GROWING CORN in Kentucky

By S.H.Phillips and F.A.Loeffel

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Corn is an important crop in Kentucky. More acres are devoted to corn production than to all other clean-cultivated crops. Corn is a versatile crop since it can be fed to livestock as grain and silage or sold for food and industrial processes. The annual value of this crop to Kentucky's economy is from 80 to 100 million dollars. Much of its value is not shown in cash receipts since most of the crop is fed to livestock. When you grow corn on good, well-managed soil, it will produce maximum feed in comparison with other crops adapted to Kentucky conditions.

Improved practices make corn production more efficient and result in a lower cost of production.

SELECTING THE LAND

Land that is deep, fertile, and least subject to erosion is the best on which to grow corn. If your farm has limited level acreage, it is wiser to produce continous corn on the more level land rather than in rotations. Provided you use proper management, continuous corn is a good practice when 100-bushel yields are produced. Newer methods of production, such as wheel-track planting, contour cultivation, minimum and mulch tillage, higher populations, or a combination of these, permits you to grow corn on land formerly considered too steep for row crops.

PREPARING THE SOIL

Land preparation for corn is being reduced each year, thus lowering the cost of growing the crop and reducing the destruction of the physical condition of the soil.

Wheel-track planting is a revolutionary practice in soil preparation (Fig. 1). Planting corn in the tractor tracks of newly plowed ground has attracted wide interest and is being used by more and more farmers. After breaking, little, if any, soil preparation is made. The planter behind the tractor places the seed in the soil which has been compacted by the weight of the tractor.

With the use of similar fertilization and production practices, yields from corn planted by the wheel-track method are equivalent to yields from corn planted following the conventional method of soil preparation.

Fig. 1.— Wheel-track planting reduces erosion, helps maintain good soil structure, and cuts production cost. (Photo—U.S. Soil Conservation Service)

SELECT A GOOD HYBRID

The U.K. Agricultural Experiment Station publishes each January a progress report on hybrid corn tests made during the previous year. It lists the yields, degree of lodging, maturity range, and disease resistance of many corn hybrids used in Kentucky. This report gives you valuable information on selecting hybrids. It is wise, when you plant a relatively large acreage to use two or more hybrids of different maturity dates. Full-season hybrids normally will produce higher yields than earlier hybrids. This difference will usually run from 6 to 10 bushels per acre. Since the Ohio Valley is a center of white corn production, consider growing white corn hybrids for cash markets.

Single-cross hybrids are becoming very popular, and they presently are producing yields comparable with those of the better regular hybrids. Uniformity of appearance and maturity can be easily observed.

PLANT CORN EARLY

Early planting is possible with today's modern equipment and high quality seed corn. The planting date will vary with the soil. Recent studies at several locations by the Department of Agronomy, University of Kentucky, show the planting date to be important to efficient production. Evidence of this importance is indicated by the experimental findings at three locations for a 3-year period. These data are shown in Table 1.

Table 1.— Effect of Corn Planting Date on Yield*

Planting Date	Yield, Bu Per Acre	Percent Lodging
April 25	95	8
May 12	91	8
May 25	81	10
June 8	74	14

* A 16,000-stalk population was used in the tests.

The data shown in Table 1 indicate the probability of a yield reduction of about one-half bushel for each day that planting is delayed after May 12. Some soils will not permit April plantings each season; however, producers can readily see that planting as early as conditions will permit is important.

GET AN EVEN, THICK STAND

Determine the rate of planting (stalk population) by fertility level, soil conditions, date of planting, and moisture. Fertility and date of planting can be changed, but moisture and soil conditions cannot be easily changed. University of Kentucky Agronomy research indicates a 12,000- to 16,000-stalk population is a good stand for average conditions (Fig. 2). Higher yields result from a thicker stand, as indicated by the data in Table 2.

