

CORN CLUB MANUAL

FOR

4-H CLUB MEMBERS



Prize winning corn grown by a 4-H Club member

NORTH CAROLINA STATE COLLEGE OF AGRICULTURE AND ENGINEERING
AND
U. S. DEPARTMENT OF AGRICULTURE, CO-OPERATING
NORTH CAROLINA AGRICULTURAL EXTENSION SERVICE
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STATE COLLEGE STATION
RALEIGH, NORTH CAROLINA

REQUIREMENTS FOR COMPLETING CORN CLUB PROJECT

1. Plant one or more acres of corn with seed from the source and of the variety recommended by the Farm Agent.
2. Select the land, prepare the seedbed, fertilize and cultivate the crop according to the methods recommended by the Extension Service.
3. Select seed in the field for next year's planting.
4. Harvest the crop and determine the yield per acre, the cost per bushel and the profit or loss made on the acre.
5. Select an exhibit of ten ears, and to exhibit, if practical, at either a club, community, county or State Fair.
6. Keep a record of all labor and materials used in carrying out the project and submit it to Farm Agent on the date designated.

Basis for determining winner in 4-H corn contest:

Yield per acre	25 points
Profit above cost of production	25 points
Field selection of seed	15 points
Selection and showing an exhibit	15 points
Record as shown by record book	20 points

Total.....100 points

Corn Club Manual for 4-H Club Members

By L. R. HARRILL, *State Club Leader**

INTRODUCTION

The average yield of corn in North Carolina for 1933 was 18.5 bushels per acre with a total of 2,265,000 acres planted, giving a total yield of 41,903,000 bushels for the State. The average consumption needed in this State is 55,621,000 bushels, leaving a shortage of 13,071,000 bushels. Therefore, there is a great need for an increase in the yield per acre. By increasing the yield per acre from 18.5 bushels per acre to an average yield of 25 bushels per acre there would be no shortage of corn in this State. It is with this in view that corn club work is being sponsored by the 4-H clubs and it is our purpose to increase the yield per acre and at the same time decrease the cost per bushel. This can be done, as has been demonstrated by the corn club boys in the State who have made an average yield of 38.2 bushels per acre for the past eight years. By applying yourself to the task and following the simple instructions in this pamphlet you should be able to make a profitable yield of corn. When in need of information see your County Agricultural Agent or write to the State College of Agriculture.

SELECTION OF THE ACRE

Your first job is the selection of an acre of land, preferably land that has recently produced a heavy crop of clover, cowpeas, alfalfa, soybeans, vetch, or some other legume. A profitable corn crop depends very largely upon the selection of a good fertile, well drained soil. A well drained sandy loam soil is best. It is impossible to determine the wetness or dryness of the season, so you must be the judge as to whether you select upland or bottom land for your corn.

PREPARATION OF THE LAND

The best results may be expected if corn is planted after a heavy legume crop is turned under. For best results, heavy cover crops should be turned in the fall or winter in order to allow ample time for decay before planting time. Land should not be plowed when too wet to pulverize finely. If in doubt, take a handful of soil from the mold board and squeeze into a ball. If it pulverizes when dropped to the ground the soil is not too wet.

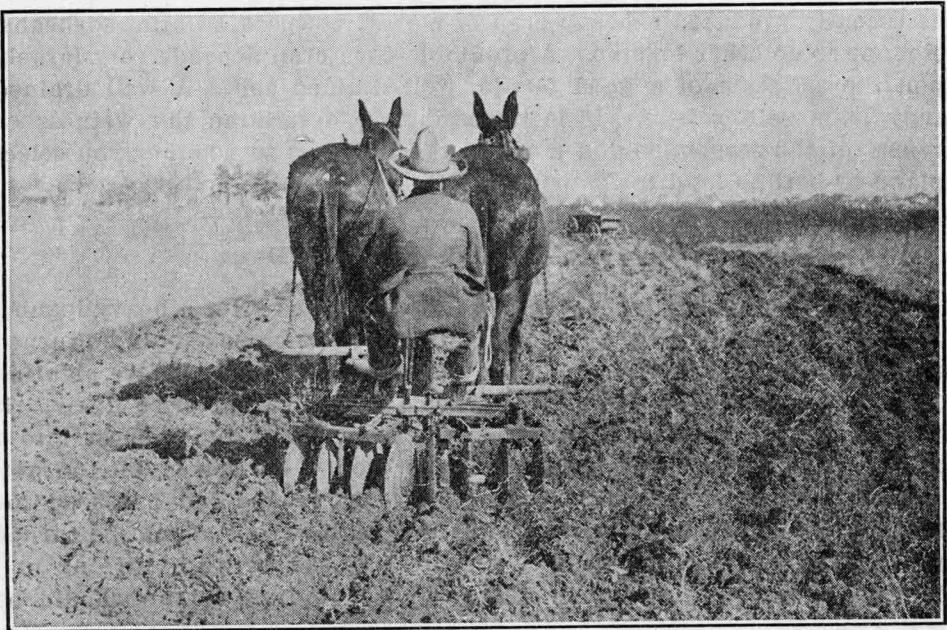
Summer crops should be turned in winter, rough, and prepared for planting in early spring. Early spring and winter crops should be turned after maximum growth and at least three weeks between turning and planting. Following spring breaking, a disc or drag harrow should be

