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IMPROVISED COURTSHIP FEEDING BY AN OSPREY (*Pandion haliaetus*) PAIR

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During the early part of the breeding cycle male Ospreys (*Pandion haliaetus*) supply their female mates with fish. This is known as courtship feeding. After a successful hunt the male typically consumes part of his catch away from the nest before depositing the remaining portion in the nest for the female (Poole 1989, Green and Krebs 1995). Typically, the female subsequently flies with the fish to a separate perch for consumption. The exchange of the fish is normally dependent upon an intact functional nest. While observing various nesting Ospreys on Santa Rosa Island, Escambia County, Florida in 2014, I observed and photographed a male Osprey that necessarily “improvised” in a novel way so as to courtship feed his mate in the absence of a functional nest.

I watched this pair for a period of several weeks in the spring of 2014 as they attempted to build a nest in the top of a dead tree. The tree offered little in the way of long branches or other features that might support a typical Osprey nest of the platform type. As a result, most of the nesting material that was delivered by the male and female to the potential nesting site either immediately, or eventually, fell from the tree to the ground. After approximately 20 days of construction, the nest had no real discernible organization, consisting mostly of a few sticks and bits of disorganized vegetation.

During one period of observation, around 15 days after the beginning of nest construction, the male arrived at the nesting site with the posterior portion of a fish in his left talons. He perched on what remained of a dead primary branch of the nesting tree, and the female continued to perch on the remaining trunk of the tree approximately 2.5 meters from him (Fig. 1). Note that in the photo there is no significant (functional) nest present in the tree below the pair. From his perch the male extended his left leg towards the female with a portion of fish in talons. The female, however, did not leave her perch.

Rather than drop the fish into the very rudimentary nest (which would be usual courtship feeding behavior for an Osprey), the male continued to hold on to the fish. Ospreys rarely retrieve dropped fish from the ground (Poole 1989). After a few minutes, the male flew to the female, and hovered before her. While she fed on the fish he continued to hover and hold the fish in his left talons (Fig. 2). The female remained on her perch during this time. The male hovered for



Figure 1. Perched male Osprey on the left holds posterior half of a fish in left talons and extends it towards the female. The female remains perched opposite him. Note that in the photo there is no significant (functional) nest present in the tree below the pair.

approximately 10 to 15 sec while she fed on the fish, and then returned to his perch with the fish in his talons. He repeated this behavior two or three more times and allowed the female to feed each time. During the entire time I observed the pair, the male did not take any meat from the fish for himself. He eventually dropped the remains of the fish into the rudimentary nest and it immediately fell to the ground. Neither bird attempted to recover it.

I am unable to find other reports of an Osprey courtship feeding its mate by holding food in its talons while hovering. Perhaps this is not surprising. Usual courtship feeding behavior in this species does not involve the direct feeding of the female by the male. Instead, male Ospreys deliver fish to the female by dropping the fish in the nest. While males of some avian species will courtship feed females by presenting food items directly to them, they are often seasonally monogamous and are competing with other males for a female's attention. Since Ospreys typically mate for life, the male is not courtship feeding the female to gain her attention. Most likely, the male is feeding the female to promote successful brooding (Poole 1985, Green and Krebs 1995).



Figure 2. After a few minutes, the male flies to the female, and subsequently hovers at a height that allows her to feed on the fish while remaining on her perch.

Courtship feeding in birds exists in many forms (Galván and Sanz 2011). It typically occurs during the early part of the breeding cycle. In many species it involves the presentation of solid or regurgitated food by the male to the female. In species where the female courts the male, the behavioral roles are usually reversed. The function of courtship feeding has been difficult to discern in breeding Ospreys and other avian (and even non-avian) species (Poole 1984, Green and Krebs 1995). While the function of courtship feeding in Ospreys remains controversial, recent reports on other avian species suggest that courtship feeding promotes overall brood success. In a study by Galván and Sanz (2011) on 170 species of birds, it was noted that many of the avian species that practice courtship feeding are those in which the female is solely responsible for most aspects of reproduction, including nest-building and the incubation of eggs. They proposed that the male's primary responsibility in these species is to feed the female. In a relatively early paper, Royama (1966) studying tits in the genus

Parus concluded that the feeding of females by the males may have a nutritional function rather than a courtship function; males may provide a substantial part of the females' food when (1) the females need to produce a large number of eggs on successive days, and (2) the females are incubating eggs and are not able to spend time acquiring food. Lifjeld and Slagsvold (1986) found a positive correlation between the rate of courtship feeding by male Pied Flycatchers (*Ficedula hypoleuca*) and the body weights of the female and the pair's offspring at the time of fledging. Courtship fed females also experienced shorter incubation periods.

I believe that the behavior of the male Osprey that I observed represents a form of behavioral "improvisation" driven by the biologic need to courtship feed under difficult circumstances (the absence of a nest). The male was forced to formulate a unique behavioral response, one that included at least two behavioral components not typically a part of courtship feeding in this species: (1) hovering, and (2) the holding of prey in talons to facilitate the feeding of a mate. Hovering is a component of some Osprey courtship displays such as the Fish-flight, and Ospreys may also hover while scouting for prey. It is not a behavior that is routinely observed in association with courtship feeding. Furthermore, I have never personally seen, and am unable to find any report of, a male Osprey directly feeding the female while holding a fish in its talons.

Ethologists use the term "fixed action pattern" or "modal action pattern" to denote instinctive behavioral sequences that are relatively invariant within a species. Often initiated by a particular stimulus, these sequences run to completion and are free of environmental influences. For these reasons they are thought to be "hard-wired" within the brain and, in this way, they are not learned behaviors. Other behaviors in animals appear to be learned and the learning process is often one of trial and error. Wolfgang Kohler (1925) proposed another form of animal learning, which he first observed in chimpanzees (*Pan troglodytes*), that does not involve trial and error. It is known as insight learning. Insight learning occurs when the solution to a problem is realized by an individual animal in a sudden and abrupt manner.

It is possible that the behavior exhibited by the male Osprey described in this paper is an example of insight learning. Perhaps the best argument for this is that the courtship feeding behavior of the male Osprey described above has not been previously reported and, therefore, may simply be a product of insight learning by this one particular male Osprey under rather unique circumstances.

It is also possible that the unique behavior demonstrated by this male Osprey during courtship feeding is a product of higher-order innovation and problem solving by trial and error. However, I did not

observe previous “trials” and one might also expect to find previous reports of this behavior by Ospreys if this were the case. Again, the absence of such reports suggests that the behavior is a product of insight learning by the male of this Osprey pair.

Generally corvids, parrots, and some raptors are considered to have intellectual abilities that are greater than other avian species (Emery 2006). Lefebvre et al. (1997) proposed a method of measuring avian intelligence in terms of innovation in feeding habits. Another raptor, the Peregrine Falcon (*Falco peregrinus*), members of the Order Ciconiiformes, and the corvids scored highest in this study.

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