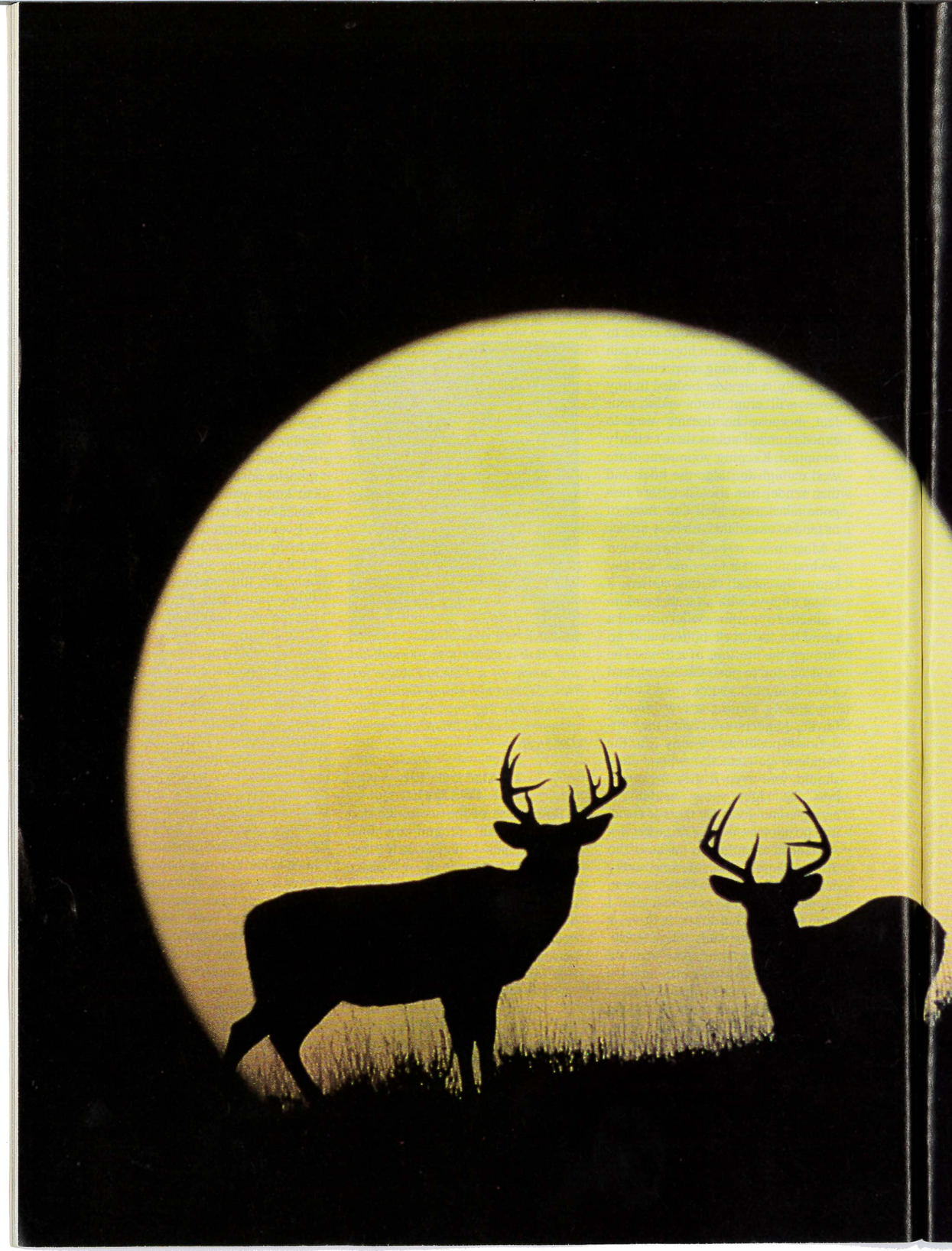


Solving The Riddle Of Deer Movement

Part 5

What really triggers the rut — and why does the timing of this great hunting opportunity sometimes change, for no apparent reason? We finally have the answer, and it's as clear as the moon in an autumn sky.

by Dr. James C. Kroll & Ben Koerth

Last month, we analyzed a number of theories about the moon and its reported effects on whitetail activity. We concluded that installment of this series by telling you that while several modern theories apparently will not stand up to science, there are some ways to use the moon to help you predict deer activity with more accuracy than ever.

