# INSIDE DEER RESEARCH

*A newsletter for supporters of the Deer Research Program*
*Caesar Kleberg Wildlife Research Institute at Texas A&M University-Kingsville*
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## Aging White-tailed Deer in South Texas

*by John Lewis*

"How old is that deer?" This question is hotly debated as hunters pour over deer photos. For the debaters, the answer comes once the deer is harvested and the teeth are evaluated. However, research at the CKWRI shows a deer over 3 years of age is less likely to be the age indicated by its teeth than some other age. How can such an important part of our deer management tool kit be so poor?

Over 10 years CKWRI researchers have captured, tagged, and released nearly 4,500 bucks in South Texas. A portion of these deer were captured first as fawns or yearlings, which are considered known age classes because of consistent tooth replacement patterns. Some of these tagged deer were later harvested and their jaws collected. We collected 264 mandibles from 134 deer at least 2 yrs old from. Six biologists, holding at least a Master's degree in Wildlife Science, aged these jaws while referring to the original scientific paper (Severinghaus 1949) on aging deer using tooth wear and a visual guide to the technique.

These trained biologists, with references in hand, categorized only 49% of jawbones correctly (Figure 1). Biologists tended to under-age deer that were greater than 3 years old, but ages were correct ±1 year for 86% of the jaws. All 6 observers agreed on the same age for a jaw only 19% of the time, and average agreement for a particular jawbone was 4.1 observers/jawbone.

Another increasingly popular way to age deer is by cementum annuli aging of an incisor. Incisors are sent to a lab where the tooth is sectioned and rings (annuli) are counted like growth rings on a tree. We sent 232 known-age incisors to a lab for such an analysis. Cementum-annuli aging resulted in 61% accuracy and was correct ±1 year for 92% of the jaws. Observers at the lab also tended to under-age deer that were over 3 years old.

So what's the problem? We had experienced biologists age these jawbones and incisors using scientific papers and cutting-edge techniques; yet the best accuracies we could attain were 61% correct. The answer is variability, not

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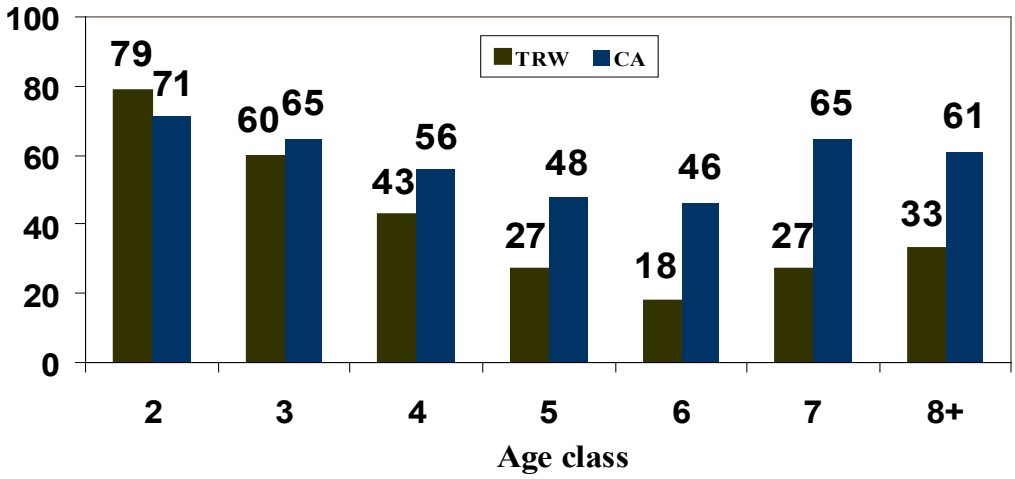
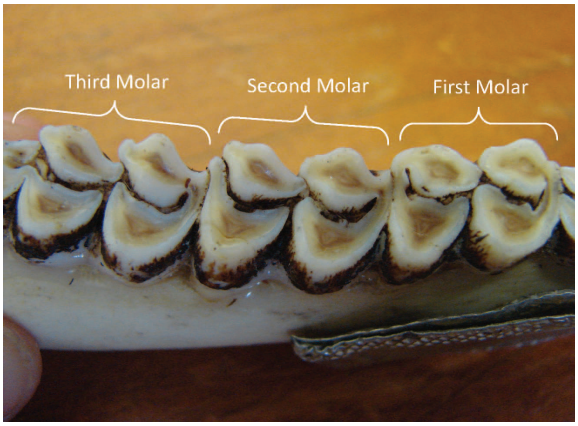
Deer Associates Meeting
March 4, 2011

