



Among mature bucks like this one, high-scoring antlers are still the exception, not the rule, even in quality habitat. At age 5½ and with estimated 120-class antlers, some might say this buck is “low scoring,” but he’s actually right in the middle of the pack for moderate-quality habitat.

PHOTO BY
HARDY JACKSON

Managing Bucks means

MANAGING

EXPECTATIONS

By Dr. Steve Demarais, Dr. Bronson Strickland, and William T. McKinley

In the movie “Dumb and Dumber,” Jim Carrey asked his beautiful costar, “What are the chances of a guy like me and a girl like you ending up together?”

“Not good,” she answered. “About one in a million!”

Carrey replied with a big smile on his face: “So you’re telling me there’s a chance!”

Deer hunters may not want to identify too closely with Carrey’s movie character, but we certainly share a perpetual optimism that each hunting season will bring new opportunities to meet our deer harvest expectations. Many aspects of Quality

Deer Management generate pleasure and satisfaction that are totally unrelated to the harvest of large-antlered bucks. However, it would be naïve to think that harvesting that “once-in-a-lifetime buck” isn’t somewhere within the mind of most deer hunters.

Many hunters develop high expectations after implementing a QDM program. Unfortunately, big bucks don’t occur naturally at the same frequency as they appear on magazine covers, in advertisements and on outdoor television shows. Now, there’s nothing wrong with daydreaming about harvesting that big whitetail, but setting your expectations too high may lead to

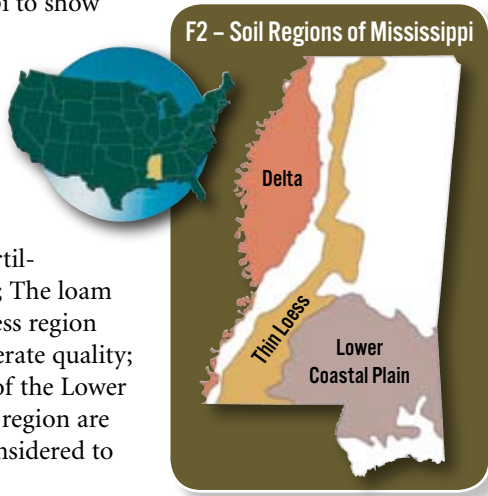
unjustified frustration with QDM.

In this article we'll explain some of the factors that affect antler size of harvested bucks. We'll contrast data within a soil region to show how much variation in antler size occurs within and across age classes. Then we'll contrast data across three soil regions to show how soil and habitat quality affect variation in antler size. Our discussion will help Quality Deer Managers understand population limitations, which will help them develop realistic buck harvest goals. Deer population management is all about the numbers, and we'll help you understand the numbers behind the harvest of bucks with various-sized antlers. We're going to demonstrate these concepts using data from more than 18,000 bucks harvested on 765 properties during 1991-2002 in Mississippi. Although the exact values are representative of specific regions in Mississippi, the concepts apply across the whitetail's range.

Certainly, "beauty is in the eye of the beholder," and there are many ways to measure the "quality" of a set of antlers, but we'll focus on two features commonly used to measure "size." We'll use the simplest approach: the number of points greater than an inch. Although simple and easily recognizable to most hunters, the number of points will not allow us to differentiate well among size classes because there can be a huge difference between a "small eight" and a "big eight." We'll also use gross Boone & Crockett (B&C) scores as a measure of overall size and talk about groupings or classes of bucks (for example, 120-class bucks or 140-class bucks). Although more complicated, B&C scores more accurately reflect the total amount of antler grown, and the "gross" score includes non-typical points.

Several of our figures show "frequency distributions" that represent the relative numbers (percentages) of a given buck population that fall into particular antler size categories. For example, in Figure 1 notice that in the Delta region about 39 percent of the 1½-year-old bucks had 2 antler points and about 40 percent of bucks 5½ or older had 8 antler points. We will refer to these frequency distributions throughout the article.

