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ALFALFA, SUGAR BEETS, CANTALOUPE

NOTES 1906

BY

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ALFALFA, SUGAR BEETS, CANTALOUPE

NOTES, 1906

By P. K. BLINN

ALFALFA

Improvement by Seed Selection—The alfalfa seed nursery established in 1905 for the selection and improvement of alfalfa, was given as uniform conditions as possible as to care and irrigation; yet there appeared a marked contrast in the size and the early development of six rows of Turkestan alfalfa in the center of the plat, as compared with four rows of native alfalfa on each side. The Turkestan alfalfa was up three inches high by April 1st, while the native rows had not begun to show above the ground; many of the Turkestan stools would measure six to eight inches in diameter, while the native stools would hardly measure three to four, as they broke through the surface of the ground. The Turkestan was also characterized by wide clover-like leaves, as compared with the native, though this character varied in individual plants.

Each stool in the plat consisted of one plant, the nursery having been thinned to one individual to a place; the rows were 20 inches apart and the plants about the same distance in the rows. Plate 2 shows the contrast in the plat, April 15, 1906.

Owing to the marked superiority revealed in the Turkestan alfalfa, it seemed advisable to begin the work of seed selection with this variety, and as we had secured a selection of seed from the most promising plants in the native rows the previous season, we accordingly cut out the rows of native alfalfa, and also eliminated all undesirable plants in the Turkestan rows.

Plate 3 is a view of 12 rows of new seeding from the seed above mentioned which was added to the nursery this year. During the season a close study was made of the individual plants to determine their variations desirable for seed selection. In the plat of over four hundred plants, sixteen were selected for their special characteristics.

Seed producing tendency was a prime consideration for obvious reasons, for how to get a good yield of alfalfa seed is an important question in Colorado. The variation in this respect of the individual plants in the plat was very marked and exceedingly promising of valuable results; for the results of tests so far, seem to indicate that these variations can be fixed through seed selection.

The following notes indicate the characteristics of the plants from which the seed was selected; in each case the seed was the

*This Bulletin is the report of progress of Mr. Blinn as Field Agent, for 1906. It was not prepared as a bulletin.

product of a single plant and had been cleaned, labeled and saved separately, and the original plant from which it came has been marked.

PART OF REPORT FROM ARKANSAS VALLEY FIELD AGENT

Plant 1.—Yield of seed, 66 grams; fine stems, thick set with leaves; desirable plant for hay; seed irregular in ripening; bloom, green pods and ripe seed on the plant at the same time.

Plant 2.—Yield of seed, 45 grams; many fine stems; very little rust or disease on the leaves; seed fairly uniform in ripening; a desirable type for hay.

Plant 3.—Yield, 53 grams; many short, thick stems; seed plump and uniform in ripening; style of stems desirable for supporting seed, but not promising for hay.

Plant 4.—Yield, 24 grams; few long, coarse stems; rust common on leaves; undesirable type.

Plant 5.—Yield, 24 grams; few long stems; seed fairly uniform in ripening, but not desirable for hay.

Plant 6.—Yield, 37 grams; stems long and coarse; seed irregular in ripening; undesirable type.

Plant 7.—Yield, 33 grams; long, coarse stems; seed irregular in ripening; undesirable type.

Plant 8.—Yield, 34 grams; seed head short and small; ripening uniform; not desirable for hay.

Plant 9.—Yield, 40 grams; stems fine; seed very uniform in ripening; a desirable type.

Plant 10.—Yield, 25 grams; a small plant; seed ripened uniformly, with no second growth of stems.

Plant 11.—Yield, 30 grams; stems and leaves free from rust or disease; seed uniform in ripening; a desirable type.

Plant 12.—Yield, 54 grams; fine, large plant; large clusters of bloom; large, uniform seed pods; ripening uniformly; a very desirable plant.

Plant 13.—Yield, 43 grams; fine stems; no rust; uniformly ripe; a desirable type.

Plant 14.—Yield, 41 grams; fine stems; small heads of seed; not regular in ripening.

Plant 15.—Yield, 44 grams; fine stems; no rust on leaves; a desirable type.

Plant 16.—Yield, 55 grams; many fine stems; leaves well retained; seed ripening fairly uniform, while the stems still remained green; very desirable type.

