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*A Study of the*  
**Food Habits of the Ring-Necked  
Pheasant in Colorado**

By W. L. BURNETT

**Feeding Habits and Food of the  
Ring-Necked Pheasant**

By ASA C. MAXSON



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# A Study of the Food Habits of the Ring-Necked Pheasant in Colorado

By W. L. BURNETT

## ACKNOWLEDGMENT

The writer wishes to offer the following acknowledgments: To Director C. P. Gillette, for insect determinations and advice; to Mr. R. G. Parvin, State Game Commissioner, for many courtesies; to Mr. A. C. Maxson, for notes on the food habits of the Ring-necked Pheasant at Longmont; to Mr. W. F. Kendrick, for valuable information concerning the early history of the pheasants in Colorado; to the members of the Departments of Botany and Entomology, Colorado Experiment Station, for assistance in identifying weed seeds and insects; to the farmers of the northern part of the state for courtesies extended in the way of shooting privileges on their farms. They have all shown much interest in the work, and we extend to them our appreciation.

The ring-necked pheasant (*Phasianus torquatus Gmel*) is a native of southern Siberia, Korea and northeastern China. Several species of pheasants have been introduced into different sections of the United States, but this one has adapted itself to our conditions better than any of the others.

According to data furnished by Mr. W. F. Kendrick, the first attempt to introduce pheasants into Colorado, was about 1875, when an Englishman brought in a trio, two hens and a cock, from England, and liberated them on his ranch on Turkey Creek, Jefferson County. One hen and the cock were shot the same day by a local grouse hunter.

In 1889, Senator Henry M. Teller gave Mr. Edward O. Wolcott, a number of pheasants he had secured from the East. Mr. Wolcott liberated these on his ranch known as Wollhurst, near Littleton, Arapahoe County.

In 1894, Mr. W. F. Kendrick started to import pheasants in large numbers, which were liberated in the vicinity of Denver, and

in other sections south and west, but for various reasons, these pheasants failed to multiply and became exterminated except in the Denver, Littleton and Golden sections. They were introduced into northern Colorado about 1908.

By the courtesy of Mr. Roland G. Parvin, Game Commissioner of Colorado, the writer was granted a permit to take fifty pheasants during the year 1920, for the study of thier foodhabits, as the following letter will indicate:

**STATE OF COLORADO**  
**Game and Fish Department**  
**Capitol Bldg.**  
**Denver**

February 14, 1920.

ROLAND G. PARVIN,  
Commissioner.

MR. W. L. BURNETT,  
c/o Colorado Agricultural College,  
Fort Collins, Colorado.

Dear Sir:

In the interest of the Colorado Agricultural College in its experimental work for the benefit of the farmers of the state, and of this department jointly, I hereby authorize you to take fifty pheasants during the year 1920 for the study of their food habits.

Yours very truly,

R. G. PARVIN,  
Game and Fish Commissioner.

The writer always has been, and is yet, strongly in favor of bird protection. Yet we must take issue with writers on economic ornithology who study the food habits of a certain bird in some locality, and find it beneficial or injurious, as the case may be, and publish statements that they apply to the whole country. In our opinion a bird may be beneficial or injurious in one locality, and the opposite in another. We believe this may be true even in different localities in the same state.

The robin is reported by all investigators as one of our beneficial birds, which is probably true. Yet, in our state, it does considerable damage to the cherry crop, especially on the Western Slope where sweet cherries are grown. But, if it were not for our commercialism, we would think nothing of that, but would gladly raise cherries, grain or other foods for our own use and the birds! So long as the dollar rules the world, we must take the commercial point of view.

It is a question if, in some sections, the good done by certain birds in the destruction of injurious insects or weed seeds, offsets the harm done to fruit and other crops.

The writer entered into the study of the food habits of this pheasant with an unbiased mind and we are here giving the results,

but no conclusions as to its economic status. We have tried to treat the subject wholly on its merits, and not from the farmer's or sportsman's standpoint, as we are neither, but a bird student of some thirty years.

We shall have to admit, however, that we are prejudiced against any and all imported or foreign birds, as our native birds have been placed here by nature to fit each particular environmental condition and any foreign bird is out of harmony with nature.

We believe it is a fallacy of our present game laws to protect the pheasant and allow an open season on the fast disappearing sage grouse, the noblest gallinaceous game bird of the West, a bird that harmonizes with its surroundings, and a sight of which always brings to us delight and a breath of the sage-brush plains.

We admit that from the sportsman's standpoint there are no comparisons between the pheasant and the sage grouse, as the pheasant is quick on wing or foot, and when flushed, does not hesitate in its flight, but as it rises from cover, it goes at once into high, with the throttle wide open. As a rule it does not fly far, but soon alights on the run, as only a pheasant can. In the air it presents a fair straightaway target.

#### DISTRIBUTION

The ring-necked pheasant is found in the following counties in Colorado: Denver, Jefferson, Adams, Arapahoe, Larimer, Weld, Morgan, Logan, Douglas, Elbert, El Paso, Boulder, Delta and Otero.

It is abundant in Adams, Arapahoe, Jefferson, Boulder, Weld and Larimer Counties and occurs sparingly in the others.

It is gradually invading the foothill regions of the state. Rockwell and Wetmore state that it occurs on top of Lookout Mountain, Jefferson County, at an elevation of 7500 feet (A List of Birds from the Vicinity of Golden, Colorado, Rockwell and Wetmore, Auk, July, 1914). It has been reported to the writer from Log Cabin, Larimer County, at an elevation of 8,000 feet. Mr. Parvin, State Game Commissioner, reports it from Estes Park, and the writer saw a male specimen in September, 1914, near Dawson, Platte Canyon, at an altitude of 6,397 feet.

