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Fertilize for High Yields

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FOR ALL SOIL productivity levels, the question the farmer needs to answer as far as corn production is concerned is: "Will I make a profit by fertilizing?"

A soil test will help answer this question. It will improve the farmer's chances of fitting the best fertilizer mixture to the needs of his corn crop. And if he has only a limited amount of money to put into fertilizer, it will help him figure out how to get the most profit out of each fertilizer dollar.

In 1952, many farmers on the medium and low productivity soils of Minnesota spent \$25 to \$35 per acre for fertilizer on corn and still got returns of \$30 to \$35 per acre over fertilizer costs. In obtaining these results, they had to provide the best growing conditions, such as good seedbeds, adaptable varieties, optimum number of plants per acre, right method of planting, proper cultivation, and weed control—in addition to the fertilization.

Not only do soil types vary from farm to farm and field to field, but there is a great variation in levels and proportions of plant nutrients. Corn land may need one, two, or all three of the basic plant food elements—nitrogen, phosphate, and potash.

Systems Vary

Methods of application vary, too. First there is the basic treatment of broadcasting and plowing under or disking in. This is done at heavy rates before planting.

Then there is the "starter fertilizer" system in which hill or row applications are made with a planter attachment. This is done at the time of planting.

These methods are used in com-

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GROWING X-TRA YIELD CORN

Consider—

- Soil fertility levels
- Soil tilth
- Adaptable varieties
- Plant population
- Cultivation
- Insects and diseases
- Yield and quality

ination and supplemented with a side-dressing of nitrogen.

A shortage of nitrogen is the big reason for poor yields from many Minnesota corn fields. Use of this plant food alone will often push yields to a much higher level. Nitrogen can be put into the soil by turning under legumes, by utilizing manure and crop residues, and by applying commercial nitrogen fertilizer.

Soils in corn fields testing medium, low, or very low need phosphate fertilizer.

At planting time, applying a starter fertilizer containing potash will usually take care of the potash needs on soils testing medium to high. When soils are low to very low in available potash, a higher rate of potash fertilization is usually needed.

Fertility Level Important

Soil fertility must be the first consideration in order to produce high yields of corn. Fields that are now producing high yields of corn are those that have had regular seedings of legumes and grasses in the crop rotation system. For soils that are now in this high state of production, the use of a starter fertilizer at around 200 pounds per acre is probably the most profitable.

Soils that are in the medium to low fertility classes should have a soil

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Some Changes Made in '53 Crop Variety Listing

Rushmore spring wheat, Clintafe oats, Montcalm barley, Morden 77 hybrid corn, and Narragansett alfalfa have been added to the list of crop varieties recommended by the University of Minnesota Agricultural Experiment Station.

Crop varieties removed from the recommended list are Moore barley, Monroe soybeans, and corn Minhybrids 800, 403, and 506.

These changes in varieties recommended for growing in Minnesota have been approved by scientists at the Minnesota Experiment Station, St. Paul, and at branch stations over the state.

Five New Names Added

Rushmore spring wheat, a selection of a cross out of Thatcher and Rival wheat, originated in South Dakota. Recommended for West Central and Northwestern Minnesota, it matures about a day earlier than Lee and three to four days earlier than Rival or Mida. It is susceptible to leaf rust. But because of its earlier maturity, it has had about 10 per cent less stem rust in University trials than Rival, Lee, or Mida.

Rushmore is just as susceptible to race 15B of stem rust as other wheats under epidemic conditions. In yield, it is similar to Lee and somewhat superior to Rival and Mida. It is satisfactory for milling and baking.

Clintafe oats is quite similar to Clinton but about two days later and two inches taller. Its principal advantage is its resistance to all races of crown rust prevalent in North America. It is resistant to some kinds of stem rust but susceptible to others. In Minnesota and Iowa testing to date, it has consistently yielded a little higher than Clinton. It originated in Iowa.

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MINNESOTA FEED SERVICE

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building treatment applied at the rate of 300 to 500 pounds per acre. The grade and the amount to use will depend on the soil test. This basic treatment should be broadcast and plowed under or broadcast and disked in. This should be followed by a "starter fertilizer" put on with a planter attachment at planting time. Nitrogen may be applied as sidedressing around June 20, or it may be broadcast immediately after planting.

Soil tilth is the result of good soil management practices such as following a good crop rotation system and turning under at regular intervals good supplies of organic matter consisting of legumes and grasses and other crop residues.

These practices result in good seedbeds, good moisture holding capacity, good moisture control, and good aeration on the heavier, tighter soils.

The usual method of plowing, disking, harrowing, and surface planting is still probably as good an answer as we have on corn seedbed preparation.

