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Lasiurus ega.

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Lasiurus ega (Gervais, 1856)

Southern Yellow Bat

Nycticejus Ega Gervais, 1856:73. Type locality "Ega, ville du Brasil," in the state of Amazonas.

Lasiurus caudatus Tomes, 1857:42. Type locality "Pernambuco," Brazil.

[*Lasiurus* (*Dasypterus*)] *ega:* Trouessart, 1904:86. First use of current name combination.

CONTEXT AND CONTENT. Order Chiroptera, Suborder Microchiroptera, Family Vespertilionidae, Tribe Lasiurini, Genus *Lasiurus*, Subgenus *Dasypterus*. The genus *Lasiurus* contains seven extant species, and the subgenus *Dasypterus*, two (Koopman, 1984, 1993). There are five recognized subspecies of *L. ega* (Handley, 1960):

L. e. caudatus Tomes, 1857:42, see above; *argentinus* Thomas is a synonym.

L. e. ega (Gervais, 1856:73), see above.

L. e. fuscatus (Thomas, 1901:246). Type locality "Rio Cauquette, Cauca River, Colombia. Altitude 1000 m"; *punensis* J. A. Allen is a synonym.

L. e. panamensis (Thomas, 1901:246). Type locality "Bogava, Chiriqui, Panama. Altitude 250 m." Goldman (1920) indicates that Bogava=Bugaba.

L. e. xanthinus (Thomas, 1897:544). Type locality "Sierra Laguna, Lower [Baja] California," Mexico.

DIAGNOSIS. *Lasiurus ega* and *L. intermedius* are the only members of the subgenus *Dasypterus*. These species are distinguished from members of the subgenus *Lasiurus* in having lateral wings of the presternum considerably broader than the body and the distal phalanx of third finger less than ½ the length of the proximal. Compared to other congeners, these two species have a better developed sagittal crest, higher coronoid process, and greatly reduced talonid on m3. In addition, *L. ega* and *L. intermedius* always possess a single upper premolar; two premolars generally occur in other lasiurines, although the anterior one is minute and displaced lingually. Where *L. intermedius* and *L. ega* overlap geographically (Texas, eastern Mexico, and Central America), *L. ega* is smaller; total length is <119 mm, and length of upper tooth row is <6.0 mm in *L. ega* (Hall and Jones, 1961).

GENERAL CHARACTERS. *Lasiurus ega* is small-bodied with a short broad muzzle (Fig. 1) and a high-aspect ratio wing. The upper lip projects laterally and forward of the lower lip, and the end of the nose is broad and slightly concave between the nostrils. Ears are short and rounded, and height of the broad tragus is slightly more than 50% of ear height. The wing membrane begins at the base of the outer toe, and the large uropatagium, when stretched, reaches far beyond the toes. The calcar is about as long as the free margin of the uropatagium and possesses a slight keel. The tail is completely within the uropatagium or protrudes slightly (Dobson, 1878; Husson, 1962; Tomes, 1857). Fingers are progressively shorter from third to fifth, and there is a prominent keel on the sternum. Females have four mammae and males possess a distally enlarged and spiny penis (Hall and Jones, 1961; Handley, 1960).

Body fur is soft and silky and varies in color with subspecies. The dorsum is pale whitish-buff in *L. e. caudatus*, yellowish-orange in *L. e. ega*, orange in *L. e. fuscatus*, dull sooty yellow in *L. e. panamensis*, and pale yellow in *L. e. xanthinus*. All subspecies have a black wash that is heaviest in *L. e. fuscatus* and least apparent in *L. e. ega* (Handley, 1960). Dorsal fur extends onto the wing membrane as far as a line drawn from the middle of the upper arm to the knee. Ventral fur generally is lighter in color and covers the wing to a line extending between elbow and knee. A broad band of fine hairs occurs next to and behind the ventral humerus and occasionally along the forearm; a patch of short hairs covers the angle between the forearm and fourth metacarpal. Dorsal surface of the tail membrane is densely furred only on its proximal one-third to one-half (Dobson, 1878; Husson, 1962). There is a spiral effect in arrangement of hair scales (Handley, 1960).

The skull is short and broad with a high rounded braincase (Fig. 2). The rostrum slopes rapidly in front, and its dorsal surface is almost in line with that of the braincase. Nares and palatal emargination are wider than deep, and the palate slopes upward in an anterior direction. Auditory bullae are well developed, but not overly large, and diameter of each is roughly equal to the distance between them. Basisphenoid pits are distinct, long, and narrow. The slender zygomatic arches are not expanded anywhere along their length (Miller, 1907).

The dental formula is i 1/3, c 1/1, p 1/2, m 3/3, total 30. Upper incisors are unicuspidate, acutely pointed, and located close to the canine on each side. A hypocone is missing from M1 and M2, and crown area of M3 is less than one-third that of M1. Lower incisors are trifid and aligned almost perpendicular to the direction of the jaws. First lower premolar is about one-third the size of p2. All cusps are well developed on the lower molars, and m3 has a distinct entoconid (Dobson, 1878; Hall and Jones, 1961; Miller, 1907).

