 1826, includes species of snake- or long-necked turtles. Historically (GOODE, 1967; BURBIDGE et al., 1974) and recently (GEORGES et al., 2002), *Chelodina* has been designated as comprising first two, then three subgeneric groups: A (= *Chelodina*), B (= *Macrochelodina* Wells and Wellington, 1985), and C (unnamed, containing only *Chelodina oblonga* Gray, 1841, = *Chelodina colliei* Gray, 1856).

*Chelodina* of the Mimika District, Papua, Indonesia, are morphologically similar to species in subgeneric group A, also called the “*Chelodina longicollis* group”; the Mimika District *Chelodina* population is thus herein designated a member of subgeneric group A. The turtles of this subgeneric group have generally narrower, more rounded heads, longer intergular scutes, vestigial barbels, shorter and thinner necks with tubercles, and broader plastrons. More specifically, *Chelodina* of the Mimika District

are morphologically similar to species of the *Chelodina novaeguineae* complex — within subgeneric group A (see McCORD and THOMSON, 2002); the Mimika District *Chelodina* population is thus herein designated a member of the *Chelodina novaeguineae* complex. Shared characters in species of the *Chelodina novaeguineae* complex include enlarged anterior bridge struts, wider triturating surfaces, narrower parietal crests, relatively more robust heads (for subgeneric group A) and shells, and an overall brown coloration.

*Chelodina novaeguineae* Boulenger, 1888 — of subgeneric group A and the *Chelodina novaeguineae* complex — is also found in the lowlands of New Guinea. However, its known range is from extreme eastern and extreme southeastern Merauke and extreme southeastern Boven Digoel districts, Papua, Indonesia, to the western region of the Gulf Province of Papua New Guinea, making it biogeographically separate from the *Chelodina* population of the Mimika District, Papua, Indonesia.

*Chelodina reimanni* Philippen and Grossman, 1990, is the only other known species of subgeneric group A and the *Chelodina novaeguineae* complex found in



*Chelodina gunaleni*, adult female head.  
Photo: G. Cosentino



*Chelodina gunaleni*, dorsal view. Photo: C. Green



*Chelodina gunaleni* habitat — swamps in Uta River basin. Photo: D. Gunalen



*C. gunaleni* holotype AMNH #R-160133  
— carapace. Photo: W. P. McCord



*C. gunaleni* holotype AMNH #R-160133  
— plastron. Photo: W. P. McCord



*C. gunaleni* paratype AMNH # R-160131  
— carapace. Photo: W. P. McCord



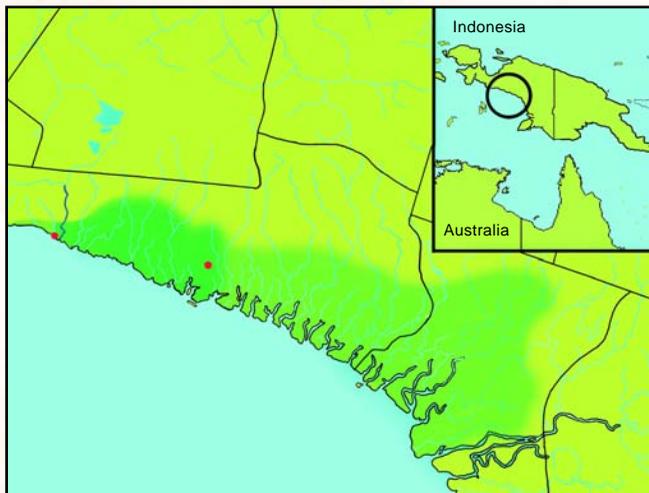
*C. gunaleni* paratype AMNH # R-160131  
— plastron. Photo: W. P. McCord

the lowlands of New Guinea. It is known only from the Merauke District, Papua, Indonesia, and thus is also biogeographically separate from the *Chelodina* population of the Mimika District (McCORD and JOSEPH-OUNI, 2004).

*Chelodina pritchardi* Rhodin, 1994, is found in the Central Province of eastern Papua New Guinea. Although it is a member of subgeneric group A, it is not a member of the *Chelodina novaeguineae* complex, and thus is morphologically distinct from the *Chelodina* of the Mimika District, Papua, Indonesia, as already herein described.

