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WHITEWINGS

The Life History, Status, and Management of the White-winged Dove

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lands. Approximately 300,000 birds were seen in one such flight in 1939. In 1946, another bumper year for doveweed, two heavy flights developed. One flight, southeast of Laredo, Texas, was estimated at 1,250,000 birds. The second, in western Willacy County, consisted of approximately 900,000 birds. The crops of many doves collected from these flights contained doveweed seeds almost exclusively. Both of these remarkable flights occurred when there were ample supplies of domestic grains, indicating the whitewings' preference for doveweed over hegari and maize at this time of year—just prior to their long southward migration.

Cultivated grains, of course, are more consistent producers of seed than the doveweed. When the cultivated grains are planted early, their expansive root systems use most of the rainfall; consequently, they crowd out the native doveweed and many other seed-producing plants, which are weeds in the grainfields. Most of the doveweed, however, grows in vast pastures on ranches north of the Valley.

Leatherweed is second in importance in South Texas only to doveweed as a native source of fall whitewing food. Unfortunately the plant produces light seed crops, although it blooms several times during the growing season. The seeds, which are about the size of number 0 buckshot, are very durable, however, and are available throughout the fall when the crop matures properly.

Occasionally there may be shortages of all foods preferred by white-winged doves. At such times, the birds that do not move into Mexico supplement the meager stocks of grain sorghums, doveweed and leatherweed seeds by foraging in thickets for the fruits of desert hackberries, *coma*, *colima*, and prickly pear or searching in waste places for seeds of sunflowers, Johnson grass, Texas millet, and careless weed. These secondary foods also assume prime importance in areas where the preferred foods are uncommon.

LABORATORY FOOD HABITS STUDIES

The feeding habits of the white-winged dove have been the object of study in the field by some of the authors and by other workers in various parts of North and Central America. Supplementing these field observations are the records of the laboratory analyses of 970 dove crops or

gizzards.* These were collected by various workers largely from February through October in 1938 through 1943 (Table 4). Slightly more

TABLE 4

Distribution and Number of White-winged Dove Stomachs Analyzed 1938–1943

Month	*South Texas*	*Southern Arizona*	*Sonora, Mexico*	*N. E. Mexico*	*So. Mexico, Guatemala, El Salvador*
January					1 *
February					26
March					69
April	1	12		3	
May	7	33	23		
June	32	50	21		
July	29	75		25	
August	16	130		1	
September	296	46		2	
October	68			4	
November	1				
December					1 *
TOTALS	*450*	*346*	*44*	*35*	*97*

* Not used in computing percentages.

than half of the stomachs collected in Texas and Arizona were taken during the hunting season. Johnson A. Neff analyzed them through laboratory procedures at the Denver (Colorado) Wildlife Research Center of the U. S. Bureau of Sport Fisheries and Wildlife. In addition to these detailed studies, field workers have examined the crop contents of hundreds of other whitewings. Careful notes were made of these hastier and less thorough field studies, but they were used only for background information and not included in the tables.

Most of the samples were collected in the United States—450 in Texas by Saunders and associates and 346 in Arizona by Neff and associates.

* As used hereafter in this chapter, the word "stomach" includes crop and gizzard.

Saunders, however, also obtained 130 from the Mexican States of Tamaulipas, Nuevo León, Querétaro, Morelos, Puebla, and Oaxaca and from Guatemala and El Salvador. Neff collected an additional 44 in Sonora in northwest Mexico.

Table 5 summarizes the results of the laboratory studies of birds collected in the various geographic regions within the range of the white-wing. More detailed tables will be found in Appendix 7. The table for southern Mexico and Central America represents foods used in late winter; the other four tables are more indicative of summer and early-fall food preferences.

TABLE 5

Composite Summary of Ten Major White-winged Dove Foods from Five Major Regions, Expressed by Percentage of Volume and Rate of Occurrence, 970 Stomachs *

Areas	*Cultivated Crops % Vol.*	*Occurrence*	*Doveweed, Spurges % Vol.*	*Occurrence*	*Torchwood % Vol.*	*Occurrence*	*Sunflower, Composites % Vol.*	*Occurrence*	*Saguaro, Cacti % Vol.*
Southern Texas	15.8%	128 **	40.7%	409			26.5%	102	0.1%
Southern Arizona	44.3	214	4.4	31			1.2	19	14.2
Sonora, Mex.	9.0	4	0.2	2	60.5%	33	0.2	1	10.9
N.E. Mexico	8.1	8	23.0	24			2.5	3	Tr.
Int. Mexico & Cent. Amer.	35.4	87	4.3	13	1.2	8	11.3	17	3.0

* Total of these ten foods equals 82.4% of food consumed.

