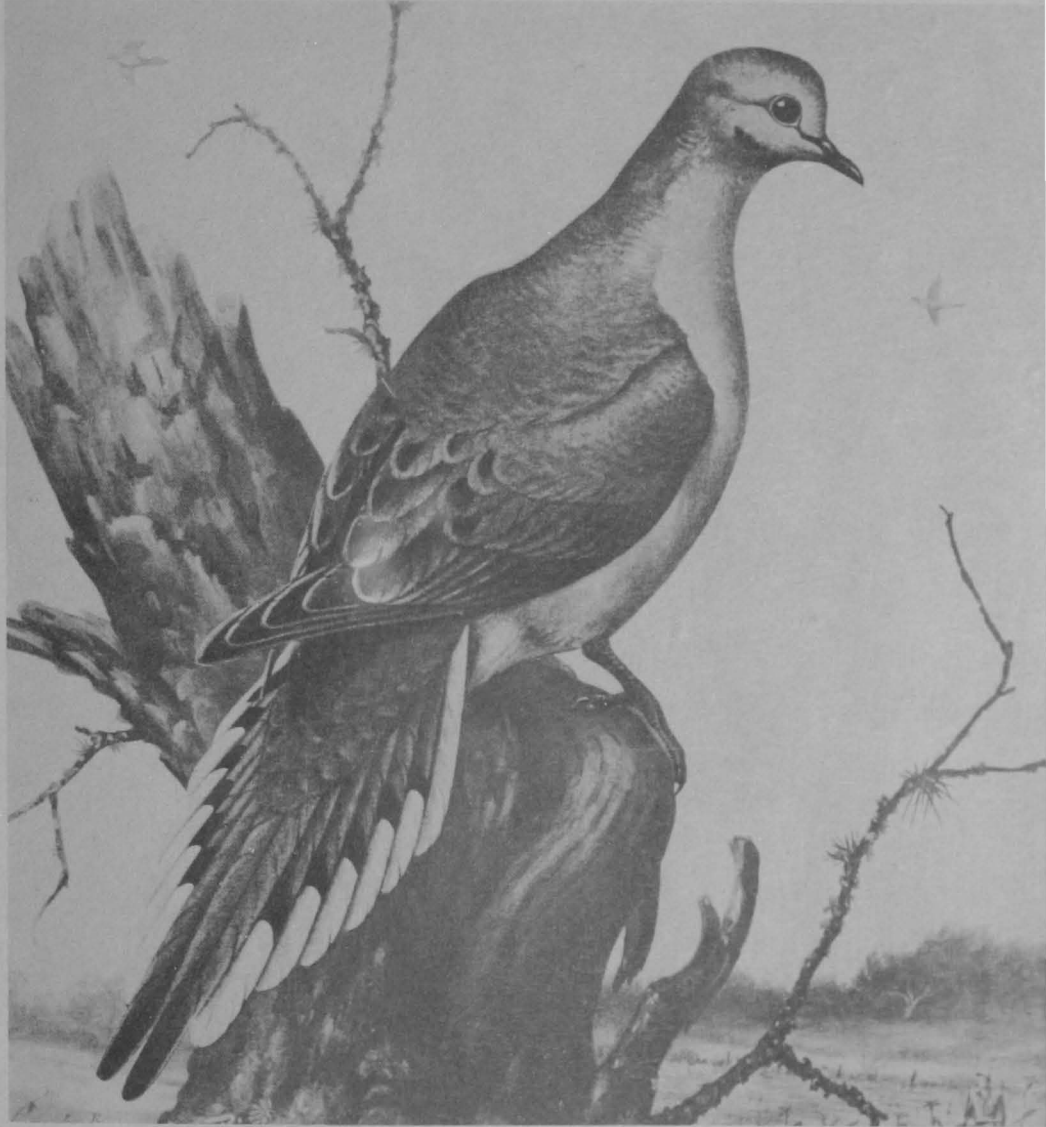


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ABSTRACTS OF MOURNING DOVE LITERATURE



United States Department of the Interior
Fish and Wildlife Service
Bureau of Sport Fisheries and Wildlife
Circular 136 1962



United States Department of the Interior, Stewart L. Udall, Secretary
U. S. Fish and Wildlife Service, Clarence F. Pautzke, Commissioner

ABSTRACTS OF MOURNING DOVE LITERATURE

Compiled by

Branch of Wildlife Research
Bureau of Sport Fisheries and Wildlife

U. S. Fish and Wildlife Service
Circular No.

Washington • December 1961



FOREWORD

This compilation of abstracts of literature in the mourning dove field is a consolidation and continuation of a series that was first issued in August 1949 by Harold S. Peters.¹ Since that date, Mr. Peters compiled abstracts that were distributed in April 1951, July 1953, and December 1957. The current compilation consolidates verbatim the abstracts prepared by Mr. Peters with those of literature appearing after December 1957, except that abstracts of three papers (entry numbers 364, 430, and 431) published before January 1958 and not appearing in previous abstracts were also prepared and included. For the January 1958 to October 1961 period, the compilation was prepared as follows: (1) abstracts were taken from Wildlife Review, Kenneth J. Chiavetta, Editor; (2) recent publications, manuscripts, and miscellaneous reports were abstracted by James G. Teer, who also prepared the subject index; and (3) abstracts of some publications on dove disease and related subjects were provided by James V. Griffo. The tedious typing assignment was performed with unusual ability by Mrs. Bernice R. Leskosky.

The value of compiling references and abstracts of literature in the mourning dove field and disseminating this information to dove biologists has been demonstrated. Accelerated progress in research is often possible through knowledge of advances of co-workers in related phases of investigation. Having the abstracts in one publication rather than in five issues has obvious advantages.

Abstracts are restricted to literature on the mourning dove, with the exception of a few publications on closely related subjects. Pittman-Robertson job completion reports are not included because these generally are summarized later in publications. This volume is not intended to be a complete bibliography of mourning dove literature.

Arrangement of abstracts is by States, by countries other than the United States, and by literature of a regional or continental nature. Entries are numbered consecutively. The subject index is an attempt to categorize entries on the basis of the information contained in the abstract. The author index lists entry numbers for each author.

¹/ Mr. Peters retired in January 1958 from the U. S. Fish and Wildlife Service and is now a research biologist with the National Audubon Society.

Many biologists cooperated in the compilation of these abstracts by submitting literature or references for review. We encourage continued cooperation of those interested in dove research. Submit literature and references for review to the Patuxent Wildlife Research Center, Laurel, Maryland.

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A B S T R A C T S

United States

Alabama

1. Alabama Department of Conservation. 1950. SETBACKS SUFFERED BY DEER AND DOVES. Alabama Conservation, 22(1-2): 4, 17.

Mentions dove disease occurring in many counties, with greatest mortality in central, northern, and eastern sections of Alabama. Estimated that several thousand doves had died by June 16, 1950. Asks for specimens of dead doves and mentions swelling in mouth and throat which indicates the disease.

2. Alabama Department of Conservation. 1951. BAG LIMIT ON DOVES CUT TO EIGHT. Alabama Conservation, 22:5, 17.

Popular discussion of 1951-52 dove regulations reducing daily bag from 10 to 8, for season December 17 to January 15. A survey of 61 Alabama counties by game wardens in 1950 showed an increase in 28 counties while in 1951 only 17 counties had an increase: 16 counties in 1950 had no change, 26 in 1951, and 18 counties reported decreases in 1950, with 23 showing fewer birds in 1951. Attributes some of this decrease to trichomoniasis and describes symptoms.

3. Barkalow, F. S., Jr. 1949. A GAME INVENTORY OF ALABAMA. Alabama Department of Conservation, 140 pp.

One page (99) on trend in mourning dove populations. Winter of 1938-39 was below wintering population of ten years previously; 1939-40 showed a slight increase; 1940-41 was far lower than had ever been recorded; no increase in 1941-42. A progressive increase occurred in 1943 and 1944. Low point in Alabama dove population was in 1941 and 1942.

4. Dahlen, James H. 1951. THE EFFECT OF CERTAIN INSECTICIDES ON THE BOBWHITE QUAIL AND MOURNING DOVE. Presented at Southeastern Association of Game and Fish Commissioners, Biloxi, Mississippi, October 21-24, 1951. Mimeo. 5 pages.

Doves were trapped in the field and confined in pens (with a cheese cloth lining to prevent injury from the wire) for testing and observation. The insecticides were administered in a gelatin capsule inserted down the throat. All work has been concerned with the location of the acute toxicity level - that level of dosage at which 50% of the treated birds die. These appear as follows for

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the dove: Aldrin, 14-15 mg/kg; Dieldrin, 45-50 mg/kg; Toxaphene, approximately 200 mg/kg; and Lindane, above 300 mg/kg. (Quail are killed by about one-third of the above amounts for the first three poisons named.) The term mg/kg means milligrams of the toxicant per kilogram of body weight, in other words parts per million.

5. Dahlen, James H., and Arnold O. Haugen. 1954. ACUTE TOXICITY OF CERTAIN INSECTICIDES TO THE BOBWHITE QUAIL AND MOURNING DOVE. Journal of Wildlife Management, 18(4):477-481.

Single acute dosages of aldrin, dieldrin, toxaphene, and lindane were administered to 212 quail and 64 doves, orally in gelatin capsules. Doves were roughly three times as resistant to any given toxicant as quail. Dosages of lindane and toxaphene below those causing acute toxicity apparently did not affect breeding condition. Medium lethal dosages for doves were: Aldrin, 15-17 mg/kg; dieldrin, 44-46 mg/kg; toxaphene 200-250 mg/kg; and lindane, 350-400 mg/kg.

6. Greenwood, Don. 1949. LATE JANUARY DOVE SHOOTING. Alabama Conservation, 20(9):10.

Discussion of 1948-49 dove season in Alabama, from hunter's standpoint. First migratory doves were shot in late December, with local birds comprising half the bag. Suggests 1949 season should include month of January.

7. Haugen, Arnold O. 1952. TRICHOMONIASIS IN ALABAMA MOURNING DOVES. Journal of Wildlife Management, 16:164-169.

First reported major outbreak occurred in Autauga County in March, 1950. The disease was reported from 43 of Alabama's 67 counties by December, 1950. Affected doves are much reduced in weight and breeding condition. While some doves recovered, as shown by reports at banding stations, large numbers of doves died in the State. Many observers reported decreases during the hunting season and following winter. The 1951 die-off appeared as serious as the 1950 when the paper was written in June. The interesting possibility is presented of the passenger pigeon being wiped out by the disease.

8. Haugen, Arnold O., and James Keeler. 1952. MORTALITY OF MOURNING DOVES FROM TRICHOMONIASIS IN ALABAMA DURING 1951. Transactions of the 17th North American Wildlife Conference, 141-151.

In 1950 an outbreak of trichomoniasis (caused by a protozoan Trichomonas gallinae) in doves reached epizootic proportions in the Southeast. It first assumed alarming

incidence in Alabama in early spring of 1950, reached a peak in midsummer, and then subsided in early fall. No significant mortality occurred from October, 1950 through January, 1951. In February, die-off reoccurred in three widely separated counties and breeding season reports of dead doves were secured from 45 counties in 1951 (from 43 in 1950). The 1951 die-off was probably not as drastic as in 1950. "It is believed that the mortality of doves in the State during each of the past 2 years might easily total between 25,000 and 50,000 birds." A decrease in dove populations was noted in random roadside counts and also suggested by a drop in the percentage of young doves in hunters bags, from 17% in the 1950-51 season to 12.5% in the 1951-52 season. Hunting success dropped off so that about 3 1/2 times as much hunting effort was required to bag a dove in 1950 and in 1951 as compared to 1949, the fall before the die-off began. Indications are that the mid-January, 1952 dove population in Alabama was lower than at any time in the past 10 years.

9. Keeler, J. E. 1951. WHY BIRDS ARE BANDED.
Alabama Conservation, 22:15, 20.

A general account of history of bird banding in America. Over 5,000 doves have been banded in Alabama during the dove study, and 2% were recovered during the 1949-50 season. One banded in Alabama June 13 was taken in Galveston County, Texas October 8. Shows two photos of dove traps and appeals for more hunters to return bands.

10. Keeler, James E. 1952. MOURNING DOVE MIGRATION.
Alabama Conservation, 24(3):14, 15, 27.

Popular account of the Alabama dove study which was activated September 16, 1948. Random road counts show a decrease from 1948 to 1951 with a slight increase in 1952. Call counts show an increase in 1952 from 1951. The peak nesting season is in May and June; 69% of the 135 nests located from 1948 to 1952 were in these months. Forty-seven percent of the nests were unsuccessful. A total of 64 trapping stations have been in operation at some time during the four years and 7,552 doves have been banded. Only 1.5% have been recovered. Of the 121 recoveries, 80 were within 20 miles of the banding location; 27 others elsewhere within the State, and 14 from other States: Missouri, Arkansas, Texas, Kentucky, Tennessee, Mississippi, Georgia, and Florida. Nineteen doves from other States have been recovered in Alabama (Ohio, Indiana, Kentucky,

Tennessee, Oklahoma, Arkansas, Texas, Louisiana, Mississippi, South Carolina, Georgia, and Florida). Dove hunting throughout most of Alabama was considered poor during the past four years, the average kill per hunter was slightly more than 3 doves per day.

11. Keeler, James E. 1953. THE MOURNING DOVE STUDY. Alabama Department of Conservation, 66 pp. processed.

Report on the Alabama dove project from September 16, 1948 to 1952. Mentions work done previously by Cooperative Unit from 1936 to 1941 on nesting populations. In 1939 nesting success was 52.3 per cent of 592 nests; in the 1949-50 study, the success was 53 per cent of 135 nests studied. Random and controlled road counts were used for populations data. Call counts were initiated in April, 1951 and have been continued. During the four year study, 64 trapping stations were operated at one time or another, and a total of 7,552 doves were banded (only 115 were nestlings). There were 116 recoveries (1.54 per cent) of which 100 were from hunters. Sixty-five per cent of the recoveries were within twenty miles of the banding station. Hunters bagged an average of slightly over three doves per hunter day. Many doves were killed by trichomoniasis in 1950. "It is suggested that the hunting season in Alabama be set between November 1 and January 30."

12. Moore, George C. 1940. THE NESTING HABITS AND JUVENILE DEVELOPMENT OF THE MOURNING DOVE IN ALABAMA. Unpublished thesis for Master Science degree at Alabama Polytechnic Institute, May, 1940.

Cooing began on first spring-like days in January. Birds were then in pairs, although large groups could be seen until late March. Male defends his perch for cooing. Nests located typically in pines along edges of fields or openings. None were found in large wooded areas. Seventy-three percent of nests were in shortleaf pines and 11.6% of nests in longleaf pines. Average height was 21 1/2' at Auburn, with most being from 5 to 20' high. Twenty nests were used two or more times in one season; 23 were used in 2 or more seasons; and 3 were used three seasons. Most were constructed of weeds and rootlets or pine needles. Doves used 20 nests of other birds (Blue Jay, Shrike, Mockingbird). Four or five active nests were often found in small clumps, but only twice were active nests found in the same tree. Construction required about 7 days, actual building being done before 9:30 each morning. The male brought material to the female and she placed it on

nest. Male never went over 60' to gather material. Eggs laid on successive days. Incubation started with laying of first egg. Male relieved female about 8:00 a.m. until 4:00 p.m. Eggs were turned several times daily, with bill. Eggs usually hatched on 14th day. Young bird was dry within an hour or two. Adult removes egg shell. Eighty-one percent successfully hatched both eggs. Nestlings are completely feathered by the 10th day, except on head and neck. They are fed same day as hatched. First day this is largely milk with a few tiny seeds. On fourth day large seeds. By fifth day over 50% was solid food. By 8th day 80% solid; 12th day 95% solid. Food of 19 nestlings consisted of 65 species of seeds and a few small univalve molluscs. Most important ones were Evening Primrose, Crane's-bill, wheat, Rumex, and Oxalis. Weight of newly hatched young was 5 to 10 gms. By time they left nest it was 65-70 gms. Average nestling left nest on 12th day, with 8 and 18 days as extremes. Parents never abandoned a nest unless young were destroyed. Juveniles remain in vicinity of nest several days, and after a week or two it is on its own. Plumage gradually moults to adult and after fifth month most young could not be distinguished. Nesting began in late February or early March continued until mid-October, with peak in late May and early June. No data secured on number of broods. One bird fledged in April laid 2 eggs on August 13 and 14, but did not incubate (in captivity). Of 680 nests studied, 324 (47.6%) were destroyed. Sixty-eight and one-half percent of destruction was in egg stage. Flying squirrel, blue jay, crow, rats, shrike, ants, and wind were greatest factors in destruction. Adults will abandon a nest after 16 days if eggs do not hatch.

(Bibliography of 12 titles)

13. Moore, George C., and Allen M. Pearson. 1940. MOURNING DOVE MIGRATIONS FROM ALABAMA. Alabama Game and Fish News, June, 1940:7, 13.

Gives short discussion and map of doves banded in Alabama and recovered in Florida, Georgia, South Carolina, Maryland, Missouri, and Texas.

14. Moore, George C., and Allen M. Pearson. 1941. THE MOURNING DOVE IN ALABAMA. Bulletin by Alabama Department of Conservation, July, 1941, 36 pp.

Report of dove study from October 24, 1935 to February 1, 1941 in Alabama. Cooing begins first warm days of January. Males in breeding condition from December 9 until last of

September. Often 3 successful broods. Eighty-four percent of 680 nests in pine trees. First egg is deposited the day after nest is completed and second egg about 30 hours later than first one. Incubation by both sexes. Male relieves female about 8:00 a.m. until late afternoon. Eggs hatch in 14 days. Describes growth of young nestlings. Feeding is by regurgitation; at first on dove milk and later with seeds. Leave nest at 11 or 12 days. Gives discussion of movements of banded doves to and from Alabama. Management might consist of protection and adequate food. Discusses hunting regulations - no hunting before November 20 in Alabama.

(Bibliography of 17 titles)

15. Pearson, Allen M. 1940. FROM FLEDGLING TO FLIGHT. Outdoor Georgia, September, 1940:16, 17, 25.

Popular presentation of results of Alabama dove study. Discusses growth of young and hunting seasons. "Dove shooting in Sept. is deplorable from any conservation or biological viewpoint."

16. Pearson, Allen M. 1941. DOVE SEX RATIO FOUND ALMOST EVENLY DIVIDED. Alabama Conservation, May, 1941:8.

Records of sex obtained on 3,491 doves from Alabama, Georgia, Louisiana, and Mississippi, showed total of 1,809 males to 1,682 females, which was 51.82% males. Gives table of ratio for each month of the year: Males ranged from 47.7% in December to 63.33% in May. Sexes are not known to congregate in separate groups in fall or winter months.

17. Pearson, Allen M., and George C. Moore. 1939. MOURNING DOVE NESTING HABITS IN ALABAMA. Alabama Game & Fish News, December, 1939:9, 10, 15.

Summary of 592 nests studied during 3 seasons at Auburn. Most nests in pine trees. Average height was 21.7' with mode from 11 - 15'. Incubation period 14 days. Nestlings spent 8-18 days in nest, most flying between 11 and 13 days. 47.8% of 592 nests were destroyed by various predators or wind. "Management . . . appears impracticable."

18. Pearson, Allen M., and George C. Moore. 1939. NESTING HABITS OF THE MOURNING DOVE IN ALABAMA. Transactions of the 4th North American Wildlife Conference, 468-473.

Research to improve management should be directed toward the nesting cycle. Data on 592 dove nests during three years in Alabama. 499 were in pines. Highest was 65.9'

and lowest on ground. Mean was 21.7' but mode was 11-15'. Incubation period 14 days. Young spend 8-18 days in nest, but usually flew in 11-13 days. Most nests active in mid-May. Latest nestlings flew from October 7-15. Nest destruction varied by year and locality as: 53%; 45%; 38%; 65%; 13%. Of total of 592 nests 47.8% were destroyed. Typical 33 day nesting period: 7 days building; 14 days incubating; 12 days nestling period. "Management . . . appears impractical."

19. Pearson, Allen M., and George C. Moore. 1940. FEATHERS MAY REVEAL AGE OF MOURNING DOVES. Alabama Conservation, November, 1940:9-10.

Very general discussion of moult of wing feathers, stating last juvenile feather on wing is outmost primary covert. Twenty-one nestlings in captivity lost all juvenile plumage at age of 11-20 weeks, with average of 15 weeks. Thus, birds hatched in spring would appear as adults in fall.

20. Pearson, Allen M., and George C. Moore. 1940. MOURNING DOVE MIGRATIONS INTO ALABAMA. Alabama Game & Fish News, 12:5, 14.

Gives short discussion and map of banded doves taken in Alabama which were originally banded in: Massachusetts, Michigan, Wisconsin, Illinois, Indiana, Ohio, and Florida.

21. Pearson, Allen M., and Lloyd G. Webb. 1942. MOURNING DOVE A STRICT VEGETARIAN. Alabama Conservation, July, 1942:3, 12.

Over 99% of food consisted of seed and plant material. A few tiny snails and insects may be taken accidentally. 135 kinds of seeds were found in 163 stomachs examined. Cultivated crops accounted for 46% of food eaten. Corn was most important of these.

22. Peters, Harold S. 1936. WILDLIFE RESEARCH STATION REPORTS ON FOUR GAME PROJECTS. Alabama Game & Fish News, December, 1936:4, 5, 13, 14, 15.

Approximately same summary of dove research work in Alabama as published in American Wildlife, 26:7, 8, 13; 1937.

23. Peters, H. S. 1937. COOPERATIVE RESEARCH IN ALABAMA. American Wildlife, 26:7, 8, 13.

Summary of 600 cards from cooperators show 43% nests in evergreens, 51% in deciduous trees, and 6% on ground. Average height 10.8 feet. This compares with 86% nests

in pines at Auburn project area, and average height of nest of 26.2 feet. Female dove incubates from about 4:30 p.m. until 8:30 a.m. Young birds spend 10-17 days in nest, average of 12.7 days.

24. Rosene, Walter, Jr. 1939. A PRELIMINARY INVESTIGATION OF THE FOOD HABITS OF THE MOURNING DOVE IN ALABAMA. Wildlife Research and Management Leaflet BS-133, U. S. Department of Agriculture.

Two hundred fifty dove stomachs collected June, 1936 to June, 1937, and 37 collected 1911-12 added. Grasses, 55.6%; peas, 15.85%; spurge, 5.96%, with tables to show all groups for each month of the year. One hundred forty-nine species of food in 287 stomachs. Over 99% of food consisted of seeds. Animal food was insignificant and probably taken accidentally. Shortage of choice food in April and May. Doves concentrate at abundant food supply.

Arizona

25. Elder, James B. 1956. WATERING PATTERNS OF DESERT GAME. Journal of Wildlife Management, 20(4):368-378.

An intensive study of the utilization of two man-made desert watering places by various game mammals and birds. Mourning doves were common although less abundant than white-winged doves. Mourning doves arrived at the tanks earlier in the morning and were seen later in the evening than whitewings. Also they were more cautious and shy; if scattered they were slow to return; they remained in trees and shrubs or on the ground longer before watering. A few doves wintered and the main nesting population arrived in late March and early April. Greatest utilization was from May 1 through August 30. Available free water appears essential to doves.

26. Gallizioli, Steve. 1955. HUNTING SEASON INFORMATION ON THE MOURNING AND WHITE-WINGED DOVES IN ARIZONA. Proceedings of the 35th Annual Conference of Western Association State Game and Fish Commissioners, pp. 226-235, graphs.

Hunter kill data have been secured each year since 1951; call counts began in 1952; and trapping and banding was done in 1953 and 1954. Most dove hunting is in agricultural areas of Maricopa, Pima, Santa Cruz, and Yuma Counties. Dove wings have been collected from hunters. In 1954, 92%

of kill was in first twelve days of a 40-day season. During 1953 and 1954, 1,492 mourning doves were banded; hunter recoveries were only 1.3 percent in the first hunting season. A questionnaire in 1951 showed that 28.6 percent of Arizona hunters hunted doves. Projection of data indicated a kill for 1951 of 420,000 mourning doves. Number of hunters has increased since. In 1951 only 41 percent of doves bagged were juveniles; in 1952, 58 percent; 1953, 47 percent; and 1954, 52 percent. Believes a higher kill of both mourning and white-winged doves could be allowed. A split season would result in re-awakening of hunter interest in the mourning dove in early winter.

[From Wildlife Review 84:37-38]

27. Neff, Johnson A. 1944. A PROTRACTED INCUBATION PERIOD IN THE MOURNING DOVE. Condor, 46:243.

At Phoenix, Arizona, a dove egg was unattended in nest for 4 days, then for 21 days was incubated by a ring-neck dove by day and exposed by night to temperatures of 65° to 70°. Yet it hatched a normal squab June 29. (Egg laid June 4.)

28. Stair, John L. 1958. DOVE MANAGEMENT AND WHAT IT MEANS TO ARIZONA. Proceedings of the 38th Annual Conference of Western Association State Game and Fish Commissioners, pp. 194-196.

Describes the hunting, the habitat, merits and demerits of call-count survey, and tells a little about banding results. Doves are abundant in Arizona more by grace of nature than through management. About all man has done is to provide suitable hunting regulations, and to provide water in the desert. As to other management, much is yet to be learned. Present survey techniques demand improvement.

[From Wildlife Review 95:84]

29. Stair, John L. 1958. WHAT IS YOUR STORY, MRS. DOVE? Wildlife News, 5(3):12-15, 28-29.

A popular account of trapping and banding mourning doves and white-winged doves and the uses and need for band-return data:

Arkansas

30. Young, Howard, Andrew Hulsey, and Robert Moe. 1952. EFFECTS OF CERTAIN COTTON INSECTICIDES ON THE MOURNING DOVE. Proceedings of the Arkansas Academy of Science, 1952:43-45 and 5 pp. tables.

Wild trapped doves were subjected to field spray concentrations of insecticides on food in cages. "Results

indicate that routine field applications of calcium arsenate, toxaphene, and benzene hexachloride do not constitute a serious danger to wild mourning dove populations. Aldrin and dieldrin proved to be extremely toxic, and apparently could not be detected by the birds. As they are not heavily employed in Arkansas, they probably do not have a significant effect on wild dove populations."

California

31. Bailey, W. D. and John Cowan. 1959. SPOTLIGHT ON THE MOURNING DOVE - A LOOK AT SOME FACTS 'N' FIGURES. Outdoor California, 20(1):1-2.

This is the lead article of this issue of Outdoor California which is devoted almost exclusively to mourning doves. This short article presents a brief review of the distribution and abundance, nesting, habitat preferences, mortality rates, and population and harvest data of the mourning dove in California.

32. Browning, Bruce. 1959. FOOD HABITS STUDIES REVEAL "SECRETS" OF DOVE'S DIET. Outdoor California, 20(1):6, 9.

More than 1,000 dove crops were collected in 1956 from various study areas in California. Analysis of half of these crops indicate the dove to be a seed eater primarily. Seeds of cultivated crops make up only about 10 percent of foods eaten. The other 90 percent of the diet is made up of seeds of more than 100 weed species; however, seeds of only 10 plants make up almost 90 percent of the total volume of weed seeds eaten. It is doubtful that the dove can control any weed species since a single plant of some species can produce over a million seeds during a season. Of 38 weeds classified by the California Department of Agriculture as noxious, only four appear thus far in the list of dove foods. Less than 0.2 percent of foods eaten is animal in nature, mostly in the form of freshwater snails.

33. Browning, Bruce M. 1959. AN ECOLOGICAL STUDY OF THE FOOD HABITS OF THE MOURNING DOVE. California Fish and Game, 45(4):313-331.

This study, initiated in 1956, presents an analysis of dove food habits in relation to the availability and abundance of food plants. The study area was a 40-acre, abandoned, olive and almond orchard surrounded by cultivated and fallow fields and rangeland 15 miles from Sacramento, California. Six vegetative units were defined on the

study area: Orchard, cultivated field, fallow field, rangeland, vernal pool, and roadside. At intervals of one to two weeks, from January through August, 1958, recordings were made of the vegetative composition and phenological succession of plants in two plots staked in each of the vegetative units. A check list of 107 plants was compiled and relative abundance of each species was determined for each vegetative unit. Doves were observed on the area during all months of the year; peak populations arrived in April and May and nested in the orchard. A total of 275 dove crops were collected on a monthly basis from the time the birds first arrived in the spring until they dispersed with the advent of the September hunting season. Ninety-nine crops were taken from hunter-killed birds, and 70 crop contents were obtained by flushing the crops of nestlings with water. Foods consisted of 99.6 percent seeds and 0.4 percent animal food items. Seeds of 71 plant species were identified from the crops, 55 of which were found growing on the area. Seeds of just 11 species made up over 97 percent of the food. An analysis of seasonal consumption of the seeds of the 11 preferred plants showed that the seeds of these plants were utilized as they became available. The majority of the 11 plants are found most abundantly in fallow and cultivated fields, and these two sites were the most attractive feeding areas. From 75 to 90 percent of the food in the crops of 1-to-3-day-old nestlings was dove milk, and 25 percent of the food in crops of 4-to-12-day-old young was dove milk. Trace amounts of dove milk were found in crops of fledged young.

34. Bryant, H. C. 1926. LIFE HISTORY AND HABITS OF THE WESTERN MOURNING DOVE. California Fish and Game, 12:175-180.

General account of life history, habits, food, and hunting. Extreme dates of nesting in Los Angeles County, February 9 and December 5. Peak of nesting is in June and July. As early as 1880, dove season began July 1 and ended January 1. Even as late as 1907 the season opened July 15, but since 1911 it has not opened before September 1. Population is steadily decreasing in California.

35. California Department of Fish and Game. 1960. DOVES TOP LIST OF GAME BAGGED IN 1959 SEASON. Outdoor California, 21(7):1-2.

The mourning dove kill for California was 3,577,900 in 1959, a 5.3 increase over the kill of 1958. Doves ranked first over all other game species in numbers bagged.

36. Cowan, John B. 1952. LIFE HISTORY AND PRODUCTIVITY OF A POPULATION OF WESTERN MOURNING DOVES IN CALIFORNIA. California Fish and Game, 38(4):505-521.

The western mourning dove is California's most widely distributed game bird. Breeding has been observed from sea level to 10,300 feet, although most nesting occurs in the bottomlands, orchards, and sparse chaparral areas of the Lower and Upper Sonoran life-zones. The state-wide dove kill in 1948 computed from a post-card hunter survey was approximately 2,378,000 birds taken by about 161,000 hunters. This may be high as subsequent annual figures approximate 2 million birds. This places the species as the leading upland game bird in California, in terms of numbers killed. This paper presents results of an intensive life history study from May 1, 1948 through April 30, 1952, at Gray Lodge State Game Refuge in Butte County, for M. A. degree at the University of California. Cooing began February 26, 1949, March 11, 1951, and February 25, 1952. The nesting season began about mid-March and continued until about September 20. The earliest hatching date was March 29, 1949. The latest brood hatched September 9 and 10, 1950, and left the nest September 22. The greatest number of active nests were found in July, followed closely by June and August. The earliest dates incubation started: March 14, 1949; March 26, 1950; March 25, 1951; and March 29, 1952. The dates the last nestlings were completed (when fledglings reached age of 11 or 12 days) were: September 14, 1948 and 1949, and September 18, 1950. During the years 1948 to 1950 on the study areas there were 208 nesting attempts in 111 nests of which 12.6% were constructed but not used, 37.8% were used once, 26.1% were used twice, 11.7% were used three times, and 9.7% were used four times. One nest was used 5 times by 2 pairs, but one nest was used 6 times, apparently by the same pair. One pair in 1949 successfully raised 12 young in 6 broods. In 1949, an average of 6.0 young were raised per pair and in 1950, 6.6 young were produced. An analysis of the total nesting attempts shows an average of 5.1 nestings were started by each pair. Nesting success was 64.5% of 220 nesting attempts. The average nesting population of the two small study areas was 28.5 pairs and they produced about 171 fledglings yearly or about one per 15 acres. About 72 percent of the dove population departs in the second week of September. October is characterized by the absence of doves. Winter groups begin to develop in the second week of November.

37. Cowan, John. 1959. "PRE-FAB" WIRE MESH CONES GIVE DOVES BETTER NESTS THAN THEY CAN BUILD THEMSELVES. Outdoor California, 20(1):10-11.

A description of the wire-mesh nesting cone and its use in providing doves with substantial substrates on which to nest. During a four-year study, 27 of 37 pairs observed used the wire cones.

38. Evenden, Fred G. 1959. AUDUBON GROUP BEGINS ANNUAL DOVE CENSUS. Outdoor California, 20(1):16.

The author, President of the Sacramento Audubon Society, discusses the first dove count conducted by members of the society in August, 1958, along 486 miles of highways and county roads. These counts were made so that the Sacramento Audubon Society could satisfy itself as to whether the bird is maintaining itself. One hundred and sixty doves per 100 miles were seen.

39. Fisher, A. K. 1893. BIRDS OF THE DEATH VALLEY EXPEDITION. North American Fauna, 7:33.

Lone Pine, California, during first part of June one nest found which contained three young.

40. MacGregor, Wallace. 1956. THE DOVE IS HOLDING ITS OWN. Outdoor California, 17(6):8-9.

"The Mourning Dove in California provides the highest sustained take of any single species of game bird in the State, and ranks as the number three bird nationally." The 1955 hunter kill was 2,571,500 doves in California. Yet only three or four percent of banded doves are taken by hunters. Dove studies indicate the population is holding up well under present hunting regulations. Doves are being studied intensively in the State and many are being banded. Some are being color-marked. Nesting studies are being conducted on seven areas.

41. MacGregor, Wallace. 1957. SPORTSMEN FACE MOVE TO TAKE DOVE OFF GAME BIRD LIST. Outdoor California, 18(2):3, 11.

Scientific studies reveal the campaign by a group calling itself the "Committee for Dove Protection" has no basis in fact or in need. "All evidence points to the fact that doves are holding their own in California and throughout the United States."

42. MacGregor, Wallace G. 1958. A TECHNIQUE FOR OBTAINING FOOD HABITS MATERIAL FROM NESTLING DOVES. California Fish and Game, 44(1):77-78.

Useful on nestlings 6 days old or older. Operator takes water into mouth and blows a little of it through plastic straw into crop of dove. He then manipulates a portion of crop contents out onto small square of cloth and ties cloth into form of small bag for storage. Precautions: Air should not be blown into crop and no effort should be made to flush out entire contents of crop.

[From Wildlife Review 91:96]

43. MacGregor, Wallace G. 1958. NON-UNISEXUAL BROODS IN THE MOURNING DOVE. Journal of Wildlife Management, 22(1):103.

Squabs from 11 broods were checked for sex by internal examination. Contrary to certain published reports, the broods were not regularly unisexual. Six broods contained 1 ♂ and 1 ♀, three contained 2 ♂♂ each, and two contained 2 ♀♀ each. This approximates the 1:2:1 ratio found in pigeons.

[From Wildlife Review 91:96]

44. McLean, Donald D. 1959. MOULTING WING FEATHERS ARE TIPOFF TO BIRD'S AGE, YEAR'S HATCH SUCCESS. Outdoor California, 20(1):8-9.

A description with a line drawing of the use of primaries and primary coverts in aging juvenile and adult doves, plus a brief analysis of age data obtained from collections of wings made in 1957 and 1958 in California.

45. McLean, Donald D. 1959. O'ER DESERTS AND MOUNTAINS BAND RETURNS TRACE DOVES. Outdoor California, 20(1):3, 7.

Arizona, Idaho, Oregon, Washington, Utah, and California have banded doves in relatively large numbers. In the case of Washington, some of the doves nesting east of the Cascades come directly south through east-central Oregon and into the central valley of California. Most, however, go south through the Great Basin east of the Sierras through Nevada and eastern California, Arizona, and western Mexico to the great dove wintering ground of Jalisco, Michoacan and adjacent Mexican states. Doves from Idaho and Oregon follow the same general pattern, with part of the Idaho birds coming into central and Southern California. Some doves are year-long residents. Doves banded in California have been returned from Arizona and from the Mexican states, and one bird banded

at Bakersfield was returned from Honduras. Three major wintering areas of California doves have been found from returns of banded doves: Imperial Valley, south-central Arizona, and the Jalisco-Michoacan-Nayarit region of central western Mexico. There is a considerable east-west migration from summer range to winter range and vice versa. Returns from Utah and California verify this pattern.

46. Outdoor California. 1959. Volume 20, Number 1.

The entire issue of this popular magazine is devoted to mourning doves. Articles in this issue have been abstracted and included elsewhere in this set of abstracts.

47. Woodward, C. H. 1929. LONG BREEDING PERIOD IN CAPTIVE MOURNING DOVE. Condor, 31:125.

At San Diego, California, 2 doves captured as nestlings in 1927 were kept in captivity. Eggs laid January 25 and January 27. Continued to lay through summer in a series of successful and unsuccessful nestings to raise a total of 8 broods. Laid 13 sets of eggs, last egg on August 30. Last young left nest on September 28.

Colorado

48. Bailey, A. M. 1944. HISTORY OF A MOURNING DOVE NEST. Wilson Bulletin, 56:171-172.

A western mourning dove built a nest behind a bronze grill over the entrance of a building in Denver, Colorado, in 1941 and raised 4 broods; 1942 raised 4 broods; 1943 raised 3 broods, and in 1944 only 1 brood (crippled adult). Thus, 12 sets of eggs were raised in four years. Not known whether same pair used nesting place each time.

