

Kentucky FARM AND HOME *Science*

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READ—

Ground-breaking
for
Agricultural
Science Center

Kentucky
Research Results
In Brief

Spray Damage
to
Tobacco Plants

Kentucky FARM AND HOME Science

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KENTUCKY AGRICULTURAL EXPERIMENT STATION

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By Richard Thurston

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The Cover



Gov. Bert T. Combs (left) had plenty of help January 31 when he broke ground for the new University of Kentucky Agricultural Science Center. Shown also in this picture, wielding a shovel, are Lt. Gov. Wilson W. Wyatt and University President Frank G. Dickey. Members of an advisory committee for the Agricultural Science Center are John Koon, chairman, Thomas Ballantine, Emerson Beauchamp, Smith Broadbent, Jr., Albert Clay, Ernest Harris, Ivan Jett, A. B. Sawyer, and J. K. Smith.

Ground-breaking Ceremonies Staged for Agricultural Science Center

Recent ground-breaking ceremonies for the University of Kentucky Agricultural Science Center brought the plans of a group of state farm and business leaders a step nearer completion.

The complex of buildings will consist of a three-story main laboratory and office structure, a food technology building, seed research building, and 16 greenhouses. The main building will include a 500-seat auditorium.

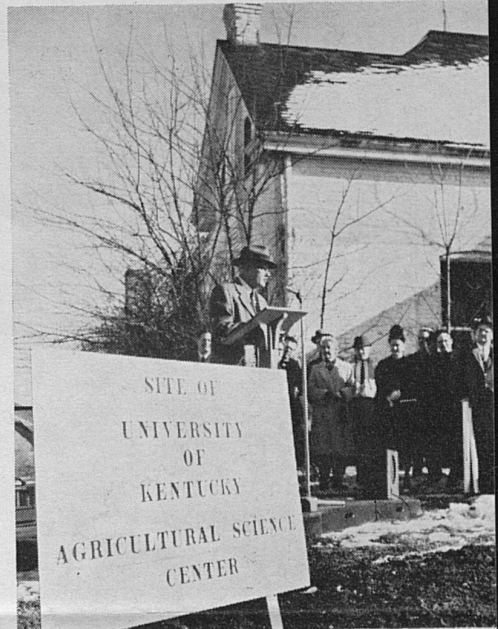
The site of the center is on South Limestone (Nicholasville Pike), south of the University Medical Center.

It is expected that total cost of the center will approximate \$7 million, of which \$4 million has been committed by the Governor's office. In 1960 the State Legislature appropriated \$50,000 for planning fees and later made \$1 million available to start building operations.

A Congressional appropriation of \$250,000 to the U. S. Department of Agriculture for cooperative tobacco research with the Kentucky Agricultural Experiment Station will go towards building greenhouses, temperature- and humidity-controlled growth chambers, a master head house, and other tobacco research facilities and equipment.

State agricultural leaders hail the starting of the cen-

Among the speakers at the ground-breaking ceremonies was Dean and Director Frank J. Welch, of the College of Agriculture and Home Economics, who is on leave with the federal government as Assistant Secretary of Agriculture.



ter construction as one of the most important steps ever taken for the improvement of Kentucky agriculture. A brochure, showing the need for the center, was prepared in 1959 by 58 statewide farm organizations which had banded together as the Blueprint-for-Kentucky-Agriculture Committee.



The site of the Agricultural Science Center is south of the University Medical Center on a portion of the Experiment Station farm acquired in 1901 from Shelby Kinkead.

Kentucky Research Results in Brief

The following reports on research activities at the Kentucky Agricultural Experiment Station and substations were excerpted from the 1960 Annual Report now being prepared for publication.

AGRICULTURAL ECONOMICS

Dark Tobacco

Estimates of government program effects on dark tobacco, based on a statistical procedure developed at U.K., indicate that removal of price supports in those tobaccos, even with no change in production, would have decreased market average prices by about 8 cents per pound or about 25 percent in a recent 5-year period.

