Distribution of the Racer Coluber constrictor in Mexico
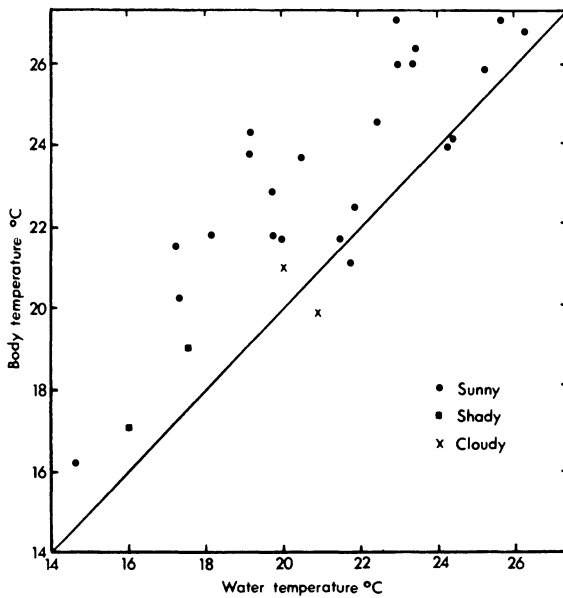
Hobart M. Smith

FIGURE 2. Body temperatures of mink frogs plotted against ambient water temperatures. Solid line indicates where body temperature equals water temperature.

tary temperature 9.5 C below that given by Brattstrom (1963).

Body temperatures of partly submerged mink frogs approximated ambient air and water temperatures (Figs. 1, 2). Animals collected under sunny conditions usually had body temperatures that exceeded the environmental temperatures. Solar radiation served to raise a frog's internal temperature above the level determined by heat conduction from surrounding air and water. By selecting a microhabitat in which radiant heat and air and water temperatures are at a maximum, a mink frog may maintain its body temperature at the highest level possible under local environmental conditions. The maximum voluntary temperature of *R. septentrionalis* is listed as 30.5 C by Brattstrom (1963).

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DISTRIBUTION OF THE RACER *COLUBER CONSTRICTOR* IN MEXICO

The status of the nominal species *Coluber oaxaca* (Jan, 1863) was altered materially by Wilson (1966) from an earlier concept of a distinct species to consubspecificity with *Coluber constrictor stejnegerianus* (Cope, 1895), thus replacing the latter name as *Coluber constrictor oaxaca* (Jan). Although three specimens of the subspecies have been recorded from southern Mexico, all bear uncertain locality data ("Colima", "Oaxaca"). Accordingly a specimen (Univ. Colo. Mus. 39897) taken by Mr. Thomas MacDougall at Ocuilapa, about 8 km (straightline) NNE of Ocozocuautla, Chiapas, is of special interest. It provides the only definite locality for the species in southern Mexico, and although the locality is in southern Chiapas it lies well within the Atlantic drainage, and thus partially bridges the gap between the record for Petén (of *Coluber ortenburgeri* Stuart, 1934) and those for central Veracruz (Wilson, 1966: 44).

The specimen provides only one bit of evidence suggesting that *C. c. oaxaca* (*s. s.*) may be separable from populations referred to *C. c. stejnegerianus* by workers prior to 1952. It is a male, 713 mm total length, tail 194 mm; 8-8 supralabials, 2 and 3 contacting loreal; 9-9 infralabials; 2-2 oculars; 1-2-2 temporals; 17-15-15 scalerows, reducing to 17 at the 4th ventral (counting as the first the ventral following the level of the posterior supralabial), to 15 at the 77th and 78th ventrals; ventrals 161; caudals 91; relative position of 17-15 scalerow reduction (RPR) 48.1; two large basal hemipenial hooks; 16 maxillary teeth; 20 dentary teeth.

Southern individuals of *Coluber constrictor* have an RPR close to 50; this figure is typical of *C. c. stejnegerianus* (*auctorum*), according to Etheridge (1952: 190), who records a mean of 50.9 (range 40.1-57.5) for that population; in the northern and eastern subspecies the mean is considerably higher (as high as 66 or more, *fide* Etheridge, 1952, and Auffenberg (1955: 130)). The character may have high percentage reliability in differentiation of *C. c. oaxaca* (*s. l.*) but suggests no regional differentiation within the latter.

Another character that might be suggestive of regional differentiation at the subspecific level within *C. c. oaxaca* (*s. l.*) is the single anterior temporal in the Chiapas specimen. The "Colima" specimen has 1-2-2 temporals also on one side, but 2-2-2 on the other side; the latter number, typical of the species, occurs in the type of *oaxaca,* and in the type of *ortenburgeri* there are three anterior temporals. The character seems actually to be uncorrelated in variation.

The only other character now known that may distinguish *C. c. oaxaca* (*s.s.*) from *C. c. stejnegerianus* (*auctorum* pre-1952) is the disturbingly large number of dentary teeth (20) in the Chiapas example. Etheridge (1955: 131) found only 16-18 dentary teeth in 31 *stejnegeri,* and only in *C. c. constrictor* (17-22) and *C. c. priapus* (16-20) did he find an equally high number (*C. c. paludicolus* probably has 20 or more; he sampled only 2 to find a range of 18-19 in that subspecies). Perhaps the range of variation in dentary teeth is simply greater in *C. c. oaxaca* (*s. l.*) than formerly supposed; indeed this seems to be the conclusion of choice at present, in the absence of comparative data on other material from Mexico and Guatemala. The range of variation accepted under such an assumption is 5 (16-20) in *C. c. oaxaca* (*s. l.*) but that range is matched in *C. c. priapus* with 68 counts, and exceeded by 1 (17-22) in *C. c. constrictor* with 51 counts. Nevertheless the huge series examined of *C. c. mormon* (203) yielded counts only of 14-16 (a span of 3). Further data on this character may be critical in determination of the status of *Coryphodon oaxaca* Jan.

