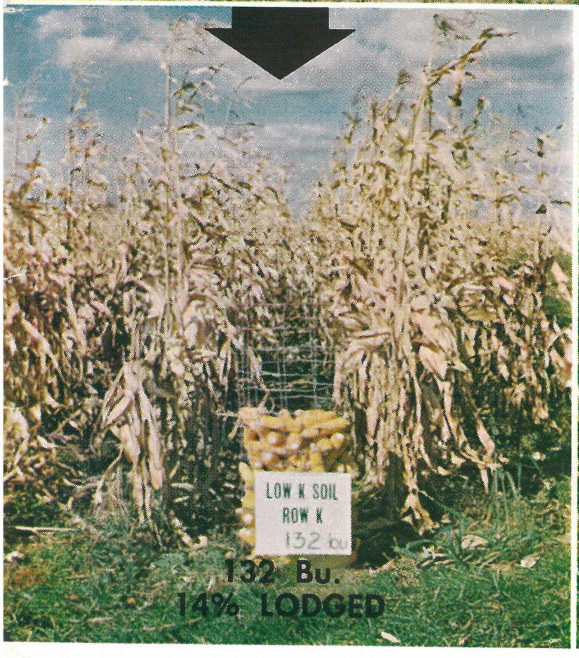

January-February 1962

20 Cents

Better Crops

WITH PLANT FOOD

Better Crops
WITH PLANT FOOD

The Whole Truth—Not Selected Truth
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ON THE COVER

. . . row fertilization with potassium obviously pays. Corn receiving 30 lbs. K_2O in the row yielded 132 bushels, with only 14% lodged stalks. Corn receiving neither row K_2O nor broadcast K_2O yielded only 112 bushels, with 35% of it lodged. Which application method is best for high yields, row or broadcast? See the Mederski report starting on page 6.

BIGGER YIELDS, LONGER LIFE

TOP dressing alfalfa pays off in bigger yields and longer life, say extension soils specialists at the University of Missouri.

Alfalfa takes more phosphorus and potassium from the soil than any other crop. A yield of four tons per acre removes about 48 pounds of available phosphate and 180 pounds of available potash.

Thus, these nutrients will be used up fast, even though adequate amounts were applied before seeding. When the supply of any one of the minerals becomes deficient, the alfalfa plants weaken and die out. Weeds and grasses start taking over and the stand is soon ready to be plowed up.

The key to keeping a thick, vigorous stand, the soil specialists say, is to top dress annually with phosphate, potash, and borax.

The top dressing should be made immediately following the first cutting in the spring, starting the first year after the alfalfa field is seeded.

The annual application should include about 120 pounds of K_2O. It can be furnished with 200 pounds of 0-0-60, or its equivalent in combination with phosphate.

Annual treatment for a field that received ample rock phosphate as a treatment might be 400 pounds per acre of 0-9-27 or 0-10-30, or any other such combination.

If only processed phosphate was used in the original preparation, then it's most effective to top dress with 600 pounds of 0-20-20 per acre, or a similar material to get enough phosphate and potash to keep production up.

Boron deficiencies have been occurring frequently in alfalfa fields, according to the soils specialists. Symptoms are short, stunted growth with yellowing leaves.

The specialists say it's good insurance to apply 25 to 30 pounds of borax per acre annually. This can be bought already mixed in the phosphate and potash fertilizer or as a straight material.

Missouri News

SPECIAL AWARD

WE ARE pleased to announce a special honor that recently came to the veteran *Better Crops* columnist Elwood R. McIntyre, who has appeared in this space as the Jeff McDermid observer for more than three decades.

At a special banquet during Farm and Home Week on the campus of the University of Wisconsin, President C. A. Elvehjem awarded Mr. McIntyre the Rural Wisconsin Leadership Scroll for his work as an "illustrious agricultural

journalist serving state and nation with unusual ability to define and interpret important issues."

Since 1909, the University has awarded this scroll to a little more than 200 men and women. Selection is based on "unselfish and outstanding service to the farm, to the home, and to the rural community."

Although Mr. McIntyre retired from his USDA editorial duties 8 years ago, he has filled many farm writing assignments since 1954. His latest, and perhaps most important work, has been a history of the Wisconsin Cooperative Extension Service which he was commissioned to complete as part of the 50th anniversary celebration of the State's Extension Service. It is now being officially published.

It is not necessary for us to attempt to add anything to what the University of Wisconsin had to say about "Jeff." On that January night in Great Hall of Memorial Union on the Madison campus, the University officials did mention that he was the "Jeff" of *Better Crops*, for which we are proud.

We do believe this might be an appropriate time to conduct an informal postcard survey on the readership of the Jeff material. In the past, some experts have wondered about reader-interest of the Jeff-type material in such a specialized journal as *Better Crops*, primarily designed to deliver up-to-date facts in the soil fertility field.

When you have time, you might drop us a postcard saying simply, "I read Jeff" or "I do not read Jeff." The results might well surprise the experts. And there is something refreshing about surprising experts.

Farming Owes Much to . . .

OFFICERS IN OVERALLS

By Jeff McDermid
(Elwood R. McIntyre)

In conjunction with the award recently bestowed on E. R. McIntyre, *Better Crops* takes the liberty of repeating here a "Jeff" classic.

REMEMBER the first County Agricultural Agent?

In my state, he drove a dusty old Ford car, loaded to the gunwales with soil augers and soil samples, wire seed corn dryers, packets of litmus paper, rag-doll testers, dairy barn record sheets, caustic potash and nippers for calf and cow dehorning, dynamite sticks for ditch and stump blasting, drain tile samples, spray guns, balanced feed guides, hip boots, formaldehyde, college bulletins, and handy plans for bull pens and split-log road drags.

No wonder many farmers put him in the same class with itinerant wanderers—such as lay preachers, tinware and notion peddlers, liniment and flavoring extract salesmen, as well as the ubiquitous lightning-rod specialist.

And the word "agent" didn't always help to clear the air either.

That was about six years after Dr. Knapp hired his demonstrators in farm management and insect control, which laid the foundation in Texas for what has since blossomed into a far-flung, many-sided and complex institution of state and federal education.

Doubters Into Believers

Iowa's pioneer extensioners—Holden and Bliss—with their corn clubs and exhibit trains belong in the same period; and in Ohio A. B. Graham was laying a strong foundation, also, for general extension, with 4-H clubs in particular.

Today the farmer and his family are a real part of the extension force themselves—but in those formative times they just looked on *and doubted.*

Today, after a half century of circuit riding and making converts, our county agricultural advisors head a large network of farm services. They are as far removed from the original models as the sleek modern motor car is from the battered old travel contraption of a bygone era of slow motion and poor roads.

Our astounding, prolific production has accompanied the rise of the county agent system.

Farmers have risen to a new life with improved seed, better soil conservation practices, multi-machinery power, scientific stock feeding, management and sanitation, conquest of plant diseases and insect ravages, and by hard work and hard thinking, careful planning and usually favorable weather.

Lonely guesswork and drudgery, with lean returns at best, have been replaced with modern equipment, better income and household conveniences on our upper level farms. It has been done mainly by education that reaches rural workers via radio, television, farm journals, newspapers, and extension meetings.

To help do a similar job for farm folks with less opportunities, an allied agency has been developed with considerable popular support, known as the Rural Improvement Program.

No Force, No Threats

This kind of education sold itself. It needed no decrees or ukases to get it going well. The Smith-Lever Act of 1914 laid the basis for the extension formula.

In a year or two an amendment challenged each cooperating state to put up matching funds above and beyond the original grant of $10,000 in federal aid to each state.

Hence we enjoyed a local option process. There was no force, no threats of reprisal or political interference. Any state might do as it desired with the new farmers' aid program—take it or leave it.

Each county, likewise, could use its own judgment and either add another fellow to the courthouse crowd or laugh it off as an "expense we can do without."

Oh, yes, it was not all easy driving on smooth roads. We had our share of vigorous objectors and fun-pokers.

Book farming and stuffy professors, the insidious influence of big business, and the useless expense of keeping another paid employee down in the basement next to the coal bins to hand out circulars nobody ever read—such were common-run sentiments we all heard spoken in the 1910-20 era.

Interestingly enough, a considerable quota of the worst grumblers in the community finally got to spending most of their leisure hours down in the stone-walled basement. The county agent just "drafted" them as "leading farm owners" to map out his first courses of action.

When *education* is uppermost in a program, the opposition usually fades away or is swept up with the tide.

Worried County Agent

Folks found they were welcome to speak out in meetings at any time on the county extension programs. Freedom of personal opinion lent savor to the sauce.

The county agent who had no outspoken critics began to worry. He preferred a hot debate and a little hostile notice to silence and forgetfulness. In true American style, no program could be accepted without

careful trial and test. A plan that dodges criticism seldom deserves to last.

Far be it from me to gloss over mistakes that have been made in adapting such traveling teachers to the open country. We made plenty, and we make them yet.

I know a few of the early county agents were timeservers and weak-sisters, and a few of them were moral scalawags who got quick dismissal. But I can whack the typewriter in pride because 99 *percent* of the county agents and extension specialists in my field of vision have done *far more for others than for themselves.*

A few more of them spent so much time and long hours away from home that they injured their health and left the family neglected. They were on a mission—so great, so good, so prophetic that we eat food, wear clothes, live under roofs today unequalled in mankind's long search for The Promised Land.

Back in the days when the county agent had to open his bag of tricks on each farm to gain attention and support, he was merely doing *personal service jobs.* I have heard the veterinarian complain about the county agents butting into his profession.

I have heard country merchants criticize the county agent for recommending home-mixed feeds and minerals when the store shelves were loaded with ready-mixed preparations.

A Widening Clientele

All that is past—and how! I don't suppose a county agent in my state has prepared a completely home-grown stock ration since antibiotics and hormones came along. Today the civic clubs who meet each week for a rousing gabfest almost always have the county agent on the executive committee.

With the rise of research and its information that farmers get so quickly, town and country are associated in business means and motives—and the county agent becomes the actual *representative of both.* Maybe "agribusiness agent" would be a better and more applicable term, in view of his widening clientele.

Had there been no trail blazed by county extension methods for 40 years, the success of the many new agencies enlisted in the various newer programs would have been less effective and lasting.

It was simpler to follow a beaten path than to push through blindly. The extension system, in all probability, will out-last most of them.

Yet, county agents are in the midst of an adjustment, as are all workers close to the modern farm of changing character. Farms grow in acreage while numbers of employed farmers decline.

This theme of change and adjustment was the keynote of an Annual County Agents Convention in Boston. Like vo-ag teachers, county agents see the countryside growing less populous with individuals.

The goal now seems to be one of building closer relations with these "elite" individuals who still farm. Some county agents are even working largely with city or town people.

Maybe our farm destiny rests on the dwindled ranks of active farmers. Maybe if we can reach and teach them more intensely, and also do something for the farm boys who cannot farm for want of opportunity, maybe there lies in this situation a stronger role for county agents (and vo-ag teachers).

Diligently "Ordinary"

More and more of our communities are finding themselves a real part of the agribusiness picture. We are forced to adjust—even to township agents, perhaps, as Michigan is doing.

There was an adage, once, that the good farmer could always use the advice of the county agent better than the poor one.

Well, the time has come now to test it out. Poor farmers are disappearing

fast—and the best, more efficient ones are remaining. These skilled farmers will need more fresh, powerful ammunition than ever, and *the county agents will bring it.*

I have always felt that there is a niche reserved in the hall of fame for folks who do ordinary tasks a little better, without vainglory or public acclaim. When such sturdy folks are called to final reckoning, there won't be so much argument about how they stood on a lot of unanswerable things, but a true prayer will rise over their ashes—that they worked long hours, diligently, with everyday folks for the the achievement of all the "ordinary" things that make up our lives, our fortunes, our hopes.

The county agent circuit-rider has really been a fervent missionary. This zeal makes him No. 1 man for the agricultural revolution just ahead.

THE END

MORE THAN ONE WAY TO DO IT

PROLONGED wet fields and a late spring have often upset the plans of many Missouri farmers for fertilizer applications on corn land.

Fortunately, there is more than one way to apply fertilizer on corn, according to John Falloon, University of Missouri extension soils specialist.

Nitrogen

Large amounts of nitrogen are usually applied in one of two ways: plowed down or side dressed: If a plow-down application had been planned but has not been made, then side dressing is still possible at a later time.

Small amounts of nitrogen are often applied in mixed fertilizers used at planting time. The amount should be limited to 20 pounds of actual nitrogen per acre with the old conventional split-boot fertilizer attachment on corn planters. Two or three times this amount can be applied with the new side banding attachments.

Phosphate

Phosphate fertilizers also can be applied in more than one way. In the past, phosphate was applied by broadcasting, use of starter fertilizer, or by a combination of the two. Using a starter alone proved to be consistently effective only on fertile soils.

This situation has changed for those who have side banding attachments for their corn planter, Falloon explains. Side banding is aimed at doing more than just getting the crop off to a good start. The fertilizer is placed so that the corn crop can be well fed throughout the whole season.

Amount of phosphate required in side banding is about two-thirds of the annual broadcast requirement. Most Missouri soils need 40 to 50 pounds of P_2O_5 per acre when banded. Side banded applications are for one year only so they must be repeated each year. With broadcasting, the rate may be heavy enough to last for several years.