#### CROP and STOMACH CONTENTS OF INDIVIDUAL BIRDS

No. 1.—Male, March 13, 1920, from edge of fall wheat field, 3½ miles northeast of Fort Collins, 8:30 a. m.

CROP CONTENTS: 3 grains of sprouted wheat.

GIZZARD CONTENTS: 1 seed of lady-finger (*Polygonum persicaria*), some finely ground vegetable matter, leg of dried grasshopper.

No. 2.—Male, March 15, 1920, taken along railroad 6 miles southeast of Fort Collins, 2:00 p. m.

CROP CONTENTS: Nothing.

GIZZARD CONTENTS: Finely ground vegetable matter only.

No. 3.—Female, April 9, 1920, edge of alfalfa field east of Fort Collins, 2:30 p. m.

CROP CONTENTS: 272 grains of wheat, 3 alfalfa leaves, 1 beetle (*Aphodius sp.*); 1 beetle larva (*Carabid*).

GIZZARD CONTENTS: Finely ground wheat, 11 seeds of ragweed (*Ambrosia trifida*); 8 seeds of white mustard (*Sinapis alba*).

No. 4.—Female, April 9, 1920, edge of alfalfa field east of Fort Collins, 2:30 p. m.

CROP CONTENTS: Nothing.

GIZZARD CONTENTS: Finely ground vegetable matter, 7 seeds of ragweed.

No. 5.—Female, April 9, 1920, edge of alfalfa field east of Fort Collins, 3:00 p. m.

CROP CONTENTS: 1 beetle (*Aphodius sp.*); 221 grains of sprouted wheat.

GIZZARD CONTENTS: Finely ground wheat, 1 seed of black bindweed (*Polygonum convolvulus*), 11 seeds of ragweed, 4 seeds of white mustard.

No. 6.—Female, April 27, 1920, edge of spring-wheat field, 6 miles north of Fort Collins, 3:30 p. m.

CROP CONTENTS: 2 grains of germinated wheat, 21 leaves of alfalfa, 2 grains of barley, 187 grains of oats, 56 grains of wild oats, 1 larva of carabid beetle, 1 dipterous pupa.

GIZZARD CONTENTS: Finely ground grain, a number of oat hulls.

No. 7.—Male, April 30, 1920, edge of spring-wheat field east of Fort Collins, 3:30 p. m.

CROP CONTENTS: 1 seed of wild oats.

GIZZARD CONTENTS: 1 seed of wild oats, a number of wheat sprouts, 6 seeds of Indian bread-root (*Psoralea*).

No. 8.—Male, April 30, 1920, edge of spring-wheat field east of Fort Collins, 3:30 p. m.

CROP CONTENTS: 35 grains of germinated wheat.

GIZZARD CONTENTS: 33 seeds of mustard (*Brassica sp.*); 23 seeds of Vetch (*Vicia*); 2 seeds of sunflower (*Helianthus*).

No. 9.—Female, May 18, 1920, near alfalfa field 3 miles northeast of Fort Collins, 6:30 p. m.

CROP CONTENTS: A number of alfalfa leaves, 1 dandelion bud, 6 ants, 7 beetles (*Eleodes extricata*, 1; *Blapitinus* sp., 2; *Aphodius inquinatus*, 4; legs of dried grasshopper.

GIZZARD CONTENTS: 3 ants, 6 beetles (*Scarabids*, 3; *Chrysomela conjuncta*, 1; *Baris* sp., 1; *Thecestermus numeralis*, 1).

No. 10.—Male, May 18, 1920, in wheat field northeast of Fort Collins, 5:30 p. m.

CROP CONTENTS: Alfalfa leaves.

GIZZARD CONTENTS: Alfalfa leaves, 1 grain of germinated wheat.

No. 11.—Male, May 19, 1920, in wheat field 10 miles southwest of Fort Collins, 4:30 p. m.

CROP CONTENTS: 48 grains of oats, 1 beetle (*Melanactes* sp.)

GIZZARD CONTENTS: 7 grains of germinated wheat, 53 fragments of wheat.

No. 12.—Male, May 19, 1920, in wheat field 6 miles southwest of Fort Collins.

CROP CONTENTS: 67 grains of germinated wheat.

GIZZARD CONTENTS: 1 seed of mustard, 71 grains of germinated wheat.

No. 13.—Female, May 31, 1920, along roadside 6 miles northeast of Fort Collins, 6:30 p. m.

CROP CONTENTS: 4 seeds of wild oats, 274 grains of sprouted barley, 70 beetles (*Chrysomela exclamationis*, 7; *Chrysomela conjuncta*, 4; *Monoxia puncticollis*, 26; *Graphorhinus vadosus*, 2; small *Curculionids*, 10; *Aphodius inquinatus*, 12; *Phylobrotica decorata*, 1; *Blapstinus* sp., 6; small *Elaterid*, 1; *Harpalus*, 1; *Harpalus*, 1); Alfalfa webworm (*Loxostege commixtalis*) 1.

GIZZARD CONTENTS: 43 whole grains and a number of fragments of barley.

No. 14.—Male, May 31, 1920, along roadside 6 miles northeast of Fort Collins, 6:45 p. m.

