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For Your Interest

Agricultural and Home Economics Experiment Station

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FOR YOUR INTEREST

farm buildings and equipment

Design a Combination Thresher-Chopper?

HARVESTING operations are of vital concern to the farm operator. But economic analysis of harvesting costs show that, for many Iowa farm operators, the cost of owning a combine is difficult to justify. And the same holds true for a forage harvester, says Kenneth K. Barnes of the Experiment Station.

He explains, however, that the flow of material through the cylinder section of a forage harvester and a combine is very similar. Their functional requirements are to receive the crop material, to

process it and to discharge the resulting products. The only differences in these two machines are in the nature of the processing done. With the chopper, the forage is cut into short lengths, while, in the combine, the grain is removed from the head or pod. This similarity of functional requirements suggests that a combination of the two machines might be both feasible and economical.

Agricultural engineers have developed and are testing and modifying an experimental unit of this kind as an aid in developing design criteria. Work during the past year was concentrated on the feeding of the threshing cylinder. Current emphasis is on a study of the throwing characteristics when the machine is used as a forage harvester since a limited number of tests on wheat and soybeans has

shown the threshing quality to be satisfactory.

Working with Barnes in this study is R. O. Reed.

Question Effectiveness of Deductible Policies for Farm Fire, Wind Losses

NEARLY ALL farm fire and wind-storm insurance coverage in Iowa is provided by "farmers' mutuals." Partly because of this, the Experiment Station has for some time been cooperating with the mutuals in analyzing the causes and extent of losses and the means by which they might be reduced. This gives some indication of progress and also enables the mutuals to change emphasis in loss prevention as some causes become of lesser importance and as new causes appear.

Henry Giese of the Department

In tests conducted by agricultural engineers at Iowa State, the combine at left was converted into a forage harvester (right). This was done by removing the separating and cleaning unit, adding a forage delivery spout and by attaching knives to the cylinder. Otherwise, only the processing differs.



grains

of Agricultural Engineering has been conducting this analysis. He has also completed an analysis of the relative effects of farm wind-storm deductible loss policies with respect to both mutuals as a whole and to their individual members.

Among mutuals, use of the deductible policy appears questionable, according to Giese. He explains that any damage to property owned by members must eventually be sustained by them and that the philosophy of mutual insurance is the spreading of losses over the many so that none suffer unduly.

Thus, he finds that the only real saving from the use of deductible policies, in the case of mutuals, is the actual cost of processing claims. Records show this to be an insignificant item and that this cost does not vary in proportion to the number of claims paid. Low cost for a mutual—in which “company” and “members” are one—can be achieved only by loss prevention and efficient management, Giese says.

In Iowa, he adds, a \$50 deductible policy reduces the average annual assessment by about \$3. But to offset this small saving, a member forfeits all rights to a full settlement for losses sustained. For about 75 percent of the claims, he'd receive nothing; for the remaining 25 percent, he'd receive \$50 less than the amount of the loss. It would require, Giese points out, the savings from 17 years of reduced assessments to recover from the sacrifice from one claim of \$50 or more.

In effect, Giese says, the deductible policy may discriminate against the lower-income members who feel that they cannot afford full coverage or who see only the small saving in assessment each year as opposed to full coverage. Most logically, Giese concludes, mutual members should have what they want, with the facts before them on the several implications. The selection of a deductible should be optional, with the rate for full coverage fixed on an equitable basis. He adds, however, that the variable deductible appears to offer possibilities in eliminating so-called nuisance claims, with a minimum penalty on those suffering real losses.

Test Chemicals to Protect Stored Grain Against Insect Pests

ENTOMOLOGISTS at the Experiment Station are testing a number of chemicals for possible use in protecting stored, shelled corn against stored grain insect pests.

In tests so far, synergized pyrethrins and malathion have given the best protection from and control of insects in stored corn, and both are being currently recommended by the federal and many state governments for the protection of stored grain. Lindane also appears to be effective as a stored grain protectant, but its use for this purpose has not yet been approved by the federal Food and Drug Administration.