Any conclusions on food preferences, however, must be based on all available information. They must take into consideration all reliable reports, published or unpublished, by competent observers as well as laboratory studies and the field notes of biologists.

Laboratory food habits studies have admitted weakness, especially in a bird like the white-winged dove, for which a relatively small number of samples are available. Those that have been made are spotty both in terms of location and of time. But they do reveal trends and provide much information on the relative values of specific food items taken by doves under specific conditions at known times and places. These are indicative, therefore, of food preferences only for the periods of the year when these stomachs were taken.

The seeds and fruit of ten groups of plants comprised 82.4 percent of the last meals of the birds examined in the laboratory. This was based on the five areas studied, considering each area as a unit.

More than 45 percent of those birds, most of which may have been shot on or near agricultural lands, had fed on some agricultural crop. In the aggregate volume, this was 22.5 percent of the average last meal. Birds in all five major areas apparently favored cultivated foods, which included sorghum, wheat, barley, corn, rice, beans, and seeds of melon, gourds, and citrus. In Arizona such foods amounted to 44.3 percent of

TABLE 5 (*Cont'd.*)

Occurrence	*Prickly Poppy % Vol.*	*Occurrence*	*Legumes % Vol.*	*Occurrence*	*Colima % Vol.*	*Occurrence*	*Grasses, Sedges % Vol.*	*Occurrence*	*Ocotillo % Vol.*	*Occurrence*	*No. of Stomachs*
5	2.3%	1	2.3%	10	2.4%	45	5.2%	129			450 **
115	1.6	19	8.1	45			0.9	9	2.1%	19	346
13	2.0	2	1.7	4					8.2	9	44
1	Tr.	1	4.3	6	14.2	6	6.9	9			35
3	20.1	15	6.2	11	2.7	7	3.7	11			95

** This indicates that 128 of the 450 stomachs contained seeds of one or more cultivated crops.

the total diet, and in southern Mexico and Central America they comprised 35.4 percent of the foods consumed. Nearly 62 percent of the Arizona birds and more than 91 percent of the birds from southern Mexico, Guatemala, and El Salvador had eaten some grain. In contrast, fewer than 10 percent of the Sonoran birds, 22.8 percent of the birds from northeastern Mexico, and 28 percent of the Texas birds had consumed agricultural foods. Undoubtedly availability influenced selection.

Of the wild seeds, doves seemed to favor the doveweed and other spurges (Euphorbiaceae). While these seeds made up only 14.5 percent of the average diet, about half of the birds studied had fed on them to some extent. In South Texas, 91 percent of the birds collected had eaten these seeds. On the other hand, only two birds from Sonora had fed on doveweed, comprising 0.2 percent of the total. The dry Sonoran summers obviously do not favor this plant.

In the drier parts of Mexico, including Sonora, whitewings were noticeably attracted to the various species of torchwood (Burseraceae), mostly *Bursera* sp., often called *copal* in Mexico and Central America. A related species includes the drought-resistant elephant tree. Of all foods consumed by the 44 Sonoran birds, 60.5 percent consisted of seeds of the genus *Bursera*. On the basis of all five areas studied, this favored but

APPENDIX 7. SUMMARY OF FOODS EATEN BY WHITE-WINGED DOVES EXAMINED

The following tables list foods eaten by 970 white-winged doves during the period from 1938 through 1943 from five regions. The identification of most of the items was by Johnson A. Neff from laboratory examination of stomach contents. The common and scientific names of the plant foods are listed in Appendix 12. Names in italics are either scientific or Spanish common names.

The term occurrence, as used in these tables, refers to the number of birds in which the item was found.

Collections were made mainly during the summer and fall months except for 97 birds taken in south Mexico, Guatemala, and El Salvador in February and March and one bird collected in January. The four remaining areas from which the collections were made, with the number of stomachs analyzed and the period of time when taken, were as follows: (1) South Texas, 450 stomachs, mainly from May through October; (2) southern Arizona, 346 stomachs taken from April through September; (3) Sonora, 44 stomachs taken in May and June; (4) northeast Mexico, 35 stomachs, mainly from July through October.

