

# Dentition's New Role

The industry tackles how to determine age for new BSE requirements.

by *Corinne Patterson*

**O**n Jan. 12, 2004, the U.S. Department of Agriculture (USDA) issued new rules to protect the public from bovine spongiform encephalopathy (BSE). In these regulations, specified risk materials (SRMs) in cattle more than 30 months (mo.) of age are not allowed into the human food supply. But the majority of steers and heifers don't exactly arrive at a feedyard or packing plant with birth certificates, at least not yet.

Dentition will assist the industry in determining an animal's age at harvest. While it may be a new buzzword, dentition isn't exactly something new — it's more commonly known as mouthing to those beef producers who have shown steers or other bovine and to commercial cattlemen who estimate ages of cows without birth records.

Today, with dentition's new role, it will qualify or eliminate certain bone-in cuts of meat from human consumption. Dee Griffin, Extension veterinarian at the University of Nebraska (NU) Great Plains Veterinary Educational Center (GPVEC), says USDA has made it clear that if producers have accurate birth documentation that is accepted by inspectors (see sidebar), it will be considered the best way to age animals. But without birth records, dentition will be used in the packing plant to determine how an animal will be processed.

## What teeth will tell

Cattle have three types of teeth. The incisors, which are situated in the rostral portion of the mouth, or near the nasal

region, are only found in the lower jaw. The other teeth are the premolars and molars, also known as cheek teeth, and are found in both the upper and lower jaws in the back region of the mouth.

When mouthing cattle for the 30-mo. rule, an inspector is looking for signs of age in the incisors (see Table 1). These incisors erupt at different months of age. Eruption is the emergence, penetration or piercing of the tooth or teeth through the gum line.

Incisors are ordered in pairs, from No. 1 through No. 4. During a dentition examination, the examiner looks at the animal's mouth to see if at least one of the second set of permanent incisors (No. 3) has erupted to determine if the animal is more than 30 mo. of age (see Figs. 1 and 2).

While dentition isn't always 100% accurate in determining cattle age, Griffin says the error is made on the conservative side. "We know that if you look at the eruption of the first of the second pair, which would be considered incisor No. 3, there are going to be some animals' [No. 3 incisors] that erupt prior to 30 months. There are going to be some that erupt after that, but there will be more that have tooth eruption and will not be 30 months," Griffin says.

## Foundation for thought

The Food Safety and Inspection Service (FSIS) is the governmental department within USDA that has been charged with enforcing the new regulations. Prior to implementing these rules, Griffin says FSIS did its homework and based its decision on a solid foundation.

There are several scientific reports that examine aging cattle by dentition, and he reports that FSIS's commitment to error in caution is achieved with the interpretation of age by the eruption of the third incisor. He says this is true based on scientific review of known studies, and on the U.S. Meat Animal Research Center (MARC) study of its own cow herd.

Ken Eng, a private nutrition consultant located in Texas, published an article in the Oct. 15, 2001, *Feedstuffs* magazine that Griffin says provides good evidence the dentition plan by USDA is accurate in its ability to identify cattle more than 30 mo. of age. While Eng's study focused on the relationship of age to tenderness, he based age on the eruption of the incisors.

The MARC has 7,000 cows, plus their calves, every year, Griffin says. Of those animals, which represent many different breeds, just shy of 2,000 were between 24 mo. and 48 mo. of age based on precise birth records the center maintains on each individual animal. The center brought each

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## Documenting birth

The U.S. Department of Agriculture's (USDA's) Food Safety and Inspection Service (FSIS) has determined that documentation, rather than dentition, can be the primary means of determining the age of cattle at harvest. They also say it is the best way because dentition only provides a means of making general determinations about age.

While certain documents will be considered, Dee Griffin, Extension veterinarian at the University of Nebraska (NU) Great Plains Veterinary Educational Center (GPVEC), warns that whether the documentation is accepted is up to the inspectors. But these inspectors do follow guidelines in their evaluations.

FSIS Notice 10-04 released Jan. 29 highlights some of the documentation requirements.

The characteristics of documentation that are most useful in determining the age of cattle offered at harvest are:

1. documentation (for example, records or certificates) that can be related to individual cattle and not just information about an entire lot; and
2. documentation that provides evidence of age that goes back to the farm where the cattle were born, including the name and address of the owner.

FSIS says examples of farm or ranch documentation may include:

1. pregnancy check records (checks for individual cows and the results of the check for each one);
2. records of which cows were in the herd when a bull was put in with the herd, and when the bull was removed from the herd (to determine start of gestation);
3. records that document when individual cows were artificially inseminated (Aled);
4. records that document where (name and address of the producer) and when the calf was born; or
5. identification applied to calves [for example, records from branding, electronic ear identification (ID) or ear tags].