Potash

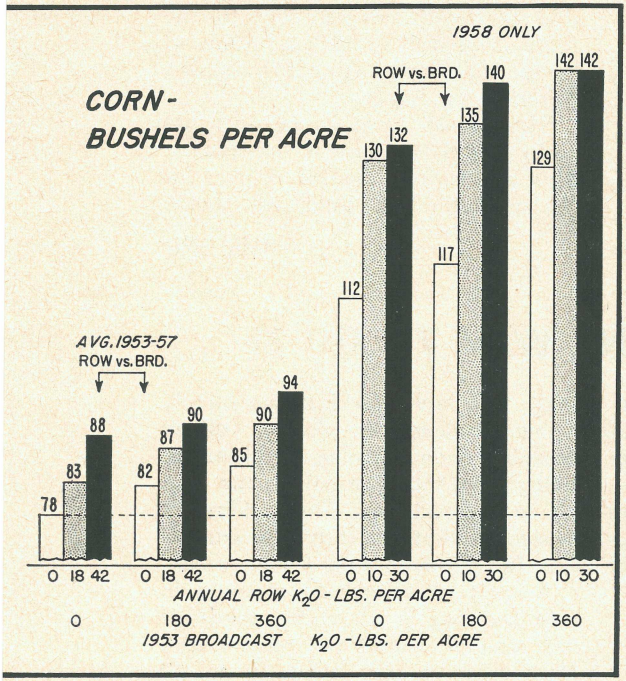
Many Missouri soils also need potash in the fertilizer to supply the needed potassium. This nutrient is most often broadcast if very much is needed.

Amounts of less than 40 pounds of K_2O (potash) per acre can be applied in the starter fertilizer with the old split-boot attachment. With the new side banding attachments, a larger amount can be used safely.

"If the weather has messed up your plans for putting fertilizer on corn, just remember there are other ways to do it," Falloon says. "Be sure to get it on in one way or another," he concludes.

Missouri News

Figure 1—Corn yields affected by rates of K_2O in the row on different residual K levels.



***Increasing* Yields Up To 20 Bushels Per Acre . . .**

ROW & BROADCAST POTASSIUM

By H. J. Mederski

WHAT fertilizer should I use, how much, and where should I apply it—these questions every corn grower asks from time to time.

An equally important question is this: Which application method is best for high yields, *row* or *broadcast?*

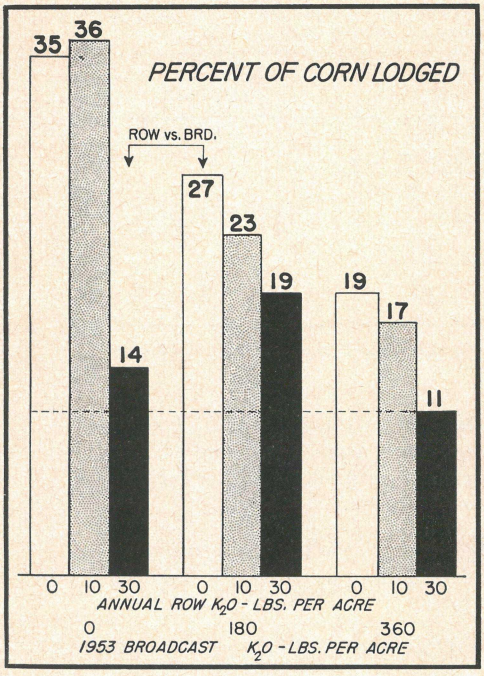
Row And/Or Broadcast

To determine the effect on corn of broadcast fertilizer only, row fertilizer only, and the combination of both, we in Ohio used the following combination of treatments in an experiment started in 1953:

1 Three rates of *broadcast* K_2O (O, 180, 360 lbs. per acre) applied on 3 separate areas in 1953. No additional K_2O was broadcast during remaining 6 years of the experiment.

2 Three rates of *row* K_2O each year (O,30,60 in 1953-54 and O,10,30 the remaining 4 years, making 5-year average of O,18,42 lbs. K_2O per acre)

Figure 2—Percent of lodged corn stalks reduced by K_2O treatments (1958 data).



. . . *Reducing* Lodging 21% Over No K_2O

AT WORK ON CORN

Ohio State University

applied in row with corn on each of 3 areas receiving the initial broadcast K_2O.

Corn was grown in a four year corn-oats-alfalfa-alfalfa rotation. Ample quantities of nitrogen and phosphorus were supplied to all crops.

Figure 1 and Table 1 show the yield response of corn to potash. The 18 and 42 lbs. annual rates in the row represent the average amounts applied during 1953 through 1957, accounting for the rate change beginning in 1955.

Figure 1 shows how row and broadcast fertilizer both increased corn yield. The 18 lb. rate in the row increased yield 5 bushels, while the 42 lb. rate boosted yield about 10 bushels. These increases were nearly the same at all levels of broadcast K_2O, as shown in Table 1.

Interesting Yield Pattern—'58

Although the 30 lb. row K_2O *without broadcast* boosted the yield 20 bushels, the 30 lb. row rate *with 360 lbs. broadcast* K_2O boosted yield only 13 bushels. In other words, yield in-

TABLE 1—INCREASES IN BUSHELS OF CORN PER ACRE FROM ROW-APPLIED POTASSIUM FERTILIZERS AT VARIOUS K AVAILABILITY LEVELS

Potash Treatments* in row	Increases in Bushels of Corn per Acre from row-applied Potash (K_2O)		
	No K_2O Brd.	180 lbs. K_2O Brd. 1953	360 lbs. K_2O Brd. 1953
	Bu.	Bu. 1953-1957 Ave.*	Bu.
18 lbs. K_2O	5	5	5
42 lbs. K_2O	10	8	9
		1958	
10 lbs. K_2O	18	18	13
30 lbs. K_2O	20	23	13

*1953-1954 row treatments were 30 and 60 lbs. K_2O, making a 5-year average of 18 and 42 lbs. K_2O.

crease from row fertilizer became smaller as soil fertility level increased.

At the highest soil fertility level, only 10 lbs. of potash was needed to produce the top yield of 142 bushels. But at low fertility levels, where no potash had been broadcast, the 30 lbs. K_2O in the row was not adequate for top yields. In fact, at this low level, 40 to 50 lbs. K_2O would probably have boosted yields into the 140-bushel level.

When used alone, which was more effective, *row or broadcast method?* The yields tell the difference. From 42 lbs. K_2O applied annually in the row (1953-57), yields averaged 88 bushels. From 360 lbs. K_2O broadcast the first year only (averaging 72 lbs. K_2O per acre per year), yields averaged 85 bushels.

An important point to remember here is this: *For top yields on this soil both row and broadcast applications were needed, since neither one alone could do the job.*

Profits From Potash

In Table 2, we have brought together the average amount of broadcast and row K_2O per year, the average corn yield increases for the 6-year period, and the ultimate goal of it all—*the profits from potash.*

We calculated the profit by deducting the cost of the K_2O ($57/Ton of 60% muriate) from the value of the corn yield increase at $1.00 per bushel. These conclusions stood out:

1 Largest yield increases and greatest profit occurred at highest K_2O rates.

2 Different combinations of row and broadcast K_2O produced similar results—showing how low rates of row application combined with relatively high fertility levels produced the same yield increase as relatively low fertility levels combined with high rates of row K_2O.

3 Although row applications may be more efficient than broadcast, high yields may be had by simply increasing the rate of K_2O application.

4 Increasing the quantity of bulk-applied potash at some convenient time or place in the rotation has four possible advantages: (1) May increase soil fertility level, (2) may allow decrease in row fertilization rate, (3) may reduce time needed for filling fertilizer hoppers, (4) may save time during planting.

Although the rate of row K_2O can be reduced at high fertility levels, some row K_2O should be used to insure rapid early growth and to improve

TABLE 2—CORN YIELD INCREASE AND PROFIT FROM VARIOUS RATES OF ROW AND BROADCAST K_2O. (6 YR. AVE. 1953-1958)

K_2O Applied Broadcast	Row	Total K_2O/yr.	Yield Increase	Profit*
Lbs./A	Lbs./A	lbs./A	bu/A	$/A
	0	0	—	—
None +	17	17	7	$ 6.15
	40	40	11	9.00
180 K_2O or	0	30	4	2.60
30 lb. K_2O/yr. +	17	47	11	8.75
	40	70	14	10.60
360 K_2O or	0	60	8	5.20
60 lb. K_2O/yr. +	17	77	15	11.35
	40	100	18	13.20

*Corn at $1.00 per bu. and $57.00 per ton of 60% muriate.

growth under unfavorable growing conditions. Table 1 and Figure 1 point this out.

Bonus From A Bargain

When considering what method and rate to apply K_2O, its relatively low cost should be remembered—about 47 cents per 10 pounds. If a grower increases his average rate from a low of 40 lbs. to a high of 80 lbs. K_2O per acre per year, his added cost will be a little less than $2.00—or equal to 2 bushels of corn.

In other words, for only 2 bushels of corn he can double his K_2O fertilization—and consider the increased bushels above the 2 it took to pay for the additional K_2O as a bonus.

Potash Reduced Lodging

Both row and broadcast application greatly reduced lodging, with the row method especially effective. Note Figure 2. While no yield increase occurred from 30 lbs. K_2O over 10 lbs. in the row at the 360 lbs. broadcast rate, corn lodging decreased much more at the 30 lbs. row rate than at the 10 lbs. rate. With mechanical harvesting this is important.

Most lodging resulted from decayed, broken stalks, but some was from weak root anchorage.

Nutrient Removal By Crops

We determined the amount of K contained in the entire above-ground portion of alfalfa, oats, and corn-plus-cobs harvested each year. Table 3 shows the average annual amount of K removed per crop. As additional K increased yields, more K was removed from the soil by the crops.

Notice that only the treatments with row applications plus the 300-pound rate of K (360 lbs. K_2O) broadcast supplied enough potash to equal removal approximately. All other treatments depleted the soil, since more K was removed by cropping than was replaced by fertilization.

Summary

Although there is considerable latitude in selecting a fertilizer program, some general principles apply to corn fertilization:

1 When soil fertility levels are low, either row or broadcast K_2O will increase yield—with the greatest return per unit of applied K_2O being from row application.

2 As the soil K_2O level increases, less row K_2O is needed to produce maximum economic returns with an increase in the rate of one allowing

TABLE 3—AVERAGE REMOVALS AND ADDITIONS OF POTASSIUM PER YEAR OF ROTATION. CALCULATED FROM CHEMICAL ANALYSIS OF 1957 CROPS

		Ave. lbs. Potassium (K) Removed** and Added					
		No K Brd.		150 lbs. K Brd. 1953		300 lbs. K Brd. 1953	
Row Treatment*		Removed	Added	Removed	Added	Removed	Added
					30		60
K_2O	K	58		65	0	72	0
					—		—
					30		60.0
					30		60
18	15	61	15	69	15	79	15
					—		—
					45		75
					30		60
42	35	73	35	81	35	91	35
					—		—
					65		95

*1953 and 1954 row treatment were 30 and 60 lbs. K_2O, or a 1953-1957 average of 18 and 42 lbs. K_2O.

**Does not include K in corn stalks.

Conversion Factors:

P to P_2O_5 = 2.287
P_2O_5 to P = .437
K to K_2O = 1.2046
K_2O to K = .8302

a decrease in the rate of the other without affecting yield. (Maximum yields were produced with as little as 10 to 20 lbs. of K_2O per acre when relatively large amounts of K_2O were broadcast.)

3 Some row K_2O appears desirable even where soil K_2O level is relatively high—with this row application hastening early development and helping insure adequate K_2O when growing conditions are unfavorable.

4 Large amounts broadcast (200 lbs. K_2O/A or more) will affect yield for at least 4 or 5 years after application.

THE END

Make Summer Crops More Profitable

Many Missouri farmers could profitably use more fertilizer, especially on their summer crops such as corn, according to George Smith, chairman, University of Missouri soils department.

In general, wheat and other fall crops are more adequately fertilized than are the summer crops. Smith says one reason farmers hesitate to put more fertilizer on corn and other summer crops is the possibility of summer drouths.

However, he points out that when rainfall is adequate, a shortage of plant food can severely limit yields. In case of drouth, there will be substantial carryover of the fertilizer to help future crops. And actually, adequate fertilization will help make most effective use of the water that is available. *Missouri News*

"OLD-FASHIONED FOLKS" SOLD ON $1,000 SOIL

By E. L. Phillips

County Agent, Mathews County, Virginia

MR. WILBER DIGGS is an old-fashioned man living in an old-fashioned community. Most of the people living there are kinfolk or neighbors of kinfolk and have been since the time of the earliest settlers. This is not uncommon in an old county such as Mathews.

Neither Mr. Diggs nor his kinfolk thought much of the idea of his county hiring a county agent with all his new-fangled ideas, but he had a problem, so he thought he would test the county agent just to see what the agent would say.

Mr. Diggs had a field which was known by all his neighbors as "That Killdee Cut." Forty or 50 years ago a neighbor had remarked that the field couldn't grow corn tall enough to hide a killdee's (killdeer) nest. That wasn't too far from the truth, and the place has been known as the Killdee Cut ever since.

The county agent told Mr. Diggs he had a valuable field, "A pound of your soil is worth $1,000 or more." After considerable discussion and cajoling, they both walked over the field, the county agent probing the soil getting samples, Mr. Diggs passing remarks of suspicion and doubt.

After the soil sample was thoroughly mixed and packed in a box, it was sent to the laboratory to see if the soil was really worth $1,000. When the results of the test came back, the county agent called on Mr. Diggs to show him what was found. It was evident that the soil needed lots of lime and considerable fertilizer, especially potash.

Mr. Diggs was still not too impressed by any such way of telling why a field wouldn't grow corn, but he agreed to try one end of the field. The first year's results were not too outstanding, but were good enough to more than pay for the cost.