Table 2.— Effect of Stalk Population on Corn Yield

Rate	Date	Yield, Bu Per Acre	Percent Lodging
8,000	May 12	73	5
12,000	May 12	88	7
16,000	May 12	91	8

Most of the corn in Kentucky is drilled, although some changing to hill dropping is reported. Modern equipment and less lodging make this method feasible. Regardless of the method used, low planting

Fig. 2.— Start with a good, thick, even stand of corn.

speeds are necessary to insure good, even spacing in addition to the matching of seed-corn grade to the planter plates. (See Table 3 for rate of planting.)

FERTILIZE CORRECTLY

You will need information from soil tests before ordering your fertilizer. These tests are the most accurate method of determining your fertility program. Most growers plan to have yields of 100 or more bushels per acre. These high yields remove large amounts of plant food. One hundred fifty pounds actual nitrogen, 60 pounds actual phosphate, and 100 pounds actual potash will be removed with this production. Without a soil test on continuous corn land, this amount of fertilizer may be applied annually. Corn following good sods will not need heavy nitrogen application and can produce an efficient yield on 80-100 pounds of actual nitrogen. Phosphate and potash levels must be maintained to produce vigorous plants and reduce down corn.

Many corn stands are lost or damaged by placing too much fertilizer too close to the corn seed. About 40 pounds per acre of total nitrogen and potash is the most that can be used safely. (This would be the

amount in 200 pounds of 10-10-10 fertilizer.) If you use a planter fertilizer attachment that places the fertilizer below and to the side of the seed corn, you can put on 120-140 pounds total nitrogen and potash. (This would be 600-700 pounds of a 10-10-10 fertilizer.) The best pH level for corn is 6.2-6.8. Liming for future crops may be timely as cultivation will work lime particles into the soil.

Table 3.— Rate of Planting Guide

NOTE: The numbers of plants per acre have been adjusted to account for an average of 15 percent loss due to germination, cultivation, etc.

(Area enclosed by shaded lines denotes more common or usable row widths.)

DRILLED CORN	Inches between rows			
Spacing in rows	42"	40"	38"	36"
	Plants per acre			
6"	21,100	22,200	23,400	24,400
8"	15,900	16,700	17,500	18,300
10"	12,700	13,300	14,000	14,700
12"	10,600	11,100	11,700	12,200
14"	9,100	9,500	10,000	10,500

HILL DROPPED CORN		Inches between rows			
Spacing between hill	Kernels per hill	42"	40"	38"	36"
		Plants per acre			
16"	2	15,800	16,700	17,500	18,300
20"	2	12,700	13,300	14,000	14,700
	3	19,000	20,000	21,000	22,000
24"	2	10,600	11,100	11,700	12,200
	3	15,900	16,700	17,500	18,300
28"	2	9,000	9,500	10,000	10,500
	3	13,600	14,300	15,000	15,700
	4	18,100	19,000	20,000	20,900

CHECKED CORN	Inches between rows			
Kernels per hill	42x42	40x40	38x38	36x36
	Plants per acre			
1	3,000	3,300	3,700	4,100
2	6,000	6,700	7,400	8,200
3	9,100	10,000	11,100	12,300
4	12,100	13,300	14,800	16,500
5	15,100	16,700	18,400	20,600

CONTROL WEEDS

Weeds rob corn of food, moisture, and light. You can control them by chemicals, cultural practices, or both. Certain new chemicals, applied before the corn comes up—called preemergence treatment—will be helpful. Special problem weeds, such as gaint foxtail, will require this type of treatment. Use all chemicals according to label. Table 4 lists some of these chemicals and their uses.