CROP CONTENTS: 12 beetles (*Chrysomela exclamationis*, 6; *Leptinotarsa decemlineata*, 5; *Chrysomela conjuncta*, 1).

GIZZARD CONTENTS: 2 beetles (*Silpha ramosa*, 1, and *Chrysomela exclamationis*, 1); grain sprouts and alfalfa leaves.

No. 15.—Male, June 4, 1920, edge of wheat field 2 miles west of Loveland, 4:30 p. m.

CROP CONTENTS: 27 grains of germinated corn.

GIZZARD CONTENTS: 1 seed of Indian bread-root, 1 whole grain of corn and mass of ground corn.

No. 16.—Male, June 4, 1920, roadside 6 miles northeast of Fort Collins, 7:30 p. m.

CROP CONTENTS: 14 beetles (*Leptinotarsa decemlineata*, 7; sun flower beetle, *Chrysomela exclamationis*, 15, and *Diptotaxis haydeni*, 2; seeds of wild oats and 28 ants.

GIZZARD CONTENTS: 6 beetles (*Diptotaxis haydeni*), 6 seeds of Indian bread-root, 1 grain of wheat, 2 cherry pits, 1 pinto bean.

No. 17.—Male, June 18, 1920, in alfalfa field 10 miles east of Fort Collins, 7:00 p. m.

CROP CONTENTS: 193 alfalfa web-worms (*Loxostege commixtalis*).

GIZZARD CONTENTS: 123 mustard seeds (*Brassica*); 29 alfalfa web-worms (*Loxostege commixtalis*); mass of partly digested worms, some leaves.

No. 18.—Male, June 29, 1920, in alfalfa field 8 miles northeast of Fort Collins, 5:30 p. m.

CROP CONTENTS: 259 alfalfa web-worms, 1 ant, 1 spider.

GIZZARD CONTENTS: 76 partially digested alfalfa web-worms.

No. 19.—Female, July 10, 1920, in wheat field east of Loveland, 3:00 p. m.

CROP CONTENTS: 67 grains of unripened wheat, 2 beetles (*Eusattus difficilis*, 1; *Trimytis pruinosus*, 1).

GIZZARD CONTENTS: 9 beetles (*Eusattus difficilis*, 8; *Trimytis pruinosus*, 1; 54 grains of unripened wheat, 97 seeds of mustard.

No. 20.—Male, July 12, 1920, edge of wheat field 8 miles east of Fort Collins, 5:00 p. m.

CROP CONTENTS: 231 grains of unripened wheat, 1 Lepidopterous pupa.

GIZZARD CONTENTS: 67 seeds of mustard, a mass of partially digested unripened wheat.

No. 21.—Male, July 15, 1920, in alfalfa field four miles north of Fort Collins, 7:30 p. m.

CROP CONTENTS: 79 grains of unripened barley, alfalfa leaves, 15 beetles (*Chrysomela exclamationis*, 2; *Campylenchia curvata*, 1; *Systema bitaeniata*, 9; *Calocoris superbus*, 1; *Collops vittatus*, 2); 2 ants, 2 dandelion buds, 1 Pyralid larva.

GIZZARD CONTENTS: Some alfalfa leaves and a mass of partially digested vegetable matter.

No. 22.—Female, Aug. 17, 1920, in barley field three miles northwest of Fort Collins, 4:00 p. m.

CROP CONTENTS: 2 dandelion buds, 167 grains of barley, 1 sunflower beetle (*Chrysomela exclamationis*).

GIZZARD CONTENTS: 37 whole grains of barley and a number of fragments of same.

No. 23.—Male, Aug. 26, 1920, in alfalfa field five miles northeast of Fort Collins, 4:30 p. m.

CROP CONTENTS: 1 grasshopper, 14 grains of unripened oats, 1 cutworm.

GIZZARD CONTENTS: 2 cutworms, 2 carabid larvae.

No. 24.—Male, Aug. 26, 1920, in field of shocked wheat five miles northeast of Fort Collins, 4:15 p. m.

CROP CONTENTS: 45 grains of wheat, 19 berries of nightshade (*Solanum triflorum*).

GIZZARD CONTENTS: 38 whole grains of wheat and a number of fragments of same.

No. 25.—Male, Aug. 26, 1920, in field of shocked barley five miles northeast of Fort Collins, 4:45 p. m.

CROP CONTENTS: 9 grains of wheat, 43 grains of barley.

GIZZARD CONTENTS: 27 seeds of black bindweed, 21 grains of barley, 50 grains of wheat

No. 26.—Young female, two-thirds grown, Aug. 31, 1920, 3 miles northeast of Fort Collins, 4:30 p. m.

CROP CONTENTS: 1 alfalfa leaf, 3 grains of wheat.

GIZZARD CONTENTS: 3 grains of wheat, 7 seeds of black bindweed, 149 seeds of green foxtail (*Setaria viridis*).

No. 27.—Young half-grown female, Sept. 8, 1920, in corn field near Waverly, 3:00 p. m.

CROP CONTENTS: 1 seed of black bindweed.

GIZZARD CONTENTS: 228 seeds of black bindweed.

No. 28.—Young, two-thirds grown, Sept. 8, 1920, in alfalfa field near Waverly, 3:00 p. m.

CROP CONTENTS: Remains of one grasshopper, 109 seeds of wild sunflower.

GIZZARD CONTENTS: 3 grains of wheat, 41 seeds of wild sunflower.

No. 29.—Young, half-grown, Sept. 8, 1920, in alfalfa field near Waverly, 3:00 p. m.