Directing the research with these and other chemicals are Paul A. Dahm, Harold Gunderson and Omar Smith. Chemicals are also being tested as repellants against stored grain insect pests.

What Effects Does "Topping" Have on Corn?

THE EFFECTS of topping corn on grain yield, date of physiologic maturity and grain moisture have been studied by research agronomists at the Experiment Station.

Topping is the cutting of the stalk above the ear node, removing all leaf or photosynthetic area above the topping level.

Topping in the tests was started 30 days after silking and was continued at 5-day intervals until the sixty-fifth day. The levels used at each date were one leaf, three leaves, five leaves and six leaves, with most plants having six or seven leaves above the ear node. The test was grown under almost ideal conditions. It was, however, conducted at only one location and with only one hybrid, so the data cannot be considered as conclusive.

The various dates and levels of topping had no consistent effects on the date of physiologic maturity—the date on which corn kernels reach maximum dry weight. As an average of all plots, this stage was reached 57 days after silking when grain moisture was 39 percent, report W. A. Russell and P. L. Cornelius.

The removal of six leaves decreased yields for the first six dates. Compared with no topping, yield reductions ranged from 11.7 bushels per acre for topping at 35 days to 4.7 bushels for topping at 45 days. The intermediate levels of topping appeared to have no consistent effects on yields.

The reduction in grain moisture was small—ranging from 0.6 to 1.4 percent for the removal of six leaves over the period of 30-55 days after silking. Though this

This photo shows the rotary corn topper mounted on a high-clearance, self-propelled machine used by the engineers in corn-topping tests.



reduction was small, there was a fairly consistent trend for the loss of moisture to increase as the number of leaves removed increased. The average grain moisture at harvest for all plots was about 19½ percent. No information was obtained on the effects of topping on stalk breakage or dropped ears.

Agricultural Engineers Report on Effects of "Topping" in 1958

DOES CORN TOPPING hasten ear drying in the field or make for better picking through less stalk breakage and less material to handle in the picker? Does it increase or reduce yields?

Because of increased interest in the past several years in topping corn before harvest, USDA and Experiment Station agricultural engineers conducted experiments in 1958 to study field ear drying and picker losses associated with topped and untopped corn.

The results of the 1958 tests, however, didn't show any significant effects from topping on the various factors studied. Kernel moisture contents, test weights and stalk breakage percentages of topped corn were about the same as for untopped corn. Though the differences were only slight, cob moisture contents in topped corn tended to average higher, and the shelling percentages and yields slightly lower, than in untopped corn.

Stands, lodging and preharvesting and harvesting losses were about the same for different topping dates and between topped and untopped corn. Harvesting losses with a picker, picker-sheller and combine weren't reduced by topping, and topping had no apparent effect on losses for either late or early harvesting.

Results from studies of this type, however, are highly dependent on weather conditions during the tests, report J. L. Schmidt and W. G. Lovely of the Agricultural Engineering Research Division, ARS, USDA. They point out that the 1958 season was ideal for corn. Thus, the ideal conditions may have reduced both the favorable and unfavorable effects that might be expected of topping. The ac-

tual effects of topping can't be established without repeated studies over several years, Schmidt and Lovely conclude.

Study Weed Competition With Soybeans

RESEARCHERS at the Experiment Station are studying the effects of weed competition with soybeans following different levels of nitrogen fertilizer applied in the preceding year. In general, similar results were obtained in both 1957 and 1958 experiments, according to D. W. Staniforth.

Weed growth and subsequent bean yield reductions were found to be greatest where nitrogen fertilizer applications were high in the previous year. In these cases, weed infestations often were heavy and bean yield reductions severe.

Differences among varieties of soybeans with respect to weed competition weren't great, Staniforth says. But, in these tests, early varieties appeared to withstand weed competition better than later varieties.

home and family

Farmers Cooperate In Test of Fabrics Used in Work Pants

MANY IOWA farmers are aiding an Experiment Station project by wearing work pants furnished them for selected periods. Researchers are conducting "wear tests" to determine which of five different fabrics wears best, is liked best by the wearer and is most easily cared for by the homemaker.

