agricultural and home economics experiment station
Outlying exp. farms

OUTLYING EXPERIMENTAL FARMS

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AGRICULTURE AND HOME ECONOMICS EXPERIMENT STATION
May 1975

PREFACE

The system of Outlying Experimental Farms described in this booklet developed and grew in response to the needs of Iowa farmers. The farms form a vital part of the research program at the Iowa Agriculture and Home Economics Experiment Station. They provide a direct link between farmers throughout the state and the Station's ongoing research efforts.

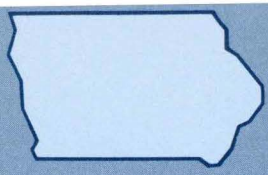
The farms are strategically located in several of Iowa's major soil association and climatic areas. This permits scientists to conduct field experiments under various agroclimatic conditions existing in the state. Field days, demonstration plots, and experimental facilities at the farms give producers an opportunity to see research in action under conditions similar to those on their own farms.

The strength of the Outlying Experimental Farms in Iowa stems partly from their close integration into the overall Experiment Station research program. The farms are administered within the Special Research and Development unit of the Experiment Station. Close liaison also is maintained with local producers and Extension Service staff in the area of each farm. Over the years, this fruitful combination of central direction and local input has contributed significantly to the success of the Outlying Experimental Farms in serving Iowa agriculture.

The Outlying Experimental Farms are open to the public, and visitors are welcome.

—Lee Kolmer, Dean of the College of Agriculture and Director of the Iowa Agriculture and Home Economics Experiment Station.

The Experiment Station conducts its programs without discrimination as to race, color, sex, or national origin.



The predominance of Iowa's "big four"—corn, soybeans, hogs, and beef cattle—suggests a homogeneous farming sector. But the state's soils, climate, and topography, which greatly influence farm production, are more diverse than is commonly recognized.

Iowa contains about 20 major soil associations or combinations of soil types that form repeated patterns from field to field within a geographical region. Soil types may differ in topography, texture, drainage, content of organic matter and nutrients, acidity, and susceptibility to erosion. These characteristics partly determine the farm enterprises and management practices most suitable and profitable in a particular soil association area.

Climate also affects farming patterns and practices, although the relationship between climate and agricultural productivity is quite complex. To some extent, climate and soil characteristics interact in their influence on crop growth.

In Iowa, the average annual rainfall is least in the northwest (less than 26 inches) and greatest in the southeast (more than 34 inches). In general, areas of the state receiving similar amounts of rainfall lie along lines extending from the southwest to northeast.

The pattern of annual mean temperatures and length of the growing season varies fairly evenly from north to south. Mean temperatures in Iowa range from about 46 degrees in the northern tier of counties to 52 degrees in the southern two tiers of counties. The growing season varies likewise, being 1 to 2 weeks shorter in northern than in southern Iowa.

Production of crops and livestock is closely related in Iowa. Some 32 million beef cattle, hogs, dairy cattle, and poultry convert Iowa's corn, soybean, and forage crops into more valuable and nutritious livestock products. In recent years, about 55 to 70 percent of Iowa's farm cash receipts have come from livestock marketings, valued at $4.2 billion in 1973.

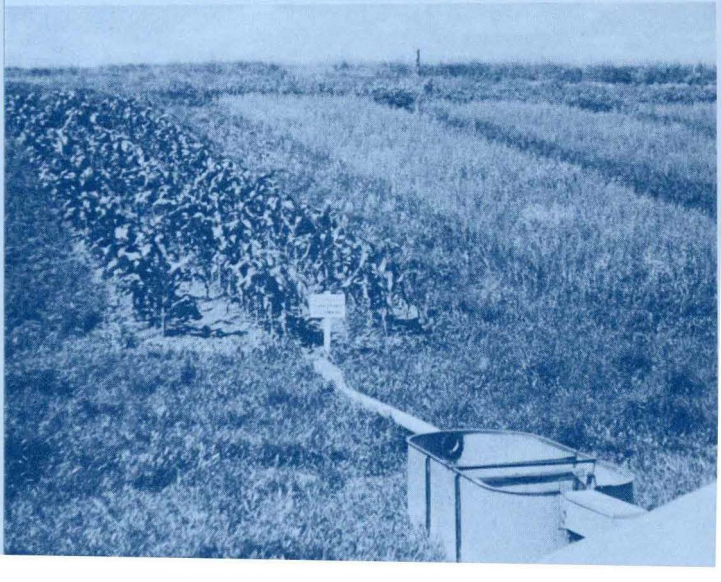
Because Iowa's land, climate, and agricultural enterprises vary considerably, farmers often have problems that are specific to their area. In an effort to solve these problems and study the effects of regional differences, the Iowa Agriculture and Home Economics Experiment Station conducts research at several experimental farms located in different parts of the state. Research at these outlying farms supplements that done in the laboratories and field research facilities in and around Ames, headquarters of the Iowa Experiment Station at Iowa State University.

Eight of the eleven outlying experimental farms are owned or leased by local, nonprofit associations of farmers and businesspeople in the area. Three of the experimental farms are state-owned and administered by Iowa State University.

Association-owned farms are leased to the Experiment Station for a rental fee equivalent to the annual taxes and insurance costs. Income from sale of farm products grown in the course of research is placed in a separate fund for each farm and used to help pay for the research. The Experiment Station assumes the remaining costs of operating the farms and research programs.

