

November 21, 1969

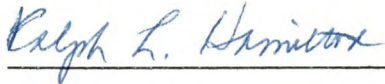
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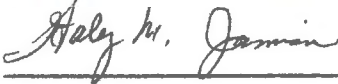
I am submitting herewith a thesis written by Clarence Edward Bible entitled "A Study of the Comprehension of Beef Cattle Terms and Concepts by Tennessee Cow-Calf Producers." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Animal Husbandry.


Major Professor

We have read this thesis
and recommend its acceptance:







Accepted for the Council:


Vice Chancellor for
Graduate Studies and Research

A STUDY OF THE COMPREHENSION OF BEEF CATTLE TERMS
AND CONCEPTS BY TENNESSEE COW-CALF PRODUCERS

A Thesis
Presented to
the Graduate Council of
The University of Tennessee

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

by
Clarence Edward Bible

December 1969

ACKNOWLEDGMENTS

The author wishes to express his sincere appreciation to the following persons who have contributed to this thesis:

Dr. Ralph L. Hamilton, for serving on the graduate committee and for his counsel and encouragement throughout the graduate course of study.

Dr. Charles S. Hobbs, Major Professor, for his guidance and for serving on the graduate committee.

Mr. B. K. Leiter, Minor Professor, for serving on the graduate committee.

Dr. Haley M. Jamison, for his efforts with the survey, statistical analysis, and counsel.

Dr. Franklin O. Leuthold, for his assistance in constructing the survey form.

The entire Agricultural Information Department whose courtesies and understanding made this graduate study a more pleasant experience.

His wife, Sandra, for her encouragement, assistance, and understanding.

ABSTRACT

The purpose of this study was to collect descriptive data which would indicate the knowledge levels of Tennessee cow-calf producers about terms and concepts related to beef cattle production. The study was designed also to determine what relationship certain personal and experience factors had to knowledge levels.

Thirty-eight terms were selected from two University of Tennessee Agricultural Extension Service publications, and a multiple choice test was constructed for the terms. Accompanying questions covered personal and experience factors. Tennessee beef cattle producers who were enrolled in the Tennessee Beef Cattle Improvement Program were tested. Survey forms were completed by mail and by personal interview, and 78 usable forms were returned.

There were significant relationships between test scores and years of formal education, whether the farmer had received any college of agriculture training, and the frequency with which farmers read Extension news articles. The mean percentage of correct answers for all questions was 86.6, indicating a high level of understanding. Correct answers ranged from a low of 42.3 per cent for a term concerning cattle feeding to a high of 100 per cent for three terms concerning cattle breeding and physiology.

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CHAPTER I

INTRODUCTION

Because of the increasing amount of new technical information available to farmers, it is important that agricultural communicators and farmers have a common understanding of this knowledge for effective communication to take place. If there is no clear mutual understanding of words or concepts, then there can be no exchange of information.

The purpose of this study is to find out to some degree how well Tennessee cow-calf producers understand some of the terms and concepts used in two University of Tennessee Agricultural Extension Service publications.

Berlo (1960) proposed a communication model which consists of the source, the encoder, the message, the channel, the decoder, and the receiver (see Figure 1). The source is a person or group of persons with a purpose, a reason for communicating. The purpose of the source is expressed in the form of a message. The encoder is responsible for taking the ideas of the source and putting them in a code, thus expressing the source's purpose in the form of a message. The channel in the communication model is a medium, or carrier of messages. Just as the source needs an encoder to translate his purposes into a message, the receiver, the target of communication, needs a decoder to retranslate the message into a form the receiver can use. In many instances, the source and the encoder are the same person. This also holds true for the receiver and the decoder.

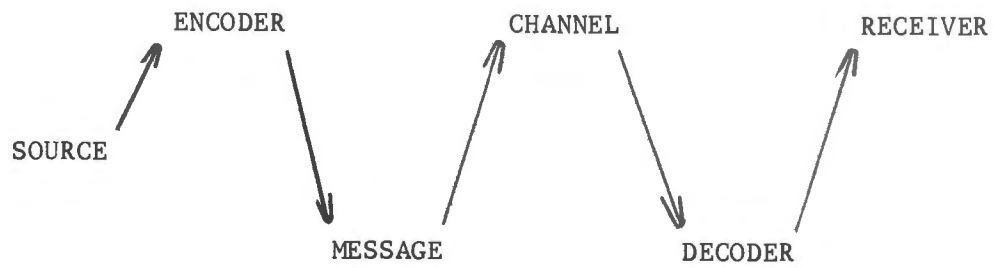


FIGURE 1
COMMUNICATION MODEL

The encoder, in order to effectively communicate, has four factors to consider, Berlo said. These factors are his communication skills, attitudes, knowledge levels, and his position within a social-cultural system. These factors also are applicable to the receiver.

It is obvious that the amount of knowledge a source has about his subject matter will affect his message. A source cannot communicate what he does not know; and he cannot communicate with maximum effectiveness if he does not understand the content of the message. On the other hand, if the communicator is highly trained and/or uses a highly specialized vocabulary he may encode the message in such a manner that the receiver cannot decode the message and does not understand him.

In considering the knowledge level of the receiver, it is apparent that if he does not know the code used for the message, he cannot understand the message. Also, if he does not know anything about the context of a message, he probably cannot understand it.

This study is concerned with the skill of decoding the written message. In writing, a communicator must have an adequate vocabulary to express his ideas accurately. He needs to use words that express his meaning most clearly to his intended receiver. Given the proper vocabulary, the communicator must put his written words together effectively--arranged so the meaning is clear.

More specifically, we are concerned here with communicating with farmer groups. Certain terms are unique to farmers, and certain terms are more specialized for different types of farmers. If an agricultural communicator does not know what the basic knowledge level is for a certain

farm group, he can only guess as to what new information he can and should provide, or to what extent more detailed explanation is necessary.