Now, several years later, at the country store, the community church, or any farmers' meeting, it is not unusual for someone to bring up the subject of the Killdee Cut. Mr. Diggs eventually went all-out to supply the needed lime and fertilizer, with a little extra care in drainage, better seed, and weed control. The results were quite impressive, at least to Mr. Diggs and his neighbors.

Yes, it is still called the Killdee Cut. There was a time when Mr. Diggs was a little ashamed of that field; but if you visit him today, it won't be long before you hear about the little magic box of soil that was worth a thousand dollars and find yourself in the field admiring the black-green plants or at the crib examining the big golden ears.

Mr. Diggs' kinfolk and neighbors are still old-fashioned but, to their credit, they have the kindness and wisdom of old-fashioned folks and know a good thing when they see it.

VPI Extension Service News

FOR PASTURE PRODUCTION . . .

A HANDFUL of progressive farmers —volunteers, of course—and their agricultural advisors started something in Western North Carolina in 1959 that may eventually boost production of rough mountain pastures from the current 1,000 lbs. of hay to 3,000 lbs. or more per acre.

After the Watauga County farmers had their hard-to-reach mountain pastures fertilized from specially equipped planes, they were "extremely well satisfied" with the results.

In some cases, grazing capacity was doubled, Watauga Agent L. A. Tuckwiller reports.

Word soon got around.

By 1961, two other mountain counties decided to try aerial fertilization —Haywood and Ashe. Ashe Agent A. B. Addington reports, "Reaction was excellent. And I believe the fertilized pastures will show up even better this year."

Haywood Agent V. L. Holloway reports, "Farmers in all sections of the county are showing an interest in the program and we expect a minimum of 1,000 acres to be signed up for treatment this year."

In last spring's program, Haywood

FERTILIZE

FOR FOREST PRODUCTION . . .

IF Joyce Kilmer, a man who once wrote a few words called "Trees", were living in calorie-conscious America today he might add a verse that trees are in better shape than ever because foresters keep close tabs on their diet.

Forestry experts no longer believe that "trees will grow anywhere they can find water." Not since 1956 when the first aerial application of a complete fertilizer was made to forest lands in New Jersey. The tonic consisted of nitrogen, phosphate, and potash.

Results were so remarkable that other progressive forest people immediately put their timber lands on the same diet. They found the trees grew faster, taller, and wider. And they were healthier.

But why fertilize? Because the demand for tree products has never been greater and many soils lack sufficient chemical nutrients to produce a sturdy timber.

Uses for wood are virtually limitless. One conservative estimate is 4,500 uses—not including plastics. Other products made from trees are tea, coffee, maple sugar, coconut oil, fruit, quinine, cork, turpentine, rubber, and even wax.

Wood production is also plagued by hazards that destroy millions of

County farmers Hillary and Bill Medford compared the ease and economy of two fertilizer application methods: (1) from the air by dust cropper planes, (2) from the ground by crawler tractor with lime spreader.

According to Assistant Haywood Agent Clayton Davis, their experiences ran like this:

Six acres of rough mountain pasture were fertilized with 2,400 pounds of 0-30-30 TVA demonstration fertilizer, applied by airplane. Application cost (the same as the other 450 acres treated in Haywood County last spring) was $5.40 per acre.

Another six acres were measured off and the same amount of fertilizer applied, using a crawler tractor and lime spreader. It took the two men six hours to treat the six acres. If they were working for someone else, they would get $6 per hour for the crawler.

Considering the extra man to help load, hauling the fertilizer from town, and the other necessary arrangements, they saved approximately $1.75 an acre to let the airplane pilot apply the fertilizer.

"Also, we would have to build roads to some of our pasture before we could haul the fertilizer to it," Hillary said. "And when the ground is frozen, it is

VIA SKY

acres of woodlands each year. Insects, diseases, hurricanes, ice, snow, hail storms and fire continue to take a heavy toll of one of our most important natural resources.

Especially fires. In 1947, a typical year, there were 200,299 forest fires. They burned more than 23,226,000 acres—an area equal in size to the state of Indiana.

Fortunately, tree fertilizers help make up for this tremendous loss by accelerating tree growth. Researchers at Washington State College estimate that nitrogen alone can increase tree growth by 40 to 65%.

The cost of aerial fertilization is small compared with the profits gained from increased timber yield. Standard "crop-dusting" airplanes quickly and economically spray hundreds of acres of forest land and reach areas that would be impossible to spray from the ground.

A cloud of fertilizer (12% nitrogen, 12% phosphate, and 12% potash) can be spread at the rate of 400 pounds an acre over 11 acres in six seconds.

There are 6,000 crop dusters in this country and most of them charge from one to two cents a pound of fertilizer applied. "That's as low a price for fertilizer as any I know," said one tree expert.

As with humans, trees need the right kind of food to grow straight, tall, and strong. Who knows? Someday, with the help of chemical fertilizers, we may have a nation of redwoods.

Allied Chemical News

FOR PASTURE PRODUCTION . . .

hard to get over very steep land with a crawler."

Their conclusion: application by airplane is easier and more economical. When the airplane pilot returns, they want to treat 25 acres by aerial method.

Apparently the word continues to spread, for two more mountain counties—Buncombe and Madison—plan to try the practice this year for the first time.

That will bring the count to five counties using a method of enriching their pastures that N. C. State Extension Agronomist Sam Dobson and his team of specialists gambled on in 1959—and won.

Dobson says about 500,000 acres of land in Western North Carolina could benefit from this practice—cleared and fenced land now averaging about 1,000 lbs. of hay per acre annually, but capable of 3,000 to 3,500 lbs. of hay with proper liming and fertilization.

Program supporters report that thousands of acres of steep mountain pastures have never been fertilized and other pastures are fertilized only with great difficulty.

Madison County Agent Harry Silver summed it up: "With no fertility, those rough, hard-to-reach mountain pastures are grazing fewer cattle each year. If not improved, they are destined to carry less cattle—and to erode into gullies or grow up into undesirable weeds and brush."

Two materials are earmarked for use this year: 0-30-30 and 0-63-0 for land not needing potash.

THE END

FERTILIZER BOOSTS TREE GROWTH

FERTILIZER will produce an increased growth rate in pine on sandy soils low in natural fertility and with stands having a closed canopy, according to studies at the University of Maine. A complete fertilizer supplying 60 pounds each of nitrogen, P_2O_5, and K_2O per acre gave the most consistent growth response on the soils tested.

Fertilizer treatments tested included zero, 20, 60 and 100 pounds, of nitrogen; 20, 60 and 100 pounds of K_2O; and 60 pounds each of nitrogen, P_2O_5, and K_2O per acre.

Four plantations were treated—two that were planted to white pine and two to red pine. One plantation of each species was about 30 years old, while the other two were about 10 years old. Fertilizer applications were made during the summer of 1958 and the results compiled during the summer of 1960.

Results indicate that fertilizer responses were greatest after the trees had produced a closed canopy over the soil. Where the canopy was open, weeds and other growth seemed to utilize and benefit from the fertilizer.

Pine tree benefit from fertilizer can be measured most consistently by the growth in the third whorl from the top of the tree. The next best results can be obtained from the diameter at breast height measurements.

Crops and Soils

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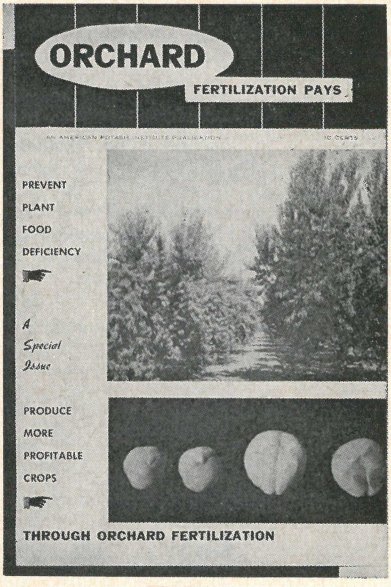

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K-10-61

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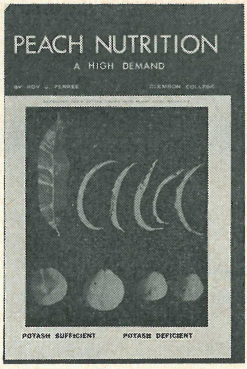

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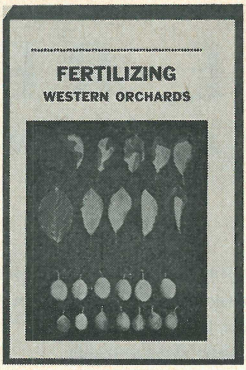
ON PEACHES: Showing why growers have turned to complete fertilizer treatment and three good weapons for fighting deficiency.



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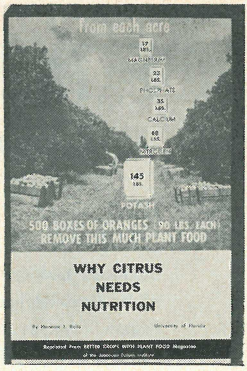

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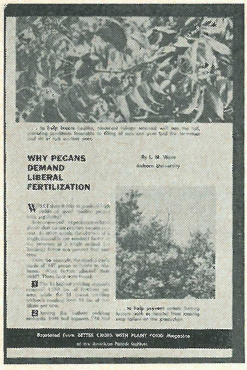

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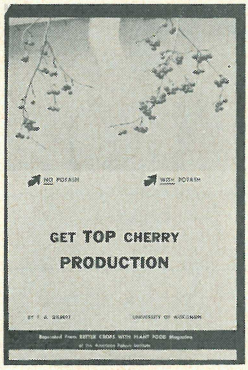

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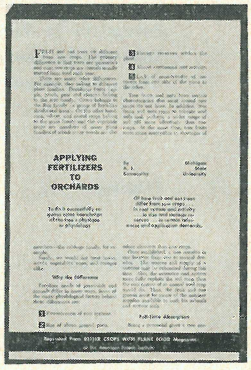

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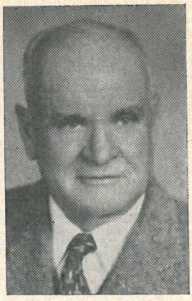


IN MEMORY OF GEORGE CALLISTER

A VETERAN technical adviser of the fertilizer industry of North America and former vice president of the American Potash Institute is dead from a car-train collision, it has been reported from Toronto, Canada.

George J. Callister, 76, of Toronto, Canada, served the potash industry in the United States for two decades, first as agriculturist for European potash interests serving this nation and then vice president of the American Potash Institute which was formed in July, 1935.

On returning to Canada in January of 1940, he served for a short period as general secretary of the Canadian Society of Technical Agriculturists, predecessor of the Agricultural Institute of Canada. This Institute honored him as a Fellow in 1956.

As assistant administrator of fertilizers and pesticides for the Prices and Trade Board of Canada in 1942, he became a Canadian member of the Combined Food Board working in Washington, D. C. on food and agricultural supplies allocation among Allied nations. He headed this board's fertilizer section, directing fertilizer distribution among 17 countries.

This led to a post as fertilizer specialist for the agricultural division of the United Nation's Food and Agriculture Organization.

His retirement was an active one—as a fruit farmer in Canada's Ontario Province, as a consultant for the Ontario Fresh Peach Marketing Board and for the United Nation's Food and Agriculture Branch. Such work took him to Rome and Paris, and on an extensive trip through the fruit-growing areas of the United States.

Mr. Callister was a native of the Isle of Man, going to Canada as a young man to work on a farm and later to teach high school in Massachusetts.

He earned his BSA from the Ontario Agricultural College, later taking graduate work at Cornell University, and serving in the Canadian Army in World War I.

PEANUT CHAMP

GEORGIA'S champion peanut grower, Jimmy Rogers of Tattnall County, put top management into his 1961 victory.

His yield of 3,359 pounds per acre on an 8.9-acre allotment was the state's highest official yield for the last growing season, according to records of the Georgia Ton Per Acre Peanut Club.

Rogers planted 105 pounds of certified seed per acre of the NC-2 variety around April 10. Seeds were planted in three 22-inch rows with a 4-inch drill spacing.

He fertilized with 900 pounds of 5-10-15 per acre broadcast. Chemical weed control was used and cultivation consisted of running the middles out twice. He sprayed for thrips control and dusted four times for leafspot diseases. The peanut crop followed corn on the land.

Rogers received an average price of $249.80 per ton.

Georgia News

MORE FERTILIZER NEEDED FOR: CROP YIELDS AND SOIL FERTILITY MAINTENANCE

By M. B. Sturgis Louisiana State University

ALTHOUGH Louisiana farmers have been using increasing amounts of commercial fertilizers, they still need to apply more to produce the yields that experiments show are possible and to maintain the soil's fertility.

In general, more nutrients are being removed from our soil by crop production than are being added through fertilization.

Farmers of the state spent about $17,500,000 for some 295,000 tons of commercial fertilizers in 1959. But these fertilizers accounted for only 40 per cent of crop yields. The remaining 60 per cent came from native soil fertility, which had a value of over 26 million dollars for 1959. Its residual value is many times greater than this. Furthermore, the immense value of native soil fertility in forest production has not been included here.