* Recognition and credit is given to Prof. C. B. Williams, J. B. Cotner, P. H. Kime, and H. B. Mann for their assistance in preparing the material for this publication.

used to break any clods and to level the surface. Freezing is the best pulverizer. Therefore, land broken before freezing weather will be in better condition. For such land it may be necessary to cut with a disc harrow before planting.



No. 1—Breaking let the plow go deep. For spring plowing plow close in order to cover all sod.



No. 2—Discing. When there is a heavy cover crop it is advisable to disc before and after plowing in order to cut the vegetation into the soil and to insure a good seed bed.

Take time to prepare a good seed bed for corn; it will pay you. Break the land as soon as the soil is dry enough to crumble. Let the plow go one or two inches deeper than the land has been previously broken, provided this does not make it more than 8-10 inches deep.



No. 3—The cultipacker is a good implement for breaking clods and firming and smoothing the surface and will make planting easier, especially if flat planting is practiced. A drag harrow may be used to good advantage.

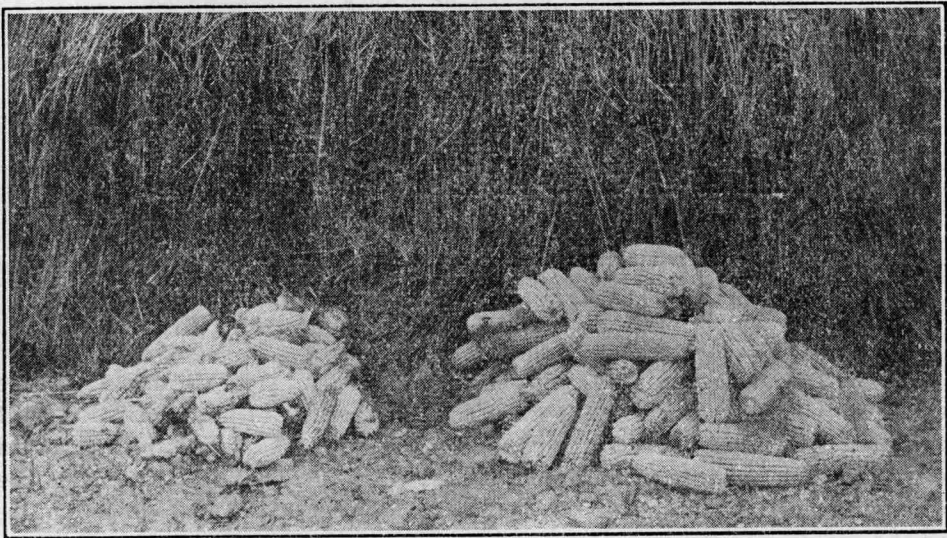
The yield and the ease of cultivation will be largely determined by the seed bed. The best of fertilizers, and the most careful cultivation will give poor results if you do not provide a good seed bed. A growing corn plant requires an enormous amount of water. The larger the yield, the more water will be required. In fact, water is one of the factors determining the yield. By the use of proper cultural methods and proper preparation of the seed bed, this could be governed to a large extent. A deep seed bed will stand drought better, and the corn will not drown out in wet weather as quickly as in a shallow soil. Remember that a good seed bed means easier planting, a better stand, easier cultivation and larger yields.