CROP CONTENTS: 3 grasshoppers, 4 grains of barley, 214 seeds of wild sunflower.

GIZZARD CONTENTS: 6 grains of barley, 76 seeds of wild sunflower.

No. 30.—Young female, two-thirds grown, Sept. 16, 1920, between field of shocked wheat and corn field near Waverly, 4:00 p. m.

CROP CONTENTS: 416 grains of wheat, 30 seeds of wild sunflower.

GIZZARD CONTENTS: 75 grains of wheat, 22 seeds of black bindweed, 61 seeds of wild sunflower.

No. 31.—Young female, two-thirds grown, Sept. 27, 1920, in wheat stubble near Windsor, 4:00 p. m.

CROP CONTENTS: 174 grains of wheat, 4 beet web-worms (*Loxostege sticticalis*).

GIZZARD CONTENTS: 58 grains of wheat, remains of 4 beet web-worms.

No. 32.—Young male, two-thirds grown, Sept. 27, 1920, in wheat stubble near Windsor, 4:00 p. m.

CROP CONTENTS: 1 beet web-worm, 396 grains of wheat.

GIZZARD CONTENTS: 47 grains of whole wheat and a number of fragments of same.

The beet web-worm in the crop was alive and able to crawl when crop was opened 16 hours after pheasant was killed.

No. 33.—Immature male, Oct. 12, 1920, in wheat stubble  $3\frac{1}{2}$  miles northeast of Fort Collins, 3:00 p. m.

CROP CONTENTS: 31 grains of wheat, 1 black nightshade berry.

GIZZARD CONTENTS: 12 grains of wheat, 8 seeds of black bindweed, 1 seed of wild sunflower, 109 seeds of green foxtail, 129 seeds of black nightshade, remains of one grasshopper.

No. 34.—Male, October 21, 1920, in corn field near Ault, 3:00 p. m.

CROP CONTENTS: 9 black nightshade berries, 32 grains of corn.

GIZZARD CONTENTS: A number of fragments of corn.

No. 35.—Immature male, November 2, 1920, in beet field three miles north of Fort Collins, 4:00 p. m.

CROP CONTENTS: 278 grains of wheat.

GIZZARD CONTENTS: 16 whole grains of wheat and a number of fragments of same.

No. 36.—Immature female, November 2, 1920, in beet field, three miles north of Fort Collins, 4:10 p. m.

CROP CONTENTS: 221 grains of wheat, 29 grains of oats, 2 seeds of wild sunflower.

GIZZARD CONTENTS: 20 whole grains of wheat, a number of fragments of same, 8 seeds of wild sunflower.

No. 37.—Female, November 8, 1920, in wheat stubble near Windsor, 4:00 p. m.

CROP CONTENTS: A number of alfalfa leaves, 141 grains of wheat, 3 grains of wild oats.

GIZZARD CONTENTS: Fragments of wheat.

No. 38.—Male, November 10, 1920, in alfalfa field near Loveland, 5:00 p. m.

CROP CONTENTS: 495 grains of wheat, 1 chrysalis of alfalfa web-worm, 1 aphid (*Lachnus dentata*), 1 beetle (*Paederus littorarius*).

GIZZARD CONTENTS: 113 grains of wheat, 3 seeds of wild sunflower (*Helianthus sp.*), 1 seed of ragweed, 1 seed of Indian bread-root, 206 seeds of smartweed (*Polygonum sp.*), a mass of digested wheat.

No. 39.—Male, November 13, 1920, in wheat stubble near Fort Collins, 2:30 p. m.

CROP CONTENTS: 112 grains of wheat.

GIZZARD CONTENTS: A number of fragments of wheat.

No. 40.—Male, November 15, 1920, in alfalfa field near Windsor, 2:30 p. m.

CROP CONTENTS: Nothing.

GIZZARD CONTENTS: 3 seeds of wild sunflower, 16 seeds of black nightshade, mass of partly digested vegetable matter.

No. 41.—Male, November 15, 1920, in wheat stubble near Windsor, 4:00 p. m.

CROP CONTENTS: 142 grains of wheat.

GIZZARD CONTENTS: 13 whole grains of wheat, and a number of fragments of same.

No. 42.—Young male, November 17, 1920, on ditch bank, College Farm, 5:00 p. m.

CROP CONTENTS: 24 grains of corn, 47 grains of oats, 8 nightshade berries, 1 seed of wild sunflower.

GIZZARD CONTENTS: 9 grains of corn, 31 seeds of black bindweed.

No. 43.—Male, November 23, 1920, in plowed field, College Farm, 4:45 p. m.

CROP CONTENTS: 195 grains of corn, 17 grains of oats, 46 seeds of black bindweed.

GIZZARD CONTENTS: 14 whole grains of corn, a number of fragments of same, 19 seeds of black bindweed.

No. 44.—Male, December 1, 1920, in plowed field near Loveland, 3:30 p. m.

CROP CONTENTS: 68 grains of corn.

GIZZARD CONTENTS: 3 grains of whole corn, a number of fragments of same.

No. 45.—Female, December 2, 1920, edge of corn field near Wellington, 4:30 p. m.

CROP CONTENTS: 42 grains of corn, 388 grains of wheat.

GIZZARD CONTENTS: 7 grains of corn, a number of fragments of same, 15 grains of wheat and a number of fragments of same.

No. 46.—Male, December 2, 1920, in corn field near Wellington, 4:15 p. m.

CROP CONTENTS: 53 grains of corn.

