SELECTED BIBLIOGRAPHY ON THE FOOD HABITS OF NORTH AMERICAN BLACKBIRDS
Selected bibliography on the food habits of North American blackbirds.

(Special scientific report—wildlife; no. 192)
Supt. of Docs. no.: I 49.15/3:192


SELECTED BIBLIOGRAPHY ON THE FOOD HABITS OF NORTH AMERICAN BLACKBIRDS

Frederick T. Crase and Richard W. DeHaven
Denver Wildlife Research Center
Davis Field Station
P.O. Box C, Davis, California 95616

Special Scientific Report—Wildlife No. 192
Washington, D.C. • 1975
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>ii</td>
</tr>
<tr>
<td>Introduction</td>
<td>ii</td>
</tr>
<tr>
<td>Food Habits References</td>
<td>1</td>
</tr>
<tr>
<td>Related References</td>
<td>17</td>
</tr>
</tbody>
</table>
ABSTRACT

This bibliography lists 261 references on the food habits of nine North American blackbird species (Icteridae) and on related subjects such as examination techniques, seed dispersal, and sources of bias. The references, which include those published through 1974, are listed alphabetically by author, and brief annotations are given for most of them.

INTRODUCTION

This bibliography was compiled as the basis for a thorough review of the literature, published through 1974, on the food habits of North American blackbirds. Most of the references are briefly annotated; the exceptions are minor articles whose contents are clear from their titles.

References on the following icterid species are included: red-winged blackbird (Agelaius phoeniceus), tricolored blackbird (A. tricolor), yellow-headed blackbird (Xanthocephalus xanthocephalus), brown-headed cowbird (Molothrus ater), Brewer’s blackbird (Euphagus cyanocephalus), rusty blackbird (E. carolinus), common (purple, bronzed) grackle (Quiscalus quiscula), great-tailed grackle (Cassidix mexicanus), and boat-tailed grackle (C. major). The bronzed cowbird (Tangavius aeneus) is not included because it is primarily a Central American species; “cowbird” in the annotations refers to the brown-headed cowbird only. Cassidix mexicanus has only recently been divided into two species, the great-tailed and boat-tailed grackles (32nd Supplement to the AOU Check-List, Auk 90(2):411-419). Where possible, the annotations indicate which of these two species were studied; otherwise, they are called “great- and boat-tailed grackles.” In annotations, “blackbirds” refers collectively to the icterid species listed above; in some references the authors were not more specific.

The references cited are from a number of sources including, but not limited to, books, periodicals, theses, and various indexes such as Wildlife Review (U.S. Fish and Wildlife Service). Theses and unpublished reports with reasonable availability to the interested researcher are included. The references, listed alphabetically by author, have been divided into two groups; those directly related to blackbird food habits and those indirectly related (e.g., techniques of analysis, potential sources of bias, etc.). An asterisk preceding the citation indicates that we have not inspected the article; for these the source from which the reference was obtained is cited. We have carefully read and verified the citations for all other references but, of course, retain responsibility for any errors.

Willis C. Royall, Jr., Robert T. Mitchell, Charles P. Stone, and Ann H. Jones reviewed early drafts and offered many helpful suggestions and additions. Deborah A. Eaton located and reverified several citations and Ruth E. McNeal typed the manuscript.
FOOD HABITS REFERENCES

(Attacked the distasteful insect the first two times it was introduced.)

(Brief mention of blackbird foods as found by other workers.)

(Refers to earlier authors for general food habits, but this paper contains one of the earliest comprehensive listings of insect taxa used as food by the redwing. The redwing is not restricted to marsh habitat as a food source.)

(Cites redwing as feeding on locusts, cutworms, armyworms, and weed seeds.)

(Stomachs of 500 blackbirds—mostly redwings—collected in Canada during the spring months contained many insects considered agricultural pests.)

(One of the earliest works to mention food items found in blackbird stomachs. Covers all blackbird species and refers to letters from early naturalists about observations of feeding.)