Table 4.— Recommended Practices for the Chemical Control of Weeds

Material*	Time to Apply	Rate
2,4-D	1-2 days before corn comes up. Do not use on sandy soils.	3-4 pt (4 lb acid per gal concentrate) to 20 gal water; solid coverage.
Simazine or Atrazine	Preemergence, or for Atrazine early postemergence. Do not use if small grain or other crops are to be planted the same year or tobacco the following year.	13-20 oz of 80% wettable powder in 10-13 gal water, centered on 12-14 in. bands. Cultivate middle.
Lorox	Preemergence (or early postemergence when weeds are less than 6 in. tall; direct spray to keep chemical to base of corn plants). Do not use on sandy soil. Plant corn at least 1¾ in. deep.	⅓ to 1 lb per acre in 10-13 gal water, centered on 12-14 in. bands. Cultivate middles. Directed spray postemergence 1⅓ lb. Follow instructions on label.
Randox T Granular	Preemergence. Do not use on sandy soil. *Caution: Caustic to skin.*	10 lb per acre in 12-14 in. bands. Cultivate middles.
Eptam	For trial use to control Johnsongrass seedlings or wild cane. Use at planting and work in lightly behind planter. Plant 10% thicker to make up for loss in stand.	1⅓ pt liquid or 20 lb 5% granules per acre in 12-14 in. band.

* Granules of the chemicals mentioned above may be used as well as the sprays.

CONTROL CORN INSECTS

Insects usually affect corn yields. Soil insects such as wireworms, northern and southern corn-root worms, aphids, seed-corn maggots, and cutworms feed on developing corn plants. Soil insecticides such as Aldrin, Dieldrin, and Heptachlor will reduce this loss. These can be applied as broadcast treatment or banded over the row. Two pounds of the actual material per acre broadcast or 1 pound banded over the row will give good control at a moderate cost. Chlordane may be used at increased rates.

Corn borer and other insects attacking above the soil level may need to be controlled. See your county agricultural extension agent for current insecticide recommendations.

CONTROL CORN DISEASES

Corn diseases can be divided into four groups: seedling, leaf, stalk, and ear. Bacterial wilt causes loss in germinating and young corn plants. Severely diseased fields should be disked and replanted. The only method of controlling leaf, stalk, and ear diseases is to use resistant hybrids. Serious early infestions of northern and southern corn-leaf blight may reduce the yield 40-50 percent (Figs. 3 and 4). Stewart's disease, a serious disease on sweet corn, can also be a problem in field corn (Figs. 5 and 6). Diplodia, Gibberella, and Penicillium are fungi that cause both ear and stalk rots. The progress report on hybrid corn, previously mentioned, by noting the degree of lodging, indicates the stalk-disease resistance and gives the relative leaf-disease resistance of the particular hybrid. For further discussion and identification of diseases, consult the U.S. Department of Agriculture Handbook 199, "Corn Diseases in the United States and their Control." The Department of Agricultural Engineering, University of Kentucky, is conducting tests in flame cultivation. This procedure involves applying an open flame to weeds in row crops. For further information, see your county agricultural extension office. Cultivation in the nor-

