

Kentucky FARM AND HOME *Science*

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READ—

**Kentucky
Research Results
In Brief**

**Half-brother
Steers Speed Up
Research**

**Ham Aging
Methods
Studied**

Kentucky FARM AND HOME Science

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KENTUCKY AGRICULTURAL EXPERIMENT STATION

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The Cover



These steers are a portion of the 80 half-brother steers sired by T R Zato Heir 181 that were used in beef feedlot research during this past year at the University of Kentucky Agricultural Experiment Station's Coldstream Farm. The use of half-brother steers saves time and money because it is possible to learn small—but real—differences due to tested items with fewer steers and less repetition of research.

Kentucky Research Results in Brief

By FRANK B. BORRIES, JR.

TOBACCO RESISTANT TO GREEN PEACH APHID IS SOUGHT

U.K. Agricultural Experiment Station entomologists are continuing a program to help develop burley varieties resistant to the green peach aphid.

This aphid is a sap-sucking insect which can damage leaves. It also can transmit some diseases, which are not too important here at present but are potentially harmful.

Richard Thurston, entomologist, is using three avenues of research. One is the use of burley, dark, cigar, and flue-cured varieties to check on resistance to the aphid. A second is the use of several hundred foreign tobaccos, some of which also are resistant. The third is the use of some wild species of tobacco (*Nicotiana*) which are resistant.

Plant selections of foreign tobaccos have shown more resistance than selections of the standard burley varieties, Thurston said. Crosses of these foreign tobaccos with the burley plants have shown intermediate resistance. The wild species, when crossed with to-

bacco, have not transmitted the formers' high resistance to this aphid. However, resistant selections and crosses with resistance from all three areas are being carried on.

* * * *

PROPERTIES OF TOBACCO PLANTS BEING STUDIED BY ENGINEERS

What's a tobacco stalk?

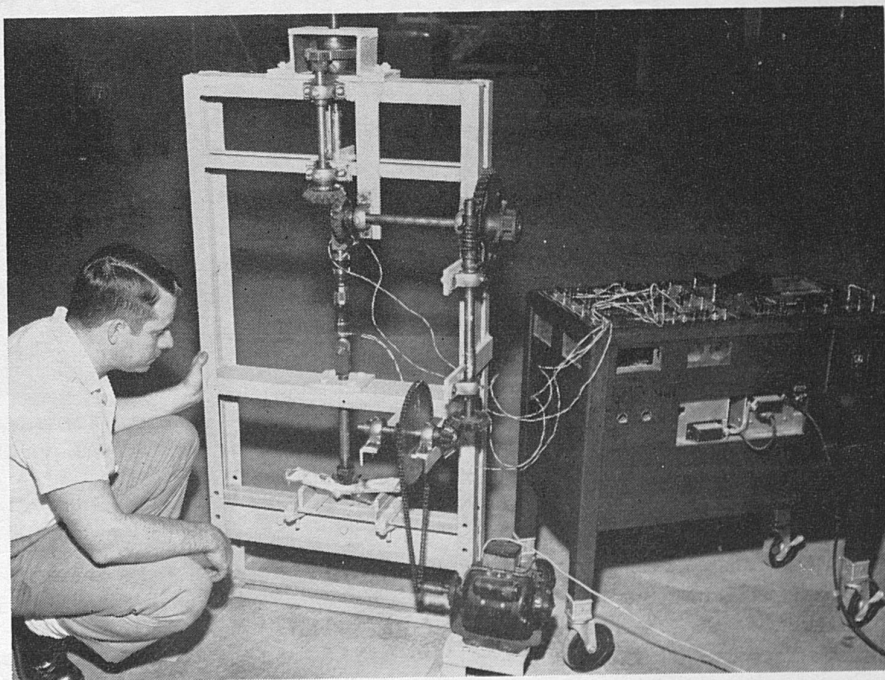
To many Kentucky farmers, it's a stubborn, woody plant hard to cut at harvest time. Sometimes it's perversely able to stand the toughest weather—but succumbs to a mild shower.

To the U.K. Agricultural Experiment Station agricultural engineers, it's a fascinating mechanism about which little is known of its real physical properties.

