

Diagnosis:

Paternal Care of the Infant

Owl monkeys are unusual in that fathers play a major role in carrying and otherwise providing for the infant. Callitrichids (marmosets and tamarins) also show paternal or sibling care of offspring (single infants to triplets). In owl monkeys, the mother usually provides either dorsal or ventral support for 1–3 weeks, transportation, and suckling. Thereafter, the father provides paternal dorsal support and transportation, although the mother still continues to suckle the infant. The father provides nearly total care between maternal feeding of the single young 2–3 weeks after birth.

Owl monkeys are generally monogamous. A breeding colony of owl monkeys (*Aotus trivirgatus*) established in 1972 produced 35 live infants during the first three years from an average daily population of 30 monogamous pairs⁷. The authors estimated a gestation period of 120–140 days by extrapolating uterine palpation data and interbirth intervals. Other authors^{8–10} have reported similar gestation periods ranging from 133–141 days. Cicmanec and Campbell⁷ collected vaginal swabs from six females during two separate 1-month periods and found the animals did not have estrous cycles. However, Merritt¹⁰ and Gozalo and Montoya⁸ found estrous cycles in captive owl monkeys lasting about 16 days. Researchers have observed no seasonal influence on births and found most births occurred during daylight hours^{4,7–10}.

Garber and Leigh¹¹ explored the relations of ontogeny, life history strategies, and patterns of infant care in 11 species of small-bodied New World monkeys. They suggested that differences in the social systems of *Aotus*, *Callicebus*, *Saimiri*, *Callimico*, *Saguinus*, *Leontopithecus*, *Cebuella*, and *Callithrix* are tied closely to both the costs of reproduction and to the ontogenetic requirements of maturing young. In squirrel monkeys (*Saimiri spp.*),

both rapid prenatal body weight and perinatal brain growth result in relatively high metabolic costs to breeding females. These costs, coupled with little non-maternal assistance in infant care-giving, appear to favor a reproductive strategy that limits offspring production to a single birth at two-year intervals. In contrast, cooperative infant care in tamarins and marmosets (family *Callitrichidae*) distributes the metabolic costs of infant ontogeny among several group members allowing callitrichids to produce twins twice in the same year. Prenatal investment in each offspring is relatively low, and the potentially high postnatal costs of nursing two infants are reduced through a social system involving extensive extramaternal care-giving. Owl monkeys (*Aotus spp.*) and Titi monkeys (*Callicebus spp.*) are characterized by an alternative strategy. In these animals, a monogamous mating system is associated with paternal certainty and male parental care of the young. The transfer of male energetic resources to a single offspring allows owl monkeys and titi monkeys to maintain a comparatively short interbirth interval of one year. Researchers^{7–10} have found that female owl monkeys are capable of giving birth every eight months, but the average interbirth interval is one year.

Adult owl monkeys weigh 0.6–1.0 kg; newborn owl monkeys are comparatively large and weigh about 96 g at birth^{4,5,8,10} (Fig. 2). Sexual maturity is attained at about three years in both sexes.



FIGURE 2. Infant 3-week old *Aotus* monkey.

References

1. Mons, B. & Sinden, R.E. Laboratory models for research in vivo and in vitro on malaria parasites of mammals: current status. *Parasitol. Today* **6**(1), 3–7 (1990).
2. Bowden, D.M. & Smith, O.A. Conservationally sound assurance of primate supply and diversity. *ILAR J.* **34**(4), 53 (1992).
3. Aquino, C.R. & Encarnacion, F. in *Aotus: The Owl Monkey* (eds Baer, J.F., Weller, R.E. & Kakoma, I.) 59–95 (Academic Press, San Diego, 1994).
4. Rieckmann, K.H., Mrema, J.E., Marshall, P.H. & Hafner, D.M. Breeding of *Aotus* monkeys for human malaria research. *Bull. Pan Am. Health Organ.* **14**(3), 251–257 (1980).
5. Hershkovitz, P. *Living New World Monkeys (Platyrrhini): With an Introduction to Primates* (University of Chicago Press, Chicago, 1977).
6. Nowak, R.M. *Walker's Mammals of the World* (The Johns Hopkins University Press, Baltimore, 1999).
7. Cicmanec, J.C. & Campbell, A.K. Breeding the owl monkey (*Aotus trivirgatus*) in a laboratory environment. *Lab. Anim. Sci.* **27**(4), 512–517 (1977).
8. Gozalo, A. & Montoya, E. Reproduction of the Owl Monkey (*Aotus nancymaeae*) (Primates: Cebidae) in captivity. *Am. J. Primatol.* **21**, 61–68 (1990).
9. Dixon, A.F. in *Aotus: The Owl Monkey* (eds Baer, J.F., Weller, R.E. & Kakoma, I.) 113–132 (Academic Press, San Diego, 1994).
10. Merritt, D.A. Jr. Captive reproduction and husbandry of the douroucouli *Aotus trivirgatus* and the titi monkey *Callicebus* in captivity. *Int. Zoo Yearb.* **20**(Breeding Endangered Species in Captivity, Third Conference), 52–59 (1980).
11. Garber, P.A. & Leigh, S.R. Ontogenetic variation in small-bodied New World primates: implications for patterns of reproduction and infant care. *Folia Primatol. (Basel)* **68**(1), 1–22 (1997).