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#### APPARENT POLYGYNOUS NESTING BY BURROWING OWLS

KEY WORDS: *Burrowing Owl*; *Athene cucularia*; nesting; polygyny.

Burrowing Owls (*Athene cucularia*) are considered to be predominantly monogamous, although polygyny was suspected occasionally in Saskatchewan (Haug et al. 1993). Haug (1985) observed a female Burrowing Owl that may have paired with an already-paired male, but this female deserted her nest burrow. Johnson (1997) observed two territories that were each occupied by three adults and reported genetic evidence showing that each of the adults at both territories was a parent of some of the offspring, and concluded that relatedness could have been due to brood mixing.

We observed simultaneous two-nest polygynous breeding where one male Burrowing Owl paired with two females that each raised young at the U.S. Army Garrison

Camp Parks in northern California in 2009. Camp Parks is a 1003-ha military training installation 3 km northeast of Dublin in Alameda and Contra Costa counties. Vegetation on the installation consisted of California annual grassland series (Sawyer and Keeler-Wolf 1995) of varying height, with patches around training facilities mowed regularly and maintained at <10 cm tall.

We surveyed the two nest burrows from a vehicle at different times of day once in February, twice in March, twice in April, eight times in May, nine times in June, and six times in July 2009. Nest burrow 1 was located 2 vertical m up a 5-m tall soil berm (20° slope) along an abandoned 700-m unpaved landing strip. Nest burrow 2 was 73 m away in the flat portion of the landing strip. We recorded the

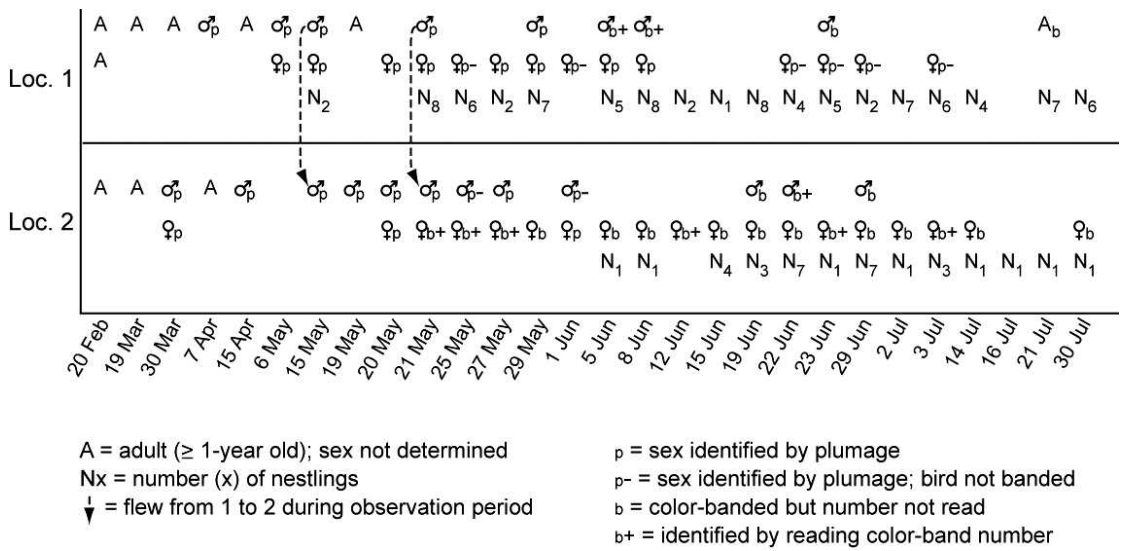


Figure 1. Summary of associations of Burrowing Owls at two nest locations where polygyny was observed at the U.S. Army Garrison Camp Parks, Alameda County, California. The nest sites, which were observed from February through July 2009, were 73 m apart and are indicated in the figure as locations 1 and 2. The male was banded at location 1 on 5 June, resighted there on 8 June and at location 2 on 22 June.

number and age class (i.e., adult, nestling) of each owl sighted during a 3–5-min observation period and assigned each sighting to location 1 or 2 if the owl was perched within 20 m of the nest burrow at each location. Beginning on 30 March we also recorded the sex of each adult, because differences in plumage fading (Haug et al. 1993) enabled us to distinguish the male (lighter plumage) from the females (darker plumage).

We observed three adults at the two nesting sites during 14 of 28 visits and never saw more than three adults (Fig. 1). Two adults were at location 1 six times and seven times at location 2. Twice, the male flew from location 1 to location 2 during our observation period. We captured and banded a female, identified by the presence of a vascularized brood patch, at location 2 on 21 May. We banded the owl with a U.S. Geological Survey band on one leg and a blue metal color band engraved with an alphanumeric code (Acraft Sign and Nameplate Company, Edmonton, Alberta, Canada) on the other leg. We observed this banded female at location 2 on 15 subsequent dates. After banding the female at location 2, we confirmed on six occasions that the attendant female at location 1 was not banded. We captured an adult that we identified as a male based on the absence of a vascularized brood patch when he delivered food into the nest burrow at location 1 on 5 June (Fig. 1).

We first observed two emergent nestlings, approximately 2–3 wk old, at location 1 on 15 May and one (also 2–3 wk old) at location 2 on 5 June. Later, we observed a maximum of eight nestlings at location 1 and seven at

location 2 (Fig. 1). The 2–3 wk difference in the age of nestlings from locations 1 and 2 enabled us to differentiate them early in the nesting cycle and precluded the possibility that exploratory movements of young and brood mixing confounded the origin of nestlings (Johnson 1997).

We never observed a second adult male at either nesting site and based on the male’s simultaneous association throughout the nesting cycle with both females and their young at their respective nest burrows (Fig. 1), we concluded that the male maintained pair bonds with both females. We never observed a female that we assigned to one nest burrow at the other female’s nest burrow and we did not observe any agonistic encounters between the females. The nearest nesting Burrowing Owls were two monogamous pairs 550 m away. We never observed owls banded at other locations on Camp Parks in the vicinity of locations 1 and 2.

We trapped and banded owls at locations 1 and 2 on four occasions in May and June beginning about one hr before sunset and ending at around midnight. We frequently observed the male fly between locations 1 and 2, interacting with both females and provisioning their young during the approximately 18 hr of monitoring traps and nighttime owl activity (Barclay 2008). Because these additional observations were incidental to our nest surveys, they are not included in Fig. 1.

We based our conclusion that the owls at locations 1 and 2 engaged in polygyny on our observations of one male maintaining pair-bonds with two females. We did

not collect genetic data to confirm parentage of the young and cannot rule out the possibility that some resulted from promiscuous, extra-pair fertilizations (Johnson 1997). Nevertheless, extra-pair fertilization(s) would not negate our conclusion, because polygyny is a sustained association of one male with more than one female, whereas promiscuity involves brief, unsustained associations (Gill 1990).

Our observations indicated that the Burrowing Owl's conventional monogamous mating system is sufficiently labile to enable simultaneous, successful polygynous nesting. We believe the demands on the male to provision two females and their young were facilitated by cathemeral (24 hr) foraging during the nesting cycle (Coulombe 1971, Haug et al. 1993, Poulin and Todd 2006). Although polygyny is uncommon in Burrowing Owls, we recommend that researchers studying breeding Burrowing Owl populations and estimating per-capita reproduction consider that a breeding population may not always be composed of pairs (i.e., an even number of adults) and reproduction may be more accurately expressed as offspring reared per breeding female (Steenhof and Newton 2007).

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