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Are Land-use Changes Reflected in Diets of Mourning Doves (Zenaida macroura) in Eastern South Dakota

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NOTES

ARE LAND-USE CHANGES REFLECTED IN DIETS OF MOURNING DOVES (*ZENAIDA MACROURA*) IN EASTERN SOUTH DAKOTA—Food habits of the mourning dove (*Zenaida macroura*) have been extensively studied in the southern United States (McClure 1943, Korschgen 1958, Carpenter 1971) and consist primarily of vegetable matter throughout their range (Beckwith 1959). Diet studies in several states have indicated agricultural crops, specifically corn and wheat, were the most readily consumed plant seeds (Korshgen 1958, Carpenter 1971). Similarities observed in diets of doves were dependent on the agricultural crops available within the area. For example, in Missouri, some seasonal variability was documented suggesting doves forage based on food availability as much as by food preference (Korschgen 1958). However, in the agriculturally-dominated landscape of east central South Dakota (SD), the two most important food items for doves were green (*Setaria viridis*) and yellow foxtail (*S. glauca*; Van't Hul and Jenks 1992).

Large-scale land use changes have occurred in eastern South Dakota in the past few decades and several factors have contributed to increased grassland to cropland conversion (Wright and Wimberly 2013). Conversion of grasslands to agricultural crops has increased as demand for biofuels and commodity prices increased (Secchi and Babcock 2007, Searchinger et al. 2008, Fargione et al. 2009, Wright and Wimberly 2013). In east central South Dakota, corn and soybean plantings have increased from 2,400,000 ha in 1991 to 4,400,000 ha in 2013 (United States Department of Agriculture 2014). These significant land-use changes that have occurred in the intervening 20 years may influence mourning dove feeding habits. We compared mourning dove diet composition in Minnehaha County, South Dakota, USA, to those published 20 years earlier from a study conducted approximately 60 km north (Van't Hul and Jenks 1992).

We employed normal hunting practices to harvest doves (South Dakota State University Institutional Animal Care and Use Committee protocol #11-065A) from six unique fields encompassing an area of approximately 250 km^2 in Minnehaha County, South Dakota, from 1 to 6 September 2013. We recorded collection date, age, and sex for all harvested doves (Cannell 1984). We froze whole carcasses to prevent digestion prior to washing and drying crop contents (Davison 1940). We sifted contents of crops and identified contents to plant species using seed keys (Delroit 1970, Musil 1978), and the reference seed collection in the South Dakota State University Seed Laboratory. We recorded and weighed crop contents separately depending on species, and converted diet items to percent of total diet. We considered anything <0.1% weight as trace.

We collected 42 doves; 14 juveniles and 28 adults. Of the 42 crops examined, one was empty. We identified 22 seed species (Table 1) in the crops of doves. The most common food item was foxtail (*Setaria spp.)*. It comprised 23% by weight and 42.9% frequency of occurrence in the diet of doves. Corn was the second most common food item comprising 17.8% by weight and 42.9% frequency of occurrence in dove diets. Spotted sand mat (*Chamaesyce alypotoperma*), black medic (*Medicago lupina*), wheat, red millet (*Panicum* ramosum), switch grass (*Panicum viratum*) and wild sunflower (*Helianthus annus*) occurred in >10% of mourning dove crops. Snails (*Gastropoda spp*.) were the only animal matter found and occurred in 16.7% of crops.

Green and yellow foxtail were the primary food items consumed by mourning doves during fall in southeastern South Dakota. Interestingly, an earlier study (Van't Hul and Jenks 1992) reported nearly four times greater weight (88% versus 23%) and two times greater occurrence (91% versus 44%) as our study (Table 1). It is possible some of the variation we observed was the result of different land uses between study areas. However, land cover in 2013 was virtually identical for the four counties (crop = 62%, grass = 9%) sampled by Van't Hul and Jenks (1992) compared to Minnehaha County (crop = 62%, grass = 10%; United States Department of Agriculture 2014). Thus, we believe differing diets of mourning doves was likely a result of land use changes from 1992 to present and not a reflection of differences in study sites. The temporal land use changes were a result of rising commodity prices, increased demand for biofuels, and loss of CRP enrolled land over the past 20 years (Fargrione 2009, Wright and Wimberly 2013).

Mourning dove diets exhibit substantial variability both spatially and temporally across their range (Korschgen 1958, Beckwith 1959), and often are associated with the most prevalent crop and associated harvest practices (Carpenter 1971). Our results, when compared to diets in 1991, tend to validate the adaptability of mourning doves, and the importance of both agricultural crops and weed seeds in their diet.

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Table 1. Comparison of food items found in mourning dove (*Zenaida macroura*) crops by weight (%) and occurrence (%) in eastern South Dakota, USA, from 1991 (n = 73) to 2013 (n = 41).