This month, we will tell you how the moon controls the timing of the rut and will offer suggestions on how to utilize that knowledge not only for this season, but for years to come. Then, next month, we will discuss how a number of "modifiers," including weather and hunting pressure, affect the activity patterns of both bucks and does each fall.

First, we offer up the following theory as to how the timing of the rut is set by nature:

THE MOON & THE RUT

The timing of the rut is primarily dependent on genetics, with the idea being that deer in temperate regions will, over time, select for a breeding period that maximizes fawn survival. In the North, fawns must be dropped late enough in the spring to avoid cold weather but early enough to give them time to reach adequate size before the next winter hits. In the South, fawning is most often timed so that does can take advantage of succulent spring growth for milk production before the scorching days of summer set in.

Thousands of generations of evolution thus have led to fairly small windows of time in which most breeding normally occurs. (We say "normally" because the rut can be knocked off schedule by any of several influences, as we will discuss.) But knowing when the rut will take place is not quite as simple as finding out when it was last year and marking those same dates on your hunting calendar for every year to come.

In the October issue, we discussed how biologists know when breeding occurred in a given year (most accurately, through the measurement and backdating of fetuses from harvested does). But experience in the woods has shown all of us that just because breeding peaks on Nov. 14 one year does not necessarily mean it will be that way every year. So, we are left with this question: "What really triggers the rut?"

By studying records compiled in a number of places over the years, we at the Institute for Whitetailed Deer Management and Research believe we have finally "cracked the code" of what triggers the rut. And that mechanism is the moon — but not in the way you might have thought.

As we discussed in the November issue, through studying a large number of wild deer in a variety of times and places, we have been unable to find any validity to either of two recently popularized theories about how the moon impacts whitetail activity. One theory holds that moon position is the key to predicting deer activity. The other suggests that a complex combination of variables in the moon's orbit determines how active deer will be in daylight on a given date.

Through comparing these predictions of deer activity to our own unbiased data (gained through infrared-triggered photos and computerized monitoring of wild deer), we have been unable to substantiate either theory. Instead, *the standard pattern for whitetails, regardless of moon position or geography, is for them to become increasingly active around sunset and remain active (on a cycle of roughly four to six hours) throughout the night, then become less active at daybreak.*

It has also been offered up that the new (dark) moon phase triggers the rut, by spurring the pineal gland to produce greater amounts of melatonin, which in turn must "tell" the deer that it is time for breeding. Unfortunately, this idea ignores some very important facts about basic biology.

Melatonin is used to measure day length, all right, but any basic text *(Continued)*

BRIAN M. WOLTISKI

on animal physiology will tell you that this hormone inhibits reproduction in mammals, rather than stimulating it. Here at the Institute's research facilities, we have used melatonin implants in an attempt to artificially synchronize deer breeding. However, we implant melatonin for only a short period, in order to "prime" does to cycle properly; then we withdraw the implant to stimulate ovulation.

A *reduction* in melatonin actually triggers the rut, so the most logical culprit is the *full* moon. *When the moon becomes full at the appropriate time of year, the doe's body starts to produce reproductive hormones, leading to a wave of breeding five to seven days later.*

Certainly, a number of modifying factors can influence how sharp or drawn-out the rut will then be, and we will talk about those a bit later. But you no doubt can see that the above statement about the rut's timing means some states and provinces with very short gun seasons are always going to be susceptible to "boom or bust" hunting results. The date on which the rut peaks can make or break hunter success, particularly for mature bucks.

