

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

---

Bulletins

South Dakota State University Agricultural  
Experiment Station

---

2-1895

## Squashes

L.C. Corbett

*South Dakota Agricultural College*

Follow this and additional works at: [http://openprairie.sdstate.edu/agexperimentsta\\_bulletins](http://openprairie.sdstate.edu/agexperimentsta_bulletins)

---

### Recommended Citation

Corbett, L.C., "Squashes" (1895). *Bulletins*. Paper 42.  
[http://openprairie.sdstate.edu/agexperimentsta\\_bulletins/42](http://openprairie.sdstate.edu/agexperimentsta_bulletins/42)

This Bulletin is brought to you for free and open access by the South Dakota State University Agricultural Experiment Station at Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in Bulletins 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](mailto:michael.biondo@sdstate.edu).

*SOUTH DAKOTA*  
*AGRICLUTURAL COLLEGE*  
AND  
Experiment Station,

BROOKINGS, S. D.

---

BULLETIN NO. 42.

---

FEBRUARY, 1895.

---

DEPARTMENT OF HORTICULTURE AND FORESTRY.

---

SQUASHES.

---

PRINTED BY ORDER OF COUNCIL.

## GOVERNING BOARDS.

### REGENTS OF EDUCATION.

HON. JUNIUS W. SHANNON, President.....	Huron
HON. FLORENZO G. HALE, Secretary and Treasurer.....	Scotland
HON. ABEL B. SMEDLEY.....	Milbank
REV. WALTER S. PETERSON.....	Rapid City
REV. W. H. JORDAN.....	Sioux Falls
HON. LYMAN T. BOUCHER.....	Eureka
HON. FRANK D. ADAMS.....	Groton
HON. N. W. EGLESTON.....	Chamberlain
HON. G. J. COLLER.....	Brookings

### AGRICULTURAL COLLEGE COMMITTEE.

SMEDLEY, Chairman; EGLESTON, COLLER, ADAMS and BOUCHER.

### BOARD OF TRUSTEES.

HON. E. T. SHELDON, President.....	St. Lawrence
HON. J. G. CARTER.....	Aberdeen
HON. JOHN GIESE.....	Watertown
HON. LARS K. LARSON.....	Dell Rapids
HON. O. T. GRATTAN.....	Elkton

### STATION COUNCIL.

JAS. H. SHEPARD.....	Director
L. C. CORBETT.....	Secretary and Vice-Director
HON. G. J. COLLER.....	Regent Member
HON. O. T. GRATTAN.....	Trustee Member
LEWIS MCLOUTH.....	President College
E. C. CHILCOTT.....	Agriculturist
L. C. CORBETT.....	Horticulturist
JAS. H. SHEPARD.....	Chemist
THOS. A. WILLIAMS.....	Botanist and Entomologist
H. N. OTT.....	Animal Pathology
A. H. WHEATON.....	Dairyman
D. A. CORMACK.....	Veterinarian
ED. F. HEWIT.....	Accountant

### ASSISTANTS.

JOHN M. PARKINSON.....	Librarian
HUBERT B. MATHEWS.....	Assistant Chemist
F. K. LUKE.....	Assistant Horticulturist
A. W. WILLIAMS.....	Farm Foreman

The Bulletins of this Station will be sent free to all citizens of this State who will apply for them.

All letters and other mail matter for the Station should be addressed to the Experiment Station.

# Squashes.

L. C. CORBETT.

From those who have attempted growing either pumpkins or squashes, in the more newly settled portions of our State, there comes almost universal complaint; that the vines, while making a satisfactory growth, do not set fruit. There is an abundant production of flowers but an almost complete failure of fruit.

This question was so constantly met with, that during the past two seasons a series of observations were made upon plants of this class with a view of determining, if possible, the cause of the failure as well as a more or less complete remedy for it.