SELECTION OF SEED

One of the important factors in the production of a good corn crop is good seed; that is, seed of desired type, carefully selected from corn adapted to the locality and stored so that it will remain good until planting time. While good crops are often produced with fairly good seed, when soil and other conditions are favorable, it is always the result that where carefully selected seed is used, increased yields are obtained.

The proper selection of your seed corn will lower your cost of production per bushel and increase your yield per acre. These are two of the important things that you are desirous of accomplishing in your corn club work and since this is true it will pay you to get the best seed available for planting your acre. The proper place to select your seed is in the field. 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 this method of seed selection. In selecting your seed 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. The season of growth lengthens about one day for every twelve miles we go southward and shortens about one day for every twelve miles we go northward.

If it is necessary for you to go outside of your community to get good seed, consult your local leader or your County Agent and secure their assistance in selecting your seed corn.



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No. 4—Results when legume crop was cut and taken from the land. Plat No. 1, with an unbalanced fertilizer, yielded 19 bu. per acre. Plat No. 2, with a balanced fertilizer, yielded 40 bu. per acre.

FERTILIZER

An abundance of stable manure makes an ideal fertilizer for corn. It may be applied broadcast or in the drill. The amount to be used can best be determined by the type of soil. This may be supplemented by commercial fertilizers. If commercial fertilizers are used, the following recommendations by the Agronomy Department of North Carolina State College are advised.

FERTILIZER RECOMMENDATIONS

In Coastal Plain: The following mixture at planting time in the drill containing approximately 4 per cent nitrogen, 8 per cent phosphoric acid, and 4 per cent potash is recommended. Commercial materials may be used or a home made mixture may be made from the following materials:

Superphosphate, 16%	190 pounds
Cottonseed meal, 5.76%, 2.8%, 1.8%.....	56 pounds
Sulphate of ammonia, 20.6%	62 pounds
(or nitrate of soda, 16%—80 lbs.)	
Muriate of potash, 50%.....	30 pounds
Total.....	338 pounds

In this mixture 20 per cent of the nitrogen is derived from cottonseed meal, and the remaining 80% is derived from sulphate of ammonia or nitrate of soda.

A mixture with nitrate of soda may be prepared by using 80 pounds of nitrate of soda instead of 62 pounds of sulphate of ammonia.



No. 5—Results when the legume crop was left on the land. Plat No. 2 yielded 26 bu. per acre with an unbalanced fertilizer and plat No. 1 with a balanced fertilizer yielded 56 bu. per acre.

In Piedmont and Mountains: The following mixture containing 4 per cent nitrogen, 10 per cent phosphoric acid, and 4 per cent potash, is recommended for application in the drill at planting time. Commercial

materials may be used or a home mixture may be made from the following materials:

Superphosphate, 16%	243 pounds
Cottonseed meal, 5.76%, 2.8%, 1.8%	43 pounds
Sulphate of ammonia, 20.6%	66 pounds
(or nitrate of soda, 16%—85 lbs.)	
Muriate of potash, 50%	31 pounds
	<hr/>
Total.....	382 pounds

A mixture with nitrate of soda may be prepared by using 85 pounds of nitrate of soda instead of 66 pounds of sulphate of ammonia.

In this mixture about 15 per cent of the nitrogen is derived from cottonseed meal, the remaining 85 per cent is derived from nitrate of soda or sulphate of ammonia.

Results of experiments over a period of 8 years by the North Carolina Experiment Station on coastal plain soils illustrate the importance of properly balanced fertilizers. Corn following a legume crop from which only the seed has been harvested yielded an average of 56 bushels per acre when fertilized with 600 pounds of 6-6-4 fertilizer. The same soil type under the same conditions and with the same treatment with the exception that 600 pounds of 3-6-4 fertilizer was used yielded an average of only 26 bushels per acre.

The same experiments with the same fertilizer treatment, except that the legume crop was cut and taken from the land, showed that plat No. 1 yield 40 bushels per acre while plat No. 2 yielded only 19 bushels per acre, showing an average increase of 35% to 40% in the yield of corn per acre when the legume crop is left on the land.

PLANTING THE CROP

The method and time of planting will have much to do with the yield, and the ease of cultivation. The best date for planting should be determined by the climatic conditions of the section in which you live. Corn should not be planted until after frost is over. Plant about the usual time used by the best farmers of your locality. If you plant too early you may not get a good stand. As a general rule, corn planted reasonably early gives larger yields.

