

# *Kentucky* FARM AND HOME *Science*

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**Kentucky  
Research Results  
In Brief**

(Excerpts from the  
1961 Annual Report  
of the  
Experiment  
Station)



# Kentucky FARM AND HOME Science

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## KENTUCKY AGRICULTURAL EXPERIMENT STATION

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## The Cover



This scene of pickers harvesting snap beans in a Wayne county field shows the large-scale nature of the snap bean enterprise in Pulaski and Wayne counties in 1960 and 1961. Supervising the pickers (left foreground) is M. H. Denney, Monticello, owner of the farm.

# Kentucky Research Results in Brief

The following reports on research activities of the Kentucky Agricultural Experiment Station were excerpted from the 1961 Annual Report now being prepared for publication.

## AGRICULTURAL ECONOMICS

### Factors in Success of Bean Enterprise

Success of a snap bean enterprise in Pulaski and Wayne counties is attributed to overall planning by management and a well-coordinated labor supply for harvesting. Management concentrated acreage, selected farmers, staggered planting dates, supervised cultural and spray programs, supervised harvesting, and marketed the beans. The labor supply was provided by excellent cooperation of the farmers, labor crew leaders, and crew members of the Employment Service Office.

### State Institutional Farm Study

A farm management analysis (linear programming) of Kentucky's institutional farms reveals that considerable savings are possible in their food production program by having the farms specialize in production of products for which their resources are best suited and to receive the rest of their food requirements from other institutional farms.

### Chain Store Fresh Egg Requirements

Chain store buyers are striving to develop more concentrated supply sources. In respect to eggs, the minimum purchase requirements range from 100 to 200 cases per week from a single supplier. About 70 percent of the fresh eggs handled by chain food stores in Kentucky comes from outside the state because suppliers here are not meeting minimum volume and quantity requirements. Most of the eggs are purchased in mid-western states, with the majority coming from Indiana.

### Looseleaf Tobacco Auction Warehouse Costs

Hand labor used in tobacco warehouse operation accounts for about 65 percent of the total operating costs, and the opportunity to reduce costs through mechanization is lessened owing to an operating period of only from 5 to 10 weeks. An operating cost of

importance to warehousemen is that of short-weight deductions by buying organizations. Much weight loss is because of moisture changes in the tobacco between the time it is weighed in at the warehouse and when delivered to the buyer's plant.

### Dairy Mergers and Expanding Market Trends

Specialization in both farm production and processing plant operations is an important trend in the dairy industry. New competitive marketing structures and complex pricing problems are appearing as the result of technological changes in the industry. More mergers and consolidations are in prospect. Ten percent of Kentucky's bottled milk plants made about 60 percent of the sales in 1960, and 13 processing centers supplied 90 percent of the fluid products.



A short operating period lessens the opportunity of tobacco warehousemen to cut labor costs by increasing mechanization.

## AGRICULTURAL ENGINEERING

### Mechanical Tobacco Harvester Progresses

Limited field tests were made with a basic-type mechanical burley tobacco harvester. The machine has been built in four components: 1. a cutting unit which was completed in 1961; 2. a spearing unit; 3. a stalk-spacing, stick-filling unit, and 4. a stick-

dispensing unit. These hydraulically controlled units are in a frame, suspended from an altered high-clearance tractor. The tests in 1961 indicated that with the elimination of minor difficulties the machine will meet its design capacity of six sticks (on which six stalks are evenly spaced) per minute. (This work was done in cooperation with J. W. Walden, Midway.)

#### **Flame Cultivation of Corn and Tobacco**

Flame cultivation resulted in satisfactory control of weeds and grasses in corn and tobacco at Coldstream Farm. The growth rate of the tobacco, however, was reduced.

#### **Outside Curing of Tobacco Under Plastic**

One acre of burley tobacco was field cured in frames covered with polyethylene film, and one acre was cured in a conventional tobacco barn. At sale time, the tobacco cured under film averaged \$68.11 per 100 pounds, while the other brought an average of \$68.24. However, a considerable amount of labor was saved with use of the frames because they could be handled with a fork lift.

#### **Greenhouse Heating and Ventilating**

A system for automatically controlling the temperature within greenhouses during both summer and winter was designed and installed in a plastic greenhouse operated by the Department of Horticulture. A continuously operating fan capable of providing one air change per hour, a forced-warm-air furnace, dampers, and controls constitute the system. The dampers enable the fan to pull outside air into the greenhouse when cooling is required. At other times the fan re-circulates air in the house. The system eliminates the need for vents and greatly reduces the humidity problem.

