

South Dakota State University
**Open PRAIRIE: Open Public Research Access Institutional
Repository and Information Exchange**

Extension Circulars

SDSU Extension

4-1923

Cultivating the Corn Crop

Ralph E. Johnston

George H. Valentine

Follow this and additional works at: http://openprairie.sdstate.edu/extension_circ

 Part of the [Agriculture Commons](#)

Recommended Citation

Johnston, Ralph E. and Valentine, George H., "Cultivating the Corn Crop" (1923). *Extension Circulars*. Paper 128.
http://openprairie.sdstate.edu/extension_circ/128

This Circular is brought to you for free and open access by the SDSU Extension at Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in Extension Circulars by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact michael.biondo@sdstate.edu.

CULTIVATING THE CORN CROP

by

Ralph E. Johnston
and
Geo. H. Valentine
Extension Agronomists

A. TYPES OF CORN CULTIVATORS:

Cultivators are of three kinds. Shovel cultivators are most common and are best for general purpose machines. The cultivators having wide blades are often known as surface cultivators and are excellent for the last two cultivations. Disk cultivators are good to assist in the eradication of quack grass, morning glories or other weeds that would catch on the shovels and be carried about over the field and take root wherever they fall.

A cultivator which will give a great deal of service for all conditions would probably be the shovel type with disk and surface attachments. With this sort of an implement it is possible to change quickly to the different types. The use of this combination is not at all common, probably because of the fact that such combinations are not widely advertised. Furthermore, it is some little work to add these attachments and get them properly adjusted. Too often South Dakota

corn growers fail to recognize that there should be a difference of cultivation at different times during the season and according to variable conditions of soils and condition of field.

B. REASONS FOR CULTIVATING:

The main benefit derived from cultivation is that of killing weeds. Other benefits are the conservation of moisture, the aeration of the soil and the making of plant food available.

Killing Weeds. Weeds always reduce the yield of corn. It is impossible to grow a crop of weeds and a crop of corn on the same ground at the same time. A large part of killing weeds may be accomplished before the planting is done. This is accomplished by thorough preparation of the ground and by frequent harrowing before planting. The type of cultivator that will get certain kinds of weeds will not be so effective in the destruction of all kinds of weeds. For instance morning glory or bindweed cannot be cleaned out of a corn field with the shovel type of cultivator. The knife or sweep type cultivator is the best to use in a case of this kind, if blades are sharp enough to cut off the roots and not drag the plants. The disk type may also be used but is not as effective as the sweep or knife-blade type in good working order.

"Weeds are much better foragers than most cultivated crops; and it would be just as reasonable to expect a lamb to thrive among a bunch of hogs as to expect corn to compete with weeds". Illinois Bul. #181.

Experiments conducted at Illinois Experiment Stations are very interesting as regards the effect of weeds upon the growing of corn. With the same preparation of seed bed, corn produced as an eight year average, 7.3 bushels per acre where the weeds were allowed to grow, and 45.9 bushels per acre where the weeds were kept down without any cultivation of the soil. The relative comparison is graphically represented below.

EXPERIMENTS DETERMINING EFFECT OF WEEDS UPON CORN YIELDS.
AVERAGE OF EIGHT YEARS.

45.9 bu.
(Where weeds were kept down.)

7.3 bu. |
(Where weeds were allowed to grow.)

Weeds deprive the plant of moisture, light, and food, all of which are absolutely necessary for the production of crops. Of these factors, however, the one that has made the greatest difference is that of plant food. At Illinois Experiment Station corn has been grown together with weeds, but irrigated so that it was not deprived of moisture, yet the increase from irrigating, as a four year average, was only 3.8 bushels per acre.

Conserving Moisture. Cultivation affects the moisture supply in two ways, namely: in preventing evaporation and in reducing surface run off. The reduction of surface run off is accomplished by cultivation, because it keeps the surface soil loose and porous, permitting water from heavy rains to pass readily into the soil. This is perhaps of greatest importance in regions where very heavy dashing rains occur and on sloping land.