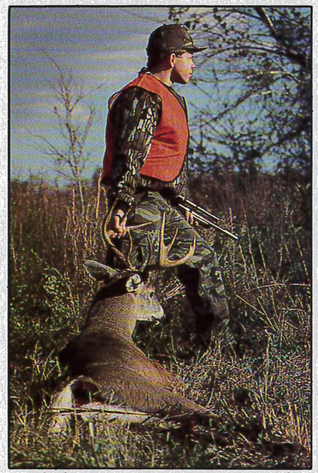
And how do whitetails "know" which full moon is the right one for triggering the rut? Again, the answer involves evolution, which has taken advantage of the moon's most obvious quality: its consistency from month to month.

If you were an animal needing to synchronize your reproductive period so that your young were born at precisely the right time of year, on which natural cue(s) would you base your decision? In the tropics, day length varies little throughout the year, but there are wet and dry seasons. So, many tropical animals reproduce around the end of the dry season, taking advantage of the coming bounty.

In temperate regions, such as North America, however, precipitation patterns are generally less reliable. But day length changes noticeably and predictably throughout the seasons, and moon phase does so on a firm monthly schedule. Both of these variables are involved in timing the whitetail rut.

One point sometimes made in support of the idea that breeding is triggered by the new moon is the "fact" that the rut progresses northward with each passing day. Well, whitetails as a group do tend to breed earlier in the South than in the North, but there are a number of notable exceptions.

Northern whitetails have a rut chronology that centers on the middle of November, while Southern populations frequently rut earlier or later, depending on the exact location and race of deer.



High hunter success rates on big deer are usually dependent on a sharp rut to keep bucks on their feet more during legal hunting hours. Photo by David Morris.

(Remember, many areas were restocked with "foreign" deer years ago, a fact we will discuss in more detail later in this feature.) North America's earliest-rutting whitetails are in Florida, where some breed as early as July and no later than August. The Avery Island subspecies of whitetails on the Gulf Coast of Louisiana and Texas are September breeders. Deer in East Texas rut in late October and early November. Those in South Texas are December breeders, while whitetails across the Rio Grande in Mexico breed in January. The rut in Mississippi and parts of Alabama runs from January to as late as March.

Clearly, the idea that the rut progresses smoothly from the South to the North is incorrect. Once again, a beautiful theory has been murdered by a ruthless gang of facts. We must look elsewhere for the answer to the timing of the rut.

THE HUNTER'S MOON

Almost everyone who has ever put on a Halloween mask has heard of the "harvest moon." This is the full moon falling nearest the autumnal equinox, the date each fall when the lengths of night and day are virtually equal. Aboriginal man celebrated this as a time of thanksgiving for a bountiful harvest, the end of the growing season.

The significance of the harvest moon is that from its date forward, nights are longer than days, telling the pineal gland of a temperate-region deer that the time for breeding is approaching. Now the deer's system can pick up on cues that will allow it to time the rut precisely.

Folks living off the land often call the first full moon following the harvest moon the "hunter's moon." But this is not simply because modern hunting seasons occur about this time; the idea of the hunter's moon is actually much older than our concept of open and closed hunting seasons. As it turns out, there was a good reason deer hunting traditionally occurred at this time, and it had to do with the rut.

As the moon gets progressively brighter each night following the new moon *after* the harvest moon, there is a gradual decrease in melatonin production by a doe's pineal gland. As the next full moon — the hunter's moon — arrives, hormones start working to initiate estrus. As these hormones take effect, over a period of several days following the hunter's moon, the doe should come into heat.

We hypothesized that the Northern whitetail rut was triggered primarily by the hunter's moon and that because of hormonal lag time, considerable breeding in Northern herds should occur several days after that full moon is reached. Using data graciously provided by biologists in Pennsylvania and Michigan, we set out to test our hypothesis — and quickly saw that the idea was right on the money.