49. Pearse, A. S. 1897. (General note) Wilson Bulletin, 4:63.

On June 8, 1896, found nest of 3 eggs; 2 heavily incubated and 1 perfectly fresh (near Denver, Colorado).

50. Stabler, R. M. 1950. TRICHOMONAS GALLINAE IN COLUMBID BIRDS IN COLORADO. Journal of the Colorado-Wyoming Academy of Science, 4:83.

Total of 202 Columbid birds of three species were examined from Colorado; 77.5% of pigeons were infected; 17.3% of mourning doves; and 19.1% of band-tails.

51. Stabler, Robert M. 1951. A SURVEY OF COLORADO BAND-TAILED PIGEONS, MOURNING DOVES, AND WILD COMMON PIGEONS FOR TRICHOMONAS GALLINAE. Journal of Parasitology, 37(5):471-472.

The pigeon is probably the source of the outbreaks of trichomoniasis which occur sporadically in various types of doves, and in chickens and turkeys. Examinations were made of 109 band-tailed pigeons (19.3% infected); 100 western mourning doves (23% infected); and 100 common pigeons (69% infected) in Colorado from 1948 to 1950. Thus, the infected rate of 309 wild Colorado columbids was 36.6%.

52. Stabler, R. M., and C. P. Matteson. 1950. INCIDENCE OF TRICHOMONAS GALLINAE IN COLORADO MOURNING DOVES AND BAND-TAILED PIGEONS. Journal of Parasitology, 36:25-26.

Twenty-one of 109 band-tails from wild showed 19.3% infection. Of 100 wild-trapped doves, 23% were infected. Presents data showing changes in incidence of infection in the same band-tails trapped in subsequent years.

Florida

53. Aldrich, John W. 1952. THE SOURCE OF MIGRANT MOURNING DOVES IN SOUTHERN FLORIDA. Journal of Wildlife Management, 16(4):447-456.

A report on results of personal examination of 299 doves from hunters' bags in the southern three counties of Florida from October 1 to 15, 1950, to check on previous beliefs of others that doves may migrate from Cuba to account at least partially for large concentrations in southern Florida during month of October. Of the 299 birds examined, 23.4% were classified as adults, 52.8% immatures, and 23.7% juveniles; thus, 76.5% were young of the year (as contrasted to much higher proportion of juveniles in years of greater concentrations). By comparison with museum skins in the field, 4 (1.3%) were identified as the West Indian race; 4 (1.3%) as the western race; and 291 (97.3%) as the eastern race. No specimens were preserved for future comparison. On the basis of his observations, the author concluded that the doves shot during the time of his visit did not come primarily from the West Indies, but rather to a very large extent from breeding grounds in the eastern United States. Recoveries of banded birds are analyzed and mapped to show birds from a wide area of eastern United States move to southern Florida. Populations of doves

in October vary in different years, possibly influenced by cold fronts during that period. "During periods when no large migrations arrive from the north the doves shot in southern Florida presumably consist to a greater extent of the relatively sedentary local population. At such times it might be expected that a higher percentage of adult birds would be present."

54. Beckwith, Stephen L. 1959. MOURNING DOVE FOODS IN FLORIDA DURING OCTOBER AND DECEMBER. Journal of Wildlife Management, 23(3):351-354.

A comparison is made of food habits of Zenaidura macroura from southeastern Florida (e.g. Dade County) during October with those of birds from north-central Florida (e.g. Alachua County) during October and December. Vegetable matter comprised an excess of 99.7% of the total food. Dade County birds subsisted principally upon seeds of Argemone spp. and Ambrosia elatior, but Croton sp. and Paspalum sp. were also consumed. In contrast, Alachua County birds fed largely on Arachis hypogaea and Zea mays during both months. Setaria geniculata, Croton sp., and Phytolacca americana were important additional foods in October and Ambrosia elatior was a supplemental food in December. Differences in food habits were related to differences in principal agricultural crops grown and their associated weeds.

[From Wildlife Review 97:60]

55. Florida Game and Fresh Water Fish Commission. 1954. WHISTLING WINGS. Florida Wildlife, 8(5):14-16.

A popular article calling attention to the dove as a game bird with some generalized life history, food, habits, and mortality information. Appeals for band recoveries.

56. Florida Game and Fresh Water Fish Commission. 1956. MOURNERS IN SILVER. Florida Wildlife, 10(5):9-11, 37.

A general account of dove banding at Alligator Point, Florida, each October from 1950 to 1955 and maps showing their recovery points. Birds pass through this area from Midwest breeding areas to southern Florida, and many are recovered in northwestern and western counties of the State. Appeals for more band recoveries.

57. Floyd, Jim. 1960. FACTS ABOUT DOVES IN FLORIDA. Florida Wildlife, 14(4):11-13, 28.

This popular article contains a series of questions and answers about doves and their management, and is based on information obtained from investigations conducted by

Frank A. Winston of the Game Management Division of the Florida Game and Fresh Water Fish Commission. Information is presented on the species of doves occurring in Florida, and on nesting habits, food, migration, mortality, hunting, and studies of the mourning dove in Florida and the Southeast.

58. Manning, Don. 1956. THE TEN DOLLAR DOVES. Florida Wildlife, 10(7):20, 21, 41.

Popular account of dove hunter success using wooden silhouettes of doves placed on ground and in small trees to attract doves. Two hunters secured bag limit, one losing \$10 bet on success of decoys.

59. Overton, W. Scott, Jr. 1952. SOME DEVELOPMENTS IN THE FIELD BAG CHECK SYSTEM OF COLLECTING HUNTING STATISTICS. Presented at the Southeastern Association of Game and Fish Commissioners, Savannah, October 20-22, 1952. Mimeo. 12 pages.

The bag check system of collecting hunting statistics was put into full scale operation in Florida during 1951-52 hunting season, and a total of 8,940 hunters were contacted. The percentage of total contacts made for any one species is theoretically equivalent to the percentage of the total man days of hunting that was expended for that species. Non-random contactability may have to be corrected. Length of time hunted data average one-half a hunt day. Each hunting party contacted was asked: Number of hunters in the party with resident license, non-resident license, or exempt from license; man hours hunted by the party; game hunted; whether finished hunting for the day; total game killed for the day; and total game crippled for the day. Information from those hunting only doves: 464 contacts for complete day, 770 for incomplete day; average 3.13 hours per complete day, 2.15 hours per incomplete day, making 2.519 average hours per contact; 13.04% of all hunting season contacts were hunting doves; 3.873 average kill per day of doves.

60. Overton, W. Scott, Jr. 1953. POST SEASON MAIL SURVEY TECHNIQUES AND PROCEDURES. Presented at the Southeastern Association of Game and Fish Commissioners, Chattanooga, Tennessee, October, 1953. 18 pages processed.

Outlines procedure found best adapted for use in Florida surveys, based on results of past three seasons. Sends mail questionnaire to sample of license holders inquiring results of hunting seven game species (includes doves).

61. Schultz, Vincent, and Frank A. Winston. 1960. A NOTE ON JUVENILE MOURNING DOVE POPULATIONS AT WEST PALM BEACH, FLORIDA. Journal of Wildlife Management, 24(1):105-106.

Paper is concerned with the trend in the percent of newly banded birds that were juveniles during March - February, as well as a comparison of individual period trends through the 8 years of banding. The primary purpose of this paper is to determine whether or not the eight yearly trends of percent juveniles in the unbanded adult-juvenile sample could adequately be described by one curvilinear regression line. It was concluded that they could not.

[From Wildlife Review 98:58]

62. Shaw, Morris H. 1956. WE'RE UNDER-HARVESTING OUR DOVE CROP. Florida Wildlife, 9(11):18-21, 34.

Popular story of mourning dove populations, harvest, and life history, based on the Southeastern Dove Study and especially investigations in Florida by Frank Winston. Recent changes in land use have provided a rapid expansion of the dove's food supply and a tremendous extension of highly favorable habitat. "The gun could not possibly account for more than four per cent of the total mortality." Only 20 to 30 percent of doves hatched survive their first year. Statewide band return rate was 3 percent. Crippling loss may be as much as 20 percent of the total kill. "Within 90 days of the period of peak population, natural mortality factors will have accounted for a large proportion of the birds whether hunting has been carried on during that period or not." Urges relaxation in hunting seasons, since dove now is being under-harvested.

63. Winston, F. A. 1950. MYSTERIOUS MOURNING DOVE. Florida Wildlife, July, 1950, 6-7, 18.

Popular account of movements and populations of doves. About 1,500 doves were banded in past nine months at 20 to 30 banding stations. Shows map of routes taken by 13 doves banded in Florida and recovered in other States, and map showing routes of 10 doves banded in other States and taken in Florida.

64. Winston, Frank. 1952. FLYING ORANGES. Florida Wildlife, 6(4):7, 8, 9, 50.

In 1950, experimental dyeing of doves began in Florida, and an orange-yellow color proved most suitable, so the term "flying Oranges" was given to dyed doves, and all sportsmen asked to watch for and report the colored birds. In early October, 1950, 157 doves were thus colored in Franklin County and some were killed near Miami, 3, 5, and 11 days after release about 450 miles away. Other

southeastern States dyed doves blue, red, green, or purple. Sight observation of colored doves seems to be one way of obtaining information beyond the limits of band recoveries. Hunters are urged to report bands as well as colored doves.

65. Winston, Frank A. 1953. THE EFFECT OF HUNTING ON THE DOVE POPULATION. Presented at the Southeastern Association of Game and Fish Commissioners, Chattanooga, Tennessee, October 12-14, 1953. 11 pages processed.

"To the question, 'What effect has hunting on the Mourning Dove?', probably the most accurate, brief answer is, 'With our present regulations, none'." This conclusion was reached after analysis of four years data on doves in Florida, and analysis of 569 recoveries from 22,167 doves banded in Florida during the past fifteen years. Fifty percent of recoveries are received within 90 days after banding. First year mortality is 70-80 percent. Crippling loss is less than 25 percent of the bag; illegal kill is negligible in Florida. Hunter kill is about 4 percent as shown by recoveries. Recommends gradual relaxation of regulations to allow a greater kill by hunters.

66. Winston, Frank A. 1954. STATUS, MOVEMENT AND MANAGEMENT OF THE MOURNING DOVE IN FLORIDA. Technical Bulletin No. 2, Florida Game and Fresh Water Fish Commission. 86 pp.

Details results of Florida's dove study from 1949 to 1953, conducted as part of the Southeastern Cooperative Dove Project. Several types of roadside counts were investigated. Nearly 9,000 doves were banded and many were retrapped and recovered. Doves moving down the Mississippi Valley may furnish more than half of the birds available to the Florida hunter during winter months. Doves from Atlantic Coastal States provide about 30 percent of hunting in north Florida. Probably many doves never leave south Florida. With our present hunting regulations, hunters have no effect on the dove. Recommends continued relaxation in regulations to provide for greater kill. Also recommends that random road counts, call counts, trapping and banding and hunter bag checks should all be continued to provide more information on the dove.

67. Winston, Frank. 1959. WHAT ABOUT THE DOVE? Florida Wildlife, 13(5):24-25, 40-41.

The natural history, distribution, abundance, and qualities of the mourning dove as a game bird are presented.

Most of the article consists of a discussion on the setting of hunting seasons for the mourning dove in Florida. Zoned seasons were permitted in the State until 1952, when the Fish and Wildlife Service ruled that Florida was enjoying a double season. A split season was then adopted. Winston recommends as an alternative to the split season a continuous statewide season starting October 15, running into the regular game season, and taking advantage of all days allowed by Fish and Wildlife Service regulations.

Georgia

68. Georgia Game and Fish Commission. 1960. FACTS ABOUT DOVES. Georgia Fish and Game, 9(2):10-12.

A popular article on the natural history, distribution, abundance, food, migration, and hunting of the mourning dove. Agencies involved in setting hunting regulations and Georgia's recommendations for a zoned season are discussed.

69. Hopkins, Milton H., and Eugene P. Odum. 1953. SOME ASPECTS OF THE POPULATION ECOLOGY OF BREEDING MOURNING DOVES IN GEORGIA. Journal of Wildlife Management, 17(2): 132-143.

The spot-mapping method was tested and the population-density of breeding doves determined on ten 100-acre study areas during 1950 and 1951. Breeding density at the peak (April-May for coastal plain areas and May-June for the piedmont) varied from one to nine pairs per 100 acres with an average of 3.3 pairs. Breeding density seemed correlated with the available peninsula or "double" forest edge on farms and the extent of habitat junctions on forested areas. In Georgia as a whole, breeding doves are relatively scattered, no densely populated nesting areas having been found. Production of young was very low, estimated at 2.1 birds per pair on the 700 acres most intensively searched. Low production seemed to be due to an average small number of nesting attempts. Nesting activity slumped sharply in mid-summer, especially in the coastal plain. The spot-mapping method was judged to be an effective and practicable census method in regions where the breeding population is scattered. Three visits spaced 2 to 3 weeks apart at the peak of the season will give a reliable estimate of breeding density. In Georgia, a nest count alone is not a reliable means of determining density unless made with a large expenditure of time. Likewise, a simple count of

birds observed is not a good measure of breeding density because of the large home range of the dove. Determining actual production is a more difficult problem than determining density. A production rate cannot be assumed until more is known about regional, local (food), and density-dependent effects on mortality.

70. Jenkins, James H. 1955. A CONTRIBUTION TO THE PHYSIOLOGICAL ECOLOGY OF THE MOURNING DOVE, ZENAIDURA MACROURA CAROLINENSIS (LINNAEUS): A STUDY OF AGE AND SEASONAL CHANGES IN FEATHERS, GONADS, WEIGHT, AND LIPID DEPOSITION. Ph.D. thesis, University of Georgia. 100 pp. typed.

Detailed data from 504 doves collected 1950-54; weights, measurements, gonads, and abdominal fat. Molt of 28 young and 30 adults studied. Both have only one complete molt per year. Adults begin to molt in mid-May and completed molt by early October. Bursa reliably distinguished juveniles from adults. Juvenal birds averaged 80.4 percent of hunter kill in September. Ninety percent of juvenal birds taken during September were hatched in April, May, June and July. Overall ratio of 112 males to 100 females was obtained. Crop gland begins to enlarge as incubation progresses and is functional for about one week after the young hatch. Lipid and gonads indicate most doves leave in March and April. In September, 43 percent of adults are immigrants, and 38 percent of juveniles are migrants from north. The leisurely migrant dove does not accumulate fat as do birds which undertake long non-stop flights.

71. Lincoln, Frederick C. 1940. WHEN THE DOVE TRAVELS. Outdoor Georgia, September, 1940:9, 22.

General account. Poor management to shoot them during September. Eighty-three banded doves taken in Georgia originally banded in 11 States and one Province. One traveled from Racine, Wisconsin to LaGrange, Georgia in 42 days. Northern birds showed up mostly beginning in November. Birds shot in September are about 99% local birds.

72. Lowe, Jack I. 1956. BREEDING DENSITY AND PRODUCTIVITY OF MOURNING DOVES ON A COUNTY-WIDE BASIS IN GEORGIA. Journal of Wildlife Management, 20(4):428-433.

McClure reported 5-6 young raised per pair in Iowa, where doves nest in large colonies. Austin estimated (by band recoveries) that Cape Cod doves produce 4.6 young per pair. Boldt and Hendrickson found 20 pairs

(N. D.) produced just over three young per pair. Also in North Dakota, Randall found production rate of 4.5 young per pair. Cowan reported as high as 6.3 young per pair in a small dense colony. Swank found 6.7 young per pair, but based on hunter kill he estimated 3.34 (1949) and 3.04 (1950) young per pair to be average for central Texas. Hopkins and Odum reported in 1950 and 1951 only 2.1 young per pair (doves made fewer nesting attempts; also lower population). Lowe worked on eight study areas of 150 acres, around Oconee County route. Breeding density varied from 1.5 to 7 pairs per 150 acres and averaged 3.8 or 2.5 pairs per 100 acres. Estimated production was 2.0 per pair or 5 young per 100 acres. Average of 1.74 pairs found per calling bird. Oconee County has about 120,000 acres, of which 107,000 is in typical dove route farmland. If 2.33 pairs were produced per 150 acres in 1954, then 107,000 acres might have 3,323 adults and in late summer about same number juvenile birds.

73. McGowan, Terry A. 1952. AN INTENSIVE STUDY OF THE CALL COUNT AS A CENSUS METHOD FOR MOURNING DOVES ON THE GEORGIA PIEDMONT. Special Scientific Report, Wildlife No. 17, U. S. Department of the Interior, Fish and Wildlife Service: 4-7.

Results of first year's results of a two-year study. Between March 8 and September 24, 1951, 37 morning and 37 afternoon counts were made by one observer of doves heard and seen on a 20-mile route in Oconee County, Georgia. In addition, "five-crew" counts were made once a month March through August on the same route. Results of the single-observer counts are graphed. Afternoon counts showed one-third, or less, as many doves as morning counts. The number of birds seen was much more variable than the number heard. Peak season was between May 10 and June 15. The five-crew counts showed calling activity was definitely less the second hour than the first hour in morning counts, but the number varied very little during the course of the afternoon counts.

74. McGowan, Terry A. 1953. THE CALL-COUNT AS A CENSUS METHOD FOR BREEDING MOURNING DOVES IN GEORGIA. Journal of Wildlife Management, 17(4):437-445.

A report on a two-year intensive study of the call-count as a method of censusing in Oconee County, Georgia, during 1951-52. In 1951, between March and September, 37 morning and 37 afternoon call-counts were made; in 1952 between March and July, 15 morning and 15 afternoon counts were

made over one census route. Monthly 5-crew counts were also made. The peak season plateau occurred between May 15 and June 15 in 1951 and May 22 and June 20 in 1952. "It is concluded that call counts, if taken at the proper time and in good weather, will provide a good index to relative abundance of breeding doves from year to year."

75. Nelson, Daniel J. 1957. SOME ASPECTS OF DOVE HUNTING IN GEORGIA. Journal of Wildlife Management, 21(1):58-61.

Summarizes results of dove hunter bag checks for four hunting seasons: September 16, 1949 to January 8, 1953. Hunters were interviewed in the field. Higher kill per gun hour was found during September seasons (1.90) than in December or January (1.61) and is considered to be an index to abundance. Crippling loss was 33 percent of the doves bagged. Four shells fired per dove bagged in 1949-50 season. Seventy percent of doves killed in September were juvenile and only 11 percent of the December-January birds were juvenile (by feather). Analysis of banded doves reported in north and south Georgia for each hunting month shows southern Georgia is the main wintering ground for doves within the State. "Juvenile doves were apparently not easier to bag than adult." "Dispersal of doves and natural mortality are thought to be responsible for reducing the kill per gun hour during the December and January seasons."

76. Peters, Harold S. 1956. THE MOURNING DOVE IN GEORGIA. Presented to the Georgia Conservation League, Cordele, Georgia, November, 1956. 2 pp.

About two million doves killed annually in Georgia. It is a highly migratory species, with 232 banded doves being recovered from 22 States. General mention of doves' status and of dove investigations.

77. Peterson, David Wallace. 1957. A STUDY OF THE POPULATION DYNAMICS OF THE EASTERN MOURNING DOVE (ZENAIDURA MACROURA CAROLINENSIS) IN OCONEE COUNTY, GEORGIA. Thesis for M. Sc., University of Georgia, 47 typed pp.

Used a 20-mile call count route and 50-mile roadside count route to determine breeding population and production in Oconee County. Results indicated time has a definite bearing on number of birds heard and seen. There is a small correlation between the number of doves seen and the number heard on the call count route. Hunter interviews

provided estimates of doves killed. About 100 hunters took part in three or four hunts, averaging ten birds per hunt, killing a total of three to four thousand doves. The estimated productivity would be only about 4,524. The total dove population during September was calculated to be 12,712. Difficult to correlate estimated production from study area results with hunter kill and available doves.

78. Thompson, P. E. 1943. RELATIVE INCIDENCE OF BLOOD PARASITES IN SOME BIRDS FROM GEORGIA. Journal of Parasitology, 29:153-155.

Two hundred and seventy-five birds in fourteen families and of 23 species were trapped in Bulloch County during previous four years; 20 percent were infected with one or more genera of parasites. Of six doves, three were infected with Haemoprotaus and/or Leucocytozoon (one had both genera).

Idaho

79. Fichter, Edson. 1956. MOURNING DOVE PRODUCTION IN SOUTHEASTERN IDAHO, 1953. 11 pp. typed report, November, 1956.

Data on breeding populations and production in Power County, Idaho, in summer of 1953. A study conducted in four orchards, with 525 trees, of 13.4 acres. Nests averaged twelve feet high; 92 percent of nests were from seven to sixteen feet high. None on ground. Of the 208 nests found, thirty (14.4 percent) were in old nests of other bird species. Earliest incubation was in first week of May, peak of nesting was in late July. Only 10 percent of breeding population was nesting at start of hunting season. Success was 54 percent theoretically. Approximately 100 pairs nested on the 13.4 acres.

80. Fichter, Edson. 1959. MOURNING DOVE PRODUCTION IN FOUR IDAHO ORCHARDS AND SOME POSSIBLE IMPLICATIONS. Journal of Wildlife Management, 23(4):438-447.

The mourning dove nests in a variety of habitats in southeast Idaho where the breeding season allows 3 nesting cycles. In 4 orchards totaling 13.4 acres, approximately 100 pairs attempted 266 nestings in 208 nests in 1953; 67% of the nestings were successful. Of 510 eggs laid, 385 hatched; 324 fledglings comprised 64% of attempted production. Causes of mortality were obscure. Nesting success shows some correlation with numbers fledged per nesting attempt and per 100 eggs laid. Improvement of breeding habitat may permit an increase in nesting density, but the immediate environs of such habitat may influence its use by mourning doves. Since losses of eggs

exceed those of nestlings by about 2:1, any attempt to improve breeding habitat might benefit by an evaluation of security factors as they respectively relate to the incubation and brooding phases of the nesting process. [From Wildlife Review 98:57]

Illinois

81. Ayars, James S. 1952. MOURNING DOVES. Illinois Wildlife, 7(3):11.

Popular article on some dove studies by Illinois Natural History Survey. In 1950, about 60 percent nest success was found, but only 45 in 1951. Of the nests producing young, an average of 1.8 birds per nest reached flying state in 1950 and about 1.6 in 1951. These figures explain in part the smaller numbers of doves reported by hunters in 1951.

82. Hanson, H. C. 1954. MORE MOURNING DOVES FOR FIFTY-FOUR. Illinois Wildlife, 9(4):1.

Suggests planting of spruce and pine to offset loss of fence row habitat for dove nesting. Doves fluctuate in population. Results from fifteen study areas in Illinois indicate that for every 100 pairs of nesting doves in 1950, there were 60 in 1951; 42 in 1952; 82 in 1953; and 134 in 1954. In recognition of such increase the dove season was lengthened by five days for 1954. "There are no data, particularly for the Midwest, to indicate that hunter kills have determined dove populations from year to year."

83. Hanson, Harold C. 1954. APPARATUS FOR THE STUDY OF INCUBATED BIRD EGGS. Journal of Wildlife Management, 18(2):191-198.

A portable egg candler was devised for determining the state of incubation of birds' eggs. It was found to be helpful in mourning dove nestling banding by computing the best date to return for banding of nestlings.

84. Hanson, H. C., and C. W. Kossack. 1950. FLYING ACROBAT GAINS, DOVES ON UPSWING BUT NEED MANAGING. Outdoors in Illinois, 16:30-31.

General discussion of dove hunting in Illinois. Gives map to show kill per 100 licensed hunters. "Hunter reports indicate that in 1946 and 1947 the annual bag of doves was about 200,000; in 1949 about 300,000. . . you could reduce

these figures by at least one-half without any great sacrifice of accuracy." Since dove population has held its own during past several years is evidence that recent kills in Illinois have not been excessive.

85. Hanson, Harold C., and Charles W. Kossack. 1951. DOVE POPULATION DOWN. Illinois Wildlife, 7(1):2.

In Illinois a decrease of 37 percent was noted in the birds returning to the nesting study areas in 1951. On the basis of data collected up to July 1, it was predicted the population in the State in late August and early September would be down 40 to 60 percent from that of a year ago. Events during the hunting season amply confirmed the biologists' earlier prediction. Probably severe winter weather and trichomoniasis caused this sharp decrease. Combined hunting pressure in Illinois and later in the southern States may be extremely important in governing total dove numbers. In years when severe losses occur the dove should unquestionably be given some respite from hunting. Everyone agrees the decision should be in favor of the dove and not the hunter, "for controlling the hunting pressure is the only short term means we have of managing the dove population."

86. Hanson, Harold C., and Charles W. Kossack. 1957. METHODS AND CRITERIA FOR AGING INCUBATED EGGS AND NESTLINGS OF THE MOURNING DOVE. Wilson Bulletin, 69(1):91-101.

Discusses method of using portable egg candlers to determine stage of incubation of doves' eggs for help in deciding when to return to nest for banding of nestlings. Shows incubation stages of eggs by series of 14 photographs, and has descriptive notes of each day. Also discusses nestling growth by days and shows stages by 14 photograph series. States that tape must be used to retain band on leg of nestlings less than nine days old. Many good points in this paper.

87. Hanson, Harold C., and Charles W. Kossack. 1957. WEIGHT AND BODY-FAT RELATIONSHIPS OF MOURNING DOVES IN ILLINOIS. Journal of Wildlife Management, 21(2):169-181.

Over 600 doves were examined, taken chiefly during the Illinois September hunting seasons, but some in July and August. Stage of wing molt, sex and breeding condition, and body fat were determined. "No consistent relationship was apparent between the amount of body fat, age and migratory habits." A change in rate of gain in body fat appears to be associated with molting; this change was most

pronounced between replacement of the second and fourth primaries of juveniles. Roadside counts showed a gradual exodus of young from their home sites after age of five or six weeks. Late-summer movements might tend to be southwestward, following river valleys. Correlations were found in rates of gain in body fat in juveniles with regional farming practices, soil fertility, and food habits. Adult doves collected in September usually carried only small or moderate amounts of body fat.

88. Hanson, Harold C., Norman D. Levine, Charles W. . Kossack, Sidney Kantor, and Louis J. Stannard. 1957. PARASITES OF THE MOURNING DOVE (ZENAIDURA MACROURA CAROLINENSIS) IN ILLINOIS. Journal of Parasitology, 43(2):186-193.

Results of a parasite survey of doves in Illinois from 1948 through 1954. Summary is quoted: "In a 7-year survey of parasites of the Mourning Dove (Zenaidura macroura carolinensis) in Illinois, Haemoproteus sacharovi was found in 58 per cent of 392 immature birds and in 43 per cent of 72 adults; H. maccallumi in 30 per cent of the immatures and in 43 per cent of the adults; Leucocytozoon marchouxi in 1.2 per cent of the immatures and in 6.5 per cent of the adults; and unsheathed microfilariae 46 to 62 microns long in two birds. No helminths were found in the intestines of more than 50 doves. The Mallophaga, Columbicola macrourae, Physconelloides zenaidurae, and Colpocephalum sp. and the mites Falculifer sp. and Megninia sp. were found commonly on the doves' feathers, and the mite Bdellonyssus sylviarum was found on the feathers of two birds. No hippoboscid flies were found despite a special search for them. Bdellonyssus sylviarum was the only ectoparasite found in 42 nests; it was present in more than half of the nests containing young doves. The incidence of Haemoproteus sacharovi was 31 per cent in very young doves; in older birds it did not vary markedly, fluctuating between 52 per cent and 69 per cent. The incidence of both Haemoproteus species varied markedly in different parts of the State and in different years. In view of the high incidence of Haemoproteus and the absence of hippoboscid flies, it is concluded that the natural vector of the blood protozoon must be some other ectoparasite."

89. Illinois Department of Conservation. 1957. DOVE SEASON JUSTIFICATION. Illinois Wildlife, 12(4):1.

With relaxation of dove regulations comes a satisfied feeling that Illinois was justified in resisting pressure to remove the dove from the game bird list.

90. Kossack, Charles W. 1952. A METHOD FOR AUTOPSYING A MOURNING DOVE KILL. Journal of Wildlife Management, 16(1):108.

This investigator secured doves from hunters at the close of each trip and carefully autopsied them at his home, after which they are washed, frozen and returned to the hunter the next day. Adult-juvenile ratios can be determined by external inspection, while the sex ratio is checked by internal examination as is the condition of the crop gland development.

91. Kossack, Charles W. 1952. AGING MOURNING DOVES. Inland Bird Banding Association, processed 2 pages.

An appeal to banders to age doves by coverts and primary feathers, illustrated by three sketches.

92. Kossack, Charles W. 1952. BANDING NESTLING MOURNING DOVES. Bird-Banding, 23(1):28-29.

Discusses his experiments in banding very young nestling doves by using elastic adhesive tape (Dalzoflex) to hold the band on the leg. He attached the tape to both band and upper leg or to the tarsus. The young used ranged from 3 to 9 days of age. The adhesive worked loose from the leg in about 9 to 12 days without any ill effect. The tape clings to the band for about 25 days. This enabled banding of small nestlings without a repeat visit to band them when the toes and tarsus had grown enough to retain the band normally.

93. Kossack, Charles W. 1955. A MOURNING DOVE BANDING PROJECT. Inland Bird Banding News, 27(1):1-10.

Good management of doves requires much more banding of nestlings and breeding adults. Gives suggestions for locating nests, how to band nestlings, how to trap adults, how to ascertain age, and urges banders to step up dove banding.

94. Kossack, Charles W. 1956. AN EGG-BOUND MOURNING DOVE. Auk, 73(1):129-130.

A dove was found prostrate on the ground under a tree with an egg protruding part way out of the cloaca near Barrington, Illinois. The egg was broken, the dove struggled free and flew about 75 yards, and again fell to the ground. The bird was very weak and had lost use of its legs. Area around the cloaca was swollen and covered with blood and feces. The bird died about three hours after being relieved of the egg. A second egg was found in the oviduct adjacent to the opening of the cloaca. Probably an egg-bound condition in doves is uncommon.

95. Kossack, Charles W., and Harold C. Hanson. 1953. UNISEXUAL BROODS OF THE MOURNING DOVE. Journal of Wildlife Management, 17(4):541.

The young in 21 broods were sexed; in 13 broods both birds were males, in eight broods both were females. This was very different from the expected sex ratio of 1:2:1 as in pigeons.

96. Kossack, Charles W., and Harold C. Hanson. 1954. FOWLPOX IN THE MOURNING DOVE. Journal of the American Veterinary Medical Association, 124(924):199-201.

Apparently first time that fowlpox has been found in the mourning dove. Five cases were observed; four in mourning doves and one in captive albino ring dove. Symptoms were nodules on the head. Treatment and vaccination prevented spread among captive doves.

97. Levine, N. D. 1953. LEUCOCYTOZOON IN THE AVIAN ORDER COLUMBIFORMES, WITH A DESCRIPTION OF L. MARCHOUXI MATHIS AND LEGER, 1910, FROM THE MOURNING DOVE. Presented before the Society of Protozoology. Typed 13 pp.

L. marchouxi was originally described from Streptopelia tranquebarica humilis from Indochina. This paper reports its finding from 10 mourning doves from Illinois in 1951 and 1952 (five were adults, 1 was juvenile 3-4 months old, and four were nestlings). Other workers have found Leucocytozoon from various species of doves and pigeons in several countries. It has now been found in mourning doves four times (District of Columbia, Georgia, Illinois, and California).

98. Levine, N. D., H. C. Hanson, and C. W. Kossack. 1952. BLOOD PROTOZOA OF THE MOURNING DOVE. Proceedings of the Society of Protozoologists, 3:2.

During a four year survey in Illinois, blood parasites were found in 66 percent of 206 doves. Haemoproteus sacharovi was found in 50 percent, H. maccallumi in 25 percent, and Leucocytozoon sp. in 0.5 percent.

99. Levine, N. D., H. C. Hanson, and C. W. Kossack. 1953. LEUCOCYTOZOON MARCHOUXI MATHIS AND LEGER, 1910 IN THE MOURNING DOVE. Proceedings of the Society of Protozoologists, 4:7.

Leucocytozoon marchouxi was found in ten doves (five adults, one juvenile, and four nestlings) in Illinois.

Indiana

100. Allen, Jack. 1960. DOVES OF DISCORD. Outdoor Indiana, 3(12):3-5.

A well-written popular article which presents both sides of the controversy of the status of the mourning dove -- game bird or songbird -- in Indiana.

101. Ginn, W. E. 1950. MIGRATION TENDENCIES OF THE MOURNING DOVE IN INDIANA. Journal of Wildlife Management, 14:378-382.

A total of 5,266 doves were observed in 23,329 miles of random daily roadside counts in northern Indiana in 1942, 1945-47. Migrants arrive in April and the peak population is in August. Southern migration starts in September, and after October only the resident birds remain. Throughout the year counts up to 10:00 a.m. averaged 29.6 doves per 100 miles; from 10:00 a.m. to 3:00 p.m. only 12.8 doves per 100 miles; and after 3:00 p.m. the average was 24.2. Many small groups appeared to migrate without forming large flocks. During a September pheasant roadside count for eight years, 1942-1949, records of doves were kept; lowest was 113 doves per 100 miles in 1945, but normal in 1946 with 195 declining in next two years, but 229 in 1949 - the highest population. During 1946 and 1947 more than 90% of the doves were close to or on power and telephone lines. Three to four times as many doves were seen per 100 miles when these lines were present.

102. Ginn, William E. 1951. STATUS OF THE EASTERN MOURNING DOVE IN INDIANA. Presented at the Thirteenth Midwest Wildlife Conference, Minneapolis, December 12-14, 1951. Mimeo. 2 pages.

Brief report on controlled road counts, starting one-half hour after sunrise and continuing for approximately one hour. The highest relative figure of 345.2 doves per 100 miles reached in 1951 was considerably lower than the 414.4 in 1950. The number per 100 miles in 1951 is lower month for month than for 1950 with the exception of July and August. The bulk of the State's dove population seems to be in the central and southern portions of Indiana. An annual dove count has been made in September since 1942 in connection with pheasant counts. The 1951 count of 178 doves per 100 miles shows the same downward trend. Call counts were made from March to August this year. The peak of calling was about mid-May. In summary, the dove population of 1951 is considerably lower than in 1950.

103. Hosford, Hallock Jay. 1951. A STUDY OF MIGRATION AND NESTING OF THE MOURNING DOVE IN NORTHERN INDIANA. A thesis for B. Sc. at Purdue University, August, 1951.

Results of a nesting study on two areas during 1950 and 1951. In 1950, 6 nests of 13 were successful, producing 11 young (5.5 per acre) on one area; 16 of 55 were successful, producing 23 young (0.6 per acre) on the other area. In 1951, 14 nests of 20 were successful, producing 27 young (13.5 per acre) on the first area; 31 of 64 were successful, producing 57 young (1.5 per acre) on the second area. Nesting reached a peak about the first of May with a smaller peak about June 15. Periodic roadside counts were made over a route of 18 miles from September, 1950, to July, 1951. Doves seen per 100 miles: September, 175; October, 151; November 12.5; December, 5.5; January, 5.5; February, 16.5; March, 32.2; April, 107.4; May, 153.7; June, 217.8; and July, 316.7. "Road counts show population changes, not actual populations." Call counts were not considered satisfactory. A total of 376 doves were banded, 173 being nestlings. He figured a population of 1800 doves per square mile from banding at one station. Nesting success was 60.6% in town and 38.5% in the country.

104. Hosford, Hallock Jay. 1955. NESTING AND MIGRATION OF THE MOURNING DOVE IN NORTHERN INDIANA. Indiana Audubon Quarterly, 33(1):3-10.

During 1950 and 1951 a dove investigation was undertaken at West Lafayette, Indiana, which included detailed nesting, migration, and population studies. In town, average nesting success was 60.8 percent and 38.5 percent in the country. December and January were low population months, and August was highest. There was poorer production in 1950 than in 1951.

Iowa

105. Carter, Dennis Lee. 1957. PRODUCTION OF THE MOURNING DOVE AT LEWIS, IOWA, 1956. M. S. Thesis, 68 pp.

This investigation was made in 1956 on the same study area (Lewis, Iowa) used by H. E. McClure, in 1938-40, and was designed to obtain an estimate of production during a single nesting season (April through September) to determine factors influencing production, and to compare results with McClure's work. The town had been divided into 14 strata, each containing about the same number of trees, and each stratum was further subdivided into 6

blocks, each containing about 40 trees. All 14 strata were visited once during each semi-monthly period and two of the blocks in one strata were visited each day. A total of 3,515 trees of 53 species were present in 1956 as compared to 1,658 trees of 37 species in 1938. American elm, box elder, peach, apple, black walnut, mulberry, and plum made up 75% of all trees; 5 of these seven were also among the 7 most numerous species listed by McClure. Twenty-one of the 53 species were used as nesting sites in 1956, and the seven most numerous trees were also the seven most used for nesting, with the exception of apple which was replaced by silver maple. Doves favored American elms out of proportion to their abundance because elms offered more suitable nesting sites. Conifers were definitely favored as nesting sites. Location of the nests in relation to the ground, to the trunk of the trees, and to the size of the trees (d.b.h.) are given by species of tree. Success of 247 nestings recorded in assigned blocks was 60.3 percent; McClure's average of 3 years nestings was 47.9 percent. The first dove was seen on March 26. A few more arrived in early April, and the number gradually increased until April 27, when there was a marked influx. The first nest was found on April 19. Four peaks of nesting activity occurred. Two of the four peaks were major peaks, occurring about mid-May and late July and early August. In 1956, 6.5% of the nestings were found in September. Ten or 3.1 percent of all 327 nestings contained more than two eggs each. Two nests had 4 eggs and 8 nests had 3 eggs. Twenty-seven or 9.0 percent of 300 nests were used more than once, and these were 51.9 percent successful. Fifteen trees contained two nests each, three contained three nests each, and one contained four nests. Trees containing more than two nests were conifers, as were 7 of the 15 trees containing 2 nests. July was the most important month of production. June, July, and August yielded 75.6 percent of all young produced. Estimated total production in Lewis in 1956 was 617 birds which was only 55.5 percent of the average yearly production of 1,108 recorded by McClure. Of the nestings found in assigned blocks, 39.7 percent were unsuccessful. In most cases cause of nest loss was undetermined, but it is definitely known that 14 nestings were deserted, 13 were destroyed by wind, and 6 were destroyed by predators. A total of 187 nestlings were banded; one return from near Crane, Texas was obtained.