All other known New Guinea long-necked turtles are members of subgeneric group B (GOODE, 1967; BURBIDGE et al., 1974). Thus, *Chelodina parkeri* Rhodin and Mittermeier, 1976, and *Chelodina siebenrocki* Werner, 1901, of the Merauke District, Papua, Indonesia, and the Western Province, Papua New Guinea, are morphologically distinct from the *Chelodina* of the Mimika District, Papua, Indonesia, as already herein described.

At this time the only threat to the Mimika District *Chelodina* is local consumption, at what seems to be a sustainable level (GUNALEN, pers. obs.).



Known (darker green shading) and suspected (lighter green shading) distribution of *Chelodina gunaleni* in Papua, Indonesia. Red dots indicate Uta and Timika villages. The Uta River is shown in a darker blue than all other rivers.

After many years of working with *Chelodina* specimens from New Guinea, we present here an original description of an isolated species from western Papua, Indonesia. This is published to provide a public and permanent scientific record. Date of publication: *Reptilia* (GB) no. 52 (no. 65/ES and no. 14/IT), Castelldefels, Spain, mailed 1 June 2007.

#### Taxonomy

##### GUNALEN'S LONGNECK TURTLE

*Chelodina gunaleni* sp. nov.

Order Testudines Linnaeus, 1758

Suborder Pleurodira Cope, 1864

Family Chelidae Gray, 1825.

Holotype (designated herein). American Museum of Natural History (AMNH) #R-160133: an adult female, preserved in alcohol, collected by Danny Gunalen and Meisutamta Teng in a swamp of the Uta River basin, southern coastal Papua, Indonesia.

Paratype (designated herein). AMNH #R-160131: an adult male, preserved in alcohol, collected by Danny Gunalen and Meisutamta Teng in a swamp of the Uta River basin, southern coastal Papua, Indonesia.

Type locality. The Uta River basin, Mimika District, Central Papua Province (Irian Jaya), Indonesia.

Distribution. Known to be found in all swampy waters between the vicinities of Uta and Timika villages, Mimika District, southern coastal Papua, Indonesia. Suspected to be found in all freshwater swamps in Mimika and Asmat districts from the Uta River basin to the Baliem River basin.

Etymology. This species was named in honor of Mr. Danny Gunalen of Jakarta, Indonesia, for his field expertise and his involvement in the discovery of these turtles.

#### Description

Head. The head is narrow in the male and moderately robust in the adult female, sometimes displaying features of megaloccephaly. It has small elevated irregular scales on the masseters; a parietal roof of

intermediate width (relative to head width); barbels usually absent, or present as two thin vestiges; a blunt and moderately sloped snout; and wide triturating surface. The iris is yellow in the center with a black periphery. Dorsal head coloration in the wild is orange-brown with some black muting (degree of melanism), especially in the center. The tympanum, mandible, maxilla, nose, and underside of the head are a creamy yellow.

**Neck.** The neck is 50–60% as long as the carapace length. It bears moderately based, bluntly pointed tubercles; these are more pointed males and young females, becoming more rounded in females with age. Dorsal coloration of the neck is gray-black. Ventral coloration of the neck is creamy yellow.

**Carapace.** The carapace is known to reach a length of at least 239 millimeters. It is fairly round, widest at the seventh marginal scute, and mildly rugose with no median groove, no median keel, and no growth rings naturally present. The length of the nuchal scute is a little more than 10% of the carapace length; the first marginal is slightly larger in dorsal surface area than the second marginal; the lateral marginals (M4–7) do not upturn; the seventh to ninth marginals flare; the supracaudals (M12) are negligibly (if at all) elevated over the tail; the fifth vertebral scute is usually wider than it is long. Carapace coloration is a chocolate brown background with varying degrees of black muting on the vertebral, costal, and eighth to twelfth marginal scutes.

