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CORN CLUB MANUAL

FOR

4-H CLUB MEMBERS

North Carolina State College of Agriculture and Engineering
of the
University of North Carolina
and
U. S. Department of Agriculture Cooperating
N. C. Agricultural Extension Service
I. O. Schaub, Director
State College Station
Raleigh

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REQUIREMENTS FOR COMPLETING CORN CLUB PROJECT

	<u>Points</u>
1. Plant one or more acres of corn with seed from the source and of the variety recommended by Farm Agent.	10
2. Select the land, prepare the seed bed, fertilize and cultivate the crop according to the methods recommended by the Extension Service.	20
3. Select the seed in the field for next year's planting.	10
4. Harvest the crop and determine the yield per acre (15 points) the cost per bushel and the profit or loss per acre (15 points).	30
5. Select an exhibit of ten ears, and exhibit if practical at either a club, community, county or State fair.	10
6. Keep a record of all materials used in carrying out the project and submit it to Farm Agent.	20

LIST OF AVAILABLE MATERIAL

1. Summary sheet showing principal recommendations for conducting the project.

CORN CLUB MANUAL FOR 4-H CLUB MEMBERS

Revised 1943 /1

INTRODUCTION

Twenty-five hundred North Carolina 4-H Corn Club members annually produce an average yield of 40 bushels of corn per acre in comparison to the State average of 18.7 bushels. During the past twenty years 23,000 boys have produced yields of corn double that of their fathers and neighbors. Some of these boys have produced seventy-five, a hundred, a hundred and twenty-five and even more bushels per acre. This record shows the possibility of corn production in North Carolina when proper attention is given to it.

Plentiful feed is a requirement for the production of livestock. The number of acres required to produce the feed for North Carolina livestock depends on the yield per acre. If the per acre yield of corn could be doubled, only half the acres would be required. Such reduction in acreage would reduce the labor necessary to produce the crop and the cost per bushel would be lowered. The suggestions given below will aid in growing corn at less expense. Your county agricultural agent can advise and aid you with your project.

SELECTION OF SOILS

Corn responds to favorable environment. Therefore a fertile soil is most desirable. Well drained loams relatively well supplied with organic matter can be expected to produce better than average yields. Sands devoid of organic matter and red clay hillsides from which all the topsoil has been eroded, cannot be expected to produce a profitable yield. Sterile sands and washed hillsides should not be planted in corn. Instead, they should be planted to crotalaria, lespedeza, etc., for soil building.

ROTATIONS

The nature of the soil should determine the crop rotation and sequence, and how often corn can be grown without impairing the fertility too greatly. Legumes or sod crops incorporated into the soil prior to corn are particularly helpful. Such crops as crotalaria, soybeans, cowpeas, Austrian winter peas and Crimson Clover, vetch are recommended for the light textured soils of the Coastal Plain and Piedmont; lespedeza, red clover and alfalfa for the heavier soils of the Piedmont and Mountains.

TABLE I
EFFECT OF THE ROTATION ON THE YIELD OF CORN
PIEDMONT EXPERIMENT STATION
STATESVILLE, N. C.

1918 - 1938 (Twenty year Average)

Rotation	Yield per Acre
Continuous Corn	17.1 bu.
2 year rotation	
Corn - Wheat	20.2 bu.
3 year rotation	
Corn, Wheat, Red Clover	37.3 bu.

/1 Prepared by the Agronomy Departments of the N. C. Extension Service and N. C. Experiment Station.

SEED BED PREPARATION

Fall and winter plowing of legume and other sod crops on the heavy soils leaving soil rough through the winter is recommended. On the light soils of the Coastal Plain, winter and early spring plowing or very deep discing is recommended. When winter cover crops, vetch, Austrian winter peas, or rye, etc., precede corn, they should be allowed to make considerable spring growth but should be disced into the soil and the soil turned two or preferably more weeks in advance of planting. This interval will allow time for the organic matter to begin decomposition. Thoroughly prepared seed beds will reduce the amount of cultivation necessary for weed control. Do not plow, prepare or cultivate soil when it is too wet. The soil is too wet when a handful of it does not crumble when squeezed.