So Hubert Casada, graduate research assistant, is deep in a project to find out what makes a tobacco plant bend, snap, resist pressure, lodge and do many other things. When he finds out, it will be in scien-

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Some physical properties of tobacco are being studied by Researcher Hubert Casada with the aid of this machine which measures the amount of stress that a tobacco plant can resist. Having more accurate data on tobacco plants will help in development of mechanization of tobacco growing and harvesting.





A part of the 80 half-brother steers used this past year in feedlot research. Their use helped to eliminate considerable variation in average daily gain normally present in steer feeding trials.

LARGE-SCALE USE OF HALF-BROTHER STEERS HELPS

Workers Speed Up Beef Research

By W. P. GARRIGUS

Department of Animal Husbandry

The Department of Animal Husbandry has scored another "first" in its continuing effort to develop research information and tested production methods that will enable Kentucky livestock producers to produce "a better product at less cost." The announced goal of this total program is a \$200,000,000 increase in livestock income for Kentucky by 1970.

This latest "first" was planned over three years ago when the author recommended to Mereworth Farm, of Lexington, that it purchase a one-third interest in T R Zato Heir 181, a Register of Merit Hereford bull which died last June 11.

Mereworth Farm had been enrolled in U.K.'s beef herd performance testing program and was anxious to make a spectacular increase in both weaning weights and type score of its feeder calves. This farm annually produces over 600 Hereford feeder calves of excep-

tional merit. It was reasoned that substantial further gains could be made only through the use of a thoroughly tested superior sire. Such sires are exceedingly few and are seldom for sale. For that reason Mereworth Farm decided to purchase a one-third interest in T R Zato Heir 181 for \$10,000 even though this necessitated an artificial breeding program for its herd.

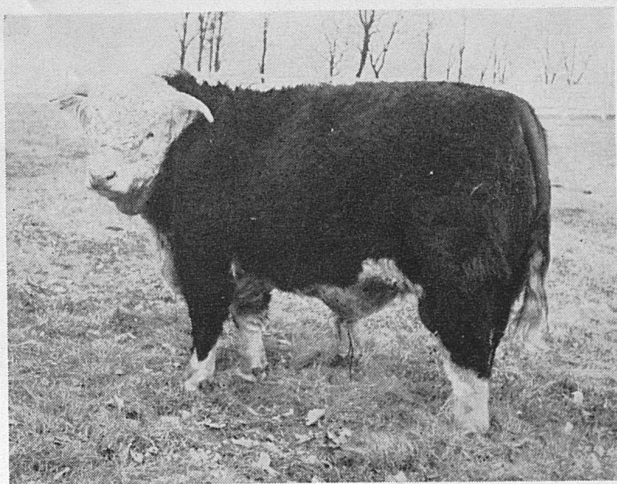
This bull was selected mainly because he had been successfully progeny tested in the show ring, in respect to carcass grade, and in the Kentucky beef bull performance test. In fact, T R Zato Heir 181 ranked 27th in the all-time Hereford Register of Merit. At the time of his death, only a few living Hereford sires outranked him in the number of show winnings earned by his get. His rank has possibilities of improvement as long as his progeny continue to show. He was the



T R Zato Heir 181 sired the half-brother steers used in the feedlot research reported in this article.



H P Real Silver 15, a promising young sire, whose owners include the University of Kentucky.



Silver Prince 194, another promising young sire being used in current beef trials.

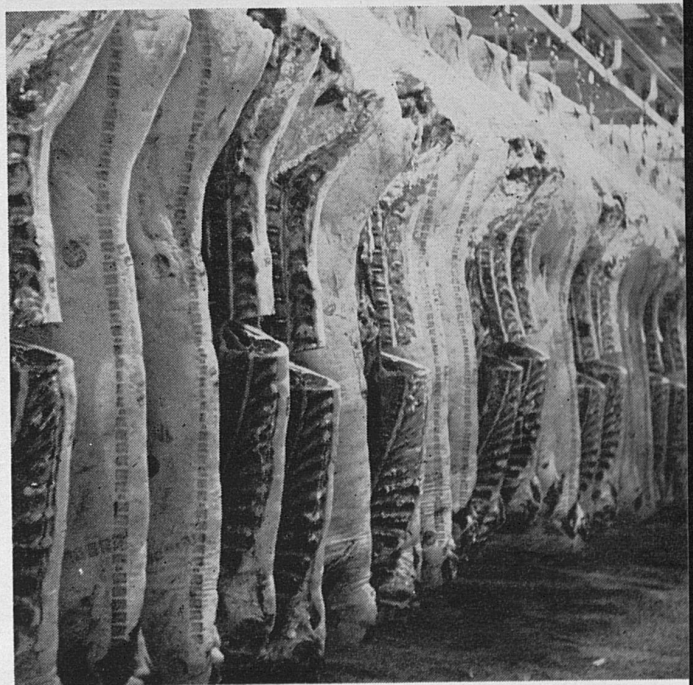
only Register of Merit Hereford sire being used in Kentucky.