Soil regions and habitat quality vary across the whitetail's range and are a significant source of variation in body and antler size. We will compare three regions of high, medium, and low soil quality in Mississippi to show the range of variation that can exist in some states (Figure 2). The Delta region is the Mississippi River's alluvial floodplain with soils of high fertility and productivity; The loam soils of the Thin Loess region are considered moderate quality; and the sandy soils of the Lower Coastal Plain (LCP) region are not as fertile and considered to be of lower quality.



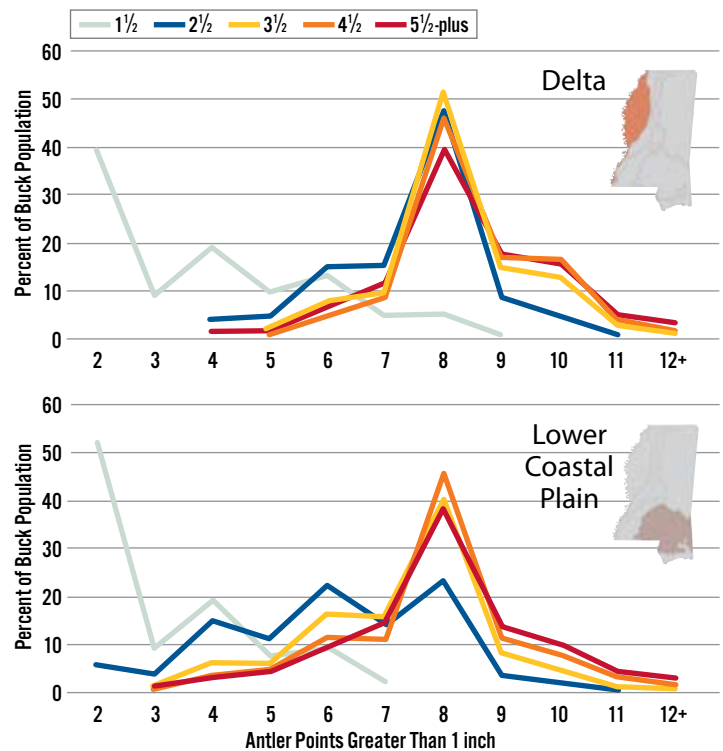
What Causes Antler Size to Vary?

Variation *Within* Age Classes – On average, older bucks grow larger antlers, but realize that all older bucks do not grow the

same size antlers. Within an age class there will be a range of antler sizes with some being very large, some being very small, and most being close to the average. This principle also holds for younger age classes. Antler size will always vary among individuals within an age class, and this relationship holds up regardless of the region or habitat conditions.

Let's clarify this concept by examining the frequency distributions for number of antler points in Figure 1. The frequency distribution for 2½-year-old bucks in the Delta region is centered on 8 points (48 percent), 15 percent have 7 points, and 8 percent have 9 points. Notice that most antlers (71 percent) are within one point of the average. Very small antlers (4-5 points) and very large antlers (10-11 points) are infrequent, making up less than 15 percent of the age class.

F1 – Antler Points by Age Class



The frequency distribution for B&C score also shows distinct variation within age classes for antler size (Figure 3 on page 24). For example, in the Delta at 5½-years, the distribution is centered on the 130-140 class (26 percent), 18 percent are in the 120-130 class, and 24 percent are in the 140-150 class. Notice that most antlers (68 percent) fall within a 30-inch band; that is, they are relatively close to the average. Very small antlers (below 90-class) and very large antlers (160- to 170-class) are infrequent, each category making up less than 5 percent of the age class.

Variation *Among* Age Classes – The general pattern of variation within age classes is seen consistently within all age classes. However, the relative frequency of specific size classes of antlers varies among age classes in a pattern consistent with the generalization that older deer grow larger antlers.