SELECTION OF SEED

The proper selection of your seed corn will lower cost of production per bushel and increase your yield per acre. These are two important objectives for your corn club work. Therefore, it will pay you to get the best seed available for your locality whether you buy it or select it yourself. The proper place to select your seed is in the field where selection can be made from good, strong plants bearing good ears. If you have not done this from last year's crop, then it will probably be best for you to secure your seed from a neighbor who has practiced field selection. In selecting seed of a variety, you should keep in mind the fact that seed from distant sections are not likely to give best results the first year. In selecting new varieties, care should be taken to secure varieties grown under similar climatic conditions.

VARIETIES

Well selected local varieties are often better adapted to the community than are the named varieties which can be recommended. Therefore, if there is a good local variety in your neighborhood use it, or if not, obtain good seed of one of the following varieties from as close to your home as possible.

Coastal Plain:

- White varieties - Biggs' Two-Ear, Latham's Double, Highland Horsetooth (on muck soil), or adapted local variety.
Yellow varieties- Jarvis Golden Prolific, Indian Chief, Latham's Yellow Cross, or adapted local variety.

Piedmont:

- White varieties - Weekley's Improved, Southern Beauty, Douthitt's Prolific, Cooke's Prolific, or adapted local variety.
Yellow varieties- Jarvis Golden Prolific, Indian Chief, or adapted local variety.

Mountains:

- White varieties - Holcombe's Prolific, Wilkes Co. White, or adapted local variety.
Yellow varieties- Jarvis Golden Prolific, or adapted local variety.

HYBRID CORN

Several different strains of hybrid corn are now being grown in the State. It is necessary for hybrid corn to be adapted to the community just as it is for

the varieties. Because you do not select seed from hybrid corn, it is even more important that the hybrid strain chosen be adapted if you are to continue growing the same hybrid strain year after year. Most hybrid strains now on the market were developed in other states and are not well adapted to our local conditions. Now, adapted hybrid strains are being developed and as these become available they will be better than the old varieties mentioned above. No specific hybrid can be recommended, but you can obtain information concerning hybrid corn by writing the N. C. Agricultural Experiment Station. Tests conducted by your state experiment station show adapted hybrids have averaged 20 percent more in yield than have the varieties listed above.

PLANTING DATES

Corn planted reasonably early after danger from frost usually produces the largest yields. Later planting is better when corn follows a winter legume (vetch, Austrian winter peas or crimson clover).

Recommended Dates

Coastal Plain

:Where bud worm damage has been serious, injury may be decreased with the delayed planting as indicated and by clean fallow a month preceding planting. /1

Southern section, March 25 to June 1 :May 10 - 20

Northern section, March 25 to June 1 :May 10 - 20

Piedmont, April 1 to June 1 :May 10 - 20 (May 15 - 30 in northern tier counties).

Mountains, May 1 to June 1 :May 15 - 30

STAND

1. Rate of seeding:

Planting should be thick enough to insure uniform stand. When rows are $\frac{3}{8}$ ft. apart, 4 to 6 qts. (7 to 10 lbs.) per acre are adequate. When rows are 4 ft. apart, 3.5 to 5 qts. (6 to 9 lbs.) per acre are adequate.

2. Spacing or thinning of plants:

Corn should be spaced thick enough to take full advantage of the fertility and moisture, but if spaced too thick may be affected adversely in periods of low rainfall and high temperatures. An evenly distributed stand is essential for a satisfactory yield. Therefore, it is usually desirable to plant more seed than the expected stand and thin or chop to a desired stand when plants are not more than 4 to 6 inches high. Spacing should be determined by fertility of the soil, not by any set rule. Usually stalks should be 22 to 24 inches apart on the sandy soils and those of medium fertility. On soils of high fertility, spacing may be 18 inches or less.