Soil Organic Matter

One of the greatest problems in

TABLE I—CROP ACREAGES, YIELDS, PRODUCTION AND NUTRIENT REMOVALS IN LOUISIANA FOR 1959

Crop	Acreage	Yield/A.	Total Production	Tons of Nutrients Removed		
				N	P_2O_5	K_2O
Cotton	495,000	1 bale	495,000 bales	9,900	3,960	3,712
Rice	453,000	28.5 cwt.	12,910,000 cwt.	8,392	4,841	2,647
Corn	530,000	33 bu.	17,490,000 bu.	7,950	3,975	2,306
Sugar Cane	268,000	22 tons	5,896,000 tons	4,288	2,680	11,936
				*(9,380)		*(21,842)
Hay (all)	422,000	1.4 tons	572,000 tons	8,294	3,146	9,152
Soybeans	138,000	24 bu.	3,312,000 bu.		1,325	1,822
Oats	83,000	31 bu.	2,573,000 bu.	830	315	216
Hort. Crops	126,000			2,270	1,010	3,780
Pastures	3,000,000			*(9,375)	*(3,300)	*(4,800)
Total	5,515,000			41,924	21,252	35,572
Total *(Including losses from burning of sugar cane trash and grazing removals from pastures)				56,391	24,552	50,278

	N	P_2O_5	K_2O
Tons of nutrients applied in 1959 from use of 295,552 tons of fertilizers.	55,759	23,188	19,733
Deficits (differences between additions and removals)	632	1,364	30,545

"Our soil fertility must be maintained if future generations are to harvest yields like this."

practical agriculture is to further increase and maintain the native soil fertility, particularly soil organic matter and nitrogen. It is more and more apparent that the soils must contain as much as 0.08 per cent soil organic matter for each per cent of clay to be able to preserve the physical conditions necessary for crops to efficiently use the fertilizers that are being applied. Soil organic matter is a function of the amount of crop growth and residues turned under; so added fertilizers may be required to prime increases in native soil fertility.

Immediate increases in yields are usually related largely to requirements for more fertilizer nitrogen. But the requirements for fertilizer phosphorus and fertilizer potassium are also very important.

An examination of the data in Table 1 shows that crop removals of nitrogen were 56,391 tons in 1959. This is slightly more than the total replacement from fertilizer additions.

Greater Yields Possible

Increases in crop production depend both on adding more plant food per acre and on increasing the acreage in various crops. Crops which should receive special attention are corn, hay and pasture crops, oats and wheat, soybeans, sugar cane, cotton and rice.

If farmers can be persuaded to use more fertilizers, better balanced fertilizers and more properly placed fertilizers, and if by so doing they increase yields from what they are

now by only half of what experimental results show they may be increased the expected average yields for the various crops would be: for corn, 77 bushels per acre; for hay, 2.7 tons; for oats, 62 bushels; for wheat, 35 bushels; for soybeans, 36 bushels; for sugar cane, 27 tons; for cotton, 1.5 bales; for rice, 23 barrels or 37 cwt. per acre.

When the above yields per acre are realized, and surely they will be, the nutrient removals at the present acreages in Louisiana for the various crops will be 83,000 tons of N, 38,000 tons of P_2O_5, and 66,000 tons of K_2O. The tonnages of nutrients applied in 309,000 tons of fertilizers used in Louisiana in 1961 were 66,000 tons of N, 27,000 tons of P_2O_5, and 22,000 tons of K_2O.

These applications barely equal the crop removals of N, and P_2O_2 and fall short of the K_2O removals by 9,000 tons.

If we are limited to our present acreages, but allowed to attain the expected increases in yields per acre, we shall have to use 17,000 more tons of N, 11,000 more tons of P_2O_5, and 44,000 more tons of K_2O just to meet the crop removals.

Since the efficiency of the use of the nutrients is not 100% but 50% or less at the higher yield levels, we should for the next few years or until we build the soil reserves be applying annually to our harvested crops 100,000 tons of N, 50,000 tons of P_2O_5, and 66,000 tons of K_2O.

These estimates are not optimistic. They do not involve the hope that we shall appreciably increase within the next few years the acreages in harvested crops. It is not anticipated that there will be much increase in the improvement of pastures.

If the animal industry people can seriously increase animal production, pastures and meadows will be improved, more feed grains will be grown, and more acreage will go in feed grains and forage crops. There are about 3,000,000 acres in pastures and meadows that are being very meagerly fertilized. Also, the placement of fertilizers on pasture and meadow crops needs to be more thoroughly investigated.

There are serious needs for better equipment for fertilizing, seeding, and renovation of pastures and meadows. The production of hay is greatly limited by lack of equipment for drying or curing.

Of course, these are potential bases for optimism. There are 3,000,000 acres in pastures and meadows that are waiting for their production to be doubled, and there are 900,000 acres of good crop land that could go back into harvested crops.

Maybe we should get more competitive rather than wait for an increase in indolent population to increase our business.

Lime Importance Growing

The physiological acidity being created annually in the soils from the use of ammonia and ammonium forms of nitrogen is equivalent to about 85,000 tons of limestone.

The continued extensive use of ammonia and ammonium forms of nitrogen depends on the development of a liming program. The extensive improvement of pastures also depends on the use of more lime.

Efficiency in the use of fertilizers is limited by lack of development of better cultural practices and better and cheaper weed control measures.

We cannot continue to reduce acreage in harvested crops and to barely return to the soil the amounts of nutrients removed by the harvested crops. Greater attention must be given to increasing the nitrogen and phosphorus reserves in the soil, to the use of more lime, to the development of better physical conditions in the soil and to the use of more effective weed control practices.

THE END

GRASS GROWER TESTS SOIL

GROWERS of turf grasses, like farmers, know that soil testing to determine lime and fertilizer needs in their operations is important, says Hugh A. Inglis, agronomist of the University of Georgia Extension Service.

As an example, he cited the case of Bill Roquemore, manager of the Patten Seed and Turf Grass Company of Lakeland, who takes soil samples to determine lime and fertilizer requirements for his turf nursery stock.

Before planting he puts down 1,000 pounds of 5-10-15 fertilizer and when new growth begins in the spring he applies 100 pounds of nitrogen per acre.

A member of the Georgia Crop Improvement Association, Roquemore has six and one-half acres of Emerald Zoysia, 23 acres of Tifgreen Bermuda, two acres of Tiflawn Bermuda, and 40 acres of Tifway Bermuda in the Crop Improvement certification program.

"Anyone who has tried to keep a yard around his home looking good will appreciate the amount of work that goes into producing, harvesting, and marketing sprigs from this many acres," Mr. Inglis declared.

Mr. Roquemore has developed a specialty of putting in grass for golf courses and athletic fields from Virginia to Texas and the Bahama Islands, the agronomist said.

In addition to the grasses sold as vegetative sprigs, the company also harvests and sells seed from 600 acres of centipede grass for lawns.

People who want an outstanding lawn, golf course, or athletic field have turned to these turf grasses developed by our plant scientists for specific purposes, the agronomist added.

Georgia Extension News

NEW BEAR BOOK FOR US FOLKS

DR. Firman E. Bear, former head of the Department of Soils at the College of Agriculture, Rutgers University, has just published a new book entitled "Earth—The Stuff of Life."

Ten years in the making, the book is not a textbook nor is it designed to be read by experts in the earth sciences.

In the words of its author: "Its purpose is to help the general public understand more fully the earth on which we live and how its use and misuse may affect us."

Many people should find this interesting reading since it deals with the soil beneath our feet and the life in it, the air that surrounds us, the rain that falls on us, our place in the sun, ancient seas and the highly important salts they left behind when their water had evaporated, the grass that is always ready to cover any bare spots, the problem of the plow, the country beautiful and the tremendous problems of land, food and people the earth over.

The 238-page book was published by the University of Oklahoma Press, Norman.

New Jersey News

BETTER FORAGE NEEDED FOR DAIRY PROFITS

Georgia Dairy Nutritionist M. E. McCullough Explains

"THE primary needs for improved dairy profits in the South are better forage and better management," says M. E. McCullough, associate dairy nutritionist at the Georgia Agricultural Experiment Station here.

He says that increased grain feeding is no substitute for these two needs.

But, Mr. McCullough cautions, "Like all farm management decisions, this one can only be made on farm-to-farm basis."

He explains: "Two factors have influenced the question of substituting grain for roughage: (1) The current favorable price for grain and (2) the publicity given large dairy operations in areas such as Florida where dairying is more of a manufacturing operation than a farm enterprise.

"The latter situation is the result of favorable laws and regulations and a highly concentrated area of population. This situation will continue favorable unless all milk is placed under uniform regulations thus opening such areas to free flow of milk. Such conditions hardly offer a usable basis for formulating changes in dairying in other areas.

"The current favorable prices for grains can hardly be expected to continue over the long haul," he says. "Long-time decisions should never be made on the basis of temporary conditions. Thus, while extra grain may be fed when it is cheap, the long range program should emphasize economical production under increasing grain prices."

DHIA Reports

A Georgia researcher recently explained, "one of the best sources of information on what's happening in the dairy business is the farms included in Dairy Herd Improvement Assn. To see whether or not higher levels of grain feeding should be useful, we examined the herd records of 140 dairy farms in Georgia in 1960.

"The herds were divided into two groups—those feeding a grain to milk ratio of 1:3.50 or higher and those feeding 1:2.5 or lower. The results are shown in Table 1.

"It may surprise some people to find that the dairymen feeding only half as much grain had the highest herd average, the greater income above feed cost, and also included 41% of herds with herd averages above 10,000 lb. of milk. The high grain feeding herds were trying to replace high quality forage and good herd management with poor forage and lots of grain. They were simply not successful."

TABLE I—SUMMARY OF D.H.I.A. HERDS FEEDING GRAIN AT AN AVERAGE RATIO OF 1:2 AND 1:4*

No. herds	Av. milk production	Ratio grain:milk	Pounds of grain fed	Income above feed cost	Percent of herds with over 10,000 lb. average
53	9,557	1:4	2,402	$374	41%
87	7,886	1:2	3,715	$284	10%

*Georgia D.H.I.A. Summary, 1960. Courtesy of the Extension Service, University of Georgia.

How much grain should be fed?

Mr. McCullough says, "A frequent answer to this question is 'Feed all the grain that the extra milk will pay for.' This is a good answer, but it is like saying, 'Wear a raincoat when it is raining.' The problem is to guess when it will rain so that you can have a raincoat available.

"There are certain facts which can be useful in making the decision. Two important ones are: (1) What will I receive for the extra milk? (2) How much response in milk production can I expect?

"Several experiment stations have studied the expected increase in milk production from feeding more grain. These results are summarized in Table 2."

The Georgia nutritionist said the calculations have all been based on terms of a herd already being fed grain at the rate of 1:4.

He explains, "The question is, 'Should a farmer feed more?' The first item of importance is the type of cow in the herd. Obviously there is little to be gained from feeding more grain to 7,000 lb. cows but 12,700 lb. cows may benefit from the extra grain. The amount of response varies with the cow and also with the forage being fed—the better the forage the less the response.

"The big question remaining is 'How much can you pay for this extra grain?' Here is where milk sales enter the picture. If the extra milk goes into surplus milk ($3/cwt.), it is obvious that only farm grown grains can be used even with the better cows. However, if the milk can be sold at a blend-price of around $5.50, then farm grains can be used in low producing herds and higher priced feeds can be fed to good cows.

"Like all farm management decisions, this one can only be made on a farm-to-farm basis," Mr. McCullough concludes. "Careful attention to the above items should make the decision somewhat easier."

Feedstuffs

TABLE 2—INFLUENCE OF FEEDING 1,000 LB. MORE GRAIN PER YEAR TO COWS ALREADY BEING FED GRAIN 1:4 AND GOOD ROUGHAGE

Type of cow	Milk production at 1:4 grain	Increase in total milk with 1,000 lb. more grain	Price per ton that can be paid for grain when milk is: $5.50 per cwt.	$3.00 per cwt.
Average	7,000	300– 500 lb.	$33.00 to $55.00	$18.00 to $30 00
Good	10,000	500– 700 lb.	55.00 to 77.00	30.00 to 42.00
Very good	12,700	700–1,000 lb.	77.00 to 110.00	42.00 to 60.00

MAKING YOUR NEW LAWN

By Richard C. Skogley
University of Rhode Island

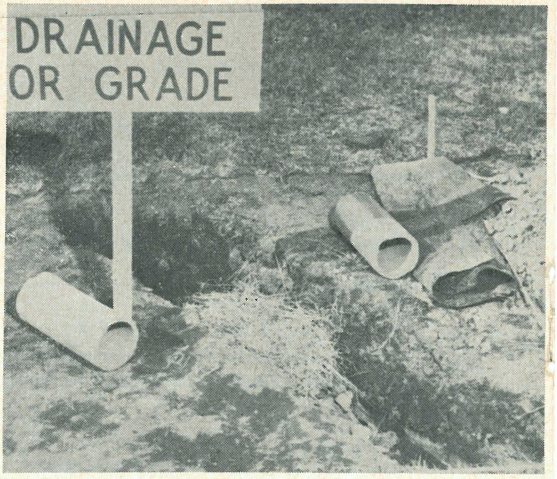
MAKING a new lawn almost always presents problems for the homeowner. Yet, they can be reduced if you pay careful attention to a few important steps during lawn construction.

Attractive lawns can be developed on almost any soil you have. Although it may be easier to grow and maintain a lawn when a good topsoil is used, it is not a requirement. Having topsoil is not a guarantee of success.

With or without good topsoil you will have a good chance of success if you fulfill the following six requirements pictured elsewhere on these two pages.