Females typically are larger than males in many measurements (Jones et al., 1965; Mumford and Zimmerman, 1963; Myers, 1978; Myers and Wetzel, 1983), although such dimorphism is not always statistically significant (Willig, 1983). Mean skull dimensions (in mm, with male measurements given first and range in parentheses) for 31 males and 32 females from Paraguay and Bolivia are: greatest length of skull, 15.0 (14.1–15.8), 15.5 (14.6–16.3); zygomatic breadth, 10.9 (10.2–11.5), 11.3 (10.1–12.0); width of least interorbital constriction, 4.5 (4.1–4.9), 4.5 (4.2–4.8); length of maxillary toothrow, 5.1 (4.7–5.7), 5.5 (5.0–6.0). External dimensions for these same bats are: total length, 118.3 (111–126), 126.1 (117–132); length of tail, 50.1 (42–58), 51.7 (45–55); length of hindfoot, 9.8 (8–11), 10.5 (9–13); height of ear, 18.7 (16–20), 19.0 (17–21); and length of forearm, 45.1 (42.9–46.9), 47.6 (46.3–48.9; Myers and Wetzel, 1983). Wingspan ranges from 335 mm to 355 mm (Allen, 1906; Barbour and Davis, 1969). Mean body mass (with standard deviation in parentheses) of 6 males and 8 females from Venezuela is 11.9 (1.4) g and 13.5 (1.6) g, respectively (Eisenberg, 1989).

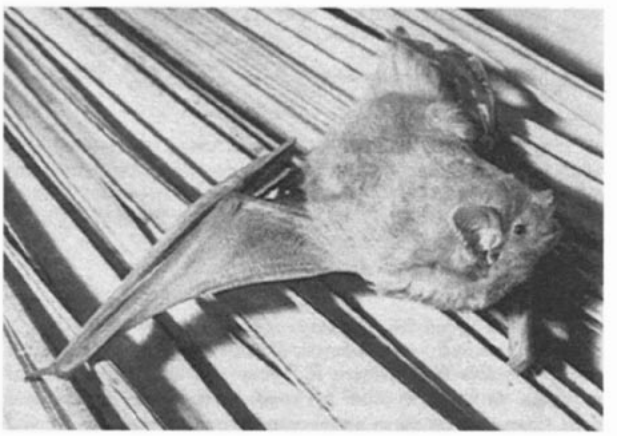

Fig. 1. Photograph of *Lasiurus ega*. Photo by B. J. Hayward.