(Redwings and cowbirds were among several bird species eating weevils.)

(Redwings and common grackles were among 13 bird species eating flying ants in Massachusetts.)

(This early work includes a general discussion on the food of each blackbird species as known at that time.)

(Redwings, common grackles, and rusty blackbirds were observed feeding on this insect pest.)

(Common grackles were observed flycatching insects.)

(Food of common grackles was about 50% animal and 50% vegetable.)
(Food of redwings and common grackles.)

(Discusses foods of the redwing and other icterids, but is essentially a preliminary report of the next reference.)

(The first major work on the food habits of blackbirds. Covers all species except the tricolor. Used the estimated percent volume method of analysis, which allows comparison with many later papers.)

(Brewer’s blackbirds ate cherries and insects in cherry orchards.)

(Birds are beneficial because they consume large numbers of insects. Scattered references to insect consumption by blackbirds.)

(Economic relations between birds and agriculture. Includes the bicolored redwing and Brewer’s blackbirds.)

(Mentions foods of the common grackle, redwing, and Brewer’s.)

(An updated revision of Beal 1915.)

(Depredations by blackbirds on rice.)

(Redwings and Brewer’s ate young leopard frogs and subadult voles.)

(Discusses evolutionary adaptations of the bill and jaw musculature of icterids in relations to their food habits.)

(The relationship of the food habits of icterids to their bill shape and other cephalic adaptations. Includes summary of the food habits work of other authors.)


Briner, L. 1896. Some notes on Nebraska birds. Pages 48-178 in Report of the Nebraska State Horticultural Society (Lincoln, Nebr.) for the year 1896. (Stresses benefits of insect-eating habits of redwings. Also discusses foods of cowbirds and common grackles.)

Bryant, H. C. 1911. The relation of birds to an insect outbreak in northern California during the spring and summer of 1911. Condor 13(4):195-208. (Brewer's blackbirds were the most important predator species during an insect outbreak. Believed that birds were an important natural check during this outbreak.)

Bryant, H. C. 1912. Birds in relation to a grasshopper outbreak in California. Univ. Calif. Publ. Zool. 11(1):1-20. (Established that a bird will feed on the insect group most available. Calculated that a 200-bird flock of redwings ate enough grasshoppers to save the alfalfa farmer at least $20 per year in insect damage.)


Christofferson, K. 1927. The bronzed grackle as a bird of prey. Bird-Lore 29(2):119. (Common grackles killed two pine siskins and a barn swallow. They consumed part of the pine siskins.)


Collier, G. 1968. Annual cycle and behavioral relationships in the red-winged and tricolored blackbirds of southern California. Ph.D. Thesis. Univ. Calif., Los Angeles. 374 pp. (The rate at which food was brought to nestlings of both species is recorded and discussed.)


Cottam, C. 1943. Unusual feeding habit of grackles and crows. Auk 60(4):594-595. (Common grackles fed on small fish like gulls and terns.)

Cottam, C., and F. M. Uhler. 1942. Birds as a factor in controlling insect depredations. U.S. Fish Wildl. Serv. Wildl. Leafl. 224. 6 pp. (Stresses that redwings eat many insect pests.)

Cottam, C., and J. B. Trefethen. 1968. Whitewings. Van Nostrand Co., Inc., Princeton, N.J. 384 pp. (Great-tailed grackles ate eggs and young of other grackles, mockingbirds, and white-winged, mourning, and Mexican ground doves.)

Cowan, I. M. 1942. Termite-eating by birds in British Columbia. Auk 59(3):451. (Brewer’s blackbird was one of several species eating termites.)
(Annual foods of redwings, tricolors, Brewer’s, yellowheads, and cowbirds were largely rice, wilddillet, and insects.)

(Most common grackles shot in peanut fields had eaten peanuts. Some data on foods of redwings, starlings, and cowbirds also collected from peanut fields.)