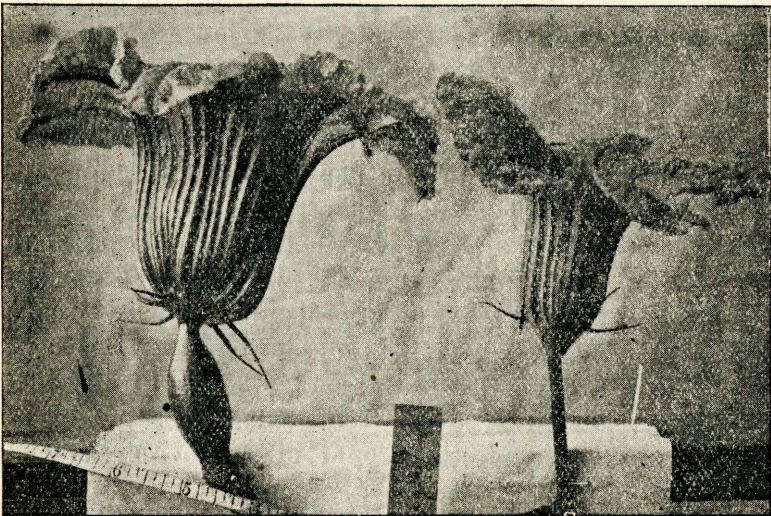
A very little observation revealed the cause of the failure to be a lack of proper pollination, due to an absence of insects capable of transferring the pollen of the male or staminate flowers to the female or pistillate flowers. In the pumpkins and, so called, winter squashes the pistillates are at considerable distance, five to twenty feet often, from the pollen bearing flowers. In this case the wind, which is usually an active agent in the dispersing of pollen, plays no part, or if any it is too insignificant to be taken into account in commercial squash growing.

Since squashes fail to set fruit when the larger and more active pollen gathering insects, such as Honey Bees and Bumble Bees, are absent, the question arises, can the

operation of pollination be performed easily and cheaply enough to warrant planting this staple garden crop either in the home or commercial garden. Judging from the experience at the Station it is safe to say a remunerative crop can be had.

As has already been suggested squashes are what the botanists call monœcious plants, *i. e.*, plants having the stamens and pistils in distinct flowers, but growing upon the same plant. The two forms of flowers are shown in the accompanying photograph.

The flower at the right being the staminate or male flower which is easily recognized by the absence of the embryo squash at its base, as well as by the simple plume of stamens bearing the rich yellow pollen within. The one at the left in the cut represents the pistillate or female flower with the ovary or embryonic squash clearly shown below the calyx and corolla. This character is



PISILLATE.

STAMINATE.

TYPICAL SQUASH FLOWERS—SHOWING THE TWO FORMS.

sufficient to distinguish the female flower. Since the pollen must be carried from the staminate to the pistillate flower in order to insure fruit production, the importance of the large pollen bearing insects becomes apparent. But these insects being absent, artificial pollination must take their place, and as it happens, this class of plants are easily and successfully operated upon.

### POLLINATION.

After a slight acquaintance with the flowers of the squash one will become able to determine, as early as the evening before, the flowers that will open the next morning. As soon as the pistillate flowers begin to open the patch should be gone over each evening and the location of these flowers marked by setting a small stick in the ground, or by any other convenient device that may suggest itself. Attention to this apparently insignificant detail will greatly facilitate the work of pollination to be done next morning. Early in the morning pollination should begin; this consists in cutting off one of the *staminate* flowers and rolling back or tearing off the yellow vase-shaped floral envelope (the corolla) thus leaving the pollen-tipped pencil of stamens exposed. Touch this pencil of stamens upon the stigma or fleshy growths found in the pistillate flower, the stigma will be found in a position corresponding in *it* to the position of the stamens in the male flower. One staminate flower will serve to fertilize from two to five pistillate ones according to the degree of economy used by the operator.

### EXPERIMENTS.

To determine the efficiency of artificial pollination the following line of work was carried out:

Each evening during the fruiting season the pistillate flowers that would probably open the next morning were carefully covered with manilla bags and marked in the

manner above described; next day these flowers were examined and if in suitable condition they were fertilized and again covered with the manilla bags. This was necessary to insure accuracy in results, which might otherwise have been modified by the flower, which was hand pollinated, being again pollinated by a chance visitor in the shape of a bee or other insect. Proceeding in this careful manner, which is unnecessary in commercial practice, *sixty-two (62) per cent.* of the flowers treated returned mature fruits of value.

