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Sciurus arizonensis.

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Sciurus arizonensis Coues, 1867

Arizona Gray Squirrel

Sciurus arizonensis Coues, 1867:357. Type locality "Fort Whipple [Yavapai Co., Arizona—Miller and Rehn, 1902:36]."

CONTEXT AND CONTENT. Order Rodentia, Suborder Sciurognathi, Family Sciuridae, Subfamily Sciurinae, Genus *Sciurus*, Subgenus *Sciurus* (Wilson and Reeder, 1993). Based upon structure of the hyoid bones, *S. arizonensis* also has been placed into the subgenus *Parasciurus* (Hoffmeister and Hoffmeister, 1991). The genus *Sciurus* contains 28 species (Wilson and Reeder, 1993). Previously, three subspecies of *S. arizonensis* were recognized (*S. a. arizonensis*, *S. a. catalinae*, and *S. a. huachuca*—Hall, 1981), but Hoffmeister (1986) demonstrated that *S. arizonensis* is monotypic.

DIAGNOSIS. *Sciurus arizonensis* (Fig. 1) may be sympatric with *S. aberti* (Hall, 1981). Compared with *S. aberti*, the skull of *S. arizonensis* (Fig. 2) is longer, flatter, the rostrum is broader, the auditory bullae are less inflated, and *S. arizonensis* has one upper premolar rather than two. In addition, *S. arizonensis* has smaller ears, no ear tufts, the underside of the tail has a central stripe of reddish brown and black, and the sides do not have a black stripe between the gray sides and the white underparts (Hoffmeister, 1986).

The ranges of *S. nayaritensis* and *S. arizonensis* approach each other in Arizona and Sonora (Hall, 1981). The skull of *S. arizonensis* is nearly indistinguishable from that of *S. nayaritensis*, and external and most cranial measurements of the two species are almost identical. Thus, these taxa may be conspecific, but there is a marked difference in color, and certain cranial features are useful in distinguishing the two. Compared with *S. nayaritensis*, the underparts of *S. arizonensis* are whitish rather than orangeish, the legs and feet are brownish interspersed with white and tan rather than reddish or ochraceous, and the tail is bordered with white rather than tan or yellow. Although color varies considerably throughout the range of *S. nayaritensis*, the variation is not as great as that between *S. arizonensis* and *S. nayaritensis* in Arizona. *S. arizonensis* has a narrower rostrum as measured across its base at the maxillary-premaxillary sutures than *S. nayaritensis* (usually <14.6 mm in *S. arizonensis* and >15.0 in *S. nayaritensis*). The distance between the infraorbital canals usually is ≤ 13.4 mm in *S. arizonensis* and ≥ 13.4 mm in *S. nayaritensis*. In *S. arizonensis*, the cranium is shallower between the orbits and the maxillary toothrow; all ≤ 21.5 mm in *S. arizonensis*, whereas most *S. nayaritensis* are >21.5 mm. Discriminant function analysis produced a complete separation of these two species (Hoffmeister, 1986).

GENERAL CHARACTERS. The upperparts of the Arizona gray squirrel are uniform grizzled gray with tawny suffusion (in winter with a pronounced ochraceous or fulvous dorsal stripe). Postauricular patches of rusty yellow sometimes are present (Hall, 1981), and the tops of the feet are gray (Hoffmeister, 1986). Dorsally, the tail is black washed with white. Ventrally, the tail is grizzled yellow-orange to rusty brown medially, bordered with black and edged with white. The underparts are white or nearly so. Compared with other tree squirrels, Arizona gray squirrels differ more seasonally in color, being grayer in winter. Some authors have mistaken the striking seasonal difference of molting animals for geographic variation. Furthermore, it is known that walnut juice stains the pelage, especially the feet and underparts, a fact that has led at times to erroneous descriptions of color of the species (Hall, 1981).

