Solving The Riddle Of Deer Movement

PART 1

You've heard all of the hype — now it is time to present the hard facts about what REALLY controls whitetail movement. This exclusive series will make you a more effective trophy hunter in 1996!

by Dr. James C. Kroll & Ben Koerth

The whitetail has now been under the microscope for roughly 50 years, during which time the species has yielded many of its most intimate secrets. Our own Institute for Whitetailed Deer Management and Research has participated in these investigations since 1973, and we feel fortunate to have contributed to the universe of deer knowledge.

But although the past several decades have seen great strides made in understanding whitetails, these wonderful animals have resisted giving up easy answers to several key questions. Of these, the one clearly of greatest interest to hunters is, What makes deer move?

The good news, evidence of which you will see throughout this groundbreaking series and in a book being published jointly by the Institute and ***WHITETAIL,*** is that we finally have solved much of that mystery. As a result, you can enter the 1996 deer season with as much sound, scientific knowledge about deer movement as anyone has ever had.

Of late, some writers have made a big splash with what they have characterized as "breakthroughs" in predicting whitetail movement. But there is a difference between true science and anecdotal "theory."

The information that we now can offer about what makes deer move is more comprehensive and scientifically sound than anything ever before compiled. This claim is based on the fact that we recently completed a full 10 years of data analysis in which we looked at information gathered during more than 20 years of field research over a broad portion of North America. Ours is not a regionalized approach.

Although there is substance to much of what has been written lately about factors affecting deer movement, the unfortunate fact is that *many of these "theories" are simply incorrect.* Also, some writers suggest that a single, predictable factor almost totally controls the timing of deer activity; they imply that if you know how to "read" this one variable, you will know exactly when to walk into the woods and get a buck. This is sheer nonsense.

A layman interprets observations on the basis of personal experiences. To him, "science" means making an interpretation and then seeking evidence to support it. (As a friend once noted, "If I hadn't believed it, I wouldn't have seen it with my own eyes!") The scientist, however, makes observations and then tries to make interpretations and reach conclusions based on skepticism. You never really "prove" anything in science — you only fail to disprove your hypothesis.

At the Institute, our hypothesis is that *deer movements and activity patterns can be predicted.* In testing this hypothesis, we first will examine how we best can study and accurately measure various factors that potentially influence deer movement. We then will discuss the roles and mechanisms of a number of environmental factors that must be figured into the equation. Then we will present the results of our studies.

GAINING RELIABLE DATA

The fact that humans are still on this earth after what some say has been about 6 million years of constant struggle is testimony enough to our prowess as hunters. During most of this time, humans were functional parts of the various natural ecosystems they occupied. Hunting skill was largely based on good observational skills. Verbal communication allowed mankind to pass on hard-earned knowledge from one hunter to the next.

The same skills of observation that kept food on the aboriginal table provided the roots of modern science. The Victorian Age — perhaps the golden years of science — produced some of the finest analytical minds ever known to exist, despite the absence of technological aids.

Unfortunately, the keen eye of the naturalist seems to have dimmed in more modern times. Today, we often rely on computers and statistics to tell us what would have been obvious to the Victorian naturalist. A recent study by Yale behavioral scientists showed that the average American is quite ignorant of how scientific research is even conducted.

It is difficult for anyone to have confidence in scientific studies without a working knowledge of how such studies are done. So, here we will introduce you to the fascinating world of deer science.

If our goal is to determine when and why whitetails move, we obviously need some basic information. First, we must be able to determine whether or not a given deer is indeed moving about and why whitetails move, we obviously need some basic information. First, we must be able to determine whether or not a given deer is indeed moving about ("active"). Second, we need to know just what type of activity the animal is engaged in. And finally, we must be able to make good measurements of *all* environmental and biological variables that might have triggered the movement/behavior pattern. Here is how we have done so:

Neither the moon nor the weather nor any other variable is in itself a foolproof predictor of deer movement, particularly when it comes to mature bucks. But after conducting and analyzing more than 20 years of research on wild whitetails, the authors are closing in on the factors that promote deer activity and those that suppress it. Photo by Mike Biggs.