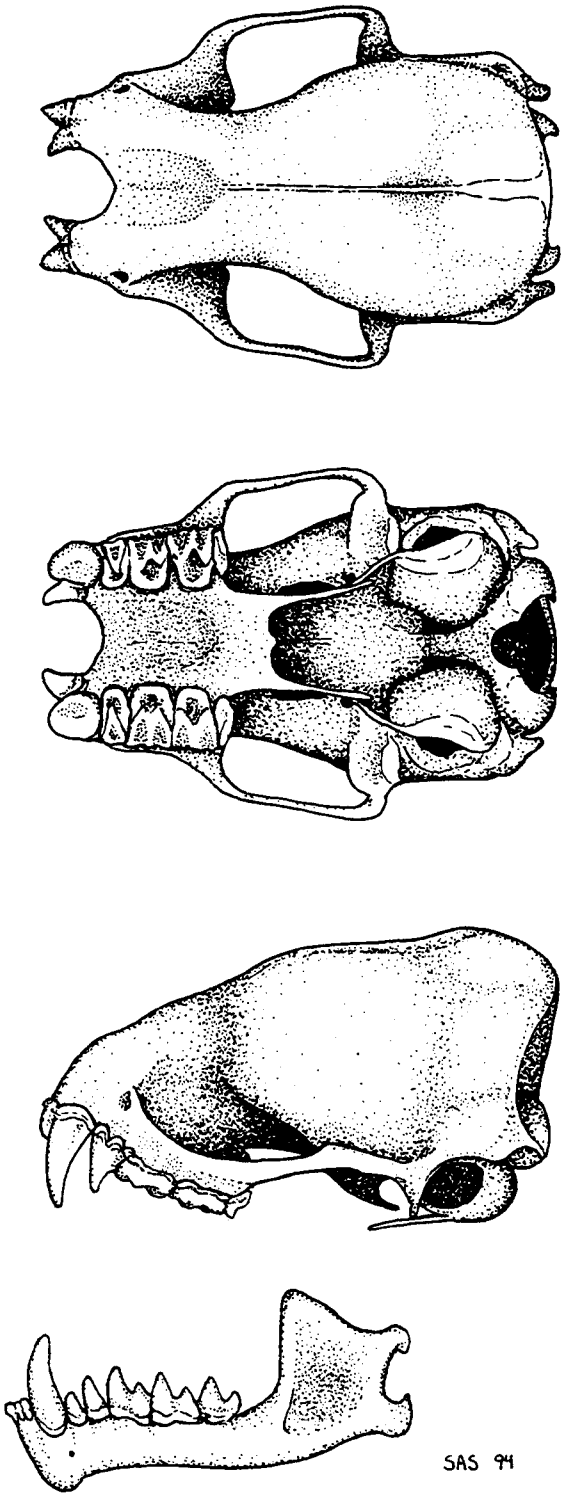

Fig. 2. Dorsal, ventral, and lateral views of the skull of a male *Lasiurus ega argentinus* from Paraguay, Departamento Central, Asunción, Recoleta (University of Michigan Museum of Zoology #124404). Greatest length of skull is 16.2 mm. Drawings by S. A. Schwemmin.

Lasiurus ega in the arid Chaco of Paraguay is smaller in length of third metacarpal, greatest length of skull, and zygomatic breadth than conspecifics from eastern Paraguay and the eastern edge of the Andes. At least five other bat species demonstrate smaller size in the Chaco compared to surrounding areas, but reasons for this geographic variation are unknown (Myers and Wetzel, 1983).

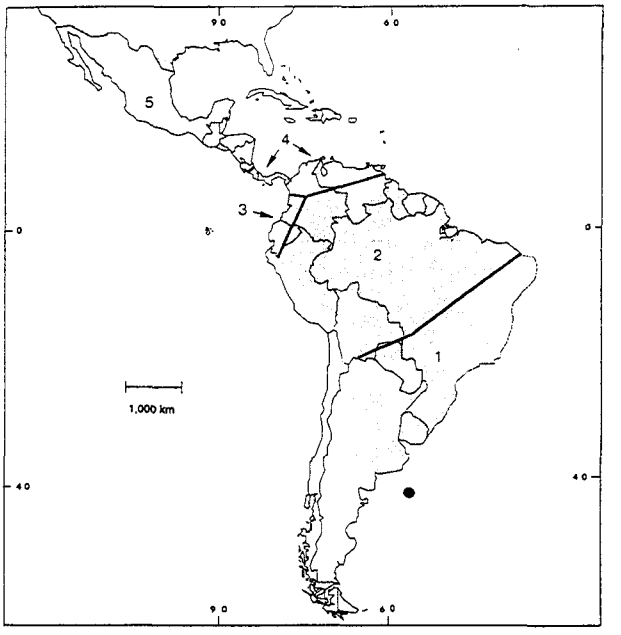

Fig. 3. Geographic distribution of *Lasiurus ega* (Chapman and Chapman, 1990; Hall, 1981; Koopman, 1982). An oceanic record, off the coast of Argentina (Van Deusen, 1961), is indicated by a closed circle. Subspecies are as follows: 1) *L. e. caudatus*, 2) *L. e. ega*, 3) *L. e. fuscatus*, 4) *L. e. panamensis*, and 5) *L. e. xanthinus*. Subspecific boundaries are only suggestions that roughly encompass specimen localities mentioned in Handley (1960) and Anderson et al. (1982) and, in some cases, approximate boundaries of faunal zones suggested by Koopman (1982).

DISTRIBUTION. *Lasiurus ega* occurs in the southwestern United States, Mexico, Central America, and South America as far south as Argentina (Fig. 3). In the United States, this bat ranges across southern California and Arizona, into extreme southwestern New Mexico, and is found again in southernmost Texas, near the Gulf of Mexico (Chapman and Chapman, 1990; Hall, 1981; Hoffmeister, 1986). In Mexico, this species occupies the entire Baja Peninsula (Woloszyn and Woloszyn, 1982), ranges down the eastern and western coastal versants, but apparently is absent from the northern midlands (Hall, 1981; Sanchez Hernandez et al., 1985; Villa-R., 1966). *L. ega* occurs in most Central American countries (Dickerman et al. 1981; Dinerstein, 1985; Hall, 1981; McCarthy, 1987), although no published records exist for El Salvador. South American records exist for Colombia (Eisenberg, 1989), Venezuela (Handley, 1976), Guyana, Suriname (Husson, 1962, 1978; Williams and Genoways, 1980), Brazil (Mumford and Knudson, 1978; Willig, 1983), Ecuador (Allen, 1914), Peru (Handley, 1960), Bolivia (Anderson et al., 1982), Paraguay (Myers and Wetzel, 1983), Uruguay (Redford and Eisenberg, 1992), and Argentina (Barquez and Loughed, 1990; Barquez et al., 1993). *L. ega* is known from the island of Trinidad (Goodwin and Greenhall, 1961), but has not reached the Antilles.