FERTILIZATION

Nitrogen is the most important part of the corn fertilizer on North Carolina farms. With very heavy crops of legumes returned to the soil or stable manure applied prior to the corn crop, nitrogen as fertilizer or as a topdressing is

/1 Recommended by Entomology Department.

less essential.

The following fertilizers are recommended:

Following non legumes: Nitrogen supply*		Coastal Plain	Piedmont and Mountains
and legumes for hay	Normal	At planting	At planting
	:	300 lbs. 5-7-5	300 lbs. 5-7-5
	:	Side dressing	Side dressing
	:	(20 lbs. N.)	(20 lbs. N.)
	:	125 lbs. 16-0-0	125 lbs. 16-0-0
	80% of normal	At planting	At planting
	:	300 lbs. 4-8-4	300 lbs. 4-8-4
	:	Side dressing	Side dressing
	:	(16 lbs. N.)	(16 lbs. N.)
	:	100 lbs. 16-0-0	100 lbs. 16-0-0
	60% normal	At planting	At planting
	:	250 lbs. 4-8-4	250 lbs. 4-8-4
	:	Side dressing	Side dressing
	:	(12 lbs. N) 75 lbs.	(12 lbs. N)
	:	16-0-0	75 lbs. 16-0-0
Following legumes for seed or turned under, green manure or on soils high in organic matter or fertility	Normal	At planting	At planting
	:	200 lbs. 5-7-5	150 lbs. 5-7-5
	:	Side dress,	Side dress
	:	(20 lbs. N)	(20 lbs. N)
	:	125 lbs. 16-0-0	125 lbs. 16-0-0
	80% Normal	At planting	At planting
	:	None	None
	:	Side dress,	Side dress,
	:	(20 lbs. N)	(20 lbs. N)
	:	125 lbs. 16-0-0	125 lbs. 16-0-0
	60% Normal	At planting	At planting
	:	None	None
	:	Side dress,	Side dress
	:	(16 lbs. N)	(16 lbs. N)
	:	100 lbs. 16-0-0	100 lbs. 16-0-0

*With a possible limited nitrogen supply during the war emergency fertilizer recommendations are based upon normal, 80% and 60% of normal supply.

SIDEDRESSING

The quantity of nitrogen and the time of application are very important factors in corn production. High applications of nitrogen made at planting time or very early as sidedressing may result in too much vegetative growth or stalk which is frequently not reflected by an increased yield. The more desirable time to apply a nitrogen side dressing is when the corn is about two feet high, or six to eight weeks after planting. Corn side dressed when it begins to shoot or tassel does not receive the maximum benefit from the nitrogen. The amount of nitrogen to apply will depend to a large extent on the available nitrogen supply in the soil and the response in bushels of corn that may be expected. The general recommendation when the nation's nitrogen supply is normal is 20 lbs. of nitrogen per acre which is equivalent to 125 lbs. of nitrate of soda per acre or 100 lbs. of sulfate of ammonia.

CULTIVATION

Corn should be cultivated frequently enough to control weeds. Excessive cultivation is not only costly but may be detrimental in that many corn roots

near the surface will be destroyed by such cultivation, as well as moisture lost in the process. Cultivation to form a mulch to conserve moisture destroys surface roots which would have taken up the moisture in the surface layer. Early cultivations are usually more effective in controlling weeds and may be made deeper than later ones. Cultivate sufficiently close to the plants to destroy weeds that may be in the row, but do not cultivate so close as to disturb the root system severely during the later cultivations. If proper cultivators and methods are employed, hand labor in chopping or hoeing can be eliminated or held to a very low minimum, thereby reducing the cost per bushel.

FODDER PULLING

4-H Corn Club members should not pull fodder. Pulling fodder reduces the yield of corn as shown by results from the Alabama Experiment Station.