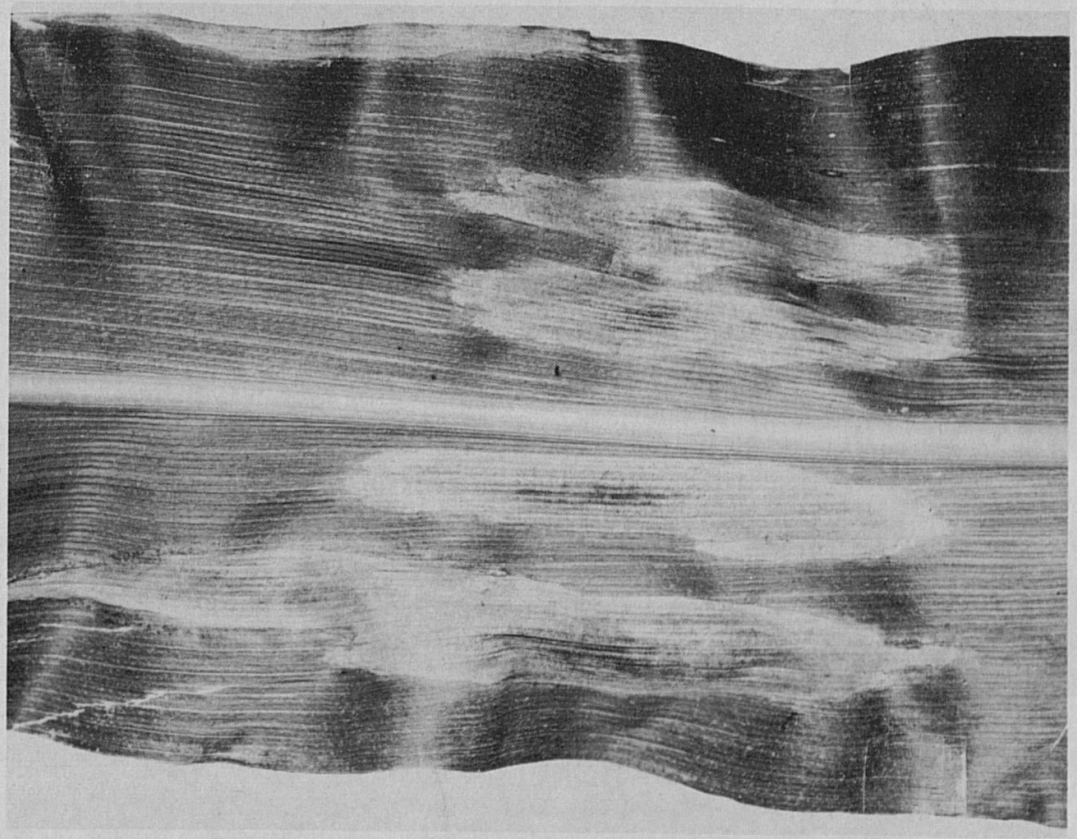

Fig. 3.— Northern corn-leaf blight is identified by elliptical, grayish-green or tan spots ranging in size up to 6 by 1½ inches.

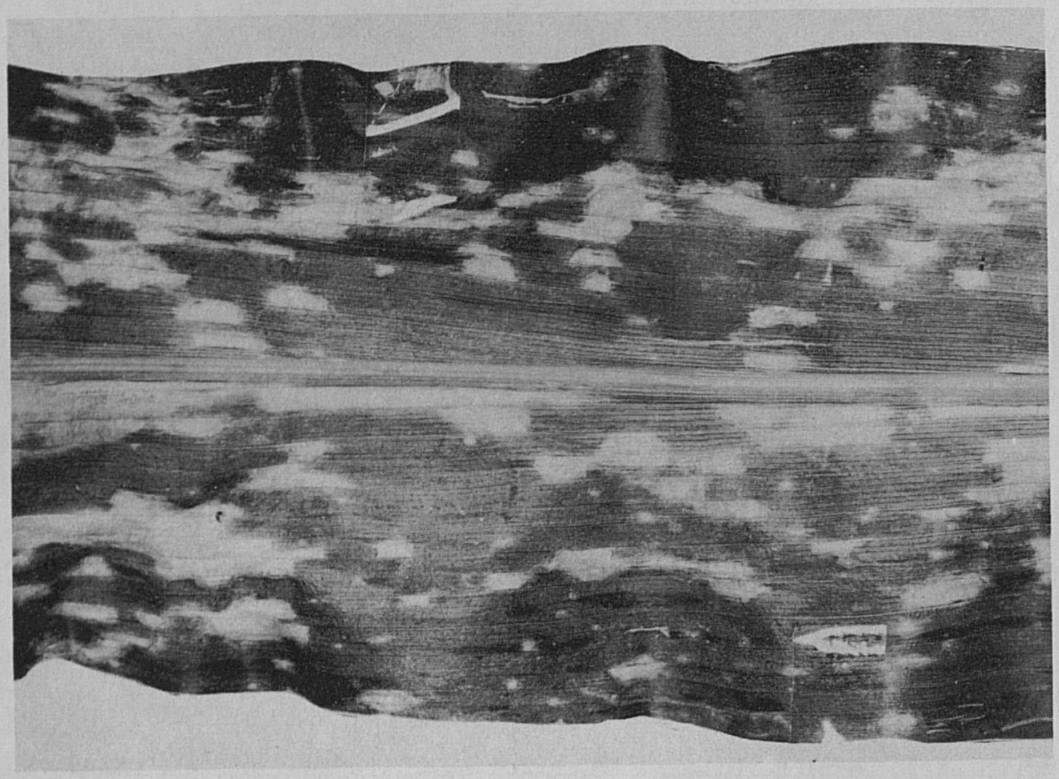

Fig. 4.— Southern corn-leaf blight causes small grayish-green or tan spots ranging up to 1 by ¼ inch in size. The spots have parallel sides.

mal manner is effective and is still a good practice. Be careful not to prune roots by close, deep, or late cultivation.