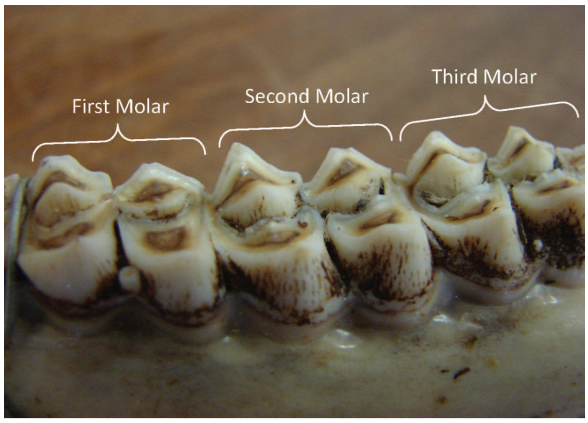
**Figure 1. Percent white-tailed deer jaws correctly aged using tooth-wear (TRW) and cementum annuli (CA) aging techniques.**




Editor's Note: John Lewis is a PhD candidate under Dr. David Hewit and Mickey Hellickson.

**Figure 2. Jaws from two 5 year old bucks harvested in South Texas. Note the differences in wear on the first molar.**



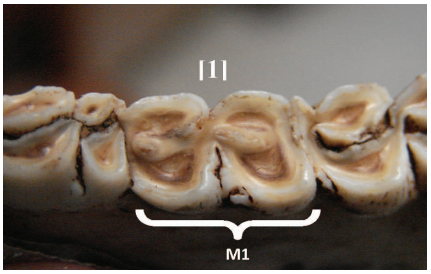

so much among observers, but among deer. Just as someone your age may have 10 cavities while you have none, different deer of the same age have different patterns of tooth wear (Figure 2).

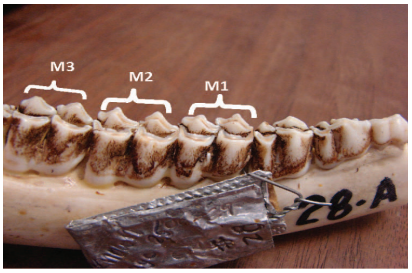
So what's the solution? There currently is no solution if you must know the exact age of a deer. But, tooth wear can be used to assign deer to categories as young, middle-age, or old with reasonable accuracy.

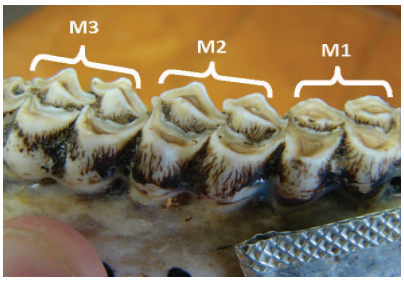
Using the known-age jaws, we developed new aging criteria that place adult deer into 3 age categories: 2 years old (young), 3 – 5 years old (middle), and 6+ years old (old; Figure 3). These new criteria used only wear on the first molar to classify jaws. We tested these new criteria by asking 20 Texas Parks and Wildlife Department biologists to place 62 known-age jaws collected during 2005 – 2008 into these 3 categories. They placed 72% of 2 year olds, 73% of 3 – 5 year olds, and 68% of ≥6 year old deer into the correct classes. This technique reduces the number of criteria used to assign an age and provides similar results to grouping estimates using the traditional tooth-wear method.

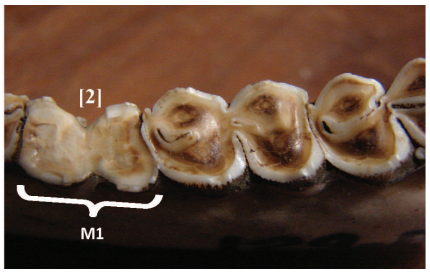
Estimating the age of a deer by tooth wear is inaccurate because of variation in tooth wear patterns among deer. Variability is also added by multiple subjective criteria that can be interpreted differently by different people. By grouping deer into young, middle, and old age classes, managers can still meet management objectives while not being mislead by the poor accuracy of their aging techniques. Using a simple, single criterion to age deer also reduces differences among observers.