The northernmost record for the species is San Bernadino, San Bernadino County, California (Constantine et al., 1979). The southernmost terrestrial record is in the province of Buenos Aires, Argentina (Barquez et al., 1993; Redford and Eisenberg, 1992). However, a male *L. ega* is known from further south, over the Atlantic Ocean, at latitude 41°4.5′S and longitude 56°21.5′W (Van Deusen, 1961). Although *L. ega* generally is considered a lowland species (Handley, 1976; Koopman, 1978; Woloszyn and Woloszyn, 1982), this bat occurs at altitudes up to 2,300 m (Genoways and Jones, 1968).

FOSSIL RECORD. A Pleistocene fossil of *L. ega* is reported from Lagoa Santa, Minas Gerais, Brazil (Mones, 1986). Other known fossils consist of portions of three humeri recovered from sediments at the Pleistocene-Holocene boundary, in Loltun Cave, Yucatan, Mexico (Arroyo-Cabrales, 1992; Arroyo-Cabrales and Alvarez, 1990).

FORM AND FUNCTION. Forearm length of females averages 4% (1.83 mm) greater than that of males. Dimorphism is still present after forearm length is adjusted for differences in body size through covariance procedures based on skull length. The degree of dimorphism in *L. ega* is greater than that of other vespertilionids with smaller litter sizes. In females, larger body size, and particularly larger wings, may represent adaptations for carrying a large litter mass (Myers, 1978).

The dorsal surface of the baculum is slightly concave and 5-6 times wider proximally than distally. The greater basal width is primarily due to broad lateral flanges that extend from the proximal half and turn ventrally on either side of the urethra. Greatest length (mean followed by range in parentheses) of the baculum of three specimens from Mexico is 0.95 (0.76–1.20) mm, and the greatest width is 0.69 (0.51–0.82) mm. The baculum of *L. ega* is very similar to that of *L. intermedius*, but has more expanded lateral flanges. Although female *L. intermedius* possess an os clitoridis, this bone is missing in female *L. ega* (n = 1; Brown et al., 1971).

Activities of citrate synthase and 3-hydroxyl-CoA dehydrogenase in the pectoralis muscle of *L. ega* (n = 1) are among the highest reported for mammalian skeletal muscle and are comparable to values for insect flight muscle. In contrast, hexokinase activity is low, as is the ratio of hexokinase to citrate synthase activity (0.008). Together these activities indicate that aerobic metabolism in the pectoralis muscle is supported largely by fat metabolism, rather than glycogen breakdown. Enzyme activities for *L. ega* are similar to those of seven other species of insectivorous bats from South America (Yacoe et al., 1982).

Uterine horns of parous, but nonpregnant, *L. ega* are equal in size, about 1 mm in diameter and 2 mm long. Ovaries of *L. ega* appear rounded or slightly oval in cross-section and have a diameter of approximately 1 mm. In comparison to *Eptesicus furinalis*, *Myotis albescens*, and *M. nigricans*, *L. ega* has larger rete and more prominent epoophoron tubules. Ova contain one or more staining inclusions of variable shape and size and unknown significance (Myers, 1977).

At the time of mating, ovarian follicles are 260 μm in diameter, and they exceed 300 μm just before ovulation. Corpora lutea are 330-630 μm in diameter prior to blastocyst implantation, although they slowly decrease in size starting in late pregnancy and disappear before lactation ends. Each corpus is extensively vascularized when first formed, but vascularity also declines beginning in late pregnancy. During lactation, luteal nuclei become smaller, and nucleoli disappear (Myers, 1977).

In Paraguay, during summer (December and January), testis mass is minimal, and the seminiferous tubules have closed lumina and are populated by cells in early meiosis. All stages of meiosis are visible by March when spermatozoa first move into the epididymides. In April, lumina reach maximum diameter, testicular mass peaks, and spermatozoa pack the epididymides. Meiotic cells steadily decrease in number beginning in May and disappear by August. Nevertheless, sperm remain in the epididymides until at least October, after which the testicular cycle begins anew (Myers, 1977).

While spermatogenesis is occurring, from March to May, interstitial cells are at maximum size and contain large, rounded nuclei. During the rest of the year, interstitial cells are smaller, and nuclei are reduced and shrivelled, indicating greatly decreased activity. Accessory glands increase in size from March to May, but unlike interstitial cells, these glands maintain activity for another 1.5–2 months, until July or August (Myers, 1977).

There is a single observation of daily torpor in this species (Myers, 1977). Activity occurs year-round in both the northern (Chapman and Chapman, 1990) and southern (Myers, 1977) parts of the range, and this bat probably does not hibernate. *L. ega* does not have an annual cycle of fat storage as expected of a hibernating mammal (Myers, 1977), although one bat taken near Buenos Aires, Argentina, on 15 March had large deposits of fat along the flanks (Van Deusen, 1961).