Direct Observation

Perhaps the simplest way to determine what deer are doing is to simply go into the woods and watch them. And that is exactly what early wildlife scientists did. Researchers such as Hahn and Michael in Texas and Townsend, Smith, Severinghaus and Cheatum in New York studied deer through direct observation.

Unfortunately, no matter how observant a scientist is, the secretive whitetail simply will not give up many secrets this way. That fact led researchers to favor indirect ways to study movement patterns. One of the Institute's first graduate students, Rick Braden, used the number of tracks crossing woods roads on an hourly basis to determine peak activity periods. Others conducted spotlight surveys and examined browsing patterns to find indications of deer activity. But again, while such techniques proved useful in early studies, they had their shortcomings.

First, direct observations are biased by the nature of the habitat. It is one thing to study deer in a park-like setting that has many roads and trails, but it is quite another in dense, remote North Woods habitats.

And what about knowing *what* the deer are doing? Direct observations provide limited information in this regard. Just because you do not see a whitetail feeding in an open field does not necessarily mean the animal is not feeding somewhere else.

One of the *least* reliable ways to study deer movement/activity patterns is to rely on hunter observations. As a whole, hunters are notorious for limiting their observations to certain times and

types of places. For example, a good friend of ours (who, for obvious reasons, will remain nameless) once meticulously recorded the exact time of kill for every buck and doe taken on his management area. "I've got deer movement all figured out," he declared. "Most bucks on our place are killed between daylight and 8:30 a.m. and between 3 p.m. and dark."

The management area in question is a large timber-company resort that customers are invited to hunt. Guests are taken to their stands at daylight and picked up by 9 a.m. They then are taken back to their blinds around 2:30 p.m. and picked up after dark. See the pattern? How can bucks be seen or shot by hunters who are not even in the woods?

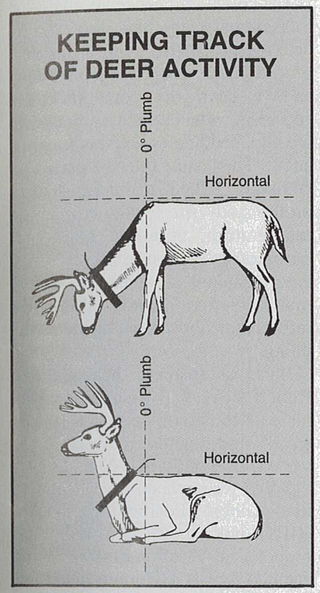
Some of the more recent studies reported in the popular press have been based on the number of deer seen by hunters while on stand. But in areas with heavy hunting pressure, what happens to daytime deer movement after opening day? Does the fact that hunters are not seeing deer from their stands necessarily mean the animals are not moving? And when the observers *do* see movement, are the deer just beginning to move, returning to their beds or somewhere in between? What about sex and age differences among the deer observed? Using data of this type, even the most sophisticated statistical analysis will yield meaningless — or worse yet, erroneous — conclusions.

This is not to contradict our earlier point about primitive man's observational skills. Remember, he was part of the natural system, not a casual visitor to the woods. He also was kept sharp by being tested daily on a rather harsh life-or-death basis!

Radio-Telemetry

Among the first biologists to use radio-tracking to study whitetail movements were Marchinton in Alabama and Inglis in Texas. Wild deer were captured, using drop-nets and tranquilizer darts; then radios imbedded in collars were placed around the animals' necks. Each radio broadcasted at a unique frequency, allowing the observer to differentiate among individuals.

A "location" could be derived by walking toward the animal with a small hand-held antenna or by using triangulation. When using the triangulation method, observers simultaneously utilized two or more tower antennas set up on the study area. Using two-way radios to coordinate their timing, the observers obtained bearings on the deer. The strength of the signal registered as the antenna was rotated around the compass was used to "confirm" a correct bearing from each antenna. By plotting two or more bearings on a map of the study area, a "location" for a given deer was derived.