Reducing Market Risks

A survey of 44 Union county hog producers indicated that for operators of larger-scale farms, the question of price fluctuation may not rank very high in regard to choice of enterprise, time of marketing, or other decisions made in marketing farm products. Over 95 percent of the group indicated that they preferred to accept the risk of price fluctuation in preference to making advance marketing contracts.

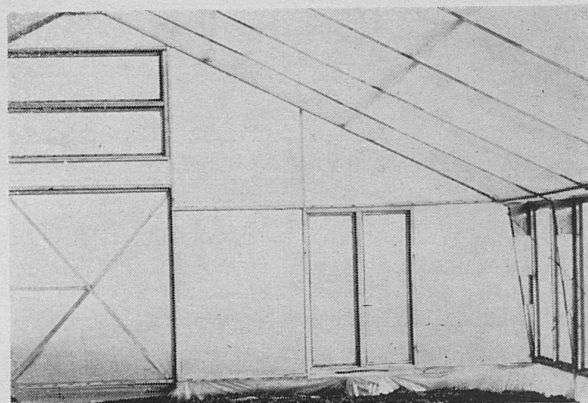
Pickle Production Work Methods

Keeping pickle vines in rows during the growing and harvesting season and rolling the vines over during picking provided the highest returns per acre and per hour of picking time; however, more labor was required than in the other methods practiced.

AGRICULTURAL ENGINEERING

Poultry House Ventilation

A new system of poultry house ventilation has been devised, using a fan located in the attic which draws warm air from the attic down into the house. The air is forced against a baffle which deflects it across the ceiling in a high velocity sheet of air. The air mixes with the air in the building, and uniform temperature is obtained at the floor level. The good air distribution throughout the house results in a drier litter and improved environment.



New greenhouse rigid frame has many advantages.

Greenhouse Rigid Frame

A 30-foot glued-plywood-gusset rigid frame for plastic greenhouses was designed and is being tested. This clear span frame is wider than the frames in conventional use and permits the more efficient use of equipment. The new frame uses less lumber and, hence, minimizes shading, is easier to erect and has smooth interior and exterior surfaces which simplify the stretching of plastic. The same basic design should be applicable to frames wider than 30 feet.

AGRONOMY

Productivity of Corn Hybrids

Performance evaluation studies of corn hybrids of different maturities conducted at Lexington indicate that Kentucky farmers who are planting early-season hybrids are sacrificing considerable yield. The growing season in this state is sufficiently long to permit growing later-maturing hybrids.

Old and New Burley Varieties Compared

Smoking tests and chemical analyses by two tobacco manufacturers of six old burley varieties and Ky 16 and Burley 21 indicate that, from the manufacturer's point of view, nothing has been lost in the development of two of the present disease-resistant varieties.

Dutch Elm Disease

Dutch elm disease was identified by isolation of the causal fungus from trees in Adair, Bourbon, Boyle,

Fayette, Mason and Shelby counties. Previously the disease has been identified from Caldwell, Campbell, Kenton, and McCracken counties.

Dormancy of Buried Weed Seed

Germination tests showed 88 percent viability of Johnson grass seed and 95 percent of wild sorghum seeds after burial for 4 years. This indicates the difficulty of eradicating either of these weeds on infested land where the seeds have been buried by plowing or by overflow soil deposits.

Explaining Effects of Liming on Soil pH

Titration curves which may be used as bases for liming recommendations, as well as in interpreting the response to liming, have been developed for more than 25 important Kentucky soil series. Field testing is still necessary in the perfection of the procedure.

ANIMAL HUSBANDRY

Rancidity in Pork Fat

A simple, fast colorimetric procedure has been developed for determining lard rancidity.

