

Observations on Reptiles of Cerralvo Island, Baja California, México

RICHARD C. BANKS AND WESLEY M. FARMER

Cerralvo Island, the southernmost of the islands in the Gulf of California, has been the subject of considerable herpetological investigation in the present century (Banks, 1962). It was not until recently, however, that the first complete list of reptiles and amphibians of the island was published (Etheridge, 1961). In the course of biological work on the island since the publication of Etheridge's paper, mostly by the senior author and various companions, additional information on the herpetofauna has come to light. The discovery of *Bufo punctatus* has already been reported (Crippen, 1962). It is the purpose of this paper to record the presence of two snakes not previously known to occur on the island and to record notes made on the habits and distribution of certain other reptiles.

Robert G. Crippen and Richard C. Banks visited the eastern side of Cerralvo Island from October 24 to 30, 1960. From October 23 to November 9, 1961, Banks and Michael Soulé camped near the site of the former Ruffo Ranch on the west side of the island. This locality is at the mouth of a large arroyo which extends far into the interior of the island. During the week of November 12 to 18, 1961, Banks had opportunity to visit briefly several other parts of the island, including the north and south tips and the sandy southwestern point.

The authors camped near the southwestern point of the island from May 20 to June 3, 1962. This is the part of the island which has been most visited by herpetologists (Cliff, 1954; Figg-Hoblyn and Banta, 1957; Etheridge, 1961; Soulé, 1961). Since this is the area where most of the observations reported here were made, the following description is offered.

Camp was established in the shelter of a sand dune just behind the beach near the north end of a large dry salt flat. The salt flat, apparently subject to periodic flooding, was partly covered by a dense growth of *Salicornia* and other salt marsh plants. To the north the salt flat merges into an area of extremely dense brush, with much *Bursera* and *Jatropha* and several species of cactus. This brush is penetrable for only a short distance. There is a narrow band of dense vegetation on a gentle talus slope between the salt flat and the steeply rising hill to the east. Toward the south the flat merges with an area of sparsely vegetated sand dunes and

with dense brush at the mouths of small arroyos. The beach at our camp afforded easy access to the sand dunes and to a broad, well vegetated arroyo to the north.

Daily maximum temperatures ranged from 84° to 101°F; night-time temperatures varied between 60° and 74°F. The highest temperature recorded, in the sun, was 115°F.

Work on Cerralvo Island is being carried out with the aid of a grant from the National Science Foundation, through the California Academy of Sciences. Field headquarters in La Paz are maintained by the Belvedere Scientific Fund. Farmer's visit to the island was made possible with the cooperation of the San Diego Natural History Museum. We wish to thank Mr. and Mrs. Richard Adcock, of La Paz, for their friendly assistance on many occasions. Charles E. Shaw provided the sex determinations for the snakes.

Specimens reported herein have been deposited in the collections of the California Academy of Sciences and the San Diego Natural History Museum.

Phyllodactylus unctus.—This species was first reported from Cerralvo Island by Etheridge (1961) who captured one under loose rocks of a canyon wall. One was collected on June 1, 1962, under a dry barrel cactus in loose talus. A specimen was taken from under a fallen cardón (*Pachycereus*) at the north end of the island on November 17, 1961.

Ctenosaura hemilopha insulana.—Although ctenosaurs are most common on the dry slopes they occasionally are found very close to the shore. One was disturbed from a rock about two feet above the surf; it ran into a hole in a nearby cliff some six feet above the water. Ctenosaurs were often seen sunning themselves on the tops of cardóns up to 15 feet above the ground and in brush about three feet high. Twice these lizards were seen in cavities in cardóns; one of these was further observed eating the petals from flowers at the top of a cardón. On October 29, 1960, a ctenosaur was seen carrying a large living dragon-fly in its mouth.

Dipsosaurus dorsalis lucasensis.—Etheridge (*op. cit.*) reported this lizard from the dune and beach areas and from adjacent dry canyons, but did not find it on the slopes. In the arroyo north of the dune area they were most abundant in the lower ½ mile; as the arroyo became narrower and more heavily vegetated the lizards were less common. Some were seen, however, on the ridges bounding the arroyo and at the head of the arroyo near the divide of the island, at an elevation of approximately 2,000 feet. They were also seen on the hills near the coast.

Cnemidophorus ceralbensis.—The whiptail lizard is one of the most abundant and widely distributed lizards on the island, along with *Sator grandaevus* and *Ctenosaura hemilopha*. They are very

susceptible to capture in buried can traps; several were also captured in mouse traps which had been left set during the day. On May 21, 1962, a pair was observed copulating. Testes of males collected in the next two weeks were greatly enlarged.

Leptotyphlops humilis slevini.—A western worm snake was found in a buried can trap on the morning of May 26, 1962. It was captured in a flat area of coarse sand at the juncture of the salt flat and dense brush, at the base of a *Bursera*. This individual, a female, was 245 mm. in length (CAS 93009). On June 3 a second worm snake was caught in another can trap. This trap was buried in gravel near a recently fallen cardón at the edge of a gentle talus slope bordering the salt flat. This specimen (SDNHM 44393) was also a female, and was 251 mm. in length. In both instances, the snakes are presumed to have fallen into the traps during the preceding nights. Both can traps were partly covered by logs or bark.

The stomach of the specimen taken on June 3 contained parts of six ants and 14 ant larvae of various sizes. The specimen of May 26 had an empty stomach.

Abnormal scalation was noted on the left side of the head of the second specimen captured. The occipital scale extends anteriorly to meet the ocular, separating the parietal from the posterior supralabial. The parietal is considerably shortened. Squamation on the right side of the head of this snake is normal, as it is on the other specimen. Apart from this oddity, both specimens are typical of *L. h. slevini* of the Cape region of Baja California. This is the first record of this species from Cerralvo Island.