In our analysis of the rut in these states, one remarkable fact jumped out at us: The peak of the rut most often occurs during the full-moon and last-quarter phases of the hunter's moon. What is more, we

soon discovered that this pattern holds up from year to year and from place to place within the region. As a result, we are forced to conclude that *the timing of the Northern whitetail rut is based on the appearance of the hunter's moon.*

Of course, the hunter's moon does not occur on the same date each year; because the lunar month is not identical to our calendar months, the dates fluctuate. As a result, breeding dates fluctuate as well. Remember, the timing of the rut is largely in a deer's genes. The animal "wants" to breed within a certain optimal window of time and tries to synchronize the rut by cuing off the appearance of the hunter's moon. But there are years in which this full moon occurs too early or too late to provide proper timing of the fawning period if that "rule" is followed.

When the full moon falls too far outside the optimal window, the deer will not have as neatly timed a breeding period as usual, and the rut will offer relatively poor hunting. This would help to explain why in some years we receive numerous calls from hunters all over North America who are complaining about the rut that season being poor for hunting. It has to be something other than coincidence when so many people with identical stories are calling to describe similar situations 1,000 miles apart.

What about areas in which the rut is on a different timetable? Let's look at a Southern example, from the pine forests of East Texas, where the rut generally is several weeks earlier than in the North.

We have graphed breeding activity in East Texas and found that the rut falls between the harvest moon and the hunter's moon, leading to the conclusion that it is cuing off the former, rather than the latter. Why?

There is a simple answer. Our studies on fawning times and forage production indicate that the timing of fawn drop in this region is critical. Because hot, dry weather typically comes in late spring and lasts on through summer, fawns must hit the ground about three weeks earlier here than in the North if they are to have good survival rates. In order to survive, the herd has shifted its breeding cycle one lunar cycle forward, cuing off the harvest moon. This is not without precedent, as



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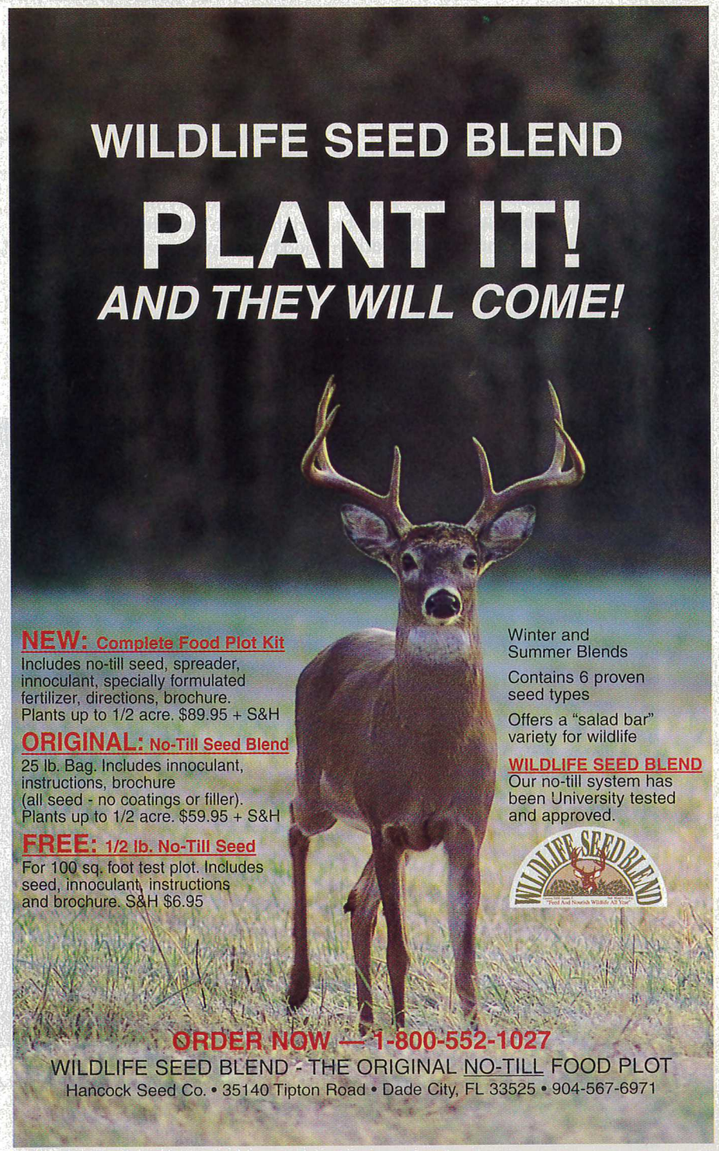
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many other types of mammals (sheep, for example) exhibit minor racial differences in breeding dates, though they all cue off day length.

