Better Crops

WITH PLANT FOOD

January-February 1961

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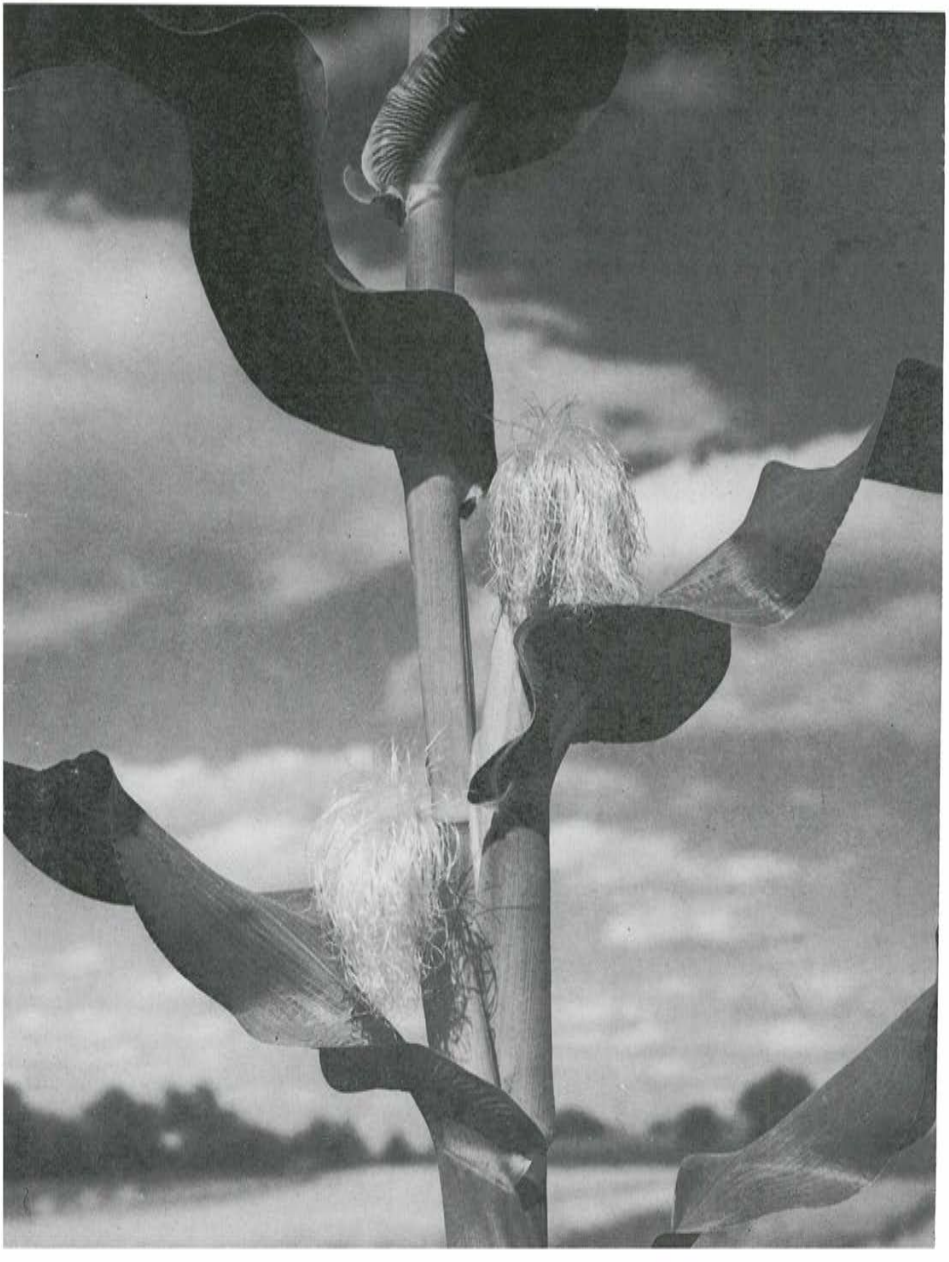

Want
A
Top
Notch
Corn
Crop?

Don't
Forget
Your
Row
Fertilizer

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See
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Better Crops
WITH PLANT FOOD

The Whole Truth—Not Selected Truth
$1.00 for 6 Issues, 20¢ Per Copy

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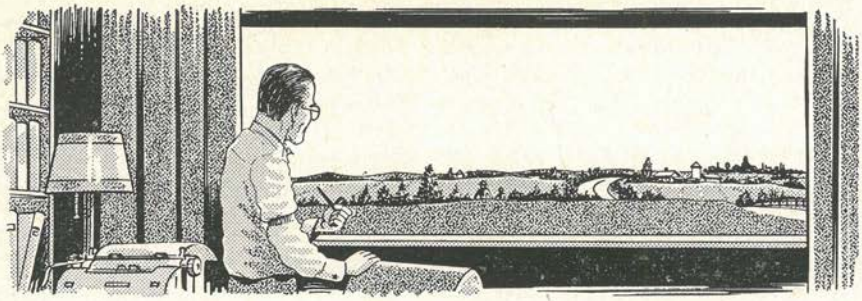


We need better protection for

THOSE MELLOW YEARS

Jeff McDermid
ELWOOD R. McINTYRE

STANDING at my big window in the pen and ink picture above, I muse on the times my grandfather walked along that road to the village when he was living in the era described with foreboding in the Bible:

"When the days draw nigh in which thou shalt say 'I have no pleasure in them'."

There were no clinics or social centers to lighten the days of the elderly. Oncoming age was taken for granted. Most of the folks looked and dressed old. Courageous capers were frowned upon. You were lucky to be a survivor when life expectancy was down in the forties. If you hung on, you were a museum piece.

The old song, "Over the Hill to the Poor House," was the lyric lament of those times before "geriatrics" became a household word and the science of keeping old folks fit to live with had not been invented.

I have been blessed by some kind Benign Spirit with unusually happy human surroundings and a wonderful balance in the health bank.

Yet that good fortune does not deter me from mentioning some reactions received from the thoughtless ones as I linger wistfully in the Lodge of Atonement wearing the degree of three-score years and ten.

The end result of their reactions does not help me. It is much like the fellows in Aesop's fable—They tried hard to please everybody, pleased nobody, and lost their ass in the bargain!

So proceed with me down the street and listen to the conversation. Few fellows in my age bracket escape it sooner or later.

If, and when, it is mentioned that I have chosen to live alone, they pass on the word that I am a hermit and hypochondriac. If I take a young student in for his room and companionship, they repeat that Jeff is sore afraid to live by himself because of a bad conscience and wants somebody he can boss around.

If I offer my domain for sale, neighbors claim it is priced too low and hurts real estate values in general. If I refuse to sell, they voice the sad charges that I'll manage to have a gas explosion or set the house afire with my groping and fumbling around.

If I start to paint the fence or rat-

tle around with the rusty lawn mower, kind well-wishers warn me to watch my step lest I falter and fall, being so frail and feeble. If I phone some yunker recommended by a chum in the community to do this renovating for me, folks say I am squandering my limited legacy.

If I am remiss sometimes in attendance at church or the temple fellowcrafters, they remind me that this should be a privilege never to be lost or missed. If I put on my togs and attend fairly often, they say I ought to spend more time on week-ends with my grandchildren.

If I take heart and courage from chatting with some woman of my own maturity, they wink and infer that the old grafter is out looking for a place where he can get a square meal off of a white tablecloth and not have to sit at a lunch counter and order liver sausage sandwich from a brown-spotted menu.

If I shy away from the widows, they inform me that widows are in need of more financial security and comfort since they average less income than almost any forgotten female you can mention. If I persist in staying away, they think I am stingy and too "sot" in my ways.

If I smile warmly at a pretty young woman and turn around to watch her vanish up the street, they point me out as an old masher or tired out Romeo who has been reading too many lusty paper-backs. If I take in the womanly scenery displayed in short shorts on summer evenings, I am just living up to my reputation for questionable morality—and no counter claims of mine as possessor of a love of youth and a flair for beauty will stifle or satisfy the rabble.

If betimes and infrequently, a girl smiles and speaks to me, in spite of all that's been said, it is simply because I resemble her ancient great uncle or granddad—bad cess to them both!

If I try to look solemn, befitting my growing years and keep my eyes glued to the sidewalk, the word soon gets out that I am getting queerer than ever and grouchy, with no interest in greeting friends and neighbors anymore.

If a chap comes along whose great uncle spent his youth with me, and I try to recall some incident to amuse him, he tries to get away fast and let the past be hanged. If I am stiff, silent, and constrained with him, I am losing my grip and need a guardian.