The Northern Iowa Experimental Association, the oldest in Iowa, was formed in March 1930. During the 1940s and 1950s, additional associations were formed throughout the state. Some as-

Field apparatus for measuring soil and water runoff at the Western Iowa Farm.



Producers observe experimental tomato plots during a field day at the Muscatine Island Field Station.

sociations have disbanded because the problems that initially stimulated their formation have been solved or now are best studied at other locations.

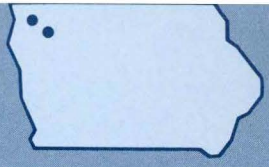
Each association-owned farm has an advisory committee composed of producers from the area, county and area Extension staff, and ISU staff members conducting research at the farm. The advisory committees, which meet annually or more often, suggest problems encountered by local farmers that need to be studied, act as a liaison between Iowa State University and local producers, and advise about the general operation of the farms.

Results obtained in research at the experimental farms are presented in annual progress reports and by Extension Service specialists in meetings, pamphlets, news stories, and broadcasts. Local farmers also are invited to attend annual or semiannual field days, held at most farms, to observe experiments in progress and learn about the latest findings.

Research projects at the experimental farms often are continued for 3 to 6 years or longer to observe fluctuations in environmental conditions and long-term trends. Sometimes, similar or identical experiments are conducted at several farms so that the influence of differences in soils and climate can be assessed.

Studies at the *Allee Farm* and the *McNay Farm* are concerned largely with livestock production. The *Brayton Memorial Forest* is used for research on the management of forest resources. Both crop and livestock research are conducted at the *Western Iowa Farm* and *Shelby-Grundy Farm.* Work at the other six farms is focused on crop production and soil-water management.

Northwestern Iowa Farms



The Northwest Iowa Experimental Association, formed in 1954, owns two tracts of land, the 76-acre *Galva-Primghar Farm* near Sutherland in O'Brien County and the 40-acre *Moody Farm* near Doon in Lyon County.

The two farms together have the major soil types characteristic of northwestern Iowa. Most land in this region is nearly level to gently undulating and is well drained, except for some flat areas with Marcus silty clay loam. The major soils have formed in loess that overlies an older glacial till.

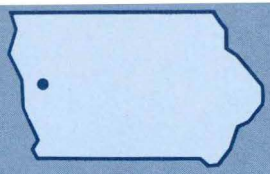
Northwestern Iowa receives less rainfall than other parts of the state and has relatively low soil-moisture reserves. Thus, although the soils are favorable for high yields and much of the land is intensively cropped with corn and soybeans, average yields are slightly lower here than in regions with better moisture conditions.

Research at the two farms primarily involves studies on fertilizer requirements of corn and soybeans grown in different cropping systems, the effect of tillage practices on crop yields and soil properties, the effect of planting rates and fertilization on corn yields under different moisture conditions, herbicide evaluations, and variety testing of oats, soybeans, barley, and grain sorghum.

Because inadequate moisture frequently limits yields in northwestern Iowa, considerable research has been conducted to determine how farm practices influence the water supply available to crops and to develop superior moisture conservation methods.

Experimental plots at Moody Farm in northwestern Iowa.

Western Iowa Farm



The 240-acre *Western Iowa Farm* at Castana in Monona County was purchased by the Western Iowa Experimental Association in 1946. The Ida and Monona soils on the farm are typical of a large area of rolling land in Crawford, Harrison, Monona, Woodbury, and adjacent counties.

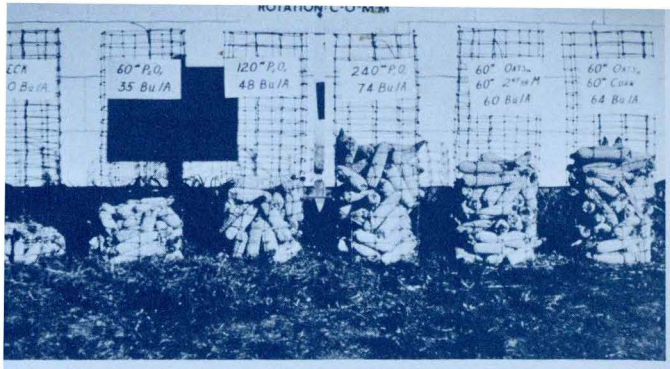
The topography of this region is characterized by narrow, gently sloping ridges and steep side slopes that gradually change to well-defined alluvial valleys. Nearly all the upland soils have formed from very thick deposits of loess that covered the rolling glacial till plain. In places, the loess is more than 100 feet thick.

Although the valleys, less-steep side slopes, and ridges usually are cultivated, erosion is a common and widespread problem. The sloping soils of western Iowa are very erosive and require terracing, contour listing, or other soil conservation practices for adequate erosion control. The steeper slopes often are kept in permanent pasture.

Tillage practices that tend to decrease erosion have been studied for many years at the Western Iowa Farm. Current research includes comparing the effects of conventional tillage, ridge planting, and till-planting on corn stands, corn yields, and the movement of sediment, plant nutrients, and pesticides. Other studies are in progress on fertilizer requirements of corn grown in different cropping systems, the effects of fertilization on soil properties, and the influence of potassium and plant population on lodging and yields of multiple-eared corn hybrids.

Because some of the land in this region should not be continuously row-cropped, research on the management and use of pasture and forage crops also is conducted at the Western Iowa Farm.