(Crows, gulls, black terns, grouse, and blackbirds ate large numbers of grasshoppers.)

(Common grackles were among several species that collectively took 2% of the acorn crop from plots on the White River National Wildlife Refuge, Arkansas.)


(Common grackles depend on pin-oak for a large portion of their winter food.)

Davis, J. 1954. Seasonal changes in bill length of certain passerine birds. Condor 56(3):142-149. 
(Seasonal changes of bill length in redwings, tricolors, and Brewer’s were correlated to the amount of insects consumed each season.)

(The common grackle killed the sparrow and ate part of it.)

(Demonstrates a positive correlation between time of nesting and general food habits. Redwings, tricolors, cowbirds, and Brewer’s blackbirds were some of the bird species studied.)

(The food of 129 great-tailed grackles was 80% animal matter, largely orthopterans. Insects were eaten most during the warm season. Nestlings were fed insects and grit.)

(Fifteen species of non-game birds, including redwings, cowbirds, and common grackles, feed on crops and non-agricultural foods in the Southeast in winter; 46 foods are discussed.)

(Estimated that each redwing eats enough insects to be worth $1 per year to the alfalfa crop.)

(Redwings destroyed 3 bushels of field corn per acre in untreated South Dakota fields.)
Dennis, J. V. 1949. Grackle competition for dogwood fruit. Auk 66(2):208. (In one-half hour, a flock of common grackles stripped the berries from 20 dogwood trees.)


Emlen, J. T., Jr. 1937. Bird damage to almonds in California. Condor 39(5):192-197. (Redwings, tricolors, and Brewer’s did not cause significant amounts of damage.)

Ernst, S. G. 1944. Observation on the food of the bronzed grackle. Auk 61(4):644-645. (Common grackles ate leopard frogs in New York.)


Fautin, R. W. 1941. Development of nestling yellow-headed blackbirds. Auk 58(2):215-232. (Food brought to nestlings was almost entirely insect.)

Fischer, R. B. 1953. Winter feeding of the redwing (Agelaius phoeniceus). Auk 70(4):496-497. (Redwings ate moth larvae from ragweed stems.)


Foster, F. B. 1927. Grackles killing young pheasants. Auk 44(1):106. (Common grackles killed and ate pheasant chicks.)

Friedmann, H. 1929. The cowbirds. Charles C. Thomas, Pub., Baltimore, 421 pp. (Food of the brown-headed cowbird is discussed along with many other life history and behavioral aspects.)

Gabrielson, I. N. 1914. Ten days’ bird study in a Nebraska swamp. Wilson Bull. 26(2):51-68. (Food of nestling yellowheads and redwings.)


Gabrielson, I. N. 1922. Short notes on the life histories of various species of birds. Wilson Bull. 34(4):193-210 (Food of nestling common grackles was largely earthworms.)

(Bears and coyotes feed upon this pest but birds destroy them in greatest numbers; hawks, sage grouse, and blackbirds noted.)

(Large flocks of blackbirds devoured these in large quantities.)

(Annual redwing foods in Ohio were 69% vegetable and 31% animal.)

(Grain sorghum, ragweed seeds, and insects were the most frequently eaten items for both species.)

(An early natural history report; some comments on the foods of most blackbird species.)

(Common grackle predation on the eggs and young of house sparrows.)

(Lists the legume species used as food by different birds, including most blackbird species.)

(Mentions the redwing’s rice-eating habits.)

(Lists the food items of 130 nestlings.)

(Blackbirds damaged corn, peanuts, and milo.)

(Also feeding behavior in cornfields.)

(Apparently tried to eat it.)

(Summarizes and discusses many studies relating to the beneficial aspects of birds, including blackbirds.)

(Blackbirds help the farmer by eating weevils.)


Hodges, J. 1951. Land birds feeding on crayfish. Auk 68(4):526-527. (Common grackle was observed eating a crayfish in Iowa.)