If I like to be helpful and offer to tote someone's burden across the avenue, they tell me that at my age I must take life easy and avoid all sudden strains. If I give presents to my own or other folks' youngsters, I am reminded sagely that inflation will get me yet and that such lavish spending is bad for old snorkers with low, fixed incomes.

Yet if I forget to leave gifts on birthdays and holidays, the whisper goes round that I have become forgetful and more selfish than ever.

There seems to be no kind of advice that costs less and gets you down more than the rubble they peddle about getting ready for the "golden years." Everybody has been spending years of research on problems of old folks. Not a one of them will come out and advise you to get a bumper of brew when feeling mad at yourself for living so long.

Yet I confess to a liking for any doctor who will tell me kindly that in my case a regular beer intake is "indicated." I can still find room for the vitamins and the victuals. He who takes to beer before he is mature is foolish perhaps, but he who fails to imbibe the froth after he is in the amen corner of geriatrics needs his head examined.

"Many causes of financial insecurity in old age can be overcome by advance planning," according to some researchers in my bailiwick. I always planned in advance and looked over the catalogs fairly early. To have the

cent you never spent is not the goal for me.

But to get serious about it all, the greatest need at present is in housing for the elderly. I have a friend who wants to get a federal loan and put up a special building of modern design and sell apartments on the co-operative plan. I know some few hotels in my state where about half the room capacity has been turned over entirely to folks past their prime.

America has awakened to the reality of a growing population of the elderly. Those who are young today will be old far too soon—at the pace America keeps up. So it becomes a universal, ageless problem.

My best wishes to all who have reached these mellow years or who are on their way. It's not half as bad as you expected, and if you look around with a sense of humor, the advice and dictation of friends and relations will never get you down.

THE END

Corn Prediction

"In 15 to 20 years, 200-bushel-per-acre corn will be as common as 100-bushel corn is today."

Dr. E. H. Rinke, Department of Agronomy and Plant Genetics, University of Minnesota.

ON THE COVER . . .

. . . corn planting time will soon be here.

How many farmers in your area will use *starter* fertilizer to get their corn crop off to a vigorous start? How many know the value of *starter* fertilizer?

Carefully conducted experiments at Agricultural Experiment Stations over the nation have proved it pays to use *starter* fertilizer on corn.

The Midwest, home of the nation's Cornbelt, is a good example. A careful study of official tests shows the following general recommendations prevailing in the Midwest:

1 —Use a *starter* fertilizer to get the crop off to a good, vigorous start.

2 —Apply a fertilizer grade containing nitrogen, phosphate, and potash—5-20-20 or 6-24-24, are among grades commonly recommended.

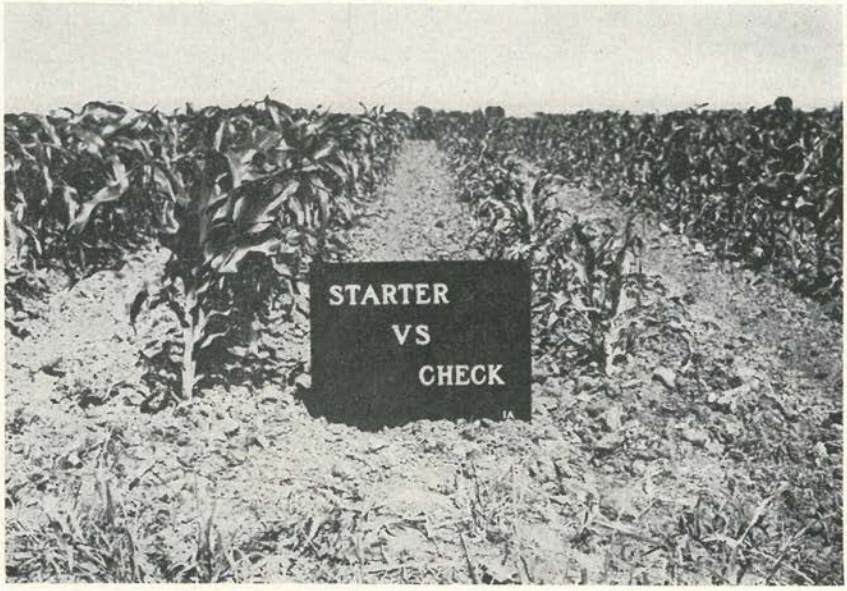
3 —Use side band placement.

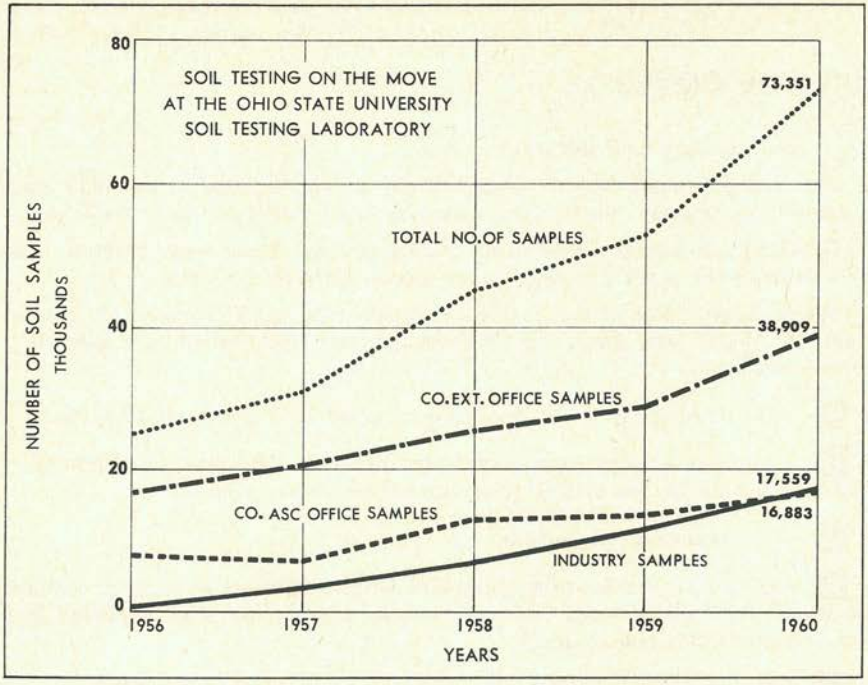
4 —Have your soil tested to determine what additional fertilizer is needed. A *starter* fertilizer provides for early season growth, but it is important that the crop not "run out of gas."

5 —Apply sufficient fertilizer to carry the crop through to maturity.

Some farmers know this . . . and practice it . . . to their own profit. Many do *not* know it! It might pay to remind them.

The results below show why.





More and more Ohio farmers are realizing that a soil test can best tell them the current fertility needs of their soil. The best evidence is the way soil samples reaching Ohio State University's soil testing program have tripled during the past 5 years—shown above.

OHIO farmers are sold on soil testing.

During the past 5 years, the volume of soil samples they have sent to Ohio State University's soil testing program has increased 191%.

Many factors have influenced this growing interest in soil testing. Some of these include:

1 Liberal Recommendations—A well-balanced fertility program builds fertility reserve to a reasonably high level and maintains fertility once that level is reached.

Recommendations based on soil tests are designed to supply nutrients for 100 to 125 bushels of corn per acre, and correspondingly high yields of other crops. Also, the recommendations emphasize a soil fertility program for the farmer's entire crop rotation, instead of fertilizer for only a specific crop or just the next crop to be grown.

Modern farming economics demand high yields per acre and efficient production. Many Ohio farmers report how they have more nearly reached the productive potential of their soil by applying the treatment suggested from soil tests. Having experienced such favorable results, they have encouraged other farmers to have their soil tested.

2 Central Laboratory—A central soil testing laboratory system is established by the Agricultural Extension Service in close cooperation with the Department of Agronomy at Ohio State University. This enables the

In Ohio

SOIL TESTING ON THE MOVE

By O. L. Musgrave
Ohio State University

most modern laboratory equipment and techniques to be used. As a result, the farmer can obtain reliable information on the current fertility status of his soil.

3 Education—The soil testing program is a service for the farmer—but, even more, a basic educational program. It is a starting point for developing an overall farm program.

Over the past few years, special soil testing schools and meetings have been held with farmers in most counties of the state. Special training conferences, designed to inform County Agricultural Extension Agents and other agricultural leaders about soil tests and their interpretation, have been conducted. A number of counties have held special short courses for lime and fertilizer dealers.

During the past year, three counties have conducted concentrated month-long soil fertility campaigns that have been highly successful in terms of soil samples tested, soil fertility information taught, and crop yield results on participating farms.

