

The Sulawesi Black Racer, *Coluber (Ptyas) dipsas*, and a Remarkable Ectoparasitic Aggregation¹

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ABSTRACT: Twelve specimens of the Sulawesi black racer, *Coluber (Ptyas) dipsas*, have been reported in the literature; none of these is from American collections. Morphology and relationships of the snake, based on a fresh specimen, are discussed. Thirteen ticks of two species, *Amblyomma cordiferum* and *A. helvolum* (Ixodidae), and the beetle *Aplosonyx nigripennis* (Chrysomelidae) were recovered from an old wound site on a 1465-mm female *Coluber dipsas* from Minahasa, Sulawesi Utara, Indonesia. Both tick species are new island and new host records. There have been no specific plant hosts reported to date for this beetle, of a phytophagous family.

ONE OF US (JDL) led an expedition to Sulawesi, Halmahera, and the Far Moluccas, Indonesia, in 1986. A number of remarkable discoveries were made, including a specimen of an apparently rare snake, a black racer. A tradition of ectoparasite collection resulted in a far more unusual discovery in this case. A cluster of ticks on the snake contained in their midst a beetle, firmly attached and apparently feeding in an ectoparasitic manner. All of the organisms found seem to require some comment and attention: snake, ticks, and beetle.

THE SULAWESI BLACK RACER, *Coluber dipsas*

Coluber dipsas is a rare snake in museum collections and very scantily reported in the literature. It bears a striking and detailed resemblance to the widespread, abundant North American *Coluber constrictor*, probably its closest living relative. It bears far less resemblance to the widespread continental Asian snakes *Coluber korros* and *C.*

mucosus usually placed with it in the spurious genus *Ptyas*, apparently on purely geographical grounds. The insular range of *C. dipsas* and its close relationship to *C. constrictor* argue for its status as a relict, not a recently derived autochthon, on Sulawesi.

Taxonomy

The species was originally described as *Herpetodryas dipsas* by Schlegel (1843). The description consists of a single paragraph. No type specimen was designated, and Schlegel did not state how many specimens he saw. He gave scale counts for only one individual. He mentioned no locality except "Celebes." Nevertheless, the color pattern and scale counts leave no room for doubt as to the species he had before him.

Schlegel (1843) separated *Herpetodryas* from *Coluber* (in which he put *constrictor*) on grounds of more elongate, slender habitus in the former and the fact that most *Herpetodryas* were green (*H. dipsas* being an obvious exception by his own description: "shining bluish-black"). The generic name *Herpetodryas* is not in use today.

Boulenger (1893) recognized the relationship of *dipsas* and *constrictor* and placed both in his genus *Zamenis*. Boulenger (1894) noted that *Coluber* closely "parallels *Zamenis*," the only difference being in dentition. This claim, which haunts us today, is that *Zamenis* has

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enlarged teeth on the posterior maxillary while *Coluber* has teeth of nearly equal size all along the maxilla. In fact, most individuals of most of the relevant species of *Coluber sensu lato* have the largest teeth on the rear of the maxilla. This is usually true in *Coluber constrictor*, type species of the genus. There is great individual variation in tooth size.

Barbour (1912) was the first to refer to our species as *Ptyas*, but this designation was not accepted by Rooij (1917), who retained *Zamenis* and virtually rewrote Boulenger's (1897) description. Barbour (1912: 193) listed *C. dipsas* from Halmahera in the Moluccas. He did so only in a table, however, and there was no mention of the species anywhere in his text. The high probability that Barbour never examined a specimen is indicated by the fact that ours is the first ever accessioned at the Museum of Comparative Zoology (MCZ 171461). Barbour always referred to *Coluber constrictor* as such.

Haas (1950) followed Barbour in placing *C. dipsas* in *Ptyas* without comment. Bosch (1985) followed suit, giving the now long defunct tooth character as definitive of the genus *Ptyas* and also listing Halmahera as a locality.

Distribution

The Halmahera record apparently comes from Roux (1904), who simply stated that the species was previously known only from North Celebes but is now known from Halmahera too. He gave locality data only for Celebes (Sulawesi) and cited no Halmahera specimen. The record should be discounted.

Before the collection of MCZ 171461, a minimum of 12 known specimens had been reported in the literature. Schlegel (1843) certainly had one. Boulenger (1893) examined another. Boulenger (1897) examined four more. Roux (1904) seems to have had at least one. Rooij (1917) examined specimens from two localities, Manado and Rurukan, but these are the same as seen by Boulenger. Bosch (1985) saw five individuals.

