



GREGARIOUS GULLS

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Almost 13% of all bird species, and 95% of those living in marine environments, nest in colonies. They exhibit many types of social behavior which can be interpreted as collaboration.

Birds living together in colonies exhibit highly organized social behavior, mainly defending the colony and seeking out sources of food and informing others about them. Birds work together at three different levels: pairs, groups of individuals, and the entire colony. A breeding pair forms an inviolable, autonomous space around the nest known as the breeding territory, and the two birds defend it from other individuals. Mobbing groups of several individuals are also frequently formed; they generally arise spontaneously and for a short time, and spend most of their time feeding



together. Such groups mob other individuals who get hold of food, bullying them until they manage to steal it. The colony as a whole, in turn, is ultimately a cohesive organism in which all birds respond rapidly to predators or feed together, for example on a shoal of fish.

In 1931, the American zoologist and ecologist Warder C. Allee in 1931 formulated the principle whereby population density is a major factor regulating the success of populations and colony size. Another advantage can come from forming effective agglomerations, while the survival of individuals is largely driven by their social skills. In all colonies, population density depends on two types of factors: ecological (the availability of space suitable for nesting and establishing a territory) and behavioral (aggression specific to the given species and personalities of individuals). Nesting together is a specific form of collaboration involving joint activity in strictly defined spheres while respecting clear privacy boundaries of individuals.

Follow and feed

The most important form of cooperation in bird colonies is anti-predatory behavior. There are several related hypotheses concerning the evolution of nesting in colonies, such as the “many eyes” hypothesis, the blurring effect linked with synchronous nesting, the effect of disorienting predators, and

colony specific geometry. Nesting in colonies makes it easier for birds to defend themselves against predators by signaling threats and joining forces to counterattack. In large aggregations, there is usually a group of individuals keeping an eye on the surroundings and watching out for dangers. Additionally, individuals in a “cloud” are significantly more difficult to catch than those leading solitary lives or congregate in small groups. While this strategy is successful against predators attacking from the air, it can be lethal with respect to land predators. Synchronous breeding in bird colonies means there can be hundreds of chicks hatching at a similar time, providing a vast source of food for mink or foxes. This may lead to huge losses in the breeding colony.

The evolutionary biologists Peter Ward and Amotz Zahavi studied yet another aspect of communal roosting. In 1973, they posited the “information center” hypothesis, based on the observation that many colony species source food from irregularly distributed feeding areas. They claimed that the colonies act as information centers, allowing individuals to reduce the cost of finding food by themselves. In other words, birds observe the behavior of other individuals to obtain information about the location of food patches, while colonies act as a medium for transmitting this information. However, the concept means that a few conditions must be met: birds must return to the colony after feeding, there must be individual differences in the success of the foraging strategy, it must be possible to identify successful foragers, and birds must explore a food patches in groups, which requires individuals to take on roles of leaders and followers. In practice, most studies have only shown that colonies fulfill a few of the conditions, hence the hypothesis that they act as “information centers” is still being debated.

Common ground

One example of the colonial nesting birds found in Poland is the European herring gull complex. The complex is formed by several closely related species, similar in phenotype, mainly inhabiting coastlines in Europe. In Poland they are generally associated with the Baltic coast; however, it is not their only habitat, and the gulls are able to find equally favorable conditions for nesting inland. A classic example are inland mixed colonies of herring gulls (*Larus argentatus*) and Caspian gulls (*L. cachinnans*) in the Vistula valley. When nesting inland, they frequently form colonies alongside common gulls (*L. canus*) and common terns (*Sterna hirundo*), forming vast, very conspicuous multi-species aggregations. These large gulls nesting inland in Poland are an interesting case. They are relative newcomers from northern Europe and from a glacial refugium in Asia, from which the species began to significantly expand their breeding



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In spite of the social signaling system, fights do occasionally break out between birds.

Gulls use many warning signals to ensure that individuals nesting nearby maintain a safe distance

Further reading:

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ranges in the latter 20th century. The herring gull expanded from the northwest, while the Caspian gull arrived from the southeast, with the two meeting in areas encompassing Germany, central Poland, Belarus and Russia. Inter-species mating is relatively common at points where closely related species meet, resulting in hybridization. This makes such mixed colonies unique natural laboratories allowing biologists to study the evolution of species *in situ*.

Herring and Caspian gulls nest in colonies numbering from tens to hundreds of individuals. They search for partners, form long-term pair bonds, set up nests and raise chicks. The breeding season lasts between five and six months from the arrival of the first birds at the colony until the last adults and juveniles leave. Both species are opportunistic feeders and highly skilled predators. They eat anything they can catch, kill and divide into pieces, including other gulls – even those of the same species. Although this behavior seems difficult to reconcile with colony life, gulls have developed an effective system of social signaling allowing them to keep aggression to a minimum.

Frighten off intruders

Birds nest close to one another within the colony, frequently coming into direct contact with their neighbors. The nesting territory (or breeding territory – the nearest area around a particular nest) is established by the male on his arrival at the colony, and it is frequently retained for many years. Its boundaries are constantly maintained and defended. Gulls use many warning signals in order to maintain a safe distance between individuals from neighboring breeding terri-

tories. They are mainly vocal (examples can be heard on www.xeno-canto.org/species/Larus-argentatus?pg=2). Their intensity depends on the threat perceived by the pair in the nesting territory. When they feel threatened, the gulls adopt an upright posture: the males stand bolt upright, chest forward, with their heads slightly tilted (resembling a charging bull) and wings outstretched. This makes them appear larger than they are and ready for anything. This posture is generally sufficient to frighten off potential intruders, although even in spite of the social signaling system, fights do occasionally break out between individuals. In evolutionary terms, this is risky: an injured individual may be less effective at protecting their eggs or chicks, maintaining their territory and feeding. In extreme cases it can lead to reduced breeding success. This explains the selective pressure towards eliminating aggressive behavior, avoiding open conflict, and improving social communication, as these lead to mutual benefits.

Cooperation between individuals in gull colonies is quite distinctive and aims to protect the interests of individual pairs and the colony as a whole. In many respects, we can say that it resembles human communities living in housing estates: neighbors recognize one another and maintain only limited contact, but a certain exchange of information on important matters enables them to respond jointly. An family apartment at a housing estate is roughly analogous to the basic functional unit in a bird colony: the nesting territory of a breeding pair. In both cases, the welfare of individual pairs depends in part on cooperation for the good of the community.

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