Many County Extension Programs are geared through meetings, press, radio, television, and demonstrations to remind farmers continually to use the soil testing program. Farmers may take soil samples to their local County Extension Office which serves as a collecting station, making participation easy and convenient. In fact, *County Extension Offices send approximately 50% of all samples received at the laboratory.*

Once the soil has been tested and recommendations given, many County Extension Agents have practiced a follow-up program to help the farmer interpret the report and carry out the recommendations.

The educational phase, core of the entire program, is largely responsible for the Ohio soil testing program being "on the move."

4 Industry Cooperation—Cooperation by various segments of the lime and fertilizer industry has been a major factor in collecting soil samples and getting them to the laboratory. In 1956, industry was invited to deal directly with the soil testing laboratory in securing supplies of soil sample bags and forms and in sending samples to the laboratory.

In such instances, company representatives receive a copy of the soil test report directly from the laboratory. This arrangement has made it comparatively easy for industry to cooperate in the program and to serve their farmer clientele more efficiently.

Dr. Orlo L. Musgrave, extension agronomist and director of soil testing at Ohio State University, is a native of Ohio. He earned his BS, MS, and PhD from there, and served as a county agent for 10 years before joining Extension.

In 1960, the lime and fertilizer industry was responsible for 25% of the total number of soil samples processed by the soil testing laboratory.

In addition to collecting soil samples, the lime and fertilizer industry has cooperated with the Agricultural Extension Service in promoting soil testing.

5 County ASC Committees—Many County Agricultural Stabilization and Conservation Committees have used the soil test to approve assistance for certain conservation practices on the land. As a result, *these committees have stimulated about 25% of the total soil samples.*

Another benefit from soil testing—perhaps a major one—is the public relations factor. It is a natural public relations and contact tool. One out of every three farmers down the road is reached by soil testing. This helps create interest in the whole University agricultural program. Such interest means support for the University.

THE END

HOW PLACEMENT CAN AFFECT COTTON YIELDS

"How can I get the most for my fertilizer dollar?"

This is a question Missouri cotton producers often ask their county agents, says Joe Scott, University of Missouri extension cotton specialist.

Since the economical production of high-quality cotton is being stressed nowadays, this question becomes highly important, Scott says.

The best method of applying fertilizer to cotton is to place it two to three inches from the seed in a band at planting time. Jim Roth and Frank Stanley, University soils specialists, found this to be the best method in their six years of experimental work on widely-varying southeast Missouri soil types.

On heavy clay soils, such as gumbo, good results have been obtained by placing the fertilizer in a band directly under the row. Broadcasting the fertilizer has given poorer results.

On Sharkey clay soils at Bragg City, banding gave an increase of 170 pounds of lint cotton an acre over the same amount of fertilizer applied broadcast.

Scott says that at Bragg City 400 pounds of 12-12-12 banded under the bed before planting produced a three-year average yield of 520 pounds of lint cotton. This compared to 350 pounds of lint an acre where the same amount of fertilizer was broadcast before breaking or bedding.

A 400-pound starter of 12-12-12 fertilizer banded near the seed at planting time produced a three-year average yield of 670 pounds of lint cotton on sandy loam soil at Malden. This compared to 520 pounds of lint where the same amount of fertilizer was broadcast before breaking, bedding, or planting.

Two colored men came to the outside of a crowd where a politician was making a speech. "Who am dat man, Sam?" asked one.

"Ah doan' know what his name is," Sam replied, "but he sho do recommen' hisself mos' highly."

A new clerk dictating a few days ago, was in doubt as to the use of a certain phrase, so he said to the steno: "Do you retire a loan?" And the wistful eyed one replied rather sleepily: "No, I sleep with mama."

Our idea of an optimist is a man who took the marriage vows at the ripe old age of 90 and started house hunting for a home close to a school.

"Chickens, suh," said the old Negro sage, "is the usefulest animal dey is. You can eat dem before dey is born and after dey is dade."

First farmer: Well since Tom has a college degree, can you see any change in the way he plows?

Second farmer: No, he plows the same. It's the way he talks.

First farmer: Yeah? How do you mean that?

Second farmer: Well, when he gets to the end of the row, instead of saying Whoa, Haw, or Gee, he says, "Halt, Rebecca, pivot and proceed."

Letting people get your goat is really paying them a big compliment. Indifference is the most powerful weapon to use against your enemies.

After a very trying day at the office, the husband was enjoying his pipe and reading the evening paper. His wife, who was working on a crossword puzzle, suddenly called out, "John, what is a female sheep?"

"Ewe," replied her husband . . . And that's how the fight began.

Conservative: One who does not think anything should be done for the first time.

Americans are people who spend money they don't have to buy things they don't need to impress people they don't like.

A cow-puncher ordered a steak at a restaurant. The waiter brought it in rare—very rare. The cow-puncher looked at it and demanded that it be returned to the kitchen and cooked.

"It is cooked," snapped the waiter.

"Cooked—nothing!"" replied the cow-puncher. "I've seen cows hurt worse than that and get well!"

In the business world, an executive knows something about everything, a technician knows everything about something, and the switchboard operator knows everything.

This official announcement, signed by an admiral, is reputed to have appeared on the bulletin board in a naval office:

"All officers wishing to take advantage of the stenographers in the pool will go to Room 801 and show evidence of their need."

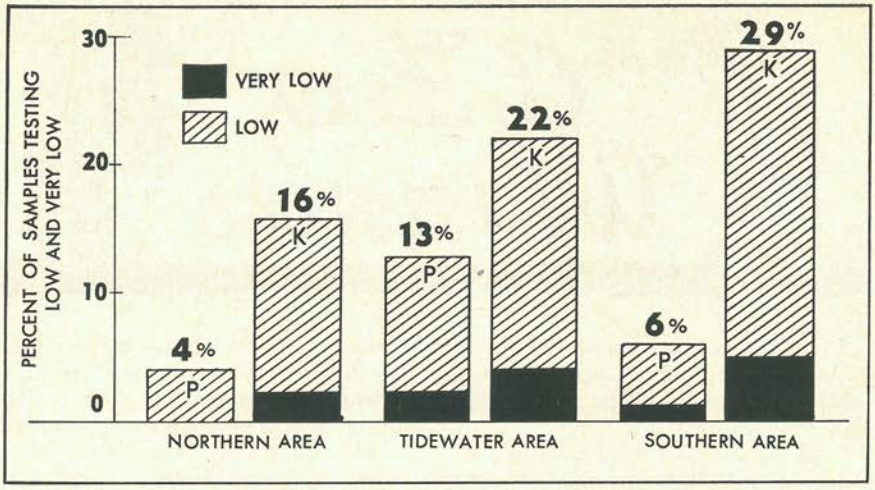


Figure 1. Soil samples testing low and very low in phosphate (P) and potash (K) in North Carolina's Coastal Plains.

WHAT INFLUENCES POTASH LEVEL?

By
E. J. Kamprath
And
C. D. Welch

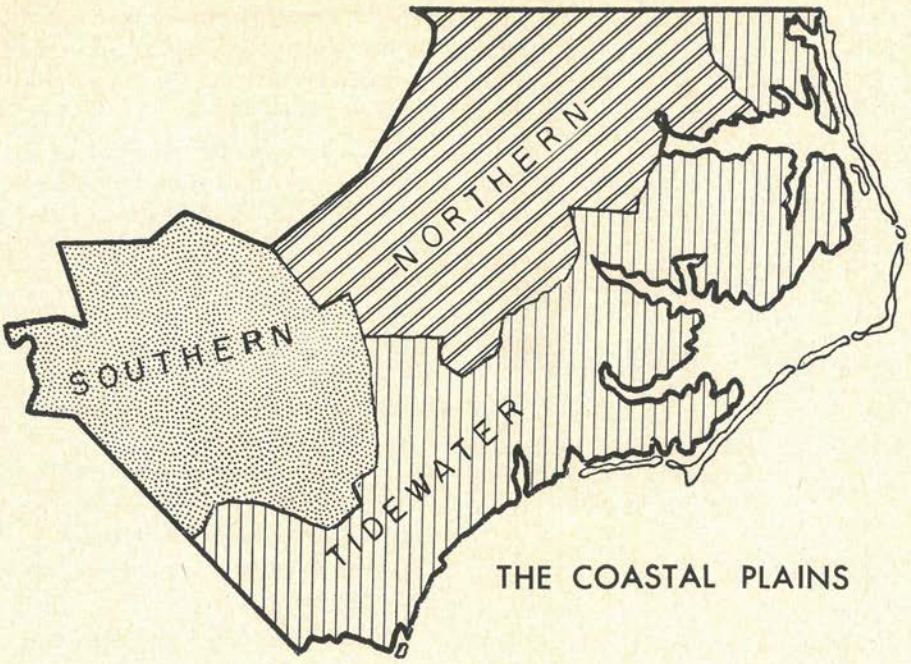
SOIL test summaries of 1950 showed a majority of North Carolina's Coastal Plain soils high in available phosphate but quite low in available potash. Prior to 1950 the leading ratio of phosphate to potash in fertilizer was 2:1 or greater.