The point frequency distributions show quite clearly how antler-point classes vary with age (Figure 1). For example, within

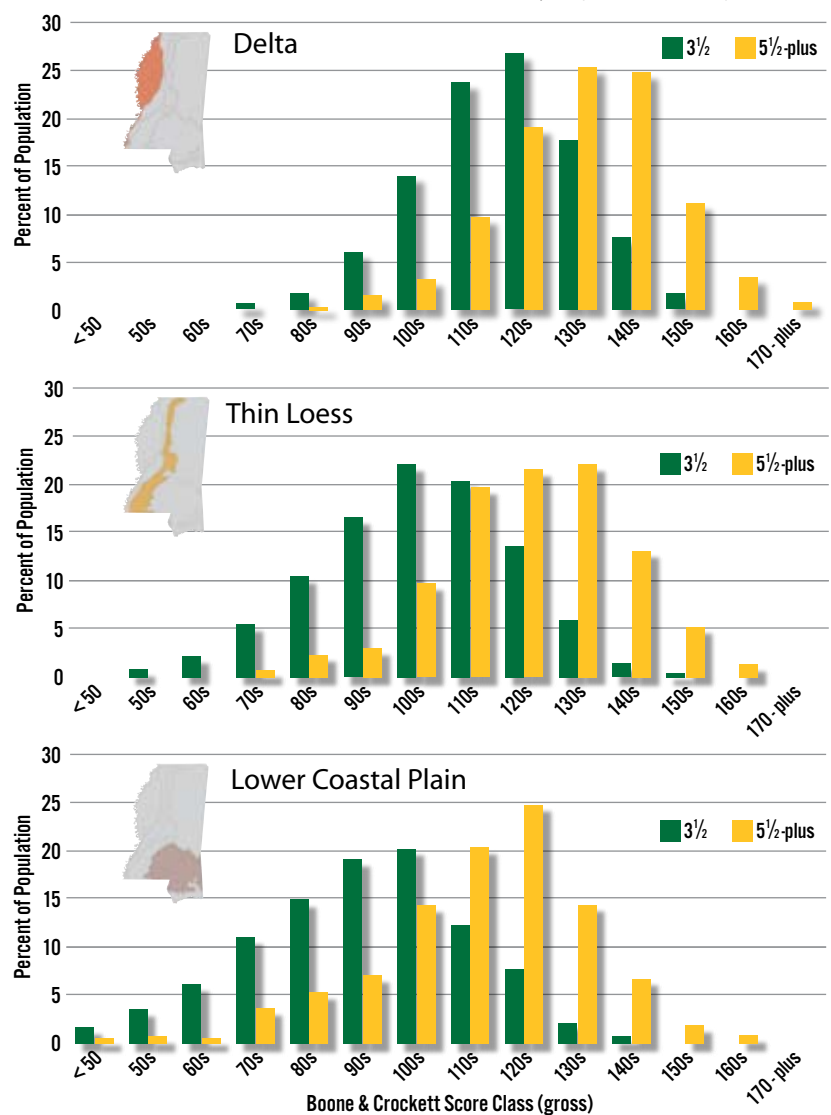
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Delta yearlings, 19 percent have 4 points and only 5 percent have 8 points. The most dramatic change in antler point frequency distributions occurs between 1½ and 2½ years. At 2½ years 48 percent have 8 points, while the 6- and 7-point categories each make up 15 percent of the population. At 3½ years the antler point frequency distribution makes a final shift that holds consistently through maturity, showing a preponderance of 8-point bucks and increased frequency of bucks with 9 or more points.