Localities range from Manado at essentially sea level (Boulenger 1893) to Rurukan at ca. 1100 m (3600 ft: Boulenger 1897),

mostly on the Minahasa Peninsula (north-eastern Sulawesi), but as close to the center of the island as Kantewu and Lemo in the Kulawi region at the peninsula's base (Bosch 1985).

Characteristics

Basic morphometrics from MCZ 171461, with variation taken from specimens examined at The Natural History Museum, London (BMNH) and gleaned from the literature (in parentheses) follow: dorsals at midbody, 13 (13); ventrals, 194 (187–198); subcaudals, 134 (132–139, discounting those with truncated tails); snout–vent length, 980 mm (other adults, 1297–1355 mm); tail length, 485 mm (no other adults seen have complete tails). Boulenger (1897) claimed a 2-m male with 550-mm tail, and Rooij (1917) gave apparently the same specimen as 1450 mm with a 550-mm tail. This specimen seems to be BMNH 1946.1.7.87 (formerly BMNH 64.4.7.10), a male from Manado that now measures 1355 mm snout–vent and has a truncated 505-mm tail.

In MCZ 171461 the tail is 33% of total length (1465 mm). In two juveniles, BMNH 96.12.9.52 and 53, the tails are 31% and 32% of total length, respectively. Roux (1904) reported a specimen with a tail 30% of total length.

Available color descriptions are so brief as to be misleading. MCZ 171461 was basically tricolor in life: satin black dorsally, olive gray-brown along the anterior sides, and ivory-white or cream on the anterior venter. The olive gray-brown includes the lips, lateral edges of the ventrals, and first three dorsal rows anteriorly. At ventral 20 black breaks through the gray-brown as a subrectangular bar to the ventrals. Thereafter posteriorly there are nine more black bars breaking the lateral gray-brown; the series terminates at ventrals 48–50. Then gray-brown appears as four irregular blotches on the sides in a ground of marbled black and cream-white to ventral 90. The chin, throat, and anterior venter are cream to ventral 54. Here black spotting, giving way to marbling, in turn giving way to cream spots in a black ground, extends to ventral 100. The posterior venter is satin black. See Figure 1.