106. Errington, P. L. 1935. WINTER KILLING OF MOURNING DOVES IN CENTRAL IOWA. Wilson Bulletin, 47:159.

About 12 doves at Ames, Iowa in late November, 1934 feeding mainly on hemp seeds. Heavy snow fell from

November 29 to December 3 and persisted for next few weeks. A resident quail covey lost half its number by January 7 and rest starved out during the winter. Five doves found dead December 8-11. One weakly flying dove seen December 11 and feathers found January 7. One dove was seen January 21 where it had access to grain near farmhouse.

107. Grant, Martin L. 1959. WHY HUNT MOURNING DOVES? Outdoor California, 20(1):14-15, 18. (Reprint from Iowa Conservationist)

The author, a Botany professor and non-hunter of any game species, gives his reasons why he would not object to the State of Iowa having an open season on mourning doves. He defends an open season on the thesis that he would not want to impose his wishes on others when, in fact, there are enough doves for both hunters and protectionists.

108. Jumber, J. F., H. O. Hartley, E. L. Kozicky, and A. M. Johnson. 1957. A TECHNIQUE FOR SAMPLING MOURNING DOVE PRODUCTION. Journal of Wildlife Management, 21(2): 226-229.

"A technique for estimating dove production by making counts of doves fledged from nests located in sample blocks of trees is presented for Lewis, Iowa, for 1955." Estimate of 488 doves produced in 1955 was only 44 percent of the 1,108 average produced in years 1938-40 by McClure. "There may be more suitable nesting habitat at the present time throughout southwest Iowa than there was in 1938-40."

109. Jumber, J. F., E. L. Kozicky, and D. L. Carter. 1956. FACTORS INFLUENCING MOURNING DOVE PRODUCTION AT LEWIS, IOWA, 1955. Iowa Bird Life, 26(3):59-61.

During spring and summer of 1955 a study of dove production was made to compare with McClure's work, 1938-40. Total of 203 active nests found, 61 percent being successful and producing 227 young. This was close to McClure's findings. The 203 nests were found in trees with mean diameter of 20.8 inches (McClure, 19 inches); were at mean distance of 189 inches above ground (272.4 inches), and 99 inches from trunk of the tree (148 inches). About 3,400 trees with diameter of two inches or more were found in the town, more than twice the number McClure found.

110. McClure, H. Elliott. 1939. COOING ACTIVITY AND CENSUSING OF THE MOURNING DOVE. Journal of Wildlife Management, 3:323-328.

From March 22 to September 17, 1938, at Lewis, Iowa, 2,254 observations of cooing activity were made. A five-minute count at the end of each hour of the day

constituted an observation. 4,101 birds cooed 45,994 times; an average of 1.8 birds at each count, 11.2 coos per bird, and 20.4 coos to an observation. Both sexes coo but note of female is weak, and most calling heard at a distance is that of male. In courting, the male coos several times, leaps from his perch, flies in a steep whistling climb for 50-100 yards, often reaching height of 150 feet or more, then banks to right or left, and with rigid wings and spread tail sails in a great arc back to same perch or to the female. He may coo on nest. Cooing is greatest early in morning and just before sundown. Temperature does not affect cooing much. Cooing decreases with increased cloudiness, most commonly heard in clear weather. Winds decrease cooing with intensity. Cooing activity was nearly constant from April to August. Gives a formula for censusing doves by counting coos in relation to time, temperature, weather, and wind. He believes such a method of census will prove helpful in management and determining populations from year to year.

111. McClure, H. Elliott. 1942. MOURNING DOVE PRODUCTION IN SOUTHWESTERN IOWA. Auk, 59:64-75.

Observations in vicinity of Lewis, Iowa, 1938-39, to determine production of young to flying age. 1,108 nests built in 1938 and 1,443 in 1939, in which 1,461 nestings were attempted in 1938 and 1,975 in 1939. Approximately 250 breeding pairs were active in the area in 1938 and 330 in 1939. Each breeding pair averaged 5.85 nesting attempts in 1938 and 5.98 in 1939. Nesting was April 16 to October 15 in 1938 and March 23 to October 11, 1939. Peaks of nesting activity in 1938 show 4 broods of young (1 in June, 1 in July, a small one in August, and 1 in September). Young raised in successful nestings; 1.85 in 1938; 1.8 in 1939. Since nests are built constantly during the season, broods overlap and are not evident. From peaks there appear to be 7 broods, but since pairs average only 6 nesting attempts and lose half of these, this is not possible. Some pairs succeed in having 4 sets of young from single nests. Ten nests raised 4 broods (6 in 1938 and 4 in 1939). Nesting success was 55.3% in 1938 and 44.4% in 1939. Production in Iowa for the two years is estimated: 201,303 nests; 264,520 nestings; and 235,744 young. Suggests a nest census to determine production of young by a factor applied to each month, from nests in sample plots.

112. McClure, H. Elliott. 1943. ECOLOGY AND MANAGEMENT OF THE MOURNING DOVE, ZENAIIDURA MACROURA (LINN.) IN CASS COUNTY, IOWA. Research Bulletin 310, Iowa Agricultural Experiment Station, 355-415.

Gives report on practically same data as in his paper in the Auk, 59:64-75; 1942. Also see Mrs. Nice's review of both these papers in Wilson Bulletin, 55:198-200. Study of nesting for 30 months in 1938-40 in vicinity of Lewis, Iowa. Trees were used in comparison with their abundance: White and red elm, boxelder, apple, silver maple, walnut, sweet cherry, plum, white ash, etc. Nests averaged 20.2 feet high. Part of success was due to abundance of robins for they are aggressive and serve to protect dove nests near their own. Average daily weights for young are given. At 1 day of age - 5 gm.; 10 days - 60 gm.; 20 days - 87.1 gm.; and 30 days - 103.3 gm.; etc. Gives analysis of stomach contents from other authors. Banded 1,643 nestling doves; 5% recovered locally. Migration: began with movement of young during July and continued until last adults and young left in October. Birds returned to breeding areas in March, but mostly in April and early May. Some doves wintered locally, about 2%. Suggests census method by counting active nests on sample plots. For management suggests planting of trees in towns. Bibliography of 59 titles.

113. McClure, H. Elliott. 1944. THE EFFECT OF TREE REMOVAL ON A MOURNING DOVE POPULATION. Auk, 61:560-563.

Found in Iowa that doves prefer to nest in certain preferred trees which he calls "patron trees." When one important "patron" was cut down the doves moved to other blocks in the small town and more nested in eaves, troughs, or nearby houses where tree was removed.

114. Peters, Harold S. 1956. THE MOURNING DOVE IN IOWA. Presented to the Iowa Ornithologists' Union, Decorah, Iowa, May 19, 1956. 2 pp.

General account of Iowa dove investigations by McClure, 1938-40, and by others. Only 1,832 doves have been banded in the State through 1955, of which 40 have been recovered (2.2 percent). These indicate a southward movement; none crossed the Mississippi River. Mention of nationwide dove banding and other investigations. Urges assistance in nestling banding program.

115. Rosene, Walter, Jr. 1950. NESTING DOVES IN IOWA. Iowa Bird Life, 20:34-37.

Reports on nesting studies from January to June, 1936, when 40 nests were found. A single Austrian pine held 10 nests, 8 active at once; a Scotch pine had 3 and another 2 nests. Average height of nests was 20-1/2 feet. Of 45 nesting attempts, 38% were successful.

116. Sherman, Althea R. 1912. POSITION OF MOURNING DOVE NESTLINGS. Condor, 14:153.

Notes in Iowa, 1907. Reports on several nests where young found facing opposite directions, but mentions that 2 nests showed young facing same direction on later visit. She concludes that most nests' young faced opposite directions.

117. Snyder, L. L. 1923. THE MOURNING DOVE (ZENAIDURA MACROURA CAROLINENSIS) AT PANORA, IOWA. Auk, 40:240-244.

A very generalized account of nesting cycle of doves during one and partial second brood.

118. Weller, Milton W. 1959. MOURNING DOVE NEST IN CATTAIL. Iowa Bird Life, 29(1):24-25. 2 photos.

Includes summary of other unusual nesting sites of mourning doves.

[From Wildlife Review 96:64]

Kansas

119. Coats, Jim. 1954. MOURNING DOVES IN KANSAS. Kansas Fish and Game, 12(2):7-9.

Doves nest in all States and commonly throughout Kansas. Mentions four major phases of Cooperative Dove Study for successful dove management. Kansas cooperates in all but the road counts. "The Mourning Dove is a valuable resource in Kansas, and will increase in importance with the tendency for more intensive farming."

120. Coleman, Dave. 1960. DON'T OVERLOOK THE DOVE. Kansas Fish and Game, 18(1):6-7.

The author discusses the results of the call-count survey, justification for hunting doves (population is increasing and hunting only takes a part of what natural mortality would remove), and methods of hunting doves in Kansas.

121. Kansas Forestry, Fish and Game Commission. 1957. DOVES IN KANSAS. Kansas Fish and Game, 15(1):5-6.

General discussion on doves and life history. Kansas is cooperating in nestling banding, being second in the nation for number of returned bands. Several were harvested as far south as Mexico.

122. Lungstrom, Leon G. 1946. COMPARATIVE MICROSCOPIC STUDY OF THE PROVENTRICULUS AND DUODENUM OF THE MOURNING DOVE, RED-HEADED WOODPECKER, AND MEADOWLARK. M. Sc., University of Kansas.

(Not available for abstracting)

123. Todd, Bob. 1961. KANSAS' DRY LAND DUCKS. Kansas Fish and Game, 19(1):3-4.

This popular article discusses the popularity of the mourning dove as a game bird and the prospects for the 1961 dove season in Kansas.

124. Wimmer, Robert B. 1954. AN ECOLOGICAL STUDY OF THE MOURNING DOVE IN EMPORIA, KANSAS, 1953. M. Sc. Thesis, Kansas State Teachers College, Emporia, Kansas, June, 1954. 111 pp. typed.

Dove studies made in two parks and two cemeteries from March to December, 1953. Nesting began May 17 and continued through September 20. First dove seen March 8 and last was October 15. Little difference in calling activity in early morning and late afternoon, but number of calls decreased as season progressed. Calls were reduced when temperature exceeded 85° F. Wind had little effect until it reached 25 mph. Hard rains stopped calling but slow drizzles had little effect. There was similarity between seasonal trend of relative humidity and number of calling doves. Nest success was 43.1 percent.

Kentucky

125. Russell, Dan. 1951. MOURNING DOVE DISEASE IN KENTUCKY. Leaflet 2, Kentucky Division of Game and Fish, 12 pp.

General discussion of Trichomonas gallinae and symptoms of the disease. First found in Kentucky July 1, 1950, near Lexington. Earliest 1951 report was from Trigg County on April 17. Relatively few cases have been reported in Kentucky.

126. Russell, Dan. 1951. WHY THE CHANGE IN DOVE SEASON? Kentucky Happy Hunting Ground, 7(5):24.

Opening date for dove season was moved back from September 1 to September 15 for this fall and the daily bag was reduced from 10 to 8. This was necessitated due to decline in breeding population; in March less than 50 percent of previous March population was noted; April also had less than 50 percent; and May the same. This same decrease was noted in other southeastern States, except Florida. A large portion of the doves shot in Kentucky come from Indiana, Illinois, Michigan, Ohio, and points north. Reports of 10 to 50 percent decrease have been received from these midwestern areas. Possibly trichomoniasis and severe winter weather accounted for this decrease. Since three-fourths or more of the doves bagged are birds of the year, the early juvenile concentrations might provide a better indication of hunting success than the number of breeding birds present. In June, 1950, large flocks of young doves were seen throughout Kentucky but this June the flocks were smaller in size and number. This might seem to indicate a poor hunting season. Consequently, with the above data at hand, the Regulations Committee has moved back Kentucky's season and reduced the bag limits. "In the face of these earlier findings it would have been foolhardy to have prescribed the same hunting season and the same bag limit. The reduced season is for the protection of the dwindling supply of birds, so that all seed stock for next year will not be eliminated."

127. Russell, Dan. 1952. DOVES MAY NOT KNOW WHERE THEY'RE GOING, WHERE THEY'VE BEEN OR THEIR POPULATION STATUS, BUT THE P-R BOYS DO. Kentucky Happy Hunting Ground, 8(6):13.

General statement of details of the State dove project. Due to disease in 1950 and severe weather in February, 1951, the population was reduced so that 1951 kill was about half the calculated kill of 1950. Further testings of techniques will be necessary as a three year study is not conclusive enough to formulate management policies.

128. Russell, Dan M. 1954. MOURNING DOVE INVESTIGATIONS IN KENTUCKY; A FOUR YEAR PROGRESS REPORT. Kentucky Department of Fish and Wildlife Resources, 90 pp. processed.

Presents results of the Kentucky dove study from July 1, 1949 to June 30, 1953. Midwinter inventory, mail carrier census, roadside counts, production studies, call counts, and nest studies were tried to provide information on populations - with random road counts and call counts

proving most efficient and economical. Trapping and banding was conducted at year around stations, and a total of 2,631 doves were banded. Only 77 (2.9 percent) were recovered, but 305 (11.6 percent) were retrapped. About 66 percent of total retraps occurred within one month after banding; nearly 7 percent within second month; and 6 percent within the third month; only 22 percent of the retraps occurred later than three months. Forty-six (59.7 percent) were recovered within five miles of the banding area. A total of 606 records of completed nest attempts was secured, earliest was February 8, 1952 and latest was completed on October 10, 1952. The peak nesting was in May of each year. Overall nest success was 49 percent, which (by calculation) would give an average of six young per pair and provide total replacement of 75 percent by production. From March through September an increase is shown in nesting success, as season advances. About 30,000 hunters shoot doves in Kentucky; about 12 percent of total license sales. Average kill of three years was 375,000 annually. For shells alone, dove hunters spent \$112,500 each year in Kentucky. In 983 hunter bags checked in four years, 3,621 doves were killed, or 1.42 doves per hunting hour. Crippling loss averaged 15.5 to 22.8 percent of total bag for three years. Juveniles made up 67.5 percent of kill, and 3.1 percent of total bag were adults with developed crops. Shooting should begin no later than the first of September for Kentucky "hunters to enjoy a safe maximum harvest." "The problem of management lies not in matters of increasing the population but in wisely utilizing the new crop produced each year."

129. Russell, Dan M. 1955. KENTUCKY'S DOVE HUNTERS TO KILL HALF-A-MILLION. Kentucky Happy Hunting Ground, 11(5):32.

"In an average season, Kentucky dove hunters will use up well over \$100,000 worth of shotgun shells and bag 500,000 doves." The average hunter will spend two and one-half hours each trip, shoot 16 shells to bag three or four doves. He will leave one cripple or dead dove in the field for every four doves he picks up. Three out of every four doves killed will be young doves, and three doves out of every 100 killed will probably be nesting doves.

130. Russell, Dan M. 1956. DO WE REALLY SHOOT MIGRANT DOVES? Proceedings of the Southeastern Association of Game and Fish Commissioners, October, 1955:69-74.

Between 1950 and 1954 Kentucky banded 972 nestling doves, from which 59 direct recoveries resulted (6.1 percent). Of these 79.7 percent were within the State. No recoveries

are on hand from doves banded north of Kentucky to indicate they shoot migrants. Most recoveries were within a mile or two of the place banded. The month banded had little effect on the returns, recoveries being secured from April through August banding. Among dove hunting States (both north and south) over 75 percent of direct recoveries were within the State where banded. In non-hunting States, over 72 percent were recovered out of State. An overall average of 6.4 percent of total recoveries were taken outside the State banded prior to the first of October. "Does this signify that 93 percent of the doves had not migrated by October 1? In the southern dove hunting States, less than 20 percent of the returns were from outside the State banded, whether recovered in September or through February. Would this mean that at least 80 percent of the shootable population would be of home-grown stock irrespective of the dates of the season?" A thought-provoking article indicating the need for more nestling banding and complete analysis of resulting recoveries.

131. Russell, Dan. 1960. POPULATION TRENDS OF DOVES GUIDE IN SETTLING SEASONS. Kentucky Happy Hunting Ground, 16(5):28, 31.

Kentucky biologists driving to and from their regular assigned jobs make roadside dove counts on from 8,000 to 30,000 miles of road per month. Information from these surveys show that doves are most numerous in Kansas in August and September and at their lowest level in January. Call-count surveys are conducted on a nationwide scale by State and Federal personnel, and these survey data are used to establish the framework for dove regulations in the States.

132. Russell, Dan. 1961. YOU CAN HAVE YOUR DOVES -- AND SHOOT 'EM TOO. Kentucky Happy Hunting Ground, 17(5):7.

Prospects for the 1961 dove season and the role of hunting as a factor affecting mourning dove populations are presented in this popular article.

133. Thomas, Carl. 1960. THE VETERAN HUNTER FINDS THAT IT'S AS MUCH FUN TO WATCH THE NOVICE FIRE AT DOVES AS IT IS TO BAG THEM HIMSELF. Kentucky Happy Hunting Ground, 16(5):29-30.

An "old-hand" dove hunter hunts with a 13-year old boy with his first shotgun and describes the hunt as a most satisfying experience.

134. Wallace, Earl. 1950. THE DOVE, AN ANCIENT EMBLEM OF PEACE, TODAY LIVES UNDER ANYTHING BUT PEACEFUL CONDITIONS. Kentucky Happy Hunting Ground, 6(5):10-11.
A general account with brief life history and description.

135. Young, James P. 1961. MOURNING DOVE INCUBATES DURING DAY-LONG SNOWSTORM. Kentucky Warbler, 37(3):55-56.
A mourning dove laid its eggs on February 21, which were hatched on March 7. An eight-inch snow fell on February 25. Both nestlings perished at two days of age when temperatures were below freezing during the mornings.

Louisiana

136. Adams, William H., Jr. 1956. A ROADSIDE DOVE CENSUS IN SOUTHWEST LOUISIANA, 1955-56. Special Report, 30 pp. typed. Louisiana State University, Baton Rouge, Louisiana.

A study of the random road count technique over a 57 mile route in Calcasieu and Cameron Parishes, from June, 1955 to February, 1956 which was conducted incidental to other work. Only 42 1/2 miles of the route were actually considered in the results. Twenty-nine censuses were made, 24 of which provided comparable information. There was a peak number of resident doves in July, August, and September, and a large influx of migrants in November. "Results showed the two dove seasons opened after these peak populations departed from the study area."

137. Duffy, McFaddin. 1961. DOVE DELIGHT. Louisiana Conservationist, 13(10):2-3, 22.
A photo-story of dove hunting in Louisiana.

138. Glasgow, Leslie, and John Newsom. 1952. THE BAND YOU REPORT MAY BE THE CONNECTING LINK. Louisiana Conservationist, 6(3):6-7.

General account of bird banding and its value in migration, longevity, and mortality studies. Briefly mentions dove banding program. Urges reports of bands found. "More than 7,000 doves have been banded by Louisiana biologists in the past few years."

139. Gowanloch, J. N. 1951. THE MOURNING DOVE. Louisiana Conservationist, 3:5-7, 22-23.

A general account of the dove and its life history as secured from other authors. Mentions passenger pigeons and their disappearance from Louisiana, also three other species of doves occurring in the State.

140. Henson, Robert C. 1956. A DOVE NESTING STUDY IN THE ROSELAWN CEMETERY, BATON ROUGE, LOUISIANA. Final report to the Louisiana Wild Life and Fisheries Commission, September 6, 1956, 19 pp. typed ms. Thesis for M. Sc. at Louisiana State University.

A study began in March, 1956 to determine the nesting in each month of the breeding season. Results are presented on 120 nests from March 22 to September 6, 1956. Nesting occurs in eight months, February to September. One nest must have started in mid-February and a nest with two nestlings (3 and 4 days old) was present on September 6. Cooing intensity became greatly reduced in latter part of August, but some was heard on every visit, including September 6. Live oaks were predominant and contained 70 percent of the nests. Overall nesting success was 66 percent. Twenty-three nests were used more than once (two being used four times, one being used three times). Strong winds and heavy thunderstorms were responsible for many nest losses; at least four nestlings died of trichomoniasis. One hundred and fifty-nine nestlings were banded. April, May and June were peak production months.

141. Louisiana Wild Life and Fisheries Commission. 1956. OPERATION DOVE BAND. Louisiana Conservationist, 8(9):6-7.

A Selman Field, Ouachita Parish, 3,724 doves have been banded within the past three years. Mentions goal of 150,000 doves to be banded in five years, also banding nestlings in Louisiana. Other methods of studying the dove population are the call count and random road counts. Requests aid in reporting dove nests to Commission biologists.

142. Moore, George C. 1953. DEAR MR. FISH AND WILDLIFE SERVICE. Louisiana Conservationist, 5(10):16.

Open letter to Director of Fish and Wildlife Service protesting dove regulations for 1953. Urges more consideration be given results of Cooperative Dove Study, 1948-53, which shows the resource is not being adequately utilized. "We have good information that has proved beyond reproach that we are not properly managing the dove."

143. Newsom, John D., and J. B. Kidd. 1951. BE AWARE OF THE GREEN DOVE. Louisiana Conservationist, 4(1-2):17.

A popular account of coloring of doves in connection with the Southeastern Dove Study. About 400 have been dyed green in Louisiana. Sportsmen are urged to report sight records. Mentions trichomoniasis and its diagnosis and the possible disastrous affect to doves of the Southeast.

144. Newsom, John D., J. B. Kidd, and Robert E. Murry. 1953. MOURNING DOVE MANAGEMENT IN LOUISIANA. Louisiana Conservationist, 5(8):16-18.

A general summary of the Louisiana dove project which began in July, 1949. "The primary aim of this study has been to obtain data for use in making hunting regulations." Call counts and random road counts have been used for annual population trends. Changing agriculture conditions have spread the dove population widely. Disease in 1950 and severe ice storm of January, 1951 have hit the population hard. Nesting peaks in June and again in late July and early August. There is a 70 percent annual turnover in population, with only 20 percent charged to legal hunting. Since 1949, about 6,000 doves have been banded in Louisiana, and about 200 have been recovered. "There is a spectacular flight of doves, composed primarily of young of the year, through north and west Louisiana and to a lesser extent in other sections of the State during July, August, and September." In the latter half of September there is an almost complete exodus of doves from north and west Louisiana; they move southwesterly. In late October and November, another flight enters the State, apparently from the north. In late December and early January there is another influx, apparently from southwest wintering areas working gradually back to the breeding ground in the north. Doves come from Illinois, Indiana, Ohio, Michigan, Wisconsin, Nebraska and Kansas. "It is plausible that 3 or 4 doves could be killed in September for each one that is killed in December-January with little difference in total effect on the population." Advocates some adjustment in dove hunting regulations; all day hunting, increase in daily bag limit to 15, and a longer hunting season of 45 days. An early September season is advocated for north Louisiana. Maps show recoveries of doves from Louisiana banding as well as source of doves killed in the State.

145. Yates, Hannah. 1960. THE BIRD OF THE MONTH. THE MOURNING DOVE. Louisiana Conservationist, 12(7-8-9):24.

A popular account of the life history of the mourning dove.

Maine

146. Powell, Stephen E. 1949. THE OCCURRENCE OF THE EASTERN MOURNING DOVE ON SWAN ISLAND, SAGADAHOC COUNTY, MAINE. Maine Audubon Society Bulletin, 5(4):77-78.

During the past four years the dove has been occurring in ever increasing numbers on the Swan Island Game Preserve.

Occasional birds were seen in 1946; in 1947 two small flocks appeared early in April. Nest found June 15, 1949, which was not successful. Flocks of 18 to 25 doves feed on grain during August.

Maryland

147. Denmead, Talbott. 1958. MOURNING DOVES. Maryland Conservationist, 35(5):20-23.

A popular account of mourning dove hunting, kill estimates, and seasons for 1958.

148. Flyger, Vagn F. 1951. HOW MARYLAND GUNNERS CAN HELP. Maryland Conservationist, 28:8, 9, 30.

Game biologists would like to learn more about factors affecting wildlife. Sportsmen are asked to save one wing from each mourning dove shot. From an analysis of these wings the ratio of young to old doves can be secured.

149. Locke, L. N., and C. M. Herman. 1961. TRICHOMONAD INFECTION IN MOURNING DOVES, ZENAIDURA MACROURA, IN MARYLAND. Chesapeake Science, Volume 2, March-June, No. 1-2.

"During the 10 year period 1950-1960 the incidence of Trichomonas gallinae among several series of mourning doves shot or trapped in Maryland has varied from zero to 12 1/2 per cent. Prior to 1959, all isolations of T. gallinae from doves during such surveys had been from birds with well-developed lesions. In 1959, trichomonads were demonstrated in 3 of 54 normal hunter-killed doves examined in Howard County. The incidence of trichomonad infection among doves which were submitted to the laboratory because they were obviously diseased was much higher. Of 44 clinically ill doves submitted during the period 1950-1960 25 were found to be infected with T. gallinae. In the Maryland area the incidence of trichomonad infection among mourning doves appears to be low, but when infection does occur it is usually due to a pathogenic strain which produces a typical canker." -- Authors' Abstract.

150. Locke, L. N., C. M. Herman, and E. S. King, Jr. 1960. CASE REPORT - POX IN THE MOURNING DOVE IN MARYLAND. Avian Diseases, 4(2):198-202.

"An outbreak of avian pox in a captive flock of mourning doves involving 12 of 23 birds is described. Typical nodular growths on the eyelids and head as well as yellowish lesions at the base of the tongue and the back of the

pharynx were seen. Typical intracytoplasmic inclusion bodies were demonstrated. Methods are described for differentiating this infection from trichomoniasis. An attempt to transmit the disease to pigeons with material from a natural case failed." -- Authors' Summary.

151. Longwell, J. R. 1953. MOURNING DOVE PROJECT; A FOUR YEAR SUMMARY, 1949-52. Resource Study Report, No. 2, Department of Research and Education, Solomons Island, Maryland, 5 pp. processed.

Brief summary of results of several types of dove studies. Wings were collected from hunter bags, 954 being secured in four hunting seasons. Juvenile percentage varied from 66 to 76.

152. Longwell, John R. 1955. MOURNING DOVE PROJECT REPORT - 1954 HUNTING SEASON. Maryland Conservationist, 32(2):27-28.

A total of 2,296 wings have been collected from Maryland dove hunters during 1949 to 1954 seasons. The juveniles made up 66 to 78 percent of the bag in the past five years. By ageing the juveniles by feather molt, 49 percent were found to have hatched during the last three weeks of June and first two weeks of July. A second peak of hatching was the first three weeks of August, when 35 percent hatched. "The high percentage of juveniles indicates a very favorable nesting season and suggests that the harvest of doves may well be increased."

153. Longwell, J. R. 1957. MOURNING DOVE REPORT 1956 HUNTING SEASON. Maryland Tidewater News, 13(5):2, 5, 6.

Data on age ratios and hatching dates as ascertained from analysis of 785 wings from dove hunter bags.

154. Maryland Department of Game and Inland Fish. 1952. WILL THERE BE AN OPEN SEASON? DOVE STUDY. Monthly News Flash, Maryland Game and Inland Fish Commission, Issue 60: 1 page.

Dove wings have been collected in Maryland over the past four years as part of the extensive dove study. During 1951 a total of 314 wings were saved, of which 58% were juveniles. On opening day (October 5) 145 were collected, of which 66% were juveniles. On the first day of the 1950 season, 70% were found to be young birds. "Since dove hunting has declined to some degree throughout the South, investigations are being carried out in an attempt to find causes and results."

155. Zeller, H. R. 1949. THE DOVE SITUATION ON THE "SHORE." Maryland Conservationist, 26(3):14-15, 24, 27, Fall, 1949.

General account of the mourning dove as related to eastern shore of Maryland. Population is declining there.

Massachusetts

156. Austin, Oliver L., Jr. 1951. THE MOURNING DOVE ON CAPE COD. Bird-Banding, 22(4):149-174.

An excellent analysis of the banding of 2,690 doves on Cape Cod from 1930 to 1950 and of their 440 returns, 3,740 repeats, and 105 recoveries (3.9%). The dove on Cape Cod is "a common summer resident, an uncommon and irregular winter visitor, and a not uncommon spring and autumn transient." Doves have been noted only 12 of the 21 winters and have been trapped only in five (no recovery or return from 40 banded). The first non-wintering doves appear between March 25 and April 5, and the last summer or transient bird is gone by the first of November. "The wintering ground of the Cape Cod doves extends through the coastal plain from southern Virginia to central Florida, westward through the Gulf lowlands to Alabama, and occasionally to Louisiana and east Texas." "The winter range centers in the coastal plain belt from South Carolina to northern Florida and eastern Alabama." Site tenacity to the breeding grounds may be considered a major behavior trait in the dove. Site tenacity must influence the selection of the wintering grounds to some degree. The recoveries suggest that doves do not remain in close-knit groups either on migration or in winter. Their time-spread over the area intimates that the birds move individually or in loosely-connected small units. Indications are that three broods of young are reared each summer on Cape Cod, producing an average of 4.6 young per pair with a nesting success of 77%. From the 105 recoveries a 69% mean annual mortality is calculated. Various methods of computing mortality and survival are given. The oldest known dove reached 10 years of age. "The annual mortality is about 80% the first year of life, at the end of which it declines to about 55% where it remains constant for the next 10 years." "The life expectancy of all doves at time of leaving the nest is less than one year, and for those which survive the first year, slightly less than one additional year." "The population 'turnover' is practically complete every four years." "Deaths from shooting cannot be demonstrated from the evidence to be of greater or lesser importance than deaths from 'natural' causes."

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Brief summary of results of several types of dove studies. Wings were collected from hunter bags, 954 being secured in four hunting seasons. Juvenile percentage varied from 66 to 76.

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157. Shaub, B. M. 1950. MARKING BIRDS FOR SIGHT IDENTIFICATION. Bulletin of the Massachusetts Audubon Society, 34:244-247.

Discusses various uses of colored bands, but suggests distinctive wing or tail markings by designs applied with a rubber stamp and colored printer's ink. The design could consist of a letter or number alone or in a frame. The frame could be a circle, square, diamond, or other distinctive geometric figure. The ink can be spread thinly on a smooth surface, the stamp inked and applied to the wing or tail of the bird held against a hard surface. Such marks appear very striking on white wing patches, such as evening grosbeaks.

Michigan

158. Caldwell, Larry Derl. 1955. A NESTING STUDY OF THE MOURNING DOVE IN KALAMAZOO COUNTY, MICHIGAN. M. S. Thesis, Michigan State University.

Forty-five adult pairs nested 165 times in one season and fledged 101 young. Eighty-five percent of the nests were in evergreens. Call counts showed that the number of calling birds was not correlated with the number of active nests. The peak of calling was about 54 days later than the peak of nesting. Sex and age ratios of 75 September-shot doves were about even. Only 3.4% of fledgling production was in September although 41.7% of the 36 adults in the shot sample had pigeon milk in their crops, which supposedly indicates that adults have dependent young. It is recommended that possibilities of dove hunting in Michigan be explored by experimental open seasons in selected areas.

[From Wildlife Review 95:84]

159. Caldwell, Larry D. 1957. CROP THICKENING AND SEPTEMBER NESTING OF DOVES. Journal of Wildlife Management, 21(2):247-248.

During second and third weeks of September, 1954, 36 adult doves were collected in southern Michigan. Of these, fifteen (42 percent) had thickened crop walls, and four others showed a trace of the thickening. Only four (10 percent) of an observed 41 pairs of breeding doves on the Sanctuary were nesting in September and thus might be expected to have the thickened crop. He believes that since the percentage of thickened crops among the collected birds was so much higher than percentage of known nesting

adults that the thickened crop is not a true indication of breeding (feeding) doves. He believes further studies of crop conditions of September nesting adults are needed to clarify this matter.

160. Carney, Samuel M., and George A. Petrides. 1957. ANALYSIS OF VARIATION AMONG PARTICIPANTS IN PHEASANT COCK-CROWING CENSUSES. Journal of Wildlife Management, 21(4): 392-397.

"Pheasant cock-crowing counts made by groups of people selected with no regard for their previous experience at counting showed very poor agreement. Cock-crowing counts made by two experienced counters were generally higher and agreed among themselves more frequently than did counts of four inexperienced people. The elimination of one participant who showed an obvious lack of ability at counting tended to improve the agreement among the counts of the remaining participants. Variation among counters was no greater at stations with interference present than at stations where it was absent. Three groups making single-species call counts obtained markedly greater agreement among themselves, regardless of the species, than did one group counting simultaneously but attempting to count the calls of three species." Pheasants, quail, and doves were counted in this test.

161. Davey, Stuart P. 1953. A STUDY OF THE MOURNING DOVE IN SOUTHERN MICHIGAN. A thesis submitted for Master of Wildlife Management, School of Natural Resources, University of Michigan, January 12, 1953.

Account of field work from April to October, 1952, in Washtenaw County, Michigan, either in a study area of 2 square miles or along one of the 2 twenty-mile transects. Study began as an investigation of the productivity on an area basis. As work progressed it expanded into a more complete population study by observations along a call-road count transect run throughout the summer. Doves have not been hunted in Michigan since 1905. Most previous breeding studies have been from concentrated breeding areas. The author decided to make a production study on an area basis. This was thought desirable and possible because of the lower populations in southern Michigan than in many of the other areas studied. Study area of 1,218 acres involved most of sections 26 and 27 of Scio Township, Washtenaw County. Land use showed 28% wheat, 16% alfalfa, 14% pasture, 12% corn, 11% woods, 5.7% homesites, 1.6% orchard, 0.8% clover, and 10.0% unused. It was typical of lands between morainic hills; elevation varied from

1,020 to 880 feet. Two twenty-mile call-road count transects were used near Ann Arbor. An index of 22 singing males was obtained from route 2 as compared to 18 males from route 1 during the first 6 trips in the height of the nesting season. Only a few doves winter in southern Michigan, birds arriving from the south in late March or early April. Breeding starts in April and continues some years into October. From April 19 to September 10 the study area was covered at intervals of 1 to 7 days. Total of 30 nests, of which 20 were active. On the study area alone, 22 nests were found of which 13 were active. Conifers were preferred for nesting. Nest height varied from 4 to 27 feet, averaging 12.1 feet. Nestings by month: April 3, May 6, June 9, July 2, August 2. Latest young fledged left the nest on September 8; 56% of eggs hatched. Overall nesting success for the study area was 50%. In the main breeding season it was thought that 10 pairs were using the study area. Only 8 nestlings were banded. Call-count routes were run so each route (of 2) was at about 9-day interval. Standardized procedure was followed on a 20-station, 20-mile route, with 3 minute stops at one mile interval. Started exactly 30 minutes before sunrise. During entire counts 391 doves were heard to coo 2,374 times for an average of 6.07 per 3 minute station. By listening to 3 doves for a total of 4 hours, coos were heard in 89 minutes and not heard in 151 minutes. Thus, coos were uttered in 37% of the observation minutes. Little effect of temperature on cooing was noted except below 45° F. Cloud cover seemed to influence cooing only if rain threatened. The author definitely heard doves up to 1/2 mile, but his usual hearing radius was 1/5 to 3/10 mile. A radius of 1/4 mile was later used as an average. A radius of 1/4 mile gives an area of 0.196 square miles. If the first 10 stations of each of the two routes are considered as covering the bulk of the nesting activity, during these 20-stations 355 doves were heard in 398 station-stops for an average of 0.892 doves per stop. Since there are 1/.196 or 5.1 hearing areas per section, $5.1 \times .892 = 4.55$ cooing males per section. When this is compared to results of the study area when 10 pairs were using 2 sections of land the similarity points to the strong possibility of a census method being workable for habitat similar to that of southern Michigan. Craig (1911) says doves coo vigorously during courtship and slacken off during incubation. In birds seen on call counts, singles made up 83% in late spring, with pairs making up remaining 17%. This changed as first young were fledged, with single's percentage dropping, pair percentage rising, and flocks becoming a factor. A total of 49 flocks were observed. Flocks of 3 made up 45% of the number. Those of 4 and 5 made up another 24%.

162. Ludwig, C. C. 1943. MOURNING DOVES. Jack-Pine Warbler, 21(2):56-59.

General account of doves and their banding near Lansing, Michigan. Doves usually begin to arrive about mid-March and many leave by mid-September. One pair nested on top of a chimney close to the tile and another on the ground, but doves usually nest from 6 to 20 feet above the ground. Most satisfactory traps used were "government sparrow trap" and the "four cell drop-door trap." From 1927 to end of 1941 the author banded 745 doves, from which 49 recoveries have resulted - from Indiana, Illinois, Kentucky, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, and Texas. A total of 52 have returned to the station in subsequent years; one dove was recaptured every year for six years in succession.

