

Duck Food Habits in Southwestern Louisiana Marshes Following a Hurricane

Author(s): Robert B. Kimble and Allen Ensminger

Source: *The Journal of Wildlife Management*, Vol. 23, No. 4 (Oct., 1959), pp. 453-455

Published by: [Allen Press](#)

Stable URL: <http://www.jstor.org/stable/3796496>

Accessed: 13/12/2010 18:15

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/page/info/about/policies/terms.jsp>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/action/showPublisher?publisherCode=acg>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.



Allen Press is collaborating with JSTOR to digitize, preserve and extend access to *The Journal of Wildlife Management*.

DUCK FOOD HABITS IN SOUTHWESTERN LOUISIANA MARSHES FOLLOWING A HURRICANE

Robert B. Kimble and Allen Ensminger

Louisiana Wildlife and Fisheries Commission, New Orleans, Louisiana

Weather is one of the most important factors affecting the welfare of many wildlife species. Although there are many references in literature concerning mortality caused by weather, there are few that evaluate the effects of storms on the food of birds and mammals.

The purpose of this study was to determine the foods eaten by ducks during the fall and winter after a disastrous hurricane on the Louisiana Coast and compare them with the foods eaten by ducks during the fall and winter prior to the storm. The food habits study made in the same general area before the hurricane was performed by Chamberlain (1959).

The material for this study was collected by Allen Ensminger, and used as a master's thesis in the School of Forestry, Louisiana State University.

THE HURRICANE

On the morning of June 27, 1957, hurricane "Audrey" struck the Southwestern Louisiana Gulf Coast with a force completely unequaled in memory of those who live in the region. The storm resulted in disastrous losses of human life and property in Cameron, Iberia and Vermilion Parishes. Great numbers of wild and domestic mammals, birds and reptiles were drowned in the marshes.

According to Yancey (1958) water level readings reached 11.3 feet above sea level and winds exceeded 100 m.p.h. In general the marshes are only about 1 to 2 feet above sea level and the effects of the hurricane resulted in complete inundation by waters from 7.3 to 10.3 feet in depth for a great distance inland from the coast. The normal tidal range is 1.5 to 2.0 feet. The highest elevations, that is, stranded beaches, Indian mounds and levees, were submerged beneath the wind-driven tide.

Large mats of vegetation were torn loose from the marsh floor and deposited in bayous, lakes, and in long wind rows at the upper reaches of the flood tide or swept into the Gulf by the receding water. This caused a large increase in the acreage of open water in the marsh. The marsh had been saturated by frequent rains preceding the hurricane. This condition plus continued heavy rains following the storm alleviated much of the damage that would have been caused by inundation with salt water. Above-normal water levels which remained in the marsh throughout the summer and fall resulted in an even greater acreage of open water. These high water conditions were detrimental to the production of fur animals and to livestock grazing. The immediate value of much of the marsh was greatly reduced for waterfowl since many food producing plants were scoured out by debris and

currents. Nevertheless, much growth was made after the storm and by the time migrant waterfowl arrived the marsh was again partially productive.

METHODS

Chamberlain (1959) analyzed the contents of 1,251 gizzards removed from 17 species of waterfowl. These gizzards were collected during the fall and winter of 1955-56 and during the fall and winter of 1956-57, one and two years prior to the hurricane. The writers analyzed the contents of 172 gizzards removed from 9 species of waterfowl taken from the same marshes. These gizzards were collected in 1957-58 during the first fall and winter following the storm.

DISCUSSION OF RESULTS

The results of this study show that 19 plant families comprising 45 species and 13 animal foods were utilized as food by waterfowl.

The 5 principal duck foods expressed as per cent of the total volume of food, were: *Cyperaceae* 53.5; *Gramineae* 12.4; *Cyprinidae* 9.2; *Zosteraceae* 5.2; and *Astacidae* 2.7 per cent (Scientific names from Gray's Manual of Botany, Eighth Ed., 1950). The remaining 16 plant families and animal foods made up only 17.0 per cent of the total food found in gizzards.

Sawgrass (*Cladium jamaicense*) was the most frequently eaten plant species. It occurred in 98.3 per cent of all gizzards and comprised 35.0 per cent of the total volume of food consumed. Chamberlain (1959) found that sawgrass occurred in 72.5 per cent of the gizzards analyzed and made up 25.0 per cent of the total volume of food. The results of these two studies show that the hurricane of June, 1957, had little effect on the amount of sawgrass seed eaten by ducks. At one time, dense stands of sawgrass occupied large areas in the marsh; but for about four years just prior to the hurricane, there was very little sawgrass vegetation in the area studied. Therefore, the seeds of sawgrass must remain available in the muck layers over a long period. Dillon (1957) states that gizzard analysis may show an exaggerated daily consumption of some hard seeded plants from 2 to 10 times (or even more) whether measured by volume or frequency. Kimble (1958) showed that a chemical analysis of sawgrass seeds indicated that they have a fairly high nutritional value, and in addition, ducks may use them as a supplement to grit because of their hardness. Table 1 lists the constituents of sawgrass, rice and millet seeds. Bullwhip (*Scirpus californicus*) occurred in 72.7 per cent of the gizzards examined and made up 9.4 per cent