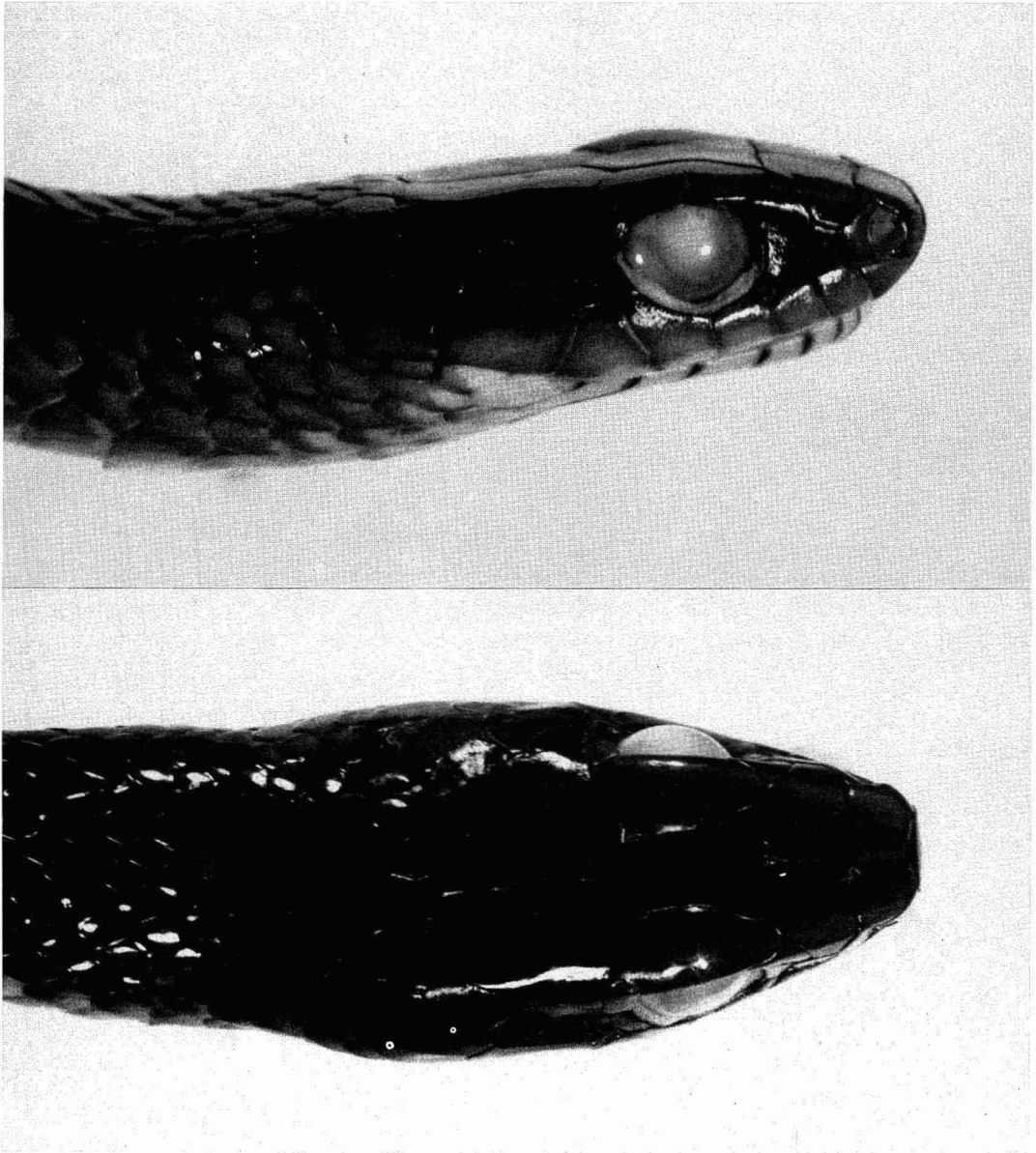


FIGURE 1. *Coluber dipsas*, MCZ 171461, from Minahasa, Sulawesi: *top*, lateral view of head; *bottom*, dorsal view of head. This specimen was host to two species of *Amblyomma* ticks and the beetle *Aplosonyx nigripennis*. Specimen in the Museum of Comparative Zoology, Harvard University.

The other adults seen are basically similar. In BMNH 1980.926, a male from Torro, Kulawi, central Sulawesi, there are 16 extensions of dorsal black (some just as scale edging) into the ventrolateral gray-brown.

These stop at ventral 60. There are irregular gray-brown spots ventrolaterally as far back as ventral 80. In BMNH 1946.1.7.87 seven black spots are present in the ventrolateral gray-brown to ventral 34. Then these connect

dorsally to make bars, as previously described, to ventral 82. There are then irregular gray-brown and cream spots and marblings to ventral 96. In this specimen there is a cream-white middorsal stripe, breaking into spots, to the level of ventral 50. Posteriorly this snake is satin black.

Color of juveniles closely resembles that seen in *Coluber constrictor*. BMNH 19.12.9.52, from Tomohon, Minahasa, is gray-brown with bold, anterior, saddlelike blotches. There are 24 blotches on the anterior 60% of the body. Thereafter the markings become irregular transverse mottlings that fade to uniform gray-brown on the posterior body and tail. The most anterior six saddlelike blotches are connected by narrow dorsolateral bars and are biconcave middorsally. This individual's total length is 537 mm.

Variation in the direction of the adult BMNH 1946.1.7.87 with the remnant middorsal light stripe is seen in juvenile BMNH 96.12.9.53 from Rurukan. On the anterior 39% of the body the blotches are amalgamated dorsolaterally by a continuous dark stripe, two to three scales wide, and broken middorsally to form a light nape stripe. The ventral extensions of dark pigment into the ventrolateral gray-brown (i.e., the ends of the remnant blotches) are subtended after a two-scale gap by irregular blackish areas, largely as scale edging. The midbody pattern is of irregular dark reticulation merging into uniform gray on the posterior body and tail. Total length is 456 mm.