In Arizona, individuals from southern populations average larger than those from northern populations in 11 of 14 external and cranial characters and are significantly larger in 10 of the 11, but northern populations are significantly larger in postorbital breadth, length of upper toothrow, and height of cranium in the interorbital region. Differences (in mm) between the two populations, even when significant, are not great, e.g., basal length of cranium, 53.9 in southern populations compared with 53.2 in northern populations, zygomatic breadth, 36.7, 35.9, and breadth of rostrum, 12.1, 11.8. Averages and ranges of external and cranial measurements (in mm) of *S. arizonensis* from the central Mogollon and Huachuca mountains, respectively, are: total length, 518 (455–547), 523 (492–574); length of tail, 257 (200–285), 255 (225–275); length of body, 261 (248–277), 267 (244–321); length of hind foot, 69 (64–73), 72 (67–77); greatest length of cranium, 62.2 (60.1–64.6), 63.3 (61.4–65.4); basal length of cranium, 53.3 (51.0–55.4), 53.9 (50.4–55.8); basilar length of cranium, 47.7 (45.5–49.5), 48.2 (46.5–49.6); zygomatic breadth, 36.3 (34.1–37.8), 36.8 (34.9–38.4); interorbital breadth, 20.9 (19.4–22.2), 20.9 (19.6–22.7); postorbital breadth, 20.8 (19.9–21.9), 20.7 (19.4–21.6); length of palate from incisive foramen, 19.4 (18.5–20.0), 20.3 (19.0–21.7); length of premaxillary palate, 31.7 (30.3–32.9), 32.6 (31.1–34.0); length of maxillary toothrow, 11.6 (11.0–12.4), 11.5 (10.9–12.4); breadth of rostrum, 11.6 (10.6–12.3), 12.1 (10.8–12.9); height of braincase, 20.5 (19.9–21.3), 20.6 (19.6–21.4); height of cranium, 20.6 (19.5–21.5), 20.6 (19.4–21.5); breadth between premaxillary and maxillary suture, 13.5 (12.6–14.8), 13.6 (12.0–14.9); breadth between infraorbital foramina, 12.3 (11.5–13.1), 12.7 (11.0–16.2—Hoffmeister, 1986). In Arizona, mass averages 647 g (range, 521–874 g—Brown, 1984).

Secondary sexual dimorphism was examined in 18 external and cranial measurements of *S. arizonensis* from Arizona. In the White Mountains, males were larger than females in breadth of rostrum. In the Huachuca Mountains, females were larger than males in total length, length of tail, zygomatic breadth, palatal length to the tip of the premaxillaries, and breadth of rostrum. In the central Mogollon Mountains, females were larger in height of the skull measured from the crowns of the molars to the braincase above the orbits and in distance across the infraorbital canals. However, a multivariate analysis of variance showed no significant differences between sexes (Hoffmeister, 1986).

DISTRIBUTION. The Arizona gray squirrel occupies the upper Sonoran and transition life zones at elevations of 1,120 to

FIG. 1. A young *Sciurus arizonensis* at Pine, Gila Co., Arizona. Photograph by H. Biller.