GIZZARD CONTENTS: 6 grains of corn, a number of fragments of same, 6 seeds of black bindweed.

No. 47.—Male, December 15, 1920, in alfalfa field west of Fort Collins, 5:00 p. m.

CROP CONTENTS: 51 grains of wheat, 4 seeds of wild sunflower.

GIZZARD CONTENTS: 3 whole grains of corn, 8 whole grains of wheat, a number of fragments of corn and wheat, 5 seeds of black bindweed, 34 seeds of green foxtail.

No. 48.—Male, December 30, 1920, in plowed field north of Waverly, 4:30 p. m.

CROP CONTENTS: 1027 grains of wheat.

GIZZARD CONTENTS: 85 whole grains of wheat, and a number of fragments of same.



# Summary

## ON FOOD HABITS

From our investigations, we find that the ring-necked pheasant is an omnivorous feeder, with grain its favorite food, showing a decided preference for wheat; and that it is by no means the extremely insectivorous bird it has been supposed to be.

When we began our investigations on the food habits of the pheasant, it was our opinion that the young birds might feed almost exclusively on insects, and but little on grains or weed seeds. Our investigation does not bear out this opinion. Eight young birds taken in August, September and October, had eaten fourteen insects, 1228 kernels of grain, and 1235 seeds of weeds. Of the eight birds, five had taken insects, six weed seeds and seven grain.

The following is a list showing the different grains, weed seeds and insects taken by the forty-eight birds examined.

### CLASSIFICATION OF FOOD MATERIALS

#### GRAIN

Corn  
Oats

Wheat  
Barley

#### WEEDS

Lady-finger (*Polygonum persicaria*)  
Ragweed (*Ambrosia trifida*)  
White Mustard (*Brassica sp.*)  
Bindweed (*Polygonum convolvulus*)  
Wild oats (*Avena fatua*)  
Indian Bread-root (*Psoralea sp.*)  
Black Mustard (*Brassica sp.*)  
Wild Sunflower (*Helianthus sp.*)  
Black Nightshade (*Solanum nigrum*)  
Nightshade (*Solanum triflorum*)  
Green Foxtail (*Setaria viridis*)  
Smartweed (*Polygonum sp.*)  
Dandelion buds (*Leontodon*)  
Nightshade berries (*Solanum sp.*)

### INJURIOUS INSECTS

#### ORTHOPTERA

Grasshoppers—7

COLEOPTERA (Beetles)

- Monoxia puncticollis*—26  
*Phyllobrotica decorata*—1  
*Leptinotarsa decemlineata*—12  
*Systema bitaeniata*—9

LEPIDOPTERA

- Alfalfa web-worm (*Loxostege commixtalis*)—558  
Beet web-worm (*Loxostege sticticalis*)—11  
Cutworms—3

HOMOPTERA

- Lachnus dentatus*—1

BENEFICIAL INSECTS

COLEOPTERA (Beetles)

- Harpalus* sp.—1  
*Silpha ramosa*—1

NEUTRAL INSECTS

COLEOPTERA (Beetles)

- Paederus littorarius*—8  
*Elateridae*—1  
*Collops vittatus*—2  
*Scarabaeidae*—5  
*Aphodius inquinatus*—17  
*Diplotaxis haydeni*—8  
*Chrysomela conjuncta*—6  
*Chrysomela exclamationis*—32  
*Trimytis pruinosa*—2  
*Eusattus difficilis*—9  
*Eleodes extricata*—1  
*Blapstinus* sp.—8  
*Thecestermus numeralis*—1  
*Graphorhinus vadosus*—2  
*Curculionidae*—10  
*Baris* sp.—1

DIPTERA

- Puparium—1

LEPIDOPTERA

- Lepidopterous pupa (*Pyralid*)—1

HYMENOPTERA

- Ants—40

## ARACHNIDA

Spider—1

## HETEROPTERA

*Campylenchia curvata*—1

*Calocoris superbus*—1

## MISCELLANEOUS VEGETABLE MATTER

Alfalfa leaves

Cherry pits—2

Vetch seed

Pinto beans—1

## MISCELLANEOUS NOTES

### *Grains Eaten:*

Twenty-eight of the forty-eight birds taken at different seasons of the year had eaten wheat to the extent of 5517 grains, or an average of 197.1 grains per bird.

Six birds had eaten 634 grains of barley, or an average of 105.4 grains per bird.

Eight birds ate 546 grains of corn, or an average of 65.6 grains per bird.

Six birds ate 342 grains of oats, or an average of 57 grains per bird.

Total kernels of all grains found in the crops and gizzards of the forty-eight birds killed during the season, 7039, or an average of 146.6 kernels of grain for all birds taken, which is probably not more than one-half the daily ration. This does not take into consideration fragments, and partially digested kernels that could not be counted.

According to our observations, pheasants usually feed twice a day, in the early morning and evening, and the above paragraph gives an average grain portion of one meal for one day for forty-eight birds.

In early spring and fall they feed mostly on waste grains, but at planting time they feed on germinated corn, wheat and barley, and in the growing season on the grain in the milk.

Grain was found in stomachs of birds taken in every month from March to January. As no birds were taken in January or February, we have no records of their food habits for these two months, but no doubt grain is eaten every month of the year.

## WEED SEEDS EATEN

In the stomachs of twenty-eight of the birds examined, we found a total of 2127 seeds of noxious weeds divided as follows:

lady-finger, 1; ragweed, 30; white mustard, 165; bindweed, 482; wild oats, 69; Indian bread-root, 12; black mustard, 170; wild sunflower, 555; black nightshade, 145; green foxtail, 292; smartweed, 206, a total of 2127.