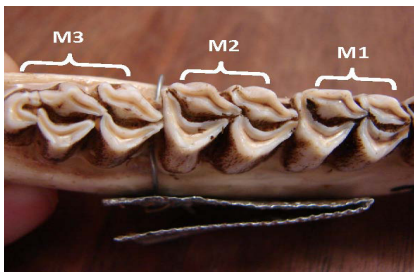
**Figure 3. Aging guide provided to Texas Parks and Wildlife biologists for evaluation of new aging method using simplified tooth-wear criteria that pools adults into 3 age classes: 2, 3 – 5, and ≥6 years old.**

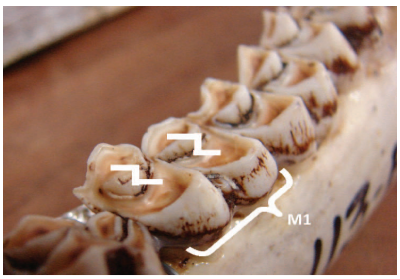


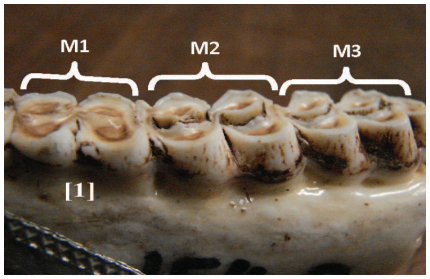




**2 Years Old (Young)**
- **First molar (M1) has enamel wider than the dentine**
- **M1 has sharp lingual crest**

**3-5 Years Old (Middle)**
- **M1 has dentine that is equal to or wider than the enamel**
- **M1 is NOT dished and infundibulum is still present**
- **Stair-step appearance between buccal and lingual crests of M1**

**≥ 6 Years Old (Old)**
- **M1 either**
  - **Dished with a ridge [1] or**
  - **Dished out completely [2]**

# Repeatability of Antler Characteristics of White-tailed Deer in South Texas

*by Aaron M. Foley*

Deer managers in South Texas often use antler criteria to remove undesirable bucks from their population to enhance the genetic component of antler expression. This approach assumes antler size is predictable. One approach to test the predictability of antler size is to use a metric termed repeatability. Repeatability ranges from 0 to 1, with 1 indicating the exact same antler measurement is obtained every year an individual's antlers are measured. A value near 0 indicates there is little similarity in a deer's antlers when measured in subsequent years.

My colleagues and I captured bucks on 7 south Texas ranches during 1985-2008 using the helicopter net gunning technique. Using antler measurements collected from 3.5-6.5 year old males, we estimated repeatability of inside spread, main beam length, number of points, basal circumference, and total antler size. Total antler size is the same as gross Boone and Crockett score minus inside spread. Inside spread was not included because it does not describe the size of an antler.

Overall, repeatability was moderate to high, ranging from 0.42-0.82 for all traits. Main beam length and inside spread had the highest average repeatability while number of typical antler points had the lowest average repeatability. Low repeatability suggests that number of typical antler points may not be the best criteria to use for harvest management decisions.

Ranches were not equal with respect to spring rainfall variability and intensity of supplemental feeding. We separated ranches based on rainfall variability (variable vs. consistent) and supplemental feed (none, partial year feeding, and year-round feeding). Average repeatability was lower in variable rainfall sites than consistent rainfall sites. The most pronounced difference was number of typical antler points; repeatability was 31% lower in variable rainfall sites. Presence of supplemental feed appeared to moderate some of the environmental effects, producing higher repeatability compared to unfed sites. Interestingly, year-round feed programs had 24% lower average repeatability than partial year feed programs. The unexpected results could be attributed to a large feed effect on antler growth, lag effects, or maternal effects because feed access is not equal among dams (Bartoskewitz et al. 2003).

What does this all mean? In order for selection to operate, there needs to be an additive genetic component. Repeatability values above 0 indicate there is indeed an additive genetic component in the trait. This implies that antler restrictions may assist in enhancing antler size of a population. The magnitude of differences in repeatability between areas of variable and consistent rainfall reveals that selection may be difficult to accomplish in variable environments. Efficiency of selection may be improved with the presence of supplemental feed; however, the inverse relationship between feed intensity and repeatability indicates that more long term studies are needed on how antlers respond to supplemental feed.

*About the author: Aaron Foley is a PhD student working under Drs. Randy DeYoung and David Hewitt. Collaborators on this research project: Steven Lukefahr assisted with the repeatability analysis. Mickey Hellickson, David Hewitt, John Lewis, and Fred Bryant contributed data from the South Texas Buck Capture Project and Stuart Stedman and Charles DeYoung contributed data from the Faith Ranch Buck Capture Project. Dan Friedkin and Donnie Draeger contributed data from the Comanche Ranch Buck Capture Project.*

**Figure 1. Antlers on deer tend to have similar characteristics in subsequent years, indicating high repeatability. Shown below are photos of the same buck in 2009 and 2010.**

*© David Hewitt*

Editor's Note: Aaron Foley is a PhD student working under Drs. Randy DeYoung and David Hewitt.

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