ONTOGENY AND REPRODUCTION. In the Region Oriental of Paraguay, mating begins in autumn (May), but ovulation does not occur until mid-August, suggesting that females store sperm for approximately three months (Myers, 1977). Gestation is 3–3.5 months, and young are born in late November and early December. The earliest that volant juveniles appear is late January, indicating a lactation period of at least 60 days. Both males and females probably breed in their first year. This species is monestrous.

Scattered records of pregnant and lactating individuals, embryo sizes, and volant juveniles indicate that females give birth during spring or early summer and suggest that parturition generally occurs earlier in the season in regions closer to the equator. In the United States, pregnant females are known from 24 April (embryos 11–14 mm in length), 4–7 June (20 mm), 8 June (25 mm), and 9 June (14–18 mm; Baker et al., 1971; Bond, 1970; Mumford and Zimmerman, 1963). Records of pregnancy from Mexico include 7 May (embryo size unknown), in Sonora; 12 June (10 mm) and 11–14 July (22–28 mm), in Baja California Sur; and 1 May (32 mm) and 9 May (10 mm), in Yucatan (Banks, 1967; Birney et al., 1974; Jones et al., 1965; Villa-R., 1966). In addition, pregnant females have been taken on 28 April (20 mm), in Guatemala; during November (embryo size unknown), in northeastern Brazil; and during mid-November (20 mm), in Argentina (Barquez and Lougheed, 1990; Dickerman et al., 1981; Willig, 1985).

In the United States, there are records of lactating or suckling *L. ega* from Texas, on 8 June, 9 June, and 15 July (Baker et al., 1971; Bond, 1970; Constantine et al., 1979). Reports of lactating females from Mexico occurred on 22 June and 21 July in Sonora, on 11–14 July in Baja California Sur, on 26 June in Sinaloa, and during June in Tamaulipas (Allen, 1906; Alvarez, 1963; Barbour and Davis, 1969; Jones et al., 1965; Villa-R., 1966). Records of lactating *L. ega* from more southern countries are 1 May in Costa Rica and 22 May in Honduras (Gardner et al., 1970; Greenbaum and Jones, 1978). Volant immatures appear as early as 13 July in Sinaloa, Mexico (Jones et al., 1972) and on 22 July in Sonora, Mexico (Villa-R., 1966).

The number of embryos carried by pregnant females varies from one to four, without any apparent geographic trend. The only female carrying a single fetus is one taken in Yucatan (Birney et al., 1974). Examples of *L. ega* with twin embryos are two pregnant bats from California (Bond, 1970), three from New Mexico (Mumford and Zimmerman, 1963), three from Baja California Sur (Jones et al., 1965), one from Yucatan (Birney et al., 1974), one from Guatemala (Dickerman et al., 1981), and two from Argentina (Barquez and Lougheed, 1990). Higher numbers of embryos occur in Texas where females carry three (n = 6) or four (n = 1; Baker et al., 1971). Similarly, the range in Paraguay is 2–4 embryos (n = 17), with a mode of three (Myers, 1977). The capture of three adult females along with nine young from a roost in Trinidad suggests a litter size of three in that country as well (Goodwin and Greenhall, 1961).

In Paraguay, the testes contain active interstitial cells, as well as cells in all stages of meiosis, from March through May. Wet-mass of each testis is only 7 mg in early summer (December–January), increases to 12–13 mg by midsummer (January–February), and reaches 25 mg or more in early autumn (April). Accessory gland activity peaks in May, corresponding to the start of the mating season, and remains high until August. The reproductive cycle of male *L. ega* in Paraguay is similar to the cycles of *L. borealis* and *L. cinereus* in north temperate areas (Myers, 1977).

Reports of male reproductive activity from other countries only indicate testicular length and are based on serendipitous observations of 1–3 specimens. In the United States, testicular length is 4–5 mm during June (Mumford and Zimmerman, 1963). In Mexico, testicular length is 1 mm during April, 3 mm on 3 July, and 7–8 mm during September (Carter and Jones, 1978; Findley et al., 1975). In Brazil, testicular length is 3 mm on 4 June (Mumford and Knudson, 1978).

Appearance of the pubic symphysis is useful in distinguishing adults from young-of-the-year (Baker et al., 1971). In adult females, there are two conditions that probably represent endpoints of a continuum. First, the pubes are separated by a gap that is 1–2 mm or more across and completely bridged by an interpubic ligament; individuals with this condition most likely gave birth within the past year. Second, the pubes are joined partly along an irregular and often indistinct line, or in some cases, there is a partial gap spanned by a ligament; the reproductive status of these apparently adult bats is unknown. In recently volant females, pubes meet along a straight line, and innominates are frail compared to those of the adults. Pubes of immature males appear heavier and more ossified than those of young females, whereas adult males have pubic arches that are completely ossified with no indication of former separation.