From the above we may conclude that sunflowers furnish the favorite weed seed, as indicated by the number of seeds eaten, and also the large number of birds that feed on the seeds of this weed.

As this plant is very abundant along the roadsides and ditch banks, also in some of the fields, it is surprising that more of the seeds were not taken. We failed to find a single bird that had been feeding on the cultivated species, although several were taken near fields of the cultivated variety.

The next largest item in the list of weed seeds is black bindweed, which was taken by eight birds. This is a common and troublesome weed of the grain and cultivated fields. A bird that would feed extensively on the seeds of this weed would be a blessing.

One bird had taken one seed of lady-finger, four birds thirty seeds of ragweed, eight birds three hundred thirty-five seeds of mustard, five birds sixty-nine seeds of wild oats, four birds twelve seeds of Indian bread-root, one bird two hundred six seeds of smartweed, two birds one hundred forty-five seeds of black nightshade and three birds two hundred ninety-two seeds of green foxtail.

#### INSECTS EATEN

The forty-eight birds ate, during the season, a total of seven hundred eighty-eight insects divided as follows: injurious 628, beneficial 2, and neutral 158.

The largest item in the list is the alfalfa web-worm, amounting to 558, all taken by three birds; one bird eating 335, another 222, and another 1, and one bird had taken one chrysalis of this worm.

Alfalfa web-worms were very abundant this past season, swarming in the fields by millions. This is also true of the beet web-worm, of which eleven were eaten by three birds.

All pheasants examined during the season failed to live up to their reputation as grasshopper feeders, none had taken the eggs, and only seven grasshoppers were taken, three of which were old, dry insects that had been picked up dead. In this section of the state, grasshoppers were not abundant enough to do any noticeable damage to farm crops, but were common in all the fields.

Cutworms were very common this season, but only one bird had taken them and to the extent of three worms. Apparently the pheasants scratch little, if at all, for their food.

Beetles were taken to the extent of one hundred twenty-three, of which ninety-eight were neutral, twenty-three injurious and two beneficial.

In 1916, Mr. A. C. Maxson, of The Great Western Sugar Company, Longmont, Colorado, was granted a special permit to take twelve male pheasants, for food habit studies. This data has never been published and Mr. Maxson kindly gave us permission to include the results of his investigation here. This we are very glad to do, as it is a valuable addition to our records. Mr. Maxson's paper follows:



# Feeding Habits and Food of the Ring-Necked Pheasant<sup>1</sup>

By ASA C. MAXSON, *Longmont, Colorado*

During the summer, fall and early winter of 1916, the writer studied, in a small way, the feeding habits of the ring-necked pheasant in connection with the taking of 12 males birds under special permit No. 25, issued by the Colorado Game and Fish Commission.

During the nesting season, the ring-necks, especially the females, feed quite locally. The same birds have been observed day after day feeding in the same field. As will be seen from the examination of the stomachs of the birds taken, the food eaten depends quite largely upon the local supply. This local feeding and the fact that a great variety of vegetable food is eaten, point toward a possibility of great local damage especially in truck-garden districts and near favorite nesting places.

The corn pulling habit of this bird results in quite heavy damage where this crop is grown and the birds are numerous. Sugar beets in all stages of development and the roots set out for seed production are damaged to quite an extent, specially near nesting grounds.

It has been noticed that the greatest damage has occurred near alfalfa fields and waste ground which is covered with a heavy growth of weeds. Such places afford concealment during the day and furnished protected nesting places.

After the young leave the nest, feeding is not quite as local as during the nesting period. It is probable that more insects are eaten by the young growing birds than by the adults, however there is no direct evidence that this is the case.

During the fall the birds congregate about waste land near water and in places where the weeds and sweet clover of the previous season afford hiding places and protection during the night. Feeding at this season seldom results in loss to agriculture only when the birds are numerous in fields where unhusked corn is standing.

Feeding generally takes place during the early hours of the morning and during the last two or three hours before dark. In the middle of the day the birds are much less in evidence. During the nesting season the males are more bold and may be seen strutting about giving their harsh call accompanied by the rapid flapping of the wings at any hour of the day.

<sup>1</sup>*Phasianus torquatus* Gmel.

## STOMACH CONTENTS

In giving the results of the examination of the stomach contents of the birds taken, no attempt has been made to express the different items in percentages.

### *Bird No. 1*

Killed 6 P. M., May 29th, 1916, consorting with females near a cattle feeding pen.

#### CROP CONTENTS

- 1 kernel of barley
- 2 kernel of corn
- 1 snap-beetle (*Elateridae*)
- Several leaves of lambsquarter and buds  
and leaves of butter-cup (*Ranunculus sp.*)

#### GIZZARD CONTENTS

- 1 *Lachnosterna* larva (white grub)
- 1 grasshopper
- 1 tiger-beetle (*Cicindela sp.*)
- Many ground-beetles (*Carabidae*)

The vegetable substance consisted of partially digested wheat, barley and corn, probably waste from the feed lots.

Four injurious insects were destroyed. To off-set this many beneficial ground-beetles and one tiger-beetle were eaten. Since the number of beneficial insects eaten out-numbered the injurious forms, the recent feeding of this bird must be considered as harmful rather than beneficial.

### *Bird No. 2*

Killed 5:30 P. M., May 31st, 1916, feeding where straw stack had stood and about 10 rods from a seed-beet field.