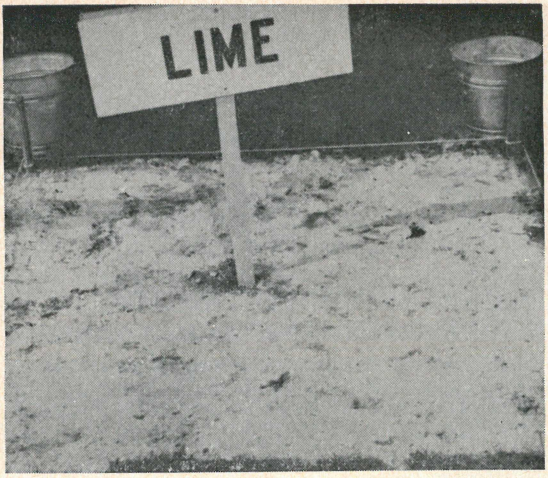
Lawn Care

You can hasten seed growth by frequent watering. Use a fine mist to avoid washing the seed or compacting the surface. When the grass reaches a height of three to four inches, it should be cut. Set the blade on your mower to cut at a height of one and one-half inches to two inches. Subsequent proper use of lime, fertilizer and water and mowing at the proper height and frequency will assure you of a fine lawn with a minimum of effort.



1 Desirable lawn grasses will not grow at their best under constantly wet soils. Make certain the lawn area slopes gently away from the house and see that that there are no low spots where water might collect. In very poorly drained areas, you may need to lay tile drain.

4 Mix lime and fertilizer by spading or tilling the soil to a depth of 5 or 6 inches. Do not do this when soil is wet. Rake the area well to level the surface. Break up large clods and remove stones and debris. Firm soil by rolling. This will help settle soil and show up existing irregularities. Rake again—to leave a level surface, neither too lumpy nor reduced to fine dust.

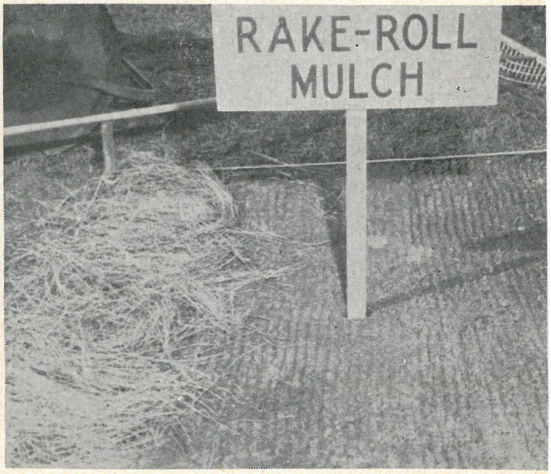


2 Many soils are too acid for good grass growth. When that is the case, you will need to add limestone. We recommend around 150 lbs. per 1,000 sq. ft. Besides correcting the acid condition of your soil, limestone provides calcium and magnesium, two essential plant foods, and improves the soil structure. Apply it uniformly after establishing the rough grade.

3 Fertilization is important. We suggest 25 to 50 lbs. per 1,000 sq. ft. of a complete fertilizer, such as 5-10-5 or 5-10-10. It can be applied at same time as lime. Spread uniformly. You can also lightly rake in an extra 5 or 10 lbs. per 1,000 square feet just before seeding. Spread easily with a spreader. Check with your county agent about soil tests.

5 If you start lawn in spring, begin as early as possible. Late spring seedings can be risky. Select a seed mixture that meets the condition of your lawn. Mixtures containing high percentages of the bluegrasses and creeping red or Chewing's fescue are preferred, with small percentages of ryegrass or redtop in mixtures permissible. Suggested seeding rate: 4 lbs. per 1,000 sq. ft.

6 Uniform distribution is most important here. Split the quantity of seed into two portions and apply the portions at right angles to each other. After seeding, cover by light raking. Roll or water very lightly to firm surface. Light mulch helps conserve moisture and control erosion. Use straw, hay or cloth.



DARK GREEN AND FAT

Deepest kernels and heaviest ears are made when all needed nutrients have been supplied, when rainfall has been ample, and days are sunny and cool.

The diameter of the corn stalk should be large, with heavy nodes. Leaves should be wide and shiny.

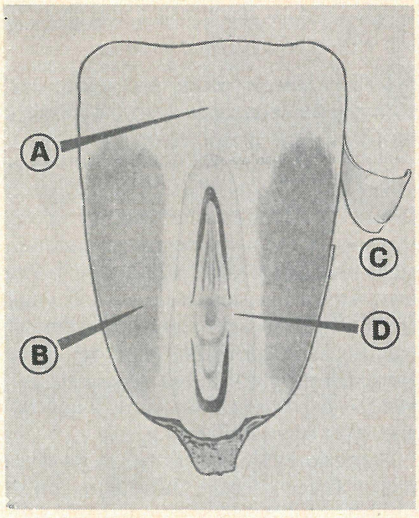
Big, strong brace roots are a key to good corn plant performance.

By George D. Scarseth

Director, American Farm Research Association

West Lafayette, Indiana

In Patrons Guide



Protein content is reflected in width of the endosperm (Code B). This is the amber colored hard part of the seed as seen when a kernel is split. A, soft starch; B, hard starch; C, hull; D, the embryo as new plant.

WE HAVE our score card for show cattle, there is another for bathing beauties, but nobody has made a point of what the farmer should look for when sizing up how well his corn crop is doing. Just what is "The Corn Look" for profit?

The corn breeder continually has new styles in the making, but until these are ready it may be useful to have a guide to go by.

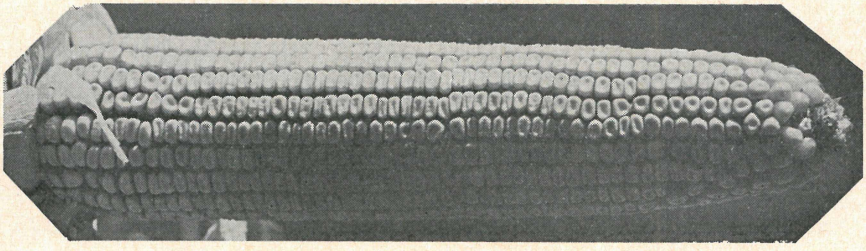
"Dark green and fat" expresses best, it seems, the impression one gets of a corn plant that is headed for a top yield.

A good time to evaluate a corn plant, therefore, is from silking to the time of full ripeness. Here are some points to look for:

1 *The diameter of the stalk must be large, with heavy nodes.*

Important factors for this are abundant available phosphorus, potassium and nitrogen. Too thick a stand will cause stalks to be slender and weak, especially if the phosphorus supply is limiting; yet the stand must be thick enough for a top yield. In the corn belt, for the majority of farms, this is a population at harvest of about 18,000 stalks per acre. A well fed, thick stand shades the ground and helps hold moisture and is a check on grasses, while a thin stand lets in too

The reward of right management—including adequate plant nutrition—is the heavy ear with deep, rich kernels.



much light to the grasses and heat to the soil.

2 *The leaves must be wide and shiny, with a waxy luster that shows a uniform dark green color.*

Any yellowing of the lower leaves along the mid-rib from the leaf tip as a result of nitrogen shortage, or along the outer margins showing a potassium starvation, is a sign of money being lost. Any other departure in leaf color from the ideal is another sign of trouble, and probably can be cured for extra profits through diagnosis and proper treatment—soil and plant tissue tests and fertilization.

Sometimes this fertilization involves more than merely nitrogen, phosphorus, and potassium, on many soils boron, zinc, magnesium, and sulfur are too deficient for profitable yields. Be on the alert for the usual hunger signs as well as signs of diseases and insects.

3 *The brace roots must be big and lusty—almost like big night crawlers reaching out and into the ground.*

Brace roots are never like that on soils starved for phosphorus. The key to a good plant performance is big brace roots. If they are not big and strong, start looking for the trouble. It is most likely to be identified as a deficiency of phosphorus.

4 *When the corn is ripening, the whole plant, including the outside husk on the ear, should remain green.*

When the ear ripens with a white outside husk something is wrong, usually a lack of nutrients, especially nitrogen. Dry weather will cause a white outside husk too, but that is because the roots can't take up enough nitrogen out of the dry soil. The deepest kernels and heaviest ear is made when the ripening process turns only the inside husks white, and the outside husk remains green until the kernels start to dent.

Any corn that shuts down the corn-making factory too early in the season for lack of water, nutrients, or too hot weather, is robbing the farmer. Such corn kernels tend to be short, flinty and the ear small in diameter. The higher the nitrogen supply at ripening time, the higher will be the protein content. Protein content is reflected in the width of the endosperm—the amber colored hard part of the seed as seen when a kernel is split. Robert Porter of Minnesota put us onto this simple indicator. The lower the protein content the wider is the starchy part of the seed.

There are other characteristics to look for, but the four described here cover a lot of the vital factors which can spell the difference between a good or poor corn performance, As my old Professor Truog of Wisconsin used to say—"It's simple if you understand it."

THE END

Help Guard Against

STALK ROT!

In Your Corn Crop

See Page 46

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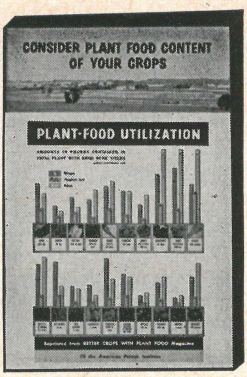
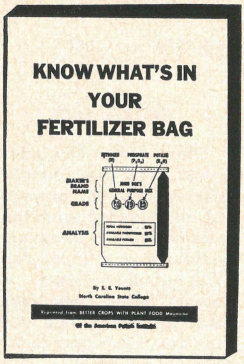
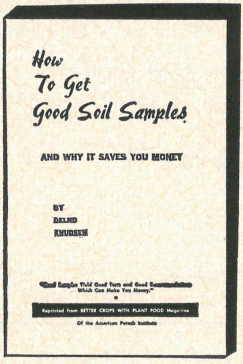


EE-12-57—Above free quantity $4.00 per 100



Q-11-59—Above free quantity $2.00 per 100



JJ-12-58—Above free quantity $3.00 per 100

A KIT-OF-THREE FOR YOUR SOIL FERTILITY WORK

ON PLANT FOOD REMOVAL

This gives how much plant food your crops remove from the soil, a composite picture of the N, P, K contained in good yields of 28 important crops citing large removals by legumes, plant food sources, and the trend toward higher analysis plant foods.

ON FERTILIZER CONTENTS

This clearly explains what a fertilizer is, why it is important, what the different types are, the difference between material and grade and ratio, a look at specialty materials, how they should be used.

ON SOIL SAMPLING

This gives the steps to good soil samples—the advice, what tools, how to divide field, depth by auger or spade, proper mixing, labeling, diagramming field, information, proper packing, etc.

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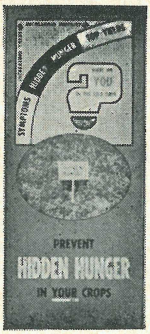
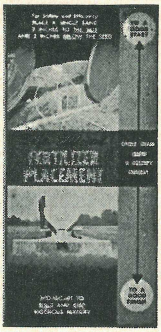


FOLDER C-59

Do you want to prevent hidden hunger in crops? If so, this folder will acquaint you with that all-important hidden hunger zone on the yield curve and how to deal with it. It points out how crops often do not show definite deficiency symptoms but still need extra plant food.



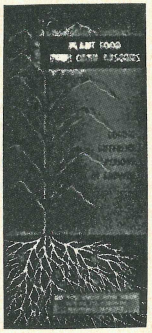
FOLDER E-59

Here are graphic pointers on safe, efficient fertilizer placement. How to avoid injury to seedlings. How to use nutrients efficiently from start to finish. How *right* placement *pays* on specific crops. How to get the right start, to build fertility, to maintain it, etc.

Quantities above free policy (stated below) *only* $1 per 100, $10 per 1000

FOLDER B-59

Here is shown the role of potash on yield and quality. How much potash certain basic crops take from the soil in a year. How heavy nitrogen treatment can cause crops to use up available potash *fast*. How potash affects quantity, quality, drought and disease resistance.



FOLDER D-59

This folder capsules plant food corn absorbs during different periods of its 4-month growing season—the minerals used by corn producing 100 bushels per acre. It shows what corn ears look like when they suffer from shortages of nitrogen, phosphate, and potash.

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INDUSTRY LOOKS AT SOIL TESTING

SOME interesting ideas turned up when the fertilizer industry was recently asked its views on soil testing as it shapes up today.

The thoughts came as a result of a survey conducted by the Soil Science Society of America's Committee on Soil Test Correlations, Dr. E. J. Kamprath, Chairman, in cooperation with the National Plant Food Institute.

The purpose of the survey was to get a measure of industry's attitudes toward soil testing and the function that this service should and does perform for the fertilizer industry.

Results of the survey as prepared by Dr. C. L. W. Swanson, SSSA committee member, who conducted the industry survey, in cooperation with the Research and Education Committees of the National Plant Food Institute, are as follows:

1 Fertilizer recommendations should be adjusted to higher yield and management levels.

2 The time lag for returns of soil test recommendations should be shortened.

3 Only qualified personnel should make soil tests and fertilizer recommendations, be they college or industry representatives.

4 Soil testing is used primarily as a service function to farmers and not principally as a sales tool.

5 More additional work must be done in motivating farmers to have their soils tested.

6 There is some need for minor element tests.

7 The chief function of soil testing is to provide a basis for more profitable fertilizer recommendations.

8 Fertilizer recommendations are made about equally by agronomists and salesmen in the companies. Dealers also made some of the recommendations.