163. Ludwig, C. C. 1960. BANDING RETURNS OF MICHIGAN MOURNING DOVES. The Jack-Pine Warbler, 38(1):29-33.

From 1927 to 1947, a total of 907 mourning doves were banded in the vicinity of Lansing, Michigan. Forty-eight (5.30%) recoveries from 11 States resulted. Returns to the banding station totaled 63 (6.94%). Two birds banded May 24, 1936, as nestlings were recovered, one on December 11, 1936, from Macon, Georgia, and the other, December 12, 1936 from Beaumont, Texas. Three doves returned to the banding station three years in succession, two returned four years in succession, and one returned six years in succession. Author's conclusions were:

- (1) Most mourning doves from central Michigan migrate to the southeastern United States.
- (2) There is a heavy mortality of first and second year birds.
- (3) At least 70 percent of the banding recoveries were from birds shot by hunters, undoubtedly because such birds are more likely to be reported than are birds dying from other causes.
- (4) Only a small proportion of the young birds return to the immediate vicinity where they were hatched to begin nesting.
- (5) After a bird once begins nesting, it usually returns to nest in the same area in succeeding years.

164. Lund, James V. 1951. OBSERVATIONS ON THE NESTING OF THE MOURNING DOVE IN THE VICINITY OF EAST LANSING, MICHIGAN. A thesis for a degree at Michigan State College, June 7, 1951.

A study of 20 dove nests was made from March 8 to June 6, 1951. Ten of 18 of these nests were destroyed. Nest No. 7

was made from 161 pieces of material; No. 12 had 98 pieces. One third of the eggs laid produced fledged young. Average height of 20 nests was 7 feet 2 inches, and 65% were in Norway Spruce.

165. Nickell, Walter P. 1943. SECONDARY USES OF BIRDS' NESTS. Jack-Pine Warbler, 21(2):48-54.

A general article on secondary uses of nests near Bloomfield Hills, Michigan. Among these are a number of cases of mourning doves during 11 years of observation. Doves have been found using recently abandoned nests of robins, brown thrashers, and catbirds. In some cases the doves added fresh materials but often these nests were used as they were. Doves nested for 6 years in succession on top of a robin's nest, each time adding fresh materials until the entire mass represented a "skyscraper" of 9 nests over a foot high. Fifty feet away doves used an unlined robin's nest for 2 years without adding any fresh materials.

166. Nickell, Walter P. 1954. MOURNING DOVES NEST IN BLACK-CROWNED NIGHT HERON NESTS. Wilson Bulletin, 66(2):137.

On June 14, 1952 in a large colony of Black-crowned Night Herons in St. Clair County, Michigan, two young doves about eight days old were found in an unoccupied heron nest. Doves had added only a few scattered straws to the original nest of coarse willow twigs, and the nest was only 25 inches above the water in a small willow. On July 12, 1953, in the same colony, a dove was found incubating two eggs in a heron's nest. No new material appeared to have been added, and the nest was 90 inches above the water. This nest had two eggs and one newly hatched young of a heron when first visited on June 7.

Minnesota

167. Harris, Stanley W. 1961. MIGRATIONAL HOMING IN MOURNING DOVES. Journal of Wildlife Management, 25(1): 61-65.

Adult mourning doves were trapped from their nests in 1957, 1958, and 1959 at the Madelia Research Center, Minnesota. When the data are corrected to allow for annual mortality of banded birds and for the presence of banded birds in the untrapped population, migrational homing rates of approximately 100 percent for adult males and approximately 60 percent for adult females were obtained. The average distance between nest sites of

returning adults was 154 feet in consecutive years and 300 feet for sites 2 years later. In three years of trapping adults from nests, only 6 of 512 doves banded as nestlings on the study area were known to have returned in subsequent years. The average distance of the nest sites of 4 of these birds from the nests in which they had hatched was 1,167 feet. -- Author's Summary.

168. Harris, Stanley W., and Marius A. Morse. 1958. THE USE OF MIST NETS FOR CAPTURING NESTING MOURNING DOVES. Journal of Wildlife Management, 22(3):306-309, 1 fig.

Describes a technique for capturing adult mourning doves at dense-cover nesting sites. Fifty-one captures were made of 37 females and 5 males at 38 nest sites in 25 hours. Usually, a 3-man crew was used with a moving net. Problems of handling net, approaching nests, 1-man operation of stationary set, and limitations are described.

[From Wildlife Review 93:67]

Mississippi

169. Bobbs, Henry. 1952. Is Cotton Dusting Harmful? Mississippi Game and Fish, 16(3):10.

An intensive study of mourning dove nests in areas where cotton was being dusted or sprayed with one or a combination of poisons (Toxaphane, Calcium Arsenate, Benzene Hexachloride, Aldrin, Dieldrin, Benzene, 5-25% DDT) showed no visible effect to doves or other game birds and animals. Of the first 250 nests out of 403 located in 1950, 61.6% were successful; in 1951, 76.2% of 63 nests; and in 1952, 68.2% of 60 nests were successful.

170. Bobbs, Henry, Jr. 1956. WHERE DO THEY GO? Mississippi Game and Fish, 20(1):10.

Mississippi cooperated in dove nestling banding program by banding 1,400 nestlings during May, June and July. Brief mention of major banding areas in the State and dove life history. Appeal for return of bands found.

171. Handley, Rolland B. 1953. FEDERAL AID IN FISH AND WILDLIFE RESTORATION. Mississippi Game and Fish, November:3-4.

Gives general and brief account of Mississippi dove study from August 1, 1948 through June 30, 1952.

172. Handley, Rolland B., and William R. Edwards. 1957. MOURNING DOVE NESTING STUDIES IN MISSISSIPPI. Presented at the Southeastern Association of Game and Fish Commissioners, Mobile, Alabama, October. 9 pp. mimeo.

Results of dove nestling banding in concentrated breeding areas, mainly in Sunflower and Boliver Counties, during 1956 and 1957. A total of 1,503 were banded in 1956 and 2,518 in 1957. At the Parchman area (Sunflower County) doves were banded in two peach orchards of 40 and 60 acres, a pine plantation of five acres, and an ash and locust plantation of five acres. The Alligator area (Boliver County) was a pecan orchard of less than 50 acres. On several occasions three active nests were located in one tree of this orchard. A yellow, weather-proof tag was used to mark location of each nest in 1957 and to record detailed information. During 1957, 1,615 nests were marked on the Parchman area. Nest tagging peaks were June 10, July 16, and August 12. A total of 1,376 nestlings were banded from 973 nests, which is 1.41 birds per nest.

173. Kaczynski, C. F., and W. H. Kiel, Jr. 1960. BAND LOSS BY NESTLING MOURNING DOVES. Presented at the 14th Annual Conference of the Southeastern Association of Game and Fish Commissioners, Biloxi, Mississippi. 17 pp. mimeo.

A study of band losses by nestling mourning doves was conducted at Parchman, Mississippi during the months of June-August, 1960. A total of 456 nestlings was banded and checked for band loss prior to fledging. Three hundred and seventy-seven nestlings were banded at 4 to 6 days of age, 117 with size 3 bands, 120 with size 3A bands, and 140 with size 3A bands and Dalzoflex tape. Two hundred and twenty nestlings were banded at 7 to 9 days of age, 114 with size 3, and 106 with size 3A bands. In the 4 to 6-day age group, 66.3% of the size 3A bands were lost. This was a statistically significant departure from the 7.7% loss of size 3 bands. No taped bands were lost. However, predators ate 13.7% of the nestlings banded with tape, and significantly fewer of the nestlings banded without tape. (Predators ate 0.8% of the nestlings banded with size 3A bands and 3.4% of the nestlings banded with size 3 bands). In the 4 to 6-day age group, percentages of nestlings known to be available for band recovery at 9 days or older were: size 3, 69.2%; size 3A with tape, 59.0%; size 3A, 25.8%. Hence, the use of taped 3A bands was more effective in providing doves available for band recovery than the use of untaped 3A bands, despite the mortality difference. In

the 7 to 9-day age group, there was a 3.3% loss of size 3A bands and no loss of size 3 bands. This difference was not statistically significant. The minimum age at which nestlings were banded without subsequent band loss was 6 days with size 3 bands and 8 days with size 3A bands. Using the aging criteria of Hanson and Kossack (1957), the minimum age for size 3 bands would be intermediate between 5 and 6 days and the minimum age for size 3A bands would be intermediate between 7 and 8 days. It is important to know if size 3A bands are necessary for adult doves, since younger nestlings, and therefore a greater number, can be banded without delay with the smaller size 3 bands. If use of size 3A bands is continued, aging of the nestlings should be done carefully so that the birds are not banded too young. Further investigation of mortality associated with the use of tape is desirable to verify the results of this study and to determine the specific causes of loss.

-- Authors' Summary.

174. Locke, Louis N., and David H. Reese. 1960. DISEASE STUDIES OF MOURNING DOVES (ZENAIDURA MACROURA) AT PARCHMAN, MISSISSIPPI. Presented at the 14th Annual Conference of the Southeastern Association of Game and Fish Commissioners. 3 pp. mimeo.

Trichomonas gallinae was found in 2 of 81 swabbings from nestling doves from Parchman, Mississippi, examined in 1959, and in 7 of 55 examined in 1960. The ages of the seven birds found positive in 1960 were: 10 days (1), 9 days (2), 8 days (2), 7 days (2). None of the doves exhibited a typical "canker." No blood protozoa were found on blood films from 55 doves. No coccidial oocysts were found in a single sample of dove feces examined by a concentration technique. -- Authors' Summary.

175. Mississippi Game and Fish Commission. 1948. REPORT GIVES ESTIMATED HUNTER KILL FOR 1947-48. Mississippi Game and Fish, 11(12):5-7, June, 1948.

From a voluntary return of questionnaires mailed to a random sample of hunting license holders figures give estimated kill by game species. In all a total of 52% of the State license holders answered their questionnaires. About 260,000 doves were killed by estimated 49,401 active hunters, to give an average annual kill of 5.2 doves per hunter. About 37% of State license holders hunted doves, as compared to 21% of county license holders - a combined State total of 29%.

176. Mississippi Game and Fish Commission. 1951. STATE WIDE GAME KILL, 1950-51 SEASON. Mississippi Game and Fish, July, 14:6.

From a table showing results of analyzing "hunters score-cards" from 40 percent of 10,000 licensed hunters receiving them, the following result of dove shooting: 21.6% of hunters shot doves; 40,786 hunters shot doves; 3.25 average times each man hunted; 3.93 doves average kill per hunt; 12.82 doves average season kill; 522,876 estimated State total kill of doves.

177. Mississippi Game and Fish Commission. 1957. OPERATION BAND. Mississippi Game and Fish, 21(2):4-5.

General explanation of five year dove nestling banding program initiated by U. S. Fish and Wildlife Service and various State Game Departments. Mississippi has cooperated, banding about 1,494 nestlings in 1956 and 2,209 this year. Discusses general life history and details of banding areas in the State.

178. Mississippi Game and Fish Commission. 1958. IT'S ALMOST TIME FOR THOSE DOVES AGAIN. Mississippi Game and Fish, 22(1):4-5.

Nesting studies conducted at Parchman have shown that dove production in 1958 was good. Results of the call-count surveys and peaks of dove nesting at Parchman are presented. Seasons are set when relatively little nesting occurs and when the greatest number of suitable birds are present.

179. Stockard, Charles R. 1905. NESTING HABITS OF BIRDS IN MISSISSIPPI. Auk, 22:146-158.

Doves often nested in colonies. Found 9 nests in clump of 15 small pine trees. Twelve nests in osage orange hedge 1/2 mile long. However, most doves nest singly, or in nests too far apart to suggest any gregarious habit.

180. Thompson, St. C. 1950. MOURNING DOVE STUDY PROJECT UNDER WAY IN MISSISSIPPI. Mississippi Game and Fish, March, 1950, 5-7.

Short article on progress of the Mississippi project. During September, 1949, 1,996 wings showed a ratio of 2.25 juveniles to each adult. Over 3,000 doves in hunters' bags showed that between four and five doves were bagged per hunt.

181. Thompson, St. Clair, Jr. 1954. WE COULD SHOOT MORE DOVES. Mississippi Game and Fish, 18(2):6-7.

Dove is second only to quail in popularity with Mississippi sportsmen. Doves are strict vegetarians, have

no specific cover requirements, and have not suffered from recent land use changes. No more than three percent of doves banded have been reported taken by hunters. "The doves killed by sportsmen appear of little importance when compared with the total mortality. Other factors causing the loss of many doves are natural enemies, disease and weather. Their combined effect causes a much greater loss of doves than the guns of the sportsmen." Urges longer gunning seasons and increased bag limits.

Missouri

182. Chambers, Glenn D. 1961. A STUDY OF WINTERING FLOCKS OF MOURNING DOVES IN MISSOURI. M. A. Thesis, University of Missouri. 86 pages, typewritten.

Primary objectives of the study were to determine whether significant numbers of summer-banded doves winter in the immediate area, and sex and age composition of these northern-wintering flocks. Juvenile:adult age ratios were established by use of the bursa of Fabricius. Age ratios ranged from 219 juveniles to 100 adults in October to 42:100 in March. Age ratios in the two sexes were different: male adults dominated the sample of males in every month except October, and juvenile females dominated the sample through December after which adult females were more prevalent. Sex was determined by internal examination, and the sex ratio of all ages taken throughout the study was 203 males:100 females, which indicates that males winter farther north than females. Twenty-one of 23 wintering, banded birds recovered on the study area were adult males. The other two were juvenile females recovered in October. Most of the doves were killed within one mile of the banding site, indicating a non-migratory segment of the population. Doves left their roosts and were feeding before one-half hour after sunrise except on foggy mornings when they remained on the roost one-half hour longer. Doves roosted on the ground at night throughout the winter commencing in mid-November, and used orchards and hedgerows as day roosts. When leaving day roosts, they always maintained close unity even when shot into. Sixteen percent of the doves collected had toes missing caused by freezing. No evidence of winter kill was found. Gonad weight and lens weight were investigated as possible age criteria. Weights of testes of juveniles were consistently low with little overlapping up until late February. Much overlapping in weights of ovaries of juveniles and presumed adults was found. Lens

of doves may not have been handled properly. There was much overlapping of weights of lenses of juveniles and adults. Lenses weighing more than 12.6 mgm. were primarily from presumed adults. Crop contents of 132 doves were examined. Corn occurred in 94.7% of the crops and made up 95.1% of the total volume. Cane ranked second, but comprised only 3.9% of the total volume.

183. Frankel, Arthur I., and Thomas S. Baskett. 1961. THE EFFECT OF PAIRING ON COOING OF PENNED MOURNING DOVES. Journal of Wildlife Management, 25(4):372-384.

Results of this study of penned mourning doves indicate that the major influence upon the cooing frequency of a male dove is whether it is mated. Tenfold increases in frequency of perch coos resulted when females were removed from their mates. When the females were returned, cooing dropped to the previous levels, if pair bonds were restored. No generalizations could be drawn about the effects on cooing of weather factors or position in the nesting cycle. If our results can be extended to the field, then any precise interpretation of call-count data requires information on the ratio of mated to unmated male doves.

-- Authors' Summary.

184. Graff, George P. 1955. DOVE BANDING PAYS OFF. Missouri Conservationist, 16(5):1-2.

About 2,000 doves have been banded in Missouri since 1949; 321 nestlings being banded by author's father near St. Charles. Twenty-three recoveries have resulted, a 7.2 percentage, compared with the State's average of 4.6. The bulk of the recoveries have been in Texas and Mexico. Sixty-four percent of nestling banding is in May and June.

185. Harris, Stanley W. 1961. NOTES ON THE MIGRATION, SEX AND AGE STRUCTURE, AND THE FOOD HABITS OF A COLLECTION OF MOURNING DOVES FROM SOUTHWEST MISSOURI. The Bluebird, 28(3):23-27.

The author and his hunting companions collected 141 doves during the hunting season of 1956 near Joplin, Missouri. Observations on the hunting areas (farmland, hedgerows, wild prairie lands interspersed with abandoned mine tailings) and on a trip through Missouri, Iowa, and southern Minnesota indicated a relatively large flight of doves moved through the study area during late July and early August. The sex ratio of the shot birds favored males for both immature and adult doves, which suggested to the author that males were either more vulnerable to hunting or that differential migration of the sexes occurred.

One hundred and thirty crops were examined for food contents. Six species - corn, Sorghum, wheat, two species of Croton, and foxtail - made up over 90% of the total volume of the food taken.

186. Korschgen, Leroy J. 1955. A STUDY OF THE FOOD HABITS OF MISSOURI DOVES. Missouri Conservation Commission, P-R Series No. 12, 31 pp., January, 1955.

Report on contents of 2,000 dove crops collected from April to October, mostly 1951-53. Major foods were corn, wheat, foxtail grasses, small wild bean, sand croton, ragweed, hogwort, cane, and spurge. In first week of September, six to seven percent of doves had thickened crops and presumably were nesting. Most doves have left the State by mid-September.

187. Leopold, A. Starker. 1943. AUTUMN FEEDING AND FLOCKING HABITS OF THE MOURNING DOVE IN SOUTHERN MISSOURI. Wilson Bulletin, 55:151-154.

Collected 234 doves in Ozarks from 1939 to 1942. They ate mostly Foxtail in September, 1939, but mostly wheat during September of other years. Rapidly shift to newly available food supplies. Select food on surface of ground since they are unable to scratch or to cling to vertical stalks. Tendency of males forming separate flocks in winter. Part of doves migrate, remainder are gregarious in winter.

188. Rotsch, Dick. 1960. BACKYARD GAME BIRDS. Missouri Conservationist, 21(9):10-12.

A popular account of dove hunting, where to find them, how to hunt them, and guns and ammunition for best results.

189. Wight, Howard. 1953. DOVE HUNTING - MISSOURI STYLE. Missouri Conservationist, 14(8):6-7.

Popular account of a dove hunt over wheat stubble as doves were coming to roost. About 10,000 Missouri dove hunters bag around 150,000 birds yearly. The average hunter goes out about six times and stays about three hours. He kills slightly less than five doves per trip and about 30 doves a season.

190. Wight, Howard M. 1954. NEEDED: A DOVE FLYWAY CONCEPT. Proceedings of the Southeastern Association of Game and Fish Commissioners, November, 1954:78-80.

An analysis of recoveries from doves banded in Mississippi and Central Waterfowl Flyways shows that doves cannot be administered on basis of waterfowl flyways. Recommends a study of the flyway concept regarding doves to provide for adequate management.

191. Wight, Howard. 1954. DOVES, BANDS AND FLYWAYS. Missouri Conservationist, 15(3):10-11.

Presents analysis of recoveries of banded doves to show they do not move in waterfowl flyways. Therefore, he urges that doves not be regulated on basis of waterfowl flyways. The great majority of Missouri banded doves migrate to Texas and Mexico, although of 33 recoveries, 25 were in Central Flyway, five in Mississippi Flyway, and three in Atlantic Flyway.

192. Wight, Howard M. 1956. A FIELD TECHNIQUE FOR BURSAL INSPECTION OF MOURNING DOVES. Journal of Wildlife Management, 20(1):94-95.

Juvenile doves molting the ninth or tenth primaries seldom exhibit white-tipped coverts and thus could not be separated from adults by plumage in field inspection. A method of separating juveniles from adults in hunter bags was developed. A transverse cut is made posterior to the vent which will expose the bursa, if present, to denote a juvenile. Probing of the bursa can be done as a routine laboratory technique, but is less satisfactory in the field.

193. Wight, Howard. 1956. THE MOURNING DOVE STORY. Missouri Conservationist, September:8-9.

Dove hunting is steadily attracting more hunters each year. An estimated 20,000 hunters will be afield in September. Doves are increasing. Doves banded as nestlings or breeding adults will return the following year to within a mile of point of banding. Over half of Missouri doves shot out of State are taken in Texas. No dove banded in a northern State has been taken by a Missouri hunter.

Montana

194. Fisher, H. I., R. W. Hiatt, and Wm. Bergeson. 1947. THE VALIDITY OF THE ROADSIDE CENSUS AS APPLIED TO PHEASANTS. Journal of Wildlife Management, 11:205-226.

A discussion of pheasant censusing by roadside counts (which should be read by all dove workers interested in such techniques). A comparative study of two routes in Montana showed roadside counts to be highly erratic and often not in line with known seasonal fluctuations in population. The authors concluded, ". . . no adequate method which may be applied generally has yet been devised for censusing pheasants; but it appears that attacks on the problem other than by means of the roadside census technique are desirable and promise to provide more accurate results."

195. Montana State Fish and Game Commission. 1961. THE MOURNING DOVE AS A GAME BIRD. Montana Wildlife, January, 18-21.

A popular article extolling the mourning dove as a wasted asset to Montana, its excellent qualities as a game bird, and the biological basis for hunting it.

Nebraska

196. Gulotta, W. and L. 1947. BANDING MOURNING DOVES IN EASTERN NEBRASKA. Nebraska Bird Review, 15:12-19.

The Gulottas have banded 508 doves from 1940 to 1947. During the September 1947 shooting season they found nestlings and unhatched eggs in dove nests. Gives protests against shooting doves in September in Nebraska.

197. LaPointe, Donald F. 1958. MOURNING DOVE PRODUCTION IN A CENTRAL NEBRASKA SHELTERBELT. Journal of Wildlife Management, 22(4):439-440.

A shelterbelt near Grand Island, Nebraska, was selected for intensive study during the 1957 nesting season. It was visited 30 times, April 7 through September 15. The median nesting attempt was observed on June 16. Doves preferred American elm and ponderosa pine for nesting. Twenty-five out of 98 nesting attempts (26%) were successful. Forty-four nestlings were banded. Production was approximately 34 doves per acre.

[From Wildlife Review 94:70]

198. LaPointe, Donald F. 1958. HELP WANTED. Outdoor Nebraska, 36(8):23-24.

A description of dove nesting and banding. Tips on places to look for profitable nesting areas and on handling nestlings at the nest are given.

199. McClure, H. Elliott. 1945. REACTION OF THE MOURNING DOVE TO COLORED EGGS. Auk, 62:270-272.

Eggs in mourning dove nests were dyed with water colors in a variety of hues (red, green, blue, yellow, orange, brown, black). In no instance did the color or colors of the eggs interrupt incubation or inhibit hatching. The presence of punctures or breaks in the eggs produces a greater response in the birds than the color and may interrupt or stop incubation.

200. McClure, H. Elliott. 1946. MOURNING DOVES IN NEBRASKA AND THE WEST. Auk, 63:24-42.

From 1941 through 1943 nesting habits studied near Ord, Nebraska, and 385 nestings were observed, with 47.9% success. 19.1% of nests were used more than once (25.7% in Iowa). Elm, blue spruce, white spruce, and boxelder were used mainly for nest trees. Nested on Brown Thrasher, Yellow-billed Cuckoo, Bronzed Grackle, English Sparrow, Robin, and Migrant Shrikes old nests. Forty-eight percent of 50 nests in Loup County, Nebraska were successful in 1942-43. Nineteen nests were under bridges, or bridge supports, at Ord. Drove 77,000 miles in Nebraska from 1941-44 and saw 19,259 doves - average of 33 1/2 doves per 100 miles. He believes such roadside counts are valuable in population trend determinations. Dove was present in Nebraska from March through October. Nesting began in April and continued until about September 25. Gives discussion of using number of active nests for production figures and presents a factor for each month in both Iowa and Nebraska for this. Compares Iowa and Nebraska data throughout this paper.

201. Nebraska Forestation and Parks Commission. 1958. WASTED GAME BIRD. Outdoor Nebraska, 36(5):19-20.

The Nebraska Commission has gone on record as favoring efforts to return the dove to the game bird list since it was removed in 1953. The Commission arrived at this decision after considering the facts that doves are in no danger of over-harvest, have a high natural mortality rate and a high reproductive potential.

North Carolina

202. Allison, Don. 1950. GETTING THE ANSWERS TO NORTH CAROLINA'S MOURNING DOVE PROBLEMS. Wildlife in North Carolina, September, 1950, 14-16, 18.

General account of the southeastern study. In North Carolina 1,222 doves have been trapped, recaptures numbering 274. Twelve returns secured from hunters. During the winter census of February 6-12, 1950 game protectors estimated doves present in each major region of the State. Results show approximately 257,000 doves were in the State. Examinations of plumage showed 72% young birds among 2,377 doves killed in 48 counties during two seasons. Crippling loss was 28.1%. Average man hunted 2.4 hours and bagged 4.3 birds. Statistical kill estimated of 52,053 doves, of which 40,635 were bagged and the rest crippled. Eleven percent were feeding young when killed. Includes general discussion of project plans and operations.

203. Allison, Don. 1953. NORTH CAROLINA'S MOURNING DOVE BANDING PROGRAM. Wildlife in North Carolina, 17(1): 11-14.

A popular account of the North Carolina dove banding since 1948. Over 5,400 doves have been banded, mostly at 13 permanent stations in 10 counties. Combined studies indicate a 70 percent annual mortality with hunting accounting for only 3 to 20 percent. Peak of southward migration occurs in late August or early September. Northward movement from the warm wintering grounds takes place mostly during February and March. Recoveries in North Carolina of birds banded in other States have been: Florida, 2; South Carolina, 1; Virginia, 1; District of Columbia, 1; Pennsylvania, 6; New Jersey, 3; New York, 5; Massachusetts, 15; Ohio, 3; Indiana, 2; Michigan, 6. Doves banded in North Carolina have been recovered in: Florida, 3; Alabama, 1; South Carolina, 5; Virginia, 1; Maryland, 1.

204. Barick, Frank B., and T. Stuart Critcher. 1956. STATISTICAL GAME KILL SURVEYS - SOME OBSERVATIONS ON FIVE YEARS OF OPERATION. Proceedings of the Southeastern Association of Game and Fish Commissioners, Daytona Beach, Florida, October, 1955:43-54.

Results of mail questionnaires to a sample of about 4 percent of hunters. Rabbits and squirrels ranked at top of the list in regard to total hunting effort, with quail next. These three species accounted for 68 percent of hunting effort. Doves accounted for 2.8 percent. Dove kill is given: 1951, 395,829; 1952, 315,041; 1953, 416,117; and 1954, 484,248. "Much work still needs to be done in the way of refining the technique."

205. Critcher, T. Stuart. 1958. IF YOU HUNT DOVES. Wildlife in North Carolina, 22(9):6-7.

A popular account of dove harvest in North Carolina and with information on when, where, how and with what to hunt doves.

206. Critcher, T. Stuart. 1960. THE MOURNING DOVE'S YEAR. Wildlife in North Carolina, 24(9):11-14.

A popular account of the status and management of the mourning dove in North Carolina with illustrations by Wallace Hughes.

207. Cummings, Edmund G., and Thomas L. Quay. 1953. FOOD HABITS OF THE MOURNING DOVE IN NORTH CAROLINA. Journal of the Elisha Mitchell Scientific Society, 69(2): 142-149.

Dove is a 99 percent vegetarian, feeding on seeds of a wide variety of wild and cultivated plants. Previous

studies indicated the four most important groups were grasses, legumes, composites, and sparges. Doves may eat whatever is available to them on the surface of the ground without scratching. This study analyzed crops from 553 doves collected all over North Carolina during 1939-40. Total plant food, all seeds, averaged 99.5 percent by volume. Eleven genera averaged 85.4 percent of all foods taken; these included: Crab-grass, corn, foxtail, paspalum, wheat, pokeweed, ragweed, galingale, soy-bean, cowpea, and croton. Seeds from 83 genera and at least 129 species were found. "Winter and spring would be the seasons when the most could be done through food management procedures about attracting and maintaining, within North Carolina, increased numbers of this second most important game bird in the southeastern United States."

208. Hankla, Donald J. 1960. NEW DEAL FOR DOVE HUNTING. Wildlife in North Carolina, 24(8):8-9.

Hunting privileges are being offered free of charge on 10 areas managed specifically for doves in North Carolina. Areas vary in size from 40 - 756 acres and are privately owned. Landowners agreed to permit the Commission to restrict hunting to designated days, to permit the Commission to plant 10 acres of browntop millet for dove food, and to permit sportsmen free access for the purpose of hunting doves. No quotas on the number of hunters are set, and hunters are not relieved of liability for damage to the owners' property, nor is the landowner liable for accidents incurred on his property.

209. Hon, William H. 1956. THE STATUS OF A GROUND-NESTING POPULATION OF EASTERN MOURNING DOVES IN COASTAL NORTH CAROLINA. Thesis M. Sc., North Carolina State College. 57 pp., typed.

Studied on a group of treeless islands near Beaufort, North Carolina, in June and July of 1951 and June, July, and August of 1954. Ground-nesting doves were compared to the tree-nesting doves in the same vicinity by means of nest censusing, trapping, marking, and recording of flights and general behavior. Twenty-two ground nests were discovered. When sixteen were revisited, it was found that parents deserted all six discovered prior to clutch completion, five of nine with full clutches, and one of two with nestlings. Ground nestlings left the nest at ten or eleven days of age and did not return. "The extensive and regular occurrence of ground-nesting on these islands seems to be the realization of a normal potential made possible by lack of predation and the presence of all necessary elements including an excellent food supply."

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175. Mississippi Game and Fish Commission. 1948. REPORT GIVES ESTIMATED HUNTER KILL FOR 1947-48. Mississippi Game and Fish, 11(12):5-7, June, 1948.

From a voluntary return of questionnaires mailed to a random sample of hunting license holders figures give estimated kill by game species. In all a total of 52% of the State license holders answered their questionnaires. About 260,000 doves were killed by estimated 49,401 active hunters, to give an average annual kill of 5.2 doves per hunter. About 37% of State license holders hunted doves, as compared to 21% of county license holders - a combined State total of 29%.

were conducted on four study areas; a total of 771 nests were found. Of these, 38.4% were in Loblolly Pines and 30% were built from 6 to 10 feet above the ground. Two day-long nest observations were made. It was estimated that 45 to 50 percent of the nests were successful. Nesting peaked during April, May and June, and lasted from mid-March until mid-September, although five successful nests were in October. In September, 20.5% of all adult doves collected were still feeding young. Eleven percent of the 771 nests were functional in September. Quay felt the study did not develop accurate techniques for estimating nesting success and production. He felt that no more than 60% of the successful nestings were found. Doves were caged and 17 were raised to maturity. These lost the last juvenile feathers at an average of 117 days (17 weeks), with extremes of 94 to 148 days. Three successful cage matings and nestings were recorded. Between April, 1940 and September, 1942 about 2,500 doves were banded (including 1,396 adults, 434 juveniles, and 520 nestlings). Only 8 were recovered outside North Carolina (in Maryland, Virginia, South Carolina, Florida, and Alabama). All of the birds collected and many of those trapped were sexed, with result that males appeared to outnumber females 162 to 100 in fall and winter months. Periodic and non-periodic roadside counts were conducted but seem unreliable due to many variables and inconsistencies. "In view of the importance of late fall nesting to the total population, it is recommended that there should be no open season on Mourning Doves in North Carolina before late October." Its management should be on a regional basis.

215. Quay, Thomas L. 1954. MOURNING DOVE POPULATIONS IN NORTH CAROLINA. North Carolina Wildlife Resources Commission, 46 pp.

Results of the North Carolina dove study conducted under direction of Donald G. Allison from August, 1949 through February, 1953. The State's dove population is composed of at least four different segments, with regard to residence status: (1) permanent residents, are first to start nesting but are smallest group; (2) winter residents, present from late November until March or April; (3) transient population, is largest group, which nest to the north and winter to the south; and (4) summer residents, which are most stable group, busily raising young during a four to six months season. These four segments tend to overlap and intergrade, and the dove population is characteristically shifting and unstable. Doves have a strong tendency to return to the same area from one year to the next; true of the last three segments named above.

This tendency is shown by analysis of banding records. While nesting occurs from March to September, the peak activity is in May and June. The proportion of young in hunters' bags provides a check on the trend of the dove population. During the last half of September the juveniles make up 52 to 73 percent of the bag, as shown by bag checks for five years. Most dove kill is during the first three days of the season. The State kill for 1951-52 season is estimated at 395,829 doves. Average hunter was out two and one-half to three hours and bagged 2.9 to 5.3 doves. About 41 percent of hunters secured the limit of eight doves in September, 1953. Kill per gun hour was 1.6 in 1953. Nearly three-fourths of North Carolina's doves die each year; 85 percent during first year of life and 57 percent in adult life. From band recoveries hunters cause 3 percent mortality. In addition, the illegal kill, crippling losses, and unreported bands may serve to increase the total gun mortality to 15 to 20 percent of the entire population.

216. Taylor, Mark H. 1941. BREEDING AND NESTING ACTIVITIES OF THE EASTERN MOURNING DOVE IN NORTH CAROLINA. Unpublished thesis for M. Sc. degree at the University of North Carolina, 1941.

Gives results of dove studies under Federal Aid Project from July, 1939 to December, 1940. Large flocks of doves seen in fields during July and August of 1939 and 1940. In second week of September, 1939 several flocks left Raleigh and new flocks were not seen until November 2; when they stayed until late February, 1940. At Hendersonville flocks left last week of August and "northern" birds did not arrive for 4 weeks. Cooing heard at Raleigh from February 19 to October 11, 1940. It is audible for 300 yards. Three hundred twenty-four nests studied. Found from ground to 80 feet high; mean height was 18 feet and most were 10 to 20 feet up. Doves used former nests of: Robin - 5, Cardinal - 1, Brown Thrasher - 2, Mockingbird - 1, Unidentified - 1; also 2 grey-squirrel nests. Incubation period of 14 or 15 days. Squab weighs 6.0 grams at hatching. Eyes not open until 3 or 4 days old. Usually flew at 10 days when observer tried to catch them. At 12 days most could fly short distances. Young feed by putting bills inside mouth of parent. First fed "dove milk." After 3 or 4 days this is supplemented by mixture of seeds and after 6 or 7 days the crop gland ceases to function. When young leave nest they return to it for roosting for first 2 or 3 nights. May was peak nesting month; with April, May, June, and July all being important. In captivity the complete juvenile plumage was attained in about one month; then began moult to adult, requiring about 3 months. At 4 months all vestiges of juvenile plumage was gone.

Approximately 850,000 doves produced in North Carolina during 1940, based on number successfully raised in study area. Nests found in 49 species of plants. Pines were most used: 60% in loblolly pine and 14% in shortleaf pine. 40% of all nests were unsuccessful. Young brooded 12 to 15 days.

Adults feeding young:

Sept.	1-15, 1939	119	collected	23	with dove milk	19.3%
	16-30, 1939	162		9		5.5
Aug.	1-15, 1940	10		0		0.0
	16-31, 1940	32		5		15.6
Sept.	1-15, 1940	56		8		14.3
	16-30, 1940	113		10		8.8
Oct.	1-15, 1940	25		1		4.0
	16-31, 1940	34		0		0.0

Other tables were included to show percentages of adults with dove milk for each month of 1940; and percentage of juveniles to adults for each month; and measurements of male testes for each month. Bibliography of 33 titles.

217. Wilson, Ken. 1952. IN DOVE HUNTING LOW HITTING AVERAGES CAN BE COSTLY. Wildlife in North Carolina, 16(2): 15, 23.

Discussion of success of 22 hunters on the afternoon of September 15, 1951, at Eaton Ferry, North Carolina. They bagged a total of 88 doves, firing 452 shots, so each dove averaged 57 cents in cost (with shells at 11 cents each). He rated the hunters on basis of number of shots required for each dove bagged: 2 used 2 shells or less, expert; 4 used 2 to 4 shells, good; 5 used 4 to 6, fair; 10 used over 6, poor; one had all misses, optimist. The experts' doves cost 17 and 19 cents apiece; good shooters' doves cost 28-33 cents each; one hunter fired 35 shells and killed only 3 birds, at a cost of \$1.21 per bird. "Dove shooting is a difficult and costly art."

North Dakota

218. Boldt, Wilbur. 1950. THE PRODUCTION OF THE MOURNING DOVE, ZENAIDURA MACROURA (L.), IN SHELTERBELTS, STUTSMAN COUNTY, NORTH DAKOTA, 1950. M. Sc. Thesis, Iowa State College, Ames, Iowa. (See Boldt and Hendrickson, 1952, below.)

219. Boldt, Wilbur. 1952. MOURNING DOVES AND SHELTERBELTS. North Dakota Outdoors, 14(12):4-5.

A very popular account of a study for M. S. degree of the dove in 5 shelterbelts near Jamestown, North Dakota, in the summer of 1950. Considerable generalized information is given on the life history and habits of the species. Shelterbelts seem to favor doves by increasing nesting sites.

220. Boldt, Wilbur, and George O. Hendrickson. 1952. MOURNING DOVE PRODUCTION IN NORTH DAKOTA SHELTERBELTS, 1950. Journal of Wildlife Management, 16(2):187-191.

The production of the mourning dove was studied in five shelterbelts near Jamestown, North Dakota, in 1950. An estimated mean breeding population of 39 doves produced an estimated 64 doves (an increase of 162%). The peak of nesting was August 13-19, when a total of 21 nests were active. Nesting began about May 15 and continued until September 25 when the last nest successfully brought off two young. Approximately 4 pairs nested to a mile, or about a pair to 3 acres of shelterbelt. About 15 doves were produced to a mile, or about one to an acre. A total of 68 nestlings were banded.

