

ECOLOGICAL ASPECTS OF DUCKS NESTING IN HIGH DENSITIES AMONG LARIDS

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VERY little work has been done on ducks nesting among larids. During a study on the ecological interactions between two sympatric gull species, *Larus californicus* and *L. delawarensis*, on two islands, A and B, in Miquelon Lake, located at 53° 15' N and 112° 55' W in Alberta, data were collected of ducks nesting among these gulls in 1964 and 1965. The two islands carried dense populations of both California and Ring-billed gulls. The islands A and B were composed of boulders, sand and clay and consisted of six and five acres, respectively. Their highest points were six feet above the lake level. A few small trees and shrubs grew on them such as *Populus tremuloides*, *Salix* sp., *Cornus stolonifera*, *Ribes oxyacanthoides* and *Rosa woodsii*. The most common herbs were *Sonchus arvensis*, *Cirsium arvense*, *Artemisia absinthium*, *Chenopodium album*, *Urtica gracilis*, *Descurainaea richardsonii*, *Scirpus americanus*, *Scirpus validus*, *Carex rostrata*, *Axyris amaranthoides*, *Amaranthus retroflexus*, *Glyceria striata*, *Hordeum jubatum*, *Taraxacum officinale* and *Juncus balticus*.

The number of duck clutches initiated on islands A and B in 1964 and 1965 are shown in Table 1.

On 23 April 1965, an observation cabin was occupied on island A. At that time the island was covered with snow, and the ice in the lake was thick and solid. Two pairs of Mallards (*Anas platyrhynchos*) were already present on the island and were observed to set out for exploration on the snow cover.

TABLE 1
NUMBER OF DUCK CLUTCHES INITIATED ON ISLANDS A AND B IN 1964 AND 1965

Duck species	No. of clutches				Total
	Island A		Island B		
	1964	1965	1964	1965	
Mallard	9	3	3	3	18
Pintail	2	4	4	6	16
American Widgeon	3	1	2	1	7
Gadwall	26	15	3	10	54
Lesser Scaup	41	44	26	32	143
White-winged Scoter	9	2	2	7	20
Total	90	69	40	59	258

Mallards and Pintails (*A. acuta*) were first observed to arrive in the Miquelon Lake region in the spring of 1964 and 1965 in the first week of April. Two pairs of Pintails were first seen on island A on 26 April, one pair of American Widgeon (*Mareca americana*) on 29 April, one pair of Gadwalls (*Anas*

TABLE 2
CLUTCH COMMENCEMENT FOR FIVE SPECIES OF DUCKS AT MIQUELON LAKE IN 1964 AND 1965

Date of clutch initiation	No. of clutches started				
	Mallard	Pintail	Gadwall	Lesser Scaup	White-winged Scoter
27-28 April	3				
29-30	1	3			
1-2 May	2	1			
3-4	1				
5-6	2	2			
7-8		1			
9-10		1			
11-12	1	1			
13-14					
15-16					
17-18				1	
19-20					
21-22					
23-24			3		
25-26		2	1		
27-28			2	1	
29-30		1	2		
31 May-1 June		1		2	
2-3 June			1	7	
4-5			2	7	
6-7	2		3	4	1
8-9		1	2	5	1
10-11		1	6	14	2
12-13			5	8	2
14-15			1	5	
16-17			4	7	1
18-19	1		5	9	2
20-21	2		1	20	2
22-23			1	9	1
24-25			5	8	2
26-27			4	5	2
28-29			3	9	2
30 June-1 July			1	3	1
2-3 July			1	3	1
Total	15	15	53	127	20

TABLE 3
INCUBATION PERIOD, CLUTCH SIZE, HATCHING AND FLEDGING SUCCESS OF GADWALL
AND LESSER SCAUP ON ISLANDS A AND B IN 1964

	No. of clutches studied	Gadwall	No. of clutches studied	Lesser Scaup
Average incubation period	10	25.1 (22-27) days	18	24.8 (21-27) days
Average clutch size	26	9.9 eggs	59	10.5 eggs
No. of clutches hatched	29	26 (90%)	67	60 (89.5%)
No. of clutches preyed upon				
by gulls		(0%)		4 (6%)
No. of clutches deserted by hen		3 (10%)		2 (3%)
Unknown loss		(0%)		1 (1.5%)
Fledging success	26	Nil	60	Nil
Cause of duckling mortality		Mostly gull predation		Mostly gull predation

strepera) and eleven pairs of Lesser Scaup (*Aythya affinis*) on 1 May, and six pairs of White-winged Scoters (*Melanitta deglandi*) on 6 May in 1965.