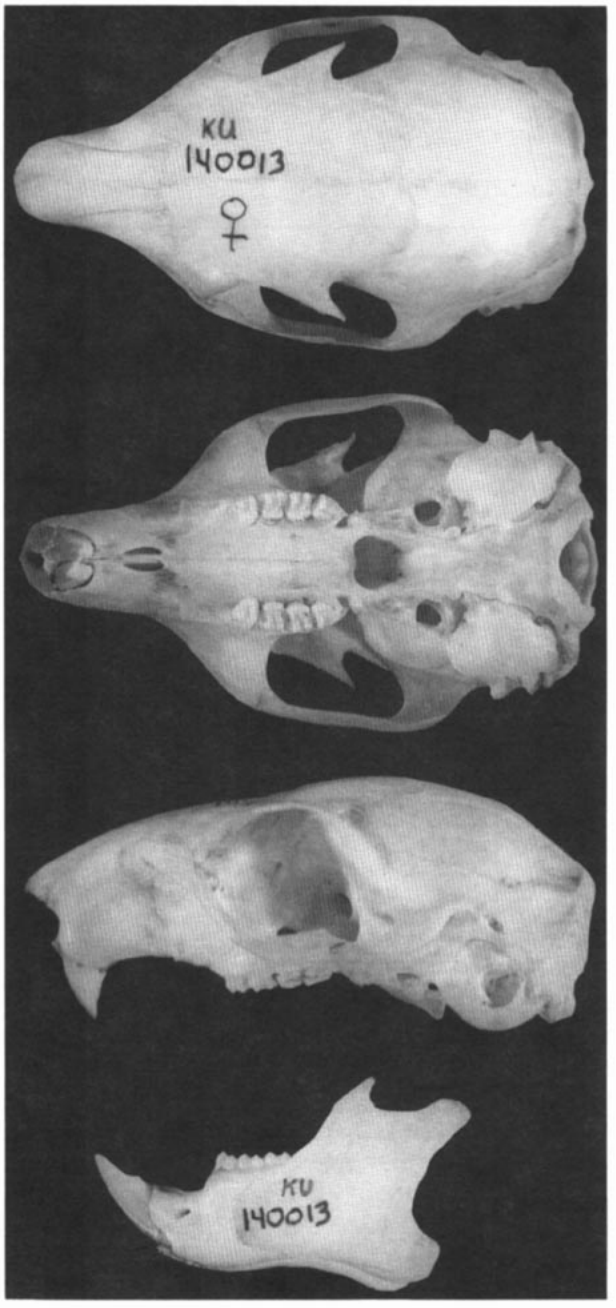

FIG. 2. Dorsal, ventral, and lateral views of cranium and lateral view of mandible of *Sciurus arizonensis* from 15.2 km S, 8.8 km E Continental, Madera Canyon, Pima Co., Arizona (female, University of Kansas Museum of Natural History 140013). Greatest length of cranium is 61.8 mm. Photographs by T. L. Best.

>2,700 m in Arizona, New Mexico, and Sonora, Mexico (Fig. 3; D. E. Brown, pers. comm.; Hall, 1981; Monson, 1972; Theobald, 1983). In Arizona, *S. arizonensis* occurs on the southern and western slopes of the Mogollon Plateau from north of Sedona, Coconino Co., to Blue, Greenlee Co., and many isolated mountain ranges to the south, including the Prescott, Bradshaw, Pine, Mazatzal, Sierra Ancha, Santa Catalina, Rincon, Santa Rita, Patagonia, Pajarito, and Atascosa mountains (Brown, 1984; Hoffmeister, 1986). In New Mexico, the Arizona gray squirrel occupies watersheds of the San Francisco and Gila rivers in Catron Co. and it occupies the Pinos Altos Mountains in Grant Co. (Brown, 1984). In Sonora, *S. arizonensis* inhabits the Sierra de los Ajos, Sierra Azul, Sierra de la Madera, Sierra Patagonia, Sierra de Piñitos, and mountains northeast of Cucúrpe (Brown, 1984; Caire, 1978).

FOSSIL RECORD. The genus *Sciurus* evolved by the early Miocene (Black, 1972). Remains tentatively assigned to *S. arizonensis* have been reported from the Brown Sand Wedge fauna of Blackwater Draw in eastern New Mexico (late Wisconsinan—Kurtén and Anderson, 1980; Slaughter, 1975). This seems unlikely, but fossils of *S. carolinensis* might occur there. If *S. carolinensis* was the correct species, it would be one of several eastern forms reaching its western limit along a riparian stringer of the Brazos drainage (Harris, 1970, 1985).

FORM AND FUNCTION. In the Arizona gray squirrel, the basal portion of the rostrum is not greatly inflated, and the top of the braincase is not greatly vaulted in the interorbital area (Hoffmeister, 1986). The dental formula of *S. arizonensis* is i 1/1, c 0/0, p 1/1, m 3/3, total 20 (Hall, 1981). In the Huachuca Mountains, one individual had a sliver of a tooth in front of each P4, and this may represent a vestige of the P3 (Hoffmeister and Goodpaster, 1954).

