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### OBSERVATIONS OF AUTUMNAL COURTSHIP BEHAVIOR IN PEREGRINE FALCONS

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The Peregrine Falcon (*Falco peregrinus*) is non-gregarious and usually monogamous (Bent 1938). Individuals sometimes remain together even after the breeding season, and pair-bonds can persist a lifetime (Walpole-Bond 1938). Peregrine social behavior has been much studied during the breeding season both in the wild (Nelson 1970) and in captivity (Fyfe 1972; Weaver and Cade 1974; Wrege and Cade 1977). Female Peregrines are formidable birds of prey and may represent a potential hazard to their smaller mates (Dekker 1979). Peregrines exhibit a complex repertoire of courtship displays (see Cramp and Simmons 1980) which may be of value in maintaining pair bonds and limiting aggression (Bent 1938; Wrege and Cade 1977). Pair interactions may be maintained at reduced intensities throughout the year (see Glutz von Blotzheim et al. 1971), yet little has been written about social behavior of Peregrines on non-breeding grounds. Albuquerque (1988) stated, "It is important to know whether any of the courtshiplike behaviors displayed by Peregrine males on the wintering grounds are really associated with pairing or whether these observations are linked to some other function."

Desecheo Island, Puerto Rico is a 122-ha, uninhabited, mountainous island 20 km west of Puerto Rico in Mona Passage. Highest elevation is 208 m on the northern ridge. The north face of the ridge slopes precipitously seaward, while on the southwestern side 3 parallel valleys and intervening ridges slope more gently southward to the sea (Morrison and Menzel 1972). Vegetation types include seasonal deciduous woodlands in valleys and on lower slopes, and scrub, grass and cactus communities on ridges and exposed slopes, particularly on windward northeastern slopes. Seabirds, including colonies of several hundred Red-footed Boobies (*Sula sula*), roost on the island. Numerous migrant birds use the island for resting and feeding during spring and fall migration (unpubl. data of authors).

We visited Desecheo during 6-18 March, 7-21 July and 14-30 October 1987 and observed behavior of Peregrines on the island. Age of Peregrines was estimated by plumage characteristics (see Clark and Wheeler 1987). Where possible, terminology describing falcon behavior follows Cramp and Simmons (1980).

A single Peregrine Falcon was observed on Desecheo in March 1987 but was not observed interacting with other avifauna on the island. No Peregrines were seen in July; however, 5 Peregrines were observed on Desecheo in October 1987. Some, if not all of these birds, may have been migrants.

One pair of adults roosted on cliffs on the northeastern promontory. Another pair consisting of a juvenile male and an adult female roosted <200 m away on a cliff overlooking the northern shore. A lone adult male visited the island but was not seen as regularly as the other 4 falcons.

Beginning 16 October both pairs were observed engaging in high-flying and undulating flights and flight play, but no talon presentation or aerial kissing (Cramp and Simmons 1980) occurred, nor were aerial food transfers observed.

Interactions between the pair that included a juvenile male appeared increasingly aggressive over the next 2 days. The male frequently stooped toward the female, often passing within <1 m. At 1630 H, 18 October 1987, this pair was high-circling at about 300 m and occasionally engaging in hitched-wing displays (Cramp and Simmons 1980). The male flew under the female, the birds interlocked talons and tumbled about 200 m through the air, separating just before landing together on a steep, bare slope. Flight behavior was accompanied by persistent calling by both members. Upon landing, the female uttered a "whine" call and assumed a head-low posture with the tail horizontal. Within 2 sec she pitched her head forward, spread her wings slightly and raised her tail. The juvenile male immediately mounted, flapped his wings and emitted "chittering" noises throughout the 6 sec duration of copulation; the female whined persistently. The male then dismounted and flew to an altitude of about 300 m. The female remained on the ground calling and whining for 30 sec before joining the male in the air. The falcons interlocked talons again, tumbled 50 m through the air, separated and flew out of sight together.

On 19 October, a juvenile male initiated a series of what appeared to be eyrie-flyby-and-landing displays (Cramp and Simmons 1980) at his roost before joining an adult female to chase and dive at 2 adult Peregrines until all 4 falcons were far out to sea. Upon returning to the roost, a juvenile male and an adult female attacked a Northern Harrier (*Circus cyaneus*) flying along the north shore of the island. The female stooped on the harrier and raked its back with her talons. The 2 Peregrines continued to chase the harrier which eventually flew around the east end of the island and out of the area. Thereafter, the Peregrines again interlocked talons and tumbled 100 m before separating.

The 2 Peregrine pairs continued to engage daily in high-flying, undulating-flights, hitched-wing flights and flight-

display. The pairs continued to roost within 200 m of each other and occasionally called at each other and engaged in short chases high over the island.

Peregrines have laid infertile eggs in autumn in captivity (Galicz et al. 1972). Courtship display and copulation are not necessarily immediate precursors to reproduction but may also function in pair integration (Willoughby and Cade 1964; Wrege and Cade 1977). Fisher (1968) indicated that copulation was the first observed interaction of the breeding season in some wild Peregrines, and Fyfe (1972) observed copulation of Prairie Falcons (*Falco mexicanus*) long before egg laying. Wrege and Cade (1977) observed copulation in *F. peregrinus* well before laying. The American Kestrel (*F. sparverius*) also copulates early in the breeding season (Willoughby and Cade 1964). Copulations are often incomplete and of short duration (5–6 sec) early in the breeding season but increase in frequency and duration until the final 2–3 wk before egg laying, when copulations occur with a frequency as high as 3–4/hr with durations of 8–10 sec (Cramp and Simmons 1980, Wrege and Cade 1977).

Courtship, including food transfers, may occur throughout the non-breeding season (Glutz von Blotzheim et al. 1971). Courtship behavior and copulation observed on Desecheo occurred in October, a post-breeding migratory period for some Peregrine species. Copulation was observed only once and was thus determined to be infrequent. Subsequent reproduction was highly unlikely as no other signs of nesting were observed. The “courting” type behavior reported here need not suggest pair bonding but simply interaction between one Peregrine and another. S. Sherrod (pers. comm.), who has witnessed autumnal courtship behavior in adult pairs of Peregrines in Australia and Greenland, feels that brief fall courtship behavior in Peregrines is not uncommon although it has not often been recorded in the literature.

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