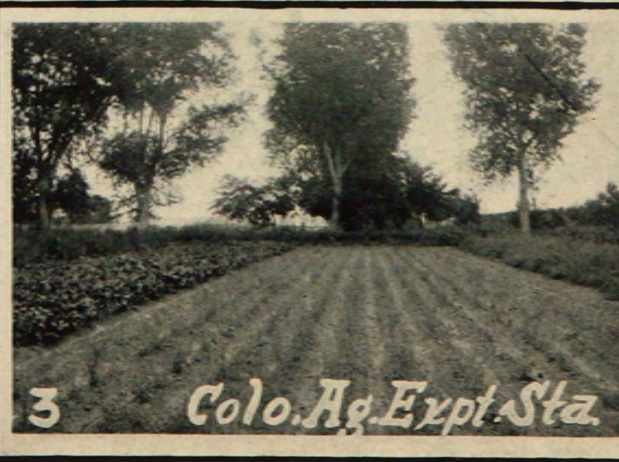
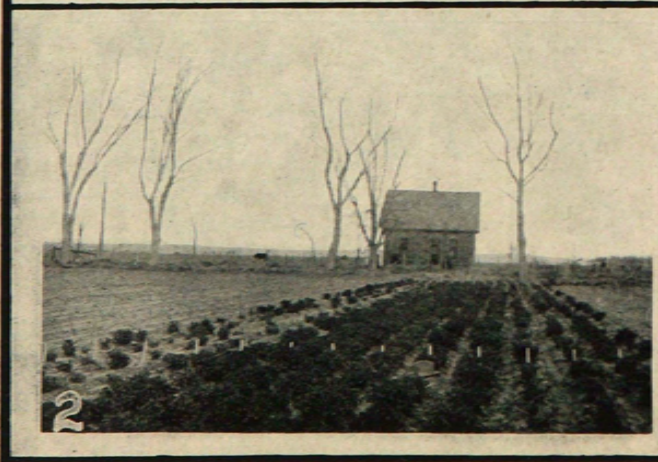
Plant 17.—Yield, 49 grams; seed from a native stool that grew on dry land with no irrigation; had remarkably large flowers that set uniform, with seed that ripened uniformly and was almost perfect in color and plumpness; stems desirable for hay; seed pods on adjacent plants under the same conditions blasted and failed to make seed.

The seed of some of the above plants was selected not for their desirable traits, but to test their future behavior and their reproducing power, and to determine the most potent tendency of the several types.

The average of those that were good seed yielders would amount to over one and a half ounces of clean seed to the plant; this computed for a theoretical yield to the acre, allowing four square feet to the plant, would give one thousand pounds per acre—a yield that does not seem impossible, and one that would be profitable even on highly valued land.

The following, Plate 4, is a view of two adjacent plants as they stood in the nursery row; the one to the left is plant No. 12.

The color contrast of the seed pods was not enough to show



1. A Characteristic Plant of Turkestan Alfalfa.

3. Alfalfa Nurserv.

2. Turkestan Alfalfa Rows Bordered by Common Alfalfa, taken April 15th.

4. Two Alfalfa Plants.

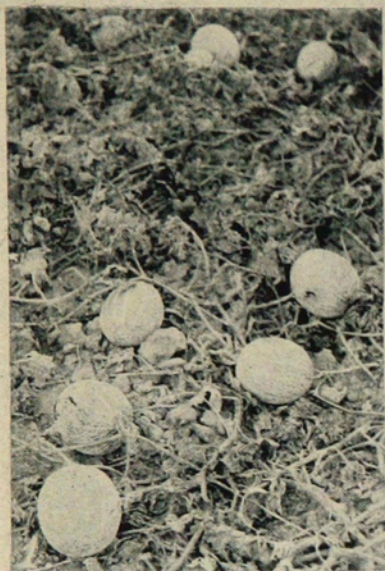
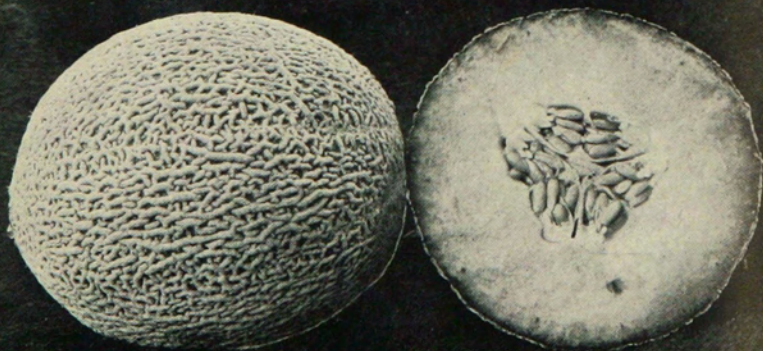


PLATE V.
A Vine Rusted on Check Row.



PLATE VI.
Adjacent Vine Showing Resistance to Rust.