In tests of cool-season perennial grasses, reed canary-grass and smooth bromegrass have yielded the best and seem well adapted to western Iowa. The effect of different amounts and types of nitrogen fertilization on smooth bromegrass yields also is being studied. In another project, started in 1971, Station scientists are testing the



The effect of phosphate fertilization on corn yields is demonstrated at the Western Iowa Farm.

influence of cutting management and nitrogen fertilization on the yield, seasonal distribution, and composition of mixed pastures containing crownvetch (a legume) and a cool-season grass.

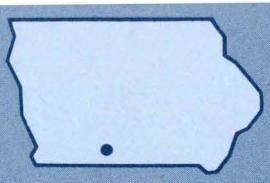
Grazing studies at the Western Iowa Farm have assessed the persistency and productivity of mixed crownvetch-grass pastures. The results after 6 years of tests suggest that yearling steers will produce 2½ to 3 times more liveweight gains per acre on improved, mixed crownvetch pastures than on unimproved bluegrass pastures.

Evaluation of a two-component system, including smooth bromegrass and switchgrass in separate pastures, is beginning in 1975. Scientists will determine whether the warm-season switchgrass can support grazing animals during July and August when bromegrass hits its midsummer slump.

In addition to the main farm at Castana, a tract of Luton silty clay is available for research near Onawa. Although the topography and generally high productivity of Luton and other bottomland soils favor crop production, the heavy texture and poor drainage of these soils often present special problems.

Because of interest in commercial vegetable production in the Missouri River Valley, the Experiment Station recently started research on vegetable crops at private farms near Whiting in Monona County. Outstanding yields of snap beans, sweet corn, and processing tomatoes have been obtained in variety trials of numerous crops. Continued variety trials, as well as studies on fertilization, weed control, row spacings and plant populations, growth regulators, and irrigation, are planned for the future.

Shelby-Grundy Farm



Research aimed at developing productive cropping and livestock systems suitable to the hilly terrain and erosive soils of southern Iowa is conducted at the *Shelby-Grundy Farm.* Located near Beaconsfield in Ringgold County, the 320-acre farm was purchased by the Shelby-Grundy Experimental Association in 1948.

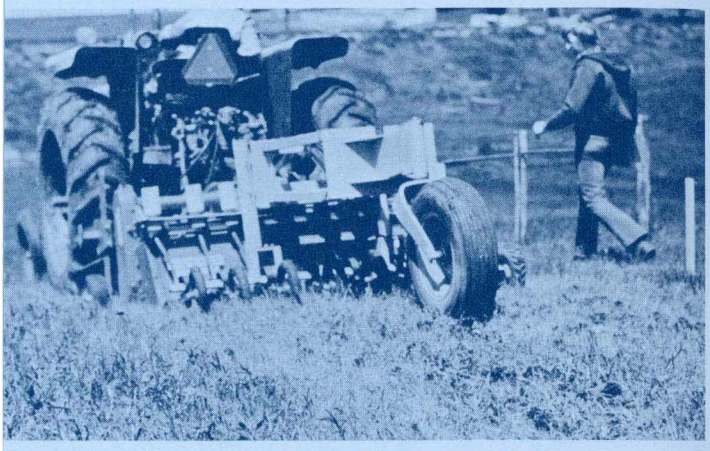
Southern Iowa is marked by an intricate pattern of narrow ridge tops flanked by gently sloping to steep side slopes. The conspicuous, irregular upland flats have eroded extensively so that, today, they consitute only about 20 percent of the land area.

Grundy soils, which developed from deposits of fine-textured loess, occur on upland ridges and side slopes with a gradient of 2 to 7 percent. Shelby soils have formed in glacial till exposed by geologic erosion and occur on slopes of 9 to 30 percent. These two major soils are subject to rapid erosion when clean-tilled unless effective erosion-control practices are used. Eroded land, where the subsoil has been exposed, is quite difficult to work and not very productive.

Although continuous row-cropping is not feasible in much of southern Iowa, the region is well suited for cattle enterprises based on pasture and forage crops. Because of this, many experiments at the Shelby-Grundy Farm involve the production, management, and use of forage crops and pastures. These include studies on the yield and persistence of cool- and warm-season grasses, fertilizer requirements for hay and silage production, grazing management, and pasture improvement.

When cool-season grasses become dormant during midsummer, other types of pasture must be available to meet grazing needs during this period. Hybrid sudangrass pastures and birdsfoot trefoil-grass pastures (plus supplemental corn and protein) are two summer alternatives under study at the Shelby-Grundy Farm. The grazing studies conducted so far indicate that both of these pasture systems support good animal growth during July and August.

About 3 million acres in Iowa are in permanent Kentucky bluegrass pasture, which is relatively unproductive unless fertilized. Although expensive, renovation of these pastures with more productive legume-forage species generally increases pasture carrying capacities 3- to 4-fold. But complete renovation, including plowing and reseeding, is not practical on much of this land, which is so sloping that plowing would cause serious soil erosion.

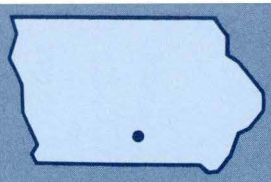


Interseeder machine used to seed a legume crop into pastures is tested at the Shelby-Grundy Farm.

To get around this problem and reduce the costs of pasture improvement, Station scientists have developed a machine that interseeds a legume crop into pastures in a one-pass operation. Tests at the Shelby-Grundy Farm and other sites have shown that interseeded pastures yield significantly better than unimproved Kentucky bluegrass pastures.