Table 2 shows the commencement of egg-laying of five species of ducks nesting on islands A and B. The 1964 and 1965 laying data of ducks were grouped together, since the laying periods of each species were similar for both years.

The majority of clutches shown in Table 2 were found during the laying period. A few which had been completed when located were backdated from the time of hatching to obtain the date of clutch initiation.

Gull predation on eggs of late-nesting ducks was less than for early nesters. This was partly due to the development of nesting cover with the advance of the season and partly the result of Lesser Scaup and Gadwalls having more time to become used to my checking the gull nests. The incubation period, clutch size, hatching and fledging success of the Lesser Scaup and Gadwall in 1964 are recorded in Table 3. These two duck species in 1964 were selected because the situation for late nesters was most normal that year and also because these species were the most numerous nesting ducks (see Table 1).

The 59 Lesser Scaup clutches, with known clutch size and which hatched, produced 619 eggs of which 91 percent hatched. The eggs which were added and those which disappeared made up 6.6 percent and 2.4 percent, respectively. Of the 259 eggs produced by 26 Gadwall clutches, 95.4 percent hatched. The eggs which were added and disappeared made up 3.1 percent and 1.5 percent, respectively. Table 4 compares the hatching success of Gadwalls and Lesser Scaup nesting on islands with and without gulls.

It can be seen that the hatching success of insular nesting Gadwalls and Lesser Scaup is high, whether or not nesting gulls are present.

TABLE 4
COMPARISON OF HATCHING SUCCESS OF GADWALL AND LESSER SCAUP
NESTING ON ISLANDS

Authority	Locality, year	Hatching success		
		No. of clutches studied	Gadwall	No. of clutches studied Lesser Scaup
Duebbert, 1966	North Dakota, 1956	70	85.7%	
"	" " , 1957	109	92.7%	
Keith, 1961	S.E. Alberta, 1953-57			18 83.3%
†This study	Central Alberta, 1964	29	90.0%	67 89.5%

† = occupied by gulls.

The high mortality of ducklings at Miquelon Lake was caused by California Gull predation. Since the island shores were devoid of emerging aquatic vegetation, the ducklings lacked protective cover against this type of predation. As soon as the ducklings entered the water, they were swallowed by the California Gulls.

European observers reported that certain duck species exhibited a strong social attraction for larids (Hildén, 1964). Evidence was gained at Miquelon Lake that Pintail and Lesser Scaup strongly associate with larids. The association was not the result of nesting on islands free from mammalian predation. In 1964, 21 Common Tern (*Sterna hirundo*) clutches were initiated within an area of 30 × 20 feet at one tip of another island on Miquelon Lake. After the establishment of the first Common Tern clutches, two nesting pairs of Lesser Scaup and two pairs of Pintails associated themselves with the terns. No other duck nests were found on the island in that year. In 1965, the terns did not nest on the tip of this island, except for one clutch which was started approximately 300 feet from where the tern colony was located in the previous year. As soon as the Common Tern clutch in 1965 was completed, two Lesser Scaup and two Pintail clutches were initiated within a 15-foot radius of the tern nest. No other duck nests were found that year on any part of the island.