The hyoid apparatus consists of a single basihyal and paired thyrohyals, ceratohyals, and stylohyals; the basihyal is thick, triangular in cross-section, long, and fuses with the short thyrohyals at an early age (Hoffmeister and Hoffmeister, 1991). The eye is yellowish (Dice and Blossom, 1937), and the mammae are arranged in four pairs as follows: one pectoral; two abdominal; one inguinal (Nelson, 1899).

There are two molts a year in *S. arizonensis*. The more luxuriant winter pelage is present from about November through mid-April. In summer, the pelage is less grizzled, more brownish, and the tail is less plumelike (Brown, 1984). During July and August, the pelage commonly is stained with the juice of immature walnuts (*Juglans rupestris*). The white hair of the undersurface becomes tawny ochraceous where the walnut juices come in contact with it, and toward the end of the season those squirrels that feed habitually on the walnut become almost uniformly this color on the whole undersurface. The naked palms and soles are likewise stained. Such individuals have coloration similar to that of *S. niger*, and the staining has the appearance of a natural hair coloring. Around the nipples where new hair is coming in or where the young in nursing removed the walnut juice, the hair is white. At the first molt after the walnut-eating season is past, the pelage becomes white. Individuals having the pelage discolored invariably have their palms stained also, while those living away from walnut trees have white bellies and clean feet (Mearns, 1907).

The baculum of *S. arizonensis* (Fig. 4) is most like bacula of *S. carolinensis*, *S. niger*, and *S. oculatus*. In *S. arizonensis*, the basal portion of the shaft is circular or nearly so in cross section. The shaft tapers distally, with an apparent twist, to its smallest diameter. At this point the shaft usually curves dorsally and expands into a broad circular disc that is concave on the right side and convex on the left. There is some variation in the way the spur projects from the shaft. Some bacula have no notch posterior to the base, and in these the spur appears to be a continuation of the shaft. Other bacula have a notch there and the spur forms an angle with the shaft. The posterior edge of the disc is either rounded or forms a small point. When rounded, the angle formed with the shaft is ca. 90°; when it forms a small point, there is the appearance of a small hook. Averages and ranges of measurements (in mm) of eight bacula of *S. arizonensis* from Arizona are: length, 11.9 (11.2–12.2); length of expanded tip, 2.7 (2.4–3.0); height of tip, 2.9 (2.6–3.1); height of base, 2.7 (2.5–2.9); width of base, 2.3 (1.9–2.5—Burt, 1960).

ONTOGENY AND REPRODUCTION. Although subadult females appear to breed later in their 2nd year than adults, there is no evidence of any female having >1 litter/year. The absence of placental scars in some adults in summer indicates that not all females breed each year (Brown, 1984). Mature sperm are present from November through July, peaking in April (Theobald, 1983). The onset of breeding activity in the Arizona gray squirrel is correlated with flower emergence and flower parts in the diet. Although an increase in width of the cervix and mass of the bulbourethral gland indicates breeding capability as early as January and February (with the flowering of manzanita, *Arctostaphylos pungens*), estrus for most occurs in April and early May. This also is the time that mating chases have been observed (7 February; 8 and 25 April; 2 and 13 May). Five males and one female were involved in one mating chase on 2 May (Brown, 1984).

Embryos are present each month from January through June,

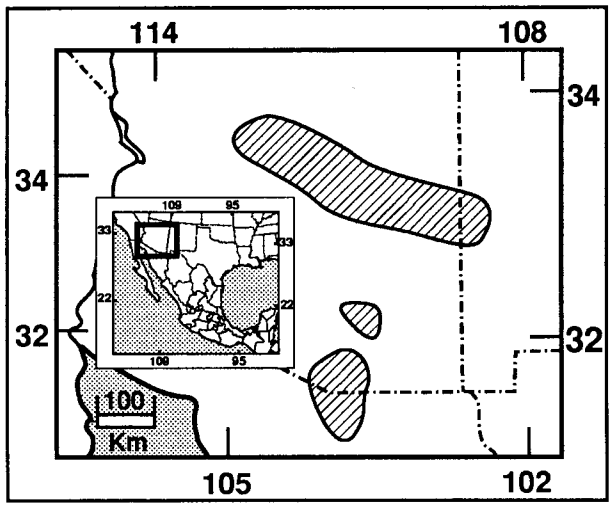

FIG. 3. Distribution of *Sciurus arizonensis* in Arizona, New Mexico, and Sonora, Mexico (Hall, 1981).