THE END

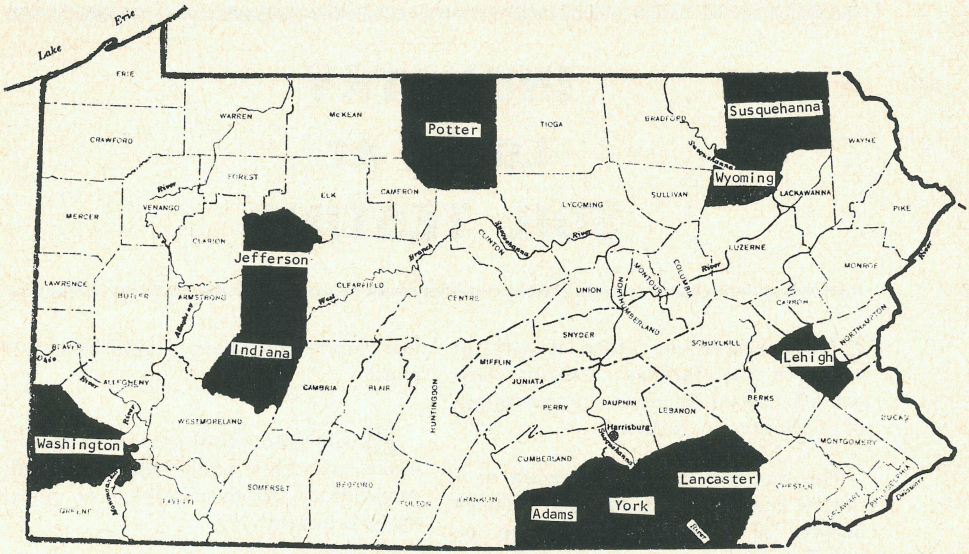


Figure 1—Twenty farms in 10 different Pennsylvania counties were surveyed.

LAND REORGANIZATION & TREATMENT

By William A. Hayes
Soil Conservation Service, USDA
Harrisburg, Pennsylvania

IN RECENT years, more and more farmers have been reorganizing and changing the treatment of their land in an effort to get more efficient production from each acre of land.

A study of 20 Pennsylvania dairy farms clearly shows how such reorganization can influence fertilizer and lime applications, crop yields and production, equipment and building changes—*and gross income*, the ultimate goal.

This report will attempt to show that increased fertilizer and lime applications greatly influenced crop yields and production, and gross income.

There is not room here, of course, to discuss all phases of the land reorganization and treatment changes on these farms—however, soil conservation practices such as contour strip cropping, diversion terraces, conversion of severely eroding fields to permanent forage production, and other related practices were major factors in efficient utilization of increased lime and fertilizer and improved crop varieties.

In a capsule, land reorganization

On 20 Dairy Farms—SCS Cooperators

and treatment changes resulted in (1) a reduction in grain acreage and an increase in grass and grass-legume acreage, (2) an increase in average yields of all crops, (3) an increase in average cow-carrying capacity of the farms from 18 to a 47-cow milking herd, (4) a 63.9% increase in gross income, (5) fields are more convenient to farm and (6) costly erosion has been practically eliminated.

The 20 farmers selected for this study were Soil Conservation District Cooperators located in 10 different counties. See Figure 1. Farm conservation plans were developed an average of 11 years before the survey, with assistance from the U. S. Soil Conservation Service. All farmers were good managers and classed as above average conservation farmers because of the large percentage of conservation practices applied on their land.

Farms included in the survey averaged 168 acres in size, as shown in Table 1 which also gives the average acreage by land use per farm.

Lime Progress

The average lime program on the farms showed this before and after picture:

Before Conservation Planning—an average of 400 lbs. of ground limestone per acre per year (about ¾ of a ton every four years).

After Conservation Planning—an average of 800 lbs. ground limestone per acre per year (about 1½ tons every four years.)

Farmers using a soil test as a guide to lime applications increased from 4 to 20, while the average pH per farm improved from 5.6 before to 6.6 after land treatment. Average annual liming cost per farm increased from $223 before to $446 after conservation planning, with average cost of lime being $8 per ton.

■ IN AVERAGE YIELDS OF ALL CROPS.

■ IN GRASS AND GRASS-LEGUME ACREAGE.

STIMULATES INCREASES

■ IN CARRYING CAPACITY OF THE FARMS.

■ IN GROSS INCOME—UP NEARLY 64%

Research results have proved that liming is highly profitable, by creating a more favorable medium (pH) for bacterial action and root growth. These studies also show that liming increases availability of fertilizer nutrients.

Fertilizer Progress

The participating farmers changed their fertilization practices greatly.

TABLE 1—AVERAGE ACREAGE BY LAND USE PER FARM AFTER REORGANIZATION

Land Use	Acres
Cropland	65.2
Perennial hay	36.6
Pasture	31.7
Woodland	30.4
Miscellaneous land	4.1
Total	168.0

For example, only one farmer continued to use the same fertility program. Two farmers used a higher rate, but the same analysis. And 17 adopted a *higher rate and higher analysis.*

The average annual fertilizer investment per farm increased from $393 (1959 prices) *before planning* to $1,361 *after planning*—an increase of $968. Proper fertilization, like liming, is a profitable practice, but there is still room for considerable improvement in efficiency of fertilizer use.

What happened to the use of the three major elements—nitrogen (N), phosphate (P), and potash (K)—on corn, small grain, hay, and pasture *before* and *after* the conservation planning? Table 2 shows that increases in nitrogen application ranged from 80 to 200%, phosphate from 60 to 650%, and potash from 250 to 1,100%.

The increased nitrogen on corn and pastures contributed materially to increased yields. In fact, some farmers used larger amounts of nitrogen on corn than indicated in Table 2, especially when not plowing down a stand of alfalfa.

Nitrogen on pastures varied according to the percentage of legume in the stand. Where N was necessary, the rate ranged from 60 to 150 lbs. per acre. This helps explain the high carrying capacity of the pastures.

Before the planning program, hay fertilization was seriously lacking. But now the average is 300 lbs. of 0-20-20 annually. Phosphate usage increased from 8 to 60 lbs. per acre and potash from 8 to 62 lbs. per acre. A similar increase occurred on pastures—from 35 to 90 lbs. phosphate per acre, from only 7 lbs. to 90 lbs. potash per acre.

It should be remembered that fertilizer materials are usually applied to the topsoil. If erosion is active, both topsoil and fertilizer can be lost. So, on sloping land a sound fertility program includes contour farming. And a good conservation program includes a sound fertility program. High fertility not only results in a greater yield of crops for feed or sale but aids more rapid establishment of a protective crop cover on the land and helps maintain organic matter and soil structure.

TABLE 2—AVERAGE POUNDS OF N, P_2O_5 AND K_2O APPLIED PER ACRE OF CROP GROWN BEFORE AND AFTER CONSERVATION PLANNING

Crop	Pounds Per Acre Before			Pounds Per Acre After		
	N	P_2O_5	K_2O	N	P_2O_5	K_2O
Corn	15	38	25	47	63	63
Potatoes	50	121	121	60	120	60
Peas	30	60	60	—	—	—
Tobacco	20	80	80	20	80	80
Small grain	10	33	22	19	53	53
Hay	0	8	8	8	60	62
Pasture	0	35	7	22	90	90

TABLE 3—AVERAGE ACRES, YIELDS AND CROP PRODUCTION BEFORE AND AFTER LAND REORGANIZATION AND TREATMENT

Crop	Average Acres Per Farm		Average Yields Per Acre		Average Crop Production Per Farm	
	Before	After	Before	After	Before	After
Corn	21.4	16.7	57 bu.	91 bu.	1220 bu.	1520 bu.
Potatoes	2.9	0.5	360 bu.	500 bu.	1044 bu.	250 bu.
Peas	1.0	—	1 ton	—	1 ton	—
Tobacco	0.25	0.25	1200 lb.	1800 lb.	300 lb.	450 lb.
Oats	14.5	12.2	41 bu.	65 bu.	595 bu.	793 bu.
Wheat	12.1	3.4	27 bu.	37 bu.	327 bu.	126 bu.
Barley	0.7	1.1	40 bu.	62 bu.	28 bu.	68 bu.
Rye	0.15	0.15	30 bu.	60 bu.	5 bu.	9 bu.
Hay	38.0	67.5	1.7 ton	3.2 ton	65 ton	216 ton
Pasture	33.8	31.7	1.9 ton	4.1 ton	64 ton	130 ton
Woodland	34.9	30.4	—	—	—	—
Misc. land	8.3	4.1	—	—	—	—

Crop Yield Progress

What happened to yields and crop production before and after reorganization and treatment of the land? Table 3 shows the significant changes in 10 major crops. Although corn acreage was reduced by 22%, yields increased 60%. The same thing for small grain—acreage reduced, yields increased.

Hay acreage increased from 38 to 67.5 acres per farm, with yields climbing from 1.7 to 3.2 tons per acre after reorganization and treatment.

Although pasture acreage was reduced by 2.1 acres per farm, forage yields increased from 1.9 to 4.1 tons per acre. Pasture yields and production shown in Table 3 are actually converted to tons of hay equivalent to enable conversion to dollars when measuring gross income from the land.

Woodland production information was not provided by the farmers, so no results are available.

Three major factors contributed to the increased total digestible nutrients (TDN) and increased carrying capacity of the farms: (1) Use of higher yielding species such as alfalfa and improved grasses, (2) higher applications of lime and fertilizers, (3) conservation of soil and moisture through accepted soil conservation practices.

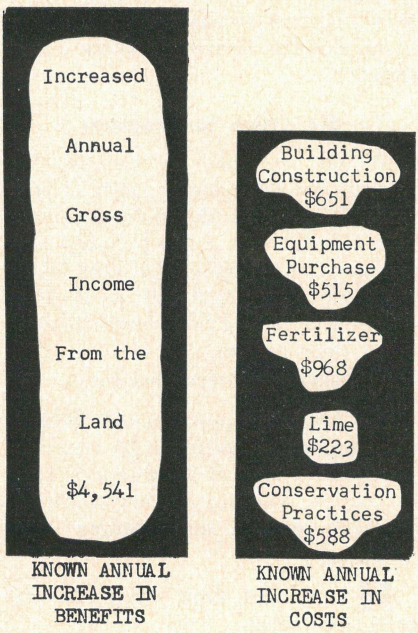


Figure 2—Summary of economic trends over 11 year period.

Gross Income Progress

Gross income increased from $7,103 before planning to $11,644 after planning, or an increase of $4,541—as shown in Table 4 and Figure 2. This

TABLE 4—GROSS INCOME FROM THE LAND BEFORE AND AFTER REORGANIZATION AND TREATMENT

Crop	Average Crop Production Per Farm		1959 Average Prices	Gross Income Per Crop	
	Before	After		Before	After
			dollars	dollars	dollars
Corn	1220 bu.	1520 bu.	1.27/bu.	1,549	1,930
Potatoes	1044 bu.	250 bu.	1.13/bu.	1,180	282
Peas	1 ton	—	120.20/ton	120	—
Tobacco	300 lb.	450 lb.	31.5/lb.	95	142
Oats	595 bu.	793 bu.	.72/bu.	428	571
Wheat	327 bu.	126 bu.	1.70/bu.	556	214
Barley	28 bu.	68 bu.	1.01/bu.	28	69
Rye	5 bu.	9 bu.	1.17/bu.	6	11
Hay	65 ton	216 ton	24.35/ton	1,583	5,260
Pasture	64 ton	130 ton	24.35/ton	1,558	3,165
Woodland	—	—	—	—	—
TOTAL GROSS INCOME FROM THE LAND				7,103	11,644
Increase in Gross Income					4,541
Percent Increase in Gross Income					63.9

income was determined by using average 1959 prices from the Pennsylvania Crop Reporting Service. No attempt was made to determine net income from a given period, since the information is not available.

This increased gross income is due largely to higher pasture and hay production.

For example:

1 Hay production increased 232%—from 65 to 216 tons, due partially to hay acreage increases from 38 *before* to 67.5 acres *after* land reorganization and treatment. Hay yields actually increased by 88% under the new treatment.

2 Pasture production increased 103%—from 64 to 130 tons of hay equivalent. Note this 103% increase in pasture yield occurred even after pasture acreage was reduced by 2.1 acres.

All the known annual increases in cost shown in Figure 2 cannot be charged off to the land, for in figuring gross income all crops were sold, as shown in Table 4. So, a good share of the building costs can logically be charged to livestock.

Although the costs shown in Figure 2 were experienced over the 11-year period of land reorganization and treatment, one could assume more than 11 years to pay for some of the costs. But the figures do show a cost trend.

Six Steps to Progress

Would you like to increase the average cow-carrying capacity of your farm? Would you like to increase your income? There is a good chance that you may by taking one or more of the 6 major steps that 20 progressive dairy farmers of Pennsylvania took to boost their returns.

The survey showed that they:

1 Applied approximately 88% of the number of conservation practices planned—a total of 26 practices, such as pasture planting and improvement of crop rotation and contour strip cropping.

2 Increased lime usage (if soil tests show need).

3 Increased the practice of soil testing—before conservation planning

4 farmers tested and all 20 after planning. They improved the average soil pH per farm from 5.6 to 6.6.

4 Increased NPK usage on corn, small grain, hay, and pasture—nitrogen up to 200%, phosphate up to 650%, potash up to 1,100%.

5 Invested $515 per farm annually into equipment, primarily for harvesting forage on 16 of the 20 farms.

6 Invested $650 per farm for building construction, largely for storage of forage and housing of additional cows.

Obviously it pays to take an inventory of your soil and crop management program and where needed make the necessary adjustments in an organized manner as conditions permit. These 20 Pennsylvania farmers received assistance from the U. S. Soil Conservation Service in making this inventory and development of the planned land use adjustments and treatments.