Since then the largest percentage of fertilizer sold has contained 1:1, 1:2, and 1:3 phosphate to potash ratios. Not only has the ratio of phosphate to potash changed, but also more fertilizer per acre is now used.

The effects of these changed fertilization practices were revealed by soil test summaries of Coastal Plain counties conducting intensified soil sampling programs over the past two years.

The soil test summary was made by counties for samples received between July, 1958 and June, 1960. The samples were further divided by crop to be planted the first year after sampling. The information was also grouped for three areas of the Coastal Plain region: *Northern*, *Tidewater* and *Southern* areas.

Dr. E. J. Kamprath is Associate Professor of Soils at N. C. State and Director of the N. C. Department of Agriculture Soil Testing Division. He earned the B.S. and M.S. from Nebraska University, the doctorate from N. C. State.



THE COASTAL PLAINS

In North Carolina's Coastal Plain Soils, K Level Affected By . . .

. . . Cropping System

. . . Fertilizer Rate

. . . Soil Properties

Potash Needs Vary

The 1960 summaries show that phosphate levels are adequate throughout the Coastal Plain with only a small percentage of cultivated cropland low in available phosphate (Table 1).

The summary also shows potash levels have been improved. At least, today only 16 to 29% of the samples are very low or low in available potash, while more than 50% were very low and low in potash in 1950.

However, as Table 1 shows, the need for potash seemed to increase as the samples went south, ranging from 16% low and very low in potash in Northern Coastal Plain to 22% in Tidewater to 29% in Southern Coastal Plain.

Corn covers the most Coastal Plain crop acres. In many counties, it occupies well over half the cultivated acreage. We found that three factors seemed to influence the potash level of the soils: (1) Crops grown with corn in the cropping system, (2) how they were fertilized, and (3) on what

Dr. C. D. Welch is Agronomist with the Soil Testing Division of the North Carolina Department of Agriculture. He did his undergraduate work at West Virginia University, his graduate work at N. C. State.

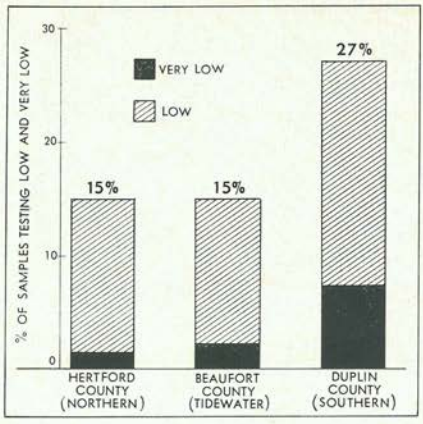


Figure 2. How soils used for corn in 3 counties tested low and very low in potash (K).

kind of soil properties they were grown.

Therefore, summary data of samples to be planted to corn were taken for three counties, each representative of the three general areas in the Coastal Plain.

In Table 2, we see what percentage of fields to be planted in corn tested very low and low in potassium. Only 15% of the samples for corn from Beaufort and Hertford Counties were very low and low in potash, compared to 27% for Duplin County. One reason for these differences was traced to the other crops grown, the total acreage of the crops, and the fertilization of these crops.

Table 3 shows the principal crops and their acreage for these three counties. Table 4 shows the estimated rates of phosphate and potash applied on row crops other than tobacco. These rates were based on the fertilizer tonnage reports for mixed goods and materials sold in the county. Tobacco was excluded in these calculations since the ratio of corn to tobacco acreage was approximately the same in all three counties and the influence of tobacco fertilization on the overall fertility level should be about the same.

You will note how greatly the rate of potash fertilization varies between the counties—Hertford using over twice the potash that Duplin County uses. The reason can be found in the cropping system.

In Hertford County, almost as many acres are planted in peanuts as in corn, while in Duplin County corn accounts for approximately 75% of the acreage in cultivated row crops. Peanuts remove large amounts of potash

TABLE I. SAMPLES TESTING VERY LOW AND LOW IN PHOSPHATE AND POTASH IN DIFFERENT AREAS OF COASTAL PLAINS.

Area	Phosphate % of samples testing		Potash % of samples testing	
	VL	L	VL	L
Northern	0	4	2	14
Tidewater	2	11	4	18
Southern	1	5	5	24

TABLE 2. SAMPLES REQUESTING CORN RECOMMENDATIONS TESTING VERY LOW AND LOW IN POTASH IN THREE COUNTIES OF COASTAL PLAINS.

Area	County	Potash % of samples testing VL	L
Northern	Hertford	1	14
Tidewater	Beaufort	2	13
Southern	Duplin	7	20

from the soil because the entire crop is removed from the field when harvested.

So, to get high yields of other crops on soils where peanuts are grown, farmers must apply fairly large amounts of potash. On the other hand, since most of the potash in corn is contained in the leaves, sometimes nearly 60% of the potash is returned to the soil where only the ear is harvested.

This explains why the same percentage of samples tested very low and low potash levels both in Hertford and Beaufort Counties although Beaufort used only half as much potash as Hertford.

Another factor influencing the potash level of the soil is the soil's capacity to retain applied potash. This depends on the amount of organic matter and clay in the surface soils, as

CONTINUED ON PAGE 25

TABLE 3. PRINCIPAL CROPS GROWN IN THREE COUNTIES OF COASTAL PLAINS.

County	Crops	1959 Acreage
Hertford	Corn	20,400
	Peanuts	15,350
	Tobacco	3,170
Beaufort	Corn	49,800
	Soybeans	37,000
	Tobacco	9,200
Duplin	Corn	87,000
	Tobacco	15,150
	Soybeans	7,230

Six heaping loads of corn were harvested from the Ratliff acre, and Paul Ratliff sits proudly with this highest yield grown anywhere this year. The historic acre surrounding him yielded 304.38 bushels in 1955.

295 BUSHELS FROM ONE ACRE!

Amazing 2,500 lbs. of Fertilizer Used,

Including 1,500 lbs. of 14-14-14.

THE famed "Ratliff Acre" in Prentiss County, Mississippi, did it again—produced what is regarded as the world's record corn yield for 1960.

An even 295 bushels were harvested from the same measured acre on which world record holder, Lamar Ratliff, produced 304.38 bushels in 1955. The 1960 crop was grown by Paul and Lindon Ratliff—father and brother of Lamar.

They irrigated their field ten times during a 135-day drouth which severely burned neighboring fields.

An amazing 2,500 lbs. of fertilizer were applied before and during the growing season. They broadcast and plowed under 1,000 lbs. of mixed fertilizer and 500 lbs. of ammonium nitrate before planting. An additional 500 lbs. of mixed fertilizer and 200 pounds of nitrate were applied under the corn at a depth of 24 inches.

The Ratliffs planted the field on

Paul Ratliff shucks back the ears on part of his 295-bushel-per-acre corn crop. Corn was planted thicker than average . . . 25,000 stalks to the acre in rows 30 inches apart. Most stalks had two ears, some three.

April 20. They used Funk's G-711AA hybrid, a new variety developed especially for growing conditions in a broad band across the South.

Planting was in 30-inch rows, with kernels spaced about eight inches in the row, giving a final stalk population of around 25,000. The corn was cultivated twice and side dressed with 300 pounds of ammonium nitrate at the last cultivation.

Field measurement and weighing were handled by Prentiss County Agent, W. T. Smith and Assistant County Agent, J. W. Archer, both of Booneville, Mississippi.

The yield figures were officially released by Mississippi State College.

THE END

FACTORS

Marcus Zuber, University of Missouri corn breeder of the field crops department and agronomist of the U. S. Department of Agriculture, sent questionnaires to corn research workers in 48 states. He asked for their highest recorded yields (through the 1958 crop) and what factors they thought were limiting corn yields in their states.

Highest acre yields obtained with irrigation were reported by Georgia, 227 bushels; Washington, 222; and Virginia, 204. Three highest yields without irrigation were Arkansas, 185; Illinois, 184; and New Jersey, 183.