Masticophis flagellum piceus.—This is the most frequently observed snake on the island, and is probably the most abundant. Only the dark phase has been noted in at least 16 snakes seen by Banks.

Lampropeltis getulus conjuncta.—This species was first reported from Cerralvo Island by Figg-Hoblyn and Banta (1957). A second specimen was obtained on October 29, 1961, by Banks and Michael Soulé. The snake was lying coiled in the shade of a large bush near Ruffó's Ranch in the morning, with the posterior half of a *Dipsosaurus* protruding from its mouth. When the snake was disturbed, it regurgitated the lizard, which was still living. The snake was approximately four feet in length, the lizard approximately one foot.

Chilomeniscus savagei.—This sand snake has previously been known from only three specimens (Cliff, 1954; Etheridge, 1961), all taken in the sand dunes on the southwestern part of Cerralvo Island. On the evening of May 20, 1962, Mr. Richard Adcock noticed a movement in the sand at his feet and Farmer picked up a sand snake from just below the surface of the dune. This was ap-

proximately 10 feet from the nearest vegetation, and 50 feet from the water, at an elevation of about 15 feet. This snake was a female (CAS 92994). Its stomach contained an ant head, chitonous material, and dirt.

Another individual (SDNHM 44394) was dug from a sand dune on May 23. This was also a female and was approximately 237 mm. in length. The measurement may be in error by a few millimeters because the snake was cut in two. The stomach of this individual contained chitonous material and a considerable amount of sand. A third specimen was taken on the surface of litter at the base of the cliff-like wall of the arroyo approximately $\frac{1}{4}$ mile from shore. This specimen (CAS 93014) was a female 224 mm. long. Its stomach contained the remains of scorpions.

Tracks of this species were seen in a small area of sand dunes about one mile north of the much investigated southwestern point of the island. These two dune areas are separated by cliffs and high hills; there is no connection along the beach. The capture of one specimen in the arroyo suggests that these may serve as avenues of dispersal between suitable sandy areas.

Stebbins (1954) considered the countersunken lower jaw of this genus to be an adaptation preventing sand particles from entering the mouth while burrowing. In view of this it seems likely that the sand found in the digestive tracts of the snakes collected on the island was ingested with food items.

All six specimens of this species are females.

Trimorphodon lyrophanes.—A lyre snake was found on the evening of May 26, 1962, approximately one hour after sundown. It was on the ground on a small dead piece of cholla cactus at the edge of the dense brush north of the salt flat. This individual (SDNHM 44395) was a male 283 mm. in length. A second specimen was obtained at about the same time of day on May 29. This individual was found on the rocks above the beach, approximately 10 feet from the edge of the brush. This snake was also a male (CAS 93015) and was 275 mm. long. This is the first record of the species from Cerralvo Island and is, as far as we are aware, the first report of the genus from any island in the Gulf of California. These snakes do not appear to differ from those on the peninsula of Baja California.

LITERATURE CITED

- BANKS, R. C. 1962. A history of explorations for vertebrates on Cerralvo Island, Baja California. Proc. Calif. Acad. Sci., Fourth Ser., 30:117-125.
- CLIFF, F. S. 1954. Snakes of the islands in the Gulf of California, Mexico. Trans. San Diego Soc. Nat. Hist. 12:67-98.
- CRIPPEN, R. G. 1962. Two new insular records of amphibians from Baja California. Herpetologica 18:137.

- ETHERIDGE, R. 1961. Additions to the herpetological fauna of Isla Cerralvo in the Gulf of California, Mexico. *Herpetologica* 17:57-60.
- FIGG-HOBLYN, J. P., AND B. H. BANTA. 1957. *Lampropeltis getulus conjuncta* (Cope) on Cerralvo Island, Gulf of California, Mexico. *Herpetologica* 13:192.
- SOULÉ, M. E. 1961. *Eridiphas slevini* (Tanner) on Cerralvo Island, Gulf of California, Mexico. *Herpetologica* 17:61.
- STEBBINS, R. C. 1954. Amphibians and reptiles of western North America. McGraw-Hill Book Co., New York. xxii + 528 pp.

Natural History Museum, San Diego, California.

Adrenal Response of the Diamond-back Water Snake (*Natrix rhombifera*) to Stress

DOUGLAS R. FICKESS

The purpose of this study is to determine if snakes undergo an adrenal response to stress. The 39 snakes used were caught in the Mingo Waterfowl Refuge Area, Puxico, Stoddard County, Missouri, between May 5 and May 8, 1961. Eight of the snakes were killed in the field to serve as field controls, the 31 remaining snakes were divided into two groups, 15 in the laboratory control group and 16 in the experimental group. They were housed in a large cage constructed of wood with hardware cloth tops and bottoms. They were given water but no food.

Each snake in the experimental group was stressed daily by the application of a hot soldering iron for 30 seconds to the back. Two experimental animals and two control animals were killed every third day for the first 15 days, and every sixth day for the last 12 days of the experiment. Throughout the period of treatment, only two snakes died, one after 10 days and the other after 18 days.

At autopsy the adrenals were removed, weighed fresh by a Roller-Smith balance and then fixed in 10% neutral formalin. Longitudinal sections were cut at 10 microns following routine paraffin embedding and stained with a modified Schorr stain.

RESULTS

The histology of the adrenal gland of *N. rhombifera* conforms to the basic pattern reported for other reptiles (Chester-Jones 1957). The main body of the adrenals is composed of an irregularly