It was suggested that the wind might be a more or less potent factor in fertilizing this class of plants, accordingly netting bags large enough to allow the flowers to come to perfect development were placed over the partially matured pistillate flower buds. This arrangement allowed a free circulation of air and at the same time excluded all insects, with the result that *every* flower so treated became abortive.

Since there are no perfect flowers on this class of plants the possibility of self fertilization is excluded. It remains, therefore, that under ordinary circumstances at least sixty per cent. of the flowers hand pollinated will produce fruits, provided the pollen be taken from plants of the same species. It is probably best to confine the work to a single variety rather than to attempt the use of foreign pollen.

In this connection it may be proper to remark, that in the work of cross-fertilization it not unfrequently happens that the fruits develop in an apparently normal manner, the influence of the foreign pollen being sufficient to stimulate the development of the fleshy portion of the squash without a corresponding production of perfect seeds. In a large proportion of cases, however, there will be a total failure of fruit production.

## SEED PLANTING.

In the loose and often shifting soil of the prairie the same rules for planting garden seeds as those laid down for eastern planters do not hold. In general these recommendations if followed would leave the seeds too near the surface, thus exposing them to the action of sun and wind. The surface soil for the first inch in depth often becomes extremely dry even during the most favorable part of the growing season, and seeds planted near the surface are retarded in germinating or lost altogether. For this reason a series of observations upon the results of various depths of planting the seeds of squashes were carried out.

## DEPTH OF SEED PLANTING.

For this work commercial seed of the Hubbard variety was selected. The planting was all done on May 16th in a very uniform and level piece of prairie soil that had been used for garden purposes for several years, and which received a heavy dressing of well decomposed stable manure which was plowed in late the previous fall. The planting was done as follows:

Garden No.	109	five hills	planted	1 inch	deep.
"	"	110	"	"	" 2 inches deep.
"	"	111	"	"	" 3 " "
"	"	112	"	"	" 4 " "
"	"	113	"	"	" 5 " "

The hills for the reception of the seeds were all below the general level of the surrounding soil, and were made by removing the surface soil to the required depth, leaving the soil compact and level in the bottom of the hill. In general the hills thus made were about one foot square. The seeds were then planted in the firm moist soil by pressing them, sharp end down, with the thumb and finger until they were buried their entire length in the



moist soil. The loose soil, which had been removed in preparing the hill, was then replaced and lightly pressed down with the back of the hoe.

After coming up all were given clean culture with the horse hoe until the vines became too large to allow further cultivation, after which all weeds were hand pulled.

TABLE OF RESULTS.

Garden No.	Time of Planting.	Depth of Planting.	When young plants appeared	When all were up.	Height in inches June 18.	No. Hills planted.	No. hills that grew.	No. fruits produced.
109	May 16	1 inch	May 31	June 3	3	5	5	1
110	" 16	2 "	" 31	May 31	6	5	5	2
111	" 16	3 "	" 30	June 4	5½	5	5	2
112	" 16	4 "	June 2	.....	3	5	4	2
113	" 16	5 "	" 11	.....	2½	5	2	2

\*One hill only up June 18.