221. Bry, Ed. 1959. DOVE HAVEN. North Dakota Outdoors, 21(10):12, 17.

Farm groves in North Dakota are excellent nesting sites. A discussion of dove banding, management, and nesting habits of mourning doves is presented. Of 101 band returns received since 1920, 40 were from Texas, 30 from Mexico, 12 from North Dakota, 4 from Guatemala, and the remainder from 9 other States and El Salvador.

222. Randall, Robert N. 1955. MOURNING DOVE PRODUCTION IN SOUTH CENTRAL NORTH DAKOTA. Journal of Wildlife Management, 19(1):157-159.

Gives results of a nesting study of two areas near Bismarck, North Dakota, in 1952. One was a shelterbelt of 1.7 acres and the other was 3.8 acres near the head of a small coulee. In the coulee 156 nesting attempts resulted in 123 nestings (69.9 percent successful); 31 attempts resulted in 23 nestings (77.4 percent successful) in the shelterbelt. The nesting activity reached a peak from early July until the second week of August in the coulee; on June 13 in the shelterbelt. The last young were brought off on September 21 in the coulee. The indicated population for the coulee was 46 pairs, or 24.2 birds per acre; for the shelterbelt 11 pairs or 12.9 birds per acre. There were 55.4 and 28.2 young per acre produced on the respective areas.

OHIO

223. Batts, H. Lewis, Jr. 1952. MOURNING DOVE NESTS IN UNUSUAL SITE. Wilson Bulletin, 64(2):114.

A nest with two eggs was built on top of a robin's nest at least a year old, on top of steel beams beneath a concrete highway bridge near Delaware, Ohio, on July 14, 1950. The nest was over water.

224. Beam, M. H. 1925. A RECORD BREAKING MOURNING DOVE. Bird-lore, 27:158-161.

One had 5 nests in the wild in Ohio.

225. Calhoun, J. B. 1948. UTILIZATION OF ARTIFICIAL NESTING SUBSTRATE BY DOVES AND ROBINS. Journal of Wildlife Management, 12:136-142.

Cones of roofing paper were constructed and nailed to crotches and forks of trees at Columbus, Ohio in 1945-46. Practically all of the doves in the area used the cones at some time, but only one-third of these attempts were successful, whereas one-half of the robins in the area used the cones at some time with only one-fourth being successful (one-half of nesting attempts not in cones were successful). Doves preferred cones with black surface inside, while robins preferred the green surface inside.

226. Dambach, C. A. 1948. THE RELATIVE IMPORTANCE OF HUNTING RESTRICTIONS AND LAND USE IN MAINTAINING WILDLIFE POPULATIONS IN OHIO. Ohio Journal of Science, 48:209-229.

Discusses development of hunting regulations and their effects on various species of wildlife in Ohio. Hunting seasons on mourning doves were first established in 1857 and it was a game bird until 1913. Since that time it has not been hunted in Ohio.

227. Kah, Bill. 1961. THE NATION'S TOP DOVE BANDER. Ohio Conservation Bulletin, 25(7):8-11.

Laurel Van Camp, Ottawa County, Ohio, Game Protector, has banded more than 9,000 doves since 1944. Helpful hints on banding are included.

228. Koppelberger, Vic. 1957. THE MOURNING DOVE IN OHIO. Ohio Conservation Bulletin, 21(4):4-5, 30-31.

Account of habits and quantitative report on nesting studies in northern Ohio. Weather was greatest mortality factor. Doves did not necessarily nest in same areas in different years even if habitat remained suitable. Roadside nesting definitely has been reduced by treatment of roadsides with herbicides.

229. Laub, Kenneth W. 1956. THE RELATION OF PARENTAL CARE AND THE CONDITION OF THE GLANDULAR CROP TO THE SUCCESSFUL REARING OF YOUNG MOURNING DOVES, ZENAIIDURA MACROURA (L.). Thesis for M. Sc. at Ohio State University, 68 pp. typed.

Major objectives were: (1) to determine the relation and degree of development of the glandular condition of the crop to the rearing of young; (2) to determine hatching success and rearing of young in relation to the presence of one and/or both parents throughout the nesting season;

(3) to determine if an adult will remate and reneest the same season when the other member of the pair dies. Sixty-five nests were disrupted at various stages in the nesting period and subsequently observed. In no case was a strange adult known to assist in incubating or caring for young in a disrupted nest. No nest was successful after an adult was removed during incubation. The youngest nestling successfully reared by a single parent was four days old when the other parent was removed. The youngest two nestlings reared by a single parent were six and seven days old when disruption occurred. The inability of one adult to produce sufficient crop milk for two nestlings is considered the most important factor in determining the success of a disrupted nest. No correlation was found between the sex of the parent removed, or the time of the season at which the nest was disrupted, and the subsequent success of the nest. Fifty-one crops from nesting studies were examined. Free crop milk was first found after nine days of incubation; the latest after nine days of brooding. Crop wall development is correlated with nesting stage.

230. Mackey, James P. 1954. SOME ASPECTS OF MOURNING DOVE BEHAVIOR RELATED TO REPRODUCTION. M. Sc. thesis, Ohio State University, 101 pp. typed.

(Not available for abstracting)

231. Nice, Margaret M. 1938. NOTES ON TWO NESTS OF THE EASTERN MOURNING DOVE. Auk, 55:95-97.

From April 3 to 14, 1928, a pair heard calling at Columbus, Ohio. On the 17th they had a bulky nest. From 10:19 to 1:34 the male made 82 trips with material. First egg laid 5:00 p.m., April 19. Destroyed by blue jay (?) next day. April 25, 1934, a pair started to build. First egg laid 28th and second on 30th. Both hatched May 14. Male took his place incubating at various times from 9:28 to 10:20. After young hatched he brooded beginning from 8:55 to 10:19. Female never returned until after 5:00 p.m. during incubation, but slightly earlier during brooding.

232. Peters, Harold S. 1952. A SUMMARY OF MOURNING DOVE CALL COUNT INVESTIGATIONS IN OHIO. Special Scientific Report, Wildlife No. 17, U. S. Department of the Interior, Fish and Wildlife Service, 35-46.

Results of testing the call-road count in Ohio from early June until mid-August, 1950, and from May 2 until June 23 in 1951. In 1950 thirteen routes were covered a total of 44 times; each route was counted from 2 to 7 times. In 1951,

41 counts were made over 9 routes, with route number 6 being covered 14 times and route number 7 ten times. Graphs and tables give results and comparisons. While more doves were heard during 1951 than during 1950, there were fewer doves seen during 1951 on the same routes. Sight records varied more than counts of calling doves. In 1950 the routes averaged 18.2 doves per count, while the 1951 routes averaged 18.9 doves heard. The 20-station, 20-mile call-road count was standardized in 1951 as a reliable census technique.

233. Petrides, G. A. 1950. NOTES ON DETERMINATION OF SEX AND AGE IN THE WOODCOCK AND MOURNING DOVE. Auk, 67:357-360.

Examinations of 41 male and 24 female doves collected in Ohio between May 23, 1947 and April 20, 1948. Most obvious distinctions were in the color of the breast and crown of the head of doves, so that sexing of adults is relatively simple, but sexing of juveniles is more difficult. Cloacal examinations of dead doves is difficult. The size and development of the sex organs may serve as a convenient source of sex and age information in rapid field checking, without resorting to dissection of the bursa.

234. Putnam, L. S., and C. E. Knoder. 1953. FIVE NESTINGS OF A PAIR OF CAPTIVE MOURNING DOVES. Wilson Bulletin, 65(4):280.

Five nesting attempts by one pair in captivity at Ohio State University during summer of 1951.

235. Stewart, Paul A. 1954. COMBINATION SUBSTRATUM AND AUTOMATIC TRAP FOR NESTING MOURNING DOVES. Bird-Banding, 25(1):6-8.

Tested two types of combination nesting substrata and trap platforms on Ohio State University campus 1951-53. One was a short board with three small sticks, arranged in the form of a triangle, nailed to the surface, over which a wire trap could be placed to catch adult. The other was a board with an arch of poultry netting to which ends could be fitted for trapping the adult. Traps could be operated automatically or manually. Doves were fledged in 19 of the 23 nests located on substrata, a success of 82.6 percent. Total of 23 adult doves were trapped. Suggests further studies on use of substrata for dove nesting.

236. Stewart, Paul A., and James P. Mackey, Jr. 1953. A PAIR OF MOURNING DOVES OCCUPIES SAME NEST TWO SUCCESSIVE YEARS. Bird-Banding, 24(1):16.

At Columbus, Ohio, on June 23 and 25, 1951, a pair of nesting doves was caught and banded. On April 4, 1952,

the same pair were retrapped on the same nest. This causes speculation as to whether this pair were continuously together during the intervening months or how they returned to the same nesting site.

237. Wallace, C. R. 1927. GROUND NESTING HABITS OF THE MOURNING DOVE AND TOWHEE. Wilson Bulletin, 39:37. (Delaware, Ohio)

Delaware County, Ohio. Last nestings, September 4, 1921, with nestlings 2 or 3 days old; September 16, 1921, with young about a week old. Three nests found on ground, with eggs, May 24, 1923, first record for ground nesting in Central Ohio.

238. Webb, L. G. 1950. THE LIFE HISTORY AND STATUS OF THE MOURNING DOVE, ZENAIDURA MACROURA CAROLINENSIS (L), IN OHIO. Abstracts of Doctoral Dissertations, No. 59, Ohio State University, Press, 417-419.

Abstract of thesis for Ph.D. degree received from Ohio State University in 1949. A study of the dove was conducted from November, 1946 to January, 1949, mainly at Columbus. "The principal objectives of this study were to determine the feasibility of hunting doves in Ohio, and the management measures advisable for increased production. The Mourning Dove has been completely protected in Ohio since 1913 and was made a songbird in 1917." Greatest concentrations are noted in August and September; the fall migration starts the latter part of July. Winter population was low in 1947-48, but was exceedingly high in 1948-49. Nesting season extended from the latter part of March to the middle of October. Average number of nesting attempts made by a pair during one season was estimated at 3.7. However, a marked pair was known to make 7 attempts. The greatest number of successful broods produced by a pair during one season was four. In 1947, 52% of eggs laid produced juveniles, while 62% produced young in 1948. Management measures recommended: Supply adequate food and cover, plant evergreens for roosting and nesting, provide open watering places, allow weeds to grow in fence rows, etc., and conclude daily shooting hours approximately one-half to one hour before sunset. Feasibility of shooting doves in Ohio "should be determined from comprehensive studies of the Mourning Dove throughout its range."

239. Wharram, S. V. 1915. DOVE NEST. Oologist, 32:184, August, 1905.

He found doves' nest July 29, 1915 in Ashtabula County, Ohio, with 3 young doves in forked limb of apple tree. First time he has found more than 2 eggs or young.

OKLAHOMA

240. Dodson, Monte M. No date (1954?). OKLAHOMA MIGRATORY GAME BIRD STUDY, 1949-1953. Oklahoma Game and Fish Department, 51 pp.

Reports results of four year studies of waterfowl (Part I) and Mourning Doves (Part II) in Oklahoma. Only the dove section (p. 28-51) is here abstracted. Roadside counts from July to September were used to denote population fluctuations. Peak numbers were recorded in late July or early August, after which the population dropped sharply and was very low by the end of September. Nestling banding totaled 1,300. Nest success was roughly 15 percent in wilderness areas and about 50 percent in orchards and cemeteries. Nests were found as early as February but did not start in earnest until May. Nesting activity increased until late July and dropped sharply through August so that few nests were found after mid-September. Shelterbelts and farmsteads were concentrated nesting areas. Hunters take only a fraction of the population. Hunting pressure was greatest in early September (65 percent from September 1-10; 22 percent, September 11-20; and 13 percent, September 21-30). The kill per hunter varied from 17 to 22 doves over five years (1948-1952) and averaged 19.17. "The dove population is now somewhat stable and is not suffering to any extent." Urges farmers to delay plowing of grain stubble to allow doves to clean up waste grain.

241. Downing, Robert L. 1957. AN EVALUATION OF GROUND NESTING BY MOURNING DOVES IN NORTHWESTERN OKLAHOMA. M. Sc. Thesis, Oklahoma State University, 34 pp. typed, August.

Study conducted March 20, 1956 until September 8, 1956 from headquarters at Woodward and on study areas in parts of Woodward, Ellis, Harper and Beaver Counties. Ground nests were located through reports of many persons, by searching on foot, and by using a flushing bar on the front of a pickup truck. One hundred and thirty ground nests were found, 25 percent being successful. Tree nests were located by weekly visits to selected study areas. No difference was noted in number of nesting attempts by ground or tree nesting doves. Few ground nests were re-used (possibly because young defecate onto the nest and hence the nest became very dirty) whereas 40 percent of successful tree nests were re-used (only 12 percent of unsuccessful tree nests were re-used). By computation, the estimate of 26,730 pairs of doves nesting in trees in region studied (four counties) and 64,760 pairs of doves nesting on the ground, is obtained. By figuring nesting success in tree and ground nests the computation is that 59 percent of

young mourning doves are produced from ground nests. Dove production could be increased by planting openly spaced stands of trees within cultivated areas. Promoters of shelterbelts might utilize this suggestion. Ground nesting by the mourning dove is not an unusual occurrence. Nevertheless, the extent of the ground nesting habit and its contribution to the dove population nowhere has been explored carefully. An effort has been made in this study to determine the extent of ground nesting and how it compares in magnitude and productiveness with tree nesting in a prairie region in northwestern Oklahoma. Ground nests seem to occur on any type of slope, in any type of vegetation, and at any distance from a tree in the region studied. The ground nesting density on 19 study areas, totaling approximately 1,184 acres, was .025 nests per acre while a tree nesting density of 1.80 nests per acre was noted for 20 small tree areas totaling approximately 67.5 acres. No difference in fecundity rate was detected between ground nesting and tree nesting doves. Nesting success on the ground was 29 percent, while tree nesting success was 30 percent in a wooded canyon and 56 percent about a farmstead and orchard. An extra-polation of the available data suggests that 59 percent of the total production of young mourning doves in northwestern Oklahoma is from ground nests. The relative density of ground nests and tree nests in the region studied indicates that trees provide the preferred nesting situation.

242. Downing, Robert L. 1959. SIGNIFICANCE OF GROUND NESTING BY MOURNING DOVES IN NORTHWESTERN OKLAHOMA. Journal of Wildlife Management, 23(1):117-118.
(See Downing, 1957, above.)

243. Jessee, Tom. 1958. DOVE SHOOTING IS TOPS. Oklahoma Wildlife, 14(9):12-13.

A photo-story of doves and dove hunting.

244. Nice, Margaret M. 1921. NESTS OF MOURNING DOVES WITH THREE YOUNG. Condor, 23:145-147.

At Norman, Oklahoma (Western Dove). Found nest with 3 robin eggs April 15, 1921 in a new robin's nest in a box-elder 15 feet from ground. On April 20 it was empty and deserted. On April 30 it had 3 dove eggs. On May 14 - 1 egg and 2 young; on May 18 - 3 young. Left nest at average ages; oldest when 13 and others on following day at 12 and 13 days. Another nest in crotch of elm 10 feet from ground. On May 3 it had 2 eggs and on May 9 three eggs. First hatched May 16, second May 17 and third on May 22. The last bird was small and died next day. At least 35 sets of 3 eggs have been reported but in only 4 instances were 3 young in a nest. (A. K. Fisher, North

American Fauna 7, 1893, p. 33; T. Semmes, Jr., Oologist, 24:8-9, 1907; S. V. Wharram, Oologist, 32:134, 1915).

245. Nice, Margaret M. 1922-23. A STUDY OF THE NESTING OF MOURNING DOVES. Auk, 39:457-474, and Auk, 40:37-58.

Study of western mourning dove on campus of the University of Oklahoma, 1919-1921. Two hundred eighty-three nests studied in the 3 years. Nest building is in early morning, male gathers materials and carries them to female who arranges them. Doves nested about equally in all kinds of trees present. Only 2 nests on ground, then up to 30 feet high. Mostly nest on horizontal branches; $2/3$ vs. $1/3$ in crotches. 28.8% success on branch nests and 53.8% success in crotch nests during two years. Sometimes used old bird nests: Brown Thrashers, Mockingbirds, Robins, English Sparrows, Bronzed Grackles, and old dove nests. Sometimes doves' nest is used again the same season. Gives records from literature of use of other birds' nests, laying of egg, change of incubating birds, sets of 3 and 4 eggs, etc. Quotes two authorities that three eggs in clutch are very improbably by one female. Gives weights of young during growth, and describes acquisition of feathers. Young usually face same direction in nest. Usually brood young 10 - 13 days, although some leave at 14 and 15 days. Some adults show "broken-wing" feigning when nest is disturbed, but about $1/3$ never show it. Nesting later than September is rare. Quotes a California record of 2 eggs, December 5, 1911; and 3 from Texas: October 9, 1900, 2 young just hatched; November 27, 1890, 2 fresh eggs; and December 20, 1899, two eggs. Two January records: Texas, January 26, 1895 and California, January 18, 1920. Three February nests reported from Texas and 5 from California. Breeding season at Norman: Doves arrive in March and leave in late September and early October, although a few winter. First coo heard March 11, 1920 and March 6, 1921. Height of cooing from last of March to last of May. Little cooing heard in July and almost none in August. Nesting season from late March through September and sometimes into October. Last nests found active were 3 in October, one with young 8-13 days old. A two-acre grove had 15 occupied nests on May 13, 1920 - thickest concentration found. Discusses hunting season. Says Texas should not begin hunting until October 16. Natural enemies are few at Norman. Cats probably are worst. 43.2% success in 141 nests studied. Discusses failures by season and month. Average of 1.7 young raised in a nest. Discusses number of broods, quoting literature. Conclude "that doves probably average at least three broods a year." Summary:

Height of 122 nests in 1920 averaged 13.3 feet; 118 in 1921 averaged 14 feet. Two-thirds of nests placed on horizontal limbs; 1/3 in crotches. Fifteen percent of nests built on top of other nests, 2/3 of these occurring in April. Quotes many authors and gives many references in footnotes. (A detailed study but lacks sufficient definite statements.)

246. Nice, Margaret M. 1926. NESTING OF MOURNING DOVES DURING SEPTEMBER, 1925 IN NORMAN, OKLAHOMA. Auk, 43:94-95.

Western mourning doves had 41 occupied nests in September, 1925 compared to 8 in 1923; 12 in 1922; 8 in 1921; 14 in 1920; and 31 in 1919. Eighty-two percent success in 39 nests.

247. Wint, G. B. 1951. IMPROVED METHOD FOR MARKING GAME BIRDS FOR IDENTIFICATION IN THE FIELD. Bulletin of Oklahoma Agricultural and Mechanical College, 48(3):1-7.

A plastic tag attached to the hind neck by surgical skin clips or to the wing by means of a wing band was used to mark 1,025 pen-reared bobwhite for field identification. Ivory and yellow colors could be seen for 50 yards or more when birds were flying. Tagged quail were seen regularly as late as eight months after release.

Pennsylvania

248. George, John L. 1951. MARSH HAWK CATCHING A MOURNING DOVE. Wilson Bulletin, 63(2):112.

A Marsh Hawk was observed to catch a mourning dove in flight in Cumberland County, Pennsylvania, May 21, 1946. After several strikes which the dove eluded, the hawk made a swift direct stoop, grasped the dove in one foot, and without pause or change in altitude wheeled and carried the dove back along the course of pursuit.

249. Hayes, Jim. 1961. ARE DOVES REALLY GAME BIRDS? Pennsylvania Game News, 32(10):11-14.

Information on the life history and habits of the mourning dove are given. The qualities of the mourning dove as a game bird are presented along with best ways to hunt them.

250. Howarth, Robert C. 1954. A STUDY OF THE MOURNING DOVE IN CENTRE COUNTY, PENNSYLVANIA. Thesis for M. Sc. at Pennsylvania State University.

Study of nesting, production, population movements, banding, and hunter kill on the University farm of 3,300 acres, from September, 1952 to fall of 1953. Only 36 doves were reported killed in the 1952 season locally.

251. Jacobs, J. W. 1897. NEST OF MOURNING DOVE CONTAINING 3 EGGS. Wilson Bulletin, 4:71.

May 11, 1896 found dove nest with 3 eggs; 2 hatching and other fresh. (Waynesburg, Pennsylvania)

252. Raney, Edward C. 1939. ROBIN AND MOURNING DOVE USE THE SAME NEST. Auk, 56(3):337-338.

At New Castle, Pennsylvania, on May 8, 1933, 2 eggs of a robin and one of a mourning dove were found in a typical robin's nest 7 feet up in the fork of a sweet cherry tree. Two days later the two females were observed taking turns at incubation, with no evidence of antagonism. Neither male bird was seen near the nest. Boys destroyed the nest the next day. The following year on May 12 a robin's nest was found in the same spot containing two robin eggs and two dove eggs. Incubation was shared and the eggs hatched and the young were fed and brooded for 8 days. On the ninth day the four young were found dead in the nest. The tree was removed by the following spring.

253. Sheldon, Howard Lee. 1957. POPULATION AND PRODUCTIVITY OF THE MOURNING DOVE IN CENTRAL PENNSYLVANIA. M. Sc. thesis at Pennsylvania State University, January, 1957. 97 pp. typed.

Results of a study within a five-mile radius of University Park, from November, 1955 to December, 1956. Peak migration was first week of April, although fourteen doves were heard on March 10 call count. First fall flocking was August 1, with a flock of 400-500 on September 9. Hunting opened next day and scattered this flock. Summer residents leave prior to October 1, although some doves are seen until first week of November, and some spend the winter. Total of 407 doves banded (153 nestlings). First active nest found April 15 and latest was one which fledglings left on September 29. Peak was about July 1. Had 70 percent nesting success, being very low in early spring but 100 percent in August and September. Each pair averaged 3.5 successful broods. About 126 pairs bred in the area. Fall population estimate was 808 or about 6.4 doves per 100 acres. Dove hunter kill in Pennsylvania: 1952, 15,274; 1953, 12,693; 1954, 19,954; and 1955, 21,033.

254. Smith, Ned. 1958. MEET OUR NEWEST GAME BIRD. Pennsylvania Game News, 29(9):5-8.

The dove was placed on the game bird list in Pennsylvania in 1945, and dove hunting has become one of the State's fastest growing sports. A description of the mourning dove, its life history, habits and management are included in this popular article.

South Carolina

255. Neely, William W. 1961. PLANNING AND PLANTING CAN PRODUCE DOVES. South Carolina Wildlife, 8(2):10-11.

A good paper on planting of dove foods for attracting doves. Browntop millet (Panicum ramosum) is a food source that can be planted in a field for the specific purpose of attracting doves. It is adapted to a wide variety of soils and soil conditions, and its seeds are a choice dove food. Seeding should be done at the rate of 10 pounds per acre in rows 36-42 inches wide and fertilized with 600 pounds of 5-10-10 or similar fertilizer per acre. One or two cultivations may be necessary to keep the middles free of grass and weeds which will provide bare ground, a favored feeding condition of doves. Observations of browntop millet plantings indicate that about 2 acres is the smallest size of planting which will produce enough shooting to be worthwhile. Plantings of 5-10 acres are best, and only one shoot per week should be allowed even in the best fields to prevent the birds from shifting their feeding areas. Other foods used by doves which have been planted to attract doves are pearl millet (Pennisetum glaucum), pokeberry (Phytolacca americana) and wooly croton (Croton capitatus). Merits and uses of these plants in dove plantings are discussed.

256. Nelson, Frank P. 1954. BANDING OF DOVES TRACES MIGRATION. South Carolina Wildlife, 1(2):6-7.

Brief mention of dove banding. South Carolina banded 3,055 doves; 66 (2.1 percent) being recovered. There have been 66 doves recovered in South Carolina which were banded in other States (map shows movements). "Sixty-two per cent of the South Carolina banded recoveries were made in September and 60 per cent of the out-of-state bands were recovered in December and January." Appeals for recovery records.

257. Nelson, Frank P. 1954. THE MOURNING DOVE STUDY IN SOUTH CAROLINA - FINAL REPORT FEDERAL AID PROJECT W-11-R. South Carolina Wildlife Resources Department, 39 pp. processed.

Report on South Carolina's dove study from January 1, 1949 to June 30, 1953, under leadership of Harold Poole until March 1, 1952. Gives results of various census techniques and operational procedures. Random road counts and call counts proved most practical as production and breeding indices. Lowest population occurs in April; September is highest. Trapping resulted in 3,055 doves being banded. Only 66 (2.1 percent) were recovered, of

which 84.8 percent were within the State. Sixty-two percent of the State banded birds were recovered during September; 40 (60 percent) of the out-of-state bands were taken in December and January. No recommendations are included on hunting season dates or for work which should be continued.

258. Nelson, Frank P. 1956. FEATHERS TELL THE STORY OF AGE AND SEX. South Carolina Wildlife, 3(1):2, 3, 19.

Feather characteristics can tell sex and age of ducks and wild turkey. Progress of molt of wing feathers reveals age of juvenile doves (shown in table).

259. Peters, Harold S. 1957. THE MOURNING DOVE IN SOUTH CAROLINA. Presented to the Charleston Natural History Society, Charleston, South Carolina, February, 1957. 2 pp.

About 750,000 doves are killed annually in South Carolina. General account of movements, population status, banding and other dove investigations. There have been 159 banded doves taken in the State; 67 originally banded in South Carolina, and 92 banded in seventeen other States.

South Dakota

260. Oldenburg, Lloyd. 1960. SOUTH DAKOTA'S WASTED RESOURCE. South Dakota Conservation Digest, 27(3):3-5, 15.

A popular article which describes the distribution, abundance, nesting, foods, migration, and the rank of the mourning dove as a game bird. A short early September hunting season is recommended.

261. South Dakota Department of Game, Fish, and Parks. 1956. DOVE BANDING IN SOUTH DAKOTA. South Dakota Conservation Digest, July; 1 p.

South Dakota is cooperating in nationwide dove banding program, the State's quota being 2,500. Gives very brief life history information.

Tennessee

262. Clapper, Louis S. 1953. GO WITH ROY AND FIND OUT ABOUT DOVES. Tennessee Conservationist, 19(8):13.

A popular account of a dove coo count with Roy Anderson, small game project leader, beginning 4:03 a.m. A total of 38 are heard on a standardized 20-mile route. Other biologists are taking similar counts in the southeastern States to assist the dove project.

263. Hamm, H. 1948. DOVE SURVEY RESULTS. Tennessee Conservationist, January-February, 1948; 4.

Brief note giving summary of results of September, 1947 dove investigation by Department of Conservation and Fish and Wildlife Service in Tennessee. Of 5,011 doves checked in hunter's bags September 1-15, 6.1% were feeding young; 1,811 doves bagged September 16-30 had 10.3% still feeding young. The 1,031 hunters checked had an average of 6.6 doves.

264. Hammond, James W. 1951. FAMILY HABITS OF MOURNING DOVE OBJECT OF EXTENSIVE RESEARCH. Tennessee Conservationist, 16(8):14, 15, 19.

General summary of Tennessee dove project to date. Random road counts for April, May and June of 1949, 1950 and 1951 show a big population drop in 1951; in 1949 an average of 18.2 doves per 100 miles, in 1950 an average of 20.6, and in 1951 only 7.4 were observed. Some of this decrease was probably due to trichomoniasis and a student is now working on the incidence of this disease in the State. A coo count will be made during the nesting season this year. Rural mail carriers took a census of doves in the winters of 1950 and 1951 and showed a drop of over 50 percent in population, possibly due to severe winter weather and trichomoniasis. Over 1,750 doves have been banded on the project, with about 35 being recovered to date. Hunter bag checks showed 79 percent juveniles in 1949, and only 57 percent juveniles in 1950. This was probably caused by a poor nesting season or high juvenile mortality from trichomoniasis. Success of this project "depends largely on the cooperation of sportsmen and others interested in preserving our game resources."

265. Hammond, James W. 1954. WHAT WE KNOW ABOUT DOVES. Tennessee Conservationist, 20(6):6-7.

A very informative general account of results of the Cooperative Dove Study, 1948-52, with special emphasis on Tennessee investigations.

266. Hammond, James W. 1956. THE MOURNING DOVE IN TENNESSEE. Final Report, Project W-11-R. Tennessee State Game and Fish Commission, 39 pp.

General report of Southeastern Dove Study with details of Tennessee's project from November 1, 1948 to December 31, 1953. Random road counts proved a reliable index to the dove population in general. The spring call counts gave an index to the breeding population and showed a steady increase since 1951; "Bad weather and disease have a direct effect on the dove population." Total of 3,784 doves were trapped. "Banding records show that the Tennessee hunter

receives little benefit from the migration of doves." "Bag limits and seasons are the only two definite management tools that can be effectively applied in the management of doves." Tennessee should have a split season, the first segment opening September 1 and the second on December 15.

267. Hammond, James W. 1959. WE FIRED OUR GUNS AND THE DOVES KEPT A COMIN'. The Tennessee Conservationist, 25(9): 8-9, 23.

A popular article on the management of the mourning dove in Tennessee and on the mourning dove as a game bird.

268. Howell, Joseph C. 1951. THE ROADSIDE CENSUS AS A METHOD OF MEASURING BIRD POPULATIONS. Auk, 68(3):334-357.

Four-hour census routes in Knox County, Tennessee, were covered at speeds of 5 to 10 miles per hour along secondary roads, and every individual bird seen or heard was enumerated. At frequent intervals, often when unidentified individuals were encountered, the car was stopped and spot counts were made. Each contact was recorded by a symbol to show whether the bird was initially contacted through its song, its call, or through seeing it. The record was kept by a helper, leaving the census taker free to count the birds and drive the car. The identity of some individuals could not be established so they were recorded as "unidentified" or "unidentified sparrow." Binoculars were used. A total of 15 censuses were made between July 13, 1947, and September 30, 1947. A new series was begun in October, 1947, and was carried through a full year. Thirty censuses taken during June, July, and August, 1948, were matched by a set of 30 censuses taken during the same months of 1949. Relative abundance of individual species was found to differ from absolute abundance chiefly because of differences in conspicuousness. Differences in conspicuousness were measured by determining the percentage of the known absolute population of a species in a certain area. These percentages of conspicuousness ranged from 1 to 28, and were secured only for species which maintained relatively small territories. They vary with the season of the year, the habitat, and certain other factors. Data are used to show graphically that the mourning dove, flicker, blue jay, and bluebird, while considered resident species, have higher populations during periods of migration than during mid-winter. Data on the mourning dove indicate that there are fall (November) and late winter (February) population peaks separated by a mid-winter (January) low. The numbers of doves increased 38 percent in 1949 over those recorded in 1948, possibly partly due to the mild winter of 1948-49. Tables and graphs are included to show populations of many species recorded on these routes.

269. Kerley, Clayton. 1952. THE CALL-ROAD COUNT AS AN INDEX TO BREEDING POPULATIONS OF THE MOURNING DOVE IN EAST TENNESSEE. Special Scientific Report, Wildlife No. 17, U. S. Department of the Interior, Fish and Wildlife Service: 8-14.

Results of weekly call-road counts of a 20-mile route northeast of Knoxville, Tennessee, from April to August, 1951. One morning and one afternoon count each week were made by the author under the standardized procedure. Three crew counts were made in April, June and August over the same route. Three absolute censuses of a square mile surrounding station 8 were made June 18-22, July 19-23, and July 31-August 6. Graphs, figures, and maps show the results of the counts and comparisons. "There was no close agreement between the average number of doves heard during comparable one-man counts and five-crew counts either at station number 8 or any of the other stations, although the peaks and depressions tend to follow the same pattern." The five-crew counts heard 41% in June and 24% in August of the doves on the censused area, while the single observer heard 25% in June and 31% in August. Differences in hearing keenness of observers interfere with comparisons of results of counts.

270. Legler, Eugene, Jr. 1954. A GAME KILL STUDY COMBINING THE FIELD BAG CHECK QUESTIONNAIRE AND POST SEASON MAIL SURVEY, 1953-54. Technical Game Leaflet No. 1, Tennessee Game and Fish Commission, 16 pp.

Reports results of a kill study based on field bag checks and a sample of resident license holders by post card questionnaire. A total of 13,664 bag checks were submitted. Mail questionnaires were sent 3,805 names drawn from 406,675 resident license holders. Only 41 percent were returned, of which 82 percent were usable. Information was requested on seven species (or groups) of game. The dove information was from 1,219 hunter contacts and 1,387 questionnaires. Hunters averaged 4.2 trips and killed 18.1 doves per season (4.3 per trip) and 1.53 per hour hunted. Estimated State kill of doves was 718,407.

271. Monk, Harry C. 1949. NESTING OF THE MOURNING DOVE AT NASHVILLE. The Migrant, 20:1-9.

A study of doves near Centennial Park, Nashville, Tennessee, extending over 34 years, but most intensively 1934-39. Doves began to sing about last week of January and pairs begin to return to breeding territory in January and always in February. Courtship display noted as early as February 13. Earliest date for occupied nest was March 13, 1921. Nests with eggs are rare in first half of March, and March 25 is a good average for first sets of laying. No young have left nest in March. Fewer nests in

June than in other summer months. Total dove nests, 1934-39 and 1946-48:

	March	April	May	June	July	August	September	Total
Nests	12	46	49	34	46	47	1	235
% of Total	5.1	19.6	20.8	14.5	19.6	20.0	0.4	100
No. Broods								
Leaving Nest	0	7	26	24	22	22	21	122
% of Total	0	5.3	21.3	19.7	18.0	18.0	17.2	100

52% of above nests were successful; average of 1.74 young per brood. A high degree of success in September nestings. Some young left nest as late as September 29 (in 1934 and 1948). Young left nest on October 7, 1932, which is his latest observation. Twenty-seven percent of nests built on old nests; usually one of their own. Twenty-three nests were on robin, brown thrasher, mockingbird, wood thrush, and cuckoo nests. Also 13 on nests of gray squirrel. Most nests 15 to 35 feet high. He did not keep close check on factors causing destruction of nests.

272. Schultz, Vincent. 1951. GAME MORTALITY RESULTING FROM A SEVERE SNOW AND ICE STORM IN TENNESSEE. Presented at the Southeastern Association of Game and Fish Commissioners, Edgewater Park, Mississippi, October 22-24, 1951. Processed, 23 pp.

A severe sleet, freezing rain, and snow storm occurred in western and central Tennessee from January 28 until the first of February, 1951. A total of 1961 persons were interviewed (by random sampling) for purpose of ascertaining mortality to birds and mammals; 421 persons (21%) reported mortality (150 of these reported dove mortality). The estimated observed mortality was 84,884 doves in Tennessee.

273. Schultz, Vincent. 1954. THE EFFECTS OF A SEVERE SNOW AND ICE STORM ON GAME POPULATIONS IN TENNESSEE. Journal of the Tennessee Academy of Science, 29(1):24-35.

By interviewing randomly selected heads of farm households, information on game mortality during and immediately following a severe winter storm of January-February, 1951 was obtained. Thousands of rabbits, quail, doves and song-birds were killed. "Its effects were apparently severe enough to cause a reduction in the subsequent fall population of squirrels and doves."

Texas

274. Ashlock, Jim. 1953. PLAGUED TRAPPER LONGS FOR "DOVE OF PEACE." Texas Game and Fish, 11(10):28.

Warden Miller of Pecos, Texas, had red ants, a ground squirrel, a snake, and a horse, interfere with his dove trapping so had to move traps to a new location.

275. Carroll, Theron D. 1953. YOUNGSTERS UP AND DOWN. Texas Game and Fish, 11(8):4, 5, 32.

A popular article concerning use of youngsters (usually under 12 years of age) to locate mourning dove nests, climb to the nests, and band the nestlings in vicinity of Cuero, Texas. The young "G" (for "Game") men were organized as Junior Game Wardens in 1951. Members receive identification certificates signed by the Mayor, Chief of Police, the State Game Warden, and the sponsor (publisher of local paper). In 1951 they banded over 200 doves; in 1952 they reached 250; and in 1953 they hope to make it 300. Banding operations are from 9 to 12 on Saturday mornings and each group has an older boy as captain and co-captain. Local merchants treat the boys to movies and refreshments as rewards. Their first 1953 banding attempt resulted in finding 107 nests with eggs, 20 nests with small nestlings, 22 empty nests, and 21 young in nests banded.

276. Couch, Andrew B., Jr. 1961. POWDER, SHOT AND THE GREY GHOST. Texas Game and Fish, 19(9):10-11.

A popular article on the mourning dove as a game bird and the types of guns and shot that are used in hunting them.

277. Dillon, Olan W., Jr. 1961. MOURNING DOVE FOODS IN TEXAS DURING SEPTEMBER AND OCTOBER. Journal of Wildlife Management, 25(3):334-336.

Six hundred and fifty-one mourning dove crops were collected from 43 counties of Texas during the months of September and October (the months of the hunting season) in 1957, 1958, and 1959. Four plant families - grass, spurge, composite, and amaranth - made up 94.5 percent of the foods in the crops. Percent by volume of the 10 most important foods were: Grain sorghum, 19.4; oneseed croton, 18.8; annual sunflower, 14.8; browntop panicum, 6.5; woolly croton, 5.4; prostrate amaranth, 4.1; Texas croton, 4.0; Johnson grass, 3.6; Stillingia, 3.3; and wheat, 2.9. Some of the plants were weeds that grow in pastures and rangeland as well as in tilled cropland, but most were either agricultural crop plants or weeds associated with tilled areas.

