

# Methodology and Procedures in Field Trials in Dairy Science

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## Abstract

During several field trials with dairy cattle, experience has been gained concerning the criteria for selection of herds, owners, and experimentalists in this type of research. The potential cow loss and participant dropout during an experiment also are indicated. General procedures are suggested to increase the number and reliability of inferences which can be drawn from field trials.

## Introduction

Field trials with cows in cooperating dairymen's herds have an advantage over experiment station trials because large numbers of high-producing cows under a wide range of natural environmental conditions increase the applicability of the results to farm conditions. The educational benefits of working with dairymen, veterinarians, and extension agents in a research context during field trials is an important dividend in this type of research. Members of the Animal Science Department at Cornell University have been involved in several field trials during the past five years (1, 2, 4, 5), and two are currently in progress. We have assembled some of the techniques and procedures useful in this type of research.

## Experimental Procedures

### A. General guidelines.

1. Make the experiment large enough in number of cows, replications, etc., that definite conclusions can be drawn. Gill (3) has shown that large numbers of experimental units are necessary to detect small differences. If additional cows will not be added to the experiment as they enter the herd, start with many more cows than are needed to complete the experiment. There is a 25% turnover in cows each year in Dairy Herd Improvement herds. Dairymen drop out and some herds are dispersed, resulting in a loss of 20 to 50% of the original participants.
2. Keep the experimental design as simple as possible. Two treatments should be maximum in most commercial herds. A control group is essential in all trials. At the beginning of the experiment set up the model and statistical analysis to analyze the data and estimate the parameters of interest.
3. Keep the procedural change by the dairymen as simple as possible. The loss of participants will be closely related to the length of the study, the inconvenience of experimental details, and the amount of benefit observed by the dairymen from the treatment imposed.
4. Devise a simple data-recording system which can be summarized weekly or monthly to keep a careful monitor on the progress of the experiment. In addition, set up at the beginning of the experiment, acceptable edit limits and checking procedures to monitor the performance of individuals collecting the data and the willingness of dairymen to continue to follow experimental procedures.
5. Select experimentalists to collect the data on their ability to work with dairymen without antagonizing them. The attitude of the experimentalist toward experimental procedures and accuracy in data reporting is important, because dairymen rapidly acquire the attitude of the experimentalist toward the importance of experimental details.
6. Visit the dairymen as often as necessary to keep them convinced of your continued interest, concern, and desire to stay abreast of developments related to the experiment.
7. Select treatments for field testing likely to increase performance over current control methods. Avoid any treatment which might harm the productivity or longevity of cows unless compensation is specified at the beginning of the experiment.
8. Even though DHI supervisors may have

- no direct involvement in the experiment, send them a description of the rationale for the experiment and general procedures. This will acknowledge that without their contribution through the testing program, this field experimentation would not be possible.
9. Enlist the good will of the herd veterinarians by sending them a description of the experiment and procedures.
- B. Select counties in which to work by the following criteria.
1. A large cow population on DHI test if a large number of restrictions will be placed upon the participating herds.
  2. Proximity to the experiment station if considerable travel to the herds is anticipated.
  3. The willingness of the Extension Agent to become involved in research and to accept it as an integral part of his extension program.
- C. Selection of participating dairymen.
1. Because response in milk production will usually be one of the parameters needed, work with herds enrolled in a DHI program (computer processed) and whose owners agree to remain on the testing program through the duration of the study. It may also be useful to summarize information on previous performance; therefore, stipulate that the herds have been on DHI for at least one year.
  2. A minimum herd size may be set to attain large numbers of cows with a modest number of participating dairymen.
  3. In view of the need to obtain research data from high-producing cows, a minimum rolling herd average should be one criterion for selecting herds.
  4. Unless there will be no interaction between breeds and treatments, select only a single breed, or measure interaction.
  5. If responses involve breeding records or measurements from them, only dairymen who keep accurate breeding records with cow identification and report these data on their DHI barn sheets should be selected.
  6. If information (in addition to production) from the DHI monthly report is an important part of the experiment, the performance of the DHI supervisor should be checked for accuracy and reliability.