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PLATE VII.
Cantaloupe Showing Perfect Netting and Internal Qualities.

the wonderful set of seed as it really was as compared with the plant to the right in the photograph. Both plants had developed under equal conditions in every way, and seemed equally vigorous; both bloomed freely, but while one set seed seemingly at every flower, the other would bloom and blast, which was also the case of the majority of the seeds in the plat; while a few such plants as Nos. 1, 3, 17 and 16 had nearly as much or more seed as No. 12.

Seed Production—In order to determine the conditions most favorable for the production of alfalfa seed, we have instituted a line of personal interviews with some of the most successful alfalfa seed growers, to ascertain their theories and methods regarding the problem; and from such data, together with results of co-operative tests and from our plat work, we hope to determine some of the factors that influence a yield of alfalfa seed, and thus enable the farmer to secure more profitable returns.

The importance of alfalfa in its relation to crop rotation for maintaining fertility is each year more apparent, as the yield from land continually taxed with beets or other crops is contrasted with the same crops grown on alfalfa sod. The breaking up of the old alfalfa fields and the seeding down of the worn out land each year, is creating a demand for alfalfa seed that bids fair to exceed the present rate of supply; for some reasons the present yield of alfalfa seed, even in the best producing sections, is not as good as in former years; and consequently there has been a steady advance in the price of alfalfa seed; this fact and the somewhat uncertainty of success in re-establishing a stand of alfalfa seems to deter many farmers from adopting a crop rotation that good judgment would seem to suggest that they should.

It is in view of increasing the yield of alfalfa seed and solving some of the difficulties of alfalfa growing, that we have undertaken this line of investigation.

BEETS

Under this topic we have continued efforts to develop a disease resisting beet. We have now about 50 pounds of seed produced from the second generation of mother beets since the selection of seed beets from the "curly top" affected fields of 1903. Since that year the trouble has not appeared in Colorado, and in order to test the merits of our selection at this time, we have sent to Dr. C. O. Townsend of the Department of Agriculture, about 25 pounds of this seed; he agreeing to send it out to portions of California and Utah, where the trouble occurs to some extent each year, and will report to us if the seed possesses any inherent resisting qualities.

In this connection we have gained considerable information relative to the problem of beet seed growing, the methods and conditions necessary for securing a yield of beet seed. Some of the points that have grown out of our experience in this line might be summarized as follows:

1. In a general selection of mother beets for growing seed, there is a wide variation in the seed producing tendency of individuals, and by selecting along this line, our tests have demonstrated that the seed yield can be materially increased.

2. So far, in the beet-growing tests there has usually been a large number of beets that would not grow a seed stalk, but only make a vegetating growth of leaves and root; this feature has varied somewhat with seasons, but our tests have indicated that the soil conditions and the manner of setting out the beets are very essential to uniform seed production.

3. Our method of siloing mother beets has been to silo late in the season, selecting only well matured beets of good shape and size, removing the leaves without injury to the center or crown buds, then layer the beets in dry soil in deep, narrow pits, to protect from frost. Ventilation is necessary, also protection from snows and rain finding their way into the silo.

4. Mother beets should be set out early in April, in this section, selecting a fertile soil, well drained, so that moisture conditions may be controlled.

5. To insure uniform conditions in setting out the beets, a deep furrow should be thrown out and still loosening the soil in the bottom of the furrow, the beets may then be set in the furrows with the crown about level with the surface of the ground; the soil may then be thrown to the beets with a small plow or cultivator, then a small stream of water is run on each side of the row which settles the soil around each beet uniformly. After the beets have started, any soil that may cover the crown is carefully removed; frequent cultivation and irrigation are then applied to induce a rapid growth until the seed stalk appears, then less water is necessary, until the seed begins to ripen, when the water should be withheld.

6. After the seed stalks are well developed, hilling up the rows with soil will prevent much breakage by wind or heavy loads of seed; tying the stalks together with twine is also sometimes necessary.

7. The injury from the false chinch bug is less frequent on alfalfa and grain land that has been kept clean from weeds upon which insects thrive. Thus far, mother beets on clean land surrounded by grain of some kind, have not been attacked by the insect. A flock of young chickens or turkeys has proven a protection from grasshoppers when they are cooped on or near the plat of mother beets.

CANTALOUPEs

The question of maintaining or improving the quality of the Rocky Ford cantaloupes becomes more pertinent each year, as we hear the unsatisfactory reports of the irregular quality of the product in all the various markets. The many inquiries and requests for seed from the farmers and the experiment stations throughout the melon growing sections of the United States is

evidence of the urgent needs, and the manifest interest in our work of developing a disease resisting cantaloupe. In order to test the merits of our rust resisting selection under various conditions, we have furnished a few seed to all inquirers from various parts of the United States to those who were willing to make the test in a co-operative way.

