



Loon Behaviour and Calls

by Dr. Charles Walcott

Photo: Mark Lachovsky

The Common Loon needs no introduction to Canadian birders, but despite this familiarity, we keep being surprised as we study its basic biology. Banding has allowed us to identify individual loons. And by identifying individuals, we have been able to learn about the details of their social system and begin to understand something of their vocalizations.

My colleagues Walter Piper and Jay Mager, together with an enthusiastic group of college students, have taken advantage of a large banded population of loons near Rhinelander, Wisconsin to determine their social structure, territoriality, and acoustic communication. Loons are migratory. Like many people from northern climes, they spend their winters on the saltwater near the Gulf Coast of Florida. When spring comes, they return to their breeding lakes, typically the one on which they bred the year before. There are nearly 100 lakes near Rhinelander, most with a single pair of loons. There are also several large lakes that attract non-breeding individuals – either young loons or displaced breeders.

Our loon crew starts work at 4:30 a.m. every morning, a most unusual time to find college students up and about. They set off individually to visit five or six lakes during the course of a day, spending about an hour on each one. They identify the individual loons that are present, record their behaviour every five minutes, and tape record any vocalizations. In this way, each one of our 80-90 study lakes is visited every few days, and we have records of which loons were on each lake and what they were doing. Over the course of 14



Photo: Peter Ferguson

years, we have begun to develop a picture of how loon societies work.

A young loon that has spent the previous two to three years on saltwater returns to the area where it was hatched. In our study area, 56% of the chicks we banded returned as adults. The problem that a young loon faces is to find a vacant breeding territory. It has essentially three options: 29% found a new territory on a vacant lake; 26% assumed territories left vacant by the absence of a previous resident; and 45% intruded on an occupied territory and, after a physical contest, ousted the previous resident and took over the territory.

In some ways, this is a surprising result. There are a number of vacant lakes that would make good loon territories. Some of them even supported loons in the past. For loons to be successful on a lake, they need fish for food, a nest site on the shore (or preferably an island), and a sheltered place

to rear chicks. Some lakes may have all of these characteristics, yet remain unused.

Interestingly, lakes where a pair of loons successfully raised chicks the previous year have more territorial intrusions the following year. This suggests that non-breeding loons spend time prospecting for suitable lakes, especially during the time when chicks are present. As a result of this inspection, loons determine which lakes are most promising for breeding in the following year. In many ways such a strategy makes sense; if breeding is successful, it suggests that the lake has all that is needed for raising baby loons.

Loon pairs do not mate for life, and males and females seem to be surprisingly independent. If a new male takes over a territory, the resident female remains and mates with him. For a new female it is the same. Yet when they are together on a territory, the two birds are almost always



Photo: Daniel Salisbury

together (except when actually incubating eggs on the nest).

When a female intrudes on an existing territory, the resident female does battle while the male watches passively. When a male loon is prospecting for a territory, it often flies over the lake giving a vocalization called the “flying tremolo.” The resident male usually responds with a “yodel,” its territorial proclamation. Sometimes, despite this acoustic challenge, a prospecting male will land on a territory. When this happens, it usually swims over to join the resident pair.

This is followed by a period of swimming in circles, splash diving, and a variety of other displays. When the loons dive, any loon still on the surface looks underwater almost constantly. Overt aggression occurs in about 26% of the encounters we have witnessed. This involves chasing, grabbing your opponent by the bill and beating it with your wings, or trying to keep your opponent underwater to drown. In the most severe contests, a bird will come up from underwater bill first and spear its opponent through the sternum into the heart!

Female contests seem to be relatively mild. There is a lot of chasing, some wing beating, and the loser often retires to the shore exhausted before departing. Male fights, on the other hand, tend to be much fiercer and are, about 30% of the time, fatal. This is a very surprising result. Generally animal aggression is tempered by displays and shows of strength. The literature would have us believe that fights to the death are rare, but this may not be the case.

Without marked animals and the ability to locate the losers in a battle, we don’t often know the final outcome. The loon situation is unusual because by surveying all the lakes in an area, we can determine what happens to loons evicted from their territories. Displaced females generally turn up on adjacent local territories or in the middle of big lakes. That is true of some male loons as well.

Why should fatal fighting occur in males? One clue is that if a male is killed in battle, it is always the territorial male (never the intruder). This implies there is something about the territory that is worth dying for. And that something must be associated with the male, not the female. We believe that nesting success is probably the cause of fatal fighting. The first year that a male establishes his territory, reproductive success is about 47%. Thereafter, his breeding success increases, rising to 66% over a three-year time period. If a new female takes over that territory, reproductive success does not change. However, if a new male comes in, reproductive success drops to the starting level.