The Shelby-Grundy Farm also is used for research on plant populations and fertilization rates for continuous corn, planting dates for corn and soybeans, and fertilizer requirements of different cropping systems. In the past, various tillage practices and cropping systems were evaluated for their effect on crop yields and soil and water losses. Information from this earlier research has formed the basis for soil conservation work in the area.

McNay Memorial Farm



The *McNay Memorial Farm* was established in 1956 when Harry McNay and his sister, Winnie McNay, deeded 480 acres to the ISU Alumni Achievement Fund. The farm, located near Chariton in Lucas County, was used for beef cattle breeding research from 1956 to 1967.

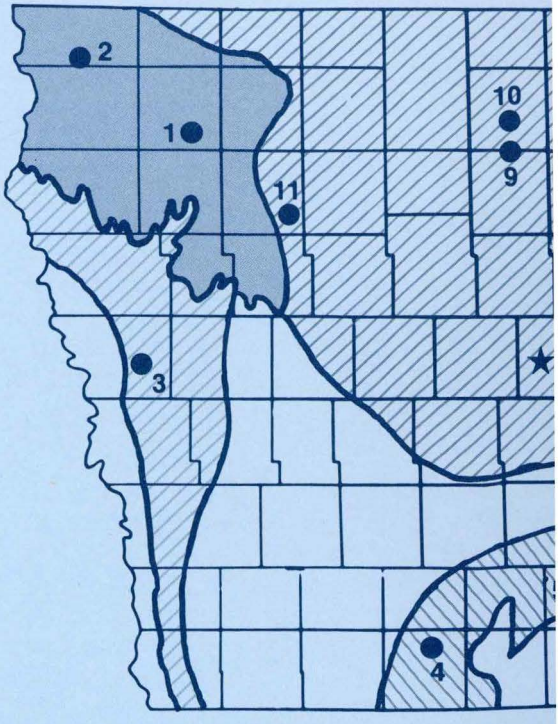
Acquistion of additional land between 1967 and 1973 increased the farm's size to 1845 acres. Eventually, the McNay Farm will serve as the Experiment Station's major research site in southern Iowa and include research activities formerly conducted at several experimental farms that have been closed in recent years.

The research program on beef breeding was expanded considerably in the late 1960s. Studies on the reproductive management of beef-cow herds were started in 1972. And experimental pastures were seeded in 1974 for work on forage varieties and pasture utilization, the third major area of research at the McNay Farm. In the future additional plots will be established for studies on tillage practices, fertilization, watershed management, and other crop production problems.

Beef Breeding: Experiment Station scientists recently completed a 6-year crossbreeding study involving two beef breeds (Angus and Hereford) and two dairy breeds (Holstein and Brown Swiss). In the first part of this study, the 16 possible crossbred progeny from the four breeds were produced. In the second phase, crossbred heifers were mated so that their fertility and mothering ability could be compared with those of purebred heifers.

In general, crossbred calves were slightly heavier at birth, gained weight faster, and yielded about the same quantity and quality of retail product as purebreds. Crossbred heifers also outperformed purebred heifers by producing, on the average, 5 percent more calves with 4-percent greater yearling weights. The beef-dairy crossbred heifers performed significantly better than those containing all beef or all dairy blood. Additional research now in progress at the McNay Farm will evaluate the lifetime produc-

Outlying Exper



Research results obtained at the outlying experimental farms are applicable to the major soil association area (shaded) in which the farms are located.

1. **Galva - Primghar Farm,** Sutherland, O'Brien County. Kenneth Ross, Manager. Crops research.
2. **Moody Farm,** Doon, Lyon County. H.E. Myers, Supervisor. Crops research.
3. **Western Iowa Farm,** Castana and Onawa, Monona County. Wayne Fruehling, Manager. Crops and beef cattle research.
4. **Shelby-Grundy Farm,** Beaconsfield, Ringgold County. Kenneth Driftmier, Manager. Crops, beef, and sheep research.
5. **McNay Memorial Farm,** Chariton, Lucas County. Robert Bishop, Manager. Beef cattle and forage research.
6. **Muscatine Island Field Station,** Fruitland, Muscatine County. Lewis Peterson, Manager, Vegetable crops research.
7. **Brayton Memorial Forest,** Delhi, Delaware County. Forest research.

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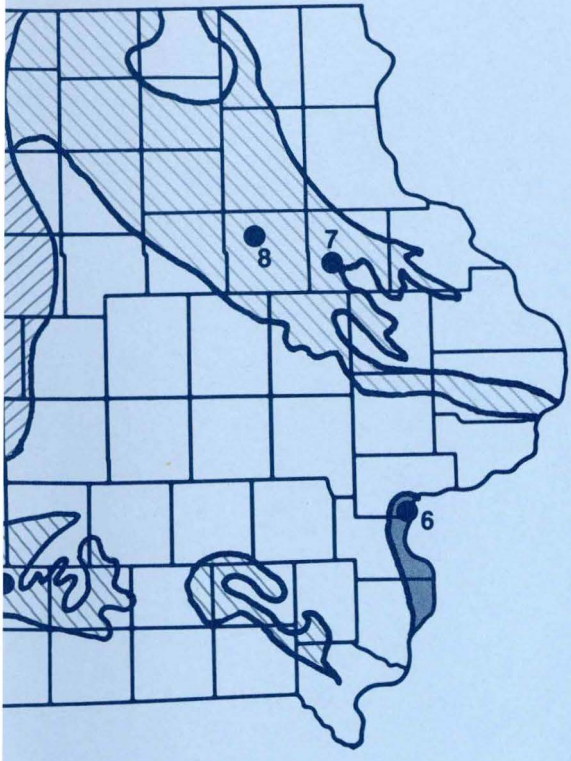