The hemipenes of some *Coluber* have been described by Schatti (1986, 1987). He did not consider any members of nominal genus *Ptyas*. The left retracted hemipenis of BMNH 1946.1.7.87 had been dissected before examination by JDL. Its interpretation was facilitated by Dr. Garth Underwood, present at BMNH with JDL on 15 June 1988. The hemipenis extends to subcaudal 14. The base is bare. Six large frounces extend from the levels of subcaudals 3 to 6. Spines extend to the level of subcaudal 12; the largest are as long as one subcaudal width. Small frounces, forming a reticulate pattern not very different from calyces, cover the tip. The sulcus is simple and scarcely discernible distally. The

organ is not bilobate and probably tapers distally when everted. It is most like that of *Coluber diadema* (Schatti 1986, fig. 6), but the frounces are on the sulcate surface in *C. diadema* and on the absculate surface in *C. dipsas*.

Examination of hemipenes of *Coluber korros* and *C. mucosus* (at MCZ by JDL) revealed conditions intermediate between these simple organs and the strongly bilobate hemipenes of *Coluber constrictor*, *C. flagellum*, and other American members of the genus. Schatti (1987) referred to *Coluber* as "polyphyletic" but provided no evidence. It is merely diverse in hemipenial structure. Indeed, had Schatti included the species placed in *Ptyas*, both the morphological and geographic gaps in his concept of the genus would have been filled.

Ecology

There is nothing in the published literature on ecology. MCZ 171461 was found still twitching on the tarmac road 2 km south of Wakan Kampong, Minahasa, at ca. 500 m, in clove and coffee plantations with natural vegetation clumps dominated by tree ferns. The snake was run over at midday, so the species is apparently diurnal. There was nothing in the stomach or intestine to indicate diet.

All ticks and the beetle *Aplosomyx nigripennis* were clustered on an old, healing wound area extending from ventral 182 to ventral 187. The wound was largely on the left side, extending from the ventrals across 10 dorsal scale rows. The skin burst beside this old wound site when the snake was mortally wounded before collection, but the ectoparasites were not at the fresh wound. The evidence is that dense congregations of *Amblyomma* may be facultative exploiters of wound sites on *Coluber dipsas*.

THE TICKS (ACARI: IXODIDAE)

Two species of the genus *Amblyomma* were found, one female *A. cordiferum* Neumann (1899) and 12 male *A. helvolum* Koch (1844); all specimens were closely congregated around the old wound site described above.

Amblyomma cordiferum. This species was described by Neumann (1899) from an engorged female found in the Zoological Museum, Hamburg, that was obtained from an unspecified host collected on Banda Island, Moluccas. *Amblyomma cordiferum* was also reported on a python on Krakatau Island, Indonesia (Krijgsman and Ponto 1931). These python ticks may well have been sent to Professor Nuttall at Cambridge University, Nuttall Collection (N) 3616, and were subsequently cited by Keirans (1985). *Amblyomma cordiferum* has also been reported from Thailand on *Ophiophagus hannah* (Anastos 1950), from Malaysia on *Python reticulatus* and *Rattus tiomanicus jalorensis* (Audy et al. 1960), and from a snake on Upolu Island, Western Samoa (Buxton and Hopkins 1927). This last collection was donated to Nuttall (N 3568) and redetermined by Keirans (1985).

The specimen of *A. cordiferum* in this study is the first published record for Sulawesi and a new host record for *Coluber dipsas*. However, the U.S. National Museum of Natural History (USNM) has the following unpublished records for this tick in Sulawesi: from pig, *Sus scrofa* (3 collections); vegetation (1); domestic buffalo, *Bos bubalus* (1); and one record of the tick crawling on a human. Five of the collections were in the Lake Lindu area and one from Soroako (Rocky Mountain Laboratory [RML] 81380–81385).

The USNM also has 51 unpublished records of *A. cordiferum* (RML 103168–103218) from the Malaysian states of Johore, Kedah, Malacca, Pahang, Perlis, and Selangore, on the following reptiles: *Cuora amboinensis*, *Python reticulatus*, *Naja naja*, *Ophiophagus hannah*, *Boiga dendrophila*, *Geochelone emys*, and *Varanus salvator*. Mammal records include *Sus scrofa jubatus*, *Felis tigris*, *Manis javanica*, *Arctogalidia trivirgata sumatrana*, *Herpestes brachyurus*, and *Rattus tiomanicus jalorensis*.

In addition, there are 20 unpublished records of *A. cordiferum* in the USNM from collections made on Taiwan, all from snakes of the genera *Bungarus*, *Elaphe*, *Naja*, and *Coluber* (as *Ptyas*).

