

# CLUTCH SIZE OF THE AMERICAN AVOCET IN THE PRAIRIE PROVINCES

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The American Avocet is a large, showy bird that is fairly common in suitable habitat across the prairie region of Canada. Considering the ease with which this species can be observed, surprisingly little information is available in the literature on the breeding biology of this species in Canada.

Nesting data was accumulated for the American Avocet from: Prairie Nest Record Scheme; Calgary Field Naturalists' Society observation files; United States Fish and Wildlife Service, Migratory Bird and Habitat Research Laboratory; Royal Ontario Museum; Field Museum of Natural History; Santa Barbara Museum of Natural History; University of Massachusetts; National Museum of Natural Sciences; Western Foundation of Vertebrate Zoology; and University of Wisconsin. As well, the authors used their own unpublished records (including data subsequently reported by Kondla<sup>5</sup> and the following literature: Bent<sup>1</sup>, Farley<sup>2</sup>, Horsbrugh<sup>4</sup>, Mitchell<sup>6</sup>, Munro<sup>7</sup>, and Vermeer<sup>8</sup>. The data base contains information available up to 1973.

A cursory examination of the data indicated that the information provided by the museums and the literature was not recent, whereas the file cards of the Prairie Nest Record Scheme were. In view of this, the authors initially analyzed the Prairie Nest Record Scheme data separately from the rest. Because the same trends emerged in clutch sizes and clutch size

frequency, the data was combined for the analysis presented here.

A total of 228 avocet nests were used for clutch-size analysis. Relatively few nests were from Manitoba but good sample sizes are available from Alberta and Saskatchewan (Table 1).

Table 1 shows the overall clutch size frequency for the sample. Slightly more than one half (54.8%) of all nests contained 4 eggs. This was by far the most commonly seen number of eggs in an avocet nest. Both 3- and 7-egg nests were second in frequency of occurrence. Surprisingly, 8-egg nests ran a close fourth in frequency. Five- and 2-egg nests ranked fifth but most of the 2-egg nests probably represented incomplete clutches. Nine-egg clutches were unknown and one extremely large clutch of 10 eggs was reported.

Fifty-six percent of all nests were on islands (Table 2), where 4-egg clutches were again most frequent (47.6%), followed distantly by 7-egg clutches (14.8%), 3-egg clutches (10.9%), and 8-egg clutches (9.3%). (Table 2A). Other clutch sizes were relatively infrequent.

For nests not on islands, separate percentage figures are not given because the sample size is 100 and the percentage figure equals the absolute figure. (Table 2B). By far the most frequent clutch size again was 4 eggs (64%) but there was a more even distribution among the other clutch sizes without a substantial abundance





*American avocet*

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of 7- and 8-egg clutches.

Nests with 5 or more eggs constituted 26.6% (61) of the total number of nests. Such clutches represented 31.8% (41) of the island nests but only 21% of the clutches of non-island nests. Thus it seems that large clutches occur significantly more frequently on islands.

These trends in clutch size show some variation between provinces. Up to 1973 Manitoba had not yet reported any clutches with more than 4 eggs. In Saskatchewan, 20% of all nests contained more than 4 eggs and in Alberta a surprising 43% of all nests had more than 4 eggs. In the case of island nests, fully 47% of the Alberta nests had clutches with more than 4 eggs as compared to only 31% of the Saskatchewan nests. In non-island

nests the large clutches were fewer, with 36% of the Alberta nests and 10% of the Saskatchewan nests having more than 4 eggs. However, when looking only at clutches of more than 4 eggs, the situation in Alberta and Saskatchewan was quite similar; with 65% of the Alberta large clutches on islands and 72% of the Saskatchewan large clutches on islands.

Mean clutch size of all Alberta nests is 5.0, while the appropriate figures for Saskatchewan and Manitoba are 4.4 and 3.4, respectively. For island nests only, the mean clutch sizes are 5.0, 5.0 and 3.4 for Alberta, Saskatchewan, and Manitoba, respectively. For non-island nests the mean clutch sizes again show more differences with 4.9, 3.9, and 3.5 for Alberta, Saskatchewan and Manitoba, respectively. These figures



TABLE 1: OVERALL CLUTCH SIZE FREQUENCY

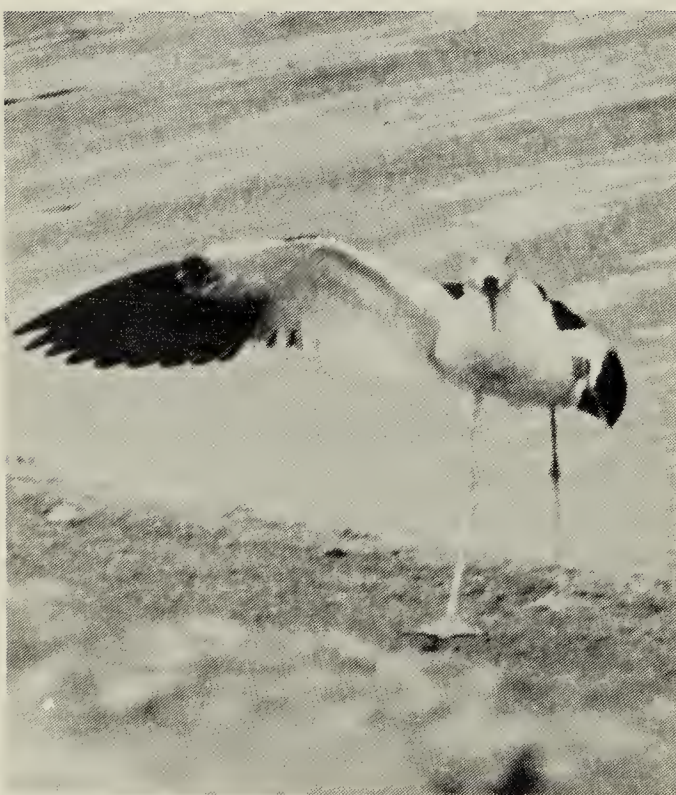
Number of Eggs	Number of Nests			
	Alberta	Saskatchewan	Manitoba	Total
1	4	2	2	8 (3.5%)
2	4	3	4	11 (4.8%)
3	6	10	7	23 (10%)
4	44	58	23	125 (54.8%)
5	8	3	0	11 (4.8%)
6	3	3	0	6 (2.6%)
7	19	5	0	24 (10.5%)
8	13	6	0	19 (8.3%)
9	0	0	0	0 (0%)
10	0	1	0	1 (0.4%)
	101	91	36	228