His sons have also been successful in beef carcass shows, one having placed first in the on-foot carcass show at the 1956 International Livestock Exposition. A son of his established an all-time feed efficiency record in our Kentucky beef bull performance test by making each pound of gain on only 5.63 pounds of feed. At the same time the son scored one of our highest average daily gains of 2.94 pounds per day while on test.

The other owners of T R Zato Heir 181 were J. D. Gay, Jr., of Pine Grove; Brownell Combs, of Lexington; and the University of Kentucky. The University's interest was two-fold—first as a joint owner of the bull and second because it was anxious to obtain a number of half-brothers for its beef cattle feedlot research. Approximately 300 cows at Mereworth were bred artificially to this bull during the spring of 1959. Over 200 calves were sired by these artificial services.

Eighty steers were purchased by the University of Kentucky for its winter feeding program in the fall of 1960. These calves weighed an average of 599 pounds at weaning time and had an average type score of

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The carcasses of some of the half-brother steers in the cooler of a Louisville meat packer. The average carcass grade was Choice minus (12).

Accelerated Ham Aging Being Studied by U.K. Meats Research Staff

Preliminary results are promising; definite recommendations yet to be announced

By JAMES D. KEMP

Department of Animal Husbandry

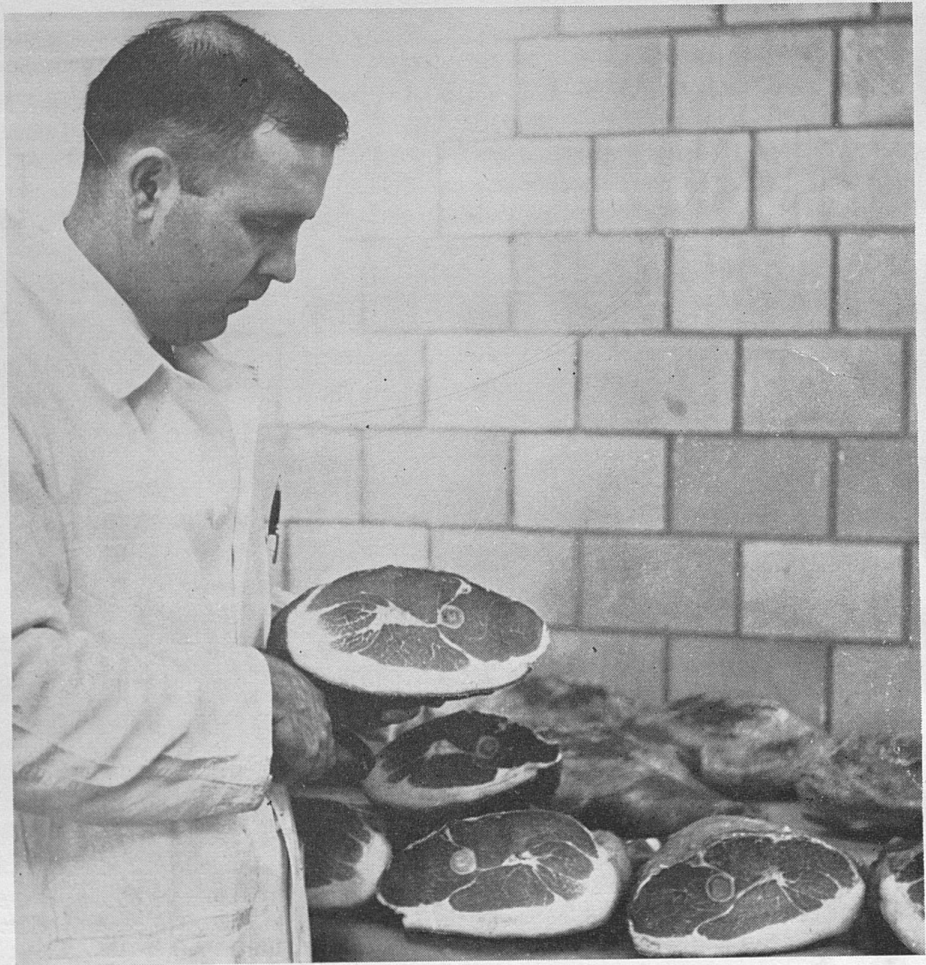
Many dry-cured hams having the so-called old ham flavor are produced in Kentucky and other southern states. They develop these desirable characteristics after being exposed to natural warm summer temperatures. This dependence on warm weather limits the production to one crop a year. With modern refrigeration and temperature control, hams can be cured at