At the time of this report, the pants had been worn a total of 24 weeks. The average number of washings per pair of pants was 14 or 15 times during the 24-week period.

Results of the test so far indicate that the pants made of a dacron-rayon blend are superior in endurance but are not as well accepted by the farmers. Some of the complaints against this particular blend are that the fabric

gathered lint easily, the pants felt too warm and were too "dressy" looking for work pants. Two other fabrics containing nylon-cotton blends are gaining in acceptance by the wearers. This study will be continued until the point of destruction of the garments in use is reached.

Research personnel working on this study are: Margaret Warning, Emil Jebe, Frances Magrabi and Mary Olson.

Knowledge of Values Is Basic to Developing Adult Education Programs

VALUES OF individuals are believed to be strong drives to action. These values may have much to do with the effectiveness or lack of effectiveness of adult education programs for homemakers. Before we can improve these programs to better meet the needs and desires of Iowa's homemakers, it's necessary to know the values of various groups of homemakers. Because of this, Mary S. Lyle and Eleanore Kohlmann of the Experiment Station are conducting a study aimed at learning these values and their possible relation to the success of educational programs.

Seek More Information On Nutritional Needs Of School-Age Girls

LEARNING THE relationship of nutrition to the growth and development of school-age girls is one goal of a long-time Experiment Station study under the direction of Ercel Eppright and Charlotte Roderuck. The researchers are trying to find out whether differences in diets are associated with differences in body measurements and nutritional status among girls aged 8 to 14 years. Another goal of the study is to learn whether or not a nutrient-rich supplement given at school over a period of time would bring about improvements in the nutritional status of the girls.

The average daily nutrient intakes of the group of girls studied were, on the whole, in fair accord with the allowances recommended by the National Research Council. The average nutritive values of

the diets were almost identical with the averages observed in a previous state-wide study made in 1948-51. Both studies indicated that the need for improvement was greatest in calcium and vitamin D.

Half of the girls in the present study were fed a nutrient-rich "snack-type" supplement at school. The average daily nutrient intakes of the girls receiving the supplement were notably improved in all nutrients except iron and niacin, without a marked increase in the number of calories daily. Therefore, the supplement achieved the desired effect of improving the diets. Because the unsupplemented diets furnished almost no vitamin D, the percentage of difference made by the supplement was extremely high for this nutrient.

Thus far, the study hasn't shown any advantages peculiar to any one age or physique type as a result of the diet supplement. This may indicate that the diets prior to supplementation were, on the average, approaching a good standard of intake. Further study is needed to examine more carefully individual girls whose diets were inadequate.

special subjects

Autopsies Provide Check On Wildlife Diseases

DURING 1958, 621 birds and animals were autopsied at the Iowa State Veterinary Diagnostic Laboratory. Rabies were found in 84 of 114 skunks, 2 of 6 civet cats and 2 of 15 foxes. Tests for rabies were negative for 286 other animals of several wildlife species. Such autopsies provide a continuing check on diseases among Iowa wildlife as specimens become available for examination during routine field work or from cooperators, reports Arnold O. Haugen of the Experiment Station.

Haugen is in charge of wildlife disease work at the Experiment Station in cooperation with the Veterinary Diagnostic Labora-



Research on wildlife disease is conducted in cooperation with the College of Veterinary Medicine at Iowa State.

tory, the State Conservation Commission, the U. S. Fish and Wildlife Service and the Wildlife Management Institute.

Die-offs of raccoons in the vicinities of Lakeview, Spring Brook State Park and Walnut Woods State Park were reported during the year. Cottontails have been reported as suffering some mortality in the Lucas and the Boone-Story county areas. Causes of the die-offs are not yet known.

Climatology Data Used by Many Persons, Groups

RESEARCH by agricultural climatologists and the Experiment Station in cooperation with the United States Weather Bureau provides information of use to many individuals and groups. Both the technical and generalized findings of this research are used not only by other research scien-

tists in their work but also by interested farm and urban people.