DETERMINE YOUR CROP YIELD

With the increased cost of producing corn, the first 40-50 bushels is needed to pay production expense. Calculate your yield by harvesting measured acres or several representive sample areas. Your county agricultural agent can supply you with a quick method, or you can use the ones supplied by many of the hybrid seed companies. The method explained in Figs. 7 and 8 may help you.

Also, you can use strip tests to determine the value of other factors contributing to production efficiency, such as planting rates and fertilizer. It is important to have an unfertilized check strip and a strip receiving twice the quantity of fertilizer applied to the remainder of the field. This enables you to determine if your investment in fertilizer was profitable, and whether you used too little or too much fertilizer. The number of corn plants per acre in Kentucky is generally too low for top production. It would likely be well worth the time and effort to change the setting on your drill and compare yields at different

rates of planting. However, remember that plant population and fertility level must be kept in balance for efficient production. Strip tests may also be used with chemical weed killers, soil insecticides, or methods of minimum tillage for preparation of land.

REDUCE FIELD HARVEST LOSSES

Corn left in the field after harvest represents a direct loss to you unless your livestock can eat it (Fig. 9). Correct adjustment of com-

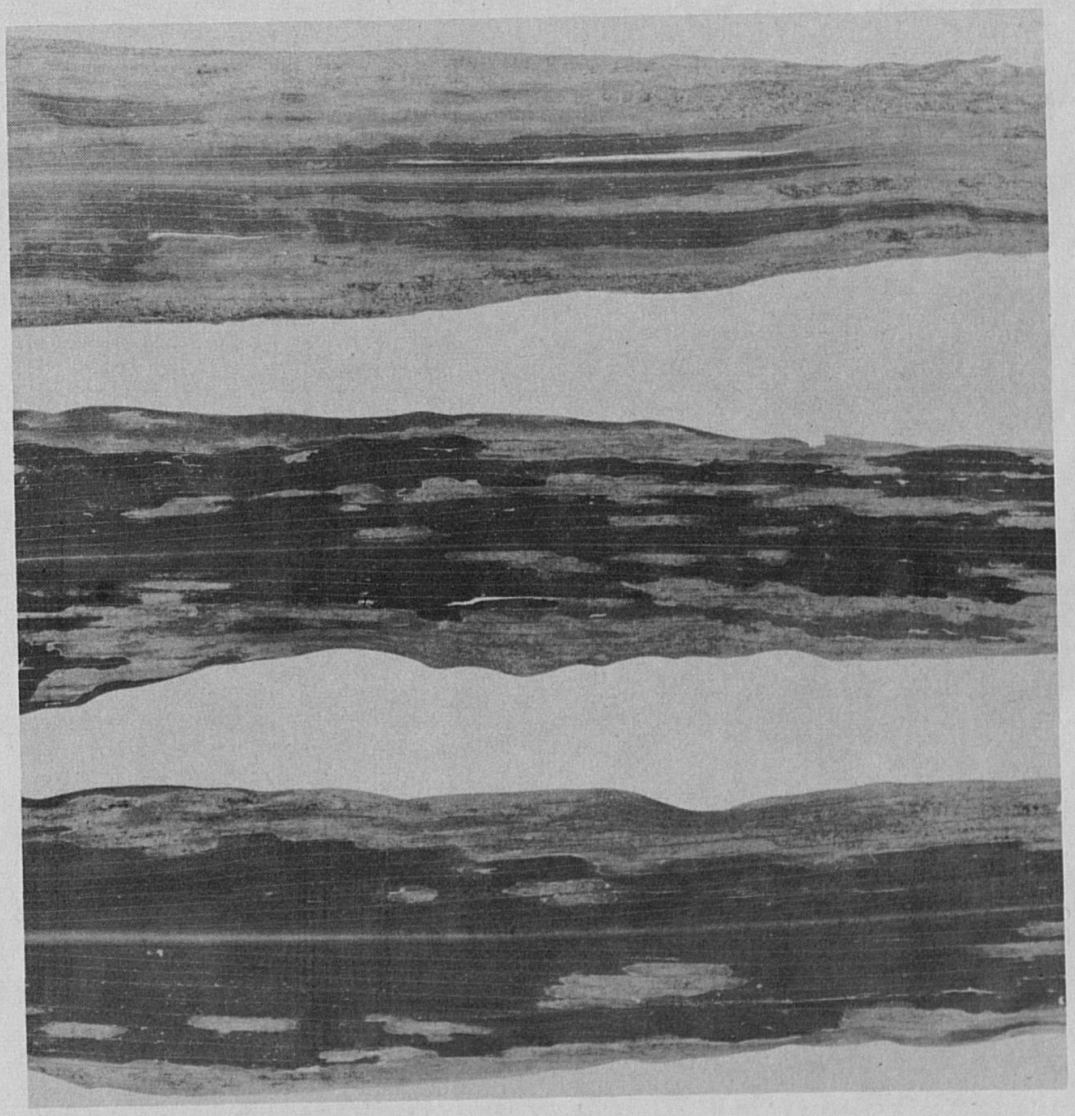

Fig. 5.— These corn leaves show injury from Stewart's leaf blight. The least diseased leaf is on the right; the center and left leaves show greater damage.