Also in planning agricultural information, a communicator should be aware of how factors such as his own attitudes, personal characteristics and his position within a social-cultural system are related to a farmer's knowledge of terminology and concepts. By knowing how these factors relate, the communicator can more accurately adjust his messages to fit his specific farmer audience.

In considering specific farm groups, beef cattle producers can be used as an example. Much of Tennessee's agriculture lends itself to beef cattle production, especially feeder calf production, because of the large areas in the state suitable only for grazing and for the production of other forages used in a beef cattle operation. This type of production is based on maintaining a brood cow herd and selling the calves as they are weaned from the cows. The calves are then taken to feedlots by the buyers where they are fed until they reach a desirable market grade. There should be a tremendous increase in the finishing of feeder calves based on a corn silage program. Research and experience have shown this operation to be profitable.

In 1956 the Tennessee Beef Cattle Improvement Program (TBCIP) was started to aid beef cattle producers in the state improve their net income by following selection procedures based upon accurate records of economically important traits. The acceptance of the program by cattle producers is attested by its steady growth from 12 breeders in 1956 to 188 breeders in 1969. Most of these farmers conduct a cow-calf operation on their farms and produce feeder calves.

Farmers participating in TBCIP were chosen as the group to test for knowledge levels in this study. The assumption was made that this group of cow-calf producers has a higher level of knowledge than is average for state-wide cow-calf producers. These farmers' calves are generally above average in their weaning weights. Also, these farmers actively seek more information about their beef cattle operations, as evidenced by their participation in TBCIP. The complete findings of this study cannot be applied generally to all cow-calf producers in the state, but if certain areas of knowledge in the test are poorly understood by the TBCIP farmers, then it could be assumed that average beef cattlemen would not understand some of these terms either. If it is found that agricultural communicators are not communicating with this test group, then it would be assumed that the other Tennessee beef cattle producers are not receiving the proper message in the communication process. On the other hand, if this study shows a very high level of knowledge about beef cattle terms and concepts, only more research in this area would give any evidence about the average beef cattlemen in the state. Of some importance in choosing this group to test is the fact that they have demonstrated their cooperativeness in trying to improve their herds and names and addresses were readily available for the study.

A study of this type, to determine knowledge levels, would help indicate if some of the words and concepts used in Extension publications are too difficult or too easy. If they are too difficult then it is obvious that more basic knowledge or detailed explanation must be provided. If the terms are too easy, then the writers could use more

technical terminology in their publications. More technical terminology would enable the writer to be more exact in his descriptions and word meanings. More time and space could be devoted to newer information based on existing knowledge levels.

It is hoped that some of the information in the study can serve as a guide for Extension personnel, agricultural communicators and leaders in the beef cattle industry in the preparation of educational information for beef cattle producers.

CHAPTER II

REVIEW OF LITERATURE

Sorenson (1957) tested Wisconsin farmers on their basic knowledge of soils. The farmers interviewed lived in the best farming areas of the state measured in terms of soil productivity. He assumed that the characteristics that influence soils knowledge also influence other general agricultural knowledge in a similar way.

Sorenson's questionnaire covered six areas of soils knowledge with from three to seven questions on each area. The six fields included nitrogen fixation, soils characteristics, fertilizer analysis, soil acidity and liming, fertilizer requirements, and general soils terminology.

He found that farmers understand concrete concepts much better than the abstract ones. For example, most know that sand dries out and warms up faster than clay and peat, but a low percentage understanding the meaning of pH. He also found that knowledge of certain commercial fertilizer facts was related to formal education, since farmers with less than a high school education had a low percentage of correct answers in this area of knowledge.

The biggest difference between high and low scoring farmers was in the amount of formal education and contacts with the Agricultural Extension Service.

Sorenson found that the most important factor affecting soils knowledge was amount of formal education. There was also a definite

relationship between the number of farm magazines read and soils knowledge as farmers who read a great deal (or took a large number of magazines) had a greater knowledge.

Factors that do not affect soils knowledge, according to Sorenson, are age and farming experience, type of farming, location, radio listening, ownership status and size of farm.

Frederick and Powers (1965) studied the comprehension levels of insecticide terms in an effort to find out how well actual and potential users of pesticides understand label wording on the containers. They chose 100 specimen labels and a readability analysis of 48 labels from the group was done using the Rudolph Flesch readability formula. A multiple-choice test was used to test knowledge of selected terms.

Among 83 adults tested, 40 per cent or more selected wrong meanings for five label terms; 14 phrases were unknown to 20 to 39 per cent of the group; and six terms were in the less than 20 per cent category.

Baxter (1967) chose 30 terms concerning swine production from a variety of sources and tested a group of Wisconsin swine producers. Level of education had the strongest relationship to test scores. There was also significant difference between age groups with those from 31 to 50 years of age scoring higher than those farmers over 50, and the 31 to 40 age group scoring higher than those 30 and younger.

Baxter also found that farmers who had 11 to 25 years of experience scored significantly higher than older ones with 26 years or more of experience. His analysis showed no difference for personal and experience factors in all of the other categories tested.

McGoogan (1959) conducted a test to determine to what extent Georgia Home Demonstration club members know and understand nutritional terms and concepts that have everyday usage. She also determined how various socio-economic factors relate to understanding of nutritional terms and concepts.

McGoogan found that club leaders did not differ significantly from non-leaders in average number of questions missed. Increased years of membership in the clubs meant fewer errors, as did higher education. Education was a factor of greater influence on test scores than years of membership. Home Demonstration club members with larger families scored higher than those with smaller families.

These previous studies show that level of formal education significantly affects knowledge levels of the groups tested. Age of those interviewed had some affect, as did Extension and farm magazine contacts, and farming experience.