The rows should be from three and one-half to four feet apart, with the drill spacing or stand of corn to be determined by the moisture content of the soil, fertility and type of corn. Deep or shallow planting must be determined by local conditions. For well drained soils deep planting is recommended. This will facilitate cultivation and help to conserve moisture. For heavy soils shallow or level planting is recommended.

Corn should be planted thick enough in the drill to allow for insect and other damage. In other words, it will be a good plan to plant the corn at least twice as thick as you expect to leave it, then after danger of insect injury is over you can thin to a stand. It is much better to thin than to replant.

CULTIVATION

If a rain comes on the corn before it comes up, a weeder or harrow should be used as soon as the ground is dry enough. This breaks the crust, works some loose dirt in the furrow and prevents the soil from



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No. 6—A comparison of (1) poor and (2) good cultural practices.

baking so that the corn can come up. It will also kill weeds and grass. These tools can be used several times before the corn is large enough to plow. Plowing will be made easier because the corn will not cover up so badly.

The first cultivation may be reasonably deep but should not be deep enough or near enough to disturb the root system of the young corn plants. After the first working, cultivation should be frequent and shallow. Cultivation should be frequent enough to keep down weeds and grass and to provide a fresh mulch at all times. Cultivate after each rain or as soon as the ground is dry enough to do so. Since shallow cultivation is desirable, suitable tools should be available.

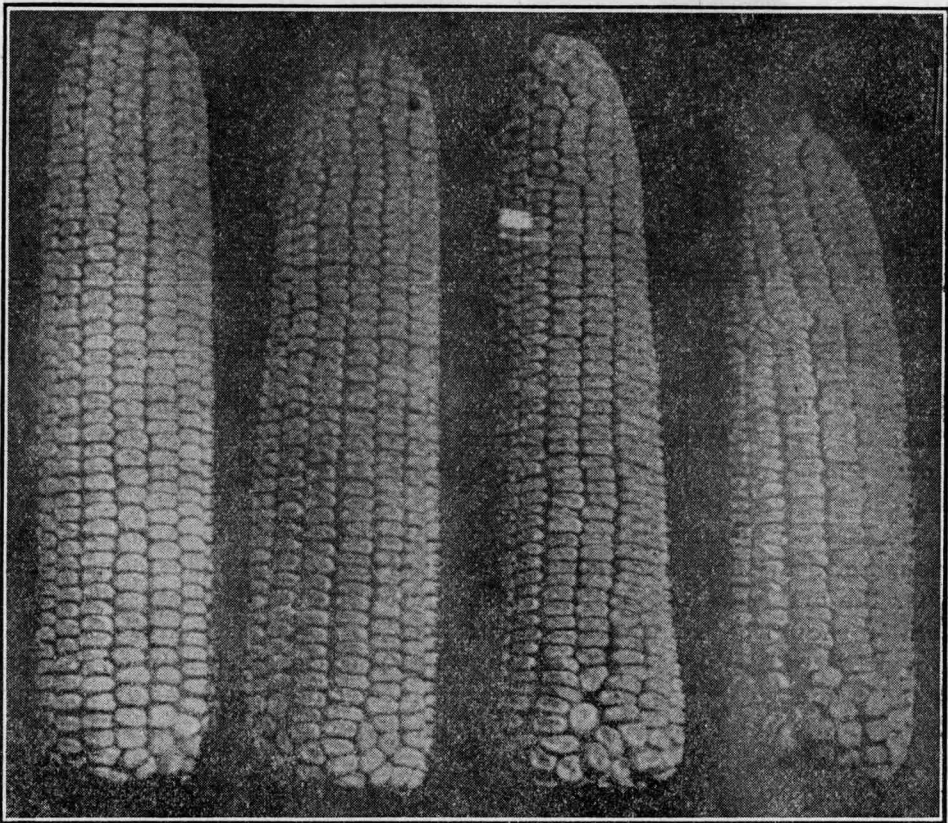
Any good cultivator may be used for this purpose. The hoe should be rather short so as not to plow too deep. A cultivator hoe with a small sweep is good on sandy soil. The larger the corn, the shallower the cultivations should be. After the corn gets about three feet high, cultivations should not be deeper than one or one and a half inches. Do not plow close to the corn after it is larger than this. Late cultivation is good provided it is shallow and does not injure the plant or the root system. Cultivation may be kept up until the corn starts to silk provided it can be done without injury to the corn. Late cultivations help to conserve the moisture in the soil and this is one of the prime factors in making a good crop. Late cultivations are not recommended in wet seasons, except such as are necessary to keep down grass and weeds.