278. Hamlin, Steve. 1953. DOVES BUILD NESTS ABOVE BARE GROUND. Texas Game and Fish, 11(9):29.

Ground nests of doves in Colorado County, Texas, tend to be in short grass. One area of natural short growth, alternating from bare ground to short Bermuda grass, had as many as 50 nests grouped close together. A clump with weeds two feet high and no nests; but after being mowed doves began nesting next day.

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279. Jackson, Alfred S. 1941(?) THE MOURNING DOVE IN THROCKMORTON COUNTY, TEXAS. Unpublished manuscript.

An investigation to gain knowledge of present status by research along 3 lines: (1) study of food and watering habits by combination of observation and stomach analysis; (2) studies of nesting populations in different habitats; (3) survey by interviews and questionnaires to determine status as a hunted game species. Investigations began August 15, 1938, and continued through May, 1940. It was carried on during the last two years of a severe drought (which began in 1934) and in 1939 there was a near-total failure of farm crops and greatly reduced yield of weeds and grasses. Dove was not being hunted much as a game bird until 1920 or 1930 in Texas. A Texas game law, effective June 30, 1904 was first to define wild dove as a game bird and established closed season between February 1 and September 1 with bag limit of 25. Main food of 201 doves, Throckmorton County, September, 1938 - August, 1939:

Grass	85.35%
Spurge	9.71%
Rose	1.68%
Amaranth	.85%
Caltrop	.73%
Flax	.21%
Poppy	.19%

And smaller percentages and traces of 16 other types of plants. Most important grasses were: Wheat, sorghums, barley, oats, millet, corn, browntop millet, etc. Took a few grasshopper eggs and grit.

Doves gradually left agricultural lands during September and October. Low of year was late November and early January. Doves fed around cattle areas in January and February and began to appear along highways by mid-March. Fed at cattle areas in April and in May moved to ripening wheat areas and continued there in June. No damage to farm crops was noted. Fed on waste grains. Both combine harvesting and rapid shallow plowing favor doves. Also over-grazing favors them by allowing weed growth. Management to increase the supply of dove food in October and May is desirable. Doves begin to seek water about 4:30 p.m. with climax between 5:30 and 7:00 p.m. First nests found March 31; last nest closed when young flew on September 25. Half of the 108 nests were found near buildings and other half in mesquite pastures or along streams. Eighty nests (74%) were destroyed in egg stage in 1939. Forty-eight destroyed (85%) of 56 in 1940. Mostly undetermined losses to nests. First cooing heard March 4. Height of nests varied from 3 feet and 3 inches to 18 feet and averaged 7 feet for 91 nests. Average kill of 30.7 doves per hunter in 1938 by residents. Conclusions and recommendations: Extensive banding needed to determine migratory status of doves in early fall. Hunting season should not open before October 1. Dove and quail seasons should be concurrent. Should limit season kill by hunters.

Should limit water-hole shooting to 4:00 p.m. closing. Question of nest failures and re-nesting needs intensive research. "A program of management for the Mourning Dove should be directed toward finding and applying the techniques which would insure the wise use and maintenance of the existing stock." (Bibliography of 28 titles)

280. Marsh, E., and Martha W. West. 1951. WANTED: NO. MD-16303. Texas Game and Fish, 9:2-5.

An appeal to report recoveries of banded doves, since 4,608 have been banded in Texas during 1950. Gives map showing movements of the 101 reported as killed during 1950 shooting season; 4 being recovered from Mexico and 1 from Louisiana. Nine doves banded in Arkansas, Missouri, Ohio, Oklahoma, and Tennessee were taken in Texas.

281. Miller, Townsend. 1952. DOVE DETECTIVES. Texas Game and Fish, 10:2-5.

General article on doves, giving results of studies by the State and mentioning the southeastern dove study. Sixty percent of doves killed in Texas are young of the year, and less than 35% are hatched in the State. Two hundred eight banded doves taken in Texas; 74 originally banded there; others: Iowa, 19; Illinois, 13; Arkansas, 13; South Dakota, 12; Louisiana, 10; Wisconsin, 9; North Dakota, 8; Indiana, 7; Michigan, 7; Minnesota, 7; Nebraska, 7; Kansas, 5; Missouri, 5; Ohio, 4; Oklahoma, 3; Alabama, 1; Arizona, 1; Colorado, 1; Florida, 1; Tennessee, 1. Of the 78 banded in Texas in 1951 which have been killed, 74 were taken in Texas and 4 in Mexico. Texas banded 4,608 doves in 1950 and 3,730 in 1951; 101 of those banded in 1950 were killed that year while 78 of the 1951 banding were killed that fall. Texas participated in the call counts during May and June.

282. Osborn, B. 1943. WILDLIFE AND HABITATS IN YOUNG COUNTY, TEXAS, BY A NEW METHOD OF SURVEY. Journal of Wildlife Management, 7:241-256.

Describes a method of recording important species of wildlife and key habitat elements on standard-sized plots at 5 mile intervals. Wildlife tallies were by quadrat method, using frequency of occurrence. Mourning doves occurred in 80% of timbered stream banks, 67% of brushy post oak, 100% of open post oak, 71% of prairie habitats, and gave a county total of 68% frequency.

283. Siegler, Hilbert R., and Coleman C. Newman. 1944. THE VALUE AND PRACTICABILITY OF WILDLIFE CENSUSES ALONG HIGHWAYS. Journal of Wildlife Management, 8:93-99.

Roadside counts of doves made in eastern Texas during 1939-41, averaging 510 miles per month. "Counts during only two years will not reveal relative population densities from one season of the year to the next." "Such counts provide general impressions as to the relative abundance of doves between two major plant zones."

284. Swank, W. G. 1949. THE CONSTRUCTION AND OPERATION OF A DOVE NEST TRAP. Mimeo. release 49-1, Texas Cooperative Wildlife Unit, September 23, 1949.

Describes construction and operation of a wire mesh trap placed over a dove nest to catch adults. Recommends using it when young nestlings are present. Operated by pulling string (from blind nearby) to drop two end doors when bird returns to nest enclosed by trap.

285. Swank, W. G. 1950. WHY TURN IN BIRD BANDS. Texas Game and Fish, 8(12):2-3. November, 1950.

Appeal to hunters to turn in bands from birds they kill, based on popularized account of a duck hunter who sent in band and received data on original banding.

286. Swank, W. G. 1950. DOVE WINGS YIELD IMPORTANT INFORMATION. Texas Game and Fish, 8(3):February, 1950.

Short discussion of dove study, molting of wing feathers, and appeals for dove wings from birds killed by hunters. A total of 1,223 wings were secured from 35 Texas counties. Until October 12 a rather certain separation of juvenile and adult wings could be made. From September 1 to October 12, 1949, 39% of the 974 wings were adult, and 61.0% were juvenile. From October 13 to November 15, 1949, 38% of the 249 wings were adult, 62.0% were juvenile, (but 21.0% could not be classified). If sex ratio was equal, each female produced 3.14 young in first period and 3.22 young in last period. Aging techniques show nesting peak was in July. In 1949, a year of apparent good dove hunting, each pair of adults succeeded in raising only three young to huntable size.

287. Swank, Wendell G. 1952. CONTRIBUTIONS TO THE KNOWLEDGE OF THE LIFE HISTORY AND ECOLOGY OF THE MOURNING DOVE IN TEXAS. Thesis for Ph.D. at Texas A & M College, May, 1952. 157 pp.

"The major purpose of this study was to obtain information concerning those factors that influence Mourning Dove populations in Texas. Information obtained in this area, when

combined with that obtained elsewhere in the United States, should provide a basis upon which to begin scientific management of this important migratory game bird." The investigation began in the spring of 1949 and terminated in June, 1951. "The study was divided primarily into three phases: (1) nesting, (2) development of a method of age determination, and (3) analysis of age ratios of doves taken during the hunting season." Most of the study was on 81 acres of the Texas A & M College campus which had a very high dove nesting population. Active dove nests were found in Brazos County in every month except November and December, but the main nesting season was from about March 10 to September 10. One nest found on February 7, 1950, with small young must have had eggs laid about January 25. "There is some indication that early nesting birds are those entering their second nesting season, while those that do not nest until the season is well advanced are birds hatched the preceding summer." In 1949 the last young left the nest on October 23 while in 1950 the last date was October 5. "It is impossible to say whether late nests are established by old birds or by birds in their first nesting season." Peak hatching occurred in June and July; that for May and August is almost equal; and there is little difference between April and September. The peak of production as determined from wings sent in by hunters is about one month later than that shown by the nest study. The wing data show that August was the leading month in dove production. "The number of nesting attempts vary from three, or possibly fewer, to at least six and possibly seven." "The monthly nesting activity of doves on the A & M campus when compared with data obtained in other areas shows that in general the peak of nesting is late in Texas." To determine the total number of nesting pairs both successful and unsuccessful segments of the population must be considered. In 1950 about 60 percent of the nestings were successful on the study area. The 1951 nesting population was much smaller than 1950, partially due to the February ice storm. In 1950 there were 93 adult doves trapped on active nests and marked. One pair made 6 known nesting attempts and another probable attempt, producing 7 young from 4 nests. Another pair raised 7 young from 4 nestings of 6 attempts. A third pair produced 7 young from 4 nestings of 5 attempts; another raised 6 in 3 nests of 4 attempts; another raised 7 in 4 nests of 4 attempts; and 2 pairs each raised 6 young from 3 successful nesting attempts. A total of 35 attempts were made by 7 marked pairs, averaging 5.0 attempts per pair, 80 percent being

successful. This was unusually high since the average success of 656 known attempts in the study area during 1950 was only 61.7%. "When nests are destroyed doves can lay a new clutch of eggs within 2 to 5 days, regardless of the stage of nesting cycle when the interruption occurs." In most cases the distance between subsequent nests of a pair did not exceed 200 feet. "Although there is a tendency for a pair of doves to use nests previously occupied by them, it is not reliable to use the number of broods raised in one nest as the number of broods reared by one pair." The 7 marked pairs produced an average of 6.7 young; this is greater than the average production. "The number of young produced per adult, as determined from the analysis of wings from 728 doves taken during the hunting season of 1949 was 1.67" (=3.3 per pair). In 1950 analysis of 907 wings showed each female produced 3.04 young. Adults began their post-nuptial molt during the nesting season in the latter part of May or the first part of June. Of the 57 returns from 1949-50 banding, 28 were from the vicinity of the station, 2 from Mexico, 1 from Louisiana, and 26 from other parts of Texas. Of the 1,359 doves banded in 1949 and 1950, 57 (4.19%) were recovered, all but 2 being shot. Hunters in Texas in 1950 were responsible for mortality of between 5 and 10 percent of the existing population. Rate of primary feather molt was studied in penned and wild birds, when the penned birds were found to delay the beginning of molt for 17 days. The 10 primary feathers were found to molt on the average at ages of 25, 30, 37; 45, 54, 66, 80, 96, 117, and 142 days. A 25-mile route was covered during fall and winter with the conclusion that this roadside census technique was not satisfactory. It might be used better in the nesting season to denote trends in population.

288. Swank, Wendell G. 1952. TRAPPING AND MARKING OF ADULT NESTING DOVES. Journal of Wildlife Management, 16(1):87-90.

Discusses construction and operation of a trap for catching adult doves on the nest. Best results were obtained by trapping adult birds from nests containing young that were 4 to 8 days old. The trap has a door at each end which can be closed by pulling triggers by a string from a blind. Males can usually be caught during the day from 8:30 a.m. to 5:30 p.m., females from one-half hour after dawn until 8:00 a.m. Trapped doves can be marked for individual identification with Testors Model Airplane Dope (white and yellow proved best). Distinct solid lines on large feathers of wings or tail were found to be the best designs. The feathers should be spread and held until the dope dries before releasing the bird.

289. Swank, Wendell G. 1955. FEATHER MOLT AS AN AGEING TECHNIQUE FOR MOURNING DOVES. Journal of Wildlife Management, 19(3):412-414.

Young doves of known age were taken from the nest and placed in pens to study rate of molting primaries, at College Station, Texas. Also sixteen birds banded as nestlings were recaptured as juveniles. Pinned birds began molting 17 days later than those in the wild. Results of all studies showed that primary "1" was molted at 25 days, 2 at 30 days, 3 at 37 days, 4 at 45 days, 5 at 54 days, 6 at 66 days, 7 at 80 days, 8 at 96 days, 9 at 117 days, and 10 at 142 days.

290. Swank, Wendell G. 1955. NESTING AND PRODUCTION OF THE MOURNING DOVE IN TEXAS. Ecology, 36(3):495-505.

Results of dove nesting studies near College Station, Texas, from 1949 to 1951. Active nesting season was from about March 10 to September 10. Seventy-two percent of the production was during May, June, and July. In September and October approximately 60 percent of hunter kill was of birds of the year. Limited band returns indicated first year birds had 86 percent mortality and older birds a 45 percent mortality. Seven pairs of marked adults each reared an average of 6.7 young. Wings from hunter bags showed an average of 3.34 young per pair of adults in 1949 and 3.04 young per pair in 1950. Data from seven pairs of marked birds showed distance between different nesting locations rarely exceeds 200 feet.

291. Texas Game and Fish Commission. 1953. BUSY WORLD DOESN'T BOTHER DOVE NESTING IN HEN HOUSE. Texas Game and Fish, 11(10):21.

A dove in Lamar County, Texas, moved in and took over one of the nests in a hen house, and hatched a pair of youngsters. These were banded by Warden Burks. "Not many doves are born with a roof over their heads."

292. Texas Game and Fish Commission. 1954. PRODUCTIVE DOVES. Texas Game and Fish, 12(4):2-3.

A total of eighteen doves were banded from repeated nesting in a single nest in a large hackberry tree in a yard at New Braunfels, Texas, in 1953. There was no way of identifying the parents to determine if the same adults were responsible. The young doves returned to the vicinity and "it was not unusual to see ten or so doves at one time, all sitting in a single line -- and all with their bright numbered bracelets gleaming in the sun!"

293. Texas Game and Fish Commission. 1956. TEXAS DATA INSPIRES DOVE BANDING PROGRAM. Texas Game and Fish, 14(6):24.

"A new five-year nationwide Mourning Dove banding program brings official recognition to the pioneering work of large-scale banding which Texas began several years ago." More than 23,000 doves were banded in preceding five years in Texas. "Slightly over three per cent of the bands were recovered, with about three-fourths of the returns coming from near the original banding place." Emphasis in Texas will be in Panhandle and Red River Valley this year.

294. Texas Game and Fish Commission. 1957. MEXICO ATTRACTS DOVES WHO FLEE WINTER IN TEXAS. Texas Game and Fish, 15(9):25.

"An outstanding number of doves are killed in Michoacan, Mexico, a state west of Mexico City." One from Texas was killed in Guatemala. Many banded near Edinburg in 1955 were killed in Louisiana in 1956. Texas has recovered 44 doves from Louisiana, 14 from Missouri, 10 from Nebraska, 9 from South Dakota, 7 from Oklahoma, and one from Massachusetts. Appeals for band recoveries.

295. Texas Game and Fish Commission. 1957. MOURNING DOVE. Texas Game and Fish, 15(9):14.

Drawings and captions publicizing doves. "Doves have many enemies, including rats, snakes, foxes, and even certain insects which feed on eggs. The fact that doves often nest on the ground makes their nests convenient to the thieving tendencies of certain robbers, such as skunks. Its greatest enemies, however, are the Cooper's and Sharp-shinned Hawks, which are capable of overtaking and capturing a speeding dove in flight."

296. Uzzell, Pierce. 1958. FAST FAVORITE. Texas Game and Fish, 16(10):16-17.

A popular article on the natural history, management and hunting of the mourning dove.

297. Uzzell, Pierce. 1959. RALLY THE WHITEWING. Texas Game and Fish, 17(9):4-6. Illus.

The white-winged dove population in Texas declined after World War II due to the accelerated clearing of cover during and after the war. Populations reached peak level of 1,039,000 in 1950 when the birds switched from native brush nesting habitat to citrus groves. A severe ice storm after the successful hunt of 1950 resulted in a new low population (about 10% of the peak). Since 1954, there has been an increase in population to 1959 with a slight decline in 1958.

[From Wildlife Review 97:61]

298. Vessels, Jay. 1951. DOVE BANDING, FAMILY STYLE. Texas Game and Fish, 9(10):25-27.

A popular story based on dove banding in an area where large numbers of grackles had been killed. Doves utilized old grackle nests and many nestlings were banded. Four active dove nests were found in one tree.

299. West, Martha W. 1953. AND THE BANDS GO ON. Texas Game and Fish, 11(7):12, 13, 32.

A popular account based on banding of 6,301 mourning doves by 200 cooperators during 1952 in Texas. Of these birds, 155 were reported killed during the following hunting season; 8 from Mexico, 3 from Central America, and singles from Florida, Alabama, and New Mexico. The 140 recoveries in Texas showed no major unusual movement pattern. "Most of Texas dove hunting again was in a 300-mile strip through the middle of the State from Oklahoma to the Rio Grande Valley." The nesting season started generally in April and nests were still fairly common on August 15, the peak of nesting occurred between the first of June and mid-July.

Utah

300. Dahlgren, Robert B. 1952. THE MOURNING DOVE IN UTAH. Utah Fish and Game Bulletin, 9(5):6, 8.

Preliminary and popular account of Utah's dove study which began in May, 1951 at Fillmore and is to extend until the fall of 1952. Average nest success in July, August, and September, 1951, was 58 percent. The majority of young doves moved out in July and August. Peak population in the study area occurred during the first week of August. Six nests contained young at the start of the hunting season on September 1. A check of hunters' bags showed 6 out of 41 adults were feeding young. "This indicates that a few nestlings may have been endangered by the hunt. The bulk of juveniles bagged throughout the nine open counties were of the August hatch." "Had the season been delayed for a week, the population at Fillmore would still have been about 75 percent of that present on September 1." "The dove does not have the reproductive capacity to withstand heavy hunting pressure. Mourning Dove management plans must be nationwide in scope, since the bird is so widely distributed and migratory in nature. Several factors should be considered in setting seasons, such as: Length of breeding season, nature of migration, status of population, and state of development of late hatched juveniles."

301. Dahlgren, Robert B. 1955. FACTORS AFFECTING MOURNING DOVE POPULATIONS IN UTAH. Thesis for M. Sc., Utah State College.

Studies conducted during 1951 and 1952, started because Utah first hunted the dove in 1951. Roadside counts were made in 23 counties in spring of 1951. Field studies at Fillmore were conducted July 1 to September 20, 1951 and April 1 to September 30, 1952 on production, mortality, population, migration, and effect of hunting season on late nesters. Dove numbers began to increase on road counts in July and reached a peak during the first two weeks of August and declined to relatively low levels by the last of September. Calling began the last week of April, increased rapidly until June 1, leveled off until mid-July, and decreased to late August when calling practically ceased. In 1951, 145 nests were found; in 1952, 272 nests. Completed nests were 57.7 percent successful in 1951 and 57.9 percent in 1952. An estimated 69 pairs nested 252 times for an average of 3.65 nestings per pair. Average breeding pair produced 3.9 fledglings. Production totaled 30.5 per acre for two acres of orchards and groves in 1952. Along 3.3 miles of irrigation canals, 62.7 fledglings were produced per mile. Two birds banded in 1951 as nestlings were retaken at Fillmore in 1952, indicating a homing tendency. When dove season opened, September 1, 1951, the dove population amounted to one-third to one-half of peak observed in August. In 1952 about one-fourth of peak population was in area on September 1. In 1951, twenty hunters killed 151 birds in 64 hours, averaging 7.85 birds per trip and 2.5 birds per gun hour. In 1952, hunters in 13 counties averaged 5.34 birds per trip, 1.79 doves per hour. A 24 percent crippling loss was noted in 1951 and 16 percent in 1952. Only 5.6 percent of successful nests were endangered by September 1, 1952 opening. Age ratios were 1.4 juveniles per adult in 1951 and 1.1 in 1952.

302. Greenhalgh, Clif. 1959. MIGRATORY SPEEDSTERS. Utah Fish and Game, 15(8):20.

A popular article on the mourning dove's migration, nesting, food, sex and age differences and use as a game bird.

303. Greenhalgh, Clif. 1961. DRYLAND DART. Utah Fish and Game, 17(9):10-11.

A popular article on the hunting of doves in Utah with some notes on nesting, migration, and population levels.

Virginia

304. Hicks, Lyle. 1950. WHISTLING WINGS. Virginia Wildlife, 9(9):8-9, 12.

Describes a hunt in Virginia with many hunters on a field; found more hunters provided better sport. Decoys used in Maryland, with pass shooting in Georgia and Florida.

305. Mosby, H. S. 1950. MARKED WILDLIFE. Virginia Wildlife, 9(11):5-7.

General account of various methods of banding, tagging, and marking birds, mammals, and fish. Metal tags or bands are most satisfactory.

306. Murray, J. J. 1959. BIRD OF THE MONTH: THE MOURNING DOVE. Virginia Wildlife, 20(4):23.

The mourning dove is featured as the bird of the month. A few facts on the natural history of the dove are given.

307. Sheldon, Howard L. 1960. MOURNING DOVE MANAGEMENT. Virginia Wildlife, 21(11):20-21.

A few phases of mourning dove management - census, banding, role of disease, migration - are presented.

308. Sheldon, Howard L. 1960. THE CASE OF DOVE NO. 533-11229. Virginia Wildlife, 21(11):14-15.

A photo-story of dove banding and needs for information that can be obtained from recoveries of banded birds.

309. Sprunt, Alexander, IV. 1957. THE SEASONAL POPULATION AND NESTING SUCCESS OF THE MOURNING DOVE IN VIRGINIA. M. Sc. thesis, Virginia Polytechnic Institute. 72 pp. typed.

Reports results of studies near Blacksburg, Virginia, in 1951 on nesting studies. Twenty-three nests found from April through September. Call counts were made weekly from first of May through first week in September. First cooing on February 14. Bad weather delayed start of nesting until early April. Cooing intensity peaked in mid-May. Last nest was found August 11, being destroyed on the 14th. One nest in Cumberland County had young leaving on October 8. Nesting may continue at Blacksburg until early October. Doves preferred conifers (82 percent of the nests found). Of the 23 nests, 52.2 percent were successful. Blue jays and grackles were greatest predators. Trichomoniasis killed 5 nestlings. Total of 348 dove wings were taken from hunters in 1950. Those taken October 1-12 were 79.2% juvenile; those from October 13-31 were 54.1 percent juvenile. These

showed two peaks of hatching: from June 1-15 and August 1-15. Wings indicated that each pair of adults produced 2.33 young (but 3.81 young using the last half of October wings). Only 135 wings were taken in 1951, showing 67 percent juveniles. Controlled road counts were made from September, 1950 through October, 1951. Route was covered each day for a week during the first week of each month, and was 20 miles through 80 percent farm land. Population dropped sharply in September and fell steeply during October. First upswing was in February. Questionnaires were mailed to 2,825 hunters and 764 were returned (27 percent). About 30,000 of the 295,086 licensed hunters (10.1 percent) in 1950 hunted doves. About 10.6 doves were killed by each hunter, giving a State kill of 317,067 doves. This compares well with North Carolina. Crops were taken from 30 doves for food determination. Corn was most important in winter, with three-seeded mercury and ragweed next.

310. Virginia Commission of Game and Inland Fisheries. 1958. THE MOURNING DOVE. Virginia Wildlife, 19(10):12.

A short, popular account of the natural history of the mourning dove.

Washington

311. Patterson, John R. 1953. THE MOURNING DOVE AS A GAME BIRD. Washington State Game Bulletin, 5(3):4, 12.

Review of literature on importance, reproduction, food habits, etc. Over 11 million doves were harvested in the United States in 1942. This amounts to half the number of quail and three-fourths of the ducks. Of all shotgun shells sold in the United States, 7 percent are expended on doves, 9 1/2 percent on pheasants, and 10 1/2 percent on waterfowl. Only about 3 percent of bands are recovered - similar to robin returns. "Apparently doves are not heavily harvested." Irrigation farming in Washington is considerably increasing dove populations.

Wisconsin

312. Mathiak, Harold A. 1953. A MOURNING DOVE BANDING PROJECT. Passenger Pigeon, 15(1):7-9.

General report on banding nestling doves from 110 nests observed in Dodge County, Wisconsin, in 1950. Sixty-four percent of the 110 nests fledged one or more young. Total of 109 nestlings were banded in 57 nests. Hatching dates were from May 5 to September 4, the peak being May 18 to June 9. Recoveries were varied; interesting ones being from Texas, Georgia, Florida, and Cuba.

313. Miller, Wilmer J., and Frederic H. Wagner. 1955. SEXING MATURE COLUMBIFORMES BY CLOACAL CHARACTERS. Auk, 72(3):279-285.

By inserting a modified nasal speculum into the vent, the cloaca can be examined to determine sex of a live bird. The male possesses two cloacal papillae, which are absent in juvenile birds. The males of thirty species of Columbiformes were found to possess conical papillae.

314. Peters, Harold S. 1956. THE MOURNING DOVE IN WISCONSIN. Presented to the Wisconsin Society for Ornithology, Beloit, Wisconsin, May 5, 1956. 2 pp.

General account of the status of doves in Wisconsin. Only 1,092 doves have been banded in the State through 1955, of which fifty (4.6 percent) have been recovered. They disperse widely - from Pennsylvania to Florida and Cuba, and across to Louisiana, Texas, and Mexico. General mention of nationwide dove banding and of other dove investigations. Urges participation in dove nestling banding program.

315. Thompson, D. R., and C. Kabat. 1950. THE WING MOLT OF THE BOBWHITE. Wilson Bulletin, 62:20-31.

Bobwhites begin the post-juvinal primary molt at 28 days of age, when outer two primaries have not yet grown to full length. Molt progresses outward through eighth primary which completes its growth at 150 days. Juvinal primaries 9 and 10 are retained until postnuptial molt of the following year. The constancy of the rate of this wing molt provides the most accurate method available for determination of the age of juveniles up to 150 days. A table gives lengths of various primaries from 24 to 150 days. The sequence of molt in the adult is very similar to that of the juvenile except that it is complete. Unmolted primaries of both juveniles and adults can be detected by the fading of the gray color to brown.

316. Wagner, Fred H. 1951. PRELIMINARY INVESTIGATIONS ON MOURNING DOVE INDEX AND SURVEY METHODS IN WISCONSIN. Presented at the 13th Midwest Wildlife Conference, Minneapolis, December 12-14, 1951. 5 pp. mimeo.

Three call-count routes were covered weekly from early April to early August, 1951. There was a rough plateau of calling in late May and June. A roadside count was conducted by rural mail carriers during the nesting peak, with 767 submitting useable forms. These were run initially to determine the dove range within the State but they may be useful as yearly indices of breeding populations to supplement call counts. The result was an average of 6 doves per 100 miles. From late July until doves left the State, personnel of the Conservation Department kept information on dove flocks. From 302 flocks observed, it was found the population peaks were reached in late August or early September, and all had departed by mid or late October.

317. Wagner, Fred H. 1952. PRELIMINARY INVESTIGATIONS ON MOURNING DOVE INDEX AND SURVEY METHODS IN WISCONSIN. Special Scientific Report, Wildlife No. 17, U. S. Department of the Interior, Fish and Wildlife Service:47-53.

Three inventory and survey methods were conducted in Wisconsin in the spring, summer and fall of 1951 to provide yardsticks of breeding population levels, yearly production, and geographical abundance. Three call-count transects were run weekly from early April to early August. They showed a rough plateau in late May and in June. Rural mail carriers counted doves on three days during a week at the height of the nesting season. Doves were found most commonly in the prairie half of the State. A total of 767 carriers found an average of 6.0 doves per 100 miles. This type of census may be useful as a yearly index to the breeding population. If this type of count could be repeated one or two months later it might be useful in showing early season production. Research and Management personnel of the Conservation Department recorded data on size, location, time of day, and activity of all flocks of 4 or more doves seen from August 5 to September 22. The number of flocks and average flock size peaked in August. This might be a suitable system for securing a population index.

318. Wagner, Fred H. 1956. THE MOURNING DOVE IN WISCONSIN. Wisconsin Conservation Bulletin, 21(8):13-16.

General discussion on doves. "Intensive studies were carried on in Wisconsin in 1950 and 1951." Gives results of 900 mail carriers' road counts in spring of 1951. More than 1,000 doves have been banded in Wisconsin and forty-five have been recovered out of the State. Some go south-east to Alabama, Georgia, and Florida (one to Cuba) while others go to Louisiana, Texas, and Mexico. Discusses possibility of hunting doves in Wisconsin; few hunters may be interested, season would have to open September 1, and most birds available would be raised in Wisconsin.

Wyoming

319. Mobley, Dave. 1960. MOURNING DOVES FLYING. Wyoming Wildlife, 24(12):10-13.

Wyoming has had one mourning dove season - in 1956. The dove was placed on the protected bird list by the following legislature. Notes on the life history, status, migration, and management of the mourning dove are presented.

Other Countries

320. Anonymous. 1959. A BED OF NAILS. Land-Forest Wildlife, 2(3):10.

A pair of mourning doves built their nest entirely of nails and pieces of welding rod in a roof-top cove of a building in Edmonton, Alberta. Two young hatched.

321. Bastin, Eric W. 1952. FLIGHT-SPEED OF THE MOURNING DOVE. Wilson Bulletin, 64(1):47.

A dove near Ridgetown, Ontario, on June 6, 1951, was observed for more than three-tenths of a mile to be flying 55 miles per hour, about 25 feet from a car and five feet above the ground.

322. Hardy, George A. 1953. NESTING OF THE MOURNING DOVE ON VANCOUVER ISLAND. Victoria Naturalist, 10(4):47.

Probably the first nest of doves on Vancouver Island, British Columbia, was found July 16, 1953. Nest had eggs, and was revisited July 18 and 25. On August 9 it was empty and presumably was destroyed.

323. Lincoln, Frederick C. 1953. EASTERN MOURNING DOVE IN THE DOMINICAN REPUBLIC - A CORRECTION. Auk, 70(2): 207.

His previous note in Auk, 58:260-261, 1941, recording recovery of a banded eastern mourning dove at Santiago, Dominican Republic, is now corrected since a mistake in reading band numbers evidently occurred and a laughing gull was actually the bird recovered. The status of the eastern mourning dove as a bird of the Dominican Republic should be at least held in abeyance pending further confirmation.

324. Lowe, V. T. 1956. THE WAY OF A DOVE. Emu, 56(3): 167-182.

A study in southeastern Australia of the Peaceful Dove (Geopelia placida). One color-banded male was followed through 11 nestings in two breeding seasons with three successive females. He participated in seven productive and one incomplete nestings in a single breeding season.

325. Taber, Wendell. 1952. MOURNING DOVE IN NOVA SCOTIA. Bird-Banding, 23(2):73.

Attempts to explain the recovery of a dove at Mabou, Cape Breton, Nova Scotia, on October 28, 1950, which had been banded as an immature at Cape Cod, Massachusetts, on August 25, 1950, as being due to a severe storm which moved up the coast September 12 and 13.

Literature of a Regional or Continental Nature

326. Anonymous. 1958. DOVE IS HERE TO STAY. Progressive Farmer, 73(1):16.

In reply to a reader's question, "Isn't the mourning dove almost extinct?", Earl F. Kennamer replied: "The mourning dove is far from extinction. An estimate by U. S. Fish and Wildlife Service officials places the population at between 1/4 and 1/2 billion (250,000,000 to 500,000,000). . . . I don't think the dove will decrease unless farmers cease planting large areas to corn, sorghum, and other grains-- and provided we follow sound policies of hunting seasons and bag limits."

327. Aldrich, John W., and Allen J. Duvall. 1958. DISTRIBUTION AND MIGRATION OF RACES OF THE MOURNING DOVE. Condor, 60(2):108-128, 3 figs.

Variation and taxonomy are analyzed to provide a tool for management research. Data on ecological distribution and migration of the races are summarized. Races recognized are: "1. The long winged, dark population of eastern United States and southern Ontario--Z. m. carolinensis. 2. The long winged, pale population of western United States, southwestern Canada, and temperate Mexico--Z. m. marginella. 3. The short winged, short legged, long billed, pale population of Panama and possibly other parts of Central America--Z. m. turturilla. 4. The short winged, dark to medium toned, deep buff-bellied population in the West Indies and Florida Keys--Z. m. macroura. 5. The relatively large footed, large billed, very dark brownish populations on Clarion Island of the Revilla Gigedo group, off the Pacific coast of Mexico--Z. m. clarionensis." Races of eastern and western United States can be distinguished by wing color alone, which facilitates determination of races in samples of birds shot by hunters. "There is an extensive postbreeding wandering of birds in all directions, particularly northward, and there is an extensive mingling of racial types during migration. Concentrations of fall migrants occur in certain areas in the southwestern states and both east and west of the Gulf of Mexico."

[From Wildlife Review 92:78]

328. Aldrich, John W., Allen J. Duvall, and Aelred D. Geis. 1958. RACIAL DETERMINATION OF ORIGIN OF MOURNING DOVES IN HUNTERS' BAGS. Journal of Wildlife Management, 22(1):71-75, 1 map.

The source of mourning doves was determined in hunters' bags in Texas and Georgia from racial identification of wing

samples. Georgia samples were mostly eastern race, carolinensis, in early fall, and mostly western race, marginella, or intermediate, in winter. Southern Texas samples showed an earlier migration and were mostly from out-of-state populations in all seasons.

[From Wildlife Review 91:95]

329. Austin, O. L., Jr. 1955. Reviews of MOURNING DOVE POPULATIONS IN NORTH CAROLINA, by Thomas L. Quay, 1954, and STATUS, MOVEMENT AND MANAGEMENT OF THE MOURNING DOVE IN FLORIDA, by Frank A. Winston, 1954. Bird-Banding, 26(2): 83-85.

Austin violently attacks two official P-R reports. He criticizes planning, methods, data handling, logic and conclusions. Especially under fire are figures on effect of hunting on populations. Austin obviously feels that recent dove studies have grossly under-estimated the effect of hunting and are little more than propoganda for relaxed hunting regulations. The author's arguments must be considered, but they will be weakened in the minds of many readers by evidences of partisanship as the following statement: "If this paper is a fair sample of the use to which Pittman-Robertson funds have been put, I shudder for the future of government subsidized research in the natural sciences. It will not take many such biased and badly executed reports to damage irreparably the scientific reputations of those ornithologists who make their livings by working for the taxpayer."

330. Bartholomew, George A., Jr., and William R. Dawson. 1954. BODY TEMPERATURE AND WATER REQUIREMENTS IN THE MOURNING DOVE, ZENAIDURA MACROURA MARGINELLA. Ecology, 35(2):181-187.

Laboratory studies on body temperature and water requirements of doves were correlated with knowledge of their behavior and distribution in deserts of southwestern United States. Daytime body temperatures varied over a range of several degrees C. but approximated 41.5° C. Nighttime temperature is about 2° lower. Doves showed elevated temperatures when kept at 39° C. When deprived of water at 39° C. body temperature tended to be higher and more variable. Short-term increases in air temperatures caused increases in deep body, skin, and leg temperatures. Short-term decreases in air temperature caused decreases only in skin and leg temperatures. The panting threshold is reached at a body temperature of 42.6° C. At 39° C. doves drank four times as much water as at 23°. Twenty-four hours at 39° without water caused a 15 percent loss in body weight. This loss was made up within a few minutes of the time at

which water was made available. At moderate temperatures (23° C.) doves can go four or five days without water or succulent food and suffer no permanent ill effects. Apparently it is not necessary for them to drink more than once a day, even in very hot weather. They can satisfy thirst by a single drink. This enables doves to range widely over the desert with only periodic visits to water.

331. Bent, Arthur C. 1932. EASTERN MOURNING DOVE in Life Histories of North American Gallinaceous Birds. Bulletin 162, U. S. National Museum, pages 402-416.

(Contributed by W. M. Tyler) General account of doves as secured from personal observations, other workers, and literature. Especially quotes Nice's paper of 1922, and others. Detailed range.

332. Black, Kenneth E., and Charles D. Evans. 1953. A MODIFICATION OF THE CANNON-PROJECTED NET BANDING TRAP. Fish and Wildlife Service, 1006 W. Lake Street, Minneapolis 8, Minnesota, April 27, 1953. Mimeo. 9 pp.

Suggests modification of the cannon-projected net originated by Dill and Thornsberry (see Journal of Wildlife Management, 14:132-137, 1950) by using black powder as the propellant and a black powder electric squib for the primer. The powder is loaded into a fired 12 gauge shotgun shell for convenience. Plans are included for the projectile, cartridge, breech block, and loading sequence.

333. Burns, Frank L. 1921. COMPARATIVE PERIODS OF NESTLING LIFE OF SOME NORTH AMERICAN NIDICOLAE. Wilson Bulletin, 33:13, 91.

Lists mourning dove as most productive species in point of families. Says this is due to prolonged duration of sexual instinct. All multiple-brooded species have access to an abundant and unfailing food supply or are adaptive to a varied and easily obtainable and seasonable diet. They have a brief nesting cycle. They have active assistance of the male. Mentions that in Pennsylvania and New Jersey the nesting cycle of the mourning dove is 30-32 days.