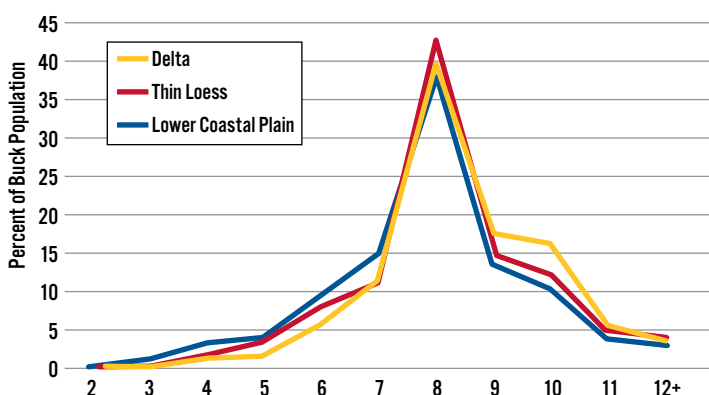
Although the antler point distribution does not allow much differentiation of antler characteristics beyond the 3½-year-old age class, the B&C frequency distribution clearly shows the distinct changes in antler size related to maturity (Figure 3). For example, within the Delta at 3½ years, 26 percent of antlers scored in the 130- and 140-class and only 2 percent score over 150. In contrast, at 5½ years, 50 percent of antlers scored in the 130- and 140-class and 4 percent scored over 160. There is a lot of overlap in frequency distributions between the 3½-year-old and 5½-year-old age classes, particularly in the 110 to 150 size classes. The upper half of 3½-year-old antlers score as well or better than the lower half of 5½-plus antlers. This overlap has important implications for harvest management issues to be discussed in the follow-up to this article in the next issue of *Quality Whitetails*.

Variation Among Regions – Body size varies greatly over the North American range of whitetails. Larger body size is an adaptation for Northern deer to better conserve heat during winter. In contrast, warmer climates tend to favor smaller-bodied deer with relatively more surface area that allows them to dissipate heat and remain cooler during hot summers. Body and antler size are generally related to each other, but luckily for southern deer managers, there is strong evidence that antler size does not follow the North American latitudinal pattern found in body size. However, there are regional patterns of antler size at smaller scales, such as soil resource regions. We will demonstrate this concept by comparing antler size frequency distributions among the Delta, Thin Loess and LCP

F3 – Boone & Crockett Gross Score by Age & Soil Region



F4 – Antler Points of Mature Bucks (5½-plus)



soil regions of Mississippi. We believe that most of this regional variation in antler size can be explained by soil fertility. Soil fertility impacts forage type and quantity which ultimately affects habitat quality. In other words, it depends on nutritional intake! We believe soil fertility and habitat quality is greatest in the Delta, moderate in the Thin Loess and lowest in the LCP.

The general pattern of age-class differences in antler point frequency distribution described earlier is evident within both the Delta and LCP, but there are some important differences (Figure 1). In the LCP where nutrition (and later birth dates) limits early growth potential, it takes bucks about a year longer to express their antler point potential. Notice that the antler point frequency distributions are almost identical for 2½-year-olds from the Delta and 3½-year-olds from the LCP. Bucks in the LCP don't reach their adult pattern of antler point frequencies until 4½ years. At maturity there is very little regional difference in antler point frequency distributions (Figure 4). Regardless of the region, 8-point antlers are the most frequently observed antler category.

As with the age-class variation described earlier, using B&C score allows us to more clearly differentiate regional variation in antler size. The bar graphs in Figure 3 show that the frequency of

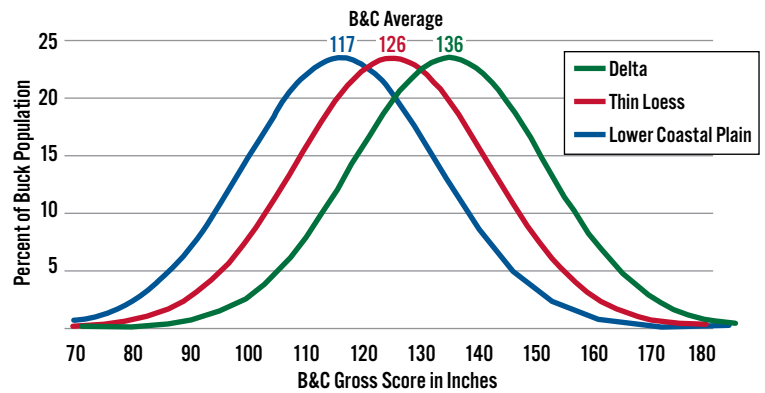
5½-plus bucks scoring greater than 150 declines from a high of 15 percent in the Delta to 6 percent in the Thin Loess to a low of 3 percent in the LCP. Clearly, large-antlered bucks can be produced in all soil regions, but the frequency will vary with habitat quality.