For further information consult your Farm Agent.

SELECTING AN EXHIBIT FOR THE CORN SHOW

There are several factors to be considered in selecting an exhibit of corn. Frequently corn selected for exhibition does not have the best production and germination records. Because of this, it becomes necessary to select show corn by visible characters, which because of past experiences have been associated with yield or quality.

The important characters to be considered in the selection of an exhibit are: (1) Maturity and seed condition, (2) Purity, (3) Trueness of type, (4) Uniformity, and (5) General appearance. The following summary of State and National standards is given for your information:



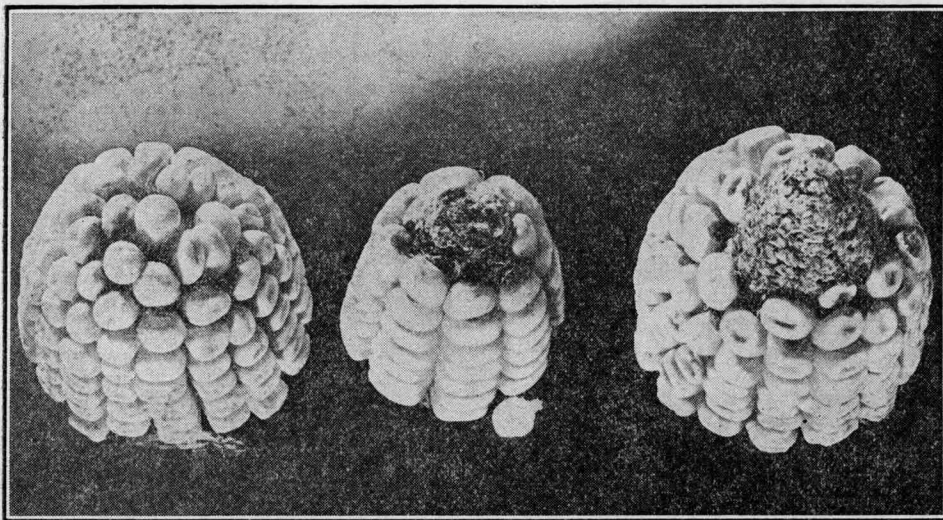
No. 7—A study of good and poor type ears.

I. MATURITY AND SEED CONDITION:

1. **Color or luster:** Discoloration usually indicates injured germination, from weather damage or improper storage. Discoloration on tip or back of kernel indicates a wet soggy ear and slow curing. Bright kernels indicate proper maturity and good vigor.
2. **Condition of germ:** A good germ should be oily, gray-white color, wax-like in texture, with little or no air space above the plumule.

Poor germs are most commonly indicated by dark color or dry sunken appearance. Large oily germs indicate strong vigorous seed.

3. **Plumpness of kernels:** A pointed shriveled grain at the tip is likely to indicate poor germination and lack of maturity. A kernel pinched at the crown may indicate lack of adaptation or lack of maturity due to early frost.
4. **Starchiness:** Starchy corn is associated with late maturity and chaffy ears. Select the most flinty types of dent corn.
5. **Blisters:** Are caused by too rapid drying of immature ears or the freezing of green corn, either cause leaves a raised hull, which is spoken of as blistered kernels. Blisters indicate injury to the germ, the extent of which can only be determined by test. (Look for blisters.)
6. **Color and size of shank:** A large heavy shank makes corn difficult to husk. It is generally associated with a large wet, cob that dries slowly. A small shank breaks easily and often indicates lack of constitution. Shanks should be one-half to three-fourths the size of the cob. The shank should be bright and free from disease and discoloration.



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No. 8—Well-filled tips are an indication of maturity. No. 1 is ideal. Nos. 2 and 3 are poor. For seed and exhibition purposes select ears that are well filled at tips.

7. **Cob-chaff adhering and tip-caps breaking out:** Cob-chaff adhering to the tip cap indicates lack of maturity and therefore affects the seed condition. Tip-caps that break deep may indicate dead or damaged kernels.
8. **Firmness of ear:** When the ears can be twisted easily or when the kernels are loose on the cob, the ear lacks maturity. (Look for firm ears.)