Cultivation Prevents Evaporation by keeping an earth mulch on the surface, which prevents the moisture in the soil from reaching the surface and being carried away in the form of vapor by the wind. The corn field is in reality a bare field during the months of April, May and June. Evaporation takes place most rapidly in a bare, wind-swept field. In a corn field where the plants are tall and leafy they protect the soil from the wind and sun, thus reducing the water lost by evaporation. If two open pans of equal area are filled with water, one placed in the center of a field of rank growing corn in late July or August and the other exposed at the edge of the field or in an adjacent open area, it will be seen that the water escapes from the pan in the corn field much more slowly than from the one exposed in the open area. This would indicate that early cultivation of corn is of greater service in conserving moisture than late cultivation.

Aerating the Soil. That air is necessary for the growth and proper development of the corn roots is well known. Cultivation permits the air to penetrate readily and at the same time it kills weeds, saves moisture and keeps the surface soil loose and open. Cultivation, as a factor in aerating the soil is of greater importance on hard, clay soils in humid regions. It is perhaps of little value for this purpose on loose, sandy soils, especially in dry regions.

Increasing Available Plant Food. This factor is closely related to that of soil aeration because air is beneficial to the formation of proper plant food in the soil.

Certain chemical changes are continually being made and the presence of sufficient air aids in these changes making more plant food available. This is rather a minor point for consideration except in heavy clay soils.

C. THE PROPER DEPTH TO CULTIVATE.

"A great difference of opinion prevails among farmers as to the proper depth to run the shovels of the cultivator. Some insist that deep cultivation is more desirable than shallow tillage. Some light is thrown on this point by experiments in root pruning by running a knife around the corn plants at different depths. At the Illinois Station the running of a knife around the hills, 6 inches from the plants and 4 inches deep three or four times during the growing season decreased the yield about 20% as an average of five year tests. At the New York Station the same sort of an experiment, in which the knife was 4 inches from the hill and at a depth of 3 inches, resulted in a decrease of 28 percent in the yield of grain and 20 percent in the yield of stover.

"Sixteen experiment stations have compared deep and shallow cultivation of corn. The average results for the sixteen experiments show a yield of 65 bushels per acre for deep cultivation as compared with 75 bushels for shallow cultivation. In these experiments, deep cultivation before the plants were 6 inches high did not injure the crop, neither did it benefit it. At the Ohio Station deep and shallow cultivation were compared for a period of nine years. The deep cultivation was done with a double-shovel plow run at a depth of 4 inches and the shallow cultivation with with a springtooth cultivator run at a depth of $1\frac{1}{2}$ inches. The average yields for the 9 years were 56.4 bushels for deep and 60.4 bushels for shallow cultivation.

"It would seem from these experiments that there is little to be gained but much to be lost by deep cultivation. However, there are conditions under which deep cultivation may be desirable. If the seedbed was not well prepared before planting, making necessary the completion of this work by cultivation, deep plowing may be best. Also, if large annual weeds have got a start it may be necessary to cultivate deeply in order to uproot them. If, however, the seed bed has been well prepared, small weeds only are present and

the earth mulch is to be established, shallow cultivation is best. Deep cultivation is more wasteful of water than shallow plowing, because deeply run shovels bring to the surface much moist soil, the water from which is soon carried away by the wind. The earth mulch need not be over 2 inches deep to prevent water from the sub-soil reaching the surface."

From "Corn Culture" by George Livingston.

D. HOW OFTEN TO CULTIVATE:

Cultivation should be frequent enough during the early part of the season to keep an earth mulch on the surface and to destroy the weeds. No exact number of cultivations can be given for all conditions. In a wet year it will be necessary to cultivate more often than during a dry year. The main functions of cultivation should always be kept in mind - to kill weeds and conserve moisture - and then the operations should be governed to accomplish these purposes. Nothing is to be gained in cultivating when there are no weeds and when the surface soil is loose and open even though it has been some time since the last cultivation.

-----oOo-----

REFERENCES:

"Corn Cultivation in South Dakota", Bulletin No. 181,
Agricultural Experiment Station, Brookings, S. D.

"Corn Culture" by George Livingston.

"Corn Cultivation" Farmers' Bulletin No. 414, U. S. Department
of Agriculture.

"Soil Moisture and Tillage for Corn", Univ. of Illinois,
Agricultural Experiment Station, Bulletin No. 181.