Howard, W. J. 1937. Bird behavior as a result of emergence of seventeen year locusts. Wilson Bull. 49(1):43-44. (Common grackles and cowbirds fed on locusts.)

Howell, A. B. 1922. Redwings of the Imperial Valley, California. Condor 24(2):60-61. (Discusses beneficial as well as harmful aspects of redwing food habits.)

Howell, A. H. 1906. Birds that eat the cotton boll weevil, a report of progress. U.S. Dep. Agric. Biol. Surv. Bull. 25. 22 pp. (Blackbirds, especially Brewer’s, eat weevils during the winter months when this is the most beneficial.)


Howell, A. H. 1908. Destruction of the cotton boll weevil by birds in winter. U.S. Dep. Agric. Circ. 64. 5 pp. (Redwings, Brewer’s, and rusty blackbirds were important bird species eating boll weevils during the winter months.)


Judd, S. D. 1899. Birds as weed destroyers. Pages 221-232 in Yearbook of Agriculture, 1898. U.S. Department of Agriculture, Washington, D.C. (Blackbirds eat weed seeds, as well as grain, and thereby benefit the farmer.)


Kennedy, C. H. 1950. The relation of American dragonfly-eating birds to their prey. Ecol. Monogr. 20(2):103-142. (Redwings are included with other passerines as important predators of dragonflies.)

Knappen, P. 1933. Some bird enemies of Odonota. Auk 50(4):452. (Redwings were among several bird species observed feeding on this insect order.)


Lamb, C. C. 1944. Grackle kills warbler. Condor 46(5):245. (Great-tailed grackle killed a yellow warbler during an apparent nest-predation attempt.)


LaRivers, I. 1941. The Mormon cricket as food for birds. Condor 43(1):65-69. (Redwings, cowbirds, yellowheads, and especially Brewer’s feed on this pest.)


Linford, J. H. 1938. Notes on food habits of the thick-billed red-winged blackbirds in Utah. Proc. Utah Acad. Sci. 15:91-92. (Amount of a given food eaten was correlated to its abundance in the habitat.)


Mailliard, J. 1914. Notes on a colony of tri-colored redwings. Condor 16(5):204-207. (Reported milk barley as being “much prized as food for the young.” Stomach contents of adults were largely grasshoppers.)


McAtee, W. L. 1913. Index to papers relating to the food of birds. U.S. Dep. Agric. Biol. Surv. Bull. 43. 69 pp. (Annotated bibliography of Department of Agriculture publications from 1885 through 1911 dealing with the food of birds. Most blackbird species are covered.)

McAtee, W. L. 1922. Local suppression of agricultural pests by birds. Pages 411-438 in Annual Report of the Smithsonian Institute for 1920. (Most blackbird species are mentioned as predators of insect pests.)


McAtee, W. L. 1946. The economic status of flocking birds. Condor 48(1):29-31. (Brewer's blackbirds wiped out infestations of canker-worms in California. Birds, including blackbirds, destroy 90% of the white grubs exposed by plowing.)

McIhenny, E. A. 1937. Life history of the boat-tailed grackle in Louisiana. Auk 54(3):274-295. (Food habits of both adult and nestling boat-tailed grackles.)

Meanley, B. 1960. Fall food of the sora rail in the Arkansas rice fields. J. Wildl. Manage. 24(3):339. (The feeding activity of redwings, along with wind action, shatter some rice seeds, increasing their availability to soras.)


Meanley, B. 1962. Feeding behavior of the red-winged blackbird in the Dismal Swamp region of Virginia. Wilson Bull. 74(1):91-93. (Peanut depredations by redwings; other foods are also mentioned.)

Meanley, B. 1965. The roosting behavior of the red-winged blackbird in the southern United States. Wilson Bull. 77(3):217-228. (The general locality in which large roosts are located is probably influenced by food supply. Also, the difference in the species composition among roosts is probably related to the differences in their food habits.)