By customizing a radio-collar to include a mercury "tip switch," researchers have been able to monitor the activity of a given deer. The switch sends one type of signal when the deer is active, another when it is bedded down.

Notice that we have placed quotation marks around some of the words relating to radio-telemetry. There is a very good reason for doing so. Because each bearing is derived using the qualitative judgment of the two observers, each with different hearing and technical abilities, there is considerable potential for error. Second, such environmental factors as relative humidity, atmospheric interference and vegetative type greatly affect the accuracy of radio-telemetry. Hence, the results of some of these studies probably are less accurate than might have been assumed by researchers. Also, fluctuating signal strength in

many early radio-collars gave false readings of the distance between the deer and the observer. That added to the potential for errors in "location."

To further compound the issue, a deer just moving its head up and down in its bed might produce the same signal as one walking or actively feeding. For all of the above reasons, while early radio-telemetry studies did provide valuable data on whitetail home-range size and the distance of some movements, they were of little help in telling us what *makes* deer move.

Advanced Telemetry

Space-age technology now provides us with much more sophisticated devices for studying deer activity and movement patterns. One of the most commonly used telemetry systems today is the one used by Robert Skinner, an Institute graduate student, to monitor deer activity in a Louisiana forest habitat.

Because the old radio-collar systems provided little more than frustration when it came to accurately determining whether or not a given deer was active, a more reliable method clearly was needed. The answer was found by making a simple modification to the original circuitry. At the Institute, we added a small device called a "tip switch" (see illustration) that could control the rate at which the collar emitted its signal.

Our decision to incorporate a switch of this type into the radio-collar was based on one important observation: A whitetail rests, but it never really sleeps as we humans do. The only time an adult deer has its head down for long is when its feeding. We simply aligned a small mercury switch in such a way that it would indicate (by triggering a different pulse rate) the position of the deer's head. With practice, a researcher working with such a device can even determine other deer activities, including walking and running, with a high degree of statistical certainty.

Robert used this technology to monitor deer feeding activity in a unique way. Because he was not interested in locating the deer, but rather wanted only to determine feeding, moving and resting behaviors, we erected a single tower antenna connected to a sophisticated computing system.

Unlike a human observer, a computer can monitor deer 24 hours a day. Also, when properly programmed, the device is virtually mistake-free. With the computer, Robert was able to generate a huge number of observations of the Louisiana deer and store them automatically on a disk. In fact, he gathered so much data that it almost swamped the large computer back at the Institute!

The computer checked each deer's transmitter every few seconds to determine its status. Using a complex procedure developed by studying captive deer, the computer then "decided" whether the animal was feeding, bedding or actively moving about. Then came the best part: The computer "asked" a weather station on the study site for the current air temperature, relative humidity, barometric pressure and other environmental variables. This information was stored alongside information about what the deer was doing.

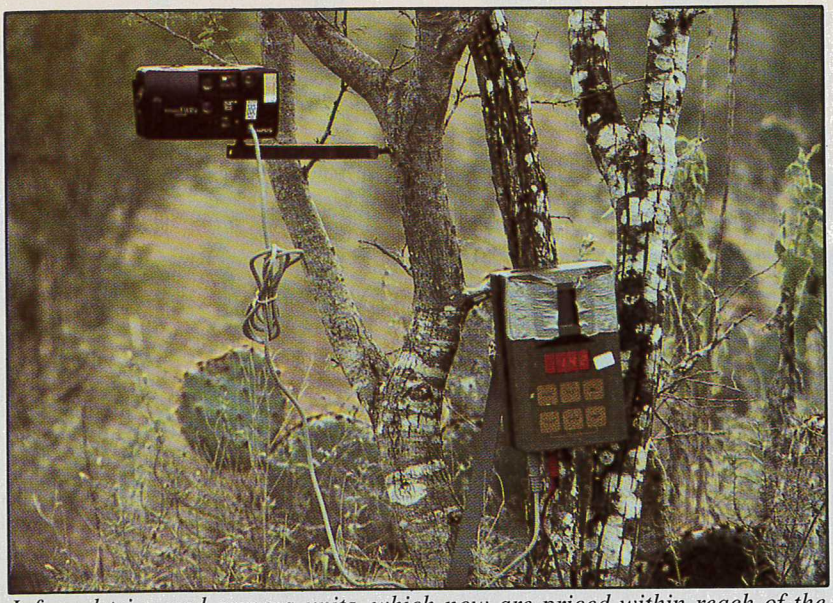
Back at Institute headquarters, Robert then could leisurely analyze his data to determine which factors were significantly correlated to various deer activities. Neat, huh?