Very little is known about the biology of this tick, but it has been considered a

parthenogenetic species (Hoogstraal 1978). Its life cycle has been studied, and the duration from adult to adult ranged from 168 to 209 days. All adults reared from the eggs of a female were also females. These females fed and deposited fertile eggs, indicating that reproduction was by parthenogenesis (Ho and Ismail 1984). However, we have two males (RML 81381) taken on vegetation, Lake Lindu area, 945 m, Sulawesi, that probably represent the undescribed male of *A. cordiferum*.

Amblyomma helvolum. This species described by Koch (1844) is almost exclusively a reptile tick; most collections are from snakes or varanid lizards. This small *Aponomma*-like tick is found from the Nicobar Islands of India eastward through Thailand, Malaysia, Singapore, Vietnam, the Philippines, and Indonesia. The records of *A. helvolum* from Australia (Robinson 1926, Anastos 1950, Kohls 1950, Hoogstraal et al. 1968) are incorrect (Roberts 1970).

The male specimens of *A. helvolum* collected in this study are the only records of the species from *Coluber dipsas* and the first from the island of Sulawesi. Nothing is known of the biology or life cycle of this tick.

THE BEETLE (COLEOPTERA: CHRYSOMELIDAE)

Aplosonyx nigripennis. The occurrence of this species on an old healing wound of the black racer, *Coluber dipsas*, in company with ticks and apparently feeding there is most unusual. Nothing is known of the beetle's life cycle, though it belongs to a phytophagous family. The beetle's attraction to the old wound site may have been a response to odor. Plant compounds, insect pheromones, and various other compounds can be powerful attractants for certain insects.

Jacoby (1884) described *Aplosonyx nigripennis* from specimens collected in the "Sanghir Islands" and "North Celebes." This species is distinctive among congeners in usually having its elytra entirely black. Jacoby (1894) reported further specimens from Sulawesi and discussed color variations in the species. Weise (1913) and Laboissiere

(1932, 1940) reported further on its distribution. This species is catalogued in Weise (1924) and Wilcox (1971).

This species is reported from Belitung Island, Borneo, Sulawesi, and Sangihe (Sanghir) Islands. Most records come from the Minahasa Peninsula of northern Sulawesi. None of the references cited for this beetle included information on plant hosts.

Aplosonyx occurs throughout the Oriental Region. Species are known from India, Nepal, Sikkim, southern China, countries throughout Southeast Asia, plus insular Malaysia, Indonesia, and the Philippines. Some 39 species are listed in the latest catalog (Wilcox 1971); of these, 20 are reported through insular Malaysia and Indonesia.

Neither Maulik (1936) nor Gressitt and Kimoto (1963) cited plant host records in their respective treatments of *Aplosonyx* from India or China. In fact, little is reported on the life histories of most tropical chrysomelids. In general, these beetles are plant feeders in the larval and adult stages. Larvae are often found in the soil, where they feed on roots. Also, larvae may bore into roots, stems, leaves, or fruit, and some are surface feeders on stems and leaves. Adults may occur in large numbers on or near the host plants; this would explain why sometimes long series of certain species are found in museum collections. However, our specimen from *Coluber dipsas*, a female, is the first accessioned in the Bishop Museum, Honolulu, Hawaii. It is shown in Figure 2.

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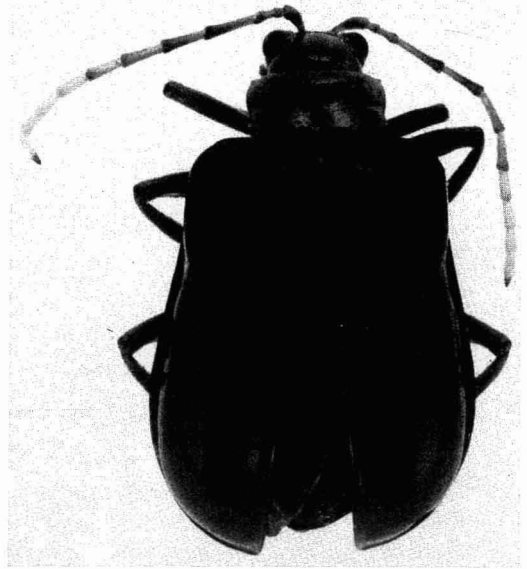


FIGURE 2. The chrysomelid beetle *Aplosonyx nigripennis*, collected clustered with ticks on the Sulawesi black racer, *Coluber dipsas*. Specimen in the Bishop Museum, Honolulu.

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