with most pregnant females (57%) in May and June. Average litter size is 3.1 (range, two to four—Brown, 1984). Lactating females have been observed 27 June–17 October (Theobald, 1983). The earliest that a juvenile was observed was on 24 June, indicating a variable and prolonged natal period (Brown, 1984). In August, all females in Arizona appeared to be lactating, and three juveniles observed in mid-August apparently were born in mid-June (Hoffmeister, 1986).

In the Huachuca Mountains, large young-of-the-year are present by mid-July (Allen, 1895; Dice and Blossom, 1937) and August. Also in August, one adult female was lactating. Either she was nursing nearly full-grown young or a newborn litter, which might represent the second of the summer (Hoffmeister and Goodpaster, 1954).

In Arizona, the sex ratio is 1:1. Of 214 individuals examined during one study, 40 were juveniles (19%), 26 were subadults (12%), and 148 were adults (69%). The percent of young among 108 individuals examined in October–February was 42.6% (Brown, 1984).

ECOLOGY. In Arizona, *S. arizonensis* occurs in dense, mixed-broadleaf communities of riparian-deciduous forest. Usually, it is restricted to 1,500–1,950 m elev., where the hardwoods are in juxtaposition with montane forest or evergreen woodlands that approach or achieve the physiognomy of forest. Sizeable populations extend downward along streamsides into semidesert grassland and chaparral only where the riparian forest exhibits high species diversity and tall, interlocking canopies. The Arizona gray squirrel does not occur in the more open, flood-prone woodlands or in the cottonwood-willow (*Populus-Salix*) communities downstream (Brown, 1984).

In Arizona, *S. arizonensis* inhabits mature forest of tall trees (to >23 m). Primary residence is on the older alluvial benches of well-watered drainages, at adjacent springs and seeps, and in well-wooded uplands. Favored habitats are groves of old cavity-prone Arizona sycamores (*Platanus wrightii*) and other large deciduous trees—narrowleaf and Fremont cottonwood (*Populus angustifolia, P. fremonti*), box elder (*Acer negundo*), Arizona alder (*Alnus oblongifolia*), big-tooth maple (*Acer grandidentatum*), ash (*Fraxinus velutina*), willows, and Arizona walnut (*Juglans major*). Ponderosa pine (*Pinus ponderosa*) and Gambel oak (*Quercus gambeli*) frequently extend downward to the riparian-forest community and in these situations these two species of trees are used extensively. Smaller trees, including alligator-bark juniper (*Juniperus deppeana*), pinyon pine (*Pinus edulis, P. cembroides*), Arizona cypress (*Cupressus arizonica*), cherry (*Prunus*), and hackberry (*Celtis reticulata*) seasonally provide mast or facilitate arboreal movement. Wild grape (*Vitus arizonica*), Virginia creeper (*Parthenocissus inserta*), and other vines may be on the trees; scarlet sumac (*Rhus glabra*) often provides a low-midstory aspect. Depending on the amount and intensity of livestock grazing, the understory may be herbaceous and luxuriant or present a barren appearance. The presence of large evergreen oaks (*Quercus arizonica, Q. emoryi,*

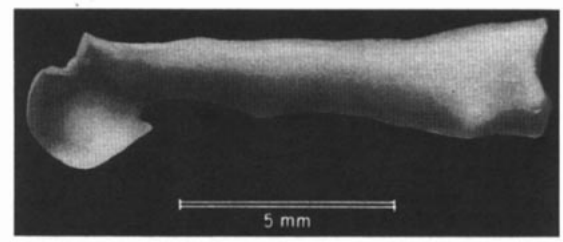

FIG. 4. Baculum of *Sciurus arizonensis* from Huachuca Mountains, Cochise Co., Arizona (modified from Burt, 1960).