Some researchers have begun to use Global Positioning System (GPS) units built into radios to pinpoint the location of deer. Using satellite signals, GPS units determine their own location to within only a few feet, anywhere on earth. So, placing such units in a radio-collar apparently has solved once and for all the problem of logging inaccurate "locations" with traditional antennas. Because very precise movement calculations are possible with GPS units, this should give us yet another way to learn when a given deer is moving and to what extent.

But even though there is a great deal of confidence in such systems, the researcher relying on electronic signals still cannot see with his own eyes that a given deer is indeed feeding or engaging in some other specific behavior. That's where one final technological development comes into play.

Infrared-Triggered Cameras

Devices that can photograph deer without anyone being around are one of the greatest recent developments for whitetail research. They are especially useful in telling us when



Infrared-triggered camera units, which now are priced within reach of the public, have yielded incredible information to researchers who want to know which individual deer move at which times. Photo by Ben Koerth.

specific deer move, day or night.

The major difference in the several units now commercially available lies in the way in which they are triggered. Those using an infrared beam, either reflected back or originating at a second unit positioned some distance away, are referred to as "active" systems. Those triggered by the body heat of a passing animal are called "passive" systems. Each type works well, but each has its nuances.

Dr. Harry Jacobson of Mississippi State University, along with us and Randy Browning from the Institute, was the first to employ these cameras to monitor deer. By placing cameras near bait stations arranged in a grid pattern, the researchers can also monitor feeding activity.

Remotely sensed data from a radio-collar might still create doubts in some minds, but a photo provides visual proof of exactly what the deer was doing at the moment the camera fired. Whether the unit is set up over a scrape, a trail or a bait pile, you know *which* deer was there, *what* it was doing and *when* it was doing it!

We have spent the last five years monitoring deer feeding activity through the use of such cameras. As a result, we now have access to literally thousands of deer observations, all of which have been analyzed to determine the sex and approximate age of the animals in the photos. Also, we have recorded the moon phase and environmental conditions that were in effect at the time the photos were taken. This gives us an unprecedented ability to see, with scientific accuracy, which conditions encourage whitetail movement and which ones suppress it.

A LOOK AHEAD

Now that you know the methods we use to study deer activity, the next step will be to discuss the specifics of various factors that influence this movement. Next month, in Part 2 of this series, we will discuss key information on the whitetail's breeding cycle, which obviously has a major influence on the fall movements of mature bucks. We will explain how researchers know exactly *when* deer are breeding and what *really* triggers the rut. Then, in issues to follow, we will show how such factors as moon phases, weather conditions and hunting pressure figure into the complex equation of whitetail movement, so you will be able to put your newfound knowledge to use.

FOR YOUR INFORMATION

The Institute is part of Stephen F. Austin State University in Texas and has produced various educational materials on whitetail management and hunting, inciuding books, videos and a newsletter. Contact: Institute for White-tailed Deer Management and Research, Box 6109, Dept. WT, SFA Station, Nacogdoches, TX 75962. Phone: (409) 468-2004.