

PRELIMINARY REPORT ON CORN AND PASTURE FERTILIZATION IN SOUTHERN ILLINOIS

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CORN FERTILIZATION

In 1940 an opportunity was afforded at the College Farm to study the effects of complete commercial fertilization of corn by the hill drop method. In the following described corn experiments as well as the pasture experiment it should be borne in mind that the data takes into account only the one year's results. Practical implications must necessarily await confirmation in subsequent experiments.

The first experiment was on a three acre plot of ground where a three year stand of alfalfa had just been plowed. The field was on rolling upland of Ava Silt Loam which, before the experiment was started, tested slightly acid, between 6.5 and 7.0 pH. The test for phosphorus showed only a moderate amount present, but enough to grow alfalfa. The soil, however, proved to be low in potassium.

The field was planted two kernels to the hill with Funk's G-Hybrid 135. The fertilizers were applied at a rate of 200 pounds per acre. The yields from the fertilized plots were calculated from two replications of four 96 hill rows. The unfertilized yield was obtained from 42 rows rather than eight as unfertilized checks were left at regular intervals across the field. The only adjustments made in yield were for moisture percentage of the corn at harvest time and for missing hills.

From the data presented in Table 1, it would be difficult to select any one fertilizer mixture for recommendation. Practically any fertilizer except the straight superphosphate (0-20-0) produced a sufficient increase in yield to justify its use and any fertilizer listed in the table above the 4-16-4 would be well justified under the conditions of this experiment. It would seem that any mixture with a little nitrogen, a medium quantity of phosphate and a high per-

TABLE 1.—FERTILIZERS HILL DROPPED AT A
RATE OF 200 POUNDS PER ACRE, 1940.

Fertilizer	Acre yield bushels	Moisture in grain at harvest percent	Approximate cost of fertilizer per acre
2-12-6..	81.62	17.4	\$3.14
0-8-24..	79.18	18.5	3.96
0-10-20..	75.14	21.0	3.70
3-12-12..	74.53	20.6	3.85
3-18-9..	74.33	14.8	4.22
0-12-12..	72.05	18.0	3.26
0-20-20..	70.08	18.7	5.06
4-16-4..	68.64	14.1	3.84
0-20-10..	68.36	16.9	4.00
Unfertilized...	62.24	18.4	0
0-20-0..	61.58	20.1	2.66

centage of potash would be adequate. The two high yield producing fertilizers (2-12-6 and 0-8-24) gave yield increases over the unfertilized corn of 19.38 and 16.94 bushels per acre respectively. It may also be worthy to note that the plots with the four fertilizers containing nitrogen in the mixture averaged 8.29% missing hills, the unfertilized corn 10.21% and the six fertilizers with no nitrogen 12.48%.

In another 10 acre fertilizer experiment, 13 Funk hybrids and two replications of open pollinated corn were fertilized at a rate of 65 pounds per acre in comparison with check plots of each not fertilized. Six other Funk hybrids and two replications of the same open pollinated corn were fertilized at a rate of 120 pounds per acre in comparison with check plots of each not fertilized. The corn was all check planted, two kernels to the hill, and hill fertilized

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TABLE 2.—3-12-12 COMMERCIAL FERTILIZER HILL DROPPED AT RATES OF 65 AND 120 POUNDS PER ACRE, 1940.

Corn	Treatment	Average acre yield bushels	Average increase per acre bushels
13 hybrids.....	Unfertilized.....	59.25
Same 13 hybrids.....	Fertilized (65 lbs. per A).....	65.96	6.71
Open Pollinated.....	Unfertilized.....	43.49
Same Open Pollinated.....	Fertilized (65 lbs. per A).....	44.31	0.82
6 hybrids.....	Unfertilized.....	57.20
Same 6 hybrids.....	Fertilized (120 lbs. per A).....	69.71	12.51
Open Pollinated.....	Unfertilized.....	42.67
Same Open Pollinated.....	Fertilized (120 lbs. per A).....	51.95	9.28

with a 3-12-12 commercial fertilizer. Adjustments in yield were made for moisture percentage and missing hills.

Where the 3-12-12 fertilizer was applied at a rate of 65 pounds per acre an average increase of 6.71 bushels per acre was obtained over the yield of the same hybrids not fertilized. When the rate of application was almost doubled (120 lbs. per acre), the average increase in yield was almost doubled (12.51 bushels per acre). In the case of the open pollinated corn 65 pounds of fertilizer per acre increased the yield only 0.82 bushels per acre, but an application of 120 pounds per acre increased the yield 9.28 bushels per acre. The greatest single hybrid increase due to fertilization at the rate of 65 pounds per acre was 17.94 bushels per acre and in only one case among the 13 hybrids did the unfertilized plot out-yield the fertilized plot and that was by 7.32 bushels per acre. The greatest single hybrid increase due to fertilization at the rate of 120 pounds per acre was 17.25 bushels per acre and the least single increase was 6.19 bushels per acre.

PASTURE FERTILIZATION

At the college farm there is an old blue grass pasture. The pasture has been over grazed and the stand of blue grass is poor. The only improvement the pasture has received is an application of limestone made a few years ago. The soil at present tests sweet, but there is a deficiency of both phosphorus and potassium. In 1940, one-fourth acre plots were laid out and given treatments as shown in Table 3. The nitrogen fertilizer was made up of approximately equal portions of 16% nitrate of soda and 20% sulfate of ammonia. The fertilizers were applied by means of the fertilizer attachment of a disc grain drill.

The 1940 season was unusually dry and only four cuttings were obtained; the last one August 14. There were no fall rains to produce a late pasture; this and the fact that the pasture was thin to begin with accounts for the small amount of green material produced even on the fertilized plots. In all of the treatments the greatest in-

TABLE 3.—PASTURE FERTILIZATION, 1940.

Treatment	Date of treatment	Yield of green material per acre (season) pounds	Increase per acre pounds	Cost of ferti- lizer per acre
1. Check.....	1,573
2. 4-12-4 (250 lbs. per A).....	April 1	4,840	3,267	\$ 4.31
3. Nitrogen (300 lbs. per A).....	May 7	4,114	2,541	5.80
4. (2 and 3).....	(2 and 3)	5,292	3,719	10.11

crease in yields over the check was obtained with the first and second cuttings. From the data presented in Table 3, it is to be noted that the 4-12-4 fertilizer produced the most efficient increase of green material. Where only 1,573 pounds of

green material were obtained from the untreated plot, 4,840 pounds (over three times as much) were obtained from the application of 250 pounds per acre of the 4-12-4 fertilizer at a cost of \$4.31 for the fertilizer.