#### **Effect of Roofing Materials on Inside Temperatures**

Thermal radiation from the underside of 15 types of roofs was measured. From the data collected, it will be possible to predict the influence of various roofing materials on the environment within either enclosed or open-front structures. These roofs will be compared with those previously tested.

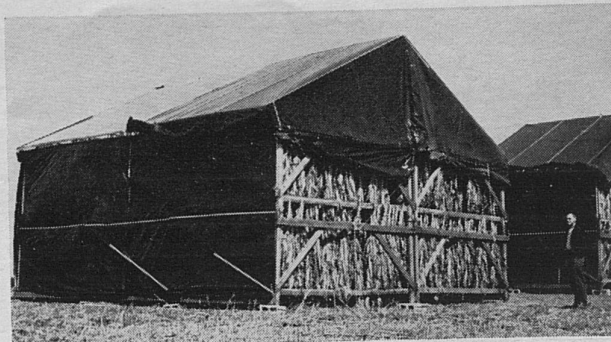
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### AGRONOMY

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#### **Most Prevalent Tobacco Diseases**

Manganese toxicity, organic matter toxicity, black shank, and angular leaf spots were among the most prevalent tobacco diseases reported in 1961. Black



Frames handled by fork lifts offer possibilities for labor saving in tobacco housing. The tobacco in these frames was field cured under plastic as shown.

shank, previously more common on smaller farms in overflow stream areas, has now appeared on many large farms in areas not subject to overflow; no good explanation has been formulated. Angular leaf spot or rust, a bacterial disease closely related to wildfire, after an almost complete absence of several years, is now becoming of increasing importance. Wildfire-resistant burley seems not to be resistant to the leaf spot.

#### **Cutting Frequency of Clair Timothy**

Three years' data indicate that cutting Clair timothy plants three times per growing season resulted in higher yields and lower weed content in the hay than when plants were cut from four to seven times a season. Hay quality of the first harvest of the three-cut system because of its over-mature state was inferior to that of the other two harvests. Plant survival was as high when the first cutting was made at the late boot stage (4 cuts per season) as at the seed stage (3 cuts per season).

#### **Alfalfa Variety Mixture Cutting Management Tests**

Three years' results show that hay yields and plant survival were the same under 3- and 4-cut systems but 5 or 6 cuts per season drastically reduced stands and yield. DuPuits, Narragansett and Rhizoma varieties reacted approximately the same under the various systems. Hay yields of alfalfa-orchardgrass and alfalfa grown alone were the same, but weed content in the latter was much higher.

#### **Eradication of Wild Garlic**

Three years of spraying wild garlic in both early spring and late fall was required to eradicate the weed even when the ester form of 2,4-D was applied each time at rates of 3 or 4 pounds per acre. When the material was applied at the same rates in early

spring only, four years of spraying was required for eradication; when the material was applied at the rate of 2 pounds per acre (as commonly recommended), five years was required.

#### **Mosaic in Old Burley Tobacco**

In 1935 it was reported (Ky. Agr. Exp. Sta. Bul. 361) that tobacco mosaic could be transferred from tobacco grown in 1882, the year the disease was first described. In 1961 the 79-year-old tobacco was again used to inoculate 123 leaves of susceptible burley plants. Mosaic developed in two of the plants, but when leaves from these plants were retested, the disease failed to develop.

#### **Calcium Uptake by Plants**

Sixteen 5'x8'x12" bluegrass sod frames have been established on soil transported from the Greenville experiment field to the Experiment Station at Lexington. The soil has received four different liming treatments and will receive injections of calcium-45 at various depths during the spring and summer 1962. Grass clippings will be analyzed to determine the calcium-feeding pattern of bluegrass grown on soils widely differing in lime status. The data will help determine ways to lower plant intake of strontium-90 because its uptake is reduced by high soil calcium in the soil zone where the strontium is present.

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### **ANIMAL HUSBANDRY**

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#### **Carcass Evaluation of Lambs**

Evaluation of the carcass characteristics of 59 twin lambs grading Choice or Prime, sired by 3 feedlot-tested Southdown rams, showed that the slower-gaining rams sired the fatter lambs and the faster-gaining rams sired the meatier lambs.