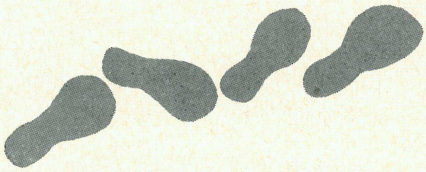
The adage about spending some money to make money still holds true, apparently—for the fertilizer and lime you apply, for the soil conservation practices you adopt, and for the equipment and building you invest in.

The END

WASHINGTON State University turf specialist Roy Goss of Puyallup is literally tracking down the answers to grass growing problems on recreation areas.

Crux of the problem is getting a good mat of grass to grow on heavily trafficked golf courses and play grounds. Heavy foot traffic compacts the soil and wears the grass, often killing it.

LITERALLY TRACKING DOWN



TURF PROBLEMS

This is a stubborn and expensive problem long familiar to officials maintaining golf courses, parks, playgrounds and athletic fields.

Goss is the first to study the problem by using a controlled compaction method. He is also the first to design a machine that duplicates the wear and compaction of foot traffic on turf.

Other scientists have studied the problem of compacted turf. Studying areas already compacted will give a certain amount of information. But, Goss says, this type of study will not yield information on the amount of traffic it takes to produce a known amount of compaction.

To know how much foot traffic can be put on turf and still have a good

turf, it is necessary to create a "played turf." A played turf, he explains, is one that has experienced foot traffic.

It is too expensive to hire enough people to walk around and produce a played turf to use in research. The automatic traffic machine solves that problem.

The motor-driven machine has four discs each fitted with four legs. The shoes are hinged to the legs under spring tension to provide ankle action and make the shoes rock down flat.

Ed Jennings, Overlake Country Club mechanic at Bellevue, built the machine. He also spaced the 16 feet on the machine so that only two shoes are on the ground at all times. The shoes are spaced at a normal 30 inch stride.

While testing the machine, June Roberts and other WSU agricultural engineers studied the walking habits of a number of men. The engineers observed that some men walk forward on their toes and others back toward the heel. Hence the need for the rocking foot action on the machine.

The engineers also studied the amount of pressure a 185-pound golfer exerts through his shoe soles when walking. Knowing this, it was only a matter of adjusting the surface area of the shoes on the machine to give the same pounds of pressure per square inch as the human foot exerts.

Goss's machine has 16 feet and gives the same results as walking a squad of eight men over the grass.

Goss used the machine in limited tests last summer and fall. With the machine he was able in an hour to get the equivalent of 600 people walking across his highest trafficked plot. His tests involve four rates of foot traffic across four plots—the equivalent of zero, 600, 400 and 200 people daily.

The four traffic plots also received replicated, varying treatments to loosen and let air into the soil and to remove the thatch. Thatch is the covering of dead, woody stems, leaves and surface roots that accumulate on the soil surface. All told, the study involves 48 comparisons of varying amounts of traffic and treatments.

Walking the daily equivalent of 600 people across a plot during the growing season compressed the surface down one inch lower than the turf receiving no traffic. The 400 and 200 trafficked plots were proportionately less compacted, Goss reports.

The heavier traffic had two effects. Traffic injured the growing grass and reduced or eliminated thatch formation. The injured grass formed less thatch; compressing the thatch speeded its decomposition.

This is why it is so difficult to build up a good mat, or desirable turf, on heavily trafficked golf courses or playgrounds, Goss says.

To combat compaction, Goss emphasizes three main points:

1 Use the best possible combinations of soils for growing turf. He is also studying soil mixtures to reduce compaction on putting greens.

2 Use airifying equipment for loosening soils and to let in air. This equipment isn't being used enough, especially on playing fields, he says.

3 Use practices that promote the most vigor in grass, such as watering, *fertilizing, etc.*

Once compaction has occurred, Goss says, the owner is plagued with the whole range of grass growing problems—the main problem being poor air and water relationships with the soil.

Washington News

Figure 1—A treatment plot at time water was applied.

FERTILIZING FLOODED FORESTS

By L. C. Walker

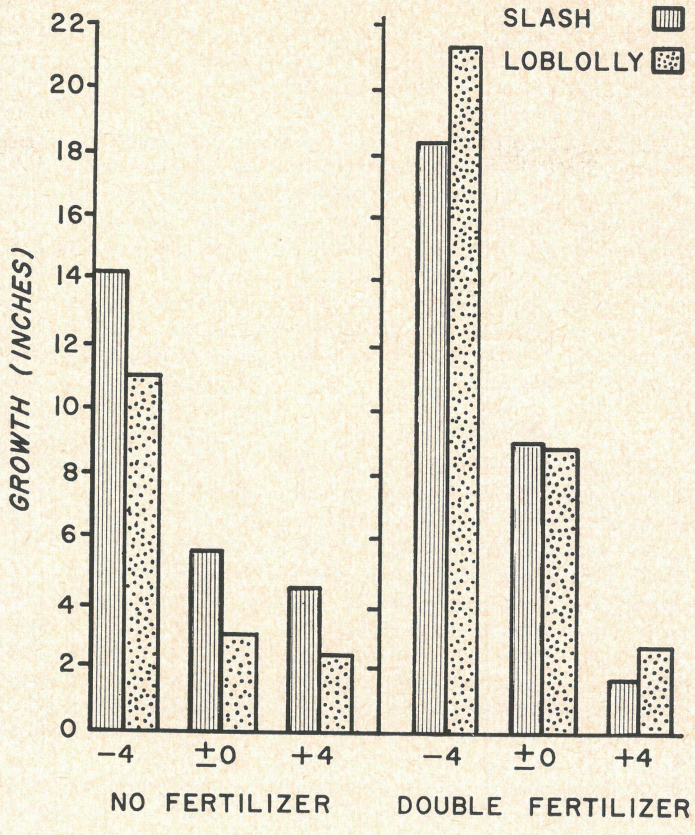
University of Georgia
School of Forestry

INLAND from the tidal marshes of the Southeastern coast lies a strip of bluish-gray, waterlogged, clay loam soil. In the Bladen series, this plastic earth is derived from thick beds of acid clay deposited at the bottom of the sea in the age of dinosaurs.

Plodding through the pine-hardwood forests of these flatwoods, one promptly learns why it has been said of the mottled Bladen soil, "You stick with it, and it will stick with you." Because of poor drainage—internally and from the surface—water frequently ponds to depths of several inches for long periods.

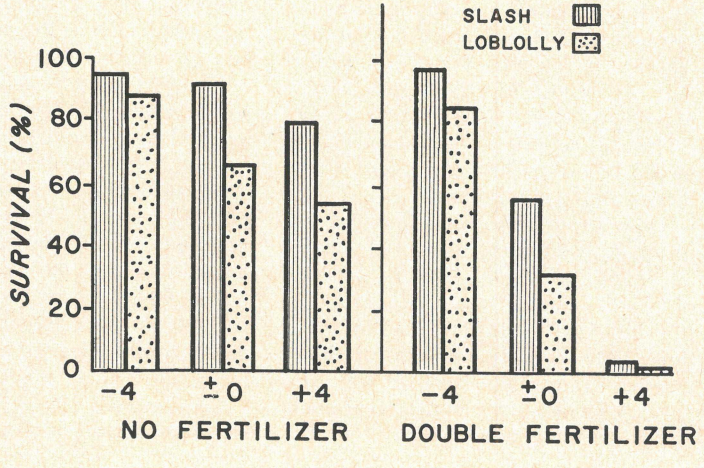
On such sites, probably aggregating several million acres, applications of a fertilizer containing nitrogen, phosphorus, and potassium have stimulated growth of recently planted pines, even

Figure 2



Growth of seedlings at end of second year.

"At present, it appears that 1,000 lbs. per acre of 8-8-8 or its equivalent is desirable in highly intensive management practices."



And Survival of seedlings at end of second year.

when permanently ponded. Survival, on the other hand, was not influenced by fertilization except where the water was maintained at a level 4 inches above the soil surface.

Hence, where drainage is coupled with fertilization, survival and growth are improved. Optimum conditions were attained when free water was removed by drainage to depths of 4 inches below ground level at planting time and the young stand then given a broadcast application of 1000 pounds per acre of 8-8-8 or equivalent fertilizer in the spring.

A Georgia Test

Slash and loblolly pines were used to determine if fertilization in adequate and excessive soil moisture increases growth. The question was also asked if extra nutrients would aid in overcoming harmful effects of high water on a Georgia coastal site.

Both species—slash and loblolly—typically occur on moist flats, one so named by early settlers who referred to ponded holes in the forest as "loblollies". Nevertheless, these desirable southern pines quickly reproduce and make good growth where lands are drained.

Treatments

Seedlings were hand-planted in diked and ditched plots, as shown in Figure 1. Water was supplied by an artesian well 6 months after planting, when seedlings were firmly established and had begun height growth. Water was maintained under these conditions: (1) at ground elevation, (2) 4 inches below ground level, and (3) 4 inches above ground level.

Superimposed on these flooding and drainage treatments were (1) a mid-April application of 1,000 lbs, per acre of 8-8-8 (single treatment) and (2) the mid-April treatment plus an additional 400 pounds per acre of diammonium phosphate applied in mid-July, 6 weeks after water treatments began (double treatment).

Trees were also observed in plots neither fertilized nor with water controls.

Survival

Not until 3 months after water treatments began did many seedlings of either species die, except those in water impounded to a depth of 4 inches and receiving the higher fertilization.

By the end of the second year, continuous flooding had virtually destroyed the fertilized trees growing in 4 inches of water and those where water was at ground level. Almost all of the slash and two-thirds of the loblolly pines survived two growing seasons with roots in water-saturated soils in the absence of nutrient amendments. Why this occurred is not fully understood.

Perhaps the fertilizer salts were too readily absorbed in the flooded plots, but this seems improbable. While fertilization stimulated weeds, herbaceous competition also appears to be an unlikely explanation for the high death rate.

Or, perhaps fertilizer stimulated overall plant metabolism so that oxygen was inadequate around roots, resulting in toxic amounts of carbon dioxide in the soil. See Figure 2.

Growth Stimulation

Fertilization stimulated growth of both slash and loblolly pines, regardless of moisture levels.

Greatest growth occurred where the soil in which fertilized trees grew was drained to a depth of 4 inches below ground level. Over the two-year study, applications of the complete fertilizer plus the extra diammonium phosphate (double) was superior to the single 8-8-8 treatment on the drained sites.

But where water stood just on the surface and where 4 inches deep, the single application of 8-8-8 was more stimulating than the two treatments.

This greater growth for the lower rate than for the higher rate was more

pronounced during the first growing season than the second and was especially significant for slash pine. In general, the higher the water level, the poorer the growth. See Figure 2.

Soil Analyses

The chemical composition of the soil did not differ after the two-year period, regardless of treatment.

Perhaps this was due to rapid utilization of the essential elements or volatilization of applied nutrients under oxygen-deficient conditions.

It is probably not due to leaching, for, through this stiff soil, water and nutrients move laterally a maximum of 6 inches and downward probably little more.

Foliage Analyses

Fertilizer applications appreciably increased the nitrogen, phosphorus, and potassium contents in the pine needles. Drainage also resulted in higher nutrient contents in foilage.

Thus, plants drained and fertilized survived best, grew most vigorously, and contained the greatest quantity of N-P-K in the plant tissues.

Needles on these stems were also the longest and appeared the healthiest. *Apparently drainage increases the availability of applied nitrogen, phosphorus, and potassium, or allows for more efficient absorption.*

Many treatments produced chlorotic foliage, but this could not be shown to be related to foliar nutrient content.

In one drained plot given both complete fertilizer and diammonium phosphate, for instance, needles of both species were long but chlorotic in the spring. Perhaps the favorable moisture and higher fertility level stimulated needle growth, yet resulted in a nutritional imbalance early in the season. By fall, the chlorosis disappeared.

At the end of the second year, only seedlings in the flooded plots, regardless of fertility treatment, were chlorotic. However, chlorosis was less serious where fertilizers were applied. Both slash and loblolly pines behaved similarly in all observed respects regarding foliage appearance and composition.

Practical Aspects

When Bladen clay loam of the tidewater area dries out, it is extremely hard, shrinks with the loss of water, cracks with large crevices, and breaks into big angular chunks.

Due to inherent, undesirable physical and possibly chemical characteristics resulting from over-drainage, it may be feasible and is definitely desirable to control drainage—perhaps with locks on ditches.

To apply fertilizer to a Bladen soil that is submerged, or one that has been excessively drained, would be folly.

Where permanently undrained by nature or man, pines give way to low-grade hardwoods. On such stands natural regeneration of coniferous forests is difficult to obtain because water stands on the seedbed when seeds are ready to germinate. This problem is greatest in years of heavy spring rainfall.

When timber harvests leave only seed trees, the demand for great volumes of water previously used for transpiration by a stand which fully-occupied the site is reduced so much that high water tables are likely to follow. This frequently results in death of residual seed trees before a satisfactory stand is obtained.

To insure an adequate stand, the use of fertilizers with surface drainage is a possibility worthy of further evaluation. At present, it appears that 1000 pounds per acre of 8-8-8 or its equivalent is desirable in highly intensive management practices. See Figure 3.

THE END

ORCHARD NUTRITION PAYS!
See Pages 15 & 16

BIG, WIDE, BEAUTIFUL,

. . . but complicated!!

THIS is a big, wide, beautiful world in which we live. But, my! it's complicated!

