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Competition of American Coots and Shoal-Water Ducks for Food

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Source: *The Journal of Wildlife Management*, Vol. 13, No. 4 (Oct., 1949), pp. 423-424

Published by: Wiley on behalf of the Wildlife Society

Stable URL: <https://www.jstor.org/stable/3795637>

Accessed: 23-02-2021 14:48 UTC

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pasture dead plants of sagebrush were less than one sixth as abundant as were live plants.

SUMMARY

Vegetation data were secured from two series of 70 plots, 100 square feet in size. The plots in one series were distributed through an area heavily grazed by a herd of milk cows and horses throughout the spring and early summer. The other adjacent area has been protected from livestock grazing for the past 11 years but has been utilized heavily by mule deer during the winter and early spring.

Perennial forbs were found to be much more prominent in the area from which livestock have been excluded. Balsamroot

was six times as abundant, and *Helianthella* almost eighty times as abundant in the deer grazed area as in the area used by livestock.

Perennial grasses, except for *Poa secunda* which responds quickly to release from grazing, showed less pronounced differences than did the forbs. However, all perennial grasses were both more vigorous and more abundant in the area from which livestock are now excluded.

Much of the sagebrush has been killed by deer browsing. Live plants were much more vigorous and abundant in the livestock pasture.—ARTHUR D. SMITH, *Associate Project Leader, Federal Aid, Utah State Fish and Game Commission, and Associate Professor of Range Management, Utah State College, Logan, Utah.*

COMPETITION OF AMERICAN COOTS AND SHOAL-WATER DUCKS FOR FOOD

The possible interference of the American coot, *Fulica americana americana*, with the feeding of waterfowl has been studied by several investigators. Allan Brooks (Field and Stream, October 1941), stated that coots helped carp destroy beds of pondweeds. He also observed that coots destroyed beds of the water-weed, *Elodea Canadensis*, by their wasteful feeding habits. Wisconsin food-habits research has failed to show this plant to be of even minor importance in this region. J. A. Munro (Can. Journ. Research, D, 17: 178-186) in an analysis of 45 coot and 91 waterfowl stomachs, concluded that "Competition for food between ducks and coots during the autumn months is negligible." John C. Jones (U.S.D.I., Wildl. Res. Bul. 2, 1940) in an analysis of the stomachs of 792 coots collected throughout the U. S., found that the pondweed family, *Najadaceae*, comprised 40.6 per cent of the total food taken; the sedge family, *Cyperaceae*, 13.7 per cent; algae and muskgrasses, *Algae*, 13.7 per cent; grasses, *Gramineae*, 8.2 per cent, etc.

The analysis of a large number of stomachs from scattered areas is necessary when describing the general food habits of a

species, but the problems that arise in small localities are seldom solved by this method of research. A study was therefore planned to learn whether this type of competition existed on a typical Wisconsin marsh. The standard volumetric procedure, as prescribed by the Fish and Wildlife Service, was used in making the following analyses.¹ Items that amounted to less than 0.1 cc. were noted as traces, and grit was not measured since an ample amount was present in all stomachs examined. A summary of the analyses of 32 coot stomachs is presented in Table 1.

The stomach contents of 31 shoal-water ducks, collected during the same period and from the same locality, were also examined. Detailed results will be reported elsewhere but a summary of the analyses is given here. Pondweeds, *Potamogeton* spp., were most important, with a rating of 27 per cent of the total volume. Bulrush, *Scirpus* spp., comprised 26 per cent; coontail, *Ceratophyl-*

¹ I am much indebted to Dr. A. C. Martin and other members of the Patuxent Research Refuge for helping me become familiar with this technique.

TABLE 1.—OCTOBER FOOD HABITS OF 32 AMERICAN COOT ON HORICON MARSH
(PART TAKEN IS SEED UNLESS OTHERWISE NOTED)

Common Name	Scientific Name	% Volume	% Occurrence
Duckweeds	<i>Lemna</i> spp.	90.	75.
Star Duckweed	<i>Lemna trisulca</i>	76.	88.
Lesser Duckweed	<i>Lemna minor</i>	24.	16.
Bulrushes	<i>Scirpus</i> spp.	3.	50.
River Bulrush	<i>Scirpus fluviatilis</i>	81.	56.
Bulrush	<i>Scirpus</i> spp.	19.	69.
Water Milfoil	<i>Myriophyllum</i> sp.	2.	13.
Great Bur reed	<i>Sparganium eurycarpum</i>	2.	9.
Sedge	<i>Carex</i> sp.	1.	47.
Snail	Gastropoda	T	56.
Coontail	<i>Ceratophyllum demersum</i>	T	18.
	(leaves)	50.	
	(seeds)	50.	50.
Smartweed	<i>Polygonum lapathifolium</i>	T	16.
Ergot	<i>Claviceps purpurea</i>	T	16.
	(grains)		
Sweet Flag	<i>Acorus calamus</i>	T	15.
Insect	Insecta	T	9.
Pondweed	<i>Potamogeton</i> sp.	T	6.
Green Algae	Chlorophyceae	T	3.
Beggar-ticks	<i>Bidens cernua</i>	T	3.
Dodder	<i>Cuscuta</i> sp.	T	3.
Bedstraw	<i>Galium</i>	T	3.
Vegetable debris		2.	16.

lum demersum, 19 per cent; oats, *Avena sativa*, 3 per cent; and duckweeds, *Lemna* spp., 2 per cent. Other foods found were relatively unimportant. The only items with a rating of higher than trace in both summaries were the bulrushes and duckweeds.

The high consumption of duckweeds by coots is probably beneficial to the average marsh in Wisconsin, since this plant often

occurs in a dense mass on the water surface of sheltered areas, and more valuable submergents are seriously retarded due to shading. This investigation thus failed to disclose any important competition for food between coots and shoal-water ducks at Horicon, Wisconsin, during the period studied.—BRUCE P. STOLLBERG, *Wisconsin Conservation Dept., Madison, Wis.*

REVIEWS

Natural History of Marine Animals. George Eber MacGinitie and Nettie MacGinitie. McGraw-Hill, New York, N. Y. 473 pp. illus. 1949. \$6.00.

Deliberately writing for the student and the curious layman, the authors ably discuss the life histories and habits of representative species of each of the phyla of West Coast seashore animals. Well and clearly written in essentially non-technical language, the book devotes one section to the phyla of animals and one section to the marine conditions

which influence the lives of marine animals.

The careful analysis given the ocean as an environment renders this book more valuable than the majority of texts on seashore biology. Amongst others, chapters on the foods of marine animals, variation and succession in marine populations, and burrowing as a way of life are significant new additions to seashore biology.

Because they chose to write primarily for the layman and the student, the authors limit technical language to scientific names