Immature volant females are larger than young males captured on the same date in Texas (Baker et al., 1971). Females exceed males in total length by 5%, length of tail by 8%, length of forearm

by 3%, greatest length of skull by 2%, length of maxillary toothrow by 5%, and maxillary breadth by 6%. There is no significant difference in interorbital breadth between immature male and female *L. ega*.

ECOLOGY. *Lasiurus ega* occurs in a variety of habitats, in both mesic and xeric environments. This species has been caught while flying over a concrete water tank in an area of scrub vegetation among low rocky hills (Baker, 1956); over a pond amid low mountains in a narrow canyon dotted with *Yucca, Agave, Larrea, Acacia,* and *Opuntia* (Greer, 1960); along an intermittent stream lined with *Populus fremontii, Platanus wrightii,* and *Celtis reticulata* (Mumford and Zimmerman, 1963); at ponds near large stands of caranday palms (Myers, 1977); in open grassy savanna adjacent to a small river and secondary tropical forest (Williams and Genoways, 1980); and over a stream beneath wild fig trees (Watkins et al., 1972). In Venezuela, this bat lives in tropical dry forest, subtropical moist forest, and tropical moist forest (Handley, 1976). *L. ega* occurs in elfin forest in Costa Rica (Dinerstein, 1985), and it is found in the Caatingas and edaphic Cerrado habitats of Brazil (Willig, 1983).

Less-specific descriptions of capture sites are more common. *L. ega* flies over streams (Barbour and Davis, 1969; Carter and Jones, 1978; Dolan and Carter, 1979; Handley, 1976; Jones et al., 1972; McCarthy, 1987; Schmidly et al., 1974), over or next to ponds or water holes (Cockrum and Bradshaw, 1963; Dalquest, 1953; Gardner et al., 1970; Irwin and Baker, 1967; Jones et al., 1965; Loomis, 1964; Myers, 1977), and over swimming pools (Barbour and Davis, 1969; McCarthy, 1987; Myers, 1977). Capture sites occasionally are along roads that travel through "the brush" (Dalquest, 1953:62), dense forest (Ingles, 1958), or at the edge of a gorge (Starrett and Casebeer, 1968). *L. ega* also visits orchards and banana and palm groves (Baker et al., 1971; Greenbaum and Jones, 1978; Watkins et al., 1972); lawns in residential areas (Mumford and Knudson, 1978); and savanna and pasture (Handley, 1976; Jones et al., 1965). Birney et al. (1974) report finding an adult female dead on a beach.

Lasiurus ega has a large geographc range and lives in a variety of habitats; consequently, it is associated with a large number of bat species. Other vespertilionids occasionally captured with *L. ega* include *Antrozous pallidus, Eptesicus fuscus, L. borealis, L. cinereus, L. intermedius, Myotis californicus, M. fortidens, M. velifer, Nycticieus humeralis,* and *Pipistrellus hesperus* (Dolan and Carter, 1979; Irwin and Baker, 1967; Jones et al., 1965; Loomis, 1964; Schmidly et al., 1974). *L. ega* occurs with the molossids *Eumops underwoodi, Molossus ater, M. molossus,* and *Tadarida brasiliensis,* (Dolan and Carter, 1979; Genoways and Jones, 1968; Irwin and Baker, 1967; Jones et al., 1965; Schmidly et al., 1974). Phyllostomid bats caught with *L. ega* include *Artibeus cinereus, A. lituratus, Glossophaga soricina, Sturnira lilium, Uroderma bilobatum, U. magnirostrum,* and *Vampyrops lineatus* (Dolan and Carter, 1979; Mumford and Knudson, 1978; Williams and Genoways, 1980). Associates from other families include *Mormoops megalophylla, Noctilio albiventris, Rhynconycteris naso,* and *Saccopteryx leptura* (Dolan and Carter, 1979; Schmidly et al., 1974; Williams and Genoways, 1980).

Lasiurus ega most often roosts in trees, generally hanging from the midrib of a leaf by the hindclaws and occasionally by the thumbs as well (Gonzaléz, 1989). This species commonly roosts among dead fronds of palm trees, and introduction of ornamental palms to the southwestern United States may have aided this bat in extending its range northward during historical times (Spencer et al., 1988). Fan palms (*Washingtonia filifers* and *W. gracilis*) are common roost trees in California (Bond, 1970; Stewart, 1969), Arizona (Cockrum, 1961), and Texas (Spencer et al., 1988). Other types of trees used by *L. ega* for roosting include banana (Gaumer, 1917), "cocoanut" (Luckens and Davis, 1957:12), and mango (Myers, 1977). In addition, one report describes a single *L. ega* roosting on a hackberry (*Celtis reticulata*) branch, 4 m above a road and well hidden from above (Mumford and Zimmerman, 1963). This bat also rests within roof thatch (Goodwin and Greenhall, 1961) and has been found under the eaves of a straw roof (Villa-R., 1966). Although lasiurines typically do not roost in caves, there is one record of a skull of *L. ega* being found in the mouth of a cave in Mexico (Pearse, 1938). The only species of bat known to share a roost site with *L. ega* are *Molossus sinaloae* in Guerrero, Mexico (Luckens and Davis, 1957), and *L. intermedius* in Texas (Spencer et al., 1988).