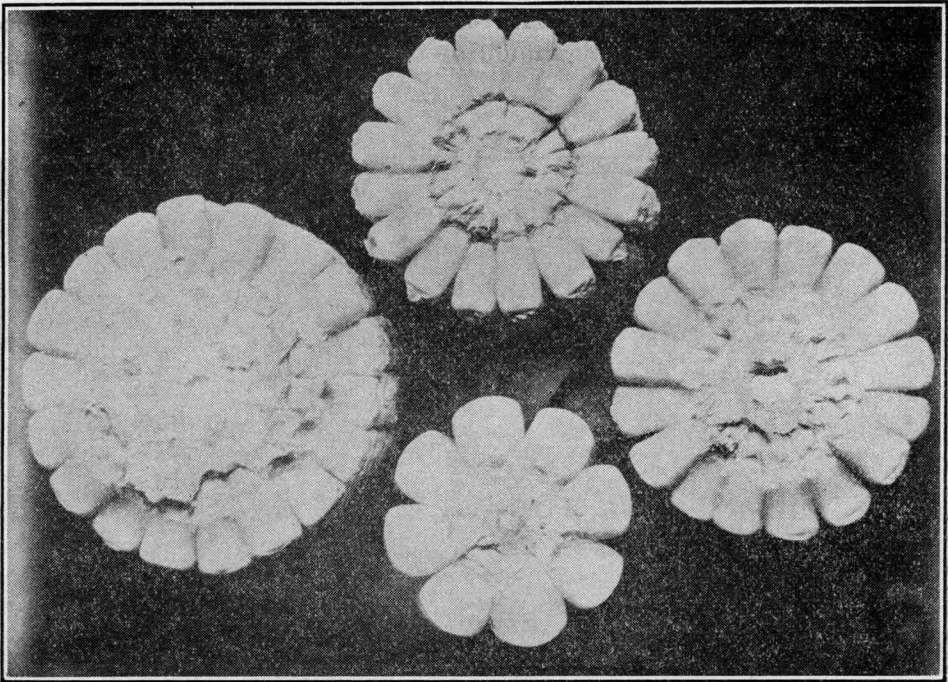
9. **Damage:** Damage may be insect damage or mechanical damage. Weevil damaged corn injures the seed condition and lowers its value. Mechanical damage may permit disease germs to enter and lowers the attractiveness of the sample.
10. **Disease:** Any indication of disease lowers the seed value and especially if the disease is carried by the seed.

II. PURITY:

Mixed corn is undesirable. Mixtures are determined by different colored kernels or different colored cobs. More corn is eliminated from exhibits because of mixture than any other single factor.

III. TRUENESS TO TYPE:

Indicates careful breeding. The shape of the ear, shape of kernel, color of grain, color of cob and arrangement of rows should be typical for the variety being exhibited.



No. 9—Cross section of ears showing size of cob and depth of grain.

IV. UNIFORMITY:

Indicates careful selection. The size and shape of all kernels of each ear and of all kernels on all the ears in a sample should conform to the **variety type**. The length and circumference of all ears should be uniform.

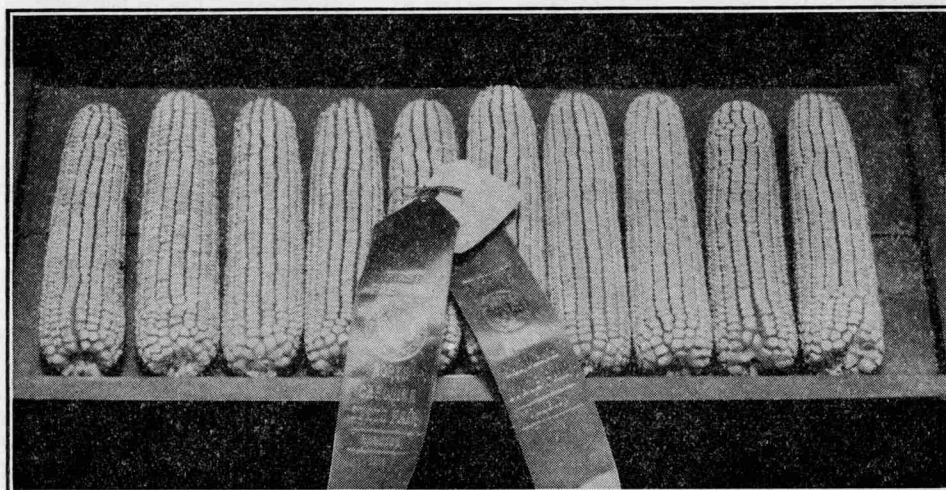
V. GENERAL APPEARANCE:

Well proportioned ears show strength, vigor and type. Well filled butts indicate perfect pollination. Well filled tips indicate adapta-

tion. Depth of kernel indicates shelling percentage, but is also associated with late maturity. Straight rows make a better appearance. The size of the ear should conform to the requirements of the variety.