TABLE 1.—THE NUTRITIONAL VALUE OF SAWGRASS, RICE AND WILD MILLET SEEDS

Plant Species	Moisture	Crude Protein	Fats	Ash	Crude Fiber	Nitrogen-free Extract
Sawgrass	5.6	6.3	2.2	8.6	32.1	45.2
Domestic rice	12.4	7.4	0.4	0.4	0.2	79.2
Wild millet	12.0	11.1	3.7	2.6	7.7	62.9

NOTE: All figures are expressed as per cent.

of the total volume of food consumed. It was the second most important plant eaten by ducks during this study and was ranked 12th by Chamberlain (1959). This plant species was utilized heavily by ducks following the hurricane, probably because high water levels were favorable to the growth, spread, and production of seed of this species, but, at the same time the hurricane was detrimental to some of the more preferred duck food plants. Spike-rush (*Eleocharis* spp.), leafy three-square (*Scirpus robustus*), smartweeds (*Polygonum* spp.), heliotrope (*Heliotropium* sp.), and some other plants were utilized about equally by frequency and by volume during both studies. These plants occurred in about 75 per cent of the gizzards and made up 6.2 per cent of food during both studies. This indicates that the storm had very little effect on the availability of the seeds of these plants. Both the seed and the foliage of widgeon grass (*Ruppia maritima*) occurred in much greater amounts and more often in gizzards examined during this study than they did in gizzards analyzed by Chamberlain. This plant species was rated fifth in importance by the writers while it was ranked 13th by Chamberlain. The abnormal high tides during the hurricane probably distributed this aquatic plant throughout the marshes in Southwest Louisiana. An influx in the volume of salt water and the slow run off in these areas resulted in a more favorable environment for the survival, growth, and spread of this plant. Domestic rice (*Oryza sativa*), wild millet (*Echinochloa* spp.), and other plants associated with their culture occurred less frequently, but in larger volume in the study conducted after the hurricane. These plants occurred in approximately 25 per cent of the gizzards and made up only 7.2 per cent of the total volume of food eaten by ducks during this study. Chamberlain found *O. sativa* and *Echinochloa* spp. occurred in 15.2 and 34.0 per cent respectively of the gizzards examined and made up 3.4 and 13.1 per cent respectively of the total volume of food. More suitable feeding areas were made available to ducks in the marshes as a result of higher water levels, therefore, ducks probably did not feed in the rice fields as often as they did during the winter prior to the hurricane. Salt-grass (*Distichlis spicata*) occurred occasionally as a trace in the gizzards during this study, but was second in importance in Chamberlain's study. This is probably the result of low seed production caused by high water following the hurricane. However,

the seeds of salt grass are very light and may have floated into the Gulf. *Cyperus* spp. was found to be an important food in the duck gizzards analyzed by Chamberlain, but was used infrequently and in small quantities by ducks during this study. Chamberlain found *Cyperus* and its related species growing abundantly on the berms of levees in the late summer and fall in the Grand Cheniere area. Following the hurricane, deep water over these areas during the growing season probably resulted in low seed production and reduced growth and spread of *Cyperus*. Several other minor plant species occurred rather infrequently and in trace amounts before and after the hurricane of June, 1957.

A review of Table 2 shows that animal material occurred much more frequently and in larger quantities in this study than it did in Chamberlain's study. Small fishes in the minnow family made up more than one-half of the total animal food consumed by ducks. A variety of animal matter such as crayfish, shrimp, crabs, mollusks, snails and insects made up the remaining animal food. The occurrence of animal food in the gizzards examined from mallards (*Anas platyrhynchos*), pintails (*A. acuta*), and blue-winged teal (*A. discors*) increased considerably during the latter part of the hunting season. The increase in animal material is probably associated with more water over the feeding areas during the winter of 1957-58 than during 1956-57.

SUMMARY

Large tidal waves caused by the hurricane of June, 1957, inundated a large portion of the marshes. Due to the low relief and the frequent rains during the year, the water remained over the area for several months. Since flooding occurred during the height of the growing season, some plants were completely eliminated, seed production was impaired on others, but certain aquatic plants increased. The comparison of the results of a food habits study of waterfowl before with one after the