#### **Correlation of Swine Carcass Cuts and Measurements**

A study of 395 purebred Hampshire pigs slaughtered over an 8-year period showed that percent of ham, expressed as percent of carcass weight, was more highly correlated with percent of lean cuts; therefore, it was the best single variable in predicting total carcass leanness. Ham fat thickness seems to be a better measure of carcass fat than is average back-fat thickness.

#### **Use of Virginiamycin for Growing Swine**

Five experiments showed the value of a new antibiotic, Virginiamycin, as a feed additive for growing pigs. The substance improved the rate of gain and

feed efficiency over the basal ration, although differences in rate of gain were not statistically significant. Compared with chlortetracycline-fed pigs, the Virginiamycin-fed pigs gained faster, except in one instance, and also more efficiently.

#### **Shearing of Ewes Before Breeding**

Based on results of 3 years' work, shearing prior to breeding definitely increased earliness of lambing in yearling and 2-year-old Hampshire-cross Montana ewes. The practice, however, appeared to be of no value with Suffolk-cross Texas ewes or with older Montana ewes.

#### **Tranquilizer with Stilbestrol for Beef Steers**

No significant increases in final rate of gain due to use of the tranquilizer trifluomeprazine fed to steers prior to the time they received diethylstilbestrol implants.

#### **Soybean Hulls for Wintering Beef Steers**

In a 168-day wintering trial with 48 Hereford steers, pelleted soybean hulls and ground soybean pellets produced faster average daily gains than ground or flaked hulls. The average daily feed intake was similar, regardless of the form of hulls fed.

#### **Stilbestrol Implants During Prewaning Period**

Results of stilbestrol implants in unweaned steer and heifer beef calves indicate that such implants are not detrimental to subsequent feedlot performance of steers but may affect the feedlot rate of gain of heifers.

#### **Evaluation of Lamb Creep Rations**

A complex creep mixture was slightly superior in producing average daily gains in an experiment involving five lots of crossbred western lambs. The complex mixture consisted of 56.5 percent cracked corn, 30 percent soybean meal, 5 percent alfalfa meal, 5 percent sugar, 1.5 percent bonemeal, 1 percent phenothiazine salt, and 1 percent Aureomycin Crumbles.

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### **ANIMAL PATHOLOGY**

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#### **Parasite Control in Sheep**

A series of seven Ruelene drenches at 3-week intervals was more effective than seven phenothiazine drenches in controlling gastro-intestinal parasites in sheep.

#### **Fetal Rhinopneumonitis in Mares**

Accumulated field tests for 3 years on 60 farms included immunizing inoculations with hamster-adapted

virus for preventing fetal rhinopneumonitis. The mares inoculated had a total of 4,298 pregnancies and 41 abortions (0.95 percent). During the same period the mares of 35 other farms on which no inoculations were administered had 477 pregnancies and 75 abortions (16.8 percent).

#### **Nematode Infection in Calves**

Grain supplement was unsuccessful in completely counterbalancing the influence of superimposed nematode infections. This conclusion was reached on the basis of relative difference in blood changes of two groups of six calves in which one group received a grain supplement and infective nematode larvae while the other group received no grain supplement or infective larvae.

#### **Vibrio Fetus Infection of Sheep**

Infection experiments indicated the practical use of susceptible lambs for investigating immunity in ovine vibriosis, a cause of abortion in sheep. Prevention of bacteremia (bacterial infection in the blood) in lambs by vaccination is believed to be a more reliable index of immunity to *Vibrio fetus* than percentage of abortions.

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### DAIRY SCIENCE

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#### **Frozen Cultures for Cultured Milk Products**

A limited number of frozen cultures stored in various concentrations of milk solids, with and without calcium carbonate, for different lengths of time, varied distinctly in ability to survive. Those cultures stored in the higher concentrations of solids with calcium carbonate added maintained the higher levels of activity. Even so, some cultures were not active enough for practical use after less than one month in frozen storage.

#### **Low-fertility Semen a Cause of Embryonic Deaths**

Indirect evidence shows that low fertility semen can be a cause of embryonic deaths in dairy cattle. A study of the conception rates of 81,944 cows indicates that if genetic superiority is reasonably certain, semen having a fertility 5 to 10 percentage units below average does not represent too great a hazard, but when genetic merits are equal, the semen with the highest fertility should be used.