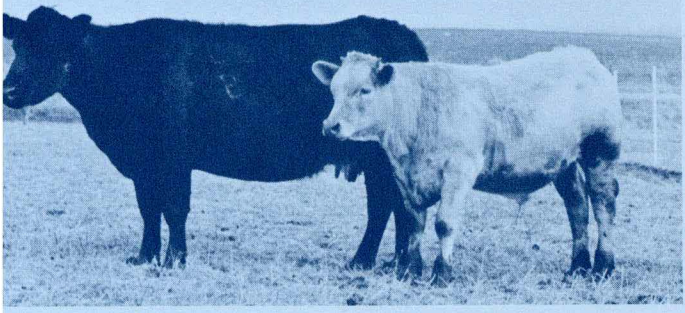
Livestock research at the McNay Memorial Farm and Allee Farm generally is applicable to cow-calf and cattle-feeding enterprises, respectively.

8. **Carrington-Clyde Farm,** Independence, Buchanan County. Robert Sherriff, Supervisor. Crops research.
9. **Clarion-Webster Farm,** Kanawha, Hancock County. Sy Angstrom, Manager. Crops research.
10. **Northern Iowa Farm,** Kanawha, Hancock County. Sy Angstrom, Manager. Crops research.
11. **Allee Farm,** Newell, Buena Vista County. Henry Schaefer, Manager. Cattle feedlot management, entomology, and corn breeding research.

*Headquarters of the Iowa Agriculture and Home Economics Experiment Station, Ames. Dr. H.L. Self, Professor in Charge of Outlying Experimental Farms. Floyd Ransom, Farms Manager.

tion of cows that have 0, 25, 50, and 100 percent dairy blood.

Crossbreeding generally affects any one characteristic, such as weaning weight or percentage calf crop, by only a few percentage points. But the cumulative effect of these small changes can be substantial. Research at Iowa and other state experiment stations strongly suggests that crossbreeding could increase commercial beef output per cow bred by 15 to 25 percent.



Angus-Holstein cow mated to a Charolais sire produces 3-way crossbred calves with good growth and cutability. The crossbred brood cow has the marbling and mothering traits of the Angus and the milking, leanness, and size potential of the Holstein.

Reproductive Management: The performance of a beef cow is judged by her production of calves. Unlike feedlot cattle, beef cows must be evaluated continuously, throughout their lives. For example, a cow may produce an offspring with a 700-pound weaning weight one year, but, if she fails to settle and produce a calf the following year, her average production is only 350 pounds per year.

Reducing the age of first calving is another possible way to increase the lifetime productivity of beef cows. In one study at the McNay Farm, 15 heifers conceived at an average age of 9.3 months, considerably younger than the usual age for first breeding. Ten of the heifers gave birth, with only one needing minor assistance. Although the preliminary results of calving at an early age look promising, the performance of offspring and cows after early calving must be evaluated further.

Early weaning, particularly of fall-born calves, is another practice under study at the McNay

Farm. Early weaning of fall-born calves avoids the problem of maintaining a lactating cow during the severe winter months. Cows not nursing can use low-quality residues and other plant material unsuitable for nursing cows. Early weaning removes the nursing activity, which seems to inhibit estrus, and helps cows to return to their first post-calving estrus sooner. Although the conception rate of cows with early weaned calves in the first post-calving estrus has been lower than normal, on the average they conceive sooner than cows with nursing calves.

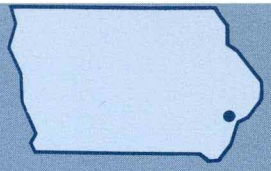
Forage Production and Utilization: Research on the efficiency of forage utilization by beef animals will begin at the McNay Farm during 1975. Scientists are using information gathered earlier at other outlying experimental farms to develop and test a variety of pasture and forage reserve systems. The long-range objective is to substantially increase the proportion of beef cattle feed derived from forages and crop residues and to reduce the proportion derived from cereal grains.

Ruminants such as beef and dairy cattle can produce highly nutritious and desirable food from materials that humans cannot eat or digest directly. Experiment Station scientists believe, for example, the level of grain and protein concentrates used in beef production today could be reduced by 50 percent or more if highly productive forage systems were more widespread. Such a shift would reduce the demand and prices for grains and oilseed crops, lessen the need to use unsuitable land for production of row crops, and allow continued production of beef at reasonable prices.

In the first part of this project, growing beef cattle will graze three different mixed pastures during a 6-month grazing season. The yield, composition, and persistence of the pastures, measures of animal performance, and grazing efficiency will be evaluated.

Scientists hope also to study several combinations of pasture and forage reserve designed to provide year-around feed supplies for growing and mature beef animals. This would start with computer-assisted simulation studies to select forage systems optimizing either net income or beef production per unit of time or land area. It is hoped that field testing of selected systems can begin in 1977.