CHAPTER III

EXPERIMENTAL PROCEDURE

Tennessee cow-calf producers participating in the Tennessee Beef Cattle Improvement Program (TBCIP) were chosen as the group to test in this study because of the previously stated reasons (page 5).

Eighty-three terms and phrases were chosen from two University of Tennessee Agricultural Extension Service publications. They were Publication 330, "Beef Cattle in Tennessee," and Publication 553, "How Good is Your Feed?" They were written generally for Tennessee beef cattle producers. Publication 330 deals with all phases of beef cattle production in the state, while Publication 553 covers the area of cattle feed evaluation and testing.

With the aid of University of Tennessee Extension animal husbandmen William P. Tyrrell and Haley M. Jamison, and after eliminating those terms that would not lend themselves to being tested with a multiple choice type test, the number of terms was reduced to 38.

A multiple choice type test was used for the terms because the purpose of the study was to find if the generally accepted meaning for the term or phrase would be selected. Franklin O. Leuthold of The University of Tennessee agricultural economics and rural sociology department helped in constructing answer choices for the terms. Supplementary questions preceded the actual test section in the questionnaire (see Appendix). These supplementary questions pertained to type of

ownership, age of farmer, size of farm, education, and other socio-economic factors that possibly could have some influence on test scores.

After the questions and answer choices had been worded and checked, the questions were arranged in a random order and the choices for each question were likewise randomly assigned. The questionnaire was pretested on 39 students enrolled in a senior level beef science course at The University of Tennessee. They were asked to take the test and then to make notations about any questions they thought to be poorly worded or misleading. Class members indicated that they would make no changes in the wording of the questions or answer choices, so the 38 terms and answer choices were left as they were. The results from the test on this group are given in Chapter IV. After each question in Chapter IV is summarized, the per cent of the students answering the question correctly is given.

The questionnaires were mailed to county Extension agents in May, 1969. The agents were instructed to administer the tests to the farmers in their counties that were participating in TBCIP. They were asked to explain what the test was about and to have the farmers complete the test without any assistance or references. County agents received 100 questionnaires.

In the counties where there were only one or two TBCIP participants, a personal letter with a questionnaire was sent to the farmers by the writer. The letter explained the purpose of the test and asked the farmers to take it with no outside help. Twenty-five individual farmers were contacted in this manner.

Fifteen farmers in the nearby Knoxville area were interviewed personally. The interviewer was generally well received and all the farmers were very cooperative. There was little misunderstanding about how to complete the multiple choice type test. Of the 140 questionnaires distributed, 78 usable ones were returned. It should be noted that a better response was obtained from the individually mailed questionnaires than from those mailed to county agents for distribution and return.

The resulting data were summarized and entered on IBM punch cards and analyzed by a one-way analysis of variance in order to partition variance components. Means were compared to see if they were significantly different at the 5 per cent level of probability according to the procedure outlined by Duncan (1955) and modified by Kramer (1957).

CHAPTER IV

RESULTS AND DISCUSSION

I. UNDERSTANDING OF INDIVIDUAL WORDS AND PHRASES

In the analysis some arbitrary standards were set to decide how well the terms and concepts were understood. If a question was answered correctly by 70 per cent or fewer of the farmers, then it fell in the poorly understood category. Questions that were answered correctly by 71 to 85 per cent of the farmers were put in the fairly well understood category; and questions that were answered correctly by 86 to 100 per cent of the farmers went into the well understood category.

For each question, the number of farmers selecting each alternative is given in the corresponding blank to the left of the choice. Also, the number of farmers not answering the question is noted. Per cent correct figures, rounded to the nearest tenth, for both farmers and the pretest student group are given beneath each question. The correct choice is underlined. The student group was not part of the study design, but results are reported as a matter of information.

1. Anaplamosis is:

- | | |
|-----------|--------------------------------------|
| <u>65</u> | <u>a disease which causes anemia</u> |
| <u>3</u> | a nutritional disease |
| <u>1</u> | a type of feed ingredient |
| <u>0</u> | a cattle insecticide |
| <u>9</u> | no choice |

Per cent correct - 83.3

(Pretest - 89.7)

Farmers indicated a fairly high understanding in selecting this simplified description of the cattle disease.

2. If a cow is settled, she is:

- 0 finished milking
- 0 grazing in pasture
- 78 pregnant
- 0 just had a calf
- 0 no choice

Per cent correct - 100

(Pretest - 89.7)

It is obvious that this well understood term needs no further explanation in Extension publications aimed at audiences similar to the one studied here.

3. The word gestation means:

- 6 the period a cow is giving milk
- 2 the time a cow is in heat
- 70 the period of pregnancy
- 0 the disease resistance of a cow
- 0 no choice

Per cent correct - 89.7

(Pretest - 100)

Gestation is another term that is well understood by these cow-calf producers.

4. A heat synchronization program is:

- 2 having heifers come into heat the first time
- 1 controlling barn temperature

- 0 securing uniform sized calves from the herd
- 72 having all cows come into heat at the same time period
- 3 no choice

Per cent correct - 92.3

(Pretest - 94.9)

This term was well understood by farmers (and students in the pretest). Baxter (1967), in testing the term estrus synchronization on Wisconsin swine producers, found that 76.7 per cent of the hog farmers understood the term.

5. If a feed is palatable, it:

- 3 is well balanced
- 1 has been finely ground
- 70 is well liked by the cattle
- 3 causes good growth
- 1 no choice

Per cent correct - 89.7

(Pretest - 94.9)

While the Tennessee feeder calf producers scored very well on this item, Baxter (1967) found that the Wisconsin swine producers had a 53.3 per cent correct on his term, palatability.

6. A cow's lactation period is:

- 5 just before calving
- 67 while she is milking
- 0 while she is being wintered
- 2 when she is in heat
- 4 no choice

Per cent correct - 85.9

(Pretest - 97.4)

This technical term was fairly well understood by the cow-calf producers.