No quantitative and little qualitative information is available on prey preferences. In Yucatan, Mexico, this bat apparently eats beetles (Coleoptera) more frequently than other potential prey (Gaumer, 1917).

This bat is susceptible to the rabies virus (Constantine et al., 1979). Infection rate over a six-year period is as high 34%, but such a rate most likely results from biased sampling methods (i.e., the tendency to test only bats that are already ill or dead). The true infection rate probably is <1% in wild populations, although specific data are lacking. The majority of, and perhaps all, confirmed cases involve no aggressive actions by the bat, other than biting when molested by a human.

Reports of other mortality factors are rare. House cats are responsible for obtaining 30% of the *L. ega* tested for rabies in California; both rabies-positive and rabies-negative individuals apparently are killed by cats. About 9% of bats tested are associated with domestic dogs and such instances also may represent examples of predation (Constantine et al., 1979). The barn owl (*Tyto alba*) is a known predator (Ceballos Gonzaléz and Galindo Leal, 1984).

Lasiurus ega is the type host of *Postorchigenes mbopi,* a lecithodenriid trematode that occurs in the intestine (Vaucher, 1981). This bat is also the type host for the cestode *Hymenolepsis dasipteri* (Vaucher, 1985). Both endoparasites are from Paraguay. Bats are not regularly parasitized by monoxenous coccidians, and *L. ega* appears to follow this pattern, although sampling is inadequate for a firm conclusion (Duszynski et al., 1988). There are no known ectoparasites, but only one report specifically mentions examining *L. ega* for this purpose (Tipton and Méndez, 1966).

BEHAVIOR. *Lasiurus ega* occasionally flies far out to sea. Van Deusen (1961) describes a single male that landed on an icebreaking ship, 335 km SE from the nearest land, as the ship passed between the Falkland Islands and the city of Buenos Aires, Argentina. The bat's heading indicated eventual landfall on Cape San Antonio, Argentina. The late-summer capture (15 March), the flight direction (north), and the migratory tendency of other species within the genus suggest a seasonal migration toward the equator for *L. ega* (Van Deusen, 1961).

A number of authors assume that *L. ega* seasonally migrates southward from extreme northern portions of its range; this conclusion typically is based on a lack of winter-caught specimens and the known tendency of some congeners, such as *L. borealis* and *L. cinereus,* to migrate (Baker, 1956; Barbour and Davis, 1969; Findley et al., 1975). However, accumulation of seasonal records over the years strongly indicates that some *L. ega* are present year-round even on the northern edge of the range (Baker et al., 1971; Chapman and Chapman, 1990; Constantine et al., 1979; Hoffmeister, 1986). Nevertheless, seasonal segregation of the sexes in northern areas during the parturition period is still a possibility; males are scarce from April through June (Bond, 1970, Cockrum, 1961; Constantine, 1946; Woloszyn and Woloszyn, 1982).

Observations of the time of night at which *L. ega* is active mostly are based on the time of capture. Capture times are generally before midnight and indicate that *L. ega* is active between approximately sundown and five hours after sundown (Baker, 1956; Birney et al, 1974; Dalquest, 1953; Jones et al., 1965; Mumford and Knudson, 1978; Mumford and Zimmerman, 1963; Williams and Genoways, 1980). The paucity of captures later than midnight may reflect the habits of biologists more than *L. ega.* This species is active earlier in the night than sympatric *L. cinereus* (Woloszyn and Woloszyn, 1982).

Descriptions of flight behavior are anecdotal and highly variable. In New Mexico and San Luis Potosi, the flight of *L. ega* is slow and steady, 9–23 m above the ground (Dalquest, 1953; Mumford and Zimmerman, 1963). In Costa Rica, however, flight of this bat is rapid and maneuverable, and the bats make a "considerable effort" to stay out of lights (Starrett and Casebeer, 1968:18). In Baja California, it flies rapidly along arroyos and is netted easily (Jones et al., 1965). *L. ega* occasionally flies very low, at least over water, as evidenced by the position of individuals caught in mist nets set over irrigation tanks or ponds (Baker, 1956; Jones et al., 1965).

This species most often is thought of as solitary (Barbour and Davis, 1969). However, 12–15 *L. ega* occasionally occupy the same roost site, although it is not clear whether these bats are members of a social group or are simply individuals attracted to an optimal roost site (Goodwin and Greenhall, 1961; Villa-R., 1966). In addition, 2–3 *L. ega* occasionally fly together (Woloszyn and Woloszyn, 1982).