334. Burns, Frank L. 1924. THE PHILOSOPHY OF BIRDS' NESTS. Wilson Bulletin, 36:87.

Mourning dove is an adaptive species nesting from ground to upwards of 50 feet, though usually 5 to 15 feet, mostly in evergreens or thick-set deciduous trees. Nests on top of bare stumps, balcony, ledges, boulders, roofs, woodpiles, and in cavities. Male makes many trips of 40 feet to gather material in bill for female to arrange and complete in two days.

335. Cohen, Arthur, Harold S. Peters, and Leonard E. Foote. 1960. CALLING BEHAVIOR OF MOURNING DOVES IN TWO MIDWEST LIFE ZONES. Journal of Wildlife Management, 24(2):203-212, 7 figs.

This study was undertaken to determine differences in calling behavior of mourning doves at 14 stations in 2 midwest life zones, and to determine other aspects of mourning dove calling behavior of potential use in the annual call-count census. There was a similar pattern at the stations in the two life zones. Some doves may call in a random fashion; but those which do not, do not call in a recognizable pattern. Differences in average calling are believed to be due to variation in calling among birds within stations rather than between life zones or between stations. Birds apparently call more during the first half hour following sunrise than the second half hour. However, calling intensity is not proved to be different for the first two quarter hours following sunrise. Additional research is suggested on calling behavior of marked individuals in relation to sex ratio, the court-mate-nest-brood cycle, and the tendency of birds to induce others to call.

[From Wildlife Review 99:47]

336. Cole, L. J. 1933. THE RELATION OF LIGHT PERIODICITY TO THE REPRODUCTIVE CYCLE, MIGRATION AND DISTRIBUTION OF THE MOURNING DOVE (ZENAIDURA MACROURA CAROLINENSIS). Auk, 50: 284-295.

Presents result of increasing light on gonads of doves in captivity. Causes female doves to lay in February whereas normally they had not laid until April in previous years. Discusses migration as related to lengthening day.

337. Craig, Wallace. 1911. THE EXPRESSION OF EMOTION IN THE PIGEON. II THE MOURNING DOVE. Auk, 28:398-407.

Describes the "perch coo" - in which male stands still. His attitude is that of holding every muscle tense during the difficult performance of the coo. Even when pursuing the female he stops in the chase and stands immovable until the coo is completed. The nest call is much shorter and fainter. The copulation note, by both sexes, is a faint growling note. Bill is kept wide open during these calls. Gives a number of other evidences of emotions, etc.

338. Crissey, Walter F. (Compiler). 1958. MOURNING DOVE BANDING PROGRAM. U. S. Fish and Wildlife Service, Washington, D. C. 7 pp. mimeo.

Original nestling banding quotas were set in 1955 entirely on the basis of the relative importance of each State as a breeding area for doves without knowledge of particular problem areas. The need for determining

comparative-harvest rates among the three management units is of greatest importance. This information can be obtained from comparative band recovery rates for each of the three flyways, provided that the dove populations in all portions of each flyway are represented in the banded sample. Banding quotas were adjusted for each State to fulfill these objectives. Quotas were arrived at by calculating the degree of accuracy with which distribution can be determined from a particular area with a given number of recoveries with adjustments for recovery rates of bands within States that have hunting seasons and for non-hunting States. A review of the banding effort revealed a need for better distribution of banding within each part of the States. Quotas set for each State were minimum quotas.

339. Crissey, Walter F. (Compiler). 1958. MOURNING DOVE NEWSLETTER. Issue No. 13. U. S. Fish and Wildlife Service, Washington, D. C. 30 pp. mimeo.

Cooperators from 44 States conducted 652 call counts in 1958 which were comparable to the 1957 counts. The call-count data were weighted for the amount of dove habitat in each State and for average dove density in each of the States. In the eastern group of States (States east of the Mississippi River plus Arkansas and Louisiana) no change was evident over that of 1957, and a very small decrease occurred in the western group of States. A total of 348 nestling band recoveries were received during the 1956-1957 season, and when added to the other nestling band recoveries presented in Newsletter Issue No. 12, the three proposed management units remain unchanged. The national kill of mourning doves was estimated at 30,052,100. This estimate was based on a questionnaire survey conducted in 8 States in combination with weighted band recoveries from these and other States.

340. Critcher, T. S., and W. Scott Overton. 1960. PRELIMINARY EVALUATION OF THE CONTROLLED ROAD SIGHT INDEX AS AN INDEX TO MOURNING DOVE POPULATION LEVELS. Presented at the 14th Annual Conference of the Southeastern Association of Game and Fish Commissioners, Biloxi, Mississippi. 16 pp. mimeo.

Breeding population indices from the call counts are currently thought of as indicators of fall population levels, and are being administratively treated in this capacity, even though the relationships have not been established. If these relationships are known, the fall population might be predicted from the breeding population as reflected by

the call counts. Using North Carolina uncontrolled road count data, available by months from 1949 to 1958, and controlled road counts conducted in the spring and summer of 1960, an analysis of the predictive qualities of road counts was made. Usefulness of winter and spring counts in predicting the September index was not shown conclusively. The May road count index of an individual road was a better predictor of the September index than was the May call count index. Recommendations are made to (1) continue the controlled road count studies over several years to determine the predictability of annual variation, (2) define and estimate a pertinent characterization of the fall and/or winter population density, either regionally or by management compartments, and (3) analyze the mass of data collected in the Southeast in the last ten years for predictive use.

341. Dalrymple, B. W. 1948. OUR FORGOTTEN GAME BIRDS. Louisiana Conservationist, 1(1):18-20. (Reprinted from September issue of Field and Stream)

"Our most abundant and widely distributed individual, the Mourning Dove, is the third most popular game bird in the U. S. today." "Upward of 15 million . . . are killed each fall. Only the pheasant and the bobwhite top that gross." Three methods of hunting; water-hole, feeding field, and pass shooting. Urges a study be made.

342. Dalrymple, Byron W. 1949. DOVES AND DOVE SHOOTING. G. P. Putnam's Sons, 243 pages.

A popular book about the history and present practices of dove shooting with information on populations. There are about 550 odd species of doves and pigeons in the world. Three species are now shot in the United States: Mourning Dove, White-winged Dove and Band-tailed Pigeon. Former hunting of the Passenger Pigeon is mentioned. "It has been estimated by competent authorities that since this country was settled a greater number of wild doves has been killed than of any other game bird." "By all estimates and surveys available it seems certain that the annual legal kill of Mourning Doves at the present time is at least 15,000,000. Only the quail kill and the pheasant kill top that figure, the quail running somewhere around 22,000,000 and the pheasants somewhere in between." The gross annual kill of Mourning Doves may be near the 20,000,000 mark. A tremendous amount of newly awakened interest in doves by the ever increasing legions of hunters has made us discover we don't know enough about the dove to handle him properly. "There is altogether too much confusion about the setting of dove seasons." Advocates a 20-gauge shotgun with heavy charges of 9 or 8 shot for mourning doves.

343. Davison, V. E. 1940. A FIELD METHOD OF ANALYZING GAME BIRD FOODS. Journal of Wildlife Management, 4:105-116.

Biologists of the U. S. Soil Conservation Service have analyzed crops of 517 doves during seasons of 1937-38 and 1938-39 in the southeastern States. Crop contents are separated by sieves for identification by volume. But dove foods are not tabulated in the article, as are quail crop contents. "Tests indicate that more than 50 crops, and preferably from 100 to 200, are needed to determine the importance of foods in a single locality."

344. Davison, Verne E. 1952. FEED THOSE DOVES. Sports Afield, 127(6):46, 47, 120.

A popular article advocating the wide planting of pokeberry for dove food. This is a perennial which grows naturally from Florida to Texas; from Minnesota to New England. It is the only field perennial eaten by doves! It produces new stems annually from crown buds. The stems above ground die every fall. The plant bears a purple fruit when ripe. A number of birds and mammals eat the fruit. Doves and quail eat the seeds after the fruits have dried, as early as mid-September at Spartanburg, South Carolina, and they may still glean seeds from the ground during the winter and until March or April. The plant may easily be grown from seed, planting about 10 days before the last killing frost in the spring. Plant in rows 36 or 42 inches apart and 12 to 20 seeds per foot. This rate uses 4 to 6 pounds per acre (one pound contains about 50,000 seeds). Cover the seed one-half inch deep and fertilize heavily, particularly with nitrogen. One acre should produce 2 to 4 tons of fruit, or 800-1600 pounds of dove food which should feed 100 or more doves all winter. "Pokeberry has value to many kinds of American wildlife - but particularly to the Mourning Dove."

345. Delacour, Jean. 1959. WILD PIGEONS AND DOVES. All Pets Books, Inc., Fond du Lac, Wisconsin. 107 pages.

This book describes New and Old World pigeons and doves and discusses methods for their care in captivity. The numerous species of pigeons and doves are distributed throughout the world. Pigeons and doves take only a single mate. Most live in pairs, flocking at certain seasons, but some band together at all times. They are excellent aviary birds, the author reports, and they live long and breed well. In his initial chapter, Delacour describes the housing, feeding, breeding and diseases of wild pigeons and doves. He presents plans and descriptions of suitable housing and flight pens, gives tips on how to ship live birds, and outlines in detail diets to keep the birds fit and in good breeding condition. The remaining chapters are devoted to descriptions of the various species of pigeons and doves and the notable characteristics of each. The

most highly colored of all is the fruit-pigeon group which includes a large number of species found principally in the Old World and being most numerous in Malaysia, Australia, and the islands of the Pacific. Their diet consists largely of fruits and berries. Doves and pigeons most abundant in America are in the seed-eating pigeon group. These birds are longer legged, harder billed, and eat mostly seeds. They never show the bright colors characteristic of the fruit-pigeon group.

[Review from Outdoor News Bulletin,
14(9):6, May 6, 1960]

346. Diamond, L. S. 1954. A COMPARATIVE STUDY OF TWENTY-EIGHT CULTURE MEDIA FOR TRICHOMONAS GALLINAE. Experimental Parasitology, 3(3):251-258.

(Not available for abstracting)

347. Dill, H. H. 1949. THE PROJECTED-NET BANDING TRAP. Talk at Midwest Wildlife Conference, Madison, Wisconsin, December 15-17, 1949. 7 pp. mimeo.

Describes a method of projecting a 25 by 75 foot net over a baited area to catch ducks and geese for banding. Propelling mechanism is a set of three steel tubes for directing an explosive charge fired by electric cap and battery. (Should be effective for doves.)

348. Dill, Herbert H., and William H. Thornsberry. 1950. A CANNON-PROJECTED NET TRAP FOR CAPTURING WATERFOWL. Journal of Wildlife Management, 14(2):132-137.

Describes a device for throwing (projecting) a 25 by 80 foot net of 2 1/2 inch mesh over a baited area to catch ducks and geese. The net is thrown by cords attached to three projectiles 2 1/2 inches in diameter and 4 inches long shot from tubes 20 inches long with a 6 dram propelling charge of equal parts of potassium chlorate and granulated sugar activated by a No. 6 electric cap. Using salvaged materials, the total construction cost was \$21.00; with new materials the cost is estimated at \$68.00. (With smaller mesh net this should work on mourning doves.)

349. Duvall, Allen J., and Chandler S. Robbins. 1952. INVESTIGATIONS OF METHODS OF DETERMINING ABUNDANCE OF BREEDING MOURNING DOVES IN CERTAIN EASTERN STATES. Special Scientific Report, Wildlife No. 17, U. S. Department of the Interior, Fish and Wildlife Service:15-34.

Results of census techniques in Maryland, Pennsylvania, and New York from May 18 to June 30, 1950, and in Maryland and Virginia from April 5 to September 11, 1951, are given to show the development of a standardized call-road count

as the most desirable index to the dove breeding population. "Calling activities showed relatively high peaks and low depressions during April and May of 1951, with a plateau in June; a decline in calling was noted after July 3, and continued until September 11 when activity apparently ceased." "A statistical analysis of calling counts covering the period from May 15-June 16, 1951, indicates that with 3 routes, 12 trips per route must be made in order to reflect a 15 percent change."

350. Edminster, Frank C. 1954. AMERICAN GAME BIRDS OF FIELD AND FOREST. Charles Scribner's Sons. Chapter 14, The Mourning Dove, pp. 429-453.

General account of range, history, habits, and habitat of mourning dove. Much information from P-R reports. Man's relations with the mourning dove; hunter, farmer, town dweller. "The harvest in most years range from three to nine million birds. Some of the States that have the largest harvest are California, Texas, Oklahoma, Tennessee, Kentucky, Georgia, and Alabama. The California and Georgia harvests alone are each estimated to be two million a year." . . . "It is likely that the harvest ranges from 10 per cent to 35 per cent of the fall dove population, and may average about 25 per cent." Crippling loss "averages at least 30 per cent of the bag, or about 8 per cent of the population." . . . "Thus the total reduction of doves from man's hunting may be from 15 per cent to 35 per cent of the fall population in various localities of the eastern part of the country." . . . "The management of the Mourning Dove is primarily the control of the hunting harvest." . . . "No dove shooting should be allowed anywhere before September 15." Good account.

351. Farner, D. S. 1949. AGE GROUPS AND LONGEVITY IN THE AMERICAN ROBIN: COMMENTS, FURTHER DISCUSSION, AND CERTAIN REVISIONS. Wilson Bulletin, 61:68-81.

An important article containing much of interest under chapter headings: The initial date for the estimation of longevity, life expectancy, and age groups; The relation between mean longevity and annual mortality rate; Monthly distribution of deaths; and, The use of birds recovered by trapping in the calculation of annual mortality rate. Dove workers may wish to follow some of his suggestions.

352. Fessler, Floyd R. 1960. MANAGING WOOLY CROTON FOR DOVES AND BOBWHITES. Presented at the 14th Annual Meeting of the Southeastern Association of Game and Fish Commissioners. (In press)

Wooly croton (Croton capitatus) is a summer annual and the seeds are preferred by doves and quail. It grows from

Oklahoma, Missouri and Ohio, south to Texas, and east to Georgia and Florida. Seed production starts in August and continues until the first killing frost. Yields calculated from two seed traps placed in a good stand of the plant were 307 and 461 pounds per acre. The species grows in a wide variety of soils and grazing animals seldom eat the plant. Establishment of the plant can be done by seeding in late winter or early spring, or by disturbing the soil by disking or plowing. Stands persist for 3 or 4 years depending on plant succession stages.

353. Foote, Leonard E. 1948. IF YOU HUNT DOVES. Florida Wildlife, 2:12, 13, 20.

Over 11 million doves were shot in 1942 in 25 States. Doves rank fourth in United States in popularity, kill, and importance among game birds. Over 20% of young left nest after September 1 in Iowa. In Tennessee a check in 1947 showed 75% to be young of year in September and 30% of adults were still feeding young. Discusses need for management. Discusses new regional dove project. Stresses need for further information.

354. Foote, Leonard E. 1953. SUGGESTIONS FOR A MOURNING DOVE MANAGEMENT PROGRAM. Presented at conference of Southeastern Association Game and Fish Commissioners, Chattanooga, Tennessee, October. 11 pp. proc.

Presents objectives of dove management, present status of studies and knowledge of production, breeding success, distribution, effects of hunting and other mortality. Lists operational and research needs for dove management. An important and helpful paper for the nationwide dove program.

355. Foote, Leonard E. 1954. BANDS, WINGS AND BAGS. Virginia Wildlife, 15(12):12-15, 26.

General explanation of reasons for hunter questionnaires, bag checks, and requests for bands and wings of various game species. About 40,000 doves were banded during the Cooperative Dove Study of 1948-53 at a cost in excess of \$1.00 per bird. Only about three percent are recovered as compared with 2 to 18 percent recovered from other species. Urges submission of bands and cooperation in bag checks. "Wildlife is a crop of the year and of the years to come; bands, wings, and bags contribute the facts for its sustained management."

356. Foote, Leonard E. 1957. SUGGESTIONS FOR A MOURNING DOVE MANAGEMENT PROGRAM. 14 pp. processed, Marietta, Georgia.

A revision and enlargement of a 1953 paper of same title. Details present status of nationwide dove knowledge and

studies and lists both operational needs and research needs for this important species. A summary in rather brief form useful for guidance of administrators and technicians, and pointing up the need for considerable expansion of dove work by Federal and State agencies and institutions.

357. Foote, Leonard E. 1960. NATIONAL MOURNING DOVE PROGRAM NEEDS, RESPONSIBILITIES AND IMPLEMENTATION. Presented at the 14th Annual Conference of the Southeastern Association of Game and Fish Commissioners, Biloxi, Mississippi. 4 pp. mimeo.

A brief outline of the National Mourning Dove Program. Agreement has been reached between the Bureau of Sport Fisheries and Wildlife and the States, as represented by the International Association of Game and Fish Commissioners, on what is needed, on assignment of program responsibilities and on how the program can be implemented. This is a technical program, and the Technical Committee, Bureau and International Association set high priority needs: (1) to determine the quantitative effect of overall gun mortality and of specific regulations on the harvest and population; (2) to improve methods of population appraisal; and (3) to determine quantitative relations of production and harvest areas. The National Technical Sub-Committee summarized the research jobs needed, and these jobs constitute projects which must be undertaken by a State, an institution or the Bureau. Cooperative Wildlife Research Units and other similar institutions will undertake specific research. Additional funds are to be provided to bolster the Bureau's research. Coordination for the National Mourning Dove Program will be furnished by the Bureau. Coordinating personnel will be placed in regions of the Bureau to work with other organizations that undertake dove research and management. The National Dove Program statement clearly spells out the agreed responsibilities of Bureau, State, Institutional and Private Conservation Agencies, and assurances from leading conservationists for support of the program have been made.

358. Foote, Leonard E., and Harold S. Peters. 1952. INVESTIGATIONS OF METHODS OF APPRAISING THE ABUNDANCE OF MOURNING DOVES. Special Scientific Report, Wildlife No. 17, U. S. Department of the Interior, Fish and Wildlife Service: Introduction, 1-4.

An introduction to the Special Scientific Report in which five separate papers on dove census techniques appear by Terry H. McGowan, Clayton Kerley, Allen J. Duvall and

Chandler S. Robbins, Harold S. Peters, and Frederic H. Wagner (see abstracts of these papers separately under authors' names). Progressive history of development of an auditory index to doves is given, resulting in the standardized call-count technique.

359. Foote, Leonard E., Harold S. Peters, and Alva L. Finkner. 1958. DESIGN TESTS FOR MOURNING DOVE CALL-COUNT SAMPLING IN SEVEN SOUTHEASTERN STATES. Journal of Wildlife Management, 22(4):402-408.

Compares results of call-count censuses of 141 original management routes and 150 randomly selected routes. Within limitations of call-count technique, random routes were chosen after stratification into State strata. Both sets of routes were censused during the regular dove censusing period in 1957 by experienced cooperators who have censused the original management routes since 1951. Results indicate that the original management-route sampling is positively biased, with higher than average dove population areas being sampled. Although differences between mean numbers of doves calling on original management routes and randomly selected routes are small, the method of selection of routes to be censused nationally should be revised so that call-count data will have application for both time and area comparisons. Results indicate that stratification by ecological zones is more efficient than either stratification by state strata or completely random sampling. Suggestions are made for revision of the nation-wide call-count sampling.

[From Wildlife Review 94:70]

360. Gallizioli, Steve. 1961. THE CURRENT STATUS AND MANAGEMENT OF THE MOURNING DOVE IN THE WESTERN MANAGEMENT UNIT. Transactions of the 26th North American Wildlife and Natural Resources Conference. Pages 395-405.

In the western management unit the mourning dove is a more important game species in Arizona and California than in other States. The 1959 kill in California was 1,800,000; Arizona, 900,000. Kill in other States varied from 86,000 to 285,000. In California, Arizona and Nevada the mourning dove is ranked first among game birds in numbers bagged and was second in Utah and Idaho. For the unit as a whole, the dove kill surpassed that of any single upland game species. Hunter interest, as evidenced by percent of licensed hunters who shoot doves, is highest in Arizona and California with 40 percent and 33 percent, respectively, and lowest in Oregon with 6 percent. Spring call counts since 1953 show no definite trend for the unit; the 1960 counts were 5 percent below the 1953 level. Individual States exhibit more fluctuations but only California shows a definite upward trend. Arizona's data indicate a downward trend since 1956. Some States doubt that call-count data depict

true State trends. Hunter success in recent years has been highest in Arizona and California with 3.4 and 1.9 doves per hour. Hunt success data was not available from all States, however. Winter populations of doves are present in significant numbers only in California and Arizona. Available data indicate hunting in the western unit is not a controlling influence on the dove population. Insecticides are apparently not a problem with mourning doves in the West although real data are scarce. Disease is not a problem except possibly in California where an outbreak of trichomoniasis has been aggravated by dove concentrations at backyard feeders. Recent land use practices are thought to be more beneficial than harmful to doves. An exception is the proposed floodway clearing along the Gila River in Arizona, which would wipe out many thousands of acres of choice nesting habitat. Arguments in favor of more liberal hunting regulations are presented. -- Author's Summary.

361. Gander, Frank F. 1928. NESTING HABITS OF MOURNING DOVES. Auk, 45:98.

Both sexes engage in search for nesting site but final choice rests with female. She settles there and builds nests under and about herself from material brought by male. He picks up sticks from ground and brings them to her. One pair was observed to place a stick about every two minutes. When she leaves nest building, the male follows to peck at her until she returns to the job. Eggs usually laid in the afternoon with an intervening period of about 48 hours between the two. Above based on observations in Florida, Kansas, and California.

362. Goodwin, Derek. 1958. REMARKS ON THE TAXONOMY OF SOME AMERICAN DOVES. Auk, 75(3):330-334.

The generic name of our mourning dove becomes Zenaida rather than Zenaidura if Goodwin's proposals are adopted. Goodwin argues for merging the genera Zenaidura, Melopelia, and Nesopelia in Zenaida, which is the genus of the white-winged dove. Other changes suggested in this paper are of less interest to U. S. wildlife biologists.

[From Wildlife Review 93:67]

363. Graham, E. H. 1941. LEGUMES FOR EROSION CONTROL AND WILDLIFE. Misc. Publication 412, U. S. Department of Agriculture, 153 pp., August, 1941.

Lists 26 legumes which are eaten by the eastern mourning dove. Discusses many uses of legumes and describes the various species with a brief account of range and wildlife which feed upon each.

364. Grumbles, L. C., W. A. Bonaz, Jr., and R. D. Turk. 1952. CHEMOTHERAPY OF ENTERO HEPATITIS OF TURKEYS. II. THE EFFECT OF 2-AMINO-5-NITROTHIAZOLE (ENHEPTIN) AND 2-ACETYL-AMINO NITROTHIAZOLE ON EGG PRODUCTION, FERTILITY AND HATCHABILITY IN TURKEY HENS. American Journal of Veterinary Research, 13:386-387.

"At a concentration of 0.1%, 2-amino-5-nitrothiazole reduced egg production, fertility and hatchability. A concentration of .05 or .03% had no effect on egg production, fertility and hatchability."

365. Herman, C. M. 1950. TRICHOMONIASIS, A DISEASE OF MOURNING DOVES. Wildlife Leaflet 331, Fish and Wildlife Service, U. S. Department of the Interior.

"Canker disease" of doves is caused by a protozoan, Trichomonas gallinae. Symptoms appear as early as five days after infection; dove loses weight rapidly, and become weak and listless. Death usually occurs by the tenth day. But some may recover and serve as carriers to infect nestlings. The mouth, esophagus, and crop may have yellowish lesions or swellings. These may close the food passages and prevent the bird from swallowing and even from closing its mouth. No control method is known.

366. Herman, Carlton M. 1953. RECOGNITION OF TRICHOMONIASIS IN DOVES. Bird-Banding, 24(1):11-12.

"Trichomoniasis is a disease of doves and other birds which manifests itself by the presence of visible lesions in the throat and elsewhere. It is caused by a flagellated protozoan: Trichomonas gallinae. The most typical lesions are usually called cankers. The disease is often referred to as 'roup' and the term 'frounce' has been used extensively to designate the malady in trained falcons." The disease is rather commonly found in pigeons and doves and has been implicated as causing extensive losses among mourning doves in 1950 and less so in subsequent years. It is transmitted from parent to young in the normal feeding process and it may spread through flocks at watering or feeding sites.

"Severity of infection depends on several factors including potency of the strain of the parasite involved. Though some birds obtain infections sufficiently virulent to cause death, many affected birds may recover or even fail to show the characteristic lesions. Such birds often serve as sources of infection particularly for next year's brood. These carriers can be diagnosed only by microscopic examination of mucous from the throat or of throat cultures." Cankers may appear in the roof of the mouth or at the base

of the tongue as pinpoint-size yellow spots. "They may grow in size as the disease progresses and form large lumps of yellowish, cheesy, but firm, material. These growths frequently block the passage of food and often hinder swallowing or breathing. They may be so extensive that the infected bird is unable to close its mouth. Such birds show drastic weight loss and weakness, and usually die within a few days." The yellowish growths may extend into the esophagus and crop, and even into the surrounding tissues of the neck. In advanced cases, these lesions may appear as round, raised areas having a conical spur in the center and may involve extensive areas of the neck and be readily visible externally. Suspected infections should be examined microscopically for positive diagnosis. Dead birds should be shipped to a laboratory unfrozen, merely wrapped in several thicknesses of paper and marked "perishable" and "rush." However, in hot weather or with transit delays it is useless to ship specimens for a bird dead over 2 or 3 days decomposes too rapidly for a technician to find recognizable trichomoniasis.

367. Hickey, Joseph J. 1952. SURVIVAL STUDIES OF BANDED BIRDS. Special Scientific Report, Wildlife No. 15, U. S. Department of the Interior, Fish and Wildlife Service: 1-177.

An important report on a study of avian population dynamics by the use of banding data for 10 species of birds. It should be essential reading for anyone using banding data in population studies. The first 44 pages consist of a critique on methods. Chapter 9, pages 101 to 107 deals with mourning doves and will be of particular interest to dove workers. The summary of this chapter is quoted in full: "Banding work on 9929 juvenile Mourning Doves has yielded recoveries of the order of 3.7 percent, most of the reports coming from hunters. In this species, about 50 percent of active nests hatched, each with 1.7-1.8 young. First-year mortality rates for young birds banded and alive on September 1 have run about 62-64 percent, the mean adult rate being close to 56-58 percent per year. Dates of banding for 318 young in the Fish and Wildlife Service recovery files closely approximate the monthly frequency of hatching dates estimated for juvenile birds bagged in Texas during the fall of 1949 as well as the seasonal spread of daily nesting activity calculated for Cass County, Iowa, by McClure, 18 percent having been marked by June 1, 46 percent by July 1, 71 percent by August 1, and 93 percent by September 1; these suggest that a minor fraction (hatching after September 1 and amounting to perhaps 10 percent) of the juveniles were excluded from

this study. In at least this section of the population, an age ratio of only 1.6 per adult as of September 1 seems necessary on the average to keep Mourning Dove population in balance."

368. Jenkins, James H. 1960. THE TECHNIQUE FOR AGING AND SEXING DOVES THROUGHOUT THE SHOOTING SEASON IN THE EASTERN UNITED STATES. Invitational paper presented to the Southeastern Dove Committee, 14th Annual Conference of the Southeastern Association of Game and Fish Commissioners, Biloxi, Mississippi. 7 pp. mimeo.

A review paper of methods of sexing and aging mourning doves during the hunting season. A need to extend aging techniques to the end of the latest open dates (January 15) of the hunting season exists. White-tipped juvenile coverts are the easiest criteria for separating juveniles of the year from adults, but the juvenile covert is usually lost by the time the ninth primary is lost which occurs at about 139 days (penned birds) after hatching. Molting of the primaries of adults begins about May 15, and replacement and loss took about 10 days per feather during the first half of the molt and then the process slowed down. Molt on other parts of the body was less orderly. Other characteristics such as the amount of cholesterol in feathers, fusion of the epiphyses and metacarpals, color of the legs and inside of the bill, ossification and color of the skull, and the position of the third digit of the wing in relation to the phalanges have been investigated as aging criteria. While juveniles could be separated from adults by some of these characters, none were reliable for aging doves throughout the hunting season. Gonad appearance and size is an indicator of age but is not always reliable. The use of the bursa of Fabricius in combination with the molt of the primaries permits aging of doves through about the middle of December. Aging of doves can be extended to mid-January by use of weights of the birds, inspection of the gonads in combination with the characters of bursa and plumage. A high degree of accuracy is possible, but the techniques are cumbersome, and unless biologists have a real need for late season data, the techniques may not be considered feasible. Doves may be sexed externally by plumage colors. Four of 127 adults and 5 of 60 juveniles were aged incorrectly.

369. Jones, Lynds. 1907. BIRDS FROM A CAR WINDOW AGAIN. Wilson Bulletin, 19:110-111.

Notes from train window, Oberlin, Ohio, to Portland, Oregon, May 28-June 1. Mourning dove was most numerous in individuals and most evenly distributed of species recorded. Possibly because it frequents railway right-of-way to feed.

370. Jones, Lynds. 1909. THE BIRDS OF CEDAR POINT AND VICINITY. Wilson Bulletin, 21:189-190.

Records nest of 4 and one of 3 eggs (no date). "Early nests are usually made above ground, but late nests are as likely to be on the ground as above it."

371. Keeler, James E. 1954. THE DOVE SITUATION IN THE SOUTH. Paper presented to the Florida Wildlife Federation meeting April 2-4, 1954. 9 pp. processed.

General results of Southeastern Dove Study, 1948-52, slanted towards importance as a game species. "The Mourning Dove more closely regulates the amount of gun pressure it will receive during the hunting season than any other game species. It has been found that gun pressure decreases when the population decreases and increases in proportion with a population increase. With proper hunting seasons provided, it would be extremely difficult, if not impossible, to exterminate this species by legal shooting."

372. Keeler, James E., and Frank Winston. 1951. MOURNING DOVE TRAPPING IN THE SOUTHEAST. Bird-Banding, 22(4): 174-179.

A very general discussion of traps, baits and techniques found most useful in the southeastern dove study. Traps mentioned: Clover-leaf, duck, Potter, quail, Alabama quail, Florida quail, resetting trigger, and Thompson. An easily assembled and readily portable trap is preferred by project leaders. Various grains and seeds have been used and the "trapper must use his own judgment on baits." Trapping sites were usually selected where dove concentrations were found. A number of traps placed 10 to 15 feet apart were usually used. If food is not plentiful, prebaiting has been found desirable. Doves usually require at least a week to overcome their shyness of the traps. Deaths due to trap injury, predation, and other reasons have run from 3 to 10 percent in some operations. Dogs, house cats and hawks are the major predators. Banders should watch for diseased doves and should keep a complete record of all repeats.

373. Kendeigh, S. Charles. 1944. MEASUREMENT OF BIRD POPULATION. Ecological Monographs, 14:67-106.

An excellent paper summarizing development of various methods of measuring bird populations and evaluating the different techniques. "Abundance of birds may be measured in relative terms or as actual populations. Although determination of relative abundance is sufficient for some purposes, it is more limited in its use and application than determination of actual populations, and the use and improvement of true census methods is encouraged. Relative abundance has been commonly measured as percentage of days or trips on which the species was recorded, number of individuals

observed per trip or per unit of time (hour) or per unit of distance (mile), or by a combination of these methods." Corrections must be made for difference in conspicuousness and for different habitats. In censusing total breeding populations of all species, sample plots of 50 to 75 acres are recommended for one person to cover in a day. Mapping of territories is advocated to secure population densities. For accurate figures on total populations during the breeding season, five complete surveys are desirable, distributed from April to July, inclusive. Most of this paper deals with censuses of total populations of all species, rather than counts of a single species.

374. Kennamer, Earl Franklin. 1954. DOVES FOR SPORT. Progressive Farmer, September.

Short article on dove as a popular game bird, giving suggestions on methods of hunting and flight characteristics.

375. Kennamer, Earl Franklin. 1957. BEST GAME BIRD? Progressive Farmer, September.

His favorite game birds are listed in order: Wild turkey, mourning dove, bobwhite, duck, pheasant, snipe, and woodcock. Says dove is a tricky target and hard to hit.

376. Kiel, William H., Jr. 1959. MOURNING DOVES - AN INTERNATIONAL RESOURCE. Outdoor California, 20(1):4-5.

Unlike many other game species, mourning doves are extending their range and flourishing. Goals of dove management are: (1) to maintain the population at a level satisfactory to both hunting and bird-watching fraternities, (2) to allow a sustained annual harvest by hunting, and (3) to consider the preservation of traditional sporting attributes of hunting. Since 1952, breeding populations, as reflected by the call-count index, have remained rather stable. They are increasing in some regions. Analysis of band recoveries indicates that three management units are defined through the relationship of production areas to harvest areas. Analysis of band recoveries indicate that approximately 70 percent of the juvenile doves die within the first year, and adult birds have an annual mortality rate of about 55 percent. Mourning doves are hunted in 30 States and interest in dove hunting is increasing in many other States. High on the list of tools needed for more efficient management of mourning doves are: (1) a method of measuring the annual hunting kill, (2) improvements in population census techniques, and (3) continued banding of nestlings and adults on a scale designed to solve specific problems.

377. Kiel, William H., Jr. (Compiler). 1959. MOURNING DOVE BANDING PROGRAM - 1959. U. S. Fish and Wildlife Service, Patuxent Wildlife Research Center. 6 pp. mimeo.

Objectives of the national mourning dove banding program remain the same with emphasis on banding nestling birds and on banding immatures and adults which can be related to breeding areas. A preliminary analysis of mourning dove banding data for the period 1953-1957 showed no statistical difference between migration paths of nestlings and adults and immatures banded during May through August. Two-thirds of the States have met their banding quotas. The need for better distribution of banding within each area of the State was again emphasized, and the need was stressed for those States situated on the boundaries of the tentative management units to meet their quotas.

378. Kiel, William H., Jr. 1959. MOURNING DOVE MANAGEMENT UNITS - A PROGRESS REPORT. U. S. Fish and Wildlife Service, Special Scientific Report, Wildlife No. 42, iv + 24 pp., 4 figs.

Tentative mourning dove management units for the United States are outlined on the basis of an analysis of bandings during 1953-57. The 3 units -- Eastern, Central, and Western -- most nearly meet criteria of an ideal management unit: A unit that produces the doves it harvests and does not produce doves that are harvested by other units. As an average for the 3 units, 95% of kill is produced within the unit and 96% of production is shot within the unit or in Mexico and Central America. Hence the 3 units are practically independent of each other.

[From Wildlife Review 97:60]

379. Kiel, William H., Jr. (Compiler). 1959. MOURNING DOVE NEWSLETTER. Issue No. 14. U. S. Fish and Wildlife Service, Patuxent Wildlife Research Center. 31 pp. mimeo.

A total of 677 call-count routes were censused in 1959 which were directly comparable to 1958 data. Doves in the eastern group of States decreased 2.9 percent over the 1958 level while States of the western group showed an increase of 14.7 percent in the doves-heard-calling index. Based on doves-heard-calling, trends in State breeding-population indexes have shown an increase over the past seven years. The national index is 27.7 percent higher in 1959 than in 1954, the first year call-count routes were run in all important dove producing States.

380. Kiel, William H., Jr. (Compiler). 1960. MOURNING DOVE NEWSLETTER. U. S. Fish and Wildlife Service, Patuxent Wildlife Research Center. 45 pp.

The primary purpose of this newsletter is to unite, through a medium of common interest, the widely scattered personnel who are engaged in research and management projects on mourning doves. There has been a demand for a newsletter that reports who is doing what and where. Personnel of many States believe they will benefit by contact with others working in the same field. The first Mourning Dove Newsletter was issued in February, 1949, and Issue Number 14 was released in June, 1959. During the 1949-54 period, the Mourning Dove Newsletter was compiled in the Atlanta Regional Office of the U. S. Fish and Wildlife Service. Issues contained information on activities in dove management and research, in addition to statistics on the status of the dove population. Beginning in 1955, the Newsletter was prepared in the Washington Office of the Fish and Wildlife Service and was essentially a report on the status of the population. In 1960, the information on the status of the dove population was summarized and published as Mourning Dove Status Report - 1960. The Mourning Dove Newsletter will report activities that are not included in the annual Mourning Dove Status Report (which is compiled in June primarily for use during discussions of hunting regulations). This issue is based largely on information supplied by the States in response to a questionnaire sent in January, 1960 from the Bureau of Sport Fisheries and Wildlife. Activities of the States, Bureau, and Cooperative Wildlife Research Units in mourning dove management and research are described. Most effort is being directed to projects concerning the call-count survey, banding, hunting-kill statistics, and habitat improvement. The thirty hunting States are devoting an average of 0.6 man-year annually to dove projects. Eighteen non-hunting States allot an average of 0.3 man-year annually to similar projects. The national average is 0.5 man-year per State annually, a total of 24.6 man-years. The Bureau spends approximately seven man-years annually on dove projects. Five Cooperative Wildlife Research Units have active dove-research projects or are planning them. A national program of research and management is being developed as a cooperative plan of the International Association of Game, Fish and Conservation Commissioners and the Bureau. Mourning dove diseases -- trichomoniasis, pox, coccidiosis, blood protozoan infections, salmonellosis, and viral diseases -- are described and suggestions for diagnostic procedures are given. (From Introduction and Abstract)

381. Kiel, William H., Jr. (Compiler). 1960. MOURNING DOVE BANDING PROGRAM - 1960. U. S. Fish and Wildlife Service, Patuxent Wildlife Research Center. 6 pp. mimeo.