7. Hybrid vigor is a result of:

- 1 inbreeding
- 0 artificial insemination only
- 67 crossbreeding
- 7 mutation of genes
- 3 no choice

Per cent correct - 85,9

(Pretest - 94,9)

This group of farmers was fairly knowledgeable about this concept of breeding. Baxter (1967) found that the Wisconsin swine producers scored only 48.7 per cent correct on this term.

8. The term crude protein means;

- 69 total protein content in the feed
- 6 protein digested or used by cattle
- 0 soybean protein
- 2 protein fed only to wintering cows
- 1 no choice

Per cent correct - 88,5

(Pretest - 92.3)

This well understood technical term needs little explanation to this group of selected farmers. Baxter (1967), however, found that only 50 per cent of the Wisconsin hog farmers understood the term.

9. A finishing program:

- 1 gets cattle ready for breeding
- 77 is used to fatten cattle for market
- 0 is used while calves are nursing
- 0 is culling cows with low production
- 0 no choice

Per cent correct - 98.7

(Pretest - 100)

This term is a well understood, practical feeding term.

10. Concentrates:

- 33 are grain and commercial feeds
- 0 are tightly packed feeds
- 43 are protein supplements
- 0 are grasses and hays
- 2 no choice

Per cent correct - 42.3

(Pretest - 89.7)

This poorly understood term needs further explanation to the farmers. More than half of the farmers chose protein supplements, which can be included in a concentrate ration. Perhaps the words, "commercial feeds" caused the confusion on this item. It was included as part of the answer because most of the feeds purchased commercially in Tennessee are grains and not forages.

11. Shrink is a term used to describe:

- 0 loss between the amount of feed eaten and gain
- 1 the discount the market uses to lower prices

75 weight loss due to shipping and handling

0 weight loss due to calving

2 no choice

Per cent correct - 96.2

(Pretest - 92.3)

The score on this term indicates that it is a well understood marketing term.

12. The term legume content concerns the:

1 energy content of a ration fed to cows in winter

0 amount of salt in a ration

12 ration of hay-to-concentrates in a ration

63 amount of nitrogen producing forages in cattle feed

2 no choice

Per cent correct - 83.3

(Pretest - 87.2)

This fairly well understood term shows that there is some misunderstanding about legumes and their nitrogen producing abilities in forages.

13. Restraining equipment;

2 grooming items for show preparation

75 devices used to hold cattle

0 equipment used to drive cattle

0 utensils used to strain milk after it leaves the farm

1 no choice

Per cent correct - 96.2

(Pretest - 97.4)

This term describing a management device is a well understood one.

14. Type in beef cattle is a term used to:

- 5 indicate the breed of an animal
- 0 estimate how much an animal will "dress out"
- 0 indicate the potential level of production
- 72 describe the conformation of an animal
- 1 no choice

Per cent correct - 92.3

(Pretest - 92.3)

This is a well understood term about animal conformation.

15. The term finish refers to:

- 5 the time beef animals are sold
- 55 the amount of exterior fat of an animal
- 0 the thickness of hair coat
- 17 the amount of intramuscular fat in a steer
- 1 no choice

Per cent correct - 70.5

(Pretest - 97.4)

This poorly understood question shows that there is some confusion among the farmers as to whether it is external or intramuscular fat that determines finish in cattle.

16. A beef animal's grade:

- 12 is a measure of how fat the animal is
- 0 is an indication of hair color
- 66 is an evaluation of the animal's conformation

0 indicates a mixture of two or more breeds

0 no choice

Per cent correct - 84.6

(Pretest - 64.1)

This fairly well understood term possibly needs to be defined more exactly for cow-calf producers. Grade fared less well on the test than did type, but its score was higher than that for finish.

17. An open heifer is:

78 a heifer which is not pregnant

0 a heifer kept on unlimited pasture

0 a heifer which is not purebred

0 a heifer not immune to preventive diseases

0 no choice

Per cent correct - 100

(Pretest - 94.9)

This well understood term was one of the easiest in the questionnaire.

18. Foundation animals are those which:

5 are from the same bloodline

66 are used in the farm herd to produce calf crops

0 are strong and eat well

5 are purebred cattle

2 no choice

Per cent correct - 84.6

(Pretest - 66.7)

The answers to this fairly well understood term indicate that there is some misunderstanding as to what constitutes foundation animals in the farm herd.

19. An animal that is said to be a carrier is one that:

- 72 has an undesirable recessive gene
- 3 is an unthrifty animal
- 1 is a dual-purpose animal
- 0 rides other cattle during heat periods
- 2 no choice

Per cent correct - 92.7

(Pretest - 97.4)

Perhaps past emphasis on eliminating dwarfism has led to good understanding of the concepts of carriers and recessive genes.

20. Estrus describes:

- 3 the period just before a cow has a calf
- 3 a cow which can't conceive
- 66 the period during which a cow can conceive
- 0 a cow's temperature during a specific period
- 6 no choice

Per cent correct - 84.6

(Pretest - 100)

Although estrus was fairly well understood, a 100 per cent correct score was achieved on the term heat, a synonym for estrus. This suggests that the use of a less technical term would increase understanding or that the more technical term needs more explaining.

21. Protein supplement is:

- 0 used to flush an animal
- 77 an added amount of feed which is high in protein content
- 0 a heavy feeding of grass hay
- 1 a comparison of the amount of protein to the amount of carbohydrates
- 0 no choice

Per cent correct - 98.7

(Pretest - 94.9)

This question indicates that the farmers know what a protein supplement is, but it doesn't tell what farmers know about adding protein supplements to cattle rations.

22. The term hand breeding means:

- 0 breeding when cow is not in heat
- 7 use of artificial insemination
- 5 to be selective of the bull used to breed the cow
- 65 keeping a bull in a separate pen in order to serve a cow a minimum number of times
- 1 no choice

Per cent correct - 83.3

(Pretest - 51.3)

The confusion about this fairly well understood term may have come from the idea that being selective of the bull used was all that is involved. Most of the farmers knew, however, that the bull must be kept in a separate pen.