In addition to the collection and interpretation of detailed technical information during the past year, R. H. Shaw of the Experiment Station and C. R. Elford, state climatologist of the Weather Bureau, prepared a series of eight articles on "what makes the weather." These were published in IOWA FARM SCIENCE during the year and are available as reprints from the Publications Distribution Room at Iowa State. These were published to provide a better understanding of the weather so that persons can improve their use and interpretation of the other weather information available to them from day to day.

The accumulation of weather data over the years earlier made it possible to establish the odds or chances for the first-fall and last-spring freeze to occur on different dates in various parts of the state. More recently, on the basis of data collected, it has been possible to establish similar odds on dates of the first fall snow (see IOWA FARM SCIENCE, Nov. 1958, or reprint FS-784).

Shaw is in charge of agricultural climatology research work at the Experiment Station.

Central Iowa Honeyflow Improved in 1958

THE HONEYFLOW in central Iowa in 1958 was somewhat better than that in 1957, according to Walter C. Rothenbuhler and Victor C. Thompson of the Ex-

Central Iowa's 1958 honeyflow was better than in 1957, according to Experiment Station data, but still was considered low for the area.



periment Station. But they say that the 1958 flow must still be considered low for this area.

In addition to collecting Iowa honeyflow data, Rothenbuhler and Thompson are also studying the influence of honeyflow and weather factors on the foulbrood syndrome in colonies of both resistant and susceptible lines of bees.

soils

How Do Alfalfa Meadow And Corn in Rotation Compete for Moisture?

DIFFERENT METHODS of handling alfalfa meadows in rotation and their effects on soil moisture are being studied by W. D. Shrader and R. P. Nicholson of the Experiment Station. Second-year meadow is killed at different times during the season, and the effects are measured by soil moisture determinations and by corn yields in the following year.

This study is designed to furnish information on the competition for soil moisture between alfalfa and corn grown in rotations and to suggest procedures for lessening this competition if it's found to be a serious factor.

Destroying the meadow crop after the first cutting in 1957 resulted in 8 inches of available moisture in the soil at corn planting time in 1958 and a corn yield of 75 bushels per acre. Leaving the meadow until April 1958 resulted in only 4.5 inches of available soil moisture at planting time and a corn yield of 48 bushels per acre. This information, however, is based on just 1 year's results. Results based on several years of study should be more reliable for making recommendations, say Shrader and Nicholson.

Study Effects of Rates Of Lime Applications

THE EFFECTS of rates of application of lime on yields of corn, oats and legume meadow in a 3-year rotation are being studied at three locations on Marshall, Grundy and Edina soils, reports



Terminal leaves of bridal wreath are rolled and tied together by spirea leaf roller larvae (left). Later, the leaves are deadened and dying (right) because of continued feeding by the leaf roller.

John Pesek of the Experiment Station.

Responses of the three crops have been slight and variable on the Marshall soil, which has a low lime requirement of about 1½ tons per acre. At the other extreme, responses have been large on the Edina soil, which has a lime requirement of almost 5 tons per acre, and responses have been intermediate on the Grundy site, which has an intermediate lime requirement.

Relative responses to lime were 24, 23, 16 and 8 percent for the alfalfa, red clover, oats and corn, respectively, on Grundy silt loam. The respective values were 80, 16, 27 and 24 percent on the Edina silt loam. Alfalfa, on the basis of these results, is the most responsive crop at either location, and the Edina site is more responsive to lime than the Grundy.

and Iowa nurseries produce a large number of these plants. In recent years, however, leaf-rolling caterpillars have been common and damaging on this ornamental. The greatest damage, in the nature of retarding growth, says H. M. Harris of the Experiment Station, is done to 1-year-old plants.

In control experiments, DDT and Guthion at 2 pounds actual toxicant per 100 gallons and Rhothane at 3 pounds per 100 gallons gave complete control when applied at weekly intervals for 4 weeks.

Though several leaf rollers are involved, Harris adds, the Spirea Leaf Roller, *Evora hemidesma* (Zeller), is the most common and damaging of the species studied. The entire life cycle of this species is completed in slightly more than a month. But several broods may infest the plants in a single season.