TABLE 2.—A COMPARISON OF DUCK FOODS BASED UPON PER CENT VOLUME DETERMINATIONS IN TWO STUDIES

Rank	Pre-Hurricane Analysis by Chamberlain, 1959	Post-Hurricane Analysis by Kimble, 1958
1	<i>Cladium jamaicense</i>	<i>Cladium jamaicense</i>
2	<i>Distichlis spicata</i>	<i>Scirpus californicus</i>
3	<i>Echinochloa</i> spp.	<i>Eleocharis</i> spp.
4	<i>Eleocharis</i> spp.	Minnows
5	<i>Scirpus robustus</i>	<i>Ruppia maritima</i>
6	<i>Brasenia schreberi</i>	Snails
7	<i>Cyperus</i> spp.	<i>Brasenia schreberi</i>
8	<i>Paspalum</i> spp.	<i>Polygonum</i> spp.
9	<i>Oryza sativa</i>	<i>Paspalum plicatulum</i>
10	<i>Scirpus californicus</i>	<i>Echinochloa</i> spp.
11	<i>Heliotropium</i> sp.	Insects
12	<i>Panicum</i> spp.	<i>Najas guadalupensis</i>
13	<i>Ruppia maritima</i>	Crayfish
14	<i>Polygonum</i> spp.	<i>Oryza sativa</i>
15	<i>Cuscuta</i> sp.	<i>Paspalum urvillei</i>

hurricane indicates a great difference in the foods eaten by ducks. Some foods such as *Cyperus*, widgeon grass, domestic rice, bullwhip, and some animal foods were found to be an important food of waterfowl in one study while the same kind of foods were found to have been a minor item in the other study.

In general the hurricane of June, 1957, had a temporary damaging effect on the vegetation in the marsh near Grand Cheniere, but by the time of arrival of wintering waterfowl most of the vegetation had recovered. The storm benefitted wintering waterfowl by opening up landing and feeding areas in dense stands of vegetation.

LITERATURE CITED

- CHAMBERLAIN, J. L. 1959. Gulf coast marsh vegetation as food of wintering waterfowl. *J. Wildl. Mgmt.*, 23 (1):97-102.
- DILLON, O. W., JR. 1957. Food habits of wild ducks in the rice-marsh transition area of Louisiana. *Proc. 11th. Ann. Conf. SE. Assn. Game & Fish Comms.*, 114-119 (1958).
- FERNALD, M. L. 1950. *Gray's manual of botany*. American Book Co., New York, 8th Ed., 1,632pp.
- KIMBLE, R. B. 1958. A food habits study of ducks in Cameron Parish, Louisiana following the hurricane of June 1957. Unpub. master's thesis, La. St. Univ., Baton Rouge, 70pp.
- YANCEY, R. K. 1958. Effect of hurricane "Audrey" on the coastal refuges of Southwest Louisiana. *Seventh Biennial Rept., Louisiana Wild Life and Fish. Comm.*, 1956-57, pp. 51-64.

Received for publication February 25, 1959.

SUMMER BROWSE PREFERENCES OF ADIRONDACK WHITE-TAILED DEER

William L. Webb

State University College of Forestry, Syracuse University, Syracuse 10, New York

Evaluation of deer browse preference is usually difficult, perhaps often impossible, because of previous selective browsing by deer on the vegetation to be evaluated. In areas of high deer population the most preferred plant species may be so heavily utilized that they are drastically reduced in availability or even extirpated from the environment. Therefore, browse habits may only reveal deer preference for plant species quite low on the preference list.

In 1958 there was a unique opportunity to determine summer browse preference for Adirondack white-tailed deer (*Odocoileus virginianus borealis*) on an area not browsed by deer for over 18 years. An enclosure fence was knocked down by falling trees and one or more deer spent a short time browsing in a "virgin field" before the fence was repaired.

The enclosure is on the Archer and Anna Huntington Wildlife Forest in a heavily forested section of the central Adirondacks where there are few natural or man-made openings in the crown canopy. The two acre area had been closed to deer browsing from the time of fence establishment in 1939 until portions of the fence were removed for a short time in 1955. At this time 50 per cent of the crown canopy was removed by logging. The fence was re-established after only a few weeks. Because of the large volume of tree tops on the ground in this short period, deer had very little influence on the living vegetation. Details on status of vegetation in the enclosure are given by Webb, *et al.* (1956).

In June 1958 two trees came down across the

enclosure fence, opening the area to browsing for a short time. A search for deer pellet groups was made on 144 milacre plots within the fenced area. Two pellet groups found on this sample area indicated 13.9 pellet groups per acre. Since the enclosure is a little over two acres it seems reasonable to assume a total of approximately two deer-days of use of the area. There was no indication that deer had been inside the enclosure fence except for a short period of time, as no old deer droppings were found either on the sample plots or elsewhere within the fence. It seems likely that the trees fell across the fence on June 16 or 17 during a very windy period. Since the fence was repaired on June 27, presumably all deer browsing took place in this 10-day period.

Vegetation available for deer browsing was counted on 36 yard-square sample plots within the enclosure fence by listing all stems present. Each plant was carefully examined for signs of browsing. These data are presented in Table 1 with the per cent of stems browsed as an index to preference.

It is clear that beech is not used any more as summer browse than it is in the winter time. Witch hobble, the staple winter deer food of the area, is not utilized as a summer browse. Hard maple, red raspberry, and white ash are utilized as summer browse, but they can not be considered preferred foods as they are used in about the same proportion as they are available. Yellow birch and black cherry are apparently preferred summer foods but their utilization is low compared with that of alternate-leaved dogwood and elderberry which are highly