We smoothed the regional B&C frequency distributions for mature bucks using statistical procedures to make patterns more evident (Figure 5). Average mature buck B&C scores differ by about 10 inches between each of the regions, from a low of 117 in the LCP to 126 in the Thin Loess to a high of 136 in the Delta. Although these regional differences are significant, remember that the underlying cause is probably nutrition. Therefore, improved nutrition should improve the antler size distribution on specific properties within any region where nutrition is a limiting factor.

Managing Expectations

Deciding what type of bucks (and antlers) you want to harvest is one of the steps in developing your QDM plan. The result of this decision will determine the type or age class of bucks that will be the target of management, and harvest recommendations will stem from this decision. The first expectation that needs to be managed is the fact that all bucks within your targeted harvest age class will not grow the same set of antlers. Based on our earlier discussion, you know that regardless of the age class, 60 to 70 percent of bucks will grow antlers similar to the average for that age class; a small percentage will be much smaller than the average and an equally small percentage will be much larger than the average.

F5 – Boone & Crockett Score of Mature Bucks (5½-plus)



Determining what size antlers you want to target for management leads you directly to the age class that would most likely produce that size. You may actually be more interested in producing antlers in the upper size class, but here you must modify your expectations to conform to the fact that high-end bucks are not common even under the best of circumstances. You must manage for an average size class and then take advantage of the limited number of upper end bucks under those circumstances.

For example, if you wanted to maximize harvest of 8-point bucks, then the composition of bucks on your property should reflect this goal. You will need to maximize the number of 3½-year-old and older bucks in your population, because at this age and above there is no significant change in percentages of 8-point bucks. Targeting 3½-year-old bucks will maximize the number of

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About This Article

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bucks available for harvest; managing for older age classes allows more attrition from non-hunting mortality and less animals available for harvest.

Early in a management program you may be satisfied with 8-point bucks. Our experience has shown that management success leads to increased expectations. Although point distributions don't change much after 3½ years, Boone & Crockett scores do. To increase the numbers of bucks that have relatively greater B&C scores, buck age structure becomes a critical management objective.

Refer to the graph of the Delta region in Figure 3. Notice there's a lot of overlap between the two

There is a good deal of "overlap" when antler scores are charted by age class. The 5½-year-old buck in the background will score in roughly the same range as the 3½-year-old in the foreground. This is why aging bucks based on body and behavior is superior to selection based on antlers.



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distributions, but peaks of the distributions are different because the average antler size of 3½-year-old bucks is 121 inches and the average of 5½-plus bucks is 136. Most importantly, notice that while only 2 percent of the 3½-year-old bucks fall into the 150-inch or greater categories, 15 percent of the 5½-plus bucks exceed 150 B&C. If your management goal is to maximize antler size on your property, then you must let bucks reach maturity before harvesting them. However, as you can see from the graph, not all of the mature bucks fall into this "large-antlered" category; in fact, there are just as many mature bucks that score *less than 120* as score greater than 150! Here's where management goals and expectations must be reasonable. Notice just how rare these large-antlered bucks are. In the Delta soil region of Mississippi, for every 100 mature bucks (5½-plus), only about 15 would score 150 B&C inches or more. Or stated another way, there's

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Even in South Texas, this exceptional mature buck is exactly that – exceptional. Bucks of this caliber can also occur in other regions given proper age structure and habitat quality, but they will always be a small proportion of the age class.

only a 15 percent chance each mature buck produced would score 150 or greater.