Furthermore, if one watches loons in the process of nesting, it seems to be the male that leads the way in choosing a nest site. The male employs a “win-stay, lose-switch” strategy; the male will use a successful nest site the following year, but choose a new site following nest failure. Since raccoon predation of loon nests is a major cause of reproductive failure and raccoons tend to return to the same area

year after year looking for eggs, moving one’s nest after predation would seem reasonable.

Why should a resident male fight to the death? It must be that for some loons, establishing a new territory is simply not feasible. Loons reportedly live for 20-30 years. A male probably begins to breed when it is three to five years old. Maybe the loons that are killed are the older loons, and the males that are displaced and live to breed another day are younger. We don’t yet have enough data to tell.

What have we learned about vocalizations? There are three long-distance vocalizations: the wail, which seems to function mainly as a gathering call; the tremolo, which is often given in response to some kind of threat; and the yodel. Unlike the wail and the tremolo, the yodel is given only by the male. It seems to be associated with territorial defense in much the same way as the advertising song of a robin. Unlike the robin, the loon only yodels in response to a direct threat – the flying tremolo of a potential intruder, for example, or the yodel of another male loon.

Each male has his own characteristic yodel, which differs from that of the other males in the area. The vocal characteristics remain stable from year to year. But to our great surprise, when a male loon changes territory, he changes his yodel! This is a surprise for two reasons. When most birds learn their songs, their song is constant for life. As well, loons are relatively primitive birds, and one might expect them to have little vocal flexibility.

Interestingly, the change that a displaced loon makes in its yodel is not random. A colleague at Cornell asked me whether the loon changes its yodel to imitate the previous resident of the territory it has just acquired. In fact, it does the opposite: it makes its yodel as different as possible from that of the previous resident. For some reason, it is important to say ‘new loon on territory!’ This finding also indicates that the male loon taking over a territory has a clear idea what the previous resident sounded like.

The loon’s yodel communicates much more than individual identity. Male loons vary in size and body weight. Jay Mager, a former graduate student at Cornell, showed that the pitch of the yodel’s third note is highly correlated with the loon’s weight (but not with its physical size). The heavier the loon, the lower the pitch.



Photo: Peter Ferguson

While on territory, male loons lose about 77 grams per year, while females gain about 62 grams per year. Thus a male on territory for five years will have lost about 385 grams, close to 9% of its total body mass. Such a loon will have an increasingly higher-pitched yodel, and a potential male intruder can derive important information about the weight and body condition of a territorial loon by listening to its yodel!

A series of playback experiments showed that males pay attention to these differences. At night, Jay played recorded yodels to loons on their territories. Using computer technology, Jay prepared three versions of each yodel; one had the normal pitch, one a higher pitch, and the third a lower pitch. Loons responded with fewer vocalizations to the higher-pitched yodels, and substantially more to the low-pitched ones.

Loons also vary the length of their yodels. The yodel consists of two or three introductory notes, followed by a series of repeated phrases. Jay found that as the level of aggression increased from flyover to fight, so did the number of repeat syllables, and hence the length of the yodel. Further, broadcasting longer yodels elicited more responses than shorter ones. It seems that yodel length is a measure of a loon's willingness to attack.

This conclusion is based on a correlation; it would be nice to prove the point through an experiment. If one could alter a loon's territory to make it more desirable, the resident loon might be more aggressive in defending it, and give longer yodels. Many investigators have shown that floating nesting platforms on lakes are readily adopted by loons, and

greatly increase reproductive success. So Jay selected 20 lakes roughly matched for size and other characteristics. He put nest platforms on 10 of these, just after the ice melted.

Then he compared yodel length of the male loons on the lakes with platforms to those on lakes with no platforms. He also compared the length of yodels of the same loons, before and after platform placement. In both cases, the yodels of the males with nest platforms were longer. In addition, four of the 10 nest platform lakes had new males come in and take over the territory, whereas there were no male takeovers on the 10 control lakes. All of this is further evidence that nest platforms increase the apparent quality of a loon territory, and that yodel length is related to aggressive tendency.

What conclusions can we draw from all this? First, that by being able to recognize individual loons, we have learned a great deal about their social organization. Furthermore, pair formation in loons seems to take place on the territory, and although pairs may be together on a territory for a

number of years, both males and females are independent in establishing and defending their territories. The resident male will battle an intruding male; the resident female will battle an intruding female. And the bystander will then pair and mate with the winner.