Q. grisea), while not always conspicuous, appears universal throughout the range. Although the Arizona walnut has been considered a key indicator of the distribution of *S. arizonensis*, an equal case can be made for Arizona oak (*Q. arizonica*). These large hardwoods (to 24 m), along with the deciduous Gambel oak, provide sources of mast, cavities, and nest platforms. In southern Arizona, with the presence of tall oaks on the uplands and the addition of madroño (*Arbutus arizonica*), silverleaf oak (*Q. hypoleucoides*), and netleaf oak (*Q. rugosa*), the Arizona gray squirrel may exist here away from deciduous trees. In northern Arizona, it may be found in groves of large Gambel oaks with riparian species absent. From the Santa Catalina Mountains north, the distribution of the Arizona gray squirrel often is associated with Arizona alder. This tree, along with oaks and walnuts, appears to be important, because records of *S. arizonensis* are lacking from alderless areas north of the Santa Catalina mountains. Southward in the Santa Rita, Rincon, and Huachuca mountains, and in other southern Arizona locales, big-tooth maples, a greater diversity of large mast-producing oaks, and the late-fruiting madroño may compensate for the lack of alders (Brown, 1984).

In New Mexico, *S. arizonensis* is common in the San Francisco River drainage. It ranges upward to ca. 2,100 m elev., and rarely is found far from Arizona sycamores. The Arizona gray squirrel is confined to deep canyons with water (Ligon, 1927), where black walnuts and acorns are abundant, and where groves of cottonwoods and sycamores afford cover and protection (Bailey, 1931). One was observed in a ponderosa pine at 2,100 m elev. (Findley et al., 1975). In Sonora, *S. arizonensis* occupies riparian situations at moderate to low elevations and has been reported in the deep canyons of mixed oaks and pines between Cananea and Magdalena (Caire, 1978).

In Arizona, the Arizona gray squirrel inhabits hollows in deciduous trees, including ash, sycamore, and cottonwood (Mearns, 1907; Monson, 1972). *S. arizonensis* builds conspicuous leaf nests, and in winter, at least, more than one adult may occupy such a nest. Three were observed on 8 February in one leaf nest near Yank Spring, Atascosa Mountains (Hoffmeister, 1986). Each squirrel may have several leaf nests or none, depending on the availability of den trees. Two types of nests are constructed; a flat platform-type structure used for resting in summer, and a more substantial, covered, bolus nest. The bolus nest, which is constructed of branches and leaves in a tree, appears to be made in lieu of a suitable den site and is used as a nursery in addition to a home. These nests can be differentiated from nests of hawks by their location in the tree and by their dome shape; nests of hawks usually are located in the tops of trees and these nests are flatter on the top. Nests may be in sycamores, walnut trees, alders, maples, cottonwoods, ash trees, and Apache pines (*Pinus latifolia*), but most commonly are in various species of oak. Nest trees are >12 m tall, and the nests are 9–30 m above the ground, mostly 11–18 m. Typical locations are at the fork of two or more substantial branches, or in the crotch formed by the trunk and a major branch. At least in central Arizona, there appears to be a tendency to favor the south or southwest side of the tree. Construction is accomplished by carrying small branches in the mouth to the nest site. These are inserted into the fork and woven into smaller branches and other twigs until a crude platform is created. Leaves, usually those of the tree in which the nest is located, and more twigs are added until the nest is ca. 30 cm in diameter and ≤60 cm in height. Shredded bark, string, grass, and spider webs may interlace and line the more substantial nests. An entrance 5–10 cm in diameter, just enough to admit the squirrel, allows access to a chamber formed by the squirrel's body (Brown, 1984). In New Mexico, the Arizona gray squirrel lives in tree hollows,

high up, rather than in nests constructed among the branches (Ligon, 1927). In Sonora, *S. arizonensis* probably nests in the branches of trees or inside hollow trees (Caire, 1978).