EFFECT OF PULLING FODDER ON CORN YIELDS

Time of pulling fodder	Fodder	Corn	Cost of fodder per ton in loss of Corn
1. Fodder pulled at early roasting ear stage	738	17.9	\$96.20
2. 1 week later	703	31.4	48.36
3. 2 weeks later than No. 1	620	39.3	29.40
4. 3 weeks later than No. 1	598	42.7	19.06
5. No fodder pulled	-	48.4	-

*Corn valued at \$1.00 per bushel.

If roughage is needed on the farm, an acre of soybeans or lespedeza will produce four or more times as much hay (roughage) per acre as corn fodder and of better quality at less cost per ton.

SELECTING AN EXHIBIT FOR THE CORN SHOW

The main object of a corn show should be selection of good seed. Since seed corn is universally handled as shelled corn, most corn shows are now based on 1/2 peck samples of shelled corn. It is seed quality that is looked for in judging such samples. The following factors in determining seed quality are taken from an international shelled corn score card.

Freedom from disease - Indications of disease are moldiness, yellow or brown staining near kernel tip, lack of luster. A flinty, lustrous appearance is associated with freedom from disease.

Plumpness of kernel tips - Shrunken kernel tips are considered to indicate inherent weakness.

Freedom from excessive starchiness - Excessive white starch may be found either at the tip, or the back, or near the crown of the kernel. In general a starch condition of the kernel tips is considered to be most objectionable.

Condition of the germ face - Refers to freedom from blistering or discoloration. A badly blistered or dark colored germ face indicates that the germ has probably been injured by disease, drought, or freezing.

Size and shape of kernels - Refers to the presence of cracked, broken kernels or mouse damaged kernels. Kernels with tip caps broken off are included under this heading.

Uniformity - Uniformity in size and shape of kernel and in color indicates freedom from mixtures of varieties or types. Mixture of distinct other color, i.e., white in yellow.

The exhibiting of 10 ear samples is still a common practice. The same general factors should be kept in mind in picking a sample of 10 ears as in picking the sample of shelled corn. To these factors should be added ear type, nature of shank, and firmness of ear.

Ear type - Should be typical of the variety. Thus it may be cylindrical, slightly tapering, or tapering depending upon the variety. While varieties are always variable in ear type, it adds to the appearance of the sample to select ears of one uniform type.

Nature of shank - Avoid too large a shank or too small. Shanks of medium strength, bright and free from disease and discoloration are preferred.

Firmness of ear - When ears twist easily or when kernels are loose on the cob, they indicate poor development.

SELECTION OF SEED CORN

As mentioned before, your corn field is the best place to select seed corn. When the husks have turned brown and dry, take a bag such as a cotton picking bag and walk through your field. Pick only plants that are standing erect and show no disease such as smut or ear rots. Also choose plants that have one or two well developed ears, with medium sized shanks and not too tall. If the ears are too high on the stalk, the plants are more apt to blow down before harvest. You may save both ears from two-eared plants since the upper and lower ears are of equal seed value. You should pick several hundred ears so that you can reselect when your crop has thoroughly dried out. Allow your ears to dry for a few days then store (see storing).

SELECTED THE EXHIBIT

a. Shelled corn sample- The field selected ears should be placed on a table where you can see the individual ears. Now pick 2 or 3 dozen ears having similar kernels in size, shape and color. First shell off the butt and tip kernels back far enough to remove the odd shaped grains. Check each ear as you butt and tip it to be sure it is free from disease. The ears can then be shelled for your 1/2 peck sample. To be sure your sample is uniform in kernel size, shape, color and freedom from diseased or discolored kernels, hand pick by spreading it out on a table so you can easily see each kernel.

b. A 10 ear sample- If the ear sample is to be shown spread your field selected ears out on a table. Pick out 20 or 25 of the best ears of as nearly the same type as possible and representing the average or most frequent type found in your variety. Now match these ears until you have the 10 most uniform.

