Euderma maculatum. By Larry C. Watkins
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_Euderma H. Allen, 1892_
_Euderma H. Allen, 1892:467. Type species Histiotus maculatus J. A. Allen._

**CONTEXT AND CONTENT.** Order Chiroptera, Suborder Microchiroptera, Family Vespertilionidae, Subfamily Vespertilioninae, Group Plecotini (Williams _et al._, 1970:605). There is one species of the genus _Euderma_ and it is known only from western North America.

**Euderma maculatum (J. A. Allen, 1891)**
Spotted Bat

_Histiotus maculatus_ J. A. Allen, 1891:195. Type locality near Piru, Ventura Co., California. According to Miller (1897:49), this locality is "probably [the] mouth of Castac Creek, Santa Clara Valley, 8 miles east of Piru, Los Angeles County, California."

_Euderma maculata_ H. Allen, 1894:61. First use of current name combination as emended.

**CONTEXT AND CONTENT.** Context noted in generic summary above. No subspecies are currently recognized (Handley, 1959:122).

**DIAGNOSIS.** The most recently published diagnosis is that of Handley (1959), which follows: supraorbital region sharply ridged; temporal ridges not coalescing posteriorly to form a sagittal crest; braincase exceptionally elongated; zygoma rela-

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**Figure 1.** Ventral, dorsal, and lateral views of skull, and lateral view of lower jaw of _Euderma maculatum_ (male, Unv. New Mexico no. 25000, from Weir Tank, 1.5 mi. E Springtime Campground, Socorro Co., New Mexico; courtesy J. S. Findley).

**Figure 2.** Dorsal view of adult female _Euderma maculatum_, Big Bend National Park, Brewster Co., Texas, 11 August 1969 (above); head view of juvenile male _E. maculatum_, Rio Grande Village, Big Bend National Park, 9 July 1969 (below). Photographs courtesy of D. A. Easterla.
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Figure 3. Map of western North America showing marginal distribution records of Euderma maculatum and its inferred geographic range (modified from Hall and Kelso, 1959).

DISTRIBUTION. The distribution is mapped in figure 3. Marginal records of this species were given by Hall and Kelso (1959:207) and handley (1959:127). Extensions of known range later were reported by Constantine (1961) for New Mexico, Gardner (1965:105) for Durango, Esterla (1970) for Texas, and Medeiros and Heckmann (1971) for California. More recently, Sieg, Schmidly, and C. O. Martin (1973) recorded this species from the Mexican state of Queretaro, some 925 kilometers southeast of the Durango locality. This bath occurs from 57 meters below sea level (Grinnell, 1910) to the high transition zone of Yosemite National Park, Mariposa Co., California (July, 1932), in habitat ranging from bleak desert to montane coniferous forest (Jomes, 1965). There are no reported fossil specimens of Euderma maculatum as well as tables of measurements were given by Handley (1959).

FORM. The combination of huge pinkish-red ears and a unique black and white pattern of the pelage make Euderma maculatum one of the most striking bats found in the New World. Grinnell (1910) commented: "The coloration of this animal, suggesting the 'death's-head' pattern displayed upon the thorax in certain moths, is, as far as I am able to learn, unique among bats. Some adaptive function is suggested by the recurrence of this pattern among distantly related groups of animals. Conspicuously contrasted black and white markings appear to be prevalent among crepuscular birds, as night hawks and poor- wills, and have been thought to be defensive in meaning. Esterla (1965:668) postulated that this color pattern "would certainly be inconspicuous" if the bat was hanging on rock walls of corresponding color. However, bats are now thought to be dependent crevices (Esterla, 1970, 1973).

Only the Old World bats of the genus Glauconycteris can compare in coloration (Walker et al., 1968:361). The spots on Euderma are located at the base of the ears, over each shoulder, and on the rump. Except for the spots, Euderma is black dorsally. The spots are approximately 15 mm in diameter, and tend to be twotoned—black basally and white distally. The pelage is much like the spots and although it appears white, parting of the fur reveals a dark base. No drastic deviation from the general pattern just described has been reported. The skin is very rough along the pattern at birth (Esterla and Esterla, 1974; Esterla, 1974). Nothing is known about the deciduous dentition of this species. The skeleton of Euderma was partly described by Hall (1934). Notable is the unusual length and shape of the sternum and the sharp angle of the acromion process of the scapula. The second phalanx of the third digit is longer than the first. No literature on the baculum, penis, testes, or sperm morphology has been found, nor have the organ systems been described.