7. A listing of the herds which meet the mentioned restrictions from the desired counties may be obtained through special request from the Dairy Records Processing Laboratory.
8. Avoid the use of "show herds" and those dairymen who emphasize the sale of breeding stock regardless of their willingness to participate because of overemphasis on individual cow performance.
9. Avoid herds known to have labor-management problems; best experimental performance is usually in owner-operator herds.

From lists of dairymen who meet the criteria of the experiment, ask the Extension Agents to contact potential participants interested in this study. For those interested, further discussion and explanation should take place during a visit by the Agent and research personnel. During this interview, determine the attitude of the dairymen regarding the questions to be answered by the research. Dairymen who do not recognize a problem exists, who feel they know the answers, or who do not recognize the need and appropriateness of experimentation on the farm should be avoided.

During the explanation of the procedure to the dairymen, speak to all people who are involved with the cows, including the herdsman, milkers, any children, and the dairyman's wife. Convince everyone associated with the herd of the validity of the experiment.

Progress reports during the experiment maintain interest, especially if the experiment is a multilactation experiment.

Upon completion of the experiment, the data should be summarized as quickly as possible, and the results and conclusions should be sent promptly to all participants whose cooperation made the experiment possible.

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## MEMORIALS

### Arthur Chester Ragsdale 1891-1969

Arthur Chester Ragsdale, Professor Emeritus and former chairman of dairy husbandry, University of Missouri, died July 22, 1969, at Boone County Hospital, Columbia, Missouri, at the age of 78. Funeral services were held July 24 at the Christian Church, Columbia.



A. C. Ragsdale

As a native Missourian, he was reared on a farm near Aurora. After graduating from Aurora High School, he entered the College of Agriculture, University of Missouri. He received the B.S. degree in agriculture in 1912.

After graduation from the University of Missouri his first job was that of assistant herdsman, Brook Hill Farms, Genesee Depot, Wisconsin. Later that same year he became dairy foreman of the Bennett Ranch, Kimball, Nebraska. He then served as instructor in animal husbandry at the New Jersey State College of Agriculture, 1913-15, and as instructor in dairy husbandry, University of West Virginia, 1915-16. In September 1916 he returned to the University of Missouri as extension assistant professor of dairy husbandry and on April 1, 1919, he became professor and chairman, department of dairy husbandry, University of Missouri, which position he held since that date. On his retirement September 1, 1961, he completed 45 years of service with the University, of which 42 years and 5 months were as department chairman.

Dr. Ragsdale received his M.S. degree from the University of Wisconsin in 1925. He was awarded a D.Sc. by Culver-Stockton College in 1957.

He served as president of the American Dairy Science Association, 1944-45; on its board of

directors, 1944-46; and as chairman of the extension section, 1918-19; the production section, 1926-27; and of the official testing section, 1928-30. He was an official delegate of the United States Department of State to the International Dairy Congress at the Hague, Netherlands, in 1953; in addition he spent three months visiting educational and research institutions in nine European countries. He was a member of many scientific and professional societies, including the American Dairy Science Association, American Society of Animal Production, American Association for the Advancement of Science, International Association of Milk, Food and Environmental Sanitarians, and was a member and director of a number of Missouri dairy and agricultural organizations. He was a member of Alpha Zeta, Gamma Sigma Delta, Sigma Xi, Alpha Gamma Rho Fraternity, and Rotary.

In his 45 years of service to the dairy industry of Missouri, Doctor Ragsdale had been the author or co-author of a dairy laboratory manual, 35 research bulletins, 24 Station bulletins, 15 Station or Extension circulars, and 64 papers published in scientific journals.

During Dr. Ragsdale administration of the department of dairy husbandry, 77 Ph.D. and 192 M.S. degrees were awarded. Twenty-one of these graduates have headed dairy departments in 18 states. He helped establish the Hatch Experimental Station in Hannibal, Missouri, and the Foremost Guernsey Farm at Columbia, which is part of the University's agriculture experimental work.

Despite the heavy demands on Professor Ragsdale's time and services in connection with his University services and responsibilities, he found time for a variety of civic and church activities. These included the offices of elder; chairman, division of finance; treasurer, chairman of the trustees; superintendent of the church school; president of both the Missouri and National Christian Men's Fellowship; a member of the National Laymen's Advisory