HARVESTING

Keep your corn separate from the other corn on the farm until your yield has been determined and certified. Do not harvest until ears are thoroughly dry. The cost of harvesting, that is the labor required to harvest an acre of corn will be less with the fewer operations that are performed. Less labor will

be required if corn is husked (shucked) direct from the stalk and thrown into the wagon box as it is driven through the field. Such practice eliminates pulling and piling on ground, loading and unloading into large piles, husking, and reloading and unloading into cribs. Labor is costly and difficult to obtain. Use it efficiently.

STORAGE*

Suitable storage space should be provided in advance of the harvesting. The storage should be a fairly air tight space and should be made as early rat proof as possible. If an old bin is used it should be well cleaned and swept to eliminate any old grain; then the floor and walls sprayed with:

Dormant-tree spray oil	1 gallon
Lye	3 ounces
Water	9 gallons

One gallon of this mixture will cover about 50 square feet of bin surface.

The corn will probably be infested with insects when taken from the field, and these insects will reproduce rapidly when the corn is placed in storage. It is essential that the grain be fumigated to prevent losses by these pests.

Carbon bisulphide should be used to fumigate the corn, and should be used at the rate of $1\frac{1}{2}$ to 2 gallons per 1000 cubic feet of space. If the corn is shelled before placing in storage the carbon bisulphide should be used at the rate of 3 gallons per 1000 bushels of grain or $\frac{1}{2}$ teacupful to the barrel of seed. The fumigant should be poured or sprayed over the top surface of the grain.

Carbon bisulphide is highly explosive so do not permit lighted matches, pipes or sparks of any kind near the storage while fumigating. (Use only when temperature of grain is above 65° F.)

Close the storage tightly immediately after applying the fumigant and leave it closed for 48 hours. Then open the storage to allow airing.

Inspect the grain about once a month and when more insect damage is noted, repeat the fumigation.

DETERMINING THE YIELDS

Honesty and accuracy should be watchwords of every 4-H club member. All records should be determined accurately and reliably. It is better to lose fairly than to win dishonestly.

An acre of land	= 43,560 sq. ft. (208.7 ft. x 208.7 ft.)
" " " "	= 12,445.7 ft. of row. Rows 3.5 ft. apart
" " " "	= 10,890 ft. of row. Rows 4 ft. apart.

How to calculate an acre with length and width of rows known: $43,560 \div$ length of row = width of acre. Width of acre $\div$ width of row = number rows per acre.

A bushel of shelled corn weighs 56 lbs.

*Prepared by Extension Entomologist.

Immature or wet corn weighs heavy. Therefore yield records should not be taken when it is in this condition.

After corn has been shucked, the entire yield of ear corn including any for seed should be weighed before it is put in the crib or mixed with other corn on the farm.

Weigh out 100 lbs. of the ear corn. Shell this lot and weigh it. The weight of the shelled corn divided by 100 is equivalent to per cent shelled corn. Multiply the total weight (yield) of ear corn per acre by the per cent shelled corn. This is the number of pounds of shelled corn per acre. Divide the lbs. of shelled corn per acre by 56 the number of lbs. of corn per bushel. The result is number of bushels of corn per acre.

See example:

Yield of ear corn in lbg. per acre $\times$ $\frac{\text{lbs. shelled corn}}{100} = 56$ (No lbs. corn per bushel) = No. bushels of corn produced per acre.

RECORDS

A book for this purpose will be furnished. Every detail is important in growing an acre of corn. Therefore it should be included in your record book. The principal objective in your project is how cheaply can you produce a bushel of corn. How does your cost per bushel compare with other 4-H members? Only a complete set of records kept up to date will tell you.

A FEW OF THE ITEMS THAT SHOULD BE RECORDED

Number of man hours, horse hours, and tractor hours required for plowing, discing and harrowing.

Number of man and horse hours required for planting, chopping, thinning, cultivating and harvesting.

Amounts of fertilizers and seed.

Your project is incomplete without a written record certified by your club leader.

Keep it up to date.