#### CROP CONTENTS

- 14 kerneles of wheat
- 7 pieces of beet pulp nearly equalling the  
wheat in total bulk.

#### GIZZARD CONTENTS

- 23 kernels of wheat
- 3 seeds of a legume

The animal matter in the gizzard consisted of the remains of numerous ground-beetles, one leaf-beetle.

Sugar beet pulp doubling the bulk of all other items combined completed the contents.

In the destruction of ground-beetles and the eating of sugar beets, this bird did some damage. The only injurious insect eaten

was the leaf-beetle. As this was not of importance as a crop pest agriculturally, no real good resulted from the recent feeding of this individual.

*Bird No. 3*

Killed June 2nd, 1916, at side of road near plowed field recently sown to barley which was not yet up. Time, 11:30 A. M.

CROP CONTENTS

The crop of this bird contained no trace of food.

GIZZARD CONTENTS

Partly digested barley, 1 kernel of wheat and one ragweed seed together with several nightshade leaves composed the bill of fare of this bird so far as vegetable matter was concerned.

The remains of several ground-beetles and 1 potato beetles were the only evidence of insects in the crop.

It is quite evident that this bird breakfasted in the recently sown barley field mentioned above. The potato beetle was no doubt taken from the nightshade, the leaves of which were found in the gizzard. The taking of this injurious beetle was off-set by the destruction of ground-beetles and the taking of barley. This bird's feeding can not be considered as beneficial to agriculture.

*Bird No. 4*

Killed at border of alfalfa, south of experimental field at Longmont. 6 P. M., June 2nd.

CROP CONTENTS

4 alfalfa leaves

GIZZARD CONTENTS

2 kernels of germinated corn

1 ground-beetle

Portion of 1 earthworm.

The balance of the food found in this bird's gizzard consisted of partly digested vegetable matter. There was evidence of corn and barley. Several small roots which appear to be from the germinated corn were also present.

The germinated corn evidently came from the experiment farm near where the bird was killed. As a whole the recent feeding of this male pheasant caused damage from an agricultural point of view.

*Bird No. 5*

Killed June 3, 1916, in a field of fall grain.

CROP CONTENTS

290 kernels of wheat and much chaff.

#### GIZZARD CONTENTS

- 39 kernels of wheat
- 1 sunflower seed.
- 1 young hopper
- 5 leaf-beetles

The balance consisted of partly digested grain and ground-beetles.

The presence of so much chaff would indicate that the grain eaten was waste, in the eating of which no damage was done. The leaf-beetles devoured feed upon wild sun-flowers and are of no economic importance. The one beneficial act, the devouring of the grasshopper was off-set by the destruction of several ground-beetles. This bird can be considered as neutral in its recent feeding.

#### *Bird No. 6*

Killed 6 P. M., June 3, 1916, in a grain field across the road from a field of corn.

#### CROP CONTENTS

- 7 kernels of corn
- Several nightshade leaves

#### GIZZARD CONTENTS

Two whole kernels of corn and partly digested corn together with green leaves.

The remains of what appeared to be a potato beetle was the only evidence of insects in the food of this bird.

In taking the corn from the field near where it was killed, this bird may have off-set all the good done in destroying the one potato-beetle. At most we can consider this individual as neutral in its feeding.

#### *Bird No. 7*

Killed in grain field across road from seed-beet field, 11:30 A. M., June 8, 1916.

#### CROP CONTENTS

Alfalfa leaves and sugar beet pulp constituted the whole contents of the crop.

#### GIZZARD CONTENTS

The only insects present were ground-beetles. Sugar beet pulp and green leaves composed the vegetable matter.

With the exception of the alfalfa which this bird ate, its recent feeding only can be considered as injurious.

*Bird No. 8*

Killed Sept. 8, 1916, at 6 P. M., feeding on dry land 40 rods from nearest field which was grain stubble.

CROP CONTENTS

- 586 wild sunflower seeds
- 226 kernels of wheat
- 9 kernels of barley
- 11 kernels of oats
- 8 Rocky Mt. bee-plant seeds
- 3 unidentified seeds
- No trace of insects

GIZZARD CONTENTS

- 15 kernels of wheat
- 361 wild sunflower seeds
- 1 Rocky Mt. bee-plant seed
- 1 Grasshopper

The grain eaten was undoubtedly all waste. In destroying the weed seeds and the hopper, considerable good was accomplished. This bird can be classed as beneficial in its recent feeding.

*Bird No. 9*

Killed Oct. 2, 1916, walking across a potato field near barley stubble. Time, 6 P. M.

CROP CONTENTS

- 135 kernels of barley
- 63 kernels of wheat
- 10 kernels of oats
- 441 wild sunflower seeds
- 453 *Polygonum* sp. seeds
- 40 Foxtail grass seeds
- 2 Rocky Mt. bee-plant seeds

GIZZARD CONTENTS

The gizzard contained the partly digested remains of the same kinds of seeds found in the crop, together with much ripe tomato pulp. Several leaves and 4 hoppers.

Since the grains eaten are undoubtedly waste, the large number of weed seeds and the hoppers constituting an element, the taking of which must be considered a beneficial act, places this bird's food largely in the class detrimental to agriculture. This bird is classed as beneficial.

*Bird No. 10*

The stomach of this bird was lost before the contents were examined, therefore no record can be given.

*Bird No. 11*

Killed Dec. 8th, at 3 P. M., in a stubble field near waste land about a reservoir.