These yields were obtained in carefully conducted yield tests where the plots were repeated to overcome soil variation and other factors. Yields in corn growing contests were not used as the methods and rules governing these contests vary widely from state to state.

The five reasons listed most often by corn breeders as limiting corn yields were *low soil fertility*, poor rainfall distribution, inadequate plant populations, poor cultural practices, and use of hybrids of incorrect maturity. Diseases and insects were rated eighth and ninth.

Most difficult problems to control are those governed by the weather. For example, moisture shortages can be corrected by irrigation. However, most farmers do not have the expensive facilities for irrigating and many do not have a source of irrigation water.

One practice farmers in some areas of Missouri use to beat this problem, Zuber explains, is to plant as early as weather and soil conditions permit. This early-planted corn often pollinates before the lack of rainfall in July becomes a major factor.

Missouri Farm News Service

CHECK YOUR PLA

By A. C. Caldwell

HOW much plant food is removed from our farms in a good crop year? A look at the figures shows a staggering deficit in the major nutrients. The amounts of N, P_2O_5 and K_2O in selected crops along with yield statistics were used to calculate removals of nutrients from Minnesota soils in 1958.

Production figures for corn, soybean, oats, wheat, barley, alfalfa, and other hay, with the amounts of N, P_2O_5, and K_2O contained in these crops are given in Table 1.

These figures do not mean these amounts of nutrients were all removed from the farm. One must estimate the percentage of crops fed on farms and these "guestimates" were 85% for corn, 50% for soybeans, 90% for oats, 0% for wheat, 25% for barley, and 100% for the hays.

N and K Deficits Striking

"Being fed on the farm" does not necessarily mean the nutrients in these crops stay on the farm in their entirety. Milk and meat removals are considerable. Also, losses from manure by leaching and volatilization must be considered.

For example, with corn grain these losses were assumed to be 60% N, 40% P_2O_5, and 50% K_2O. These values will vary somewhat with the crop, due to utilization and digestibility. When nutrient losses were combined with plant food sold off the farm in crops, the figures in Table 2 were obtained.

Total annual plant food removal was estimated to be 299,800 tons N; 80,900 tons P_2O_5; and 121,600 tons K_2O. During 1958, Minnesota farmers purchased only 48,300 tons N; 89,600 tons P_2O_5; and 54,700 tons K_2O.

The large deficits in nitrogen and potash are striking. The figures for phosphate look better than they actu-

Table 1

Nutrient content and yield of selected crops in Minnesota in 1958

Crop	
Corn grain	312
Soybean grain	53
Oat grain	211
Wheat grain	25
Barley grain	31
Alfalfa	5
Other hay	1

* Phillips Plant Food Guic

"The bank of nutrients
tinue to withdraw, we
to do a better job of i

Table 2

Estimates of nutrients removed from Minnesota farms in crops and purchased as fertilizers

Crop	
Corn	
Soybean grain	
Oat grain	
Wheat grain	
Barley grain	
Alfalfa	
Other hay	
Total remove	
Fertilizer pur	
1958 deficit	

NT FOOD DEFICIT

University of Minnesota

Yield	Plant food content		
	N	P_2O_5	K_2O
	Thousands of tons*		
,448,000 bu.	121.9	56.2	40.6
,935,000 bu.	118.6	37.7	43.1
,464,000 bu.	74.7	32.4	21.1
,345,000 bu.	14.9	6.6	3.8
,000,000 bu.	13.7	5.9	3.3
,000,000 tons	116.9	29.4	112.5
,663,000 tons	22.0	8.3	25.0
Total	482.7	176.5	249.4

e used in calculations.

in the soil is not inexhaustible. To con-
must deposit. It's about time we started
t."

	Plant food removed		
	N	P_2O_5	K_2O
	Thousands of tons		
.....	73.1	22.5	20.3
.....	89.0	24.5	30.2
.....	41.1	11.3	9.5
.....	14.9	6.6	3.8
.....	12.3	4.7	2.8
.....	58.4	8.8	45.0
.....	11.0	2.5	10.0
d	299.8	80.9	121.6
:hased (1958)	48.3	89.6	54.7
	−251.5	+ 8.7	--66.9

ally are because over half the phosphate bought is applied to corn while some crops do not get fertilized at all.

The figures actually tell only part of the story and a very conservative one at that. When you consider that applied N, P_2O_5, and K_2O have much less than 100% availabilities, the problem is amplified. For general practical calculations, you might assume that for any given year the efficiencies for N, P_2O_5, and K_2O are 50%, 20%, and 50% respectively.

The figure for nitrogen includes that amount the plants get from the soil, plus the nitrogen obtained from the air by legumes. We do not know exactly how much the latter figure is, but if the legumes obtained about half their nitrogen from the air, the soil removal would still amount to over 200,000 tons, which is over four times that purchased and put back in the soil.

Don't Bankrupt Your Soil

Obviously the soil will eventually become bankrupt, and if cropping continues and no nitrogen is added, grain yields will be reduced to around 10 to 12 bushels per acre. This is about the yield that can be sustained by the small amount of nitrogen brought to the soil in rain or snow and free fixation. This is the history of long continued cropping of unfertilized lands.

Actually plant food losses are greater than the figures used here indicate. These have referred only to crop losses. No account has been taken of erosion, leaching, or volatilization losses which can be great in certain instances.

The bank of nutrients in the soil is not inexhaustible. To continue to withdraw, we must deposit. It's about time we started to do a better job of it.

THE END

PROFITABLE SOYBEAN YIELDS WHY NOT?

By J. R. Miller **University of Maryland**

HOW are your soybean yields? Do you grow 35 or more bushels per acre or are you getting only 15 to 20 bushels? If your fields fall into the latter group, plant food or lime is probably limiting your yield—that is, *too little plant food or lime!*

Chemical analyses have shown that a 30-bushel soybean crop will remove about 30 lbs. phosphate (P_2O_5) and 60 lbs. of potash (K_2O) from the soil —or enough nutrients to equal the phosphate and potash in 300 pounds of an 0-10-20 fertilizer.

From this, it is easy to see how soils can soon become nutrient hungry when soybeans are grown on the same field for a number of years with little or no fertilizer added. This has occurred on many soils, causing low soybean yields.

To show the importance of both fertilizer and lime in profitable soybean production on such soils, demonstrations have been conducted on a number of farms in Maryland.

Toward More Profits

Table 1 shows results for one of the tests conducted during 1960. In this demonstration, fertilizers with and without nitrogen were applied to the

TABLE 1. HOW FERTILIZATION INCREASED SOYBEAN PROFITS IN WICOMICO COUNTY

Treatment	Yield	Extra Profit
	Bu/A	$/A
No Fertilizer	9.7	
400# 0–10–20 Broadcast	28.0	26.16
500# 4–8–16 Broadcast	32.8	33.35

Soil Test Results:
pH 6.2, Magnesium—Med., Phosphate—V. High, Potash—Low

plots. Since the soil was at pH 6.2, no lime was used.

Note how broadcasting fertilizer equal to 20 lbs. nitrogen, 40 lbs. phosphate, and 80 lbs. potash increased soybean yields more than 23 bushels and how extra profit from this treatment equaled $33.35 per acre. Also note how 20 lbs. nitrogen per acre increased soybean yields by 4.8 bushels, giving an additional $7.19 profit.

This soil was very sandy, a type on which nitrogen is more likely to boost soybean yields.

On the heavier soils (loams and silt loams), soybean yield increases from nitrogen are usually quite small. So, nitrogen is not recommended on such soils.

Lime When Needed

Another demonstration test, conducted in Worcester County, showed the value of both fertilizer and lime in producing top yields of soybeans (table 2).

The soil at this location was at pH 5.5 and magnesium, phosphate, and potash levels were low. When 290 lbs. 0-20-20 per acre was applied on this soil, soybean yields increased 6.6 bushels. And when *both fertilizer and lime* were applied, yields jumped an additional 6.5 bushels.

This emphasizes the importance of fertilizer and lime on low fertility soils.

On the other hand, we should remember that soybeans grown on medium to high fertility soils often give little or no response to fertilizer. For example, in a Wicomico County test, the yield of soybeans was 33.6 bushels per acre with no fertilizer and 33.5 bushels when 300 lbs. 0-20-20 per acre was applied.

Keep Soil Account Balanced

However, producing soybeans without fertilizer and lime does not make "dollars and cents" in the long run because many soils, after a few years, will yield only 15 to 20 bushels, while 30 to 35 bushels can be obtained with a good fertility program. One might say that growing soybeans without adding plant food is like writing checks and never making any deposits.