Working soil when it is wet breaks down its structure and causes it to "puddle" or run together and bake as it dries out. This reduces air space, reduces release of soil nutrients, and reduces the moisture holding capacity of the soil. Corn in a field that has been worked too wet will be stunted and turn yellow.

Farmers should by all means select the variety of corn that has the maturity rating recommended for their area.

Good Stand Needed

The increase in the number of corn plants grown per acre must not come ahead of soil fertility. The population must be kept in balance, as nearly as possible, with the soil fertility level.

No matter how well a farmer fertilizes his corn field, he won't get top returns unless he has a good stand of

Miracle Drugs Have Proved Value

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ANTIBIOTICS, arsenicals, and detergents are making headlines in the feed industry. In order to keep up on these "miracle drugs" the following summary of the latest developments in advanced feeding methods is given.

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corn. It takes a good stand to make the best use of the fertilizer, especially when this fertilizer is applied at high rates. The idea is to try to balance the number of corn plants with the ability of the soil to produce. Otherwise, the full measure of profits will not be obtained from fertilization.

High grade quality and high shelling percentage, as well as high yields, are the goals of all good corn farmers. These are the men who will get efficient returns from the fertilization and management program. Too many farmers consider only bushels per acre, forgetting about quality, grade, and feeding value for market and livestock needs.

Soil fertility is the backbone of soil conservation. If you do not have the balance and necessary amounts of plant nutrients to produce and maintain soil conserving crops, you have no soil conservation program.

It has long been the recommendation of the University of Minnesota to fertilize the legumes and grasses as they are seeded down so that eroded land may be protected. This system has been described as "fertilizing the crop rotation."

This system and the practice of using increased fertilizer rates on corn reach the same goal. The only difference is that by applying the fertilizer on the corn, the fertilization of the rotation is started sooner.

This means that if a farmer retires 10-15 per cent of his present cropland to hay and pasture, he can make up the difference in the acreage taken out of corn by increasing the yield in bushels per acre of the land he keeps in corn.

Farmers say that they will be willing to seed more land to hay and pasture under this system of rotation fertilization, because they will be assured of the necessary bushels of corn and other grains they must have to meet their livestock needs.

If we follow good soil fertility practices and use higher fertilizer rates on corn, soil conservation can be made easier for Minnesota farmers.

ANTIBIOTICS

Poultry

The antibiotics of proved value include aureomycin, bacitracin, penicillin, and terramycin. For poultry many workers favor the use of penicillin at a level of 2 to 5 grams per ton of complete feed. Other workers report excellent results with aureomycin, terramycin, or bacitracin at somewhat higher levels.

The benefits of the use of antibiotics in poultry rations are (1) a 10 to 15 per cent increase in growth rate in chicks, with the greatest growth in early stages, (2) a 15 to 20 per cent increase in growth rate of turkeys, and (3) about a 10 per cent saving in feed per pound of gain. Antibiotics may also improve general health and reduce mortality of birds. The value of antibiotics in the rations of layers is controversial.

Swine

Aureomycin, terramycin, and penicillin have received the most attention in swine rations. Unlike the results obtained with chicks, the same amount of penicillin as aureomycin and terramycin is needed to get results in swine. The most commonly used antibiotic level for pigs is 10 grams per ton of complete feed.

The use of antibiotics in rations usually makes pigs grow 10 to 20 per cent faster and in many cases it also saves feed. In experiments with weaning pigs at University Farm the past two years, the use of antibiotics has always increased the rate of gain, but has not made for more efficient use of feed. Similar reports have come from Ohio and Purdue this year.

It appears that antibiotics have their greatest effect on young pigs, and University Farm studies show that antibiotics are a valuable addition to pig starters for suckling pigs. The use of bacitracin in the form of a pellet implanted beneath the skin of two- to five-day-old pigs is a new development.

The Arkansas Experiment Station reports a marked response in growth rate of pigs treated this way. Reports from other stations have been variable. This fall at University Farm 207 pigs were used to test the value of bacitracin implants. Under the conditions here, the bacitracin pellets did not cut down on deaths and did not increase the weaning weight of the pigs that were treated.

This past year interesting reports have come from a research laboratory in England and from the University of Notre Dame. In the English studies it was demonstrated that chicks raised

in an environment where chickens had not been raised previously grew as well without antibiotics as other chicks fed antibiotics but raised in old lots. In the Notre Dame studies germ-free chicks grew as rapidly without antibiotics as normally hatched chicks that were fed antibiotics.

These studies show clearly that the effect of antibiotics in chick rations is concerned with the "germs" or bacteria with which the chicks have to contend under the usual conditions of production. Thus it appears that if the producer could maintain perfect sanitation the antibiotics would be of no value.