If your goal is to maintain a high number of bucks harvested, then you should consider harvesting younger bucks, but you must lower your antler size expectations. For example, if a club in the Delta region wanted to maximize hunting opportunity for 120-class bucks, then protecting bucks until at least 3½ would be the best strategy. On the other hand, if you’re interested in harvesting the best antlers a property can produce, then harvesting bucks at full maturity (5½-plus) is the only way to go. However, you should understand that managing for maximum antler size on a property is an inefficient process. As you increase your expectations for antler size on a property, you will decrease the number of bucks that meet that expectation. This occurs for two reasons: 1) few bucks have really large antlers, and 2) some bucks will die of other causes (hunting and non-hunting related) before they reach 5½ years of age.

Regional variation in antler size frequency distributions can be a source of management frustrations due to unrealistic expectations. The Lower Coastal Plain doesn’t produce as many large-antlered bucks as the Delta because habitat quality is naturally lower due to soil fertility. However, this does not mean that you can’t produce large-antlered bucks in this region

with proper management, because both regions produce bucks in the 150-inch or greater categories. Instead, realize that with the same management effort you wouldn’t produce as many 150-inch or better bucks as you would in the Delta region. Your expectations must coincide with reality – match your expectations with the region’s potential. But also realize that the frequency of larger-antlered bucks in a lower quality region can be increased if you remove the nutritional limitations. Proper habitat management and food plots can shift the antler frequency distribution to include a higher proportion of larger-antlered bucks.

How to Apply This Information

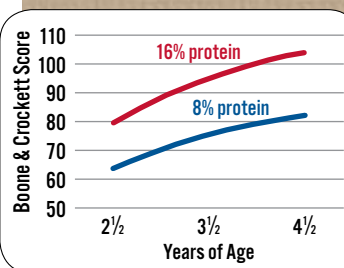
We are using percentages by age class in our graphs, but the actual

The Main Mission: Age & Nutrition

Every reader of *Quality Whitetails* knows that age and nutrition are the two most important factors influencing antler size. They are important because they have such a big impact on antler size and also because they can be manipulated successfully in free-ranging populations.

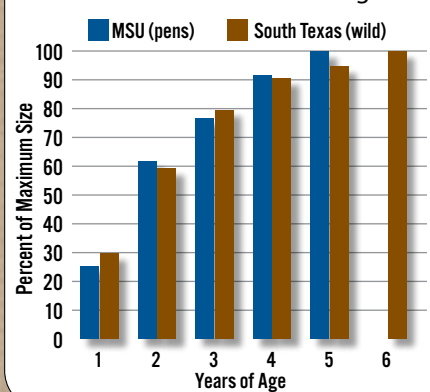
Research by the Caesar Kleberg Wildlife Research Institute in South Texas and by Mississippi State University (MSU) show that maximum antler size is obtained at maturity. Year-round optimum nutrition may explain why the MSU bucks reached maximum size a year sooner on average than wild bucks that had to endure the variable South Texas environment.

A buck at 3½ years has grown only 80 percent of his potential B&C score. Looking at it another way, that 130-class 3½-year-old buck might have been a 150-class 5½-year-old buck.



nutritional quality is the key that unlocks a buck’s genetic potential for antler development. Older bucks without proper nutrition will grow antlers that do not fulfill their potential. Research at the Kerr Wildlife Management Area in Texas showed that B&C scores of 3½-year-old bucks fed 8 percent crude protein pellets were 20 inches less than bucks fed 16 percent crude protein pellets. Most management programs would be ringing the church bells if they could increase B&C scores by 20 inches!

Antler Size Increases With Age



numbers of bucks produced in these antler size categories will depend on the buck density and buck age structure on your property. Table 1 shows an example of how to translate the frequency distributions into absolute numbers. Let's say your habitat quality resembles that of our Thin Loess soil region and you manage 3,000 acres. With a deer density of one adult deer per 20 acres (32 per square mile) and a balanced adult sex ratio you should have about 75 bucks 1½ years or older on your property at any given time. Now let's assume you have a younger buck age structure like the one shown in the top of Table 1, a distribution that is based on real-world examples of deer populations under traditional deer management.