APPENDIX TABLE 4

Foods Eaten by White-winged Doves in Texas, by Volume and Occurrence

Foods	*May–7* * *% Vol.*	*Occurrence*	*June–32* * *% Vol.*	*Occurrence*	*July–29* * *% Vol.*	*Occurrence*	*Aug.–16* * *% Vol.*	*Occurrence*	*Sept.–296* * *% Vol.*	*Occurrence*	*Oct.–68* * *% Vol.*	*Occurrence*	*Average % Vol.*	*Total Occurrences* **	*% of Occurrence*
Cultivated crops	13.5%	7	13.1%	20	19.2%	17	29.7%	15	8.7%	62	1.7%	2	15.8%	123	27.4%
Doveweed, spurges	34.6	7	20.8	23	13.2	13	12.0	8	72.3	287	91.8	68	40.7	406	90.6
Sunflower	11.0	4	50.0	27	50.0	23	45.4	13	2.5	34	Tr.	1	26.5	102	22.8
Wild grasses	13.9	6	15.4	32	5.2	20	0.5	13	1.6	48	2.5	3	5.2	122	27.2
Colima					0.2	1			10.4	36	4.0	9	2.4	45	10.0
Nightshade	14.0	1											2.3	1	0.2
Legumes	13.0	1			Tr.	1			0.8	8			2.3	10	2.2
Cacti									0.5	5			0.1	5	1.1
Bumelia									0.2	1			Tr.	1	0.2
Misc. seeds			0.5	6					Tr.	1			0.1	7	1.6
Unidentified seeds	Tr.	1	0.1	2	3.0	2	6.2	2	1.0	5			1.7	12	2.7
Misc. veg. debris	Tr.	1			5.0	2	6.2	1	0.2	2			1.9	6	1.3
Misc. animal matter	Tr.	1	Tr.	7	4.0	7	Tr.	2	1.0	7			0.8	24	5.4
Granjeno, hackberry			0.1	1	0.2	1			0.8	11			0.2	13	2.9
SUMMARY															
Vegetable food	100.0		100.0		96.0		100.0		100.0		100.0		99.3		
Animal food	Tr.	1	Tr.	7	4.0	7	Tr.	2	Tr.	7	0.0		0.7		
Gravel †	3.6		3.0		7.6		7.6		0.4		Tr.		3.7		

* Number of stomachs examined.

** Total of 450 stomachs includes one taken in April and one in November containing 100 percent seeds of *Forestiera* and *Bumelia* respectively.

† Gravel not a part of food percentage.

APPENDIX TABLE 5

Summary of Foods Eaten by White-winged Doves in Arizona, by Volume and Occurrence

Food	*April–12* * *% Vol.*	*Occurrence*	*May–33* * *% Vol.*	*Occurrence*	*June–50* * *% Vol.*	*Occurrence*	*July–75* * *% Vol.*	*Occurrence*	*Aug.–130* * *% Vol.*	*Occurrence*	*Sept.–46* * *% Vol.*	*Occurrence*	*Average % Vol.*	*Total Occurrences*	*% of Occurrence*
Cultivated crops	18.2%	4	22.1%	9	66.0%	36	13.8%	15	75.8%	116	68.2%	34	44.3%	214	61.8%
Saguaro–cacti	1.6	1	Tr.	1	20.0	15	57.8	65	4.0	28	2.0	5	14.2	115	33.2
Legumes	16.6	2	21.6	11	1.0	3	5.2	11	6.1	14	Tr.	3	8.1	44	13.0
Doveweed-spurges			Tr.	1			4.0	3	4.0	13	18.0	14	4.4	31	9.0
Buckthorn			15.0	5	4.0	5							3.2	10	2.9
Oak mast	8.4	1			3.1	4	3.1	7	6.3	7	6.3	6	3.1	25	4.0
Desert willow	16.6	2	Tr.	1									2.8	3	0.9
Ocotillo			4.0	2	2.0	5	4.0	4	3.0	6	Tr.	2	2.1	19	5.5
Lycium–nightshade			11.3	4									1.9	4	1.2
Prickly poppy			1.0	4	3.0	4	1.8	3	1.0	5	2.4	4	1.6	20	5.5
Sunflower–composite					1.5	2	3.5	11	2.0	6			1.2	19	5.5
Agave sp.	6.8	1											1.1	1	0.3
Grasses–sedges	3.8	1			Tr.	3	Tr.	1	Tr.	3	2.0	1	0.9	9	2.6
Four-o-clock			4.7	2	Tr.	1							0.8	3	0.9
Mulberry			3.0	1									0.5	1	0.3
Cottonwood	3.0	1											0.5	1	0.3
Wild grape			3.0	1					Tr.	1			0.5	1	0.3
Hop bush			3.0	1					Tr.	1			0.5	2	0.6
Jojoba			2.3	2									0.4	3	0.9
Melons, gourds			2.0	2									0.3	2	0.6
Mallow			1.0	2				1					0.2	3	0.9
Misc.—12 genera			Tr.	4			Tr.	2	Tr.	8	Tr.	2	Tr.	16	4.6
Unidentified seeds			3.0	2	1.0	4	2.6	4	1.0	1			1.1	11	3.2
Galls	8.4	1	3.0	1	Tr.	1	Tr.	4	Tr.	1	Tr.	1	1.9	9	2.6
Veg. debris	16.6	2			1.5	5	Tr.	3	Tr.	3	1.1	1	3.2	14	4.0
Beetles					Tr.	1	7.3	17					1.2	18	5.2
Insect & related items			Tr.	1	Tr.	10	Tr.	8	Tr.	4	Tr.	4	Tr.	27	6.6
SUMMARY															
Vegetable Food	100.0		100.0		100.0		92.0		100.0		100.0		98.8		
Animal Food			Tr.		Tr.		8.0		0.0		0.0		1.2		
Gravel	32.0		12.0		17.0		15.0		21.0		7.0		17.3		