SELECTING THE EXHIBIT

If the selection is to be made from the field, take a cotton picking bag and select a number of ears of the desired type. It will require time and patience and possibly several hundred ears of corn, but you will find it interesting. Keep in mind the desired type as you make selections of corn from the field. After you have made your field selection, place the ears on a table where you can look at it, arranging it as you would for an exhibit. Now select an ideal ear; that is, one true to type, free from disease, well matured, and one that is well filled at butts and tips. Select an ear of the desired size. If your corn is of the single-ear variety, you will want to select a fairly large ear, while for prolific varieties medium sized ears are desirable. Select an ear that is cylindrical in shape; that is, an ear of uniform size from butt to tip. Select an ear with straight rows of grain. Now that you have your desired type, select ten ears as near like this sample as possible. It is a good plan to send two or three extra ears in case of injury or damage. (The Superintendent of the department will select the best ten).



No. 10—Winner of the Sweepstakes award in the 4-H Corn Show at the 1934 North Carolina State Fair

TREATMENT OF EXHIBIT

If your corn is immature (or loose on the cob) it may be improved by storing in a hot dry room or by drying in the oven of the stove. In the latter case great care must be taken not to overheat the corn. (Corn so treated is not recommended for seed purposes.) Do not pack corn for exhibition until the day of shipment.

PREPARATION FOR SHIPMENT

Wrap each ear separately in paper then pack the twelve ears in a box. Write your name and address and the name of the corn and how you wish it entered, place this in the top of the box with the corn. Write the name of the person to whom it is to be shipped, and ship as instructed.

FIELD SELECTION OF SEED CORN

The yield of corn and the type of corn grown on your club acre next year will be determined to a large extent by the care exercised in selecting seed for planting. Experience of a period of years has proved that best results are obtained from field selected seed. That is, seed selected in the field before the corn is harvested. By this method one is able to observe the physical characters of the corn as well as that of the stalk and these are very important. The size of the stalk, its height, freeness from disease, the distance apart the stalks grow, the number of ears on the stalk, the position of the ear on the stalk, and the length of the shank. These are most important in the selection of good seed corn because these characters are inherent. What you want is a good ear of corn from a good stalk.



No. 11—Field Selection of Seed.

Some of the requirements for good seed corn are:

1. The variety must be well adapted to the local climatic and soil conditions.

2. The variety or strain must produce high yields of good quality corn.
3. The seed must be saved from healthy, vigorous, high yielding plants typical of the variety.
4. The seed must be well matured and should when harvested be properly stored and protected from insects.
5. The seed must germinate well.

WHAT IS A GOOD EAR OF CORN

A good ear of corn is one that is true to type, free from disease, well matured and one that will germinate well. For more complete details study carefully the chapter on selecting an exhibit. These rules apply to selection of good seed corn.

Points to consider in Field Selection of Seed Corn:

1. Select ears from typical stalks having two good ears if it is a prolific variety. Both ears may be saved. One will produce as well as the other.
2. Select sound ears from healthy stalks. A medium large stalk, erect and rigid at harvest time indicates vigor and freedom from disease. A broken stalk indicates weakness or disease. A hollow cob or a pinkish color of the pith also indicates disease and should not be saved.
3. Select firm, well matured ears having plump, bright kernels.
4. Select ears which grow at a medium height from the ground.
5. The tips should be well filled out and be covered with shuck to keep out the weevil. Smut is less prevalent where the tips are well covered.
6. The shank should be long enough to allow the ear to turn down when it begins to mature. An ear which points upward when mature will weather damage badly. An extra long shank is objectionable.
7. Other desirable ear and grain characteristics are given in instructions on selecting corn for an exhibit.

The type of stalk has much to do with the type of ear. Your seed ears should be selected from stalks of medium height, vigorous growth and free from disease. Select the corn which is growing a medium height from the ground. Ears with medium length shanks should be selected. Always select the ears with a good covering of shucks.