Meanley, B. 1971. Blackbirds and the southern rice crop. U.S. Fish Wildl. Serv. Resour. Publ. 100. 64 pp. (Details the annual foods of the redwing, cowbird, common grackle, and boat-tailed grackle in the Arkansas ricelands. Also includes less complete data for the Brewer's blackbird, rusty blackbird, bobolink, and starling.)


Merrill, D. E. 1916. Grasshopper control. N. M. Agric. Exp. Stn. Bull. 102. 32 pp. (Quail, meadowlarks, and blackbirds are the main bird predators on this insect.)


Munro, J. A. 1929. Blackbirds feeding on the forest tent caterpillar. Condor 31(2):80. (Redwings and Brewer's.)


Orions, G. H. 1961. The ecology of blackbird (Agelaius) social systems. Ecol. Monogr. 31(3):285-312. (Discusses the food of breeding redwings and tricolors in California.)

Orions, G. H. 1966. Food of nestling yellow-headed blackbirds, Cariboo Parklands, British Columbia. Condor 68(4):321-337. (Food brought to nestlings was 100% animal matter.)

Orions, G. H., and H. S. Horn. 1969. Overlap in foods of four species of blackbirds in the potholes of central Washington. Ecology 50(5):930-938. (No differential specialization in food gathering was observable for redwings, yellowheads, Brewer's, and meadowlarks, and a large overlap in nestling food was apparent.)


Payne, R. B. 1969. Breeding seasons and reproductive physiology of tri-colored blackbirds and red-winged blackbirds. Univ. Calif. Publ. Zool. 90:1-137. (Relates the timing of nesting of tricolors to the emergence of grasshoppers. Food of nestling tricolors was almost 100% animal matter.)


Pessino, C. M. 1968. Red-winged blackbird destroys eggs of common and roseate terns. Auk 85(3):513. (Apparently ate some of the contents.)


Phillips, W. J., and K. M. King. 1923. The corn earworm: Its ravages on field corn and suggestions for control. U.S. Dep. Agric. Farmers’ Bull. 1310. 17 pp. (Most important predators of the corn earworm were Brewer's, California redwings, great- and boat-tailed grackles, and downy woodpeckers.)


(Discusses relationship of bill structure to feeding habits.)

(Common grackles and redwings fed on the smelt.)


(Food brought to nestling yellowheads.)

(Food brought to nestling yellowheads.)


(Food brought to nestling yellowheads.)

(The section on the differential locust mentions that large flocks of blackbirds fed extensively on this insect.)

(Most icterids did not maintain feeding territories.)


(Summarizes known foods and feeding behavior of both species.)

(Studies showed that birds, including redwings, were significant predators of the larch casebearer.)

(Although the insects taken by each species were generally the same, competition for food was not apparent.)

(Common grackle ate minnows from a bird bath.)
(Extensive study of the foods of these species before 1916 in California.)

(Boat-tailed grackles stole crayfish from the ibises.)

(Sprout damage by redwings and common grackles was reduced after dusting the seed with methiocarb.)

(Study of redwing foods in Lake Erie marshland.)

(Food of adult redwings during the breeding season. Differences among sexes, upland versus marsh breeding birds, seasonal and daily time periods are treated statistically. Sex and ecotype differences are discussed in relation to morphological differences.)

(Estimated that there were 15 million redwings in Kansas and in 21 days their young could consume 9,400,000 pounds of insects or they might destroy 6,300,000,000 cutworms.)

(Common grackles ate goldfish from a garden pool.)


(Common grackle.)


(Makes note of egg predation by great-tailed grackles.)

(Food and feeding behavior at a tricolor breeding colony.)

(Table 2, a summary of oak use by birds, includes four listings for the common and boat-tailed grackles.)

(Feeding behavior and locations.)


Wayne, A. T. 1899. Destruction of birds by the great cold wave of February 13 and 14, 1899. Auk 16(2):197-198. (Redwings ate fox sparrows killed by the cold.)