Finally, loons' vocalizations are remarkably complex and interesting. The male's yodel contains information about the individual bird, but the yodel changes when he changes territory. Yodel pitch correlates with body mass, which likely relays information on a loon's fighting ability. And the length of the yodel indicates a loon's tendency to attack. Listening to those loons across a moonlit northern lake, who would have thought that their calls contained so much information?

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Canadian Lakes Loon Survey

Are you interested in monitoring and reporting on the loons breeding on your local lake this summer? Please email aqsurvey@birdscanada.org or visit www.birdscanada.org/volunteer/clls for more information about Bird Studies Canada's national loon survey program.

Comportements et vocalisations des plongeurs

La recherche continue de nous fournir des détails étonnants sur le Plongeur huard, espèce pourtant déjà bien connue. Depuis 14 ans, Walter Piper, Jay Mager et un groupe d'étudiants de niveau collégial étudient la structure sociale, la territorialité et la communication acoustique au sein d'une grande population de plongeurs bagués près de Rhinelander, au Wisconsin. À intervalles de quelques jours pendant la période de la reproduction de l'espèce, ils patrouillent quelque 80 à 90 lacs. Ils identifient les individus présents, notent leur comportement toutes les cinq minutes pendant une heure environ et enregistrent leurs vocalisations.

Les jeunes plongeurs à la recherche d'un territoire ont trois options : trouver un nouveau territoire sur un lac inoccupé, occuper un territoire laissé vacant ou s'approprier un territoire occupé après en avoir chassé l'occupant, options retenues dans respectivement 29, 26 et 45 % des cas.

Les plongeurs font de la prospection pour déterminer quels lacs sont les plus propices à la reproduction. Fait intéressant, les lacs où un couple a élevé une progéniture avec succès une année donnée sont sujets à davantage d'intrusions l'année suivante. Chez le Plongeur huard, les couples ne restent pas unis toute la vie et, bien qu'un même couple puisse utiliser un territoire pendant un certain nombre d'années, le mâle et la femelle sont indépendants l'un de l'autre en ce qui concerne l'établissement et la défense du territoire.

Une femelle qui fait intrusion dans un territoire doit faire face à l'opposition de celle qui l'occupe déjà, sans que le mâle n'intervienne. Toutefois, les deux protagonistes ne semblent pas trop belliqueuses. On assiste à de nombreuses poursuites et à des battements d'ailes, et la femelle vaincue se retire souvent sur la rive, épuisée, avant de quitter les lieux. Le mâle déjà sur place s'apparie ensuite avec la nouvelle venue. Les femelles évincées se retrouvent sur des territoires voisins ou au milieu de grands lacs.

Il arrive souvent qu'un mâle en quête d'un territoire survole un lac en poussant ce qu'on peut appeler un trémolo, auquel le mâle occupant ce lac répond



Photo: Mark Lachovsky



Photo: Peter Ferguson

par un ioulement territorial. Si l'intrus se pose dans le territoire, on observe habituellement des poursuites en cercle sur l'eau, des plongeurs avec élaboussures et d'autres manifestations. Dans environ 26 % des cas, il y a visiblement agression; ainsi, les opposants peuvent se pourchasser, s'attraper par le bec et se battre à coups d'ailes, essayer de noyer l'autre ou le harponner jusqu'au cœur au travers du torse. Environ 30 % des affrontements entre mâles sont fatals. Si l'intrus réussit à ravir le territoire à l'occupant, la femelle s'accouple avec lui.

Les plongeurs se distinguent par trois manifestations vocales de longue

portée : le hurlement plaintif, un cri de rassemblement; le trémolo, souvent émis en réaction à une menace; et l'ioulement, propre au mâle et souvent associé à la défense du territoire. Jay Mager, à l'époque où il était étudiant diplômé à l'Université Cornell, a découvert que le ton de la troisième note de l'ioulement est fonction de la masse de l'individu : plus l'oiseau est lourd, plus le ton est grave. Cette caractéristique peut constituer, pour un mâle qui cherche à ravir un territoire à un autre mâle, une importante indication de son poids, et donc de sa possible combativité.

Chaque mâle a son ioulement propre, distinct de celui des autres mâles des environs et constant d'une année à l'autre. Fait très étonnant, quand un mâle change de territoire, son ioulement change aussi, de manière à se démarquer le plus possible de celui du mâle qui occupait ce territoire précédemment. La durée de l'ioulement varie également d'un individu à l'autre, celle-ci indiquant, semble-t-il, la pugnacité de l'individu.

Qui aurait cru, en écoutant le concert des plongeurs sous la lune, que leurs chants étaient si instructifs?

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