Muscatine Island Station

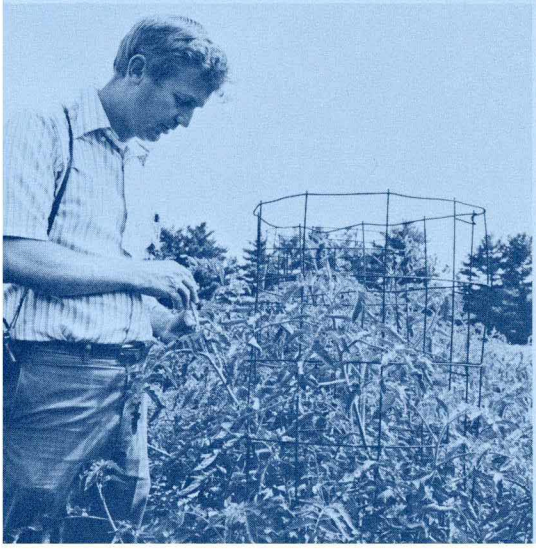


Since 1936, the Muscatine Island Truck Growers Association has provided land to the Experiment Station for studies on vegetable production in the Mississippi River bottomlands of eastern Iowa. Easily tilled sandy soils, irrigation, and proximity of major markets have fostered profitable truck crop farming in the bottomlands of Muscatine and Louisa counties.

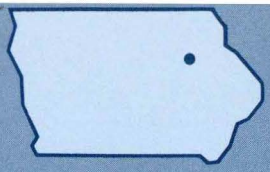
Trials of advanced breeding stock and the newest varieties of muskmelons, sweet potatoes, watermelons, tomatoes, cucumbers, and other crops are conducted annually at the 60-acre *Muscatine Island Field Station,* located near Fruitland.

New cultural methods are evaluated, such as growing tomatoes in cages, using irrigation water for cooling in summer and for frost protection in early fall, chemical control of fruit ripening, and use of mulches and transplanting to increase early yields of muskmelons. Studies on weed and pest control also are carried on at the field station. Other research includes studies on rates and techniques of fertilization and on problems associated with mechanical harvesting.

Growing tomatoes in cages increased the average quality of fruit and reduced the number of cull fruits, but had little effect on total yield at the Muscatine Island Field Station.



Northeastern Iowa Farm



The Carrington-Clyde Experimental Association has leased a 40-acre farm to the Experiment Station since 1949. The *Carrington-Clyde Farm* is located 4 miles north of Independence in Buchanan County in the glaciated soil region of northeastern Iowa.

The region's numerous soil types have formed in loamy material, overlying an old glacial till. The land is nearly level to undulating, with low swells rising gradually between intervening swales, which often are poorly drained.

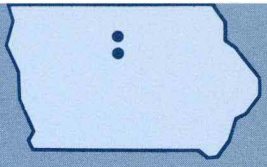
In northeastern Iowa, farmers use about as much land for small grains, hay, and pasture as they use for corn and soybeans. Dairy farming is much more important here than elsewhere in the state. Areas with slopes of 5 to 10 percent require some erosion-control measures when planted in row crops. On the nearly level soils, tile drainage often is required for good crop yields.

Many experiments at the Carrington-Clyde Farm have focused on problems of corn and soybean production in the area. These include studies on nutrient and lime requirements, tillage methods, weed and pest control, and the long-term effects of different management practices on yields and soil properties. Disposal of livestock wastes on cropland also has been studied because of the need for economic and environmentally acceptable methods for handling the nearly 100 million tons of animal wastes produced on Iowa farms each year.

The original small Carrington-Clyde farm, however, has been "used up" for research purposes. Experimental treatments during the past 25 years have left it no longer typical of its soil area, and a larger farm is needed to conduct realistic conservation and tillage research and to use research equipment and personnel efficiently.

During the fall of 1974, farmers and businesspeople in northeastern Iowa began to raise funds to purchase a new and larger experimental farm so that research in this area of the state can continue.

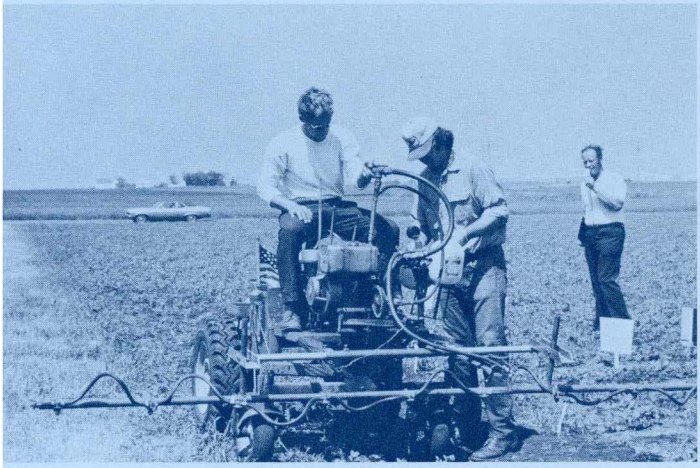
North-Central Iowa Farms



Two outlying farms are located in the extensive north-central and central area extending from the Minnesota border south to Des Moines. Nearly level to gently sloping terrain, dark brown to black surface soils, a neatly rectangular gridwork of roads and fields, and large expanses of corn and soybeans characterize this region, which typifies the Iowa landscape for many persons. Cash-grain farming is very important in this part of Iowa.

The dominant soils—Clarion, Webster, and Nicollet—all developed from loam glacial till deposited when the last glaciers advanced into Iowa about 11,000 to 14,000 years ago. Because much of the land has naturally poor drainage, about a third to half of the area is drained artificially by tile systems and open ditches.

