For Your Interest

Agricultural and Home Economics Experiment Station

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FROM A PRACTICAL standpoint, every crop grower knows that soil water and moisture affect the growth of his crops—sometimes making the difference between success and failure of the crop. Important as it is, however, relatively little is known about the movement and behavior of water and moisture in the soil.

Don Kirkham, Howard Johnson and Raymond Kunze of the Experiment Station are conducting basic research on the movements of water and gases in the soil and their relation to other physical properties of the soil. These detailed studies involve cooperative investigations by soil scientists, agricultural engineers, physicists and, where appropriate, atomic scientists.

In some of the current work, deuterium (heavy water) is being used to trace certain water movements and behavior characteristics. Another study is being initiated to find out more about the types of water movement involved in the evaporation of water from the soil.

**Compare Manure, Commercial Fertilizer**

Efficient crop production on a farm depends on efficient and effective use of farm by-products, such as manure and crop residues, as well as fertilizer. Experiments conducted by John Pesek and co-workers are aimed at evaluating the effectiveness of manure in terms of commercially available sources of nutrients. The manure is applied plowed down ahead of the corn crop at the rate of 2 tons per acre per year for the rotation. The commercial P₂O₅ and K₂O are applied at rates of 30 pounds per acre per year for the rotation, but with the application split—the corn crop receiving its 1-year’s supply in the hill at planting time and the balance being applied ahead of the oats.

Because of the method of applying the commercial fertilizer, an evaluation can be made only when the average total yield of the rotation is considered. The crops at all locations tested respond to phosphorus, and all except oats respond to potassium. Average responses to potassium, however, vary from slight to large depending on the soil type and location. Responses of all crops to manure are high.

There’s a residual influence of the manure on all crops following the corn. This high residual effect is at least partly due to the fact that relatively small quantities of phosphorus and very small amounts of potassium are removed in the grain. Corn stover residue is then returned to the soil and serves as a source of phosphorus and potassium for the other crops. Slow decomposition of the manure probably continues to release available nitrogen directly to the oats crop following the corn.

**Iowa Land Values: Increase in 1958**

IOWA FARM LAND values increased an average of 8 percent during 1958, according to Dwight M. Gadsby of the Experiment Station. On Nov. 1, 1958, the state average was $244 an acre—
up $18 from a year earlier. And, in contrast to the year before, land values increased in all areas of the state, with the greatest percentage increases for low-quality land.

The two largest factors in the rise, says Gadsby, were the continued pressure for additional land to add to existing farms and the relatively few number of farms for sale. Other factors were at work, too—including both “swelling” and “dampening” factors. But the net result of all of the factors was on the value-increasing side. In total the average value of high-quality land increased about 6 percent; medium-quality land, approximately 8 percent; and low-quality land, about 10 percent.

These figures are based on reports from 576 Iowa real estate brokers who replied to the 1958 questionnaire on farm values in the state.

**Vertical Integration**

**Further Developed In Europe Than Here**

Though relatively new to Iowa agriculture, vertical integration has been carried much farther by both farmers and urban consumers in most western European countries. This is particularly true in the Scandinavian countries, reports Frank Robotka of the Experiment Station. But the development of vertical integration in the western European countries was made mainly through cooperatives, he adds.

In the Scandinavian countries, for example, from 90 to 98 percent of the milk produced is assembled, processed and distributed—even at the retail level—by farmers through their cooperatives. And, in Denmark, from 70 to 80 percent of the hogs slaughtered are processed and distributed by farmer cooperatives.

The extensive development of integration in Western Europe, however, hasn’t been a “cure-all,” Robotka says. Despite the high degree of integration, excessive production has come about in dairy, pork and some other products.

**What’s the Best Size For Dairy Herds?**

Many Iowa dairy farmers are now receiving well below $1 per hour for their labor. In many cases, however, it would be possible to increase these earnings to more than $2 per hour, say economists Earl O. Heady, Randolph Barker and Hugh Stewart of the Experiment Station. Mainly, the operators would have to be willing to expand the size of their herds and to adopt loose-housing techniques.