23. The term full feed means;

- 3 that an animal is fed several times a day at specified intervals.
- 73 allowing an animal to have access to all the feed he will eat without being harmful
- 1 that a group of steers is being fed out in a feedlot
- 1 that an animal is on pasture with no other feed
- 0 no choice

Per cent correct - 93.6

(Pretest - 89.7)

Scores on this item show that the farmers well understood this feeding term.

24. A beef herd that has sufficient bull power is one that has:

- 5 bulls that have sufficient size for their age
- 0 bulls with known pedigrees
- 0 purebred and registered bulls
- 73 the proper ratio of bulls to cows
- 0 no choice

Per cent correct - 93.6

(Pretest - 92.3)

This group of farmers seems to have a very good idea of the importance of the proper ratio of bulls to cows.

25. Parturition is a term used to describe:

- 6 immunity to a disease
- 63 giving birth

- 1 a beef cow that is barren
- 0 an animal that has died while giving birth
- 8 no choice

Per cent - 80.8

(Pretest - 100)

Although fairly well understood, calving, a synonym for parturition, was tested with 100 per cent of the farmers answering correctly. This also suggests that the use of a less technical term would increase understanding.

26. The word heat:

- 0 is a cow's temperature variation
- 78 indicates the period during which a cow can conceive
- 0 describes a cow which can't conceive
- 0 is the period just before a cow calves
- 0 no choice

Per cent correct - 100

(Pretest - 100)

This well understood term obviously needs no further explanation to this group of farmers.

27. Colostrum is:

- 0 an important cattle disease
- 1 a genetic freak
- 0 a vaccination process involving a waiting period
- 75 the milk a cow gives at calving
- 2 no choice

Percent correct - 96.2

(Pretest - 100)

Scores indicate that this term is well understood.

28. An emasculator is:

- 0 an immunity produced by the use of a bactrin
- 1 an appearance of an animal covering up a disease
- 1 a sterile bull
- 70 an instrument with serrated cutting edges used in animal surgery
- 6 no choice

Per cent correct - 89.7

(Pretest - 97.4)

Farmers well understood the description of this piece of equipment.

29. Creep feeding is the process of:

- 75 giving young animals extra feed prior to weaning
- 0 feeding animals at regular intervals
- 1 force-feeding an animal for maximum gains
- 2 feeding a high level of grain
- 0 no choice

Per cent correct - 96.2

(Pretest - 97.4)

This feeding term was well understood by the cow-calf producers.

30. Nondescript calves are those that:

- 4 are crossbred calves
- 69 don't fit in a standard grade

- 1 are infested with internal parasites
- 0 are not dehorned
- 4 no choice

Per cent correct - 88.5

(Pretest - 51.3)

The only confusion about this well understood term is that some of the farmers confused crossbred with nondescript. Farmers fared much better than students on this question.

31. Malignant edema is:

- 25 a disease affecting fertility
- 0 a type of test for pregnancy checks
- 41 a disease caused by a wound infection
- 0 a genetic freak
- 12 no choice

Per cent correct - 52.6

(Pretest - 51.3)

32. Leptospirosis is:

- 64 a disease that often causes abortions and death in cattle
- 7 a disease that affects the leucocyte level of the blood
- 1 a genetic freak
- 2 a condition caused by internal parasites
- 4 no choice

Per cent correct - 82

(Pretest - 100)

These two questions, poorly understood and fairly well understood, respectively, show that although the farmers knew the terms referred to diseases, they didn't know the causes or symptoms of the diseases.

33. A balanced ration is one that:

- 0 is self feeding
- 1 is weighed prior to feeding
- 7 has an equal amount of concentrates and roughages
- 70 has correct nutrient amounts to satisfy an animal's feed needs
- 0 no choice

Per cent correct - 89.7

(Pretest - 100)

Cattle feeding knowledge is demonstrated in this well understood term.

34. The term TDN is used to indicate:

- 1 a disease that commonly causes reproductive failure
- 66 amount of total digestible nutrients in a ration
- 7 a measure of the total daily nutrients
- 1 total immunization to common diseases
- 3 no choice

Per cent correct - 84.6

(Pretest - 100)

A fairly good understanding was indicated on this term. This question did not truly test for the meaning of TDN, but only showed that most of the farmers knew what the initials stand for.

35. The term early maturing describes an animal:

- 52 that goes to market or can reproduce at an early age
- 1 whose carcass is more tender
- 4 that is early weaning
- 19 that fattens quickly
- 2 no choice

Per cent correct - 66.7

(Pretest - 82.1)

Farmers showed that they understood this term poorly. Although early fattening enters into the concept of early maturing, the first choice is the most complete.

36. Failure to conceive means that:

- 0 an animal fails to become immune
- 9 an animal is incapable of reproducing
- 0 an animal fails to breed while nursing a calf
- 68 an animal doesn't become pregnant
- 1 no choice

Per cent correct - 87.2

(Pretest - 92.3)

Although a well understood term, there is some confusion about whether it referred to an animal's being incapable of reproducing or failing to become pregnant.

37. Calving percentage is computed as:

- 53 the number of calves divided by the number of cows
- 0 the proportion of multiple births in a cow herd in a given year

- 19 the number of calves born that survive to weaning age
4 the number of calves born which are sold
2 no choice

Per cent correct - 67.9

(Pretest - 79.5)

Only one computation was actually given in the answers, but the cow-calf producers still showed poor understanding of this term. Most of the farmers missing the question apparently were thinking of how many calves they would sell, rather than how many they would have born.

