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White-tailed Deer Home Range Characteristics and Impacts Relative to Field Corn Damage

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Abstract

Research was conducted to examine the relationships between the physiological growth stages of field corn; timing and impacts of deer damage on corn yields; and female deer home range characteristics relative to corn growth, harvest, and hunting season.

To determine the effects of timing of deer damage on corn yields, we observed a non-irrigated, 24-ha cornfield in the DeSoto National Wildlife Refuge (DNWR) during the growing season, *1991.* The field had a history of deer damage and was frequented by deer, as we determined by radio-telemetry and direct observation. We randomly located *22* treatment plots and 6 control plots (1 m x 50 m) across corn rows and along the northern edge of the cornfield, which was immediately adjacent to a 50-ha woodlot. From 15 May through 25 September *1991,* we recorded presence or absence of deer damage that had occurred to each plant during the previous week and the plant growth stage. Damaged and undamaged plants were harvested at maturity. Deer damage to corn plants peaked during the tasselingsilking stage, with *22%* of all damage incidents occurring during s 1-week period in mid- to late July.

The location and size of the home ranges of 16 radio-equipped resident female white-tailed deer (Odocoileus viqinicatus) at DNWR were examined relative to crop growth, harvest, and hunting season during *1991* and *1992.* The does were located 14 times/day via triangulation and direct observation. Location data were solved with the Spatial Ecology Analysis System (SEAS) and plotted with the Map and Image Processing System (MIPS) Geographic Information System (GIS).

Home ranges overlapped cornfields and centers shifted an average of 174 m (± 128 m S.D.) closer to cornfields just after damage peaked. Field corn is attractive to deer and functions as both food and cover throughout the latter half of the growing season. Home range sizes were not found to be statistically different (P–0.554) before versus after the peak of damage (tassel *ing-silking). Home* range centers shifted an average of 157 m (± *99* m S.D.) further into permanent cover after crop harvest. Home range areas after harvest averaged 135 ha (± 68 ha S.D.) and were significantly larger 00.024) than home ranges before harvest, which averaged 92 ha (± 36 ha S.D.). The same trend was found when pre-crop harvest home range centers were compared to centers just prior to the DNWR hunting season, as deer shifted an average of 172 m (± 113 m S.D.) farther into permanent cover. Home

range area increases were also significant (>~-0.055) and similar, as pre-crop harvest home ranges averaged 92 ha (± 36 ha S.D.) and home ranges just prior to the hunting season averaged 125 ha (± 61 ha S.D). These shifts in location of home ranges, and increases in home range sizes, are likely the result of reduced availability of food and cover after corn harvest.

In the summer of 1989, we selected a level, irrigated, 32-ha cornfield near Ceresco, NE to examine the impact of simulated deer damage to field corn relative to the plants phenological growth stage. We simulated deer damage by removing 500 g of vegetative and/or reproductive tissue in a manner consistent with previous experience and similar to deer damage that was occurring at the time. Growth stages at which we simulated damage included: sixth leaf (15 June), twelfth leaf (3 July), tasselingsilking (19 July), blister-milk (7 August), and mature (10 October). Corn yields were measured at maturity. The mean number of plants damaged per plot to attain a 500-g sample ranged from 2.3 (mature) to 62.9 (sixth leaf). Simulated damage during the tasseling-Bilking stage resulted in the greatest decrease in corn yields (-0.989 kg/plot relative to undamaged controls), more than 2 times the yield loss than damage at any other growth stage.

Most deer damage to crops occurred in fields near large areas of permanent cover. Year-round deer densities are highest in these areas of permanent cover, and densities increase in winter as deer from 30 km away or more immigrate to them. Cornfields and subsequent yields were found to be impacted most by deer damage during the tasseling-silking stage. At this stage deer use is highest, more plants are required to satiate deer, and the plants are physiologically more susceptible to physical damage. Landowners may be able to reduce deer damage to tolerable levels by delaying implementation of control, measures until shortly before the tassel ing-Bilking stage and employing such short-term and cost-effective techniques as frightening devices, repellents, or singlestrand electric fences.

Depredation permits are another option intended to aid in the alleviation of damage. In all cases, our resident does showed a high degree of fidelity toward their home ranges, from crop emergence through the hunting season. Therefore, depredation permits issued during this period may successfully result in the harvest of offending deer. It may be most efficient to harvest deer with depredation permits in early to mid-fall, to ensure harvested deer are the residents that are causing the damage, and not transients who are only in the area for the winter and are needed to help sustain populations in adjacent areas of lower deer densities where damage is not significant enough to warrant control.