CROP CONTENTS

- 27 wild oats
- 268 kernels of wheat
- 1 winter larva of a blister beetle
- 4 hoppers (old dead insects)

GIZZARD CONTENTS

- 40 kernels of wheat
- 1 hopper (old dead insect)
- 100 unidentified weed seeds

In destroying weed seeds and wild oats, this bird rendered a service to agriculture. The only detrimental act was the eating of the blister-beetle larva. These beetles may do some damage in the adult stage, however the larvae are beneficial, those of the common species feeding on grasshopper eggs.

*Bird No. 12*

Killed Dec. 8th, 1916, 3 P. M., on lake shore.

CROP CONTENTS

- 43 kernels of wheat
- 5 hoppers (dead when eaten)

GIZZARD CONTENTS

- 1 dead hopper
- 1 Russian thistle seed
- 5 *Amaranthus* seeds
- 1 *Rumex* sp. seed
- 24 *Atriplex* seeds

Several nightshade seeds and berries.

The recent feeding of this bird did some good in the destruction of noxious seeds. There was no evidence of injury to agriculture in the stomach contents.

SUMMARY

In the following table the various kinds of foods are tabulated according to their relative bulks, the largest being No. 1 and the others relatively placed. Agricultural vegetable matter is any plants or parts of plants and seeds raised as field or garden crops in northern Colorado. Noxious vegetable matter is weed seeds or other parts of so-called noxious weeds. Neutral animal matter is any insect or other animal substance which is not of importance as a crop pest or of agricultural value in any way.

Bird No.	VEGETABLE FOOD			ANIMAL			Bird Classified
	Waste	Agri-cultural	Noxious	Injurious Insects	Beneficial Insects	Neutral	
1	1			3	2		Inj.
2	3	1		4	2		Inj.
3		1	4	3	2		Inj.
4	2	1			3	4	Inj.
5	1		4	3	2		Neut.
6		1	3	2			Neut.
7		1			2		Inj.
8	2		1		3		Ben.
9	2	4					Ben.
10	No record						
11	1		2		4	3	Ben.
12	1		2			3	Ben.

The points worthy of note are:

- 1st. That the food of the ring-necked pheasant is largely vegetable matter. It is at least double in bulk the animal matter in those months when the most animal matter is taken. During the winter months very little animal matter is consumed.
- 2nd. That the insects devoured consist very largely of ground-beetles, nearly all of which are beneficial to agriculture.
- 3rd. The presence of potato-beetles in the stomachs of two birds indicate that where potatoes are extensively grown, the ring-necked pheasant might render a service in the destruction of this pest.
- 4th. The apparent liking for tomatoes and the fruits of related plants would indicate that tomatoes might be damaged to a considerable extent.
- 5th. The liking for young seedling sugar beets and the pulp of seed beets and commercial beets in the fall points toward the possibility of the pheasants being a source of injury to these crops.
- 6th. The corn pulling habit has already resulted in considerable damage. At present this crop suffers more than any other. In several instances the stand has been completely destroyed over considerable areas.
- 7th. Spring and summer feeding results in injury to field and garden crops. Winter feeding results in a benefit to agriculture because of the destruction of large numbers of noxious weed seeds.
- 8th. Feeding takes place quite locally. Both the males and females feed more locally during the breeding season than at other times of the year. The proximity of nesting places to such crops as corn, sugar beets and garden and small fruit crops will very likely result in heavy local damage.

In studying this report it must be borne in mind that no birds were taken during January, February, March and April. It is possible that during the spring when cut-worms are very numerous, the pheasants do great good in the destruction of this pest.

#### CONCLUSION

If we were to judge the ring-necked pheasant by the evidence at hand, we would be forced to say that the value of these birds to agriculture has been over estimated. At best, it appears that the injury done at certain times of the season and in certain localities is off-set by the good done at others. There seems to be no foundation for the statements that this bird is a great enemy of grasshoppers.

# General Summary

W. L. BURNETT

Summing up the two reports on the food habits of the fifty-nine pheasants taken, we find that the two reports harmonize well. The majority of Mr. Maxson's birds were taken near beet fields, or waste places, and show a smaller percentage of grain than ours, which were taken largely in or near grain fields. On the other hand, Mr. Maxson's birds show a larger percentage of weed seeds taken, which is not strange considering the conditions under which they were taken. Two of his birds had eaten beet pulp, and one, tomato.

With respect to the insect eating habits of pheasants, we may form the same general conclusions, from the two reports, viz., that they by no means show a preference for insect food, and are very indifferent to grasshoppers.

Our forty-eight birds took seven grasshoppers, and Mr. Maxson's eleven birds took eighteen. Eleven of the hoppers found by Mr. Maxson, and three by us, were old dry insects which had been picked up dead, leaving eleven as the total number of live hoppers taken by the fifty-nine birds at one meal.

None of Mr. Maxson's birds had taken cutworms, and ours had taken but three. His birds showed the same decided preference for wheat, taking five times as much of this grain as of all other grains together, barley being their second choice, the same as in ours.

In the weed seeds taken by Mr. Maxson's birds, wild sunflower heads the list, and black bindweed holds second choice, the same as we found in the forty-eight birds taken.

These investigations were carried on to obtain actual data on the food habits of the Ring-necked Pheasant in the Loveland-Ft. Collins section. The results are here recorded for farmers and all interested, that each may draw his own conclusions as to the economic importance of this bird as an inhabitant of the farming sections of the state.