But under most conditions of production, sanitation is seldom perfect. That is why we usually do get a response from the feeding of antibiotics. It should be clearly understood that antibiotics are not a substitute for sanitation and good management, because many diseases of livestock cannot be prevented by the feeding of antibiotics. Good sanitation and management, plus the use of antibiotics as an insurance factor, seems to be the best approach to efficient production.

ARSENICALS

Poultry

Arsenic compounds have long been used in veterinary practice as tonics. Then six years ago it was reported that a compound containing arsenic would stimulate growth in chicks. Considerable work has been done in the past few years to study the value of three arsenicals: 2-nitro-4-hydroxy phenyl arsonic acid, arsanilic acid, and sodium arsanilate.

In poultry feeds the best possibilities for use of the arsenicals appear to be in broiler and turkey feeds. The reports to date indicate that when properly used the arsenicals do stimulate growth under many conditions. And perhaps more important—they seem to have a beneficial effect on feather development and skin color of the birds. Some workers have reported that combining arsenicals with antibiotics produces faster growth than when either is fed alone.

Dr. H. A. Bird of the USDA reports the most effective level of the 3-nitro compound to be approximately 45 to 50 grams and of sodium arsanilate approximately 75 to 90 grams per ton of complete feed. (The arsenic compounds are poisonous and have to be used carefully.) Dr. Bird reports that a level of 0.02 per cent of the 3-nitro compound is harmful to growing chickens. Arsanilic acid and sodium arsanilate are less toxic, but all of the arsenicals are dangerous and can produce tragic re-

sults unless they are properly used. When arsenicals are fed to chickens the arsenical should be removed from the ration five days before the birds are slaughtered for human consumption.

Swine

Arsenicals have been tested less in swine feeds than in poultry feeds. The Hormel Institute and the Illinois Experiment Station have reported increased growth rate in pigs from feeding 3-nitro-4-hydroxy phenyl arsonic acid. But both stations reported toxic effects on the pigs from the feeding of this arsenical.

At the Nebraska Station arsanilic acid increased the growth rate of pigs as much as an antibiotic. In studies at University Farm arsanilic acid appeared to increase the growth rate of the pigs early in the experiment. But for the feeding period as a whole there was no advantage from the feeding of arsanilic acid—either in growth rate or in the feed required per pound of gain.

At present there is not enough evidence to support a recommendation for the use of arsenicals in rations for pigs. Information is also needed on arsenic storage in the bodies of pigs. Such information is being obtained at the present time in work being done at the Hormel Institute and at University Farm.

The value of arsenicals in the control of bloody dysentery in swine has been demonstrated by L. E. Carpenter of the Hormel Institute. This treatment consists of medication of sick pigs with an arsenical, plus the use of a ration highly fortified with an antibiotic. In addition, infected premises must be cleaned up carefully and the pigs moved to noninfected premises.

DETERGENTS

Last year it was reported that certain detergents stimulated growth in chicks. This spring a report from the Michigan Station indicated that a specific detergent would stimulate the growth of pigs as well as aureomycin did. Since the earlier work with chicks many conflicting reports have been made.

For example, Purdue reported little or no benefit from the feeding of the detergent which produced the results reported by Michigan. The Purdue workers have reported a slight benefit from the feeding of a different detergent. The Purdue and Michigan workers used different basal rations and the opposite results obtained have been explained on that basis. In a short-time test at University Farm this summer, no response was obtained from a detergent that was fed.

The experts in this field are generally agreed that certain detergents may well become important in feeding. However, they seem to agree too that these compounds are not ready for commercial use at this time. Much research must be done before these compounds can be properly evaluated. There are literally hundreds of different detergents, so research will take time.

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Montcalm barley, recommended as a malting variety for West Central and Northwestern Minnesota, has been equal in yield to Kindred.

Morden 77 hybrid corn, a variety developed at the Morden Experiment Station in Manitoba, is recommended for the Northern Minnesota area. It is the earliest dent hybrid recommended.

Narragansett alfalfa, developed in Rhode Island, is approved for use in short rotations in which the hay crop will not be harvested more than two years. It is susceptible to wilt but has outyielded Ranger alfalfa during the first two years of the stand by about one-fourth ton per acre.

Moore barley was removed because of inferior performance in yield trials, lack of malting qualities, and susceptibility to net blotch disease. Monroe soybeans were removed because of inferior yields as compared with Blackhawk.

Minhybrid corn varieties 800, 403, and 506 were taken off the list because other recommended varieties are superior.

Crops now on the Minnesota recommended list include:

Spring wheat—Mida, Lee, Rival, Rushmore; **durum wheat**—Carleton, Mindum, Stewart; **winter wheat**—Minturki, Minter.

Oats—Bonda, Clinton, Mindo, Andrew, Shelby, Ajax, James, Branch, Clintafe; **barley**—Kindred (L) and Montcalm (for malting), Vantage, and Peatland; **rye**—Emerald, Imperial.