Continue Research On Potato Late Blight

LATE BLIGHT of potatoes is one of the continuing problems being faced by agricultural research workers. J. R. Wallin, regional coordinator of the Crop Disease Forecasting Project headquartered at the Experiment Station, is currently conducting a study covering various phases of forecasting

horticulture

Spirea Leaf Roller Damaging to Ornamentals

BRIDAL WREATH (*Spirea vanhouttei*) is one of the more popular ornamental landscaping plants,

outbreaks of the late blight disease.

Some of these phases under consideration in 1958 were: the influence of post incubation temperature on the infection of potato foliage; the resistance of different potato varieties to late blight disease; the use of a "late blight garden" in forecasting the initial outbreak and development of the disease; the relationship of humidity in the fields to disease outbreaks; and the accuracy of regional late blight forecasts developed from weather data.

Stimulate Runner Growth Of Strawberry Plants

SOME STRAWBERRY varieties and selections are nearly runnerless. This is an advantage in some ways, but propagation of such plants poses a problem. The possibility of using the chemical gibberellin to stimulate runner production in such situations is under study by E. L. Denisen at the Experiment Station.

Tests using gibberellin sprays showed that 30 percent of the sprayed plants showed runner development, while none of the unsprayed plants developed runners. The use of gibberellin, however, produced certain other effects on the plants—such as reduced fruit set. Denisen reports that further studies are needed to determine the practicability of runner stimulation by this chemical.

Nearly runnerless strawberry plants are difficult to propagate. Gibberellin sprayed on runnerless strawberry plants produced runners (right), but also produced certain other undesirable effects.



farm business and management

What Do Feed Dealers Think About Feeder Contracts?

THE EXPERIMENT STATION is cooperating with the USDA in surveying the impact upon and the role of the feed industry with respect to vertical integration or contract farming in the Midwest.

In preliminary work, it has been found that relatively few feed dealers in Iowa offer contracts themselves to their customers. Those that do generally finance them through local banks which also provide management service to their customers under contract. The extent of this service appears to vary considerably, notes Richard Phillips of the Experiment Station.

Most of the feed dealers interviewed in the preliminary survey thought that feeder contracts backed by the feed manufacturers would increase their sales of feed somewhat. But about half of these dealers also thought that such contracts would increase their expenses more than their returns.

While most of the feed dealers interviewed expressed no strong opinions toward feed contracts, a few were strongly opposed and a few strongly in favor of them, Phillips reports.

Compare Supply of Farm Products With Farm Resource Demand

TWO MAJOR studies are in progress at the Experiment Station concerning the supply of agricultural products and the demand for resources in agriculture. One deals with the supply of agricultural products in general, and the other is concerned with farm resource use and demand.

These studies, under the direction of Earl O. Heady, involve both the nation as a whole and various geographic areas. The results will furnish additional information on the various changes taking place in agriculture and other sectors of the economy as well as on the factors and forces behind the changes.

Study Movements of Grain in Iowa

THE EXPERIMENT STATION is cooperating with other north-central states in a study of pricing and trading practices for grain. As a part of this work during 1958, considerable information was collected on the 1957 patterns of grain movement by truck in Iowa.

A total of 246,455,711 bushels of grain were merchandised (incoming or outgoing) by Iowa country elevators in 1957, reports Richard Phillips of the Experiment Station. Of this total, 69,052,951 bushels were outshipments by truck from the trade territory, and 25,718,909 were inshipments from outside the territory by truck.

Of the outshipments by truck, 30,547,416 bushels were moved to destinations outside of the state, while 38,505,535 bushels went to destinations in Iowa. Of the inshipments by truck, 14,425,368 bushels came from outside of the state (chiefly from Minnesota), while 11,293,541 bushels came from sources within Iowa.

Soybeans, Phillips says, were the most important grains moved to destinations within Iowa by truck (25,577,369 bushels). Corn (20,570,472 bushels) and oats (6,655,860 bushels) were the major grains moved to out-of-state destinations by truck.