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Female deer disperse farther than males, present disease-control challenge

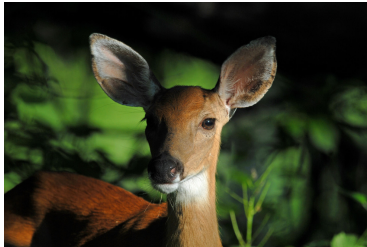


IMAGE: COURTESY PENNSYLVANIA GAME COMMISSION

By Jeff Mulhollem
June 28, 2016

UNIVERSITY PARK, Pa. – Fewer female white-tailed deer disperse than males, but when they do, they typically travel more than twice as far, taking much more convoluted paths and covering larger areas, according to researchers in Penn State's College of Agricultural Sciences.

These findings, from a study in which 277 juvenile female deer were fitted with radio collars, has important deer-management implications in states where chronic wasting disease is known to be infecting wild, free-ranging deer, noted researcher Duane Diefenbach, adjunct professor of wildlife ecology.

"Dispersal of female deer is density dependent, meaning that higher deer densities lead to greater dispersal rates," he explained. "Therefore, reducing deer density will reduce female dispersal rates – and likely will reduce disease spread.

"Containing the spread of chronic wasting disease is going to be difficult when female deer disperse. Although not as many females disperse in Pennsylvania – 8 to 24 percent of females versus 50 to 75 percent of males – there end up being more of them, because they live longer than males and they disperse an average of 11 miles compared to 5 miles for males."



IMAGE: COURTESY
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Commonly referred to as CWD, chronic wasting disease affects the nervous system of deer and elk and is always fatal for those animals. Wildlife

- managers are scrambling to find a way to slow or stop the spread of the disease, which has been discovered in free-ranging and captive populations of deer and elk in 23 U.S. states and two Canadian provinces.

Dispersal, which is the permanent movement of juvenile white-tailed deer away from where they were born, is an important behavior because it affects the rate at which genetic traits are transferred through the population, can influence population growth, and can spread disease, said Diefenbach, who is leader of the Pennsylvania Cooperative Fish and Wildlife Research Unit at Penn State.

Wildlife biologists believe that dispersal, from an evolutionary perspective, can benefit individuals by reducing inbreeding and competition for mates and local resources. Juvenile white-tailed deer usually are "motivated" to disperse by social cues, such as aggressive behavior directed toward them by older, socially dominant does or maternal abandonment.

Documenting and understanding deer-dispersal behavior and identifying factors that influence that behavior are important to understand the basic ecology of the species and to provide critical information for its conservation and management.

The study, published this month in the *Journal of Wildlife Management*, involved young does radio-collared in four study areas in Pennsylvania – in the western, northcentral, northeastern and southcentral sections of the state. Findings included dispersal occurred at one year of age, which coincided with the fawning season; dispersal paths generally were nonlinear, and the dispersal process, on average, took two days but sometimes weeks; roads, rivers and human development caused females to change direction and sometimes inhibited dispersal; and about 50 percent of yearling females made foray of several miles outside the home range where they were born, even if they did not ultimately disperse.

One particular GPS-collared doe stood out, said lead researcher Clayton Lutz, who conducted the study as a master's degree student at Penn State.

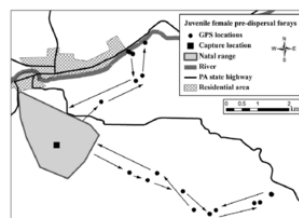
"On May 25, she left her natal home range for good, and she kept going for 55 days and 10 hours," said Lutz, now a Pennsylvania Game Commission biologist, working in the agency's southcentral region. "She traveled 160 miles, crossed Interstate 80 twice, and crossed three major rivers four times. Despite all of this effort, she did not end up that far from home – only about 20 miles."

This single deer is a great example of how complex dispersal behavior can be and how it makes controlling disease spread so difficult, Lutz said. When it comes to females, biologists cannot predict the direction they will travel. Also, while roads and rivers stop some deer from dispersing farther, they don't stop all deer.

Beyond disease control, knowledge of female dispersal also is important for localized management of deer population densities, pointed out Christopher Rosenberry, chief of the Game Commission's deer and elk section, who also contributed to the research. He said managers increasingly are looking for methods to control deer densities in areas closed to hunting, such as parks and areas of suburban development.

"For any population-control method to be effective, it must consider the effect of immigration from dispersing females on the target population," Rosenberry said.

The Pennsylvania Game Commission and the U.S. Geological Survey supported this work.



Example of pre-dispersal forays outside of the natal range by a juvenile female white-tailed deer equipped with a global positioning system transmitter. Arrows indicate direction of movement.

IMAGE: COURTESY PENNSYLVANIA GAME COMMISSION

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