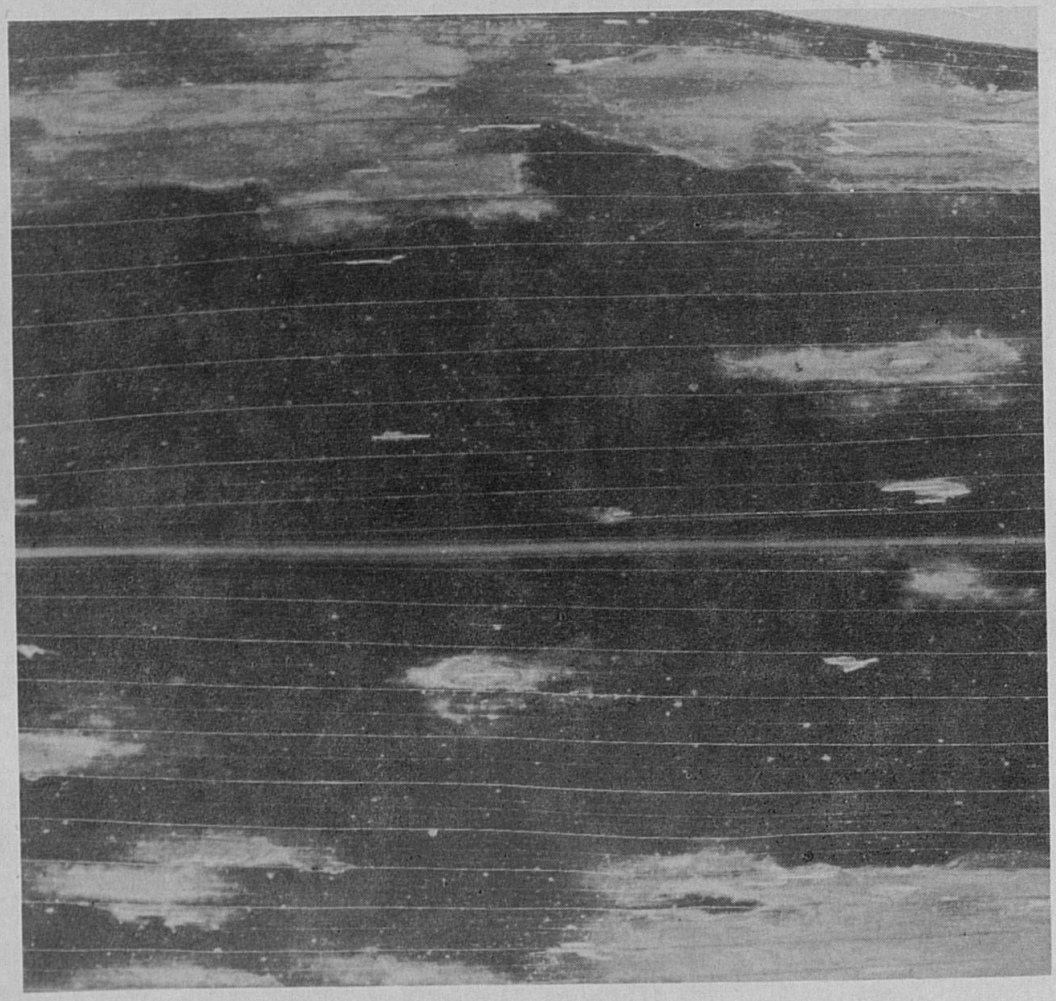

Fig. 6.— Stewart's leaf blight infection around flea beetle feeding points is shown on this leaf. The spots have no definite shape. (Disease photographs were furnished by A. J. Ullstrup, pathologist, U.S. Department of Agriculture.)

bine, picker sheller, or picker is important. Two kernels per 3 square feet left in the field equals 1 bushel lost per acre. One ear per 138 feet of row means 1 bushel is being lost per acre.

PROTECT YOUR STORED GRAIN

Twenty percent of the corn produced in Kentucky is lost or damaged in storage. Insects, birds, and rodents cause some