38. Calving is a term used to describe:

- 78 giving birth
0 barren beef cows
0 death caused by giving birth
0 disease immunity
0 no choice

Per cent correct - 100

(Pretest - 100)

This easy to answer question further points out the advantage of using a synonymous term for a more technical one. While 100 per cent of the cow-calf producers answered this question correctly, only 80.8 per cent knew the meaning of the synonym, parturition.

II. SIGNIFICANT RELATIONSHIPS

A one-way analysis of variance showed significant differences between test scores and three of the personal and experience characteristics covered in the preliminary questions.

These characteristics found to significantly affect test scores were years of formal education, whether the farmer had had any college or agriculture training, and the frequency with which he reads Extension educational news articles.

Farmers who had 16 or more years of formal education scored significantly higher than those having 11 years or less. The cow-calf producers that had from 12 to 15 years of formal education scored significantly higher than those having eight years of formal education. No significant differences were revealed among the other education levels tested.

The farmers who at one time or another had received some college of agriculture training scored significantly higher than those farmers never receiving this kind of training.

In comparing scores with how frequently the farmers read Extension educational material, the farmers who said they read Extension news articles frequently scored significantly higher than those indicating they read the articles only seldom (see Table I).

The analysis of variance showed no significant relationship between test scores and these following characteristics:

1. Whether the individual farmed by himself or with another person.
2. Experience factors--whether the person had farmed all his life, whether he always raised beef cattle, whether he was a full-time farmer.
3. Age.

TABLE I
FACTORS RELATED TO SIGNIFICANT DIFFERENCES IN MEAN
UNDERSTANDING SCORES

Factors	N	Mean Number of Correct Answers
EDUCATION		
a. 7 years or less	2	28.5
b. 8 years	3	24.3
c. 9-11 years	3	30.7
d. 12 years	24	32.3
e. 13-15 years	14	32.9
f. 16 or more years	32	34.7
FREQUENCY OF READING EXTENSION ARTICLES		
a. Seldom	2	25.5
b. Occasionally	8	29.4
c. Regularly	23	31.9
d. Frequently	45	34.4
COLLEGE OF AGRICULTURE TRAINING		
a. Had training	27	35.2
b. Did not have training	51	31.7

4. Acres of land operated.
5. Number of beef cows.
6. Total livestock productive man work units.
7. Total farm productive man work units.
8. County Extension agent contacts.
9. Vocational Agriculture and 4-H training.
10. Membership in organizations (livestock, civic, fraternal).
11. Level of living.
12. Use of Extension publications.
13. Local cosmopolitan leadership scores (based on a score developed from answers to questions 17 through 19) (see Appendix).

The numbers of farmers in each of the above classifications are reported in the Appendix.

III. UNDERSTANDING ACCORDING TO GENERAL AREAS OF BEEF

CATTLE PRODUCTION

The questions used in the test can be divided into five subject matter areas. These areas are diseases, feeding and nutrition, marketing, breeding and physiology, and management. Since these categories did not lend themselves to statistical analysis because of the small number of terms, only the means of the percentages of the farmers answering correctly will be compared in each category (see Table II).

Comparisons of these means seem to indicate that the questions on marketing were the best understood as a group. Following marketing are the management questions. The breeding and physiology category falls

TABLE II
AREAS OF KNOWLEDGE COVERED IN QUESTIONNAIRE

Area and Question Numbers in Area	Mean Percentage of Correct Answers
Marketing-11, 16, 30	89.77
Management-13, 22, 24, 27, 28, 37	88.82
Feeding and nutrition-5, 8, 9, 10, 12, 15, 21, 23, 29, 33, 34	85.03
Breeding and physiology-2, 3, 4, 6, 7, 14, 17, 18, 19, 20, 25, 26, 35, 36, 38	83.49
Diseases-1, 31, 32	72.63

into the fairly well understood area, while the diseases section is almost low enough to be in the poorly understood category.

The study reveals some misunderstanding about several of the 38 beef cattle terms and concepts, but there was generally a high level of knowledge displayed by the farmers. The mean score for the entire test for all farmers was 32.94 out of a possible 38.

As stated previously, three categories of degree of understanding were designated. These were poorly understood, fairly well understood, and well understood.

Three terms were related to the cattle diseases. One was poorly understood and two were fairly well understood (see Table III).

Eleven terms and phrases related to feeding and nutrition. Two were poorly understood, two were fairly well understood, and seven were well understood (see Table IV).

Three terms were related to the marketing of beef cattle. One was fairly well understood and two were well understood (see Table V).

Fifteen terms were related to the breeding and physiology of beef cattle. Only one was poorly understood, while three were fairly well understood. Eleven of the terms were well understood (see Table VI).

Six terms were related to beef cattle management practices. One question was poorly understood, one was fairly well understood, and four were well understood (see Table VII).

TABLE III
CATEGORIES OF UNDERSTANDING FOR DISEASES TERMS

POORLY UNDERSTOOD		FAIRLY WELL UNDERSTOOD	
Question	Per Cent Correct	Question	Per Cent Correct
31-Malignant edema	52.6	1-Anaplasmosis	83.3
		32-Leptospirosis	82.0

TABLE IV
CATEGORIES OF UNDERSTANDING FOR FEEDING AND NUTRITION TERMS

POORLY UNDERSTOOD		FAIRLY WELL UNDERSTOOD		WELL UNDERSTOOD	
Question	Per Cent Correct	Question	Per Cent Correct	Question	Per Cent Correct
10-Concentrates	42.3	12-Legume	83.3	5-Palatable	89.7
15-Finish	70.5	content		8-Crude protein	88.5
		34-TDN	84.6	9-Finishing	
				program	98.7
				21-Protein	
				supplement	98.7
				23-Full feed	93.6
				29-Creep	
				feeding	96.2
				33-Balanced	
				ration	89.7