any time. If aging is limited to warm weather, however, production is still limited.

There is a good demand for aged hams throughout the year. Because of that and, also, because of limited production and the need to expand the market for a good uniform product, methods for increasing the rate of aging were studied by the Kentucky Agricultural Experiment Station.

A ham-aging room was built several years ago. In this room the temperature is maintained at 65°F, with a relative humidity of 55 to 60 percent. Hams equivalent to those of a year old can be produced satisfactorily in 5 or 6 months. Based on the satisfactory results of several years' experience at this temperature,

The author and some of the hams being used in tests on the feasibility of increasing the rate of aging of hams. Hams are aged at temperatures ranging from 75 to 105 degrees F. They are kept in special cabinets in which the temperature and relative humidity can be carefully controlled.



plus the help of a financial grant from the Kentucky Department of Economic Development, the Station decided to try faster aging methods.

Four temperature-humidity-controlled aging cabinets were built so that temperatures could be maintained as high as 110°F. Hams, after normal dry-curing and smoking, were placed in these cabinets at temperatures of 80, 90, 100, and 110°F, respectively, with a relative humidity of approximately 55-65 percent. Humidity control is important, as increased shrinkage occurs at lower humidities and excess mold growth occurs at high humidities.

Hams were removed from the cabinets at monthly intervals, analyzed for fat characteristics, and tested by a palatability panel. The results were variable. The highest temperatures were evidently too high because the outside fat was discolored and over-rancid. A few hams spoiled, evidently due to being subjected too quickly to the extreme conditions. Some hams were excellent at 4 to 5 months, showing that fast aging is possible. Because too many hams were undesirable, the initial test was regarded as only partially successful. Therefore, modifications were made and new tests begun.

Present tests include hams being aged at 75, 85, 95, and 105°F as well as the 65° control hams. The hams were kept in cure for a longer time to allow better salt equalization. After smoking, they were placed in the 65° room for 2 weeks before being placed in the warmer cabinets. After 3 months in the cabinets there seems to be no spoilage. Palatability tests will be made again soon.

No definite recommendation can be announced yet. Details will have to be worked out so that uniform, consistent results can be expected. When and if this occurs, recommendations will be forthcoming.

Half-brother Steers Used

(Continued from Page 5)

Choice minus (12) according to the Kentucky beef herd performance testing program. They were used in eight lots of research work at the University's Coldstream Farm and were slaughtered in Louisville on April 28, 1961. This was done to obtain carcass grades, marbling scores, conformation scores, color of lean, thickness of fat covering, and other important carcass information. The lot was considered to be among the best group of steers of its size to be killed in Louisville over quite a period. The average final feedlot weights at Coldstream were 1,043 pounds per steer and the average age at that time was 506 days. Their

average dressing percent was 63.52; and the average carcass grade was Choice minus (12).

The most significant part of this whole project lies in the fact that considerable variation in average daily gains was eliminated through the use of half-brothers. This represents a practical compromise of the researcher's ideal which calls for the use of identical twins for nutritional research. By using half-brothers, small but real differences due to tested items can be uncovered with fewer steers and less repetition of research—with a consequent saving in time and money. So far as can be determined, this is the first and only time that a land grant institution or commercial research establishment has ever used 80 half-brothers for steer feedlot research.

The project is continuing with over 100 sons of T R Zato Heir 181 headed for U.K. feed lots this fall. In addition, a smaller group of calves sired artificially by Big Foot Corrector, a \$10,000 herd sire at Mereworth, will be purchased for U.K. research this fall.