The mechanism which leads to ducks selecting breeding sites in larid colonies may be imprinting of ducklings to these particular circumstances. Birds nesting among larids may benefit from the association. They are warned at an early stage by the larids' alarm at the approach of a predator. Certain avian predators such as crows and predaceous gulls may be driven away from the nesting colony (Kruuk, 1964). Where ducks nest in association with larids such as Common Terns, Black Terns (*Chlidonias niger*), Franklin Gulls (*Larus pipixcan*) and pure Ring-billed Gull colonies, a high fledging success for ducks may result. Hildén (loc. cit.) observed "social

TABLE 5
EGG PARASITISM OF DUCKS ON ISLANDS A AND B IN 1964 AND 1965

Parasitizing ducks	Parasitized ducks—No. of nests parasitized				
	Lesser Scaup	Gadwall	White-winged Scoter	Pintail	Mallard
Lesser Scaup	12	8	1		
White-winged Scoter	5	3	1		
Gadwall	1				
Redhead				4	1
Total	18	11	2	4	1

attraction" of ducks to gulls such as the Black-headed Gull (*Larus ridibundus*), the Common Gull (*Larus canus*) and the Lesser Black-backed Gull (*Larus fuscus*). However when ducks nest among one of the larid species predaceous upon them, the result may be disastrous. This occurred in 1964 when fledging success was nil among ducks which nested on islands A and B occupied by California Gulls (Table 3).

Not much is known about the anadid-larid relations in North America. The Lesser Scaup was also a numerous nesting duck in some of the other mixed California and Ring-billed Gull colonies which were visited in Alberta. Most of the Gadwall nests were located in dense herbaceous cover, i.e., in nettles on islands A and B at Miquelon Lake. Duebbert (1966) found 121 nests of the Gadwall on a seven-acre island in the Lower Souris Refuge, North Dakota, in 1957. No larids nested there. Not far from the island where Duebbert did his study, there was a 0.8-acre island. Henry (1948) reported 160 pairs of Gadwalls nesting on the latter in 1947. A colony of Common Terns also nested on the 0.8-acre island that year. It is possible that the higher concentration of Gadwalls breeding on the 0.8-acre island was due to the presence of nesting Common Terns.

EGG PARASITISM

As a result of the high density of nesting ducks on islands A and B, several duck nests were parasitized accidentally. Foreign eggs in parasitized clutches could be recognized by either shape, colour and size. Table 5 shows the egg parasitism of ducks.

Some nests were parasitized by more than one hen. One Gadwall nest, e.g., was parasitized by a Lesser Scaup and White-winged Scoter. In two Lesser Scaup nests the clutches increased by three eggs per day, indicating that more than one hen parasitized these nests. A two-egg increase per day in one nest and none in the other was observed in two closely located Lesser Scaup nests. In one of these, a double clutch resulted while the neighboring

clutch never advanced beyond two eggs. The clutch with two eggs was probably not found again by the hen which initiated it, since it was not incubated. These examples show that at least in the Lesser Scaup, egg parasitism resulted as a consequence of the high density of nesting ducks. That egg parasitism is related to the nesting density of ducks can also be indirectly seen by comparing Tables 1 and 5. The Lesser Scaup and Gadwall were the most numerous nesting ducks on islands A and B. The Redhead (*Aythya americana*) did not nest on the islands, hence egg parasitism was deliberate. The relatively high number of Pintail nests parasitized by Redheads is probably a consequence of Pintails having on the average the most exposed duck nests on the islands at Miquelon Lake.

Since most egg parasitism was observed during the process of laying, no eggs of the late nesting Lesser Scaup and White-winged Scoters were found in clutches of early nesting Mallards and Pintails. Of the three late nesting ducks, the Gadwall parasitized nests of other ducks least. Gadwalls and White-winged Scoters nested in more dense cover, i.e., nettles, than the Lesser Scaup. The Gadwall appears more adept in finding its own nest than the White-winged Scoter in this type of cover.

SUMMARY

A high density of ducks was observed nesting among California and Ring-billed gulls at Miquelon Lake, Alberta. The most numerous ducks, the Lesser Scaup and Gadwall, had a hatching success of 90 percent and 89.5 percent, respectively, but the fledging success of both species was nil due to gull predation.

Evidence was gained that Pintail and Lesser Scaup strongly associated with Common Terns.

Due to the high density of nesting ducks, egg parasitism occurred frequently.

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