Flax—Koto, Minerva, Redwood, B5128, Marine, Redwing; **soybeans**—Ottawa Mandarin, Capital, Blackhawk, Renville, Flambeau.

Alfalfa—Ladak, Ranger, Narragansett; **medium red clover**—Wegener, Midland; **biennial sweet clover**—Evergreen, Madrid; **birdsfoot trefoil**—Empire; **brome grass**—Achenbach, Fischer, Lincoln; **sudan grass**—Piper; **timothy**—Itasca, Lorain.

All crop varieties recommended for Minnesota are listed and described in Extension Folder 22, *Improved Varieties of Farm Crops*. The folder will soon be available in revised form from county agents and the Bulletin Room, University Farm, St. Paul.

Cost Accounts Can Save You Money

HAROLD C. PEDERSON*

THE FEED DEALER is constantly searching for new ways to improve the feed he grinds, mixes, and sells so as to have more satisfied customers. But what he sometimes overlooks is the fact that he can look to his books to find another important way to improve his business. Keeping accurate cost accounts is one road to success in the feed business.

When two feed merchandisers meet it is rather common to find them covering the subject of costs quite thoroughly. There are merchandising costs such as labor and management, repairs, truck expense, freight, and drayage. Then too, there are heat, light, power, rent, and advertisement costs. That is a long list of bills to meet at regular intervals, but even that is not all.

There are administrative and general expenses such as office salaries, office supplies, licenses, inspection, and bonds. Yes, and there are also such costs as audits, local taxes, state and federal taxes, and payroll taxes. And of course you can't overlook depreciation, bad debts, and other miscellaneous expenses.

Cost Analysis Helpful

These items of expense must be met in order to remain in business. Some of them are fixed, leaving little choice for the operator. Many of them are variable, so a reasonably wide range of opportunities is open for consideration. The problem of evaluating the various choices becomes rather difficult unless some measures of efficiency are available.

For such a purpose a cost analysis of successful feed merchandisers would be exceedingly helpful. Such a guide would help each firm to find the strong and weak links in its business. The weak ones could be strengthened and the firm's costs reduced as a result. Such improvements increase a firm's income and improve the competitive position of the products offered for sale.

In the absence of such cost records some other sources of information can

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be used. These shed some light on some areas which should be considered at this time and will very likely remain important during the months ahead.

One of these sources is a study made of Minnesota cooperative elevator associations by Dr. Rex W. Cox, agricultural economist at the University of Minnesota. In this study Dr. Cox pointed out:

"Feed is the most important item of merchandise, the sales of which averaged almost two-thirds of the total sales of all merchandise in area three [24 counties in southeastern Minnesota] and more than one-third in area one [17 counties in northwestern Minnesota]." Seed and fertilizers were also prominent items.

Margins Vary Widely

On margins Dr. Cox said that it is harder to determine margins and to merchandise supplies than to merchandise grain. Competition again plays an important part in determining the selling margin. However, using these margins, Dr. Cox said, does not involve too much risk. But this is assuming that the dealer has been careful to purchase saleable supplies and keep inventories at the right level, in order to avoid losses because of big price changes.

When Dr. Cox compared variations in gross margins he found that some elevators obtained less than 6 cents per dollar sales of merchandise, compared to 12 cents for another group.

Feed grinding was found to be one of the main sideline services offered by elevators. Variations in income from this source ranged from 2.5 per cent of the gross margin in some instances to over 25 per cent in others.

Since a group of elevators included in Dr. Cox's study were feed merchandisers, some of the information about them may be helpful to local operators. Two im-

portant findings are related to costs of labor and management and to credit.

Dr. Cox stated: "The importance of successful labor adjustments in elevator operation is evidenced by the fact that the labor and management costs made up 52 per cent of all operating costs. The proportion averaged highest where merchandise sales relative to grain sales were high."

And again, "Accounts receivable from patrons, which mainly represents credit sales of merchandise, averaged \$8,992, or 11 per cent of current assets. Ten per cent of the associations, however, had outstanding accounts of \$16,000 or more. In the southeast area where merchandise sales constitute a higher proportion of total sales than in other areas . . . it should be noted that only 14 associations set up a reserve for bad debts."

Credit a Touchy Business

Over-extension of credit with the problems of collections which follow is one of the most serious problems of financial management. Slow or uncollectable accounts can mean real trouble—especially during periods of declining farm prices.

Thus a local feed firm's long list of expenses may vary greatly and it is not always easy to single out the weak points in the business. The University of Minnesota study has suggested some places that appear very important and deserve careful attention. Perhaps some day a detailed cost analysis study can be made of firms of this kind. Then managers and operators can have a more effective guide so they can evaluate their business item by item.

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