In the fall of 1962, groups of calves sired by four carefully selected Hereford bulls will be compared in our feedlots and through a packing plant in an effort to discover lines of Hereford breeding that combine rate of gain, feed efficiency and desirable carcass characteristics in a high degree. Dr. Neil Bradley, of the Animal Husbandry Department, and the author are convinced that desirable eating qualities can be bred into beef cattle whereas, up to now, such qualities have been fed into our cattle at a high cost, with a resulting excess of carcass fat. Our belief is based on genetic research which shows that tenderness has a heritability index of 61%, ribeye area 69%, and dressing percentage 71%.

Other research has shown that ribeye area is closely associated with cutout value in the beef calf. Every additional inch of ribeye area means approximately \$4 extra cutout value per 600-pound carcass at present beef prices. Since ribeye area ranges from 8 to 16 inches per 600-pound carcass, it is evident that great progress can be made in this important carcass characteristic if only outstanding individuals and families can be located.

The University and Mereworth Farm each presently owns a one-fourth interest in a young Real Silver Domino-Hazlett bred Hereford bull (H P Real Silver 15) acquired last January at Denver, Colo. Electronic readings of his ribeye indicate that he exceeds the present-day goal of 2 square inches of ribeye per 100 pounds of carcass. It is hoped that his other performance and carcass records will match this one.

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Half-brother Steers Used

(Continued from Page 7)

Silver Prince 194, a son of Real Silver Domino 203, also a Hereford Register of Merit sire standing 37th in the present all-time list of sires, is jointly owned by the Animal Husbandry Department of the University of Kentucky and Mereworth Farm. He placed first in his class at Denver, Amarillo, and Ft. Worth shows earlier this year. He is presently rated as one of the very top sons of a sire that combines size, smoothness, and apparent meatiness. He weighed 1,063 pounds at one year of age and seems to have the essential characteristics of an outstanding beef sire. Complete performance testing and carcass evaluation of his progeny will furnish the answer to this question.

The University of Kentucky Animal Husbandry Department expects to continue its search for superior sires using part ownership, artificial insemination, feedlot testing, complete carcass evaluation, and type scores as the bases for a selective breeding program. More will be heard about the results some two years hence.

Kentucky Research Results in Brief

(Continued from Page 3)

tific terms, so other research workers can save time trying to find out the same things.

For instance: The department has been working on a mechanical tobacco harvester for several years. This machine (now in the pilot stage) feeds tobacco through an endless belt affair at one point, and splits the stalk to receive the holding stick.

The first work was trial and error, simply because the engineers had no accurate information on how much pressure a stalk could take, how much force was needed to move it and spear it, and how easily the leaves bruise, etc. It is safe to say the work on the harvester was delayed some because of this. Constant adjustments in design had to be made to accommodate

tobacco's unknown physical properties. Casada's work undertakes to supply these answers.

Casada has a long list of things he wants to know. As he puts it: "We want to find out all we can about the plant. Then we will 'describe' it so that other engineers can visualize the plant instantly and get a picture of it just from our terms. We can't do that now, because nobody has completely worked out this set of physical-properties values."

This would be valuable. Scientific explanations, unless based on standards, are laborious and difficult. That's why physicists have standard values for their materials—so do chemists, biologists and pathologists, to name a few.

Casada is investigating, too, the taper of the stalk, its diameter, breaking point (when flexed, crushed or ground), physical qualities of leaf (to see how much force is required to bruise or tear it), rate of growth, etc.

The possibilities are enormous. Casada does not emphasize this point but will admit he hopes he or someone will find one "key point" physical measurement on the plant whereby it may be possible to predict accurately the plant's height, number of leaves, and perhaps total potential yields.

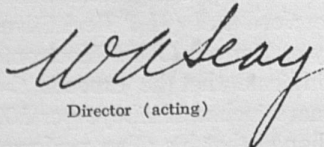
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RESEARCH ON CATTLE BLOAT TURNS UP POSSIBLE CULPRITS

Research by U. K. Agricultural Experiment Station dairymen on causes of bloat has turned up a couple of substances which, when in combination, contribute to this distressing and dangerous condition in cattle.

D. R. Jacobson, dairy researcher, says the substances are glucose and Ladino clover extract (juice). These two, when combined in the laboratory and added to a quantity of rumen contents, caused creation of a gaseous froth similar to that observed in living animals' paunches. Such a condition in a live animal apparently causes bloat.

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