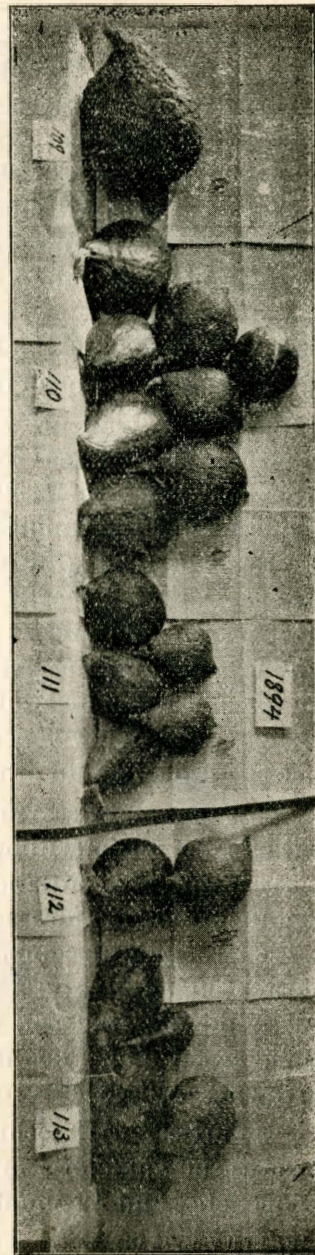
From the accompanying table the rate of germination will be noted, and with the single exception of those planted three inches deep there is a regular gradation in the period of time corresponding to the depth of planting. As the depth increased the time of germination also increased. These results correspond in general with results obtained in work of like character upon wheat at the Cornell University station. Taking into consideration, in this connection, the number of hills that came up in each set, it will be noted that at any depth exceeding three inches as the depth increased the number of hills to germinate decreased. The same rule does not hold in the case of the number of fruits produced, for it is shown both in the photograph and in the table of results that those planted one inch in depth were less profitable than those planted

two inches deep, and that these in turn were better than any planted more deeply. It may therefore be inferred, that for a dry season such as '94, that two inches is the most profitable depth at which to plant squashes. The deeper plantings being less satisfactory.

#### CULTURAL SUGGESTIONS.

**TIME TO PLANT SEED.**—In the cultivation of squashes, either commercial or otherwise, a great measure of one's success depends upon a knowledge of climatic conditions by which the most propitious season for planting the seed may be chosen. With us in South Dakota from the fifth to the fifteenth of May is usually a safe period. At this time the soil has become sufficiently warmed to insure rapid germination of the seed, the danger from spring frosts is past, and when the young plants come up they find the conditions most conducive to rapid growth.

CHARACTER OF THE PRODUCT OF THE TEST OF SEED PLANTING.



DISTANCE TO PLANT.—All the late varieties of squashes, on account of the vine-like habit of growth require considerable room for their development. Practice has proven that eight feet is not too much distance to allow between contiguous hills. For the “bush squashes” which never produce runners of any considerable length a less distance is admissible but not advised unless in the home garden which must necessarily be limited, as in the case of a town lot. The greater distance will greatly facilitate cultivation which for economy is to be done with horse power in the farm or market garden.

SEED.—If home grown seed is to be used care should be exercised to select from the most typical fruits, and those grown by themselves, viz., not in the same patch with others of the same species. Summer squashes, *Pepo* varieties, may be grown together with the *Maxima* or *Moschata* varieties, the so called “winter squashes,” without fear of admixture. Plant as above described in hills two inches below the general surface of the soil. Place five to eight seeds in a hill, after all are up and the first true leaves have developed, select four of the best plants to stand, removing all others.

SOIL for squashes should be well subdued and as rich as it can be made without rendering it too light and dry. Select as moist a situation as is available. Unless you irrigate do not manure squashes in the hill with even the most thoroughly decomposed stable manure, as it makes the soil too porous and if at all strawy it acts as a leach thus rendering the soil dry instead of moist. Manure should either be worked into the soil by top-dressing and harrowing or used as a mulch about the plants in the hill.

An article in a recent issue of the *Dakota Farmer*\* emphasizes the value of a mulch for plants, such as squashes, melons, etc., and recommends the following plan :

\*Fruitful Vines in Dry Seasons—E. C. Kittinger, in issue of Dec. 15, 1894.

Take stones as large as can be handled conveniently and lay them in a circle of two or three feet inside diameter, filling up the center with stable manure. In the ground outside of the stones, but close up where they lap together, plant the seeds of the squashes, cucumbers or melons as desired. After the seeds are planted and occasionally throughout the summer, pour a few pails of water upon the mound, this watering serves a double purpose of irrigating and at the same time fertilizing the plants.