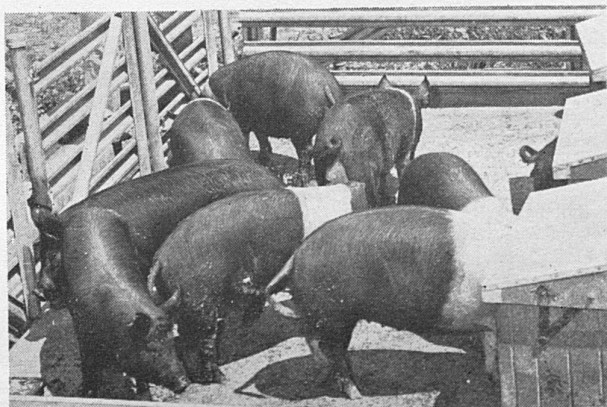
Silage Rations for Pregnant or Lactating Ewes

Based on 100-day lamb weights, corn-preserved and sodium bisulfite-preserved silage, was significantly superior to flavored anti-oxidant-preserved alfalfa-bromegrass and corn silage as feed for pregnant or lactating crossbred ewes. The alfalfa-bromegrass silage was preserved with either 150 pounds of cracked corn, 8 pounds of sodium bisulfite or 1 pound of flavored anti-oxidant per ton of green forage. A standard alfalfa hay-corn ration served as a control.

Bred Gilts Confined on Concrete

Work with 12 Hampshire gilts confined on concrete floors for their entire gestation period showed that bred gilts raised under such conditions should receive a higher level of calcium than the recommended 0.60 percent.

(below) These bred gilts confined on concrete showed a need for more calcium.



The seed of Johnson grass, one of the state's worst weeds, remains viable even after long burial.

Tranquilizer Implants for Beef Steers

None of the three levels of trifluomeprazine (tranquilizer) implants increased rate of gain significantly for yearling steers receiving a fattening ration in dry lot.

Creep Feeding of Beef Calves

Three years' work on the effect of creep feeding beef calves on their preweaning performance showed that such a practice is not profitable, despite a small increase in rate of gain, except where supplies of milk and/or grass are inadequate.

ANIMAL PATHOLOGY

Salmonella Contamination of Animal Feeds

A survey of commercial animal feeds and their ingredients showed that about 8 percent of 355 samples contained Salmonella organisms. The feeds were intended for chickens, hogs, and dogs. Nineteen serotypes of the organism were identified.

Strongyle Control in Horses

A combination of phenothiazine with piperazine in single therapeutic doses was effective against strongyles (a kind of internal parasite) in horses. The combination was especially effective against the large strongyles, *Strongylus vulgaris* and *S. edentatus*. Low-level administration of dithiazanine iodide compared favorably with low-level phenothiazine for strongyle control.

DAIRY SCIENCE

Tracy Sorghum Silage vs. Alfalfa Hay for Milk Production

Work with 24 Jersey and Holstein cows comparing good quality Tracy sorghum (cut at the milk stage of

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Insecticide formulations, application rates, spraying methods, amounts of water used are checked to explain tobacco leaf injury and effects of bud burning

Spray Damage to Tobacco Plants

By RICHARD THURSTON
Department of Entomology and Botany

Foliar applications of insecticides to control tobacco insects may injure tobacco in a number of ways. The production of malformed leaves by foliage treatments of lindane and chlordane was described in a previous article in *Kentucky Farm and Home Science*.¹ These hormone-type leaf symptoms were not caused, however, by the other commonly used tobacco insecticides.

To explain the other types of leaf injury commonly occurring on Kentucky farms, experiments were run in 1959 and 1960 using various insecticide formulations, rates of application, spraying methods, and amounts of water. The 1959 tests showed that the solvents used in formulating emulsifiable concentrates were responsible for the burning of tobacco leaves and buds.²

Emulsion-type sprays without insecticides were as toxic to tobacco plants as similar sprays with TDE or endrin added. The greater the amount of solvent used per acre the greater the amount of burning. Xylene-type solvents caused less leaf burning than heavy aromatic naphtha solvents, but there was no difference in the amount of bud burning. Holding the sprayer nozzle 4 inches from the plant resulted in much more leaf and bud burning than when the nozzle was held 12 to 15 inches from the plants. TDE and endrin wettable powders did not cause any burning of leaves or buds, but TDE at 4 pounds (actual) per acre—four times the recommended rate—caused a yellowish mottling or mosaic of the treated leaves. This leaf discoloration gradually disappeared with no injury to the plants.