**Plastron.** Relative to the plastral length, the plastral width is intermediate for subgeneric group A; relative to carapace length, plastral width is low for subgeneric group A. Inguinal width is 92% of axillary width; the width at the femoral/anal seam is 69% of the width at the humeral/pectoral seam. The plastral lobes narrow going both anteriorly and posteriorly; the anterior plastral lobe is wider than the posterior plastral lobe. The distance between the humeral seams of the intergular scute increases going posteriorly. The anterior edge of the plastron ends exactly at the caudal border of the ventral marginals and shows no skin when viewed from below. The gular/intergular seams are longer than the humeral/intergular seams. The plastral seam formula is  $IG \text{ scute length} > IAN > IAb > IP(70\%) > IF > IG$ . There is an intermediate plastral notch. Bridge length relative to carapace length is high for subgeneric group A. Axillary and inguinal scutes are absent. The ventral surface of the sixth marginal scute of the carapace is 50–55% of the width of the ventral seventh marginal. The ventral seventh marginal aligns with (helps form the border of) the anterior inguinal notch, which usually brings the pectoral/abdominal seam of the plastron to meet the marginals of the carapace at, or just caudal to the fifth/sixth marginal seam. The plastron is equally flat in both sexes. Plastral coloration is a uniform pale yellow with no dark markings present.



Adult female (left) and adult male (right) *Chelodina gunaleni*. Note sexual dimorphism. Photo: D. MacKinnon



*Chelodina gunaleni*, head and neck. Photo: D. Gunalen

Males are 30% smaller than females and have relatively thicker, longer tails. There are five horizontal scales on the dorsal surface of each foreleg. Soft parts are gray-black dorsally and creamy yellow ventrally.

### Diagnosis

The following differentiates in detail *Chelodina gunaleni* **sp. nov.** from its only New Guinean congeners in both subgeneric group A and the *Chelodina novaeguineae* complex: *C. novaeguineae* and *C. reimanni*. Of the characters given in the foregoing description, only those that differentiate these species are given here.

*Chelodina gunaleni* can be differentiated from *C. novaeguineae* as follows:

**Head.** The head of female *C. gunaleni* is more robust than that of *C. novaeguineae* ( $HW \times HD/HL$ ), whereas the head of male *C. gunaleni* is similar in robusticity to the head of *C. novaeguineae*. The parietal roof is narrower (relative to head width) in *C. gunaleni* than in *C. novaeguineae*. *C. novaeguineae* is not known to display megaloccephaly as do some



Photographic identification key for *Chelodina gunaleni*: step 1 – note M1 is larger than M2; step 2 – note V5 is wider than long; step 3 – note the humeral/intergular scute seams are shorter than the gular/intergular scute seams; step 4 – note the gular/humeral scute seams are equal to or nearly equal to the gular/intergular scute seams, forming a “W” composed of four equal parts. Photos: G. Cosentino

female *C. gunaleni*. The interorbital width is greater (relative to head width) in *C. gunaleni* than in *C. novaeguineae*. Although barbels are usually absent in both forms, when present they are thin in *C. gunaleni*, tubercle-like in *C. novaeguineae*. The snout in young adult *C. gunaleni* is more steeply sloped and blunter than the less sloped and more conical snout of *C. novaeguineae*. The dorsal head color of wild *C. gunaleni* is distinctly orange-brown compared to the brown dorsal head color of *C. novaeguineae*.

Neck. The neck of *C. gunaleni* bears moderately based, bluntly pointed tubercles, whereas the neck of *C. novaeguineae* bears moderately based rounded tubercles. The dorsal neck color of *C. gunaleni* is a much darker tone of gray-black than the dorsal neck color of *C. novaeguineae*.

Carapace. The carapace of female *C. gunaleni* is known to reach about 30% greater length than the carapace of female *C. novaeguineae*; carapace length in males does not differ significantly between the two forms. The carapace is rounder (CW/CL is greater) in *C. gunaleni* than in *C. novaeguineae*. The carapace of *C. novaeguineae* is more rugose. The first marginal scute is consistently larger than the second marginal (dorsal surface area) in *C. gunaleni*, whereas the sizes of the first and second marginals are equal or nearly equal in *C. novaeguineae*. In *C. gunaleni* the length of the nuchal scute is a little more than 10% of the carapace length; in *C. novaeguineae*, a little less than 10% of the carapace length. The black muting of the vertebral and costal scutes is darker in *C. gunaleni* than in *C. novaeguineae*.

