



## ScienceWatch-Sex and the Single Oystercatcher

Sexual relationships in animals run the gamut from polyandry (multiple males to a female) to polygyny (multiple females to a male) and all combinations in between. In particular, wading birds exhibit a great variety of mating behaviors including serial monogamy,

polyandry, polygyny, lekking and many mixed mating systems. Biologists generally agree that these arrangements occur because they benefit the participants by removing aggression and/or promoting cooperative brooding. Such behavior can be evolutionary beneficial because it allows the partners to raise more young, thus passing more of their DNA on to the next generation.

Two Dutch scientists, Dik Heg and Rob van Treuren, writing in a recent issue of the journal *Nature* describe a polygynous relationship among European oystercatchers (*Haematopus ostralegus*) in which the benefits are unclear. Oystercatchers are normally monogamous, but will occasionally exhibit polygyny presumably in response to the severe competition that exists for beach-front nesting sites. The birds are long-lived (40 or more years) and established pairs tend to return to the same nesting site year after year. The paucity of nesting sites results in unmated females challenging resident ones for nesting space. At this point competing females will normally fight viciously and may do so over a period of weeks or months to gain control of a territory and the male that goes with it.

Over a period of 14 years Drs. Heg and van Treuren observed that in nine out of ten cases where protracted fighting occurred, females adopted a shared relationship with the male, resulting in about three percent of breeding females becoming polygynous. Fifty-seven percent of these females continued to exhibit aggressive behavior toward each other. They defended their portion of the divided territory even while sharing the male. The rest (43%) exhibited a remarkable variant of polygynous behavior exemplified by female-female cooperation that the authors term “cooperative polygyny.”

Cooperative females appear to decide that “if you can’t beat ‘em’ join ‘em.’” They begin preening each other and acting cooperatively. Former enemies become fast friends, sharing and defending one territory and one nest. They also regularly copulate with the male and with each other. Female-female copulations are behaviorally indistinguishable from male-female copulations, except that cloacal contact is achieved less frequently. At these times either female will play the role of the male and sometimes they will switch roles in rapid succession. It is likely that these frequent copulations between cooperative polygynous females reinforce their bond and signals it to others as is the case for mates in monogamous pairs.

Animals will often cooperate in rearing young if they share a high degree of relatedness. For example, by cooperating, young brother lions may usurp the pride of an older, stronger male, kill his cubs and jointly mate with the lionesses. This is not the case for oystercatchers. When the scientists examined the DNA of the cooperative females within a trio for genetic relatedness, they found no special kinship. Moreover, joint nesting did not provide greater brooding success for cooperative females. Normally four eggs per nest is the maximum that can be incubated, but joint nests contained up to seven eggs and were too large for a single bird to brood at one time. Since the birds in a trio did not brood communally, but instead took turns, many eggs failed to hatch. Thus cooperative females were no more successful in producing fledglings than monogamous ones.

Why engage in such bizarre behavior if a reproductive advantage does not ensue? It may be that the cooperative behavior currently observed is an evolutionary transition that will evolve into cooperative brooding and benefit each of the troika by yielding more offspring. The authors did observe that one bird, the interloper, appears to gain a reproductive advantage over a nonbreeding female, but only in subsequent seasons. On average they found that a nonbreeding female has only a nine percent chance of breeding the following year, while an interloper's chance greatly improves to 67%. Thus one of the females may benefit by using the polygynous territory as a stepping stone to a new breeding position during the next season. As for the resident female, she may just gain peace of mind!

Saul Scheinbach