GENETICS. *Lasiurus ega, L. seminolus, L. cinereus,* and *L. borealis* possess identical karyotypes, representing the primitive condition for the genus (Bickham, 1987). In these taxa, the diploid number of chromosomes is 28, and the fundamental number is 46. The Y chromosome is minute and the smallest of the chromosomes. Ten pairs of autosomes are metacentric or submetacentric, whereas three pairs are acrocentric (Baker and Patton, 1967).

Lasiurus e. panamensis (as defined by Baker et al., 1988) and *L. intermedius* are sister taxa, as indicated by the synapomorphic nature of their inverted X chromosome (Bickham, 1987) and genic similarities (Baker et al., 1988). C-band karyotyping of *L. ega* indicates that large blocks of heterochromatin are present at the centromeres of all autosomes. The short arm of the X chromosome and the Y chromosome are heterochromatic (Bickham, 1987).

The X chromosome differs between *L. e. xanthinus* and *L. e. panamensis* (as defined by Baker and Patton, 1967). In *L. e. xanthinus*, the X element is submetacentric, but in *L. e. panamensis*, it is acrocentric or subtelocentric. The condition in *L. e. xanthinus* presumably is primitive because it is shared with other lasiurine species and *Myotis*. The X chromosome of *L. e. panamensis* apparently is derived from the primitive form through a pericentric inversion (Bickham, 1979, 1987).

Lasiurus ega taken from South America (Venezuela and Suriname) and Chiapas and Guerrero, Mexico, exhibit the high levels of genic similarity (Nei's identity: 0.97) that are expected for conspecific populations (Baker et al. 1988). Specimens of *L. e. xanthinus*, however, from Baja California and Nuevo Leon, Mexico, display similarity values of only 0.69 with the Chiapas and Guerrero populations and 0.72 with the South American group. In addition, electrophoretic analyses indicate that *L. e. xanthinus* is fixed for four alleles that apparently are not shared with the other groups. Based on electrophoretic data and structural differences in the X chromosome, Baker et al. (1988) suggest that *L. e. xanthinus* is specifically distinct, despite low levels of morphological differentiation. The elevation of *L. e. xanthinus* to full specific status is accepted by some authors (Jones et al., 1992), but not others (Koopman, 1993).

REMARKS. The name *Lasiurus* derives from the Greek words *lasios*, meaning "hairy," and *oura*, meaning "tail" (Baker, 1983); *ega* stands for the type locality (Ega, Amazonas, Brazil). The vernacular name, southern yellow bat, is used by Hall and Jones (1961) to differentiate North American populations of *L. ega* from *L. intermedius*, the northern yellow bat; other common names applied to *L. ega* include *murciélago platanero* (Gaumer, 1917), *murciélago de las palmeras* (Gonzaléz, 1989), *murciélago leonado* (Barquez et al., 1993; Redford and Eisenberg, 1992), *murciélago amarillo* (Villa-R., 1966), tropical yellow bat (Dalquest, 1953), big yellow bat (Husson, 1978), western yellow bat (Stewart, 1969), and Panamanian short-eared bat (Goldman, 1920; Goodwin, 1942).

Although the title page of the bound volume containing the type description of *L. ega* indicates the year of publication as 1855, Sherborn and Woodward (1901) show that the actual year of publication of Gervais' work is 1856. Tomes (1857) first placed this species in the genus *Lasiurus*, but he used the name *Lasiurus Aga*; *Aga* apparently is a *lapsus* for *Ega*. *Atalapha ega* is a name combination proposed by Peters (1870). *Dasypterus ega* is a name combination used by Allen (1894), and it appears in much of the literature prior to the work of Handley (1960).

We follow Handley (1960) and Hall and Jones (1961) in our listing of subspecific names and synonyms with one exception. Although Handley (1960) uses the subspecific name *argentinus* and places *caudatus* as a synonym of *argentinus*, Koopman (in Willig, 1983) notes that *caudatus* has priority by 44 years. Hence, we place *argentinus* as a synonym of *caudatus*. However, Cabrera (1958), in contrast to Handley (1960), indicates that the name *caudatus* is actually a synonym of *ega* and not *argentinus*. Cabrera (1958) also believes that the differences between *L. e. fuscatus* and *L. e. panamensis* are within the limits of individual variation, and he arranges *fuscatus* as a synonym of *panamensis*.

Subspecific boundaries are not distinct anywhere in the range of *L. ega*, but the situation is particularly obscure in North America. Hall (1981) indicates that *L. e. panamensis* is found only from Costa Rica southward (Fig. 3). In contrast, Alvarez-Castaneda and Alvarez (1991), Birney et al. (1974), Goodwin (1942), and Handley (1960) state that it is found as far north as Chiapas and the Yucatan Peninsula. Baker et al. (1971, 1988), however, believe that *L. e. panamensis* follows the Gulf versant northward into Texas.

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