Plastron. The anterior lobe of the plastron of *C. gunaleni* is relatively larger than that of *C. novaeguineae* — apparent in the way the anterior border of the plastron of *C. gunaleni* covers all ventral carapacial skin when viewed from below, whereas the anterior border of the plastron of *C. novaeguineae* leaves skin exposed both anteriorly and anterolaterally when viewed from below. The gular/intergular seams are longer than the humeral/intergular seams in *C. gunaleni*, whereas the opposite is true in *C. novaeguineae*. In *C. gunaleni* the gular/humeral seams are equal in length to the gular/intergular seams, forming a “W” composed of four equal parts, whereas in *C. novaeguineae* the gular/intergular seams are longer than the gular/humeral seams, making the gular scutes more rectangular. The bridge is longer (relative to carapace length) in *C. gunaleni* than in *C. novaeguineae*. In *C. gunaleni* the ventral surface of the sixth marginal scute of the carapace is 45–50% narrower than the ventral seventh marginal, whereas in *C. novaeguineae* the ventral sixth marginal is 35–40% narrower than the ventral seventh marginal; thus *C. gunaleni* has a more flared appearance from below. In *C. gunaleni* the pectoral/abdominal seam of the plastron usually meets the marginals of the carapace at or just caudal to the fifth/sixth marginal seam, whereas in

Data Table for *Chelodina gunaleni* sp.nov.

	CL	CW6	CW7	CW8	CD	V1L	V2L	V3L	V4L	V5L	V1W	V2W	V3W	V4W	V5W	M1L
AMNH #160133	199.95	148.88	156.65	153.67	65.07	43.18	-	-	-	33.04	50.02	42.05	-	-	47.15	22.92
AMNH #160131	147.28	112.26	113.96	108.50	46.21	31.56	24.69	19.37	20.82	29.29	37.95	39.57	38.10	27.63	34.62	14.39

**Morphometric Key**

CL = straight midline carapace length; CW6,7,8 = straight carapace width at 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> marginals; CD = maximum carapace depth; V1–5L = vertebral number length; V1–5W = vertebral number width; M1–2 L & R = marginal #1–2 length left and right side; PL = midline plastral length; PWA = plastral width at axillary notch; PWI = plastral



Plastral view of hatchling *Chelodina gunaleni*. Photo: D. Gunalen



Head of juvenile *Chelodina gunaleni*. Photo: D. Gunalen

*C. novaeguineae* the pectoral/abdominal seam meets the marginals at or just anterior to the fifth/sixth marginal seam.

There is greater sexual dimorphism in *C. gunaleni* with males 30% smaller than females; in *C. novaeguineae* males are 12% smaller than females.

Dorsal coloration of soft parts is darker in *C. gunaleni* than in *C. novaeguineae*.

*Chelodina gunaleni* can be differentiated from *C. reimanni* as follows:

**Head.** The robusticity of the head (HW x HD/HL) is 22% less in *C. gunaleni* than in *C. reimanni*; megaloccephaly is more common (both sexes) in *C. reimanni*. The intermediate parietal roof is wider (relative to head width) in *C. gunaleni* than in *C. reimanni*. The small irregular scales on the masseters are flat to slightly elevated in *C. reimanni*, but always elevated in *C. gunaleni*. Although barbels are usually absent on both forms, when present they are thin in *C. gunaleni*, more tubercle-like in *C. reimanni*. The snout of *C. reimanni* is more steeply sloped and blunter than that of *C. gunaleni*. The dorsal head color of wild *C. gunaleni* is orange-brown compared to the brown dorsal head color of *C. reimanni*; the underside of the head is a creamy yellow in *C. gunaleni* compared to white in *C. reimanni*.

**Neck.** The neck is 50–60% as long as the carapace length in *C. gunaleni*, compared to 46–50% in *C. reimanni*. The tubercles on the neck of *C. gunaleni* are moderately based and bluntly pointed, whereas those of *C. reimanni* are broad based and round. The

ventral neck color is a creamy yellow in *C. gunaleni* compared to white in *C. reimanni*.