#### **Timothy vs. Orchardgrass for Dairy Pasture**

(Cooperative with Agronomy) First-year grazing trials comparing Clair timothy with Boone orchardgrass as a grazing crop for dairy cows gave inconclu-

sive results. The results did indicate, however, that Clair timothy produces forage relatively high in nutrients needed for maintaining milk production. No grain was fed.

#### **Use of Dried Skim Milk in Calf Starter**

Work with 31 Holstein and Jersey male and female calves indicated that dried skim milk in the calf starter contributed little in their 2- or 3-week weaning program. It was concluded that, after a milk feeding period of 3 weeks, dairy calves could be satisfactorily weaned when offered a simple but palatable dry calf starter and hay diet.

#### **Tracy Sorghum Silage**

Tracy sorghum silage cut at the dough stage is superior for use as a dairy cattle roughage to that cut in the early milk stage.

#### **Use of Penicillin in Bloat Studies**

Continuing studies on the role of penicillin in preventing bloat in dairy animals have shown that the fermentation rate of rumen microorganisms is reduced when penicillin is administered during bloat conditions, thus preventing bloat for a short time. The fermentation rate was measured as gas production per minute of strained rumen contents during a 90-minute period in a Warburg apparatus. The rumen samples were obtained from fistulated animals stall-fed fresh, chopped bloat-producing alfalfa. Differences in fermentation rate disappeared after 10 days of penicillin administration.

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### ENTOMOLOGY AND BOTANY

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#### **Use of Vapona for Household Pests**

The interiors of two houses were fogged with 5 percent Vapona (DDVP) in fuel oil for cockroach, silverfish and spider control. Then the houses were closed for 2 hours before being ventilated. Complete control of the pests was accomplished, but no damage to upholstering, furniture, floors or walls was noted. A dog kennel was also fogged to control brown dog ticks. No live ticks could be found 2 hours after treatment. The dog and the surrounding run were treated with Korlan to prevent reinfestation.

#### **Strawberry Insect Studies**

The effectiveness of phorate, a systemic insecticide, to combat mites on strawberry plants was studied. The material, in granular form, was applied at the rates of 2 and 4 pounds per acre in small areas to selected mite-infested plants that had been transplanted. Six

weeks later a serious infestation existed on the check plants, and within 2 weeks more the plants were so depleted of food value that the mites had become scarce. The treated plants, however, contained a relatively high infestation at the end of 8 weeks, the mite population having developed slowly up to that time. Hence, the mites were inhibited but not entirely killed by the phorate granular applications.

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## HOME ECONOMICS

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### Food Shopping and Preparation Practices

A comparison of working wives with non-working wives in their food shopping and preparation attitudes and practices showed that working wives in Louisville spent less money per person meal for meals eaten at home than did non-working wives. The difference was small but it indicated that working wives do not use more of the expensive, ready-prepared and "convenience" foods than do non-working wives. Working wives in the sample surveyed showed a tendency toward being more economy-minded in food management. (Cooperative with Agricultural Economics)



Food-buying practices of working and non-working wives in Louisville were studied.

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## HORTICULTURE

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### Food Technology Irradiation Studies

(Cooperative with Home Economics) In the gamma irradiation studies, sweet corn continues to show the most promise as an acceptable product. Canned samples of whole kernel corn subjected to pasteurizing dosages of gamma rays and held at 35° F for 9 months

were still acceptable to a taste panel. Excluding oxygen from the can by the use of nitrogen gas or a glucose oxidase packet was beneficial. Analysis of irradiated corn samples for total sugar and reducing sugars showed little change from the initial sugar content, while control samples similarly stored had lost nearly all their sugar. Work is continuing with irradiated strawberries but so far no combination of treatments has preserved berries having the quality of frozen strawberries.

### Strawberry Variety Testing

Of 12 varieties of strawberries tested at Lexington and 13 at the Eden Shale Farm, Dixland, Armore, and Pocahantas were among the first five in yield at both locations but not in the same order. Armore, however, is too soft for commercial use. This was the first time that Tennessee Beauty had been out of the top-five rank at both locations.

### Clear Plastic Over Black Plastic Mulch

Use of a clear  $\frac{3}{4}$  mil layer of plastic over black plastic mulch laid in the usual way, with a dead-air space maintained between the two layers, was effective in greatly increasing both early and total yields of snap beans, lima beans, sweet corn and tomatoes. The increases showed the warming power of the double layer early in the spring. The thin clear plastic soon disintegrates, and the black plastic remains; the clear remains long enough, however, to provide the initial stimulus to the germinating seed and the young plant.

