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## **Landowners' perceptions of white-tailed deer damage to crops in Tennessee**

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*Abstract:* We conducted a mail survey to determine Tennessee landowners' perceptions of white-tailed deer (*Odocoileus virginianus*) damage to crops, their tolerance for damage and the effectiveness of damage control methods. Fifty-five percent of landowners had wildlife damage and 47% had deer damage. The majority had light or moderate damage. The majority of participants who had taken measures to prevent damage used hunting. State-issued depredation permits were rated the most effective method of controlling damage. Although most survey participants did not have substantial deer damage, landowners with serious deer damage problems may need further assistance.

**Key words:** crop damage, deer damage, *Odocoileus virginianus*, Tennessee, white-tailed deer

Deer damage is a significant problem for many Tennessee landowners, especially farmers. While farmers expect a certain amount of wildlife damage, several factors such as growing deer herds and changing land use practices, have led to an increase in deer damage problems. Tanner and Dimmick (1983) found 59% of farmers surveyed in west Tennessee had deer damage. Thirty-seven percent of the farmers wanted deer populations in their area to remain the same, and 15% reported that they felt deer were a nuisance. In a statewide survey, King (1993) found 33% of the farmers had deer damage, and 10% felt deer were a nuisance. Groundhogs (*Marmota monax*) were the main species causing damage (King 1993).

The objectives of this study were to determine landowners' perceptions of the extent and nature of deer damage to crops in Tennessee and assess their perceptions of deer and tolerance for crop damage. Additional objectives were to determine landowners'

perceptions of the effectiveness of deer damage control methods and to evaluate landowners' actions concerning wildlife on their land.

### **Methods**

A mail survey was conducted in eight Tennessee counties: Weakley, Henry, Lincoln, Franklin, Robertson, Montgomery, Hardeman and Fayette. These counties were selected based on 1997 deer harvest numbers (Tennessee Wildlife Resources Agency 1998) and 1997 soybean yields (Tennessee Department of Agriculture 1998). Counties with high levels of soybean production and high deer harvest numbers were selected to target farmers likely to experience wildlife damage.

A total of 2,110 survey participants were selected from a list of names and addresses provided by the United States Department of Agriculture Farm Services

Agency. A questionnaire and cover letter were mailed to selected participants. Subsequent mailings were sent out according to the four-wave mail survey method described by Dillman (1978).

### **Data analysis**

Non-response bias was evaluated by comparing early and late respondents' answers to selected questions. The first and last 351 questionnaires returned were classified as early and late responses, respectively. Early and late respondents' answers to key questions were compared to determine if any non-response bias existed. Questionnaire responses were analyzed using descriptive statistics, (frequencies and means) to summarize data. Pearson's chi-square test was used to test for relationships between variables. All relationships were tested at a significance level of 0.05.

### **Results**

A useable response rate of 59% was obtained for the survey, yielding a confidence interval of 97%. There was a possibility of some non-response bias since 52% of early respondents had deer damage, compared to 42% of late respondents.

#### **Attitudes toward deer**

Many participants reported that they enjoyed deer (48%), while 38% enjoyed deer but worried about damage. Fifteen percent felt deer were a nuisance. Most participants felt deer damage had increased in their area (63%) or stayed the same (31%) over the last five years. Nearly half of all participants (49%) wanted deer populations in their area to decrease, 32% wanted populations to stay the

same, and 20% wanted an increase in populations.

#### **Experience with deer damage**

Over half of all participants (55%) experienced wildlife damage to their crops and 47% had deer damage. Deer were named as the main species causing damage by 78% of participants, followed by groundhogs (7%) and raccoons (*Procyon lotor*) (6%). The majority of participants who had deer damage rated their damage as either light (39%) or moderate (32%). However, 29% of participants had substantial or severe damage. Over half of the participants reported that they would not consider more than \$ 100 of damage tolerable (figure 1). Slightly more than one quarter of participants (26%) had damage that exceeded their tolerance. Participants who had deer damage were more likely to feel deer were a nuisance.

#### **Deer damage control measures**

One quarter of participants had taken measures to control deer damage. Among participants who had taken action to prevent deer damage, 77% used regulated hunting to control crop damage. Shooting outside of the hunting season with a depredation permit was rated as the most effective method of controlling deer damage, followed by electric fencing and in-season hunting. The majority of participants (80%) were not aware that the Tennessee Wildlife Resources Agency (TWRA) offers assistance with crop damage problems.