* Number of stomachs examined: grand total 346.

APPENDIX TABLE 6

Summer Foods Eaten by White-winged Doves in Sonora, Mexico, by Volume and Occurrence

Food	*May–23* % Vol.*	*Occurrence*	*June–21* % Vol.*	*Occurrence*	*Average % Vol.*	*Total Occurrence*	*% of Occurrence*
Wheat			18%	4	9.0%	4	9.1%
Torchwood	75.0%	21	46.0	12	60.5	33	75.0
Organpipe cactus	6.4	6	15.5	7	10.9	13	29.5
Ocotillo	9.5	6	6.9	3	8.2	9	20.5
Acanthus	7.0	7	Tr.	1	3.5	8	18.2
Soapberry			5.0	3	2.5	3	6.8
Prickly poppy			4.0	2	2.0	2	4.5
Legumes	0.4	2	3.0	2	1.7	4	9.1
Smartweed			1.3	1	0.7	1	2.3
Milkwort	1.3	1			0.6	1	2.3
Doveweed, spurges	0.4	1	Tr.	1	0.2	2	4.5
Sunflower			0.3	1	0.2	1	2.3
Misc.—3 genera	Tr.	3			Tr.	3	6.8
SUMMARY:							
Vegetable Food	100	23	100	21	100	44	
Animal Food	0		0				
Gravel	5.2		7.3		6.3		

* Total number of stomachs; grand total 44.

APPENDIX TABLE 7

Foods Eaten by White-winged Doves in Northeastern Mexico, by Volume and Occurrence

Food	*July–25* % Vol.*	*Occurrence*	*Other–10** % Vol.*	*Occurrence*	*Average % Vol.*	*Total Occurrence*	*% of Occurrence*
Corn & other cultivated crops	15.0%	7	1.2%	1	8.1%	8	22.9%
Grasses	4.0	5	9.8	4	6.9	9	25.7

APPENDIX TABLE 7 (*Cont'd.*)

Food	*July–25* % Vol.*	*Occurrence*	*Other–10** % Vol.*	*Occurrence*	*Average % Vol.*	*Total Occurrence*	*% of Occurrence*
Croton–spurges	9.8	8	36.8	16	23.3	24	68.6
Colima	2.0	4	26.3	2	14.2	6	17.1
Forestiera			16.8	3	8.4	3	8.6
Legumes	4.5	4	4.0	2	4.3	6	17.1
Granjeno, hackberry	15.0	7			7.5	7	20.0
Caper	17.1	5			8.6	5	14.3
Pigeon berry	15.6	6			7.8	6	17.1
Caltrop	3.5	3			1.7	3	8.6
Sunflower	5.0	2	0.3	1	2.5	3	8.6
Bumelia	3.0	2			1.5	2	5.7
Morning glory			0.4	1	0.2	1	2.9
Benne	0.3	1			0.2	1	2.9
Commelina	0.1	1			0.1	1	2.9
Lantana	0.1	2			0.1	2	5.7
Misc.—4 genera	Tr.	2	Tr.	2	Tr.	4	11.4
Unidentified seeds	0.5	2	3.4	1	1.9	3	8.6
Veg. debris			1.0	1	0.5	1	2.9
Insect eggs, larvae & pupae	4.5	3			2.2	3	8.6
Misc. animal matter	Tr.	2	Tr.	1	Tr.	3	8.6
SUMMARY:							
Vegetable Food	95.5		100		97.8		
Animal Food	4.5	5			2.2		
Gravel	2.7		2.0		2.4		

* Total number of stomachs; grand total 35.
** Includes April–3, August–1, September–2, and October–4.