The distribution of *C. c. oaxaca* (*s. l.*) was accepted by Wilson (1966: 44, Fig. 1) as embracing parts of western Mexico, presumably on Pacific slopes. There are, however, no clear-cut records of occurrence on Pacific slopes. The record for "Colima" is based upon a zoo specimen received by Ditmars; its locality data are open to serious question. The "Oaxaca" record (from Jan) is ambiguous and can as easily refer to Atlantic as Pacific origin. The Coyotes, Durango, locality is indeed barely within Pacific drainage, but there is no evidence that the specimen may not actually have been taken on Atlantic slopes which lie near Coyotes. In the absence of clearcut evidence to the contrary, it seems advisable to conclude that the species occurs nowhere on Pacific slopes, in Mexico.

The specimens in Field Museum of Natural History from Coyotes, Durango (Sierra Madres, 8000 ft., Heller and Barber, Aug., 1904; No. 1503) and the Sierra del Carmen, Coahuila (Main spring at Campo Central, Rancho El Jardin, 5300 ft., Clifford C. Presnall, 3 Apr. 1945; No. 42379) were reexamined through the kindness of Mr. Hymen Marx, to whom I am much indebted for loan of the material. Both specimens are females; respectively they have 173, 160 ventrals; 96, 87 caudals; 7-7, 8-8 supralabials; 9-10, 9-10 infralabials; 100-101, 66-72 scalerow drop position; RPR 58.1, 43.1; 15, 15 maxillary teeth; 17, 17 dentary teeth. The Coyotes specimen is a juvenile with dorsal markings in the form of narrow saddles 2-3 scales long on anterior half of body. Although at least geographically the Coahuila and perhaps the Durango specimens appear more likely referable to *C. c. mormon* (as implied by Smith and Taylor, 1966:20), their characters require allocation to *C. c. oaxaca* (*s. l.*), as indicated by Wilson (1966). *C. c. mormon* seemingly never has more than 14 maxillary and 16 dentary teeth; the 15-17 counts of the Durango-Coahuila specimens are acceptable for *C. c. oaxaca* (*s. l.*). Data given by Ortenburger (1928: 221) provide a mean RPR for *C. c. mormon* of 55.35; this figure is not sufficiently different from that of *C. c.*

oaxaca (*s. l.*) to be useful for diagnosis (50.9 for *C. c. oaxaca* (*s. l.*), *fide* Etheridge, 1952), and is not as different as Etheridge's table (1952: 190) suggests. Data given by Webb (1960: 292) on two specimens from about 10 mi S Cuatro Ciénegas, Coahuila, yield an RPR of 51.7 and 58.4. However, the count of 173 ventrals is one higher than the 151-172 range for *C. c. oaxaca* (*s. l.*) given by Wilson (1966: 43), although typical for *C. c. mormon,* and the saddle-shaped dorsal blotches of the Durango juvenile resemble those of *C. c. mormon* rather than the crossbandlike bars of *C. c. oaxaca* (*s. l.*). The latter two discrepancies from *C. c. oaxaca* may be regarded as minor; allocation to *C. c. oaxaca* (*s. l.*) seems required by essential criteria.

Summary. — A specimen of *C. c. oaxaca* from Ocuilapa, Chiapas, provides the first precise locality record for the species in southern Mexico and substantiates Wilson's conclusion that *Coryphodon oaxaca* Jan, 1863, and *Zamenis stejnegerianus* Cope, 1895, are synonymous, although the extremely high dentary tooth count (20, as opposed to the expected range of 16-18) requires examination in further material. Coahuila and Durango *Coluber* seem to be referable to *C. s. oaxaca,* not to *C. s. mormon.* Apparently the species occurs nowhere on Pacific slopes in Mexico.

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AGGREGATION AND DISPERSAL BEHAVIOR IN CAPTIVE *GOPHERUS AGASSIZI*

It has been shown (Auffenberg, 1969a) that the South American forest tortoise, *Geochelone denticulata,* lacks a definite social pattern at low population densities but shows aggregation behavior when the number of suitable shelters is restricted or the population density is high. In a Utah study (Woodbury and Hardy, 1940) it was discovered that the desert tortoise, *Gopherus agassizi,* is solitary during the spring and summer but aggregates during the winter.

In an attempt at determining the basis for aggregation and solitary behavior, I studied a herd of desert tortoises, in my backyard, Orange, California. Eight tortoises were allowed 6 months to select sleeping and basking areas. On October 4, all but two of the sleep areas were eliminated by filling the areas with boulders. All of the tortoises but two then aggregated in the larger of the two sleeping areas. Urine samples, collected separately from male and female *Gopherus agassizi* were poured, on different days, over the two sleeping areas, with no apparent effect on aggregation behavior in the tortoises. When urine from male Berlandier's tortoise, *Gopherus berlandieri,* which has more ammonia smell to the human nose than the urine of the desert tortoise, was placed in the larger of the two sleeping areas, 4 of the 6 tortoises sleeping there left and slept in the open for two nights.