loss, and heating causes damage. Sanitation is important. Cleaning the premises and the use of poison bait stations, along with rodent-proofing measures, will help cut some losses. Storage structures should be thoroughly cleaned and sprayed with a 5-percent DDT or a premium-grade 57-percent malathion emulsion solution for insect control. Spray-

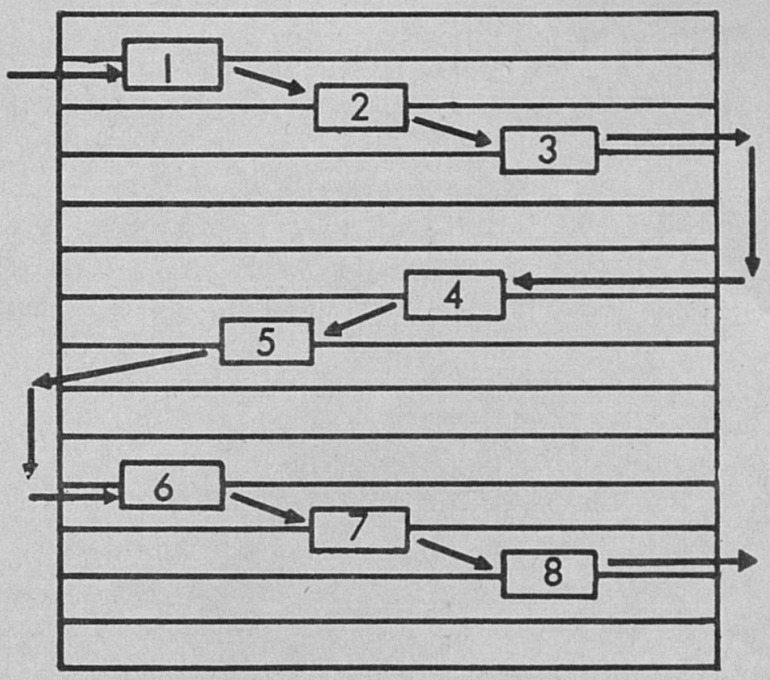

Fig. 7.— How to measure your corn yield. Pull the ears from 12½ feet of row from each of the eight areas. Weigh this corn shucked; estimate or check the moisture content. Then measure across 12 rows. (From Ga. Agr. Ext. Pub. 381)