Leaf injury, caused by the solvents in the emulsifiable concentrates, showed up as oil-soaked areas 20 to 30 minutes after spraying. These areas within 24 hours turned tannish brown and eventually dropped

out of the leaf (Fig. 1). In cases of heavy leaf burning nothing but the mid-vein and some of the lateral veins were left. The plants recovered, however, from this type of injury and except for the loss of leaf tissue no observable damage was done except possibly some slight stunting of the plants.

The effects of bud burning did not show up so rapidly but were more drastic in the long run. If the bud was killed, a stunted plant with many suckers was produced. Often only part of the bud was killed, resulting in a stunted plant with the new leaves being malformed and the veins distorted (Fig. 2).

Tests in 1960 again showed that a xylene-type sol-



Fig. 1.— Burning of a tobacco leaf caused by an excessively high rate of an emulsifiable concentrate applied with the spray nozzle held too close (4 to 6 inches) to the plant. The speckled areas will eventually drop out of the leaf.

¹ Thurston, Richard. Malformed tobacco leaves. *Ky. Farm and Home Science* 3(2): 6-7, 12 (1957).

² Thurston, Richard, and Wade, Claude F. Phytotoxicity of insecticidal and spray treatments to burley tobacco. *Tobacco* 150 (25): 22-27 (1960).



Fig. 2.— Leaf malformation with vein distortion caused by the burning of the tobacco bud by high rates of emulsifiable concentrate sprays applied to the bud.

vent was less harmful to leaves and buds than a heavy aromatic naphtha solvent. Increasing the amount of water used from 10 to 100 gallons per acre did not decrease the amount of bud burning but eliminated the leaf burning (Table 1). When the spray nozzle

Table 1.— Effect of Spray Practices on Toxicity to Tobacco Plants

| Solvent* | Gallons Water Per Acre | Inches From Bud | Rating of Leaf Burn** | Percent of Buds Burned |
|----------|------------------------|-----------------|-----------------------|------------------------|
| RX-4 | 10 | 4 | 2.5 | 50 |
| RX-4 | 100 | 4 | 0 | 89 |
| RX-4 | 10 | 12-15 | 0 | 0 |
| RX-4 | 100 | 12-15 | 0 | 0 |
| AN2K | 10 | 4 | 3.75 | 78 |
| AN2K | 100 | 4 | 0 | 74 |
| AN2K | 10 | 12-15 | 3.5 | 12 |
| AN2K | 100 | 12-15 | 0 | 29 |

* RX-4 is the xylene-type solvent, and AN2K the heavy aromatic naphtha solvent used in making the respective emulsifiable concentrate formulations. AN2K has a high boiling point and RX-4 a low boiling point. They were applied in the amount of 16 pints per acre.

** Based on a rating system of 0 to 4 with 0 being no injury and 4 the greatest injury.

was held 4 inches from the bud, many more of the buds were injured than when the nozzle was held 12 to 15 inches from the bud whether 10 or 100 gallons of water was used. At cutting time the high dosage of emulsifiable concentrate in 10 gallons of water sprayed at 4 inches from the bud was the most damaging of all the treatments. Plants in these plots were very stunted with many suckers.

In another test 16 pints of the heavy aromatic naphtha formulation was used with 10, 25, and 50 gallons of water. The spray nozzle was held 12 to 15 inches from the bud. The 10-gallon treatment caused the most leaf burning but the least bud burning. The

50-gallon treatment caused practically no leaf burning but the most bud burning of all the treatments (Table 2).