### Weed Control in Turf

Materials recommended for pre-emergence control of crabgrass are Dacthal, Zytron, and calcium arsenate. Liquid Zytron is recommended for post-emergence control of nimblewill. Stam shows considerable promise as a post-emergence herbicide for controlling crabgrass and chickweed.

### Bird Problem in Blueberries

Birds continue to be the No. 1 pest of blueberries. An automatic carbide gun, designed to frighten birds with its noise at periodic intervals, failed to protect the fruit this year, although it was effective a year ago.

### Christmas Tree Production

Christmas tree plantings at the Eden Shale Farm, begun in 1956, include Douglas Fir, Norway Spruce, Arizona Cypress, Mexican Cypress, White Pine, Red Pine, Virginia Pine, Austrian Pine, and 11 strains or

selections of Scotch Pine. The Douglas Fir, Norway Spruce and White Pine have been almost complete failures. Observations indicate that shearing must start the third growing season after planting if tree-form quality is to be controlled. Shearing time for 13,225 trees was approximately 300 man-hours, or slightly less than 1½ minutes per tree.

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## POULTRY SCIENCE

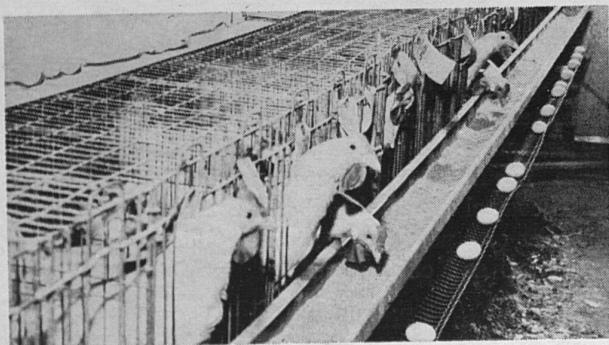
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### Energy Restriction on Pullet Development

Feeding of low-energy diets at any age significantly reduced growth of White Leghorn pullets. In addition, feed consumption was increased when the low-energy diets were fed. Three hundred day-old pullets were used. At the beginning, half of them were fed a high-energy diet containing 940 calories of productive energy, and the other half received 706 calories per pound. Eight weeks later the birds were weighed individually, and each original group was subdivided into two groups. One of the new subgroups was continued on its original diet, while the other was fed the diet it had not been receiving. At 18 weeks the pullets were again weighed and placed in individual laying cages.

### Calcium and Antibiotics in Laying Diets

Results with four replicate groups of 10 hens each indicated that neither increasing the calcium level nor supplementing the diet with an antibiotic mixture



Effects of added calcium and antibiotics on laying hens were studied.

had any significant influence on rate of production, egg shell thickness and interior quality, or mortality or feed required per dozen eggs.

### Contamination of Eggs

Atmospheric conditions on the day an egg is laid apparently influence the likelihood of its becoming contaminated by bacteria in the nest. Culturing of 981 eggs laid in contaminated nests showed significant positive gross correlations between bacterial recovery rate and the atmospheric variables of temperature, absolute humidity and vapor pressure.

### Protein Source on Chick Growth

No significant differences in respect to growth response or feed utilization occurred when broiler-strain male chicks were fed a corn-soybean meal basal diet and a supplement of fish meal or meat scraps, alone or in combination. Methionine supplementation of the basal diet produced similar results.

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## RURAL SOCIOLOGY

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### Recommended Farm Practices

Farmers in 12 neighborhoods of a county in the Outer Bluegrass were surveyed in 1950, '55, and '60 as to their use of 14 recommended farm practices. In neighborhoods of relatively high education, the use of recommended practices was 10 years or more in advance of the use level in neighborhoods of low education—when one considers only the practices that gained in use during the decade. Scale of farming and use-suitability of the land characterizing the neighborhoods also were associated with the pace at which farmers began using the practices.

### Farm Information Media Use

Use of various farm information media in an Outer Bluegrass county generally increased between 1950 and 1955 but declined thereafter to 1960. Only radio and television retained or increased their audiences, while the use of most of the following media declined to near the 1950 levels: farm magazines, newspapers, farm meetings, farm agency representatives, circular letters, bulletins, and dealers and salesmen.

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