TABLE V
CATEGORIES OF UNDERSTANDING FOR MARKETING TERMS

FAIRLY WELL UNDERSTOOD		WELL UNDERSTOOD	
Question	Per Cent Correct	Question	Per Cent Correct
16-Grade	84.6	11-Shrink	96.2
		30-Nondescript calves	88.5

TABLE VI
CATEGORIES OF UNDERSTANDING FOR BREEDING AND PHYSIOLOGY TERMS

POORLY UNDERSTOOD		FAIRLY WELL UNDERSTOOD		WELL UNDERSTOOD	
Question	Per Cent Correct	Question	Per Cent Correct	Question	Per Cent Correct
35-Early maturing	66.7	18-Foundations animals	84.6	2-Settled	100
		20-Estrus	84.6	3-Gestation	89.7
		25-Parturition	80.8	4-Heat	92.3
				synchronization	
				6-Lactation period	85.9
				7-Hybrid vigor	85.9
				14-Type	92.3
				17-Open heifer	100
				19-Carrier	92.3
				26-Heat	100
				36-Failure to conceive	87.2
				3-Calving	100

TABLE VII
CATEGORIES OF UNDERSTANDING FOR MANAGEMENT TERMS

POORLY UNDERSTOOD		FAIRLY WELL UNDERSTOOD		WELL UNDERSTOOD	
Question	Per Cent Correct	Question	Per Cent Correct	Question	Per Cent Correct
37-Calving percentage	67.9	22-Hand breeding	83.3	13-Restraining equipment	96.2
				24-Sufficient bull power	93.6
				27-Colostrum	96.2
				28-Emasculator	89.7

CHAPTER IV

SUMMARY

As stated in the introduction to this study, it is important that agricultural communicators be aware of the knowledge levels of their audiences in order to communicate effectively. The study gives some indication of the knowledge levels of a specific group of Tennessee cow-calf producers whose herds are enrolled in the Tennessee Beef Cattle Improvement Program.

The study indicates that the general knowledge level of these farmers is relatively high, but it does not give a good indication about knowledge levels of the entire population of Tennessee cow-calf producers, since a selected audience was chosen instead of a sample of all Tennessee cow-calf producers.

The majority of the terms were well understood by the farmers, while a few were poorly understood. Perhaps agricultural communicators should offer alternative terms or further explanations for the poorly understood terms and concepts.

Factors found to influence scores significantly were years of formal education; whether the farmers had had any college of agriculture training, which is closely related to years of formal education; and the frequency with which the farmers read Extension news articles. None of the other attitude, personal characteristics, or social-cultural factors were significantly related to test scores.

In considering the various areas covered in the test, it seems that more education and explanation are needed in the area of cattle diseases. This section had the lowest per cent correct answers of all sections. Marketing and management questions were the best understood, suggesting that little further explanation is needed for audiences similar to the one used in this study.

The feeding and nutrition and the breeding and physiology sections fell between the above mentioned sections, and this suggests that some further work is needed in these areas, but not as much as in diseases. It should be pointed out however, that these areas could not be tested for significant differences because of the small numbers in each category.

Some suggestions that can be made from this study are that new beef cattle information should be based on existing knowledge levels and that less technical terms can be substituted for more technical ones until farmers are well educated about the more technical ones. Perhaps glossaries should be used more or the technical term could be given immediately following the non-technical one, such as calving (parturition). Farmers with less education need more explanation about terminology commonly used in agricultural communications. The use of less technical terms would help these farmers better understand beef cattle information. The study suggests also that more research is needed in the area of farmer knowledge of beef cattle terms and most likely in all the other areas of agriculture. Agricultural communicators need to know the knowledge levels of all their audiences in order to communicate more effectively.

It is the job of the agricultural communicator to dispense information in such a manner as to be within the receiver's knowledge levels and to educate him about new, more technical terms and concepts.

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APPENDIX

SURVEY OF COW-CALF PRODUCERS

Information Department
Institute of Agriculture
University of Tennessee

Name: _____

1. Do you operate your farm with another person(such as father, son, brother, etc.)?

☐-No ☐-Yes: Explain arrangement and with whom _____

2. Have you farmed all your life (excluding military service or part-time jobs)?

☐-Yes ☐-No: How many years have you worked off the farm? _____

3. Are you a full-time farm operator?

☐-Yes ☐-No: Indicate type of part-time work
and approximate hours per week _____

4. Have you always raised beef cattle?

☐-Yes
☐-No, but have for past five years
☐-No, but less than five years: How many years? _____

5. What is your present age? _____

6. How many years of school did you complete? _____

7. How many total acres does your farm contain (both owned and rented land)? _____
a. How many acres are in crops? _____
b. How many acres in pasture land? _____

8. Indicate below the number of livestock you have. (CHECK the boxes for livestock enterprises you do NOT have)

☐-No Beef
____ Number of beef cows
____ Number of feeders fed out
during the past year
____ Number of beef heifers
____ Number of other beef
Indicate _____

☐-No Dairy
____ Number of dairy cows
____ Number of heifers
____ Number of other dairy
Indicate _____

☐-No Swine
____ Number of sows
____ Number of feeder pigs
fed out during past year
____ Number of other swine
Indicate _____

☐-No Sheep
____ Number of ewes
____ Number of lambs fed out during
past year
____ Number of other sheep
Indicate _____

Other livestock:
____ Number: Indicate kind _____
____ Number: Indicate kind _____
____ Number: Indicate kind _____

9. Did you have any College of Agriculture training?

☐-No ☐-Yes: How many years? _____

10. How many times in the past year did you talk to a county Extension agent about some farm problem? _____

11. How often do you read or hear Extension articles, releases and other Extension material?

☐-Frequently
☐-Regularly
☐-Occasionally
☐-Seldom

12. Did you have Vocational Agriculture training in high school?

☐-No
☐-Yes: How many years? _____ Did you have a beef enterprise? _____

13. Did you have any 4-H training?

☐-No
☐-Yes: How many years? _____ Did you have a beef project? _____

14. Of what organizations are you a member?

☐-Farm Bureau
☐-N. F. O.
☐-Tennessee Farmers Co-Op.
☐-Lodge
☐-Livestock breed associations
☐-Other: Indicate _____