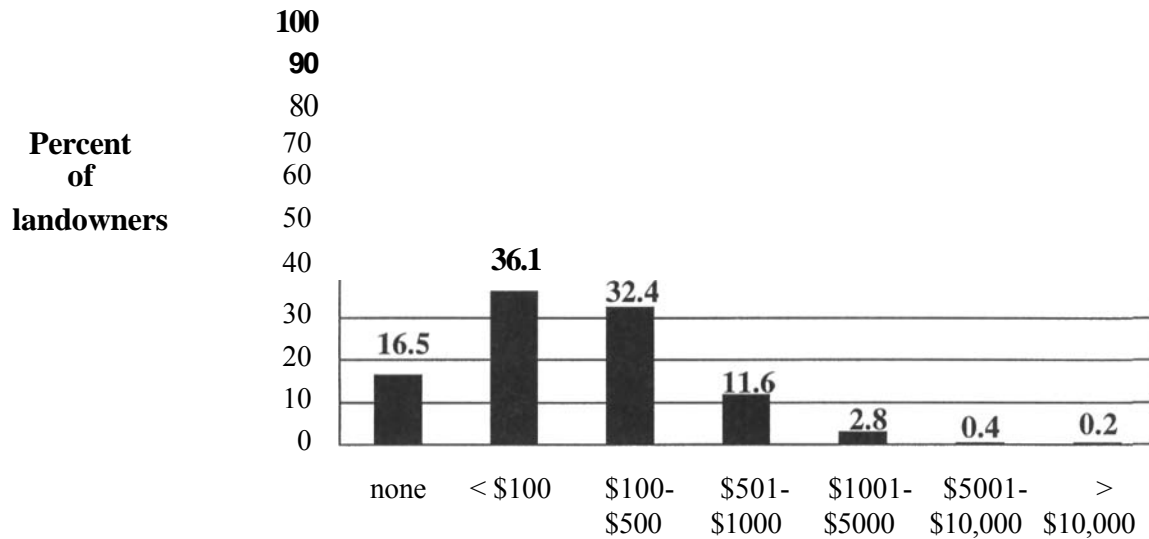


Figure 1. Maximum amount of wildlife damage considered tolerable by landowners (n=935).

### Hunting on property

The majority of participants (79%) allow hunting on their property, however, only 10% lease their land to hunters. Participants who had deer damage were more likely to allow hunting and lease their land to hunters. Half of all participants had experienced problems with hunters on their property, such as property damage and unauthorized hunters.

### Wildlife management on property

Many participants (42%) reported that they managed their land for wildlife. Of the participants who managed for wildlife, 59% managed for game birds, followed closely by deer (57%) and small game (52%). The most common wildlife management practice used by participants was providing cover (77%), retaining wooded areas (72%), and letting fence rows grow (50%).

### Discussion

The majority of participants (55%) had wildlife damage to their crops and nearly half (47%) had deer damage. Although most participants had light to moderate damage, a few participants had serious deer damage. The amount of deer damage reported by participants in this study is moderate in comparison to previous findings in Tennessee (Tanner and Dimmick 1983, King 1993) and is slightly higher than levels reported in New York (Brown et al. 1980).

The percentage of participants who considered deer a nuisance was similar to previous studies conducted in Tennessee (Tanner and Dimmick 1983, King 1993).

Farmers in New York appear to be more tolerant of deer than Tennessee farmers, as only 2% of farmers in New York felt that deer were a nuisance (Brown et al. 1980).

This may be attributed to lower levels of deer damage. However, historic differences in deer populations may also explain a higher tolerance for deer damage in New York. New York farmers may be more accustomed to deer damage because deer populations have been higher in New York than Tennessee. Many Tennessee farmers began farming when deer were scarce and deer damage was not a problem.

### **Management implications**

This study revealed that most Tennessee landowners do not have a serious problem with deer damage. However, some landowners have a serious problem and may need further assistance. The majority of landowners were not aware that TWRA offers assistance with crop damage, such as depredation permits, although depredation permits were rated the most effective damage control method. Efforts to increase awareness of the availability of depredation permits may alleviate some landowners' crop damage problems.

Another area for consideration is improvement of habitat on private lands. Many participants wrote comments expressing an interest in doing more to enhance wildlife habitat on their land. This indicates that there may be many landowners who are willing to manage for wildlife but have not been reached through current landowner assistance programs.

Landowner surveys to assess wildlife damage are a useful tool for wildlife managers. They provide an important communication link between members of the agricultural and wildlife communities. Farmers and other private landowners provide

habitat for wildlife and may be more supportive of wildlife management decisions if their interests are being considered.

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