Table 2.— Effect of AN2K at 16 Pints in Various Gallons of Water Per Acre on Toxicity to Tobacco When the Spray Nozzle was Held 12 to 15 Inches from the Tobacco Buds

| Solvent | Gallons Water Per Acre | Rating of Leaf Burn | Percent of Buds Burned |
|---------|------------------------|---------------------|------------------------|
| An2K | 10 | 3.75 | 8 |
| AN2K | 25 | 2.0 | 28 |
| AN2K | 50 | 0.5 | 56 |

Research Results in Brief

(Continued from Page 5)

maturity) with good quality alfalfa hay showed that milk production could be maintained at an above-normal level with either or with a combination of the two types of forage.

Effect of Grain Feeding on Growth of Dairy Cattle

Results with Holstein and Guernsey heifers at one year of age indicate that grain-fed Guernseys were 75 pounds heavier, 1.1 inches taller, and 2.3 inches greater in heart girth than the non-grain-fed group; that grain-fed Holsteins were 88 pounds heavier, 2.6 inches taller, and 2.9 inches greater in heart girth than the non-grain-fed group.

ENTOMOLOGY AND BOTANY

Insects Attacking Grasses

The cause of silver-topping of Kentucky bluegrass could not be traced to virus infection, mechanical injury, or feeding by plant bugs or thrips. Fly larvae of the Family Chloropidae were found in 10 percent of silver-topped stems, whereas none was in the apparently normal stems.

Several bluegrass lawns treated with hydrocarbon insecticides have developed damaging populations of sod webworms. Preliminary tests indicate that such treated lawns may have fewer predaceous ground beetles than untreated lawns.

HOME ECONOMICS

Why Consumers Select Specified Foods

Grocery stores' food ads in newspapers influenced 51 percent of white homemakers and 39 percent of Negro

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Research Results in Brief

(Continued from Page 7)

homemakers to buy a specific food item during the month before the interview. This was revealed in a study of factors affecting decision making by over 6,000 consumer-families in 110 urban areas in six southern states. (Kentucky workers compiled the data.) This influence increased as the level of the homemaker's education rose, as per capita income rose to \$3,000, and as the homemaker's age increased up to 60 for the white and up to 50 for the Negro homemakers. (Cooperative with Agricultural Economics.)

HORTICULTURE

Potassium Nitrate as Tomato Fertilizer

Potassium nitrate gave significant increases in both early and total yields of tomatoes over ammonium nitrate and potassium sulfate. In some cases the yields were better when a complete fertilizer was used at the start, followed by potassium nitrate applications.

Strawberry Variety Tests

Of the 13 varieties of strawberries that fruited at Lexington and Eden Shale in 1960, Dixiland was the top yielder at Lexington and Pocahontas at Eden Shale.



Black and red raspberry planting at Eden Shale Farm.

Black Raspberry Varieties

In the second producing year at Lexington and Eden Shale, Bristol continued to be the highest producer, followed by New Logan and Cumberland.

POULTRY SCIENCE

Effect of Fiber in All-mash Laying Diets

Including ground oats up to a level of 30 percent had a stimulating effect on egg production for hens receiving a corn-soybean oil meal basal diet. Addition of 60 percent oats, however, adversely affected production and feed conversion. When equivalent fiber levels from cottonseed hulls were added to the basal diet both egg production and feed conversion were adversely affected. An effort to improve a low-protein diet by lowering the energy content was not successful.

RURAL SOCIOLOGY

Adoption of New Ideas by Farmers

In Washington county, the higher the farmer's education, socio-economic status, scale of farming and participation in formal social organizations, and the more favorable his attitude towards scientific farming—the greater is his inclination to contact institutionalized farm information media (agricultural agencies). Once he learns of a new idea in this manner, the probability he will use it is directly related to his scale of farming operations and how favorable his attitude is towards new farming ideas.

The higher the farmer's scale of operations and his participation in formal social organizations—the more extensive his contact with mass farm information media (newspapers, magazines, radio). Those who have had more than an eighth grade education and who have high levels of formal social organization participation are more likely to try new ideas gained through mass media.

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Lexington, Ky.

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