

*Nos. 3 and 4.* These were twin fetuses from a doe of normal appearance which was overdosed during a tranquilization attempt. The male fetus had shortened mandibles, rotation of both front limbs and the left hind foot had a club-foot appearance. The female fawn had shortened mandibles and rotation of both front limbs.

*No. 5.* This 6 year-old male had shortened mandibles but all limbs were normal. The extent of the shortening of mandibles was such that the incisors just made contact with the back of the dental pad and about 2 cm of the roof of the mouth was exposed when closed normally. The animal was in excellent physical condition (80 kg bodyweight).

Animals 1 through 4 were recovered from RAAP, Dublin, during the interval from January to May, 1972 from a population which numbered 350 to 400 the previous fall. Animal No. 5 was recovered from RAAP, Radford in July, 1973.

## **A BROWN PAPER TECHNIQUE TO DEMONSTRATE FAT IN BONE MARROW.\***

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A simple technique to demonstrate fat in bone marrow is to take a sample of fat marrow, put it on kraft paper and heat it to a temperature approximately 200° F. The size of the spot on the paper is determined by the amount of fat in the marrow. It is suggested that the method might be used for determining fat in mandibular tissues.

### **INTRODUCTION**

The color and consistency of bone marrow has been used as an indicator of "condition" in deer. (Chetum, E. L. 1949. Bone Marrow as an index of malnutrition in deer.) This is one of a number of methods used in Alabama to compare one herd with another, to compare the same herd from year to year, and as an indicator of the adequacy of the herds environment.

The words white, pink or red followed by solid, soft or gelatinous are adequate to describe the bone marrow to a deer biologist; but they have little impact upon a landowner or non-technician who wants some "figures" about his herd.

At one time, colored slides were taken as a permanent record of the condition of the bone marrow. These could be compared directly; but this proved to be time consuming - particularly when done as a routine field exercise. To actually measure the fat content of the marrow by the Soxhlet either extract method is far too expensive for use on all specimens collected for condition studies.

A relatively fast and inexpensive method of measuring or recording the amount of fat was needed in Alabama - primarily for public relation purposes.

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\*A contribution of Pittman-Robertson Project, Alabama W-35

## METHODS

Kraft is a strong, usually dark brown, paper made of sulfate pulp. It absorbs fat readily and offered a possibility of a permanent record.

The Gulf States Paper Corporation supplied a generous quantity of six inch square sheets of kraft paper that had been tested for uniformity of texture and absorbency. However, squares cut from any single roll of kraft paper would have approximately the same uniformity.

A measured amount of bone marrow, taken from the center one-third of the femur, when put in the center of the paper and heated, makes a grease spot that represents the amount of fat in that marrow.

To get a measured amount was the first problem. Various tools to take a core from the marrow were tried and abandoned. Then a standard one-quarter teaspoon measuring device filled level was used. This gave a large rounded sample, but there was too much residue containing fat after it had been heated.

Best results are obtained when a slice of solid marrow one-fourth inch is used. This allows a flat sample and there is maximum sized spot with only a little residue left. Thinner slices have only slightly smaller grease spots than do thicker slices. For the extremely soft or gelatinous material a "glob" approximating a one-quarter inch slice in volume is put in the center of the paper.

The paper and sample is put in an oven. Various temperatures were tried and a few samples were lost from charring when the oven was set above 350° F. Temperatures between 200° and 225° F. produce spots that reach maximum diameters in about fifteen minutes. As a standard, the author is heating the papers at 200° F. for twenty minutes.

The diameter of the original sample is discernible after the baking. It is outlined in pencil when the residue is removed. The diameter of the grease spot is measured and divided by the diameter of the original sample. The resulting figure, or grease spot index, can be used for comparative purposes.

The papers can be used for demonstration or stored for permanent records. Those stored at room temperatures for nine years are still legible.

## RESULTS

Although there is considerable variation in spot size between animals with the same color and consistency of bone marrow, there is enough correlation between fat and the size of the grease spot to use this technique as an index to fat.

In general, young animals produce smaller grease spots than older animals from the same area. Old animals from poor range produce smaller spots than the same aged animals from good range.

Of animals taken within the last three years and when the marrow was graded as white the average grease spot index was 8.2; when the marrow as pink, the grease spot index was 6.9; when the marrow was red and solid, the index was 4.4; and when the marrow was red and gelatinous, the index was 2.7. (Note: there were no gelatinous samples when the marrow was white or pink.)

An ether extraction analysis was made on some femurs taken in 1965. The other femur of the same animal was subjected to a paper test, usually using one-quarter teaspoon of marrow. When the marrow was graded as pink, these femurs contained an average of 59.9 percent fat and had a grease spot index of 7.4. Those that were graded as red and solid contained 27.1 percent fat and had a spot index of 4.2. For those that graded as red and gelatinous, there was 12.5 percent fat and an index of 2.7. There were no animals with white bone marrow in the 1965 samples.

## DISCUSSION

The brown paper technique opens a possibility of using it for mandibular cavity tissues (Baker, Maurice F. and F. X. Lueth, 1966. Mandibular cavity tissue as a possible indicator of condition in deer. Proc. Southeast Assoc. Fish Game Commissioners, pp. 69-74.) A standard location from which to extract a standard sized sample of tissue is all that is needed.

Regardless of whether the sample is from the femur or the mandible, the brown paper technique can be used as an index to the amount of fat; it can be used to show landowners, refuge managers and conservation officers, the differences between deer on good range and deer on poor range.

## DEER BROWSE GROWTH REDUCED BY PINE OVERSTORY

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### ABSTRACT

Twig growth of young browse plants growing in the open was several times greater than that of plants beneath pine trees. The difference was most pronounced when plants were youngest. Most twig growth was within reach of deer (below 5 feet) until plants were 5 or 6 years old, but the proportion decreased with age for tall shrubs and small trees.

Although twigs constitute only a small fraction of the browse consumed by deer (Harlow and Hooper 1972), twig length is a good indication of total browse yields (Schuster 1965). This paper presents data on the length of annual twig growth for young browse plants growing in the open and beneath a canopy of pine trees in east Texas.

### METHODS

In 1963 and 1964, 1-year-old seedlings of 14 browse species were planted beneath a recently thinned sawtimber-size stand of shortleaf and loblolly pines

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<sup>1</sup>In cooperation with the School of Forestry, Stephen F. Austin State University.