One of the advantages of the plan is that the stones can be arranged and the manure filled in during the leisure of the winter. It is claimed that this method gives very satisfactory results, particularly upon naturally high and dry ground. It, at least, is worthy of a careful trial.

CULTIVATION must be thorough from the time the plants appear above ground, but never deep. The only deep culture to be that done with the plow at the time of preparing the soil, all subsequent culture to be surface culture. Thorough culture does not mean merely keeping weeds down, but, rather, frequent stirring of the soil. By this method, growth is promoted and the moisture of the soil conserved to the greatest possible extent.

### INSECT ENEMIES.

The two great pests of plants of this class are known to all by the common names—Striped Cucumber Beetle and Squash Bug.

The Striped Cucumber Beetle, (*Diabrotica vittata*, Fabr.) is the small yellow beetle with black stripes down the back, that so commonly attacks squashes and cucumbers soon after they appear above ground in the spring.

The habits of these insects render them particularly annoying and difficult to combat. The standard insecticides, such as those that kill by poisoning or by contact, are of no avail. The only satisfactory measures are pre-

ventative, such as mechanical devices to keep the insects off the vines. The cheapest and one of the most efficient means known is tobacco dust incorporated with the soil of the hill, and used as a mulch for the young plants as soon as they appear above ground. What is sold as "tobacco fertilizer" made from the ground stems, answers the purpose. The sweepings of a cigar factory are another form in which it may often be procured cheaply at local factories.

The other insect, familiar to every grower of vines, is the Squash Bug, (*Anasa tristis*, *De Geer*.) The same remarks apply equally to this insect, and while Kerosene Emulsion\* is an efficient remedy for the young insects, the tobacco dust is the best preventative I have ever used.

#### VARIETIES COMPARED.

The following comparison of varieties based upon the crop of the season of 1894 will be helpful in selecting those for home or market use, which will be most prolific, most marketable and at the same time best for table use.

Those placed at the head of the list belong to the *Pepo* tribe, this tribe is familiar to all as represented in the common field pumpkin. The members of this group are characterized by deeply lobed leaves, sharp spines, and five-ribbed woody fruit stem, swollen where it joins the fruit. Many of the fruits of this class are only fit for use while in a growing state, *i. e.*, while the shell of the squash is soft, others are suited to winter use after having become fully ripe.

1. EARLY SUMMER CROOKNECK.—Planted May 16; up May 26; in bloom July 4, first fruits gathered July 21.

This is a most satisfactory summer variety, thick meated, sweet and very prolific. It is not injured by late drouth and is a strong grower.

\*Formula for Kerosene Emulsion.—"Hard soap  $\frac{1}{4}$  pound; boiling water, 1 gallon; kerosene, 2 gallons. Churn or pump the ingredients vigorously 15 or 20 minutes. Dilute ten times when using."

2. **PERFECT GEM.**—Planted the same day as the above, but was slower in germinating, coming up May 28. The vine is a medium grower, but much weaker than the crookneck. It bears profusely, a small deeply furrowed white squash. The only advantage it possessed over the summer crookneck is that it is edible both while green and after maturity.

3. **FORD HOOK.**—Planted on May 16, same as both the preceding but did not come up until June 4. The vigor of the seed was in this case an index to the character of the plant, it being a weak grower and light cropper. The fruits are small, elongated and of a straw color. Neither a profitable nor attractive market sort with us.

4. **COCOANUT SQUASH.**—A plant more vigorous than the Ford Hook, germinating four days earlier and bearing more profusely, although it can hardly be classed among the prolific squashes. The fruits are small, four to six inches in diameter. The coloring is particularly attractive, being a rich yellow upon the body of the squash, while the distal end, over a circle two or three inches in diameter, is green. It is not worth a place among market varieties for this state.

5. **RED CHINA SQUASH.**—A small fruited variety, with a vine of moderate growth, but prolific bearer. The fruits are short and broad, very attractively colored, being a deep orange red with light markings. The flesh is of medium thickness and of a rich orange color. A squash that is of value for pies.