Some soils in north-central Iowa contain excess lime, which reduces the availability of potassium and phosphorus and also may aggravate iron-deficiency chlorosis in soybeans. Water erosion generally is not excessive, except on occasional



A small, highly maneuverable sprayer is used for accurate placement of chemicals on herbicide-evaluation plots at the Northern Iowa Farm.

short, steep slopes. But wind erosion often is substantial, especially during winter and early spring when the soil surface is exposed.

The headquarters of the Iowa Experiment Station at Ames is located in the southern portion of this soil association area. Differences in the length of the growing season, internal soil drainage, and soil nutrient levels, however, are sufficient for the location of experimental farms in the northern portion of these important soils.

The *Northern Iowa Farm,* located at the edge of Kanawha in Hancock County, was purchased by the Northern Iowa Experimental Association in 1930. During its early years, the 93-acre farm was used primarily for research on crop diseases and sugar beet production and to produce certified seed, which was not available from commercial growers at that time.

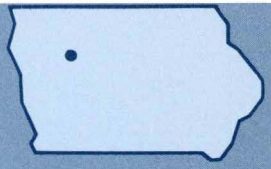
Most recently, the Northern Iowa Farm has been a major testing and evaluation site for the Experiment Station's small grain and soybean breeding programs. Current research also includes testing fungicides as seed treatment for protection against soil-borne fungus diseases and studies on control of brown stem rot in soybeans. Evaluations of corn and soybean herbicides frequently are conducted at the Northern Iowa Farm.

The *Clarion-Webster Farm,* located 1 mile south of Kanawha, is owned by the Clarion-Webster Experimental Association. This 80-acre farm originally was purchased in 1953 to study drainage problems.

Today, part of the Clarion-Webster Farm is used for corn and oat breeding research and for increasing the seed of experimental lines developed in breeding programs. Fertilization experiments also are conducted for continuous corn, continuous oats, and different rotations, involving corn, oats, soybeans, and meadow.

Recently, a study was started on the influence of planting date and hybrid maturity on corn and soybean yields. Because hail, flooding, or poor stands sometimes make a late or second planting necessary, this research should provide useful information on how farmers can most profitably manage late-planted corn and soybeans.

Allee Farm



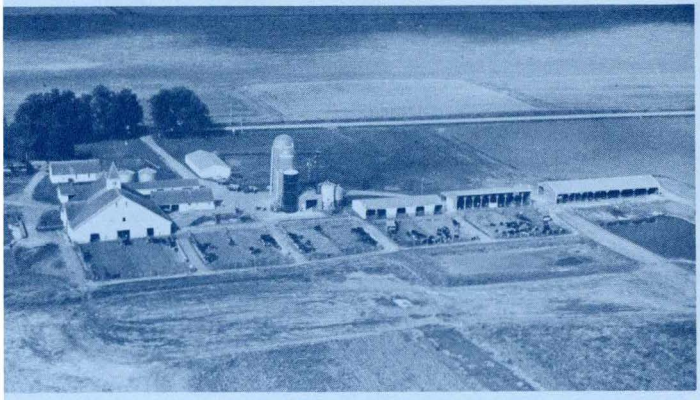
The *Allee Farm*, in operation since 1958, is located 1 mile south of Newell in Buena Vista County. Part of the 288-acre farm was willed to the Iowa Experiment Station by George M. Allee, and part of it is leased from the Newell American Legion Post.

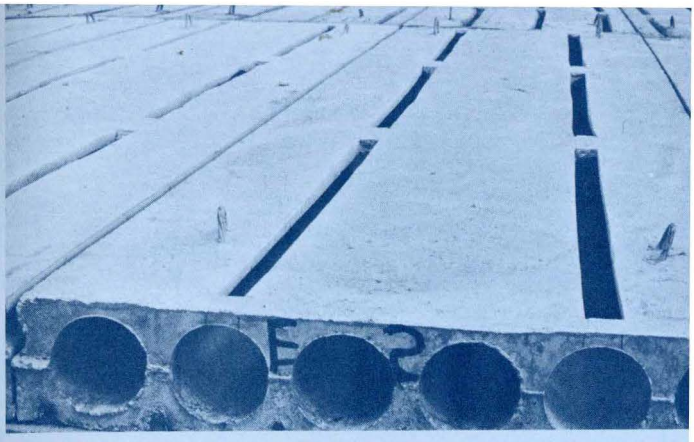
For the past decade, research at the Allee Farm has focused on cattle feedlot management. In one project, started in 1970, scientists are comparing the performance of yearling steers fed in confinement, in outside lots with access to overhead shelter, and in outside lots without shelter.

The feeding trials conducted so far indicate that, on a year-around basis, the rate of gain for yearling steers fed in confinement about equals that for similar steers in open lots without shelter. Confinement steers are more efficient, however, requiring about 6 percent less feed per pound of gain than open-lot animals. Steers fed in open lots with shelter available have performed better than either confinement steers or open-lot steers without shelter.

Although confinement feeding may not be justified solely on the basis of rate and cost of gain, there are other advantages to confinement systems, including better waste control and the possiblity of reusing animal wastes. To meet new

Research on cattle feedlot management is the major activity at the Allee Farm.