Fixed costs and investments are relatively high in dairying, even with loose housing, the economists explain. But these costs can be reduced by as much as 65 cents per hundredweight on farms with typical 3- and 4-stall milking parlors by expanding herd size from 15 to 25 cows.

In their study of different herd sizes and production techniques and their effects on returns, the economists found that a herd size of about 25 cows makes it possible to realize most of the cost economies related to herd size. The economists point out, however, that increasing herd size to take advantage of these cost economies over the long run may require a considerable immediate investment.

They add that herd size on most Iowa dairy farms is limited not only by labor but also by the supply of forage. And, in order to expand herd size, some dairy farmers may find it more profitable to buy some roughage than to change their rotation to include more forage.

**Dormant Strawberries Survive Poorly When Planted in the Fall**

DORMANT STRAWBERRY plants show poor survival when planted in the fall, according to a study by E. L. Denisen of the Experiment Station. Denisen compared the results of fall and spring planting of dormant strawberry plants, and compared fresh-dug with dormant plants for fall planting.

Most strawberry plants sold by nurseries are dug in the fall, stored at below freezing temperatures, and shipped or sold locally.
while still dormant in the spring. Those sold for fall planting usually are dormant too, having been in cold storage during the summer months.

Results of the comparison study of these two planting methods showed that the dormant plants bloomed shortly after planting. This may have greatly weakened the fall-planted strawberries before the approach of winter. Fall-planted dormant plants showed an extremely poor survival rate; fall-planted fresh-dug plants survived much better. A corn cob soil mulch helped the survival of fresh-dug plants. The spring-planted dormant plants survived well and had a 93-percent stand.

**Name All-America Rose Selections**

**Three roses** have been chosen to receive the All-America Rose Selections award for 1960. They are: Garden Party, a white hybrid tea; Sarabande, a brilliant orange-red floribunda; and Fire King, a dark orange-red floribunda. These roses should be available from commercial sources in the fall of 1959, reports Griffith J. Buck, who directs the Iowa testing.

Entries from previous trials which have been introduced commercially—though they have not received the AARS award—are: the hybrid teas, Sunlight, Kordes' Perfecta and Angel Wings; the grandifloras, Governor Rossellini and Gold Coast; and the floribundas, Green Fire, Heat Wave, Ruby Lips, Pink Chiffon and Red Wings.

**Heptachlor Controls Thrips in Cabbage**

In 3 years' trials at the Experiment Station, heptachlor has been outstanding in controlling onion thrips infesting cabbage. The thrips cause so-called "bronzing" of cabbage, and they represent a contamination of both fresh market cabbage and processed sauerkraut. Heptachlor at 1/4 pound per acre added to Phosdrin, DDT or parathion adequately controlled thrips if weekly or biweekly spray applications began at heading.

Insecticides were also tested against various other pests attacking cabbage. Here are the results as reported by E. T. Hibbs:

- The imported cabbageworm and the diamondback moth were adequately controlled with Phosdrin at 3/4 pound per acre, endrin at 1/4 pound per acre, Dibrom at 1/4 pound per acre, and DDT at 1 pound per acre. (These are listed in descending order of control. That is, Phosdrin was most effective; endrin next; and so on.)
- The cabbage looper was controlled by the following formulations in descending order of effectiveness: endrin at 1/4 pound per acre, Phosdrin at 3/4 pound per acre, Thiodan at 1 pound per acre, parathion at 1/4 pound per acre, Dibrom at 1/4 pound per acre, parathion at 1/4 pound per acre, and DDT at 1 pound per acre in weekly applications.

**Grains**

**When's the Best Time To Harvest Oats for Silage?**

Interest has been increasing during the past few years in using oats for silage. Results from Experiment Station research indicate that the best time to harvest oats for satisfactory silage is when the grain is in the early- and mid-dough stages, according to F. P. Gardner who directed the research. The research was aimed at finding the effects of both variety and stage of growth on yield and quality of oat silage.