Dr. James R. Miller is Extension Soils Specialist at the University of Maryland and head of the state-wide soil testing laboratory. Before joining Maryland, he was soil scientist with USDA at Beltsville. He has done research on radioactive fallout in soils and methods for determining available phosphorus in soils. He earned his B.S., M.S., and Ph.D. at Maryland.

TABLE 2. YIELDS OF SOYBEANS FOR LIME AND FERTILIZER DEMONSTRATION IN WORCESTER COUNTY

Treatment	Yield
	Bu/A
No Fertilizer	23.6
290# 0–20–20+Manganese	30.2
Lime[1]+290# 0–20–20+Manganese	36.7

Soil Test Results:
pH 5.5, Magnesium—Low, Phosphate—Low, Potash—Low
[1] 1850 lbs/A of hydrated lime containing 41% CaO and 29.5% MgO.

We all realize what happens with this type of program unless we have a large reserve in the bank. The same is true of the reserves in our soils. And to keep your soil account in balance, we suggest the following program for soybeans grown in Maryland:

1. Lime the soil up to about pH 6.5.
2. On light soils, broadcast a fertilizer that supplies about 15 lbs. nitrogen, 30 to 60 lbs. phosphate, and 60 lbs. potash per acre. On medium to heavy soils, use 30 to 60 lbs. phosphate and 60 lbs. potash.

THE END

SOYBEAN CHART

THE SOYBEAN crop has been one of the most rapidly growing segments of American agriculture. Production has grown from 180 million bushels at the close of World War II to 550 million bushels in 1960.

A soybean utilization *chart* which lists the *many and diverse* uses of soybeans is featured in the 1961 edition of the soybean Blue Book, annual yearbook of the American Soybean Association. The attractive chart can be taken out of the book and hung on the wall if desired.

Another feature of the 1961 book is a complete glossary of definitions and terms used by the soybean industry, valuable as a reference work.

A total of 148 soybean processing plants in the United States, including four new ones, are listed in the 1961 Blue Book. U. S. soybean processing capacity has increased by 25 million bushels, to 525 million bushels during the past year.

The book also lists seven Canadian and 64 foreign soybean processing plants, 17 of them unlisted last year.

Assembled for quick reference are the latest statistics on production and exports, prices and utilization of soybeans, meal and oil.

There are directories of soybean trade groups, soybean processors, oil refiners, and manufacturers using soy products in their operations, as well as firms offering their services and equipment to the soybean industry.

The book is available at $3 per copy from the American Soybean Association, Hudson, Iowa.

TABLE 1. AVERAGE ANALYSIS AND TOTAL PLANT NUTRIENT CONTENT OF COMPLETE FERTILIZER AND RELATIVE COMMERCIAL VALUES USED IN SOUTH CAROLINA FOR THE PERIODS SHOWN

Year	N	P_2O_5	K_2O	Total units plant food	*Relative commercial value per unit		
					Nitrogen	Av. P_2O_5	Sol. K_2O
1888–89.....	1.81	8.30	1.34	11.45	$3.64	$1.20	$1.00
1897–98.....	2.22	9.15	1.93	13.30	2.79	.65	.90
1907–08.....	2.48	9.17	3.01	14.66	4.00	.90	1.00
1917–18.....	2.54	8.54	2.25	13.33	7.29	1.00	5.00
1927–28.....	3.07	9.02	3.76	15.85	4.86	.80	.90
1937–38.....	3.10	8.40	4.60	16.10	1.70	.75	.80
1947–48.....	4.01	9.86	6.11	19.98	2.90	1.00	1.00
1957–58.....	4.16	9.93	9.84	23.93	2.20	.90	.90
1959–60.....	4.37	10.02	10.74	25.13	2.20	.90	.90

* These values represent the average cost values at the ports as reported by the manufacturers. They do not include the price of bagging, handling and freight. The values are used in calculating the payment to the farmer when the analysis indicated a shortage of plant food.

COMMERCIAL FERTILIZER TRENDS

. . . for 72 years in South Carolina

By Bruce Cloaninger
Clemson College

. . . no longer a "by guess" and "by gosh" business

THE adage, "There's nothing so constant as change," strongly applies to the fertilizer business.

The manufacture, storage, sales, and distribution of commercial fertilizer is no longer a "by guess" and "by gosh" business. It is a highly specialized chemical field that the country's most capable, efficient agriculturists, engineers, and promotional personnel are constantly trying to improve.

Had it not been for our energetic agriculturists and manufacturers looking ahead to secure better products for higher yields, this country might be facing a deficit in food and fiber crops instead of the surplus we now have.

The modern push-button commercial fertilizer plant has increased the operation capacity per hour, reducing to a minimum operating personnel and cost per unit of plant nutrients to the farmer. Granulation and pelletizing processes have perfected uniform mixing of higher analysis mixtures.

These types of products have not only reduced manufacturing cost per unit, but also have made a fertilizer that distributes more uniformly. Theoretically, each particle in the mixture is homogenous and should meet the guaranteed analysis appearing on the package. Due to the tremendous cost of erecting and equipping a modern pelletizing plant, there are not too many in operation.

TABLE 2. AVERAGE ANALYSIS AND TOTAL PLANT NUTRIENTS IN MIXED FERTILIZERS USED IN SOUTH CAROLINA FOR THE PERIODS SHOWN

Years	Average analysis N	P_2O_5	K_2O	Total plant nutrients	Total tons mixed fertilizer	Tons of plant nutrients N	P_2O_5	K_2O	Total tons plant nutrients
1939–40	3.55	8.40	4.99	16.94	392,958	13,950	33,008	19,609	66,567
1940–41	3.71	8.25	5.29	17.25	425,461	15,785	35,101	22,507	73,393
1941–42	3.70	8.20	5.29	17.19	467,566	17,300	38,340	24,734	80,374
1942–43	3.07	9.27	6.03	18.37	525,211	16,124	48,687	31,670	96,481
1943–44	3.62	9.55	5.70	18.87	545,563	19,749	52,101	31,097	102,947
1944–45	3.82	9.64	6.65	19.49	545,296	20,830	52,567	36,262	109,659
1945–46	3.80	9.71	6.54	20.05	596,133	22,653	57,885	38,987	119,525
1946–47	3.96	9.86	6.13	19.95	704,653	27,904	64,479	43,195	135,596
1947–48	4.01	9.86	6.11	19.98	680,354	27,282	67,083	41,597	135,962
1948–49	3.88	9.69	6.50	20.07	720,163	27,942	69,784	46,811	144,537
1949–50	3.73	9.68	6.86	20.27	613,019	22,866	59,340	42,053	124,259
1950–51	3.64	9.72	7.31	20.67	679,174	24,722	66,016	49,648	140,386
1951–52	3.62	9.70	7.65	20.97	718,301	26,003	69,675	54,950	150,628
1952–53	3.69	9.73	7.78	21.20	710,322	26,211	69,114	55,263	150,588
1953–54	3.33	9.69	8.11	21.13	672,022	22,378	65,119	54,501	141,998
1954–55	3.71	9.71	8.42	21.84	645,053	23,931	62,635	54,313	140,879
1955–56	3.64	9.92	9.33	22.89	620,921	22,601	61,595	57,932	142,128
1956–57	4.01	9.75	9.33	23.09	565.959	22,995	55,181	52,804	130,680
1957–58	4.16	9.93	9.84	23.93	525,460	21,859	52,178	51,705	125,742
1958–59	4.42	10.49	10.39	25.30	639,975	28,287	67,133	66,493	161,913
1959–60	4.37	10.02	10.74	25.13	578,406	25,293	57,959	62,102	145,354

Proving fertilizer is the biggest bargain the farmer buys—in cost per unit and net return.

Although the cost of commercial fertilizers may seem high, numerous surveys reveal that for every dollar spent for commercial fertilizers, *there is a minimum net return of five to seven dollars.* When you compare the slight increase in fertilizer costs with other items the farmer purchases, you should be most grateful to agricultural scientists and members of the fertilizer industry for their efforts in holding the prices down.

Table 1 shows average plant nutrient content in mixed fertilizer and the commercial values, which incidentally represent the price at the ports less freight, bagging, tagging, etc., for the past 72 years at 10-year intervals.

Note that prices have fluctuated slightly, but for several years have been somewhat uniform. Perhaps fluctuations were caused by war years that directly affected foreign shipments, especially prior to development of certain material-producing plants and mines in the United States.

To show the full picture, table 2 gives the increase in plant nutrient content of commercial fertilizers over the same period of years.

In 1889, the total plant food content of mixed fertilizers in South Carolina was 11.45% compared to 25.13% for the fiscal year ended June 30, 1960. If South Carolina farmers today used the same low analysis mixtures as in 1889, they would have to use over twice the tonnage to get the same plant food.