As our work of selection was only well begun, we could only furnish what might be termed a second grade selection of seed, as the few seed of the first selection was reserved for our own work. The following are brief extracts from the reports that have been received so far at this time :

"The rust-resistant plat furnished fine melons after the other plats were all dead with rust."—E. C. Green, Texas Experiment Station.

"The melon seed received from you this spring, gave the best melons I have had in previous seasons."—J. D. Fraser, Leamington, Ontario.

"I found the Pollock, or rust-resistant melon superior in quality to the others, but many of them grew rather large."—Chas. L. Goodrich, Glendale, Maryland.

"The reports of three growers who tried the seed you sent me, show that this melon was unusually free from rust, although other melons in the immediate vicinity were badly injured by it."—Samuel B. Green, Minnesota Experiment Station, St. Anthony's Park.

"Until about a week ago the vines showed little or no rust, but at the present writing the leaves are badly spotted; the fruit is good size, and the vines may withstand the attacks until after the melons ripen; I think I gave the variety a very severe test, as the seed were planted on soil that a year ago was devoted to the same crop, which was entirely wiped out by the rust."—H. D. Haskins, Hatch Experiment Station, Amherst, Mass.

"The vines from the disease-resistant seed which you sent me, certainly did resist diseases much better than the old Netted Gem."—F. L. Stevens, North Carolina Experiment Station, Raleigh, N. C.

"I ran all other melons out of the hotels with the rust-resistant "Pollock" seed I got from you."—A. Van Wagenen, Sioux City, Iowa.

From twenty-nine reports from growers in New Jersey, who tested the rust-resisting seed that we furnished Eyron D. Halsted of the New Jersey Experiment Station, eighteen reported very favorable results; eight reported that they observed no difference, and three made unfavorable reports; the seed furnished for this test was pure "Pollock" strain, which only had had one year's selection for the rust-resistant feature.

The popularity of the cantaloupe as a fruit on the American table does not seem to diminish, nor does the output or the returns to the grower seem to decrease; these facts are unquestionably due to the greater attention being paid to the quality of the seed selected for planting and also the improved refrigerating and marketing facilities. About the only progress the melon growers have made in regard to seed selection, is the almost unanimous selection and use of single strains of seed by the various associations, thus insuring uniformity. In general, they have selected the strains that were early, prolific, uniform, and also desirable in appearance, with little or no attention being paid to disease-resisting tendencies; in fact, some prejudice exists against the rust-resisting strain, as it is thought to be later and less productive than the strains in general use. This apparent lateness of the rust-resistant strain is probably due to abnormal ripening of the other strains, rather than to any inherent lateness in the rust-resistant strain.

The past season proved very favorable for the development of the rust trouble, and the melon fields went down nearly three weeks earlier than usual; our rust-resistant selection remained green until the majority of the fields were dead, and some of the most markedly resistant plants in the plat remained green until frost, this in spite of the fact that the seed was grown on soil that for four consecutive years had been badly infested with rust, the idea being to develop the quality under as adverse conditions as possible, consequently, irrigation was applied in excess to favor the development of the rust. The plat was planted with the seed of nine individual melons, which had passed the rigid test of selection on the same plat the previous season; one row was planted as a "check" row; seed from a very perfect melon, but from a field that had not been selected for rust resistance. The plat developed nicely until about August 15. The season was characterized by frequent showers and heavy dews, and in July the rust spots appeared on all the early melon fields, and when the first picking began, about August 10th, the fields were getting brown with rust, as was also the check row in our plat, while the other rows were comparatively free from rust. The following photographic record represents the relative condition of the vines on the check row and adjacent rust-resisting row on August 20th; the whole plat having received the same treatment in every respect.

When the rust had developed to some extent on the plat (which began at least ten days later than any other plat under equal conditions), the plat was carefully studied, and over one hundred resistant plants were staked and numbered, and each day as the ripe melons were gathered, these were marked with the number of the hill and the seed saved separately and the description made of the qualities of each. At the close of the season, the plat was gone over and notes taken of the rusted condition of the various plants; this revealed the fact that a few of the whole number, had remained resistant later than others. With the system of numbering used, this seed can be identified and used in further developing this important quality.

Careful consideration and a great deal of time has been devoted to selecting melons with a view to improving their keeping qualities, as well as flavor and other qualities desired in a perfect melon. The following photograph reveals some desirable internal and external qualities shown in some of the melons of our selection.

In order to develop early maturity in our rust-resistant strain, we have made arrangements for a co-operative test, by having some of this seed grown in Canada, the product of which will be tested this coming year at Rocky Ford, to indicate the influence of latitude on early maturity.

Some investigational work in regard to the life history of the melon louse, and the means of combatting it was taken up in co-operation with and under the direction of Prof. C. P. Gillette.