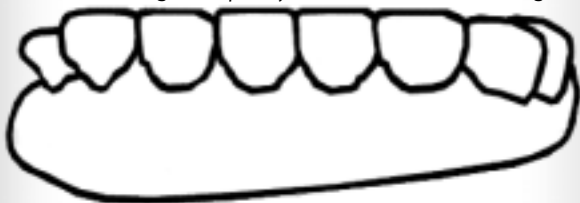
**Table 1: Eruption time of permanent incisors**

Teeth	Age at eruption, in months
First incisor	18-24
Second incisor	24-30
Third incisor	36
Fourth incisor	42-48

Source: [www.fsis.usda.gov/ofotsc/bse\\_information.htm](http://www.fsis.usda.gov/ofotsc/bse_information.htm)

**Fig. 1: Dentition representing cattle less than 30 mo. of age**

Full set of eight temporary teeth at about 15 mo. of age



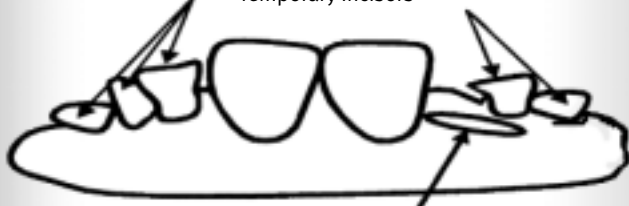
Erupting first set of permanent incisors



Erupted first set of permanent incisors



Temporary incisors



Erupting third permanent incisor: If top of tooth is *not* above gum line, the animal is determined to be less than 30 mo. of age.

Source: Dee Griffin, GPVEC.

**Fig. 2: Dentition representing cattle 30 mo. of age or older**

First set of permanent incisors



Erupted third permanent incisor: If top of tooth *is* above gum line, the animal is determined to be 30 mo. of age.

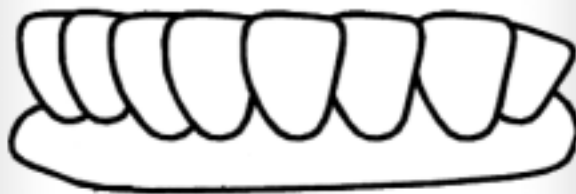
Erupting fourth permanent incisor



Erupted third permanent incisor: If top corners of the tooth are above the gum line, the animal is determined to be 30 mo. of age or older.



Four permanent incisors: If the top corners of the second set are above the gum line, the animal is determined to be 30 mo. of age or older.



Full set of permanent incisors indicates animal is older than 48 mo. of age.

Source: Dee Griffin, GPVEC.

of those cattle through the chute and took pictures of their teeth.

But MARC didn't have a continuum of calves across 30 mo., so the center is committed to bringing the animals back through the chute to examine what their teeth look like as they age across a 30-mo. time interval. The second evaluation has not occurred, but Griffin expects the data to be released in about 6 mo.

Griffin says Eng's numbers suggest that about 15%-20% of cattle that have that third tooth erupted will be less than 30 mo. of age, and somewhere between 5%-10% will be older than 30 mo. when that tooth erupts.

### **Effect on industry**

So what does that tell the industry? That's one question feeders and packers want to know, Griffin says.

Based on Eng's numbers, he says that by examining USDA reports for days on feed and making some assumptions of weights of cattle associated with days on feed, if animals presented for harvest are 22-24 mo. of age in January, approximately 1% would have the third incisor indicating they are 30 mo. of age. He also considered that as June

approaches, the percent of calves with that third incisor will increase to 4% because most calves are born in the spring, so more cattle are in the pipeline for harvest at that point.

Griffin says, as a whole, very few traditionally fed cattle will show up for harvest with dentition aging them 30 mo. old or older. Heiferettes and long yearlings may be a concern, and feeders may discount cattle accordingly.

However, what's worthy of thought, he says, is that there isn't a market for "cattle less than 30 mo. of age" — U.S. consumers aren't demanding that the beef products they consume be from cattle less than 30 mo., and major trading partners like Japan aren't accepting our beef products at this point in time. While packers say it isn't a problem to sort cattle based on that 30-mo. benchmark, they aren't currently labeling the product in that manner at the retail level, Griffin adds.

Because the 30-mo. rule only excludes certain SRMs, like the dorsal root ganglia, animals that are 30 mo. or older are still harvested, but down a separate processing line much like the method in which *Certified Angus Beef*® (CAB®) product is processed. Since the rule requires removing the dorsal

root ganglia, many of the bone-in cuts from the middle meats (T-bone steaks, porterhouse steaks, club steaks, bone-in New York strip steaks) of those animals aren't processed for human consumption.

If there is a demand for cattle less than 30 mo. of age — say Japan will open its doors to U.S. product from these animals — you'll see the industry differentiate those products. But at that point, Griffin says, it may not be a 30-mo. issue. Testing for BSE may be done on a greater level, instead of depending on age.

"Most likely, what's going to happen is that they are not going to [be concerned with] 30 months," he says, referring to Creekstone Farms' application to USDA in late February for approval to test all the cattle it harvests for the presence of BSE in order to regain access to export markets. "They are going to do what Creekstone did; they are going to say we are going to test them all."



**Editor's Note:** For more information on dentition and aging, visit [www.fsis.usda.gov/oyo/tsc/bse\\_information.htm](http://www.fsis.usda.gov/oyo/tsc/bse_information.htm), or <http://gpvec.unl.edu/sites.htm> and look under *Aging Cattle Reference Documents*. Information from these sites contributed to this story.