

## **Deer Habitat and Behavior**

Uma Ramakrishnan

Dept. of Forestry and Horticulture Connecticut Agricultural Experiment Station

123 Huntington Street, Box 1106 New Haven, CT 06504

Voice: (203) 974-8609 Fax: (203) 974-8502

E-Mail: Uma.Ramakrishnan@po.state.ct.us

White-tailed deer (*Odocoileus virginianus*) have made a miraculous comeback in Connecticut, increasing in number from an estimated 12 in 1889 to over 76,000 in 2001. White-tailed deer were hunted close to extinction through much of their range by the end of the 1800's. A major factor that contributed to the recovery of deer is that by 1900, thousands of marginal farms in Connecticut had been abandoned, and these abandoned agricultural lands then converted back to forests. Connecticut now has over 60% forest cover, with suburban communities bedded within these wooded areas. Residential communities in forest fringes are particularly attractive to white-tailed deer because they provide year-round access to food. Thus deer densities in such areas are usually high. There are few natural regulators of deer numbers in suburbia - coyotes are the only predators in Connecticut capable of taking down adult deer. However, they have little effect on the overall deer population in an area.

### **Reducing browse damage to landscapes**

High deer numbers in suburban areas have led to browse damage, resulting in the destruction of landscapes and gardens. It is relatively easy to identify deer browse damage -- deer have no upper incisors, hence they tear vegetation using their lower incisors and their upper palate. The resulting browsed fragment has a jagged edge. Male deer also damage trees and saplings by rubbing them with their antlers, resulting in bark being scraped off trees. Damage control options depend on factors such as deer density in the area, the type of deer damage (buck-rubs or browse damage), the season when damage is most noticeable, and the location of high-use areas by deer. Often, a combination of control options work better in areas with large numbers of deer. Deer damage control is more effective when implemented before the growing season. Some methods of controlling deer damage include the use of scare devices, using fencing or other physical barriers, and using repellents. Scare devices and repellents are limited in use to areas of low to moderate deer density.

### **Choosing a deer management plan**

The choice of a deer management plan should depend on annual monetary loss and annual pattern resulting from deer damage. Patterns of deer damage change from year to year depending on weather, availability of food, deer density and other factors. Growers have often used repellents successfully from 2-3 years, and then lost their entire crop as a result of deer damage after a severe summer or winter. It is best to plan a deer damage control program that is based on the most severe instance of damage in the past five years. Seasonal patterns of damage must also be evaluated over a period of years. Deer have definite food preferences that vary seasonally. In general, summer damage is less extensive than winter damage, because other sources of preferred foods are often available. This fact is especially important to fruit growers, foresters, and nursery operators. It is difficult to change seasonal deer feeding habits after they have begun, therefore, damage should be anticipated and the appropriate controls applied before the damage begins.

## **Deer damage control using fences**

The most effective method of preventing browse damage is fencing the entire property. Design is crucial if the fence is to be effective in excluding deer. Fences have to be high enough to prevent deer from jumping over, or the fence can be constructed using a combination of height and depth to keep deer out. It is also important to make sure that the bottom of the fence is no more than 1 foot from the ground. Deer are in fact more likely to crawl under the fence than jump over. A single/double strand electric fence coupled with peanut butter bait is often sufficient to keep deer out. It is best used for gardens, nurseries, orchards and field crops that are subject to moderate deer pressure. To construct a peanut butter fence, a single strand of 17-gauge wire is suspended about 30 inches above the ground using 4-foot fiberglass rods. To bait the deer, 4x4 inch aluminum foils are attached to the wire and the underside of the flags is baited with a 1:1 mixture of peanut butter and vegetable oil. The smell attracts the deer, which touch or sniff the flags and receive an electric shock. The flags should be re-baited every 4 to 8 weeks, depending on weather conditions.

Another option is the plastic mesh fencing. Plastic mesh fencing has some residential and landscape applications. The fencing is lightweight, high-strength, and virtually invisible, so it does not detract from the appearance of the property it protects. The fencing consists of a 7.5-foot black plastic mesh with an expected life of 10 years. This type of fence can be attached to existing trees or hung on pressure treated posts. The light weight of the material minimizes the need for many posts.