Now let's move to a place with an extremely out-of-the-norm rut pattern: the Mississippi Delta. Here, we find another logical modification of the basic pattern. Early spring in this region is traditionally characterized by flooding, and radio-telemetry studies done by researchers at Mississippi State University have shown that deer often migrate tremendous distances out of the river bottom when the waters rise. If deer here rutted on the same timetable as those in East Texas, fawn survival would be quite low, due to flood waters, so the deer have adapted to a later rut that puts fawns onto the ground after the river has subsided.

We must note, however, that not everyone believes this is the reason for the Delta's late rut. Some biologists attribute it to the source of animals stocked there in the early days of herd restoration, as some of the deer came from South Texas and Mexico. DNA studies probably will answer this question someday. The reason deer from the Rio Grande plains of South Texas and Mexico evolved to rut late is so that fawns can benefit from the summer-fall hurricane season, which often brings needed moisture to this parched region.

The rut chronology for Mississippi deer shows a peak in breeding a full lunar cycle later than is the case for Northern deer. In Mississippi, whitetails are not cuing off the hunter's moon, but the full moon following it.

What about the strangely timed rut of Florida deer? We have not a clue! Seriously, there are two plausible explanations. First, the region is virtually tropical in nature, particularly South Florida. Day length there varies relatively little from season to season, and temperatures remain more moderate for most of the year. This could produce a situation in which the breeding period tends to drift away from a sharp peak. For all we know, deer might be trying to breed at the "right" time but are unable to find good cues.

Also, there might be some advantage for Florida deer that fawn in January or February. Perhaps growing conditions then are more conducive to fawn survival. At present, we cannot answer this question, but Dr. Harry Jacobson of Mississippi State University and biologists from Florida are studying rut chronology of South Florida deer in an effort to figure out the causes of this unusual rut.

The upshot of this discussion is that we finally have a model that seems to fit deer behavior. Again, this model serves to explain the vast disparity between hunting-season results from one year to the next (even after we have allowed for the effects of weather, to be analyzed in next month's issue).

When the hunter's moon falls within or very near the time when deer instinctively "want" to breed, this model holds that there should be a classic rut (barring any problems caused by modifying factors). If the hunter's moon comes more than a couple of weeks earlier than the herd's normal breeding time, however, there should be a more sporadic, strung-out rut, with less of a true peak in breeding activity.

Many states and provinces with a November rut have a traditional gun opener on the second Saturday in November. Because the timing of the hunter's moon varies so widely, some years thus will offer much better rut hunting than others. Where



In most of North America, the rut is most intense in years when the so-called "hunter's moon" occurs in early to mid-November, spurring whitetails to breed when they are genetically inclined to do so. Photo by Curt Helmick.

the firearms season lasts for only a few days, this "luck of the draw" can be either very good news or very bad news for hunters, especially those seeking mature bucks.

Another interesting point to come out of our studies is that *the lowest observed rutting activity in every geographic region and in every year occurred during the first quarter of the moon.* Again, this might be due to higher melatonin production during the new-moon phase, which could then inhibit breeding for several days. But regardless of the reason, when we couple this knowledge with everything else we have learned about deer activity, *the first-quarter moon phase does not appear to be a good time to go whitetail hunting, compared to other phases.*

MODIFIERS TO THE RUT

Next month, we will look in detail at how such variables as wind, rain, air temperature and hunting pressure affect deer movement. All of these are what we call "modifiers" of the basic whitetail activity pattern and, as such, must be considered in any hunter's game plan for success. For now, let's look only at those modifiers that can affect when the rut occurs, and at what level of intensity.

