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NOTES

A FEMALE-FEMALE SAME-SEX PAIR OF FLORIDA SCRUB-JAYS (*Aphelocoma coerulescens*)

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While rare overall, same-sex courtship, bonding, and sexual behaviors are nevertheless widespread across animal taxa (Bagemihl 1999). Such behaviors are seemingly maladaptive because of apparent reproductive barriers. However, some species exhibit persistent high rates of same-sex pairings with successful, though reduced, reproductive output as an alternative to forgoing reproduction entirely (Bailey and Zuk 2009, Young and VanderWerf 2014). The factors regulating same-sex pairings are not always clear, but may include type of breeding system (MacFarlane et al. 2006), degree of parental care (MacFarlane et al. 2010) skewed sex ratios (Young et al. 2008), or social isolation (McGraw and Hill 1999). Same-sex courtship or mate-bonding behaviors have been reported in over 100 bird species both in the wild and in captivity, including in three corvids (Bagemihl 1999, MacFarlane et al. 2010).

Florida Scrub-Jays (*Aphelocoma coerulescens*; hereafter scrub-jays) are cooperatively breeding corvids endemic to central and coastal Florida. This breeding system has been the focus of multiple long-term studies of behavior and physiology (Mumme 1992, Woolfenden and Fitzpatrick 1996, Small and Schoech 2015), primarily conducted at Archbold Biological Station (27° 10'N, 81° 21'W, 38-68 m ASL) in Venus, Florida. There are no previous published records of same-sex behavior in this species. Here, we report our observations of same-sex courtship between two female scrub-jays during the 2014 breeding season. While we did not observe a breeding attempt, we noted repeated courtship and territory defense behaviors typical of male-female breeding pairs; thus, we will refer to these birds as a female-female pair.

During routine population monitoring at Archbold we observed the formation of a new territorial pair of scrub-jays, consisting of a known female breeder (fledged two young in 2013, male mate presumed deceased before 2014 season) and an adult non-breeder of unknown sex from a nearby territory. While jays on site are typically genetically sexed as nestlings, the non-breeder was banded as an adult early in 2014 and genetic results were pending. S. M. Ferguson observed a number of territorial encounters between this pair and birds from neighboring territories from 11 March to 18 March 2014. At 0645 EST on 19 March 2014, E. K. Elderbrock and S. M. Ferguson witnessed a male-specific courtship display as described by Woolfenden and Fitzpatrick (1996), in which the unknown sex bird flew to the ground and presented to the known female by fanning and dragging its tail along the ground, accompanied by 3-5 sec of warble song. The known female adopted a receptive posture, begging and fluttering her wings throughout the display. We did not observe copulation or locate a nest at this time. On 20 March 2014, B. C. Jones witnessed a territorial encounter during which the presumed male of the pair (the unknown-sex bird) gave a rattle call, a sex-specific female vocalization, accompanied by a distinctive head bob (Woolfenden and Fitzpatrick 1996). The bird was positively identified by unique colored leg bands from a distance of less than 10 m during both encounters.

On 28 March 2014, E. K. Elderbrock observed the known female adding twigs to an early platform (Florida Scrub-Jay nests consist of an outer basket, or platform, of twigs lined with scrub palmetto [*Sabal etonia*] fibers) while the unknown-sex bird, now presumed to be her male partner, also picked up twigs nearby but was not seen adding to the platform. By 6 April 2014, construction on the nest had not progressed and the nest site was presumed abandoned. However, S. M. Ferguson discovered another twig platform on 16 May 2014, which was defended only by the known female with flights and vocalizations. On subsequent days the nest was not defended by either bird and construction did not progress. While the female-female pair successfully defended a territory against neighboring pairs throughout the breeding season and expressed male-female typical courtship behaviors, they did not, to our knowledge, complete a nest or lay eggs.

Body mass and size measurements of the unknown sex scrub-jay taken during routine capture procedures were consistent with those of a small adult female (Florida Scrub-Jays exhibit weak sexual dimorphism, with males slightly larger; Woolfenden and Fitzpatrick 1996), and results of genetic testing confirmed the bird to be a female. During the 2015 breeding season both birds paired with known males (sex determined genetically), built nests, and laid fertile eggs as confirmed by hatching or candling (S. M. Ferguson, pers. obs.), though neither successfully fledged young. These observations make unlikely the possibility of a ZZW gynandromorph, as have been reported in other bird species (e.g., Zebra Finch [*Taeniopygia guttata*], Agate et al. 2003; domestic chicken [*Gallus domesticus*], Clinton et al. 2012; White-ruffed Manakin [*Corapipo altera*], DaCosta et al. 2007; and Black-throated Blue Warbler [*Dendroica caerulescens*], Patten 1993). Note too that gynandromorphs are typically infertile (Lin et al. 1995) and usually exhibit intermediate-sex morphology and behavior.

In this scrub-jay pair we witnessed two females express courtship and defense behaviors typical of a male and female pair. Same-sex courtship and mating behaviors are not well understood, but may arise in highly social species under specific conditions (e.g., absence of opposite-sex partners). It may be that such a relationship in Florida Scrub-Jays was facilitated by the behavioral flexibility of their cooperative breeding system, in which adult non-breeders aid breeders (usually their parents) at the nest and in territory defense prior to obtaining territories of their own (Woolfenden and Fitzpatrick 1996). However, this does not explain why a female bird would express male-typical behaviors. Courtship behaviors are often hormonally regulated (Fusani 2008) and the observed female may have experienced transiently abnormal hormone levels or hormone sensitivity, after which it resumed typical female behaviors.

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