West, R. R. 1969. Repelling boat-tailed grackles from sprouting corn with a carbamate compound. Tex. J. Sci. 21(2):231-233. (Great-tailed grackle damage to corn sprouts was reduced with a methiocarb seed treatment.)


Wiens, J. A. 1965. Behavioral interactions of red-winged blackbirds and common grackles on a common breeding ground. Auk 82(3):356-374. (The grackles did not prey on redwing eggs or young.)


**RELATED REFERENCES**


Anonymous. 1942. Laboratory procedure in wildlife food studies. U.S. Fish Widl. Serv. Wildl. Leafl. 222. 11 pp. (Complete guide to the laboratory portion of food habits studies.)

Bartonek, J. C., and J. J. Hickey. 1969. Food habits of canvasbacks, redheads, and lesser scaup in Manitoba. Condor 71(3):280-290. (The food contents of the esophagus, proventriculus, and gizzard were different within each species of duck. Should also apply to blackbirds.)

Beer, J., and W. Tidyman. 1942. The substitution of hard seeds for grit. J. Wildl. Manage. 6(1):70-82. (Showed that hard seeds are sometimes used as a substitute for grit in six species of gallinaceous birds.)


Cahn, A. R. 1914. The determination of the food of nestling birds. Wilson Bull. 26(4):189-193. (Discusses the relative merits of field observations and stomach examinations.)


Dillery, D. G. 1965. Post-mortem digestion of stomach contents in the savannah sparrow. Auk 82(2):281. (Digestion continues after death and could result in the digestion of soft-bodied insects and worms before exmination.)
(Discusses bias associated with the use of hunter-killed fall birds only, relatively short-term studies, and the lack of related population and ecological data.)

Hanson, W. R., and F. Graybill. 1956. Sample size in food-habits analysis. J. Wildl. Manage. 20(1):64-68
(Method of computing the sample size needed so the data will be statistically significant.)

(In-depth discussion of the various methods used to investigate the foods of birds.)

(Methodology for determining digestive rates of various kinds of seeds.)

(Discusses various problems incurred in food habits work; includes the economic status of redwings.)

(Many species of birds were repelled from grains dyed bright colors. Certain colors in themselves apparently disturb birds.)

(Economic considerations of an introduced species.)

(Excellent ecology-oriented study on how house wrens have adjusted to meet the rigors of their environment.)

(Includes procedures for avian food-habits analysis.)

(Chapter 12 has an excellent discussion of food theory and Chapter 13 discusses food as a population-limiting factor.)

(Seeds were germinated from fecal pellets.)

(Discusses three methods of estimating damage and the factors that determine which would be the best method to use.)


Morse, D. H. 1970. Ecological aspects of some mixed-species foraging flocks of birds. Ecol. Monogr. 40(1):119-168. (Studied mixed-species foraging flocks of parids and concluded that the flocks have several functions that vary for the individuals and species in the flocks.)


Proctor, V. W. 1968. Long-distance dispersal of seeds by retention in digestive tracts of birds. Science 160(3825):321-322. (Seeds regurgitated by birds were viable.)

Seibert, H. C. 1949. Differences between migrant and non-migrant birds in food and water intake at various temperatures and photoperiods. Auk 66(2):128-153. (Did not study blackbirds but results may be pertinent.)

Shields, P. W., and D. A. Duncan. 1966. Fall and winter food of California quail in dry years. Calif. Fish Game 52(4):275-282. (Discusses important differences, related to habitat changes, found in the foods of this species in studies conducted during 1960-63 and a study conducted in 1937.)


(Seeds germinated after passing through the intestinal tract of pheasants. Hard seeds germinated more frequently than soft.)

(Significant disagreement in the composition of esophageal and gizzard contents from North Dakota teal.)

(Contains an informative discussion of “endozoic biochore dispersal,” or dispersal of seeds by passage through the intestine.)

(Relationship of quality and quantity of food to mating systems. Most blackbird species were included in the analysis.)

(Use of the “palatal keel” in feeding by common grackles.)
As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.