A number of variables can and frequently do have an impact on the timing of the rut. Among them is the genetic makeup of a deer population, particularly one containing animals that did not evolve in that area.

Several years ago, Dr. Harry Jacobson of Mississippi State University conducted a landmark study to determine if the timing of the rut was genetically programmed. He bred deer from Michigan (mid-November breeders) to deer from Mississippi (December-January breeders); if there was a genetic link to the timing of the rut, the offspring of these matings should show an intermediate breeding date. Dr. Jacobson's results, presented to the Southeast Deer Study Group several years ago, show that the intergrade offspring did indeed have an intermediate breeding period, supporting the idea that rut timing is genetically fixed.

But just as the timing of the appropriate full moon can cause this timing to fluctuate somewhat, so can other variables muddy the water. For starters, the rut timing you see in the area you hunt might be quite different from that of the deer which originally inhabited the region, making the rut especially hard to pin down.

During the first half of the 20th century, when there was far less concern about the potential environmental impact of such practices, many wildlife agencies stocked thousands of deer from a variety of sources. Whitetails from Mexico and South Texas (where the animals were still plentiful) were hauled to a number of Southern states, as were deer from the Great Lakes region. The resulting mosaic of rut chronologies is enough to boggle the mind! In some areas, deer now breed over a very long period of time, primarily due to genetic "pollution" from stocked animals.

The date on which the rut peaks can make or break hunter success, particularly for mature bucks. When deer are in poor body condition, the rut's timing will be less dependable and often will be spread over a relatively long period.

One other factor also can shift the expected timing and intensity of the rut: body condition. Even if your hunting area contains only "pure," native whitetails, the rut pattern can be altered by the fact that does are nutritionally stressed, whether from overpopulation, poor forage-growing conditions (drought, etc.) or a mixture of the two.

When deer are in poor body condition, the rut's timing will be less dependable and often will be spread over a relatively long period. Herds that are properly managed (good nutrition and balanced buck:doe ratios) typically have well-defined peaks in the rut, with the majority of breeding being done in only a few days. A lesser peak then will occur 25 to 28 days later, as young does come into their first estrous cycle and older does that did not conceive earlier cycle again.

As whitetail numbers in many areas continue to grow beyond the habitat's capacity to support them, we will see a deterioration in defined ruts. This already has happened in the Central Texas Hill Country and in some Eastern states where deer populations have been too high for too long.

SUMMING UP THE RUT

We have covered a tremendous amount of material concerning the moon's effects on deer, and it admittedly can be confusing. So, here is a quick review of what matters most to hunters:

- Whitetail activity, including feeding, is influenced by the amount of light present at night, not by the position of the moon.
- Each race of deer has adapted to take advantage of prime habitat conditions for fawn survival, and the breeding period has been adjusted accordingly, using lunar cues.
- In Northern regions, it is the hunter's moon (the first full moon following the harvest moon, which is the first full moon following the autumnal equinox) that largely regulates the timing of that year's breeding activity.
- The lag time of hormones is such that breeding is delayed for five to seven days after the pineal gland "reads" its appropriate cue.
- The first-quarter moon phase is the worst, overall, for daytime movement of mature bucks, even around the time of the rut.

* * *

Next month, we will examine a number of rut modifiers, including weather and hunting pressure, to see how they figure into the activity equation. And then, in the February finale of this series, we will discuss common-sense strategies for putting all of this newfound knowledge to work for you.

FOR YOUR INFORMATION

This series has been adapted from a new Institute book, produced in cooperation with ***WHITETAIL***, titled *Solving The Mysteries Of Deer Movement.* For more information on ordering this book, as well as other publications available from the Institute, contact: Institute for White-tailed Deer Management and Research, Box 6109, Dept. WT, SFA Station, Nacogdoches, TX 75961; (409) 468-2004.