Over a 3-year period, it was found that the yield and percentage of dry matter increased sharply as oats matured from the boot stage (just prior to heading) through the late-dough stage. As much as 12 tons of dry matter per acre were harvested from oats cut at the early- to late-dough stage, compared with only 6 tons when harvested at the boot stage.

The moisture content of the forage varied from as high as 88 percent in the boot stage to about 55 percent in the late-dough stage. The moisture content generally was best for silage preservation at the early-dough through at least the mid-dough stage. Moisture content was too high for good silage quality at earlier stages of growth. The protein content was highest at the boot stage and decreased uniformly through the late-dough stage.

Differences among oat varieties included in the tests weren't great. Gary, a tall, late variety, was more productive in 1958 than were the midseason varieties, but the difference was less striking in the previous 2 years.

When dairy animals were given free access to the silages harvested by direct chopping at different stages of growth, there was a strong preference for the silages harvested in the early- to late-dough stage. Silage from oats
harvested earlier tended to be slimy and had a foul odor. Silage from the late-dough stage of harvest was eaten readily but showed more top spoilage than did silage from the other stages of harvest.

**Examine Timing, Rates Of Treatment for Borers**

In 1958, granular formulations of DDT, endrin, heptachlor and toxaphene were recommended for corn borer control. Experiment Station and USDA tests of these insecticides show that the following granular formulations and rates are equally as effective in controlling first- and second-brood borers as 1 pound of DDT in granular formulation: endrin at 0.2 to 0.25 pound, heptachlor at 0.75 pound and toxaphene at 1.5 pounds per acre.

Likewise, the same granular formulations at the same rates were equally effective for both broods on sweetcorn.

Six granular carriers were tested, and all gave equal control when a constant amount of DDT was applied with each. The size of the granular particles had no effect on control.

Tests to determine the best time to apply insecticides gave the following results: In a late-planted field, the best second-brood control was obtained when 68 percent of the plants were shedding pollen, and 90 percent of the plants still had green silks. In another field planted earlier, 100 percent of the plants had shed pollen and 95 percent of the plants had dry silks when the best second-brood control was obtained.

The researchers also checked the effect of granular application on yield of field corn. One application of toxaphene, DDT or parathion for first-brood control increased the yield 6 to 14 bushels per acre depending on the time the insecticides were applied. Second-brood studies indicated a loss of over 10 bushels from an artificial infestation of borers made when the plants were shedding pollen.

These studies had the cooperation of a number of specialists both from the USDA and from the Iowa Experiment Station. M. L. Fairchild, E. E. King, G. W. Mauston and A. N. Sparks were responsible for the entomological phases of the work. W. G. Lovely was in charge of all equipment, and D. V. Sisson was responsible for the statistical analyses.

**Prevent Undesirable Regrowth in Floodplain Areas?**

A PROBLEM in floodplain areas following flooding is the regrowth and development of undesirable plant species. Poison ivy, for example, is one of the more persistent species that take over as weed, shrub and vine cover redevelop.

Experiment Station and U.S. Forest Service researchers are seeking methods of achieving more desirable regrowth as well as the control of undesirable regrowth. Clearing, burning and combinations of the two are being tested, under the direction of J. M. Aikman and Glenn H. Deitschman, as means of controlling regrowth.

**The Insect Problem Varies With Weather**

Populations of major agricultural pests tend to fluctuate with the weather, according to H. M. Harris of the Experiment Station. This conclusion is based on many years’ observations of population trends of Iowa insects.

For example, says Harris, in 1958 grasshopper populations continued the trend downward for most of the state—except in northwest Iowa where there was a noticeable drouth area conducive to grasshopper survival.

Similarly, populations of the European corn borer in northwest Iowa were markedly down in 1958 from the year before. But in other areas of the state where local weather was more favorable, the population trend of the borer, though downward, was less markedly so. Chinch bug populations continued at a very low ebb in 1958, adds Harris.