Weather conditions, soil, fertility and climatic conditions will have much to do with the character of the stalk but even then there will be a noted difference. Keep in mind that the ears selected will produce both ears and stalks similar to the ones selected. Therefore, the time spent in selecting seed for next year's planting is spent very profitably.

If you are selecting a prolific variety of corn always select the ears from stalks growing two or more good ears. Avoid selecting seed ears from

stalks growing near skips or where due to some other unnatural cause the stalks appear to be superior to the others. A poorer ear might do better with similar treatment.

STORING

After you have selected your seed corn your next job is to store it for next year's planting. The seed corn should be stored in a cool dry place protected from mice and other rodents. To protect it from weevil the corn should be treated with carbon-disulphide by storing the corn in a barrel or air-tight box and placing a small container of carbon-disulphide on top of the corn and then fasten the top on the box or barrel. Corn so treated should not be used for feed or food. (For detailed instructions consult your county agent.)

A pound of naphthaline or moth balls stored with each bushel of seed ears will protect it from weevil and will do it no injury. Boxes or crates completely covered with fly screening or woven wire will give protection from mice and rats.

HARVESTING

The date and method of harvesting is a matter for you to decide. There are still a few farmers in this State who practice topping and pulling fodder. This is a poor practice. To do so will lower the yield of corn and rob the soil of organic matter which will be needed for the next crop. Then, too, the time required for harvesting such roughage if spent in making a legume hay crop will produce more feed of a better quality and at the same time improve the soil, provided some of the crop is plowed into the soil. The actual method for harvesting of the corn must be determined by the available equipment. On some farms the corn is cut, shocked and later shredded. On others the ears are pulled and hauled to the barn. Circumstances will alter cases. However, these two points should be kept in mind. First, do not harvest the corn until it is mature and dry. Second, harvest it with the least amount of labor. Keep the corn from your acre separated from other corn produced on the farm until your yield has been determined and certified to as specified in your record book.

After your corn has been pulled and hauled to the barn, invite the members of your club and their friends to a corn-husking to shuck out your corn. Make a party out of what might otherwise be a big job.

DETERMINING THE YIELD

A record to be of any value must be honest and accurately determined according to standard methods of measurement. **The standard of measurement for determining corn club yields will be by weight.** An old proverb says: "It is better to die with honor than to live without it." Another way of saying, "It is better to lose fairly than to win dishonestly."

A plat of ground measuring 43,560 square feet makes an acre (208 7/10 feet by 208 7/10 feet). A bushel of shelled corn weighs 56 pounds and a bushel of corn on the cob (shucked) weighs 68 pounds provided the corn is

dry and mature. Immature corn or corn full of water will weigh heavy and yield measurements of corn in this condition will not be a true measurement.

The best way to determine the accurate yield of your acre of corn is to harvest the crop, shuck it out and then weigh the entire yield grown on the acre. (To this should be added the weight of any corn harvested from the field for seed or other purposes). Now weigh out 100 pounds of ear corn, shell and weigh the shelled corn to determine the number of bushels of shelled corn for each 100 pounds of corn on the cob. Arriving at this figure multiply the total weight of ear corn by this figure and divide by 100 and you will have the number of bushels of corn grown on the acre.

For example: We have a total of 7980 pounds of ear corn after it is shucked out. We weigh out 100 pounds and shell it and find that we have 80 pounds of shelled corn for each 100 pounds of ear corn. One bushel of shelled corn weighs 56 pounds therefore we have

$$\begin{array}{r} 7980 \quad 80 \\ \text{--- X ---} \text{ or } 638400 \div 5600 \text{ or } 114 \text{ bushels.} \\ 100 \quad 56 \end{array}$$

KEEPING RECORDS

The record kept of this project, if accurate, will be of great value, and the project is not complete without it. A 4-H crop record book will be furnished for this purpose. A record of every activity in connection with the growing of the acre of corn should be entered in this record book. The number of hours required for preparing the land for planting, the time required for planting, cultivating, harvesting and any other work done in connection with the project. A record of the club members time as well as a record of hired help and the number of hours the team or tractor was used. Keep the record up to date at all times.

THE CLUB PLEDGE

I Pledge:

My Head to clearer thinking,

My Heart to greater loyalty,

My Hands to larger service, and

My Health to better living for

My Club, my Community, and my Country.

THE CLUB MOTTO

"TO MAKE THE BEST BETTER"