15. Indicate the following home items you have.

☐ -Home freezer	☐ -Flush toilet
☐ -Electric clothes washer	☐ -Dishwasher
☐ -Electric or gas dryer	☐ -Air conditioner in home
☐ -Color television	☐ -Air conditioner in car
☐ -Piped-in water	

16. Indicate which of the following U-T Agricultural Extension Service publications you have used?

- ☐-Beef Cattle In Tennessee
☐-Tennessee Beef Cattle Calendar
☐-Let's Go SOLO
☐-TBCIP *What it is *How it works
☐-Summer Feed
☐-How Good Is Your Feed?

17(a). How frequently would you say that you discuss with other farmers those farm practices you have found to be successful?

- ☐-Never ☐-At least once a month
☐-Less than once a year ☐-At least once a week
☐-A few times per year

17(b). As compared to most farmers you know, would you say you are more likely or, less likely to be asked for advice about new farming practices?

- ☐-Less
☐-About the same
☐-More

17(c). Would you say you are generally regarded by your neighbors as a pretty good source of ideas about new farming practices?

- ☐-No
☐-About the same
☐-Yes

17(d). How frequently do you travel 20 miles or more to discuss new farming ideas with other farmers?

- ☐-Never ☐-A few times per year
☐-Less than once a year ☐-At least once a month

18. Have you ever traveled outside of Tennessee to obtain and discuss new farming ideas?

- ☐-No
☐-Yes: Where? When? _____

19. Have you ever talked about a farm problem with a person from a college of agriculture or Institute of Agriculture at the University of Tennessee?

- ☐-No
☐-Yes: Who? When? _____

OPINION LEADERSHIP AND PMWU CALCULATIONS:

Opinion Leadership

Question 17a: never-0; less than 1/yr.-1; few times/yr.-2;
at least 1/month-3; at least once/week-4

17b: less-0; about the same-1; more-2

17c: no-0; about the same-1; yes-2

17d: never-0; less than 1/yr.-1;
few times/yr.-2; at least once/month-3

18: no-0; yes, only once-1; yes, two or more-2

19: no-0; yes, only one-1; yes, two or more-2

PMWU

Crops: 0.8 times acreage

Pasture: 0.4 times acreage

Dairy cattle: 10.0 times number of cows
1.5 times number of heifers

Beef cattle: 2.0 times number of cows and bulls
1.0 times number of feeders and heifers

Swine: 2.5 times number of sows and boars
0.2 times number of mkt. hogs

Sheep: 1.0 times number of ewes and rams
(goats)

Poultry: 7.0 times each 100 laying hens
1.5 times each 1,000 broilers

TABLE VIII
FACTORS NOT HAVING SIGNIFICANT RELATIONSHIPS WITH SCORES

Factors	N
Type of farming arrangement:	
Farmed with himself	47
Farmed with father (father-in-law)	10
Farmed with son (son-in-law)	12
Farmed with brother	4
Farmed with other person	5
Experience factors:	
Farmed all life	46
Been off farm 5 years or less	5
Been off farm 6 years or more	27
Full time farmer	41
Works off farm 20 to 39 hours per week	7
Works off farm 40 or more hours per week	30
Always raised beef cattle	45
Raised beef cattle for past five years	29
Raised beef cattle less than five years	4
Age of farmers:	
Under 25 years	3
25 to 29 years	3
30 to 34 years	7
35 to 39 years	6
40 to 44 years	13
45 to 49 years	13
50 to 54 years	13
55 to 59 years	9
Older than 60 years	11
Size of farm:	
0-99 acres	9
100-199 acres	14
200 to 499 acres	34
500 or more acres	21

TABLE VIII (continued)

Factors	N
Number of beef cows in herd	
0 to 29 cows	13
30 to 74 cows	32
75 to 149 cows	25
150 or more cows	8
Livestock productive man work units:	
0 to 99 PMWU's	18
100 to 199 PMWU's	21
200 to 299 PMWU's	16
300 to 399 PMWU's	13
400 to 999 PMWU's	6
More than 1000 PMWU's	4
Total farm productive man work units:	
0 to 99 PMWU's	6
100 to 199 PMWU's	14
200 to 299 PMWU's	11
300 to 399 PMWU's	12
400 to 999 PMWU's	27
More than 1000 PMWU's	8
Times talked to county agent in past year	
0 to 9 times	27
10 to 19 times	32
20 to 29 times	14
30 or more times	5
Vocational Agriculture and 4-H training:	
Did not have Vo-Ag training	41
Had Vo-Ag training, but no beef enterprise	22
Had Vo-Ag training and had beef enterprise	15
Did not have 4-H training	45
Had 4-H training, but no beef project	12
Had 4-H training and had beef project	21

TABLE VIII (continued)

Factors	N
Membership in organizations:	
Member of one organization	7
Member of two organizations	20
Member of three organizations	23
Member of four organizations	24
Member of five organizations	2
Member of six organizations	2
Level of living:	
Had four of the home items	6
Had five of the home items	10
Had six of the home items	15
Had seven of the home items	18
Had eight of the home items	18
Had nine of the home items	11
Opinion leadership scores:	
Local scores	
two	3
three	10
four	15
five	11
six	19
seven	8
eight	12
Cosmopolitan	
zero	2
one	4
two	3
three	12
four	15
five	13
six	19
seven	10

VITA

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While an undergraduate, he was initiated into Alpha Zeta and Alpha Gamma Rho Fraternities and Block and Bridle Club. He is a commissioned officer in the Tennessee Air National Guard,

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