In Arizona, the Arizona gray squirrel eats green walnuts in late summer and early autumn. Other favorite foods are acorns of evergreen and Gambel oaks, and seeds of ponderosa pine (Monson, 1972) and Douglas fir (*Pseudotsuga menziesii*). *S. arizonensis* feeds extensively on walnuts; sometimes several individuals harvest these nuts in the same tree (Hoffmeister, 1986). Mast (walnuts, acorns, juniper berries, hackberries, and pine seeds) is taken throughout the year and constitutes 67% of the diet. Fungi, both subterranean and emergent species, also are important foods year-round. Flower parts are seasonally important, and their presence in the diet coincides with the breeding season. Flower parts may contain vitamin A and other vitamins that stimulate reproductive activity. In February and March, *S. arizonensis* often can be spotted at the ends of alder branches feeding on the new buds and staminate flowers. By April and May, blooming is advanced among several deciduous trees, and the newly emerging leaves provide cover during the breeding season. Later, during summer months, insects and other animal matter supplement a mast diet. Pine seeds begin to show up in the diet in June, and these items are eaten through autumn and into winter. Seeds may be gleaned from cones of ponderosa pine, Apache pine, and Mexican white pine (*Pinus strobiformis*), as well as from white fir (*Abies concolor*) and other conifers. In late autumn (November–December), juniper berries, hackberries, mistletoe (*Arceuthobium*), and fungi are taken, but walnuts and acorns are the mainstay of the diet (Brown, 1984). In New Mexico, the Arizona gray squirrel feeds almost exclusively on walnuts, but also digs in the ground to obtain roots (Ligon, 1927).

Ectoparasites of *S. arizonensis* include the lice *Enderleinellus arizonensis* (Kim, 1966), and *E. longiceps* (Ferris, 1916) and *Hoplopleura sciuricola* (Ferris, 1951) and the fleas *Opisodasys robustus* (da Costa Lima and Hathaway, 1946), *Orchopeas fulleri* (Traub et al., 1983), and *Orchopeas howardi* (Jellison and Senger, 1976). No endoparasites are known.

Adult Arizona gray squirrels have few natural predators that are proficient in their capture, but predators include goshawks (*Accipiter gentilis*), red-tailed hawks (*Buteo jamaicensis*), and bobcats (*Lynx rufus*). Many *S. arizonensis* are killed on roadways (Brown, 1984).

Since the introduction of *S. aberti* into the Santa Catalina Mountains in 1940, the rapid spread of *S. aberti* may have acted adversely on an already small population of *S. arizonensis* (Lange, 1960; Monson, 1972). The population of Arizona gray squirrels in the Santa Catalina Mountains has been listed as a "Category 2" species by the United States Department of the Interior, Fish and Wildlife Service. This category is for taxa that may be appropriate for listing as endangered or threatened (Drewry, 1991).

In Mexico, *S. arizonensis* has suffered severe habitat loss through logging, burning, and the clearing of forests for agriculture (Leopold, 1959; Nowak, 1991). In Sonora, the Arizona gray squirrel is rare; there are no recent verifications of its occurrence in the state (Caire, 1978), and it is considered to be a threatened species (Ceballos and Navarro L., 1991).

BEHAVIOR. The Arizona gray squirrel often runs on the ground and jumps from branch to branch in the trees (Allen, 1895). It is a forager, does not cache food, and usually does not bury nuts, but *S. arizonensis* may bury acorns in leaf litter. Depending upon its feeding habits and time of year, the Arizona gray squirrel may be secretive or readily observed. It may be especially difficult to locate during early summer, when females are pregnant and nursing young. *S. arizonensis* also may be shy and hard to find in winter when the forest is bare and open. At other times, when feeding on alder buds at the ends of branches, when foraging for acorns or walnuts, when engaged in mating chases, or when artificially fed, these squirrels are conspicuous (Brown, 1984).