Farmers of today just cannot afford to spend money for low analysis mix-

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tures. The increased freight rates, cost of bags, and cost of labor, along with other increased expenses, have caused the energetic wide-awake farmer to go to higher analysis.

However, as he goes to higher analysis mixtures, he must also give attention to the proper placement of these higher analysis mixtures in relation to the seed. Otherwise, the young seedlings will be injured.

Even though research data have been firm on this subject for over 30 years, each year numerous complaints are heard (usually from absentee landlords) that stands of cotton, corn, or tobacco are poor due to improper fertilizer placement. Some of the better farmers applying more than 500 pounds per acre usually broadcast part of the mixture before planting or as the land is prepared.

Modern equipment developed by the manufacturers of farm equipment, in cooperation with the A & M college engineers and scientists, now make it possible to apply fertilizer mixtures and materials correctly and economically.

Through the concerted efforts of all agricultural agencies and the fertilizer manufacturers, the number of grades has been reduced from 201 in 1939 to 36 in the year just ended. Incidentally, of these 36 grades, six grades constituted 80% of the tonnage of mixed fertilizers sold last year.

The leading grades in order of the amount sold in 1939 were 3-8-5, 4-8-4, 3-10-3, 5-7-5, 4-8-6, and 4-7-5. The leading grades sold in 1959-60 were 4-12-12, 4-8-12, 4-10-6, 5-10-10, 3-12-12, and 3-9-9 (tobacco only). The 4-12-12 grade constituted 28% of the total tonnage of mixed fertilizer sold. The tonnage for the 4-12-12 grade has increased from 1,737 tons in 1952 to 162,740 in 1960.

The fewer number of grades assists the manufacturers in reducing storage space and cost of production and also enables him to deliver a well-cured drillable product.

It is essential that the fertilizer manufacturer, agriculturist, and farmer revaluate their program or programs to make progress. It has been aptly said that one either goes backwards or forwards. One never stands still. The person with the know-how and the ambition to do better will, as usual, succeed. **THE END**

HOW DOES FORAGE FERTILIZATION PAY?

. . . IN MORE DRY MATTER PER ACRE

. . . IN MORE STOCK-CARRYING CAPACITY PER ACRE

. . . IN MORE MILK AND MEAT PER ANIMAL

. . . IN MORE PROFITS

ORDER NEW HANDBOOK ON PAGE 3

CONTINUED FROM PAGE 13

TABLE 4. ESTIMATED RATE OF P_2O_5 AND K_2O ON CULTIVATED CROPS EXCLUDING TOBACCO.

County	Estimated rate of fertilization of row crops	
	P_2O_5 lbs./acre	K_2O lbs./acre
Hertford	37	58
Beauford	28	30
Duplin	22	24

well as clay in the subsoil, which determines how much potash leaches out.

Table 5 shows the predominant texture of surface soils and subsoils in the three areas. Hertford and Beaufort County soils are finer-textured, both in surface and subsoil, than Duplin County soils. This difference explains why Beaufort soils had a higher potash content than Duplin soils, even though the difference in added potash was small.

Since Duplin soils are sandy, you would expect potash losses from leaching to be greater than in the finer-textured soils of Beaufort County.

The potash level of soils, therefore, depends upon (1) the rate of fertilization, which in turn is influenced by crops grown and (2) the chemical and physical properties of soil which affect the capacity of the soil to retain potash, as well as losses due to leaching. **THE END**

TABLE 5. SOIL TEXTURE RANGES IN THREE COUNTIES OF COASTAL PLAINS.

County	Predominant texture of the surface soils	Predominant texture of the subsoils
Hertford	very fine sandy loam to silt loam	silt loam to clay
Beaufort	very fine sandy loam to silt loam	silt loam to silty clay
Duplin	sand to very fine sandy loam	sand to sandy clay

A WESTERN Ohio study shows that when poor crop production practices are used, profits from crops average only $1.25 an acre. But when good crop production methods are followed, profits per acre go up to $10.50.

These profits are left after making a land charge of $15 and $17 an acre and paying all labor at $1.50 an hour.

In each case, the same rotation was followed—corn, soybeans, wheat, and one year of meadow that was harvested as hay.

Poor Versus Good

When poor production practices were used, crops were raised under the following conditions:

1. Corn received 200 lbs. 3-12-12 per acre.
2. Wheat received 400 lbs. 3-12-12 per acre.
3. One ton of agricultural ground limestone was applied to the cropland every four years.
4. Spray was used on the corn and hay crops.
5. Only the best varieties were used.
6. Sufficient tile was installed to provide good to excellent drainage.

These practices produced the following yields per acre: corn, 85 bushels; soybeans and wheat, 30 bushels; hay, 3.0 tons per acre.

UP PROFITS $9 PER ACRE

By
R. H. Blosser

Ohio Agricultural Experiment Station

2. Wheat received 240 lbs. per acre of the same analysis.
3. No lime or spray was applied to any of the crops.
4. Varieties used could not be rated any higher than average.
5. Drainage would fall somewhere between fair and good.

This kind of farming produced the following yields per acre: corn, 55 bushels; soybeans, 22 bushels; wheat, 23 bushels; and hay 1.5 tons.

Good crop production methods included the following practices:

1. Corn received 400 lbs. 3-12-12 and 40 pounds nitrogen per acre.

Table Shows Details

Table 1 gives a detailed breakdown of receipts and expenses for the two different cropping programs.

Prices used in calculating gross receipts were as follows: corn, $1.00 a bushel; soybeans, $2.00 a bushel; wheat, $1.75 a bushel; hay, $20.00 a ton.

When good crop production practices were followed, gross receipts were 52% higher than income obtained from poor production methods. But expenses were only 31% higher. Consequently, good production practices increased profits $9.20 an acre above

TABLE 1. PROFITS FROM POOR AND GOOD CROPPING PROGRAMS IN WESTERN OHIO

	Cropping Practices Used	
	Poor	Good
Receipts for 4 acres*		
Corn, 1 acre	$ 55.00	$ 85.00
Soybeans, 1 acre	44.00	60.00
Wheat, 1 acre	40.25	52.50
Hay, 1 acre	30.00	60.00
Total	169.25	257.50
Expenses for 4 acres		
Man Labor	28.70	36.55
Tractor Power	21.85	26.65
Machinery	23.85	30.80
Fertilizer	11.00	25.00
Manure	6.00	7.50
Lime	.00	4.00
Seed	12.75	15.50
Spray	.00	1.60
Land	60.00	68.00
Total	164.15	215.60
Profit From Rotation	5.10	41.90
Profit Per Acre	1.27	10.47

* Based on a rotation of corn, soybeans, wheat and one year of hay.

the net returns from a poor cropping program.

Usually, high crop yields are considerably more profitable than low ones because most crop expenses do not increase in the same proportion as yields. The main exception is expenditures for fertilizer and lime. On an acre basis costs of plowing, disking, planting, and cultivating are about the same regardless of the yield.

Although good crop production practices increased gross receipts about one-half, expenditures for man labor, tractor power, machinery and seed increased only about one-fourth above the costs of farming with poor practices. Land charges increased only 13 percent.

A good crop farmer may not have the lowest possible costs because of heavy expenditures for fertilizer, lime, seed, and harvesting a large yield.

But, he should make considerably more profit per acre than a poor crop farmer because of higher yields and lower production costs per bushel of grain or ton of hay produced.

THE END

Fertilizing fruit trees may greatly increase the efficiency of this job—spraying for insects. First-year results of a study conducted by Dr. John A. Quist, assistant entomologist with the CSU Agricultural Experiment Station at Austin, show fertilized trees had half as many apple worms as non-fertilized trees in four out of six treatments. Dr. Quist is shown applying an insecticide to one of the trees in his experimental orchard.

FERTILIZER MAY AID INSECT PEST CONTROL

From A
Colorado Agricultural Experiment Station Project

In Colorado *Farm and Home Research*

IT MAY be possible to increase effectiveness of insecticides by as much as 100 percent through the proper use of fertilizers, research with apple trees at CSU's Western Slope Branch Experiment Station indicates.

Dr. John A. Quist, assistant entomologist at the Western Slope station in Austin, says first-year studies show that apples from fertilized trees had only half as many worms as those from unfertilized trees with four out of six insecticide treatments. Dr. Quist applied the six different insecticides to both fertilized and unfertilized trees in his experiment. The increased response to insecticides was noted on fertilized trees with four of the materials.