Row Width	Percentage Moisture												
Inches	14	15	16	17	18	19	20	21	22	23	24	25	26
30	5.17	5.10	5.01	4.94	4.84	4.75	4.66	4.59	4.52	4.42	4.32	4.25	4.18
31	5.02	4.95	4.87	4.80	4.70	4.62	4.53	4.46	4.39	4.29	4.20	4.13	4.06
32	4.88	4.81	4.73	4.66	4.57	4.49	4.40	4.33	4.26	4.17	4.08	4.01	3.94
33	4.74	4.67	4.59	4.52	4.44	4.36	4.28	4.21	4.13	4.05	3.97	3.90	3.83
34	4.60	4.53	4.46	4.39	4.31	4.24	4.16	4.08	4.00	3.93	3.86	3.79	3.72
35	4.47	4.40	4.33	4.26	4.19	4.12	4.04	3.97	3.89	3.82	3.75	3.68	3.61
36	4.35	4.28	4.22	4.15	4.06	4.00	3.93	3.86	3.79	3.71	3.65	3.58	3.51
37	4.23	4.16	4.10	4.03	3.96	3.89	3.82	3.75	3.68	3.61	3.54	3.48	3.41
38	4.11	4.05	3.99	3.93	3.86	3.79	3.72	3.65	3.58	3.52	3.45	3.39	3.32
39	4.00	3.95	3.89	3.82	3.76	3.69	3.62	3.56	3.49	3.42	3.36	3.30	3.24
40	3.90	3.85	3.79	3.73	3.66	3.60	3.53	3.47	3.40	3.34	3.27	3.21	3.15
41	3.81	3.76	3.70	3.64	3.57	3.51	3.45	3.39	3.32	3.26	3.20	3.14	3.08
42	3.72	3.67	3.61	3.55	3.49	3.43	3.37	3.30	3.24	3.18	3.12	3.06	3.00
43	3.64	3.58	3.53	3.47	3.41	3.35	3.29	3.23	3.17	3.11	3.05	2.99	2.94
44	3.55	3.50	3.45	3.39	3.33	3.27	3.21	3.15	3.10	3.04	2.98	2.93	2.87
45	3.48	3.43	3.37	3.32	3.26	3.20	3.15	3.09	3.03	2.97	2.92	2.86	2.81
48	3.26	3.21	3.16	3.11	3.05	3.00	2.95	2.89	2.84	2.78	2.73	2.68	2.63

Fig. 8.— How to convert ear-corn weights to bushels when you know moisture. The distance across the 12 rows in feet will be the average row width in inches. Read the figure in the tabulation that is opposite the average row width and moisture content of your corn. Then multiply this figure by one-half the weight of your shucked corn. This will give you the yield of your corn in bushels. EXAMPLE: Assume that the row width is 42 inches and the moisture content of the sample is 20 percent. Then by referring to the tabulation in Fig. 8, we find the figure to multiply by is 3.37. Let's say that one-half the weight of the corn pulled from 100 feet of row is 28 pounds, then 28 × 3.37 = 94.36 bushels of shelled corn to the acre.

ing bins in July tends to reduce field infestations. For milling purposes, white corn must be clean. Premium-grade malathion added to shelled corn will give excellent insect control with no insecticide residue problem. Fumigation of structures that can be made airtight will provide complete control and partial rodent control. For better grain protection, consider replacing your storage building with more modern types. For more detailed information ask your county agricultural extension agent for directions on preventing and controlling insects in stored grain.

Many growers are shelling in the field and reducing moisture with drying equipment. Caution: corn dried at temperatures too high results in an unusable food crop and reduces feeding value. The maximum safe drying temperature is 150°F.

Shelled corn requires careful observation to prevent heating or other forms of deterioration in storage. Good air circulation and temperature and moisture tests can save your valuable crop.

Fig. 9.— Ears and shelled corn left in the field are costly.

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