**Carapace.** The carapace of female *C. reimanni* is known to reach about 5% greater length than that of female *C. gunaleni*; carapace length in males does not differ significantly between the two forms. In *C. gunaleni*, the widest point of the carapace is clearly at the seventh marginal, whereas in *C. reimanni* the width at the eighth marginal often equals or is greater than the width at the seventh marginal. The carapace is rounder (greater CW/CL) in *C. gunaleni* than in *C. reimanni*. The first marginal scute is consistently larger than the second marginal (dorsal surface area) in *C. gunaleni*, whereas the sizes of the first and second marginals are equal or nearly equal in *C. reimanni*. The supracaudals (M12) are negligibly elevated in all *C. gunaleni*; likewise for male and young female *C. reimanni*, but in many adult female *C. reimanni* the supracaudals are substantially elevated. In *C. gunaleni* the length of the nuchal scute is consistently a little more than 10% of the carapace length; in *C. reimanni* the length of the nuchal scute varies from a little more to a little less than 10% of the carapace length. Adult female *C. reimanni* develop a shallow median groove, which is absent in *C. gunaleni*. Adult female *C. reimanni* often develop a median keel, which is absent in *C. gunaleni*. Black carapacial muting is more complete on most *C. reimanni* than on *C. gunaleni*.

**Plastron.** The anterior plastral lobe of *C. gunaleni* is relatively larger than that of *C. reimanni* — apparent in the way the anterior border of the plastron of *C. gunaleni* covers all ventral carapacial skin when

M1R	M2L	M2R	PL	PWA	PWI	PWHP	PWFA	BL	IG	IGSL	IP	IAb	IF	IAn	HL	HW	HD	IOW	PRW
21.65	18.54	19.46	156.71	93.41	84.11	86.88	57.41	42.81	8.63	47.93	20.00	28.44	19.32	31.34	46.11	33.19	23.17	7.03	6.36
14.39	14.83	14.39	114.05	66.87	63.91	61.54	43.61	25.13	6.51	37.08	15.60	15.89	13.99	23.23	35.89	26.64	17.88	6.06	3.90

width at inguinal notch; PWHP = plastral width at humeral/pectoral seam; PWFA = plastral width at femoral/anal seam; BL = bridge length; IGSL = intergular scute length; IG, IP, IAb, IF, IAn = midline plastral inter-scute seam lengths; HL = head length; HW = head width at tympana; HD = maximum head depth; IOW = inter-orbital width; PRW = parietal roof width.



Plastral view of a juvenile *Chelodina gunaleni*.  
Photo: D. Gunalen

viewed from below, whereas the anterior border of the plastron of *C. reimanni* leaves skin exposed both anteriorly and anterolaterally when viewed from below. The gular/intergular seams are longer than the humeral/intergular seams in *C. gunaleni*, whereas the opposite is true in *C. reimanni*. In *C. gunaleni* the gular/humeral seams are equal in length to the gular/intergular seams, forming a "W" composed of four equal parts, whereas in *C. reimanni* the gular/intergular seams are longer than the gular/humeral seams, making the gular scutes more rectangular. The *C. gunaleni* plastral seam formula is  $IG \text{ scute length} > IAn > IAb > IP > IF > IG$ . The *C. reimanni* plastral seam formula is  $IG \text{ scute length} > IAb > IAn > IF > IP > IG$ . The bridge is longer (relative to carapace length) in *C. gunaleni* than in *C. reimanni*, which has the shortest bridge (relative to carapace length) of all species of *Chelodina* in subgeneric group A. In *C. gunaleni* the ventral surface of the sixth marginal of the carapace is 45–50% narrower than the ventral seventh marginal, whereas in *C. reimanni* the ventral sixth marginal is 15–40% narrower than the ventral seventh marginal; thus *C. gunaleni* has a more flared appearance from below. In *C. gunaleni* the seventh marginal aligns with (helps form the border of) the anterior inguinal notch, whereas in *C. reimanni* the sixth marginal aligns with this notch. In *C. gunaleni* the pectoral/abdominal seam of the plastron usually meets the marginals of the carapace at or just caudal to the



Locals collecting *Chelodina gunaleni* in Uta River swamp. Photo by D. Gunalen

fifth/sixth marginal seam, whereas in most *C. reimanni* the pectoral/abdominal seam meets the marginals at or just anterior to the fifth/sixth marginal seam.

There is slightly more sexual dimorphism in *C. gunaleni* with males 30% smaller than females; *C. reimanni* males average 28% smaller than females.

Ventral coloration of soft parts is creamy yellow in *C. gunaleni*, but white in *C. reimanni*.

Note the diagnostic characters given in the introduction for all other New Guinean *Chelodina*.

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