A national mourning dove nestling banding program has been underway since 1956, with a 5-year objective of obtaining banding goals. States were assigned quotas to meet these objectives. Only 13 of the States have not attained their banding quotas numerically. Improvement is needed, however, in the distribution of banding within the States. Preliminary analysis of banding data has resulted in the establishment of tentative management units. A management unit produces the doves it harvests and does not produce doves that are harvested by other units. It is particularly important that States situated on boundaries of management units fulfill banding quotas. Emphasis on banding nestlings remains, and when possible, adults in May-August should be trapped because these birds may also be related to a breeding area. Banding in each area of the State should be in proportion to dove production and should extend throughout the nesting season to represent early, peak, and late production. Banding data are needed for detecting migration patterns, calculating mortality rates, harvest rates of sex and age classes, and for studying other specific problems within the States.

382. Kiel, William H., Jr. (Compiler). 1960. MOURNING DOVE STATUS REPORT - 1960. U. S. Fish and Wildlife Service, Special Scientific Report, Wildlife No. 49. iv + 34 pp., 3 figs.

"An index to the 1960 mourning dove breeding population was obtained by a call-count survey conducted throughout the United States. Trends in the breeding-population index are calculated for three management units and for hunting and nonhunting States within management units. Long-term trends in the breeding indexes show substantial increases in the Central and Eastern Units and little change in the Western Unit. For the United States as a whole, the 1960 breeding-population index is up 6 percent from 1959 and is 40 percent above the 1953 level."

[From Wildlife Review 100:68]

383. Kiel, William H., Jr. (Compiler). 1961. MOURNING DOVE BANDING PROGRAM - 1961. U. S. Fish and Wildlife Service, Patuxent Wildlife Research Center. 6 pp. mimeo.

Objectives of the national mourning dove nestling banding program remain the same. Only seven States had not met banding quotas; two of these States lack only 2 or 3 returns to meet their quotas. Banding records are being reconstructed

following damage by fire in June, 1959. A new objective of pre-and post-hunting season banding is recommended for the purpose of determining the portion of annual mortality occurring during the hunting season.

384. Kiel, William H., Jr. 1961. THE MOURNING DOVE PROGRAM FOR THE FUTURE. Transactions of the 26th North American Wildlife Conference. Pages 418-435.

Through the cooperative efforts of State and Bureau of Sport Fisheries and Wildlife personnel, a National Mourning Dove Research and Management Program has been devised. The International Association of Game and Fish Commissioners and the Bureau of Sport Fisheries and Wildlife have agreed on the plan which is to be a cooperative program. Research needs of highest priority are: (1) to improve techniques for measuring the density and distribution of mourning doves, (2) to determine the relationship of production and harvest areas, and increase knowledge of the migratory movements and mortality of mourning doves, and (3) to evaluate the effect of hunting mortality on the size of the population and the effect of hunting regulations on the kill. At the present time, an analysis of the dove call-count data is being made, and research is being conducted on methods and sampling frames to determine dove kill. Management needs are law enforcement, population and harvest surveys, banding and establishment of managed public-hunting areas. Much of the current effort in management goes into the call-count survey and banding. It has been estimated that \$1.7 million will be needed each year for an adequate dove research and management program. The full text of the National Mourning Dove Research and Management Program is included in the appendix to the paper.

385. Kiel, William H., Jr. 1961. MOURNING DOVE STATUS REPORT - 1961. U. S. Fish and Wildlife Service, Special Scientific Report, Wildlife No. 57. iv + 34 pp., 3 figs.

An index to the 1961 mourning dove breeding population was obtained by a call-count survey conducted throughout the United States. Trends in the breeding-population index were calculated for three management units and for hunting and nonhunting States within management units. Trends in the breeding-population indexes from 1960 to 1961 were as follows: Eastern Unit down 4%, Central Unit down 10%, and no change in the Western Unit. Long-term trends in the breeding indexes, however, are upward in the Central and Eastern Units. The index for the Western Unit is essentially unchanged from 1953. For the United States as a whole, the 1961 breeding-population index is down 7% from 1960 and is 30% above the 1953 level.

[From Wildlife Review 103:63]

386. Knappen, Phoebe. 1938. PRELIMINARY REPORT ON SOME OF THE IMPORTANT FOODS OF THE MOURNING DOVE IN THE SOUTH-EASTERN U. S. Transactions of the Third North American Wildlife Conference, 776-781.

Two hundred nineteen stomachs of doves obtained in southeastern States are analyzed.

January, February, and March contained 31 different items of food: Egyptian grass, 42%; pokeweed, 7%; crabgrass, 5 1/4%; sweet rush, 2 1/4%; bull paspalum, 8.3%; loblolly pine, 4.35%; hollies, 3.17%; wheat, 1.18%; corn, 12.75%; peanuts, 4.12%.

April - 72 kinds of plants. Half was seeds of grasses (corn - 25%).

May-June - 15 stomachs contained 1 bug and 2 kinds of snail. Grasses formed nearly half of total.

July-August - 29 plants. Economic grains, 31.7%.

September - 68 plants. Economic plants, 33.5%.

October - 34 plants. Economic plants, 8.18%.

November - Economic plants, 42.3%.

December - Grasses equal 55.2% and economic plants 32.4%.

Grasses took first place in every month except November.

387. Kossack, Charles W. 1955. A MOURNING DOVE BANDING PROJECT. Inland Bird Banding News, 27(1):1-10, 1 fig.

Good management of mourning doves requires much more banding of nestlings and breeders. This leaflet is written to stimulate amateur participation in dove banding and to tell just how to go about it. It discusses how to locate nests, how to band nestlings, how to trap older birds, how to ascertain age of doves, what traps are best, and what equipment is needed.

[From Wildlife Review 88:72]

388. Lamm, Donald W. 1956. MOURNING DOVE AND DICKCISSEL ON THE ATLANTIC OCEAN. Auk, 73:290.

While crossing the ocean by steamer, sailing from New York November 1, 1954, a mourning dove alighted on the ship at 3 p.m., November 4, at 39° 45' N., 57° 47' W. after winds of gale force previous day. "During remainder of the afternoon, it made short flights over the water but always returned, and stayed most of the time on deck. It spent the night on board and took off from the ship at eight the following morning." An hour later a Dickcissel flew on board. "It seems probable that both of these birds were caught by the storm during migration." At noon November 5 the ship was about 1,116 nautical miles from New York.

389. Leedy, D. L. 1949. HUNTING STATISTICS IN THE UNITED STATES, 1936 vs. 1946. Transactions of the 14th North American Wildlife Conference, 410-423.

Discusses changes in hunting pressure and kill from 1936 to 1946. Mourning dove is hunted by one-tenth as many hunters as are cottontail rabbits. The reported kill of doves from 12 States decreased 49% from 1936 to 1946.

390. Legler, Eugene, Jr., Herbert Stern, Jr., and W. Scott Overton. 1961. A PRELIMINARY EVALUATION OF TELEPHONE AND FIELD SAMPLING FRAMES. Transactions of the 26th North American Wildlife and Natural Resources Conference, 405-417.

This paper presents a more detailed account of the efforts and procedures being developed to estimate total kill of doves in Wilson County, Tennessee, and Acadia Parish, Louisiana (see Stern and Legler, 1960, above). A list of telephone subscribers forms the primary sampling frame and a secondary frame of hunter bag checks will provide a ratio of kill by persons not in the telephone frame to kill by persons in the telephone frame. Results of the telephone interview phase of the sampling effort were encouraging, but the field phase was less encouraging. Some data obtained from the telephone interview and field sampling phases are presented, but have not yet been statistically analyzed. Some further refinements of the sampling procedures are recommended.

391. Lehrman, D. S. 1955. THE PHYSIOLOGICAL BASIS OF PARENTAL FEEDING BEHAVIOR IN THE RING DOVE. Behaviour, 7:241-286.

A detailed experimental study of feeding by regurgitation in the ring dove (Streptopelia risoria). Prolactin elicits parental feeding because it causes engorgement of the crop and suppresses sexual behaviour, rather than by affecting central nervous mechanisms specific for parental behaviour. This engorgement makes the crop sensitive to emetic stimuli provided by movement of the squab's head against the parent's breast. Inexperienced parents regurgitate in response to tactile stimuli only, but the response soon becomes conditioned to visual and auditory stimuli. (From a review in Ibis, 1955, Vol. 97, No. 4, p. 749)

392. Levine, N. D., and S. Kantor. 1959. CHECK-LIST OF BLOOD PARASITES OF BIRDS OF THE ORDER COLUMBIFORMES. Wildlife Diseases, 1:1-38.

"Reports are tabulated of Trypanosoma, Plasmodium, Haemoproteus, Leucocytozoon, Toxoplasma, hemogregarines, and filariae from birds of the order Columbiformes (doves and

pigeons). For each report there is given the host species, parasite species, number of birds examined, percentage of birds infected, and geographic locality, 204 references."
-- Authors' Abstract.

393. Lincoln, Frederick C. 1936. RETURNS OF BANDED BIRDS: SECOND PAPER. Bird-Banding, 7:121-128.
Lists returns from 66 banded doves.

394. Lincoln, Frederick C. 1941. WHEN THE DOVE TRAVELS. Florida Game and Fish, September, 1941:5-6.
Practically reprint of article published in Outdoor Georgia, September, 1940.

395. Lincoln, Frederick C. 1945. THE MOURNING DOVE AS A GAME BIRD. Circular 10, Fish and Wildlife Service, U. S. Department of the Interior. 8 pp.

Only game bird breeding in every State, and wintering mostly in southern States. Commonly 2 broods in northern part of range and may be as many as 5 or 6 in the South. Slightly over one month for complete brood. Discussion of life history as determined in Iowa, North Carolina, Alabama, and Texas studies. Shooting should not be before October 1.

396. Locke, L. N. 1961. POX IN MOURNING DOVES IN THE U. S. Journal of Wildlife Management, 25(2):211-212.

"Pox infection has occurred in mourning doves in at least 8 States on 12 separate occasions. Unsuccessful attempts were made to transmit bowl fowl pox (chicken isolate) and passerine pox (cowbird isolate) to mourning doves." -- From Author's Summary.

397. Locke, L. N. 1961. THE SUSCEPTIBILITY OF THE CARDINAL, RICHMONDENA CARDINALIS (L.), TO TRICHOMONAS GALLINAE FROM A MOURNING DOVE, ZENAIDURA MACROURA (L.). Journal of Parasitology, 47(1):76.

A report on the successful transmission of T. gallinae (from culture) to a cardinal.

398. Locke, L. N., C. M. Herman, and E. S. King, Jr. 1960. THE NEED FOR DIFFERENTIATION OF TRICHOMONIASIS AND POX INFECTIONS IN DOVES. Journal of Wildlife Management, 24(3): 348.

"A paper describing the similarities and differences between trichomoniasis and pox infection. The need for laboratory diagnosis to differentiate between them is indicated." -- From abstract by L. N. Locke.

399. Locke, Louis N., and David H. Reese. 1960. TRIALS OF TWO METHODS FOR THE PROPOSED DOVE DISEASE SURVEILLANCE SYSTEM. Presented at the 14th Annual Conference of the Southeastern Association of Game and Fish Commissioners. 9 pp. mimeo.

Two methods of sampling the incidence of trichomonad infection in mourning doves were designed and tested. One method, "the call count route system" was tested on 10 routes in Alabama, Kentucky, Louisiana, and Maryland. Nesting cover was searched for nests along the previously established call count routes and the throat of one nestling in each nest found was to be swabbed. The sampling design called for cover to be searched 100 yards at two-mile intervals along each side of the route at 11 stops on the 20-mile route. Ten swabbings were needed per route. The other method, "the block survey system," was used in three localized areas in Mississippi, Texas, and Indiana. The objective of this system was to obtain 100 swabbings from nestlings in each area. The two methods were compared on the basis of number of dove nestlings swabbed and on cost of the survey. No nests with nestlings were found along the call count survey routes, and 101, 55, and 26 swabbings were made on the study areas in Texas, Mississippi, and Indiana, respectively. Costs of the call count survey system averaged \$22.505 per route, and costs of the block survey system was \$412.31, \$433.27, and \$411.47 for Texas, Mississippi, and Indiana, respectively. Fifty-three of 101 Texas swabbings were positive for Trichomonas gallinae; 7 of 55 Mississippi swabbings were positive; and none of the 27 Indiana swabbings was positive.

400. Low, Seth H. 1935. NOTES ON THE SURVIVAL, WINTER DISTRIBUTION, AND MIGRATION SPEED OF EASTERN MOURNING DOVES. Bird-Banding, 6:61-65.

Gives records of 519 doves banded in 4 years (1930-33) at Cape Cod. A total "return" (recoveries and station recaptures) of 106 or 20.4% is reported. Compares migration, wintering areas, and speed with Taber's 1930 paper. Most doves kept to coastal plain, although one went to Tennessee. Fastest bird flew 43.8 miles per day (to Georgia). The 10 fastest doves averaged 17 miles per day. Majority of Cape Cod birds were taken in Georgia.

401. McClanahan, Robert C. 1940. ORIGINAL AND PRESENT BREEDING RANGES OF CERTAIN GAME BIRDS IN THE UNITED STATES. Wildlife Leaflet BS-158, Bureau of Biological Survey, U. S. Department of the Interior, 21 pp.

Gives map showing mourning dove breeding in all 48 States and wintering in same areas.

402. McClure, H. E. 1944. MOURNING DOVE MANAGEMENT. Journal of Wildlife Management, 8:129-134.

Doves are fourth in most popular game bird groups, about eleven million being killed in 1942. Points out lack of knowledge of populations. Doves should not be hunted north of the 37th parallel, for, over 20% of young do not leave nests until after September 1, migration of young from northern areas begins in July, only a very small population winters, only 15% of the population is produced away from towns and farmyards, dove is beneficial. Suggests management practices such as planting trees, shrubs, and shelterbelts for nesting, providing drinking places, and saving food plots and weeds for feed.

403. McClure, H. Elliott. 1950. AN ELEVEN YEAR SUMMARY OF MOURNING DOVE OBSERVATIONS IN THE WEST. Transactions of the 15th North American Wildlife Conference:335-346.

Summarizes author's dove studies in Iowa (1938-41), Nebraska (1941-43), and California (1946-50). Nesting success from 4,598 attempts averaged 51.2%. Suggests a factor can be derived from nesting observations during one month to give an indication of production during the year for that locality. Results of road counts are given for each State, showing peaks in July for California and in August for Nebraska and Iowa.

404. Moore, George C. 1949. NORTHERN DOVES AND SOUTHERN HUNTING. Mimeo. 5 pp. Talk at Midwest Wildlife Conference, Madison, Wisconsin, December 16, 1949.

General discussion of organization and objectives of southeastern P-R study and an appeal for cooperation from technicians in midwestern States.

405. Moore, George C. 1950. SOUTHEASTERN COOPERATIVE DOVE STUDY. Mimeo. 6 pp. Talk at Southeastern Association of Game and Fish Commissioners, Richmond, Virginia, October 17, 1950.

Summary of objectives in P-R projects. Discusses kill (5%), unknown mortality (55%), and survival (40%) based on band returns as compared to 21%, 49%, and 30% from the southeastern study.

406. Nelson, Arnold L., and Alexander C. Martin. 1953. GAMEBIRD WEIGHTS. Journal of Wildlife Management, 17(1): 36-42.

Tabulations of weights of 80 species of game birds from 26,000 records in files of the Fish and Wildlife Service from many cooperators throughout the country, mainly from bird banders and from investigators checking the contents of game bags. Average weight of 164 male mourning doves was 4.6 ounces, with a maximum of 6.0; average of 80 females was 4.4 ounces, with a maximum of 5.5.

407. Nelson, Dan, Leonard Foote, James E. Keeler, Harold Alexander, Frank A. Winston, Dan M. Russell, John Newsom, Henry Bobbs, Jr., Donald G. Allison, Harold B. Poole, and James W. Hammond. 1951. STATISTICS AS A TOOL IN MEASURING DOVE INVENTORIES. Presented at the Southeastern Association of Game and Fish Commissioners, Biloxi, Mississippi, October. Mimeo. 15 pp.

A combined summary of results of census techniques from the dove study of 10 southeastern States. Random road counts, controlled road counts, rural mail carrier counts, biologists' counts, study area counts, and call counts have all been used for securing indices to dove populations. The biologists' area and road counts were found to be highly unreliable because the sample was too small. Data from controlled road counts were slightly less variable than those from random counts. "A yearly production index must be established in order to determine the relative number of doves available to the gun. This index should be set at the earliest possible date following the primary nesting peak of doves." "July seems to be the logical month in which to establish the dove production index." It appears that so many miles of random road counts are needed for each State that the practical solution will be for all States to pool their data and establish an index for the range of the eastern dove. Call counts appear to be the best method for censusing the breeding population. It appears that 174 call counts will be needed in eastern United States to denote a 10 percent change in population. Tables are included of results of random and controlled counts in each of the southeastern States, as well as statistical analysis and comparison of the various census techniques.

408. Newsom, John D., Dan M. Russell, Frank A. Winston, Leonard E. Foote, and Harold S. Peters. 1957. A SUMMARY OF MOURNING DOVE INVESTIGATIONS, 1948-1956. Transactions of the 22nd North American Wildlife Conference, 360-379.

A summary of major activities and results from the Cooperative Dove Study, 1948 to 1956. A detailed report is in press by the Southeastern Association. While the major emphasis has been on the population supplying hunting to the southeastern States, a considerable volume of data is included from other parts of the dove's range. Objectives were to investigate movements, breeding, population densities and distribution, and hunting effects and to recommend proper management. Various census methods were tested; the call-count was adopted as giving an index to breeding populations. Band recoveries were analyzed, but more banding (especially of nestlings) is needed. Hunter kill appears negligible. Suggests operational and research needs.

409. Owen, B. L. 1958. RECORDS OF NASAL MITES OF THE MOURNING DOVE. The Texas Journal of Science, 10(4):447.

Locality and incidence data for Neonyssus zenaidurae from Texas, Alabama, and Mississippi.

[From Wildlife Review 95:84]

410. Pearson, Allen M., and Walter Rosene, Jr. 1938. OBSERVATIONS ON THE BREEDING SEASON OF THE MOURNING DOVE IN THE SOUTH. Transactions of the Third North American Wildlife Conference, 865-868.

Climatic conditions permit longer breeding season for resident doves of southern States. Data collected from March, 1937 to January, 1938 in Alabama. Typical nest was active for 33 days. Earliest nests found in March and last was vacated in first half of October. Peak was in mid-June. Measurements of testes of 317 males showed greatest activity from mid-June to mid-July and lowest in mid-November. Young should weigh at least 100 gms. and preferably 110 gms., before being hunted. Average weight of 105 gms. reached at 60 days of age. Recommended open season from November 20 to January 31 as interfering less with early breeding.

411. Peters, Harold S. 1949. A SUMMARY REPORT OF THE MOURNING DOVE PROJECT, FISCAL YEAR 1949. Mimeo. 4 pp., Atlanta, Georgia.

Summary of results from P-R dove projects in the 6 States (Alabama, Arkansas, Florida, Mississippi, South Carolina, and Tennessee) which began during fiscal year 1949. Major activities were banding, hunter's bag checks, roadside counts, and study of nesting and migration. A total of 1,969 birds were banded.

412. Peters, Harold S. 1949. ANALYSIS OF RETURNS FROM BANDED EASTERN MOURNING DOVES. Mimeo. 22 pp., August, 1949, Atlanta, Georgia.

Gives a detailed analysis of 1,242 recoveries from the 33,247 doves banded from 1920 to June 30, 1948. Small return of 3.74% is far less than that from ducks. A total of 15,143 (45.6% of total) were banded in 11 States of Region 4; and 797 returns (64.2% of total recoveries) were obtained from Region 4. A summary of bandings and recoveries from individual States in Region 4 (and some other States) is given. Nearly 60% of recoveries are within first year after banding, and 95.6% are recovered within first three years following banding. Two doves lived 9 years. Two major migration routes are indicated; one down Mississippi Valley and the other down Atlantic coast east of the mountains.

413. Peters, Harold S. 1950. A SUMMARY OF THE P-R MOURNING DOVE PROJECTS OF REGION 4, FISCAL YEAR 1950. Mimeo. 10 pp., Atlanta, Georgia.

Gives a summary of the 10 P-R dove projects of Region 4 during fiscal year 1950. Major emphasis was on populations, migration, banding (a total of 16,262 doves had been banded to close of June, 1950), hunter's bag examination, disease, study of rate of molt, and experimental cooing counts. Controlled road counts gave better results than random counts; rural mail carriers made a winter count which gave better results than biologists or plot counts; hunters' bags yielded data on percentage of adults and immatures and hunting success; records of immatures among trapped birds gave information on production and movements.

414. Peters, Harold S. 1950. MOURNING DOVE INVESTIGATIONS IN THE NORTHERN STATES. Mimeo. 4 pp. Talk at Midwest Wildlife Conference, Columbus, Ohio, December 15, 1950.

Summary of dove studies conducted by 105 persons during 1950 in 17 States and 1 Province. Three Service biologists found coo-road counts gave best index to nesting population and suggest a standardized route of 20 three-minute stops at one mile intervals be run, beginning one-half hour before local official sunrise. Periodic road counts at daily, semi-weekly, weekly, or bi-weekly intervals gave indications of gradual build-up in populations due to production of young. Study areas showed nesting density and success.

415. Peters, Harold S. 1950. SUMMARY OF DOVE STUDIES IN THE NORTHERN STATES. Mimeo. 4 pp. Talk at Southeastern Association of Game and Fish Commissioners, Richmond, Virginia, October 17, 1950.

Summary of 1950 dove studies by cooperators and Service biologists in 14 States and 1 Province. Cooperation was solicited in study area, roadside counts, and banding. Service biologists found coo-road counts evidently gave best index to breeding populations.

416. Peters, Harold S. 1951. ANALYSIS OF RECENT RECOVERIES OF BANDED MOURNING DOVES. Fish and Wildlife Service, Atlanta, April, 1951. 7 pp. processed.

Analysis of 519 recoveries reported from July 1, 1948, to March 31, 1951. Eighty percent were recovered in the State of banding, and 75.7 percent were from the 10 southeastern States. Tables show the States of banding and recovery. About 27,000 doves were banded from July, 1948 through December, 1950, (mainly in the southeast) as contrasted to 33,247 banded in the previous 28 years.

417. Peters, Harold S. 1951. MOURNING DOVE CENSUS TECHNIQUES. Presented at the 13th Midwest Wildlife Conference, Minneapolis, December 12, 1951. Processed, 5 pp.

A discussion of three census methods found most reliable in the southeastern States; random road count, controlled road count, and a count of calling doves. A call count is explained and an appeal made for assistance in conducting them next summer in accordance with plans for 176 transects in States east of the 100th meridian.

418. Peters, Harold S. 1952. PROGRESS OF THE COOPERATIVE MOURNING DOVE STUDY. Presented at the 14th Midwest Wildlife Conference, Des Moines, Iowa, December 17-19, 1952. Processed, 4 pp.

A brief presentation of the major results of the southeastern study and its extension to 33 States. Tables are included to show the number of call counts in 12 midwestern States and the 32 States and countries of recovery of 642 doves originally banded in the same 12 States.

419. Peters, Harold S. 1956. BANDING - A KEY TO DOVE MANAGEMENT. Transactions of the 21st North American Wildlife Conference, 365-375.

A detailed analysis of nationwide mourning dove band recoveries. By December, 1955, 5,448 recoveries had been reported from 145,000 doves banded since 1920 (3.7 per cent recovered). "About 3 per cent of the banded doves are reported by hunters." Nestling banding has produced 22.4 per cent of the recoveries, 79.4 per cent of these within the State of banding. About three-fourths of juvenile- and adult-banded doves were recovered in the State where banded. Tables show distribution and migration as indicated by band recoveries. More doves have been recovered by hunters in September than in other hunting months. "Recoveries by hunters are a biased sample." . . . "A greatly increased dove banding program is needed, with special emphasis on banding of nestlings in all States."

420. Peters, Harold S. 1956. NINETEEN MILLION DOVES. Southern Outdoors, 4(6):9.

Results of a questionnaire to the 29 States which hunted mourning doves in 1955 indicated that 19 million doves were killed by hunters. This is an increase from 15 million estimated killed in 1949 and 11 million in 1944. Kill of doves greatly exceeds the estimated kill of all species of waterfowl combined.

421. Peters, Harold S. 1956. PRESENT STATUS OF MOURNING DOVE INVESTIGATIONS. Proceedings of the Southeastern Association of Game and Fish Commissioners, Columbia, South Carolina, October 2-5, 1955:67-68.

The three and one-half years of Cooperative Dove Study resulted in recommendations that four phases be continued by all States interested in dove hunting: Annual call count May 20-June 10; random road counts monthly July to January; continuation of banding; and hunter bag checks. Only the call count has been continued by all States with 44 States running over 700 call-count routes. A five-year program of dove nestling banding has been started. Several problems need the attention of dove workers and graduate students; especially, a study of breeding population and production per unit area on several important ecological habitats, more work on progressive wing molt of juveniles, and relation of ground to tree nesting doves in prairie habitats. No State has a full-time dove biologist and the Service has only one biologist assigned to this important species. This in spite of information indicating the kill of doves equals or exceeds that of waterfowl. More attention should be given the dove by both Service and the States.

422. Peters, Harold S. 1956. THE MOURNING DOVE HUNTER KILL - 1955. Processed, 4 pp., Atlanta, Georgia.

Results of a questionnaire sent to 29 States and one Province which hunted doves in 1955 give an estimated kill of 18,777,640. This may be expressed in round numbers as 19 million. This is an increase over the 15 million estimated in 1949 by Dalrymple and the 11 million which McClure estimated in 1944. "Certainly more doves are killed than any other species of migratory game birds, in fact, the kill of Mourning Doves greatly exceeds the estimated kill of 15 million ducks in the United States in 1955." Texas killed slightly over 4 million doves, California two and one-half million, and Georgia an estimated two million.

423. Peters, Harold S. 1957. MOURNING DOVE RESEARCH PROJECT. Processed, 4 pp., Atlanta, Georgia, February, 1957.

Suggested research project for "A Study of Breeding Density and Production" to determine what a calling dove represents when compared with breeding pairs on a study area centered on one station of a call-count route. Lists objectives, work plan, job outline, requirements and supervision, and is suitable for a graduate student's study. Patterned after study in Georgia by Lowe (See Journal of Wildlife Management, 20(4):428-433, 1956).

424. Peters, Harold S. 1957. MOURNING DOVE BANDING IN THE SOUTHEASTERN STATES. Processed, 8 pp., Atlanta, Georgia. General account of life history, economic importance (19 million killed in 1955), life history, and banding. Gives results of 1956 banding and suggestions resulting from it for guidance of 1957 banders. Urges participation in nationwide nestling banding programs. Tabulates States of recovery for 3,708 birds which were originally banded in the twelve southeastern States. (Similar reports were prepared for Northeastern, Northwestern, Southwestern, and North Central States.)

425. Peters, Harold S. 1957. A FOURTH SET OF ABSTRACTS OF MOURNING DOVE LITERATURE. U. S. Fish and Wildlife Service, Peachtree-Seventh Building, Atlanta 23, Georgia. Processed, 27 pp.

"Abstracts of 139 articles, theses, and papers. . . Most of these have appeared since the Third Set of 79 abstracts was compiled in July 1953." Some of the works listed are unpublished or obscure papers that might escape attention except for this compilation. Most papers included are substantial ones, but a few are entirely popular.

[From Wildlife Review 91:96]

426. Peters, Harold S. 1958. RECENT RECOVERIES FROM MOURNING DOVE BANDING. U. S. Fish and Wildlife Service, Peachtree-Seventh Building, Atlanta 23, Georgia. Processed, 4 pp.

Peters, retiring from government service, here summarizes all banding recoveries in 3 tables. Table 1 gives the States of banding and recovery for the 3,199 most recent recoveries. Table 2 shows States of banding and recovery for 1,071 doves banded as nestlings. Only 59% of these doves were recovered in the State where banded. Table 3 shows States of banding and recovery of 5,448 doves recovered between 1920 and December 1, 1955. Overall recovery rate has been only 3.6%.

[From Wildlife Review 91:96]

427. Peters, Harold S. 1961. THE PAST STATUS AND MANAGEMENT OF THE MOURNING DOVE. Transactions of the 26th North American Wildlife and Natural Resources Conference, 371-374.

Peters, formerly in charge of mourning dove investigations, U. S. Fish and Wildlife Service, reviews the past status of the mourning dove, its rank as a game bird, history of research and management investigations, and the need for continuing studies for putting the management of the species on a firmer footing. The mourning dove is a game species

in 30 States and one Province, and more doves are harvested than all species of ducks and geese combined. The kill is increasing; estimates of 15 million and 19 million were made for 1949 and 1955-56, and 30 million birds may now comprise the annual bag. In spite of these heavy kills, the continental dove population is maintaining itself. Fluctuations in dove populations have occurred, but these have been minor. Severe freezes in winter, cool rains in nesting seasons, and occasional outbreaks of disease have depressed the population only temporarily. Nests have been found in every month, and doves average about 3 successful broods from 5 or 6 attempts. Two eggs comprise a clutch and each pair may produce 4 to 6 young. Nest and juvenal mortality is about 50 per cent. In the fall the young of the year comprise about 70 per cent of the population. Few investigations of the life history, production and movements of mourning doves were made in early years. The growing importance of the mourning dove induced the Southeastern Association of Game and Fish Commissioners to launch in 1948 a region-wide study under the P-R program. By 1949 the Southeastern Study was being conducted in 10 States. The study ended in mid-1952 but many projects of the program continued through 1956. The call count was investigated and adopted as an index to the breeding population, and 100,000 doves were banded. Results of the Cooperative Dove Study, from 1948-1956, were published in 1957 as Technical Bulletin No. 1 by the Southeastern Association. This bulletin is regarded as the foundation for a realistic Mourning Dove Program.

428. Peters, Harold S., Leonard E. Foote, James W. Hammond, James E. Keeler, John D. Newsom, and Frank A. Winston. 1957. CURRENT STATUS AND PROBLEMS OF MOURNING DOVE INVESTIGATIONS IN THE SOUTHEASTERN STATES. Presented at the 11th Annual Conference of the Southeastern Association of Game and Fish Commissioners. Mimeo. 4 pp.

Far more doves are shot than ducks and geese combined. About \$15 million worth of shells were shot at doves in 1955. This provided 13% of Federal Aid funds appropriated that year. Despite this importance, little work is being done on doves. Only the annual call count is participated in by all southeastern States. In 1956, 13,270 doves were banded in the southeast, 84% of them in 4 States. Relatively few nestlings were banded. Bag checks are made in 7 southeastern States, random roadside counts in 6. Dove research is being done in only one southeastern school. Indications are that hunting does not destroy dove populations; regulations have been liberalized in each of the last three seasons. Several

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(By Entry Numbers)

Behavior

12 14 110 183 199 335 337 463

Census Techniques

28	77	124	161	216	282	317	359	413	423
66	105	128	181	232	283	318	360	414	434
69	108	136	183	253	287	335	373	415	439
72	110	141	194	257	301	340	403	417	458
73	111	158	200	262	309	349	407	421	463
74	112	160	214	268	316	358	408		

Diseases and Parasites

1	52	99	150	307	366	409	434	443	449
2	78	125	174	309	392	413	435	444	450
7	85	140	212	346	396	430	439	445	451
8	88	143	264	360	397	431	440	446	452
11	96	144	266	364	398	432	441	447	453
50	97	149	269	365	399	433	442	448	461
51	98								

Distribution and Migration

6	45	76	163	200	257	299	325	388	419
9	53	101	167	202	259	301	327	393	421
10	56	104	170	203	261	302	328	394	424
11	57	105	172	214	264	303	338	395	426
13	63	112	177	215	266	307	339	400	427
14	64	114	182	216	279	311	341	401	428
20	65	119	184	221	280	312	345	402	434
25	66	121	185	238	281	314	355	408	439
28	67	130	186	240	282	317	376	411	455
31	68	144	187	245	287	318	377	412	457
33	70	146	190	250	293	319	378	413	458
36	71	156	191	253	294	322	381	416	463
39	75	162	193	256	298	323	383	418	

Economics

128 129 217 311 428 439

Food Habits, Water and Grit

12	25	34	57	146	186	277	309	344	363
14	28	42	68	181	187	279	330	345	386
21	32	54	87	182	207	302	343	352	439
24	33	55	112	185					

Growth, Plumages and Molt

12	18	70	91	214	245	287	302	327	413
14	19	86	112	216	258	289	315	410	439
15	44	87	192	233	286				

Game-bird or Song-bird Status

41	100	195	201	249	318	319	439	460	461
89	107	196	238	260					

Habitat Management

14	82	112	208	220	238	242	311	360	434
28	108	113	218	225	240	255	344	363	439
80	109	207	219	235	241	279	352	402	459

Herbicides and Pesticides

4	5	30	169	228	360	439			
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Homing

162	163	167	193	215	301	463			
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Hunting Practices

6	34	68	137	189	211	276	304	342	439
26	57	120	147	205	243	303	341	374	460
28	58	133	188	208	249				

Hunting Regulations

2	14	28	62	67	82	126	144	178	191
6	15	34	65	68	85	136	147	181	196
11	26	40	66	71	89	142	158	190	208

Hunting Regulations (continued)

211	226	266	301	350	378	402	410	434	460
213	238	279	318	360	395	408	428	439	461
214	245	300	342	371					

Kill Estimates

10	40	84	176	215	270	339	360	411	427
11	59	127	180	240	279	341	389	413	428
26	60	128	181	250	301	350	390	420	434
31	75	129	189	253	309	353	402	422	439
35	76	147	202	259	311	355	408	424	454
36	77	175	204	263					

Local Movements

25	87	128	182	279					
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Marking Techniques

40	64	143	157	247	287	288	305		
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Miscellaneous

94	155	210	267	285	310	350	356	380	423
106	171	248	272	295	321	351	357	384	425
139	205	254	273	296	329	354	369	404	436
145	206	265	274	306	331	355	375	406	438

Morphology and Physiology

70	87	122	229	330	336	391	439		
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Mortality Rates

31	62	144	163	203	287	351	376	405	439
57	65	156	181	215	290	367			

Nesting and Production

10	39	103	129	169	216	235	252	301	370
11	40	104	135	172	218	236	253	302	395
12	47	105	140	178	219	237	263	309	402
14	48	108	144	179	220	238	271	312	403
17	49	109	152	196	221	239	278	320	408
18	57	111	153	197	222	240	286	322	410
22	69	112	158	199	223	241	287	333	411
23	70	115	159	200	224	242	290	334	414
27	72	116	161	202	225	244	291	336	427
31	77	117	164	209	228	245	292	353	437
34	79	118	165	213	229	246	298	354	439
36	80	124	166	214	231	250	299	361	456
37	81	128	167	215	234	251	300	367	464

Other Columbiformes

51	97	313	345	440	443	446	448	450	452
52	139	324	362	441	444	447	449	451	453
96	297	342	391	442	445				

Populations and Fluctuations

2	53	84	126	193	253	300	319	376	418
3	62	85	128	202	257	301	326	379	421
8	63	101	131	211	259	303	339	382	427
10	65	102	132	213	264	307	341	385	428
11	67	103	136	214	266	309	342	408	434
31	68	104	144	215	268	316	349	411	439
34	72	105	155	232	269	317	354	413	458
38	77	120	161	238	279	318	360	414	463
40	82	123	178	240	281				

Sex and Age Determination Techniques

19	90	126	192	258	289	313	368	429	458
44	91	148	216	286	302	315	413	434	462
70	93	182	233	287					

Sex and Age Ratios

8	44	72	129	154	185	216	287	309	428
16	53	75	151	158	202	264	290	353	439
26	61	95	152	180	214	281	301	413	458
43	70	128	153	182	215	286			

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12	47	105	140	178	219	237	263	309	402
14	48	108	144	179	220	238	271	312	403
17	49	109	152	196	221	239	278	320	408
18	57	111	153	197	222	240	286	322	410
22	69	112	158	199	223	241	287	333	411
23	70	115	159	200	224	242	290	334	414
27	72	116	161	202	225	244	291	336	427
31	77	117	164	209	228	245	292	353	437
34	79	118	165	213	229	246	298	354	439
36	80	124	166	214	231	250	299	361	456
37	81	128	167	215	234	251	300	367	464

Other Columbiformes

51	97	313	345	440	443	446	448	450	452
52	139	324	362	441	444	447	449	451	453
96	297	342	391	442	445				

Populations and Fluctuations

2	53	84	126	193	253	300	319	376	418
3	62	85	128	202	257	301	326	379	421
8	63	101	131	211	259	303	339	382	427
10	65	102	132	213	264	307	341	385	428
11	67	103	136	214	266	309	342	408	434
31	68	104	144	215	268	316	349	411	439
34	72	105	155	232	269	317	354	413	458
38	77	120	161	238	279	318	360	414	463
40	82	123	178	240	281				

Sex and Age Determination Techniques

19	90	126	192	258	289	313	368	429	458
44	91	148	216	286	302	315	413	434	462
70	93	182	233	287					

Sex and Age Ratios

8	44	72	129	154	185	216	287	309	428
16	53	75	151	158	202	264	290	353	439
26	61	95	152	180	214	281	301	413	458
43	70	128	153	182	215	286			

Taxonomy

53 57 327 342 345 362

Trapping and Banding Techniques

9	86	138	168	221	275	288	332	348	387
29	92	141	173	227	284	305	347	372	434
83	93	162	198	235	287	308			