6. **CANADA WINTER CROOKNECK.**—The fruit of this variety reminds one of an overgrown dipper gourd painted green. It belongs to another group of squashes, the *Moschata* of botanists, a class not grown to the extent that either the preceding or the following type is in this country, although it is of a high quality.

The habit of the vine of this variety is weak, neither

growing well nor producing pistillate flowers in any number, and since these flowers must be fertilized by pollen from the same class this variety was very unsatisfactory. Twenty hills produced only two small squashes, therefore it is placed among those to be discarded under our conditions.

7. PIKES PEAK OR SIBLY SQUASH.—This variety and all of those following belong to a third class recognized by botanists under the name, *Maxima*. The well known Hubbard squash is a typical representative of the class. The fruit stem in this tribe of squashes is always large, slightly fusiform and not enlarged where it joins the fruit. It is this class that furnishes us with the greater part of our so called "Winter Squashes." The Pikes Peak squash is a moderate grower and a profitable variety for this state as it is considerably earlier than the Hubbard and because it does not grow as large as that variety it is better suited for market and family use. It is a good keeper and a squash of high quality. The fruits are elongated but largest near the stem end and tapering gradually towards the distal end. In color it is a light green on the outside while the flesh is a rich orange yellow. Everything considered it is the most suitable squash for South Dakota of any now upon the market.

8. ESSEX HYBRID.—A strong growing vine, size medium to large, producing a profitable crop of good sized squashes of a dark drab color, in shape it is peculiar, being a contracted and shortened cylinder with the characteristic form of the turban squash at the distal end. It is somewhat variable in shape and is more liable to injury in handling than the regular formed varieties, but both these faults are characteristic of the whole class of turban squashes. The flesh is of a rich orange color, sweet and nutty in flavor, and is a remarkably good keeper when carefully handled.

9. CHICAGO ORANGE MARROW.—The squash that came to us under this name proved to be the same as the one sent out as Boston Marrow. The fruits are of an orange color with lighter creamy markings, the markings being distributed in such a way that it gives a netted appearance to the surface. In shape the fruit is fusiform, its two diameters being nearly equal, the axial diameter being slightly greater. The vines are strong growers and bear an abundant crop of high grade fruits of attractive appearance. For this state I place this variety second on the list for market, but not so high for home use.

10. MARBLEHEAD.—This is a very attractive, regularly formed ashy-gray squash of medium size. It is a long keeper of high quality. The vines are strong growers but, with us, have proven to be shy bearers. It is a variety worthy of a place in the home garden.

11. AMERICAN TURBAN.—A yellow fruited turban squash, a strong growing vine and an abundant fruiter, but the quality of the fruit is low. Like all turban varieties it is liable to injury in handling and is, therefore, not as satisfactory a keeper as some of the regular formed varieties.

12. HUBBARD.—Although this is one of the strongest growers and most prolific among high grade squashes it is too late to be a profitable market variety in the northern half of the state. Frost is apt to catch it too immature, and as a result it never attains its highest standard of quality, and does not keep as it does when well matured. Where it can be successfully grown and ripened it stands second to none, but is perhaps on a par with Pikes Peak.

13. LARGE SUGAR SQUASH.—A large orange squash with lighter creamy markings down the furrows, these markings grow broader near the distal and giving the squash a lighter color there than elsewhere. The chief



value of this fruit is for pies, and since it is large and an abundant cropper it might be grown with profit as food for stock.

#### SUMMARY AND CONCLUSIONS.

1. The failure of squash flowers to set fruit is due to a lack of proper pollination.

2. When insects are not present in sufficient numbers to insure pollination, hand pollination may be relied upon to give a supply of fruits for home use.

3. It is safe to state that in prairie soil squash seed should never be planted less than two inches deep, and then in hills below the general level of the soil.

4. In general, the best time to plant is, between the fifth and fifteenth of May.

5. Tobacco dust mixed with the soil of the hill, and later used as a mulch is a most satisfactory preventative for squash bugs and cucumber beetles.

6. Summer Crookneck is the best early squash for this state.

7. Pikes Peak or Sibly Squash has give nthe largest yield of fruits of good quality of any variety tasted. The Boston Marrow stands second.