	Weight (%)		Occurrence (%)	
Food items	1991[a]	2013	1991[a]	2013
Foxtail (*Setaria viridis and S. glauca)*	88.0	23.0	91.0	43.9
Corn (*Zea mays)*	6.0	17.8	30.1	43.9
Black medic (*Medicago lupulina*)	Trace	9.3	2.7	17.1
Spotted sandmat (*Chamaesyce alypotoperma*)	–	8.7	–	29.3
Wheat (*Triticum aestivum*)	–	8.7	–	17.1
Grape seed (*Vitis vinifera*)	–	7.3	–	9.8
Wild sunflower (*Helianthus annus*)	4.0	4.7	31.5	14.6
Red millet (*Panicum ramosum*)	–	4.2	–	17.1
Switch grass (*P. viratum*)	Trace	2.9	27.3	17.1
Hemp (*Cannabis sativa*)	Trace	2.7	2.7	2.4
Genus: *Polygonum*	Trace	2.5	9.5	2.4
Snails (*Gastropoda sp.*)	Trace	2.2	13.6	17.1
Broom corn millet (*P. miliaceum*)	–	2.1	–	14.6
Poverty weed (*Iva axillaris*)	0.2	1.2	5.4	7.3
Redroot pigweed (*Amaranthus retroflexus*)	0.5	1.0	61.6	7.3
Wild buckwheat (*Polygonum convolvulus*)	0.1	0.8	17.8	2.4
Smart weed (*Polygonum sp.*)	Trace	0.4	4.1	2.4
Soy bean (*Glycine max*)	–	0.2	–	2.4
Rumex sp.	Trace	0.1	1.3	2.4
Helianthus sp.	–	Trace	–	2.4
Perennial sow thistle (*Sonchus arvensis*)	Trace	Trace	1.3	2.4
Common ragweed (*Ambosia artemisiifolia*)	1.0	–	30.1	–
Marsh elder (*I. xanthigolia*)	0.1	–	5.4	–
Musk thistle (*Carduus nutans*)	Trace	–	16.4	–
Canada thistle (*Cirsium arvense*)	Trace	–	4.1	–
Paspalum (*Paspalum spp.*)	Trace	–	1.3	–
Giant ragweed (*A. tridida*)	Trace	–	2.7	–
Sedge (*Carex spp.*)	Trace	–	1.3	–
Cinquefoil (*Potentilla spp.*)	Trace	–	1.3	–
Barnyardgrass (*Echinochloa crusgalli*)	Trace	–	5.5	–
Unknown	Trace	Trace	13.6	4.9

[a]Data from Van't Hul and Jenks (1992)

LITERATURE CITED

Beckwith, S. L. 1959. Mourning dove foods in Florida during October and December. Journal of Wildlife Management 23:351–354.

Cannell, P. F. 1984. A revised age/sex key for mourning doves, with comments on the definition of molt. Journal of Field Ornithology 55:112–114.

Carpenter, J. W. 1971. Food habits of the mourning dove in northwest Oklahoma. Journal of Wildlife Management 35:327–331.

Davison, V. E. 1940. A field method of analyzing game bird foods. Journal of Wildlife Management 4:105–116.

Delroit, R. J. 1970. An illustrated taxonomy manual of weed seeds. Agronomy Publications, River Falls, Wisconsin, USA.

Fargione, J. E., T. R. Cooper, D. J. Flaspohler, J. Hill, C. Lehman, T. McCoy, S. McLeod, E. J. Nelson, K. S. Oberhauser, and D. Tilman. 2009. Bioenergy and wildlife: threats and opportunities for grassland conservation. Bioscience 59:767–777.

Korschgen, L. J. 1958. Food habits of the mourning dove in Missouri. Journal of Wildlife Management 22:9–16.

McClure, H. E. 1943. Ecology and management of the mourning dove, *Zenaidura macroura* (Linn) in Cass County Iowa. Iowa Agricultural Experiment Station Bulletin 310:355–415.

Musil, A. F. 1978. Identification of crop and weed seeds: agriculture handbook no. 519. U. S. Department of Agriculture, Washington, D.C., USA.

Searchinger, T., R. Heimlich, R. A. Houghton, F. X. Dong, A. Elobeid, J. Fabiosa, S. Tokgoz, D. Hayes, and T. H. Yu. 2008. Use of US croplands for biofuels increases greenhouse gases through emissions from land-use change. Science 319:1238–1240.

Secchi, S., and B. A. Babcock. 2007. Impact of high corn prices on Conservation Reserve Program acreage. Iowa Ag Review 13:4–7.

United States Department of Agriculture. 2014. National Agricultural Statistics Service. Cropland Data Layer Metadata. <http://www.nass.usda.gov/research/Cropland /metadata/meta.htm>. Accessed 11 August 2014.

Van't Hul, J. T., and J. A. Jenks. 1992. Food habits of mourning doves in east central South Dakota. The Prairie Naturalist 24:251–256.

Wright, C. K., and M. C. Wimberly. 2013. Recent land use change in the western Corn Belt threatens grasslands and wetlands. Proceedings of the National Academy of Science 110:4134–4139.

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