show that overall, the mean clutch size of Avocets increases as one moves west from Manitoba to Alberta. They also show that mean clutch size for island nests is the same for Alberta and Saskatchewan, indicating that large clutch size is more closely correlated with nesting habitat than other factors.

Derivations of mean clutch size can, of course, vary with the available data and the concept of "clutch" that is used. For example, Vermeer used the

concept of number of eggs in a nest and thus had a range of 1 to 8 eggs per clutch.<sup>8</sup> In contrast, Gibson used the concept of total number of eggs laid by one female, thereby excluding nests with 6 or more eggs, although he included 2-egg nests as complete clutches.<sup>3</sup> Kondla reports that even 4- or 5-egg nests may have composite clutches and hence Gibson's concept is not applied to mean clutch size calculations for this study, since his data does not allow consistent differentiation of eggs from different birds in one nest.<sup>5</sup> Vermeer's inclusion of 1- and 2-egg nests<sup>8</sup> is questionable since all available information indicates that such clutches are not complete. For this study we based mean clutch size on nests with more than 3 eggs. Thus, the figures indicate more closely the mean maximum number of eggs that will be incubated.

It was previously pointed out that 7 and 8-egg clutches appear more frequently than 5- or 6-egg clutches. This can be explained if one accepts that 3-, and more often 4-, egg clutches are the rule for individual females. This assumption is supported by virtually all available information. If one further assumes that composite nests are most often the result of only



American avocet

Wayne Renaud

TABLE 2. CLUTCH SIZE FREQUENCY IN ISLAND AND NON-ISLAND NESTS.

No. Eggs	A Island Nest Numbers				B Non-island Nest Numbers			
	Alta	Sask	Man	Total	Total = %	Alta	Sask	Man
1	2	1	2	5 (3.9%)	3	2	1	0
2	4	1	2	7 (5.4%)	4	0	2	2
3	4	3	7	14 (10.9%)	9	2	7	0
4	21	23	17	61 (47.6%)	64	23	35	6
5	5	0	0	5 (3.9%)	6	3	3	0
6	3	1	0	4 (3.1%)	2	0	2	0
7	14	5	0	19 (14.8%)	5	5	0	0
8	6	6	0	12 (9.3%)	7	7	0	0
9	0	0	0	0 (0%)	0	0	0	0
10	0	1	0	1 (0.7%)	0	0	0	0
TOTAL	59	41	28	128	100	42	50	8

two females, then these composite clutches must be comprised of various combinations of individual 3- and 4-egg clutches in proportion to their frequency of occurrence, assuming that a female lays her normal number of eggs in both composite and single clutches. Since 4-egg clutches predominate, most large clutches will have a 4-egg component which, in turn, dictates a 7- or 8-egg composite clutch.

A number of trends and phenomena have been pointed out. These may or may not represent the actual situation since it is not known that the data is representative of the actual situation. For example, large clutches on islands may be reported more often than they actually occur because they are easier to find. More information is needed on the situation in Manitoba to determine if the differences that show up are a reflection of the relatively few nests reported from Manitoba or if they are a product of basic environmental and biological differences. Certainly, from an evolutionary perspective, differing environmental conditions in different portions of a species range should be expected to select for differing reproductive strategies.

A thank-you note is warranted for the custodians of the information sources used in this paper. A special

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<sup>1</sup>BENT, A. C. 1927. Life histories of North American shore birds (Part 1). Smithsonian Inst. U. S. Nat. Mus. Bull. 142 (Dover edition, 1962).

<sup>2</sup>FARLEY, F. L. 1932. Birds of the Battle River region, with notes on their present status, migrations, food habits and economic value. Institute of Applied Arts, Edmonton. 85 p.

<sup>3</sup>GIBSON, F. 1971. The breeding biology of the American Avocet (*Recurvirostra americana*) in central Oregon. Condor 73:444-454.

<sup>4</sup>HORSBRUGH, C. B. 1918. Further notes on birds observed at Alix, Buffalo Lake, and Red Deer in the province of Alberta, Canada, in 1915 and 1916. Ibis 6:477-496.

<sup>5</sup>KONDLA, N. G. 1977. An unusual American Avocet nest. Blue Jay 35:94-95.

<sup>6</sup>MITCHELL, H. H. 1916. Peculiar nesting habits of the Avocet. Condor 19:101.

<sup>7</sup>MUNRO, J. A. 1936. A study of the Ring-billed Gull in Alberta. Wilson Bulletin 48:169-180.

<sup>8</sup>VERMEER, K. 1971. Large American Avocet clutches at Dowling Lake, Alberta. Blue Jay 29:88.