When humans are around, *S. arizonensis* sits quietly and can be passed without being detected (Hoffmeister, 1986), e.g., one remained almost motionless for ca. 30 min and gave no call (Hoffmeister and Goodpaster, 1954). This prolonged immobility may occur when in clear view of humans. When feeding $\geq$18 m above the ground in trees, this behavior is an effective defense. When caught in the open or startled, the Arizona gray squirrel runs to the tallest trees and disappears behind a large bough or into a den cavity. Frightened animals will remain hidden and motionless for $\geq$45 min (Brown, 1984). *S. arizonensis* can run over rocks as dexterously as *Spermophilus variegatus* and does not always take refuge in the nearest trees but may flee on the ground (Hoffmeister, 1986).

In the Santa Catalina Mountains on 24 August, one Arizona gray squirrel went to the end of a branch and gnawed off a cone. Instead of letting the cone fall to the ground and going there to eat it, the squirrel carried it part way back along the branch and there, balancing itself on its hind feet, held the cone between the front feet and the branch. As the squirrel ate the seeds it turned the cone around on the branch with much dexterity. The cones at this time of year are covered with soft resin and the squirrel became smeared with this, especially on the paws and about the mouth, thus causing the pelage there to become badly matted (Doutt, 1931).

During the day in the Huachuca Mountains, *S. arizonensis* moved out of the canyons to stands of walnut trees near ranch houses. The squirrels came down on the ground in the yards to recover the walnuts. Dogs and humans did not greatly disturb the squirrels; the squirrels seemed accustomed to them. At dusk, the Arizona gray squirrels moved some distance through the intervening trees up the canyon to their nests (Hoffmeister and Goodpaster, 1954).

Usually the Arizona gray squirrel is silent, except for the chucking and barking alarm calls (Brown, 1984). When it is vocalizing, it invariably is in a tree. Alarm barks vary among individuals, but generally are more raspy and gruff than the "quirk" calls of *S. aberti* and may be followed by a whirring screech or scream. *S. arizonensis* is more likely to call when sound will carry well and when the squirrel is concealed. The Arizona gray squirrel vocalizes more in summer than in winter, and this is attributed to habitat characteristics and kin selection; young squirrels would be those most likely to benefit from the calling behavior of a parent (Hobbs, 1980). Animals that elicit calls from *S. arizonensis* are coatis (*Nasua narica*), spotted skunks (*Spilogale putorius*), snakes of various kinds, Montezuma quail (*Cyrtonyx montezumae*), house cats, and humans (Hobbs, 1980).

Sciurus arizonensis was reported to migrate from place to place in large numbers in March and April 1886 (Mearns, 1907), but there have been no more recent reports of such a migration (Brown, 1984). However, when acorns ripen in summer, *S. arizonensis* may migrate far down into the oak belt from higher elevations (Dice and Blossom, 1937).

In the Santa Rita Mountains, five Arizona gray squirrels were observed chasing another squirrel through the trees. The lead squirrel was a female, three of the others were males, and two were of unknown sex. Within 3 days, one female, nine males, and two squirrels of unknown sex were seen at this locality. Based on the condition of her uterus and mammary glands, the female recently had given birth to young. It appeared as though the males had concentrated in this spot in pursuit of the female (Burt, 1933). Nothing is known about the genetics of *S. arizonensis*.

REMARKS. The Arizona gray squirrel might better be called the Arizona fox squirrel because it has only one pair of upper premolars, as in the fox squirrel (*S. niger*) and the Mexican fox squirrel (*S. nayaritensis*—Hoffmeister, 1986). *S. nayaritensis* and *S. arizonensis* may be subspecies of *S. niger* (Brown, 1984; Hall, 1981; Lee and Hoffmeister, 1963).

Sciurus is from the Latin meaning squirrel (Jaeger, 1955). The specific epithet *arizonensis* refers to Arizona.

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