REPRODUCTION AND ONTOLOGY. Few data have been gathered on the reproductive habits of Euderma Maculatum. Constantine (1961:96) reported the testes of a male Euderma as 2 by 4 mm. These measurements were made on 6 November and the testes had been held in captivity for 5 months. Gardner (1965:105) reported two adult male Euderma netted on 29 May in Durango, Mexico, that had "small, undescribed testes." Esterla (1965:666) found testes measuring 7 by 3 mm in a male taken on 21 August in Garfield County, Utah. Jones (1961:539) found no mature spermatids in the testes or epididymides of two males from Catron County, New Mexico, netted on 23 June. Pariturtion apparently occurs prior to mid-June. Females in post-partum condition have been noted for 23 June and 1 July in Catron County, New Mexico (Jones, 1961:539), 30 June in Catron County, New Mexico (Findley and Jones, 1965:679), 10, 15, and 18 August in Garfield County, Utah (Esterla, 1965), and 3 and 9 August in Brewster County, Texas (Esterla, 1970). Findley and Jones (1965:979) noted that in one bat the right uterine horn was elongated and flaccid and contained a placental scar. In another "the right uterine horn was larger than the left, although no scar was evident." They found the left ovary of one specimen measured 2 mm in greatest diameter, whereas the right measured 1½ mm. A netted pregnant female gave birth to a single young male weighing 4 grams on 23 June at 1143 (MST) at Big Bend National Park, Texas (Esterla, 1971). Photographs show uterine newts with no indications of the striking color pattern of adults. The eyes were tightly closed at birth, and the ears were large and fully developed. The pinnae, however, were not to be pointed. Recently Esterla (personal communication with editor) captured two pregnant Euderma in western Texas that gave birth to a single young in early June. The single young one is in agreement with other evidence, especially that presented by Findley and Jones (1965).
ECOLOGY. The spotted bat frequents a wide variety of habitats. Early accounts (Vorhies, 1955:225) indicated that the species frequented the forests and swamps. Parker, 1952:481; Vorhies, 1955:225) recorded observations of this bat in caves or cave-like situations. Euderma has been collected in dry, rocky terrain, not far from the habitat of some other phyletids. Eusterla (1975) noted 54 during the summer in the Lower Sonoran life zone of the Chihuahuan Desert (Ernst Tinaja Canyon, Big Bend National Park). Stomachs and scats examined have contained little other than the remains of noctuid moths (Ross, 1967:232). Spotted bats generally pull the wings and heads from moths before eating them (Eusterla, 1956:65). Whitaker (1972:889) found some evidence that this bat will take June beetles (Sarcaeaidae). Captive individuals have eaten flies (Durrant, 1955: 220), cottage cheese (Parker, 1952:481), mealworms (Constantine, 1961:95), and kattybirds and grasshoppers (Eusterla, 1970: 307).

Eusterla (1973) observed a kestrel, peregrine falcon, and red-tailed hawk diving at released Euderma, and the capture of a released Euderma by a kestrel was reported by Black (1976). Whitaker and Eusterla (1975) reported the external parasites Cryptopygus sp. Basiliscus rondani, and Ornithodoros sp. on Euderma in the Texas Panhandle, and the ticks and trombiculids from a bat in New Mexico. Poché and Keirans (1975) reported a larval tick, Ornithodorus rossi, on a spotted bat from Utah. No intestinal parasites were found in this study. To date, the number of species of this species that have been reported to be infected in bats is small. It is to be expected that bats will be infected with helminth parasites, and that some will be infected with viruses. The number of helminth parasites has been found to be greater in bats than in other mammals. The number of species of helminth parasites found in bats is small, and the number of species of helminth parasites found in bats is small.

BEHAVIOR. Parker (1952:480) first noted that Euderma traverses flat surfaces with relative ease. Eusterla (1970:307) suggested that this behavior may be linked to roosting habits in horizontal rock crevices. More recently, Richard Poché (personal communication) has observed Euderma landing on the ground and pursuing food items as does the pallid bat, Antrozous pallidus. Eusterla (1973) watched with binoculars 13 banded and released Euderma in Bexar County, Texas; all ignored trees and flew to cliffs and entered crevices or sought refuge under loose rocks and boulders. The voice of Euderma has been described as a "squeak" or a "tink." Euderma was not observed to be flushed by Peters (1952:481) and as a series of high-pitched squeaks (Medeiros and Heckmann, 1971:358). Jones (1961:539) reported that the voice of Placodus pholiotus has a tone similar to that of Euderma. Euderma is a true aerial insectivore; it has been found to be active at night, and its flight speed is greater than average. The delicate nature of this bat may not be apparent for a high injury rate. Constantine (1961:95) found that when Euderma was wounded, it became torpid and the enormous ears were rolled into a "rams head" position. Rectal temperatures of 8.9°C were recorded while the bat was torpid, compared with 25.4°C at "room" temperature.

GENETICS. According to Williams et al. (1970:620), the karyotype of Euderma maculatum consists of 2N = 30, FN = 52, and a total number 55. The autosomes are composed of 11 metacentric and submetacentric pairs, generally graded from large to small, one medium-sized submetacentric pair, and two very small acrocentric pairs. The X chromosome is medium-sized and submetacentric, and the Y is a small acrocentric chromosome. They concluded that the karyotype of E. maculatum was most similar to that of Placodus pholiotus and that the two genera were probably derived from the same ancestral stock.

REMARKS. The vernacular name of is Latin origin. Euderma means "good skin" and maculatum means "spotted." The vernacular name most used is "spotted bat," although "pintoo bat" is occasionally used. Robert S. Hoffmann criticized early drafts of this manuscript, and Jeanne Robertson prepared two of the illustrations.

LITERATURE CITED


ADDITIONAL REFERENCES CONSULTED


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