Fertilization boosts plant vigor which in turn increases the natural resistance of the trees to parasites, Dr. Quist explains.

"The nutritional vigor of long-lived plants has been recognized for years as an important influence in insect populations," he points out. "The studies at Austin are to determine how much proper fertilization can help to alleviate pest problems along with the use of chemical controls."

Although other agricultural researchers have reported marked responses in insect populations to various chemical fertilizers, Dr. Quist's study is believed to be the only concentrated research program to accurately measure increased insecticide response with fertilization.

Dr. Quist is applying nitrogen, phosphate, and potassium fertilizers along with chelated metal fertilizers of iron, zinc, and manganese to obtain proper nutritional balance. He is using leaf analyses of samples taken throughout the summer to determine amounts and frequency of application of fertilizers.

Dr. Quist acknowledges that it is a bit unusual for an entomologist to use some horticultural methods in his approach to insect problems. But by working closely with Ewell Rogers, assistant horticulturist at the Austin station, he feels the broad approach of the integrated horticultural-entomological study will result in far more valuable and beneficial findings than if separate studies were conducted in the more narrow specialized fields.

Stressing that the performance of an insecticide cannot be thoroughly understood in only one season of experimentation, Dr. Quist said several years' testing is necessary for positive conclusions. He also noted that further responses are obtained in the second or third year following application of fertilizer to apple trees.

"Therefore if results obtained in last year's studies are valid, the response to chemical controls will be equally pronounced this year because of the delayed response to fertilizer," he explains.

THE END

Dr. Quist can tell at a glance which treatment any tree in the orchard is receiving. These bands, which are color coded, indicate whether the tree is fertilized or unfertilized and what type of insecticide is being used.

HE LEARNED TO KEEP ALFALFA

"GRASS is taking over my alfalfa." That statement echoes a common complaint among Southeast farmers. Mr. W. A. Shadow, Meigs County, Tennessee, had this problem for many years. His first stand of alfalfa lasted four years before grass took over, but with his second stand, grass and weeds had taken over in two years.

His third seeding on the same field has lasted ten years and produced over 3 tons per acre average. His secret has been a willingness to follow recommended practices.

In 1950, Mr. Shadow fallowed his field, limed and fertilized the land, and seeded alfalfa for the third time.

A maintenance fertilizer demonstration was started on this field in 1952. This involved (1) a plot treated according to soil test recommendations, (2) a check plot that received only fertilizer applied at seeding, and (3) the rest of the field treated according to his normal practice.

By the second year, the treated plot was showing such good response that Mr. Shadow started fertilizing the remainder of his field with the same treatment. This left the whole field treated according to soil test with a check plot that received no maintenance fertilizer.

The yields from the demonstration are shown in Table 1.

After 10 years of successful alfalfa production, Mr. Shadow has this advice to offer farmers who have the

TABLE 1.

Year	Check Plot lbs. per acre	Treated Plot lbs. per acre
1951 & 1952	No yield taken	No yield taken
1953	3,400	6,400
1954	3,600	6,600
1955	2,300	6,300
1956	1,500 (Mainly grass)	6,500
1957	Alfalfa gone	6,200
1958	Alfalfa gone	8,200
1959	Alfalfa gone	5,900
Total	10,800 5.4 tons	46,100 23 tons

problem of "grass taking over their alfalfa fields."

(1) Select a well-drained soil.

(2) Lime and fertilize according to soil test recommendations.

(3) Use a recommended variety and be sure to inoculate the seed.

(4) Start land preparation in time to get a good, weed-free seedbed.

Joe D. Burns is Assistant Agronomist of the Tennessee Agricultural Extension Service. An Alabama native, he earned both the B.S. and M.S. from Auburn University. Specializing in pasture and forage research, he joined the Auburn staff for a period before entering the fertilizer industry for 3 years. In 1957, he joined the Tennessee Extension program.

By
J. D. Burns
And
J. R. Turner

Knoxville,
Tennessee

10 years good alfalfa when official recommendations followed

Weeds and grass when official recommendations not followed

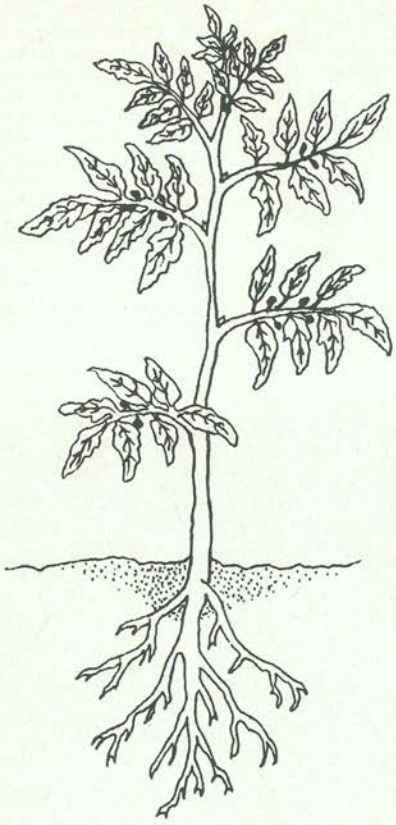
(5) Seed on time.

(6) Fertilize alfalfa *every year according to recommendations.*

Mr. Shadow places special emphasis on the last step. He points out that many farmers follow recommended practices at seeding but fail to fertilize every year. *As a result they lose their alfalfa.*

THE END

James R. Turner is Manager, Plant Food Product Development, U. S. Borax & Chemical Corporation, working out of Knoxville, Tenn. He attended both Berea College and the University of Kentucky, earning his M.S. in Agronomy at Kentucky. Before joining his present firm, he served as Assistant Professor of Agriculture at Eastern Kentucky State College.



Plant Analysis And Fertilizer Problems

A new book published by the American Institute of Biological Sciences.

Sponsored by the American Potash Institute.

Edited By: Walter Reuther, Chairman, Department of Horticulture, University of California, Riverside, Calif.

A valuable group of references for the researcher . . . the technical advisor interested in soil fertility and mineral nutrition problems . . . and crop production.

THIS new 454-page book is based on the proceedings of the Third Colloquium on Plant Analysis and Fertilizer Problems held at Montreal, Canada, in August, 1959.

It consists of 30 chapters—or papers—prepared by leading authorities on soil fertility problems and plant analysis techniques for diagnosing deficiencies.

In the two major sections of the book, authorities from the United States, the United Kingdom, Canada, South Africa, the Congo, the USSR, Brazil, France, Israel, and Japan discuss (1) the development and application of plant analysis techniques to crop fertilization problems, and (2) the fundamental relations of tissue composition, mineral nutrient status, and yield of plants.

Growing knowledge of plant nutrient needs and soil fertility conditions has played a major role in keeping food production in line with population explosions of the past two or three decades in some parts of the world.

"However, in many areas little or no application has been made as yet of modern scientific principles of soil fertility and plant nutrition," according to Dr. Walter Reuther, editor of the new book.

"Even in the United States, with its highly developed systems of research and education in the agricultural sciences," Dr. Reuther points out, "faulty mineral nutrition is still an important factor limiting the quality and yield of food or fibre on many farms in many areas."

One of the basic purposes of the new book is to contribute further knowledge to the basic principles, techniques, values, and limitations of plant analysis as a tool for determining fertilizer needs of plants.

"Those of us who have been closely associated with the development of plant analysis as a research and diagnostic tool during the past several decades," Dr. Reuther explains, "firmly believe that for many basic crops the method is now sufficiently refined to make swift and spectacular contributions to agricultural productivity, especially in underdeveloped countries, if given an opportunity."

There is not space, of course, to cite every topic covered in the book. But the following points summarize the overall pattern of this useful volume:

1—It discusses plant analysis and fertilization of citrus, deciduous fruits and vines, as well as row and plantation crops—ranging from the interpretation of nutrient balance in leaves of fruit trees to the association between potash hunger symptoms, plant analysis, growth, and yield of Concord grapes.

2—It discusses the fundamental relations of plant life to the growth factors in its environment, including mineral nutrition—ranging from the law of the minimum and balanced nutrition to the influence of nitrogen on the growth and composition of such a crop as sugar cane.

It is an authoritative book, full of scientific truth, no gimmicks, no utopian schemes or sudden solutions. Instead, it is full of carefully documented facts about plant analysis and soil fertility problems discussed by internationally known scientists who work daily with the problems they discuss.

It is illustrated with more than 140 graphs, charts, and pictures and simplified by more than 130 tables that convert much of the narrative into carefully correlated results.

This magazine recommends *Plant Analysis and Fertilizer Problems* as a superb reference text for every thinking agriculturist.

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