With this deer herd scenario you would expect to produce about two bucks in the 100-class, three bucks in the 110-class, two bucks in the 120-class, and no bucks greater than 130.

Changing to an older age structure using QDM principles has a major effect on availability of bucks with larger antlers. With a slightly improved buck age structure like the one in the lower half of Table 1 (which is representative of some real-world populations under QDM), you can expect to produce about five bucks in the 100-class, six bucks in the 110-class, five bucks in the 120-class, three bucks in the 130-class, and two bucks in the 140-class. Additional increases in the older age classes will further improve the availability of larger-antlered bucks. Even using

Younger Buck Age Structure	Total Bucks by Age Class	Boone & Crockett Score Class						
		< 100	100s	110s	120s	130s	140s	150s
1.5 (75%)	57	57						
2.5 (15%)	11	9	1	1	1			
3.5 (7%)	5	2	1	1	1			
4.5 (3%)	2			1	1			
5.5 (0%)	0							
	Total	68	2	3	2			
Older Buck Age Structure	Total Bucks by Age Class	< 100	100s	110s	120s	130s	140s	150s
1.5 (45%)	33	33						
2.5 (25%)	19	16	2	1				
3.5 (15%)	11	4	2	2	2	1	1	
4.5 (10%)	8	1	1	2	2	1	1	
5.5 (5%)	4		1	1	1	1		
	Total	54	5	6	5	3	2	

Table 1. An example of the actual numbers of bucks that can be expected in various Boone & Crockett size classes based on a property of 3,000 acres in the moderate-quality Thin Loess soil region with a deer density of 1 adult deer per 20 acres and an even adult sex ratio, which results in about 75 bucks on the property at any given time. The two tables contrast the number of bucks produced in each size class based on a younger buck age structure (typical of traditional deer management) and an older buck age structure (typical of Quality Deer Management).

conservative improvements, this model clearly demonstrates the positive effect buck age structure improvement can have on your QDM program.

The most effective way to manage for older bucks and improve buck age structure is learning to age deer “on the hoof”

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Learn More about Managing Bucks

Managing numbers and quality of bucks will be the topic of this year's Think Tank on Thursday, July 24, at the 2008 QDMA National Convention in Chattanooga, Tennessee. Dr. Steve Demarais, one of the authors of this article, will be the first of four Think Tank speakers and will expand on the topic presented here: *Managing bucks and expectations within local habitat limitations*. Steve and many other experts and regular *Quality Whitetails* contributors will be in Chattanooga and available for one-on-one questions and discussions throughout the Convention. For more information about attending, visit www.QDMA.com.

and then making the decision to harvest the animal based on your management goals. Both QDMA and the Mississippi State University Extension Service have produced publications to help you learn how to use body characteristics and behaviors to age bucks on the hoof.

Most deer hunters and managers are familiar with the reputation South Texas has for producing quality bucks. Year in and year out South Texas ranches produce some of the largest record-class bucks in the nation. Remember the article "Whitetail Rodeo" in the February issue of *Quality Whitetails*? Dr. Dave Hewitt of the Caesar Kleberg Wildlife Research Institute said the average 5½-year-old or older buck captured for research on several South Texas ranches scored 128 B&C inches. Do you recall the average antler size of 5½-plus bucks in Mississippi? In the Delta region 136, in the Thin Loess region 126, and in the LCP region 117 B&C inches! You can produce South Texas caliber bucks too if

you manage for numbers of bucks, older age classes and quality deer habitat. But remember to keep your expectations reasonable because it won't happen overnight.

Our goal with this article was not to discourage Quality Deer Managers. Instead, we hope to provide you with information about the frequency at which bucks of various antler sizes occur in the wild to keep your expectations reasonable. As QDMA has often advised, you must match your expectations with the capability of your management program to produce the desired results. Indeed, those 150-class bucks are rare, but with reasonable expectations for your management plan, you will be pleased with your results – and even more appreciative of your accomplishment when that once-in-a-lifetime buck appears!



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