Wire mesh fences can be used for year-round protection of crops in areas of high deer density and damage. These fences have the disadvantage of being very expensive and difficult to construct, but are highly effective. Although a fence may last for 20 years or more, its initial cost of \$2 to \$4 per linear foot. These fences also have the advantage of requiring very little maintenance.

## **Psychological control of deer**

In areas of low deer density where damage is light or occasional, deer browse damage can be controlled using psychological methods. Psychological methods are not effective in areas with a high deer population or where deer have already begun to do moderate damage. Deer are naturally nervous and alert to danger. Psychological methods play on this nervousness, making deer uncomfortable to feed on the property. Some examples of this technique include the sonic and ultrasonic deer repellents. The ultrasonic deer repellent is similar to that used on vehicles to deter deer. These have the advantage that humans are not disturbed when the devices are activated. Unfortunately, there is no evidence that deer are in fact deterred by ultrasonic or sonic sounds. One example of a scare device is the propane gas exploder. Gas exploders set to detonate at regular intervals are the most common scare devices for reducing deer damage. They are effective for only a few weeks and should be used only for temporary control. The other major problem with these devices is that these noise-making devices are very annoying to humans, especially at night when deer are most likely to be active.

## **Deer damage control using repellents**

There are two kinds of repellents - contact repellents and area repellents. Contact repellents are applied directly to plants; their taste repels deer. They are most effective on dormant trees and shrubs. Contact repellents may reduce the palatability of forage crops and should not be used on parts destined for human consumption. Area repellents deter deer by odor and should be applied near plants you want to protect.

There are a wide variety of deer repellents on the market. Some of the more common repellents have been described below. Hinder is a deer repellent made from fatty acid soaps. It is an area repellent that smells like ammonia and is one of the few registered for use on edible crops. Applications can be made directly to vegetable and field crops, forages, ornamentals and fruit trees. Its effectiveness is usually limited to 2 to 4 weeks but varies because of weather and application technique. Hot sauce is a taste repellent and is registered for use on ornamental, Christmas and fruit trees. Vegetable crops also can be protected if sprayed before the development of edible parts. Coyote urine and other predator urines such as mountain lion and wolf are also available, however, are not very effective. Another repellent found in the market is Deer –Away. This is made from egg solids, and is often effective when working in areas of moderate deer density. This contact repellent smells and tastes like rotten eggs. It has been reported to be 85 to 100 percent effective in field studies. It is registered for use on fruit trees before flowering, ornamental shrubs and Christmas trees. Other repellents include Tree-Guard (containing bitrex), which is a taste –based repellent. Ropel is another taste-based repellent. Ropel also repels deer with its extremely bitter taste. Both these repellents cannot be used on edible crops.

### **Deer population management**

Another method to reduce deer damage to an area is by reducing the number of deer in the area. Regulated hunting is the most widely used method of white-tailed deer control. While hunting can be effective in controlling deer numbers, it comes with some limitation. The most important limitation of hunting is that it is often not feasible or safe in some suburban areas due to high human densities. Intermediate to low levels of hunting may result in improved overall deer health and reproductive output, because hunting often reduces competition for the surviving deer, which then have access to more food, resulting in more fawns.

### **Regulating the reproductive output of deer**

Currently, experimental methods of reproductive control are being explored to reduce deer numbers in suburbia. By suppressing reproduction in a population to a level below that of natural mortality, it is possible to achieve a decrease in population size. Most of the research on reproductive control has focused on females. Two reproductive control methods that have been tested extensively on deer are immunocontraceptives and contragestation agents. The major problems with these techniques are that they are expensive and since the effect of the treatments are not permanent, requiring repeated treatment of the target individuals each year.

The Connecticut Agricultural Experiment Station is also testing a method of deer reproductive control by focusing on sterilizing large males. The technique does not affect the production of hormones, thus the behavior of the treated individual is not significantly altered as a result of the treatment. By retaining treated males in the population, these individuals will continue to use resources and participate in mating behavior, reducing the reproductive output of females. The major advantage of this technique is that the effects of the treatment are permanent. All reproductive control techniques should be viewed as a long-term solution. The function of reproductive control research is not to find a technique that is cheaper than hunting, but to provide alternatives to communities that are looking for other options.