Sections of the ISU Multi-Flume Flush Floor before installation at the Allee Farm. Manure is pushed through the slots into the hollow cores, which are flushed with water. Two of the three slot spacings under evaluation are visible.

pollution-control standards, some producers may have to feed their cattle in confinement. The recycling of manure into livestock feed and fertilizer may become an important feature of confinement systems if the prices of feed and fertilizer continue to increase. Confinement systems also eliminate the need for bedding, require less land, and permit greater mechanization.

In the fall of 1974, tests were started on protein sources for steers in confinement and the removal of all supplemental protein during the latter part of the finishing period. Other studies will deal with silage levels in the ration of finishing steers.

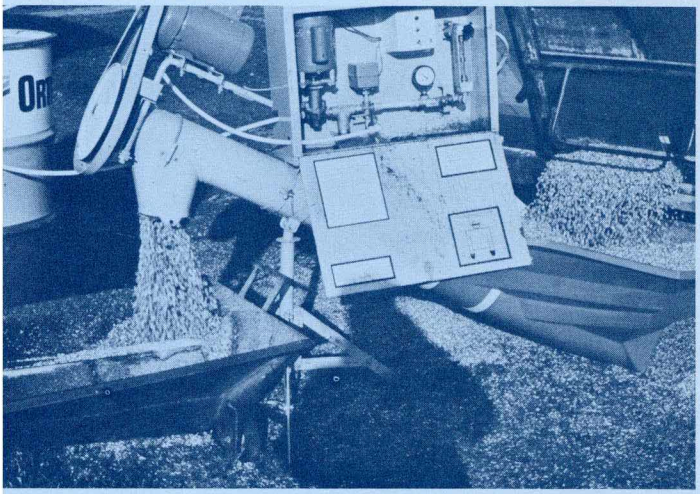
Because of the need for more knowledge about techniques to handle, treat, and eventually dispose of beef animal wastes, the Iowa Experiment Station has built a new beef confinement unit at the Allee Farm. The new facility, financed largely by a grant from the Iowa Beef Industry Council, will be used to test and demonstrate two variations of the "flushing floor" principle.

In half of the new building, the solid concrete floor slopes toward two U-shaped flumes or open pipes set 12 feet apart below floor level. Movement of the cattle's feet pushes the manure down the sloping floor into slots located over each flume.

A new type of floor, the ISU Multi-Flume Flush Floor, has been installed in the other half of the new building. Hollow cores, or flumes, are em-

bedded within the concrete floor sections and extend continuously from end to end. Slots open from the hollow cores to the floor surface. As manure is deposited, the cattle's feet push it through the slots into the cores below. Three slot spacings (24, 16 and 8 inches) are being tested in the multi-flume unit.

With both types of floor unit, water flowing through the flumes, under the floor surface, flushes the solid wastes into a lagoon for further processing. Water for flushing is recycled from the lagoon.



Applying chemical preservatives to high-moisture corn grain.

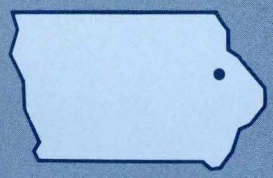
Feeding trials with yearling steers began in the new building during the summer of 1974. The performance of the cattle on the different floors will be of major interest. Other things under study include periodic versus continuous flushing, effect of cattle density on the movement of manure into the slots, general performance of the flushing system, and the effectiveness of waste treatment in the lagoon.

Station scientists also have tested methods to store and use high-moisture corn in livestock feeding operations. These studies are of great interest to livestock producers who feed most of the grain they grow.

Harvesting corn while the moisture level is too high for storage in conventional bins reduces harvest losses resulting from ears dropping off the stalks. Drying corn before conventional storage, however, has become increasingly difficult and expensive because of tight fuel supplies and high equipment costs. Harvesting and direct storage of high-moisture grain offers a way to increase yields, to reduce equipment and fuel requirements, and to eliminate bottlenecks that often slow harvest operations.

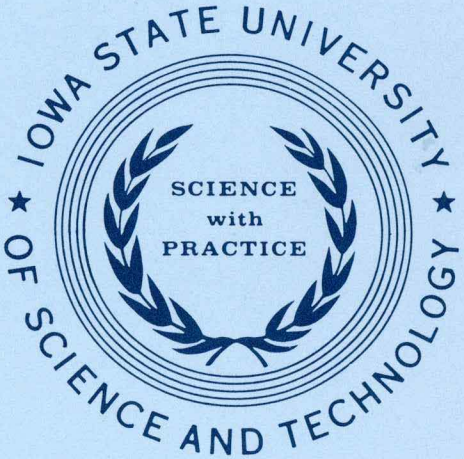
Tests conducted at the Allee Farm from 1968 through 1972 showed that high-moisture corn, when properly ensiled, has a feeding value equal or superior to grain handled by the conventional method of drying before storage. High-moisture corn also can be preserved by treatment with propionic acid or ammonium isobutyrate. Station scientists have found that yearling steers gain as rapidly and efficiently on chemically preserved high-moisture corn as on dried corn.

Brayton Memorial Forest



The *Brayton Memorial Forest*, located near Delhi in Delaware County, was given to Iowa State in 1949 by the late Emma L. Brayton. The 305-acre forest has been used to study methods of reproducing, growing, managing, and utilizing timber stands.

In one study under way, walnut seedlings were started in different types of containers in a nursery and later transferred to Brayton Forest. Measurements on the survival and growth of the seedlings will be used to evaluate the different types of containerized stocks.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