And it's getting more so. Not long ago, those of us in the working occupations didn't have to worry too much about tariffs and international trade agreements. Keeping up farm production, taking care of our job, looking after the family, and going to church on Sunday was about the extent of our obligations.

But it's not that way any more. Take the European Common Market, for example: Brussels, Belgium, the Common Market headquarters, is a long way from rural Sumter county, or any other county in the state for that matter. Yet, in many respects Brussels is as close to us as the crackling fire over the hearth. Here is why:

One acre in every six devoted to agricultural production in this country grows products which go to the export trade. That's a fair sized proportion of business. In 1961, for example, total U.S. export trade of farm goods amounted to over 4.9 billion dollars.

According to Clemson Information Specialist, L. C. Hamilton

Why local farmers and businessmen are deeply concerned about the effect of the Common Market on U. S. economy is easy to see. The six member nations: West Germany, France, Belgium, Italy, Luxembourg, and the Netherlands are our most important overseas customers. Farm exports to those countries last year was over a billion dollars. Any altering of existing trade policies is sure to have meaning for us here in the Southeast.

What is the Common Market? It is a pact between the member states to maintain a common tariff against outside countries and gradually reduce

tariffs between trade of member nations. It started in 1958 and is supposed to be in full effect in 1969 at which time there will be no trade tariffs between member nations.

Important as the Common Market is now to us, it is growing even more important: "Perhaps the biggest news story in the world trading community in 1961 was Great Britain's decision to join the Common Market," the *Monthly Review* of the Federal Reserve Bank of Richmond said in December. Britain is now working toward full Common Market partnership.

Ireland and Denmark are making plans to join. And Austria, Sweden, and Switzerland have expressed interest in going along with trade policies of the market.

"These countries, with a vast industrial and agricultural complex, have the potential of almost complete self-sufficiency," Dr. M. C. Rochester, Clemson extension agricultural economist, says.

"Fortunately for South Carolinians, Western Europe still has large requirements for cotton, tobacco, soybeans and poultry.

"But we in the U. S. hold no monopoly on production of these farm products. Rhodesia, for instance, is becoming more important as a supplier of tobacco to Europe. Brazil, India, Egypt, and Mexico are producing more cotton."

That's why our future trade relationship with Europe brings a problem of international trade right into our living room. For this reason, Rochester feels that people all over the country should read and learn everything possible about the Common Market and the possible impact upon our agriculture.

Our government is now attempting to work out trade agreements with the Common Market countries. We hope these will favor continued trade. However, with European countries trading between themselves without restrictions, we may find that we may have to make changes in our export trade policies to hold and improve our position in world trade.

In a sense, we'd be competing against European efficiency and wages to an extent that we have never done before. How successful we'd be, no one will say. Some observers say that the growing industrial plants on the European continent are in many ways more modern than our own—especially the ones built since World War II. This must include most of them.

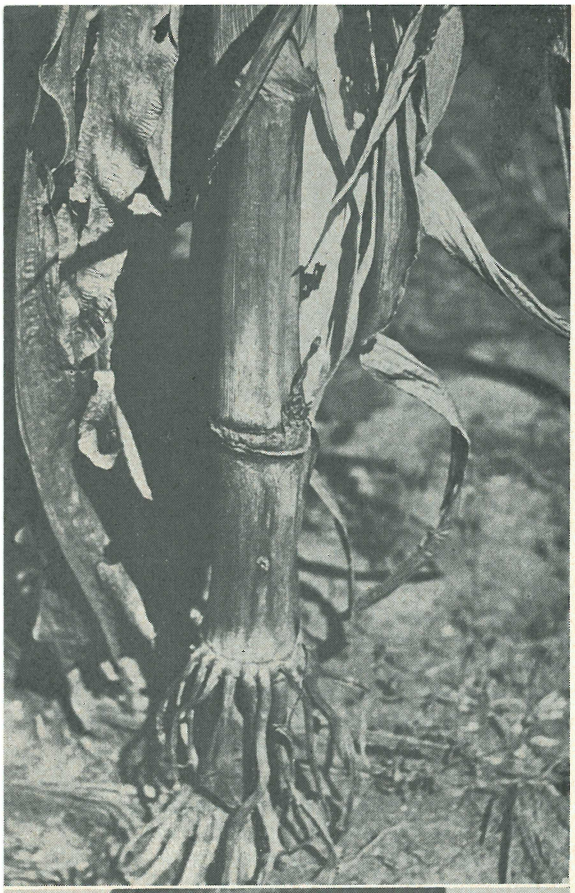
In farm efficiency, we are perhaps still ahead of Europe. But according to Claude W. Gifford, economics editor of *Farm Journal,* Europe already produces 87 percent of her farm needs. Under the stimulus of the Common Market economy, it is conceivable that European farmers could further close the gap toward complete agricultural self-sufficiency.

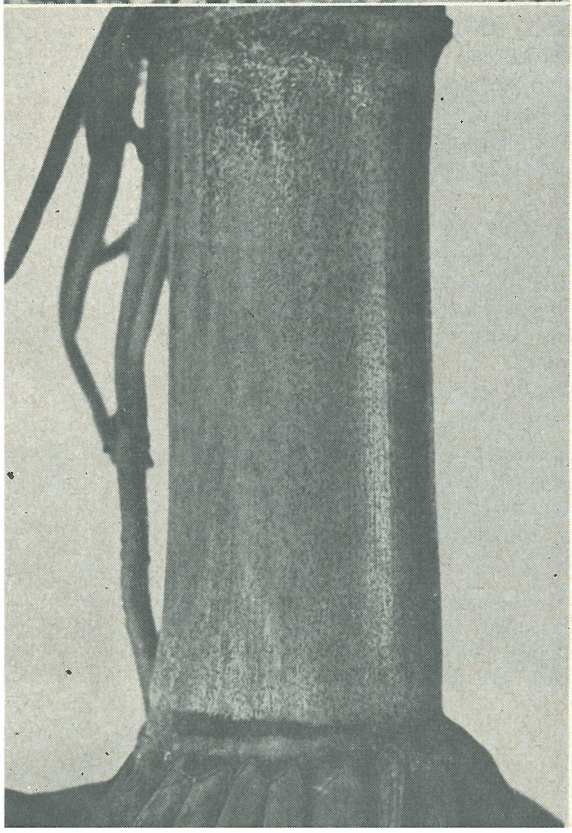
"And you can't trade," Rochester says, "on a one-way street. In order to sell, you have to buy. Any reduction of our total imports from Europe could eventually mean reducing our exports."

The objective of current trade negotiations is to make continued trading easier. And farmers and manufacturers in this area have a big stake in the outcome.

That's why farm people, and others for that matter, need to give some thought to problems far removed from their job or farm.

THE END





FIGHT STALK ROT—GREEDY PROFIT EATER

HOW OFTEN have you watched potential profits collapse right before your eyes as your corn lodged from stalk rot, often causing rotten ears on the ground, costly harvesting delays, etc.?

Poor nutrient balance may be one of the factors behind stalk rot infection (Diplodia or Gibberella) in your corn, according to reports from the American Society of Agronomy Crops and Soils journal and USDA handbook 199 on Corn Diseases.

The Agronomy Society reports, "Rot severity increases when soils are high in nitrogen and low in available potassium . . . and infection usually less when a balance is maintained."

The USDA handbook reports, "Where soil is infertile or potassium is deficient and nitrogen proportionately excessive, this disease is often more severe. The application of the proper kinds and amounts of fertilizer based on soil and tissue tests may help minimize stalk rotting and breakage."

In this day when high yields demand high nitrogen fertilization, these reports reveal the importance of *balanced* fertility to help prevent increased stalk breakage.

"The fertility problem may be more deep-seated than thought at present," the Agronomy report warns.

For example, Cornell workers found that increased rates of potas-

(Pictures courtesy USDA)

. . . with balanced fertility

sium chloride fertilizer on corn decreased stalk rot incidence. And they noted a close relation between the "percentage of plants with stalk rot and the percentage of chloride in the ear leaf."

The accompanying table from Dr. Benjamin Koehler's Illinois Bulletin 658 shows how several kinds of fertilizer applications on potassium-deficient soil affected stalk rot. Conducted on the Clayton experiment field when stalk rot was more severe than average and the infection about equally caused by the Diplodia and the Gibberella form of rot, these tests showed the importance of balanced fertility.

In seasons when stalk rots are severe, plants may die 2 to 3 weeks before becoming fully mature, resulting in lightweight, poorly finished ears. But more frequently the greatest damage is caused by stalk breakage, making harvest difficult and causing lost ears on the ground.

Although factors affecting prevalence of stalk rot are not fully known, the following conditions have been observed with the Diplodia and Gibberella forms, the most common types of the disease:

1—Both forms usually attack plants several weeks after silking.

2—Dry weather in early-growing season followed by ample rainfall for 2 to 3 weeks after silking appears to favor stalk rot.

3—Severe infection by any of the leaf diseases or destruction of leaves by hail or insects predisposes stalks to infection.

4—Soil fertility—or inadequate balance of it—is a major factor, to which this brief report is devoted.

Suggested symptoms in USDA Handbook 199 include these:

1—When infection occurs before plants reach maturity, the leaves suddenly become greyish green, similar to frost injury.

2—The lower parts of the stalk turn from green to tan or brownish and the pith becomes soft.

3—When diseased stalks are split open, the pith (from Diplodia) is disintegrated and discolored, with only water-conducting vascular bundles left intact—(from Gibberella) the split stalk will generally reveal a reddish discoloration of the diseased area.

4—Stalks become weakened, breaking rapidly in wind and rain.

5—Sometimes minute black pycnidia, the fruiting bodies of the fungus, form in fall just beneath the surface of lower internodes of stalk.

Although no satisfactory control measures have yet been developed for

Diplodia Stalk Rot: "Observations and a few experiments have shown that more stalk rot occurs where soils are excessively high in nitrogen and low in potassium than where fertility is ample and balanced."
USDA Handbook 199

EFFECT OF FERTILIZER APPLICATIONS ON CORN YIELDS AND STALK ROT DEVELOPMENT CAUSED BY *GIBBERELLA ZEAE* AND *DIPLODIA ZEAE*

Fertilizer application equivalents [a]			Acre yield 8-year average	Acre yield	Rot damaged stalks
N	P_2O_5	K_2O	1949-1956	1951	1951
lb.	lb.	lb.	bu.	bu.	perct.
0	0	0	80	80	16
80	0	0	84	84	40
80	80	0	83	76	49
80	80	80	100	110	17
0	80	0	80	84	21
0	80	80	90	85	13
0	0	80	93	88	17
120	120	120	101	102	16

[a] For 80 pound equivalents: 400 pounds 20 percent ammonium sulfate, 400 pounds 20 percent superphosphate, and 133 pounds 60 percent muriate of potash. These were applied in the spring before plowing for corn, in a 4-year rotation. All the soil had been limed.

(From Illinois Bulletin 658)

cornstalk rots, damage can be reduced by following these suggestions:

1 Use full-season resistant hybrids, because they are generally more resistant than those that mature early in a given area. Local agricultural advisors should be consulted on such hybrids.

2 Proper fertility balance is essential—because soils high in organic matter and nitrogen may increase stalk rot in susceptible hybrids, soils low in potassium also increase the rot, and insufficient phosphorus has been observed to increase the rot, though to a lesser degree.

3 Rotate crops properly and control residue by plowing under infected stalks. In such rotation, soybeans help to reduce the amount of fungus spores in the area because the organisms do not attack this crop and a sod crop helps to keep soils aerated and in better tilth for less root rot.

4 Follow good cultural practices on an area-wide basis, because spores spread readily to nearby fields and may remain alive in the soil several years.

Until resistant hybrids free the farmer from this profit-eater, these steps should help the corn farmer hold on to some of those profits he often feeds to cornstalk rot when he fails to fight the culprit.

THE END

Gibberella Stalk Rot: "This disease may be controlled by using full-season resistant hybrids and by adjusting soil fertility to proper balance where necessary."
USDA Handbook 199

Take out every surplus letter—
Boil it down.
Fewer syllables the better—
Boil it down.
Make your meaning plain. Express it
So we'll know, not merely guess it;
Then, my friend, ere you address it,
BOIL IT DOWN.

G. V. Jacks, *Soils and Fertilizers*

Paul Ratliff of Baldwyn, Miss., with all 283 bushels of Funk's-G from a measured acre.

THE BIG CORN YIELD for 1961

Remarkable proof that Funk's G-Hybrids have more Capacity to Produce

FUNK'S G HYBRID

Following are excerpts of an extension information release from the extension editor of Mississippi State University:

"Booneville, Miss.—The yield of 283 bushels of corn from a single acre is the report this year from the famous Ratliff demonstration in Prentiss County, Miss. This is the same acre on which the 304 bushel yield credited with being the world's highest to date was made in 1955 by Lamar Ratliff, who was then a 16-year-old 4-H Club member.

"Cultural practices this year were similar to those of the past. Mr. Ratliff broadcast about 38 tons of barnyard manure on the acre and plowed it under. He plowed 11 times during the fall, winter and early spring.

"Before planting he placed 1,500 pounds of 14-14-14 and 1,500 pounds of ammonium nitrate about 20 inches deep. He planted one bushel of Funk's G-711AA on April 27 in 30 inch rows and hand thinned to a population of 20,500 plants on the acre. The side dressing was 500 pounds of 14-14-14 and 500 pounds of ammonium nitrate."

THE PRODUCERS OF FUNK'S G-HYBRIDS

FUNK BROS. SEED CO. • BLOOMINGTON, ILLINOIS

BROWSER'S EYEVIEW . . .