EFFECT OF STRIP-CROPPING SUGAR BEETS AND FIELD BEANS

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During the past five years there have been a few growers in the Michigan Sugar Company area who have been growing sugar beets and white pea beans in various combinations of alternating beet and bean rows in the same field. The practice of alternating 4 rows of sugar beets and 4 rows of beans has been the most popular.

OBSERVATIONS

It has been a popular practice in some areas to plant sugar beet field headlands to field beans and often an 8 or 12 row strip of beans through the center of the beet field. After the bean harvest the beet field is opened up ready for harvest. It has been observed that the outside, or border rows of sugar beets will invariably yield considerably more than the rest of the rows in the field. This phenomena has also been observed when a row is missing through a field. There are also variations in yield of border rows depending on what the adjacent crop may be. Yields of these border rows will range from 35 to 100% more than the normal rows.

It has been observed that when beet rows are adjacent to bean rows both the beans and beets appear to yield more.

It is known that some species of plants will have an inhibitive effect on certain other plant species when grown together with intermingled root systems. For example, quack-grass growing in a field of corn, will depress the corn yield more than can be accounted for by mere competition given by the quack-grass for water and plant nutrients. There is a further inhibiting effect. It would seem reasonable then to assume that some species of plants may act as stimulants to other plant species if they were grown in a manner that would enable their root systems to be intermingled. This would appear to be the case with field beans and sugar beets.

TESTS AND RESULTS

Several fields have been planted alternating 4 rows of beets and 4 rows of beans. The average yields of both beets and beans have been increased from 30 to 50% when compared to solid plantings. In 1962, one field gave an average sugar beet yield of 31.26 tons per acre where only 125 lbs. of 5-20-20 fertilizer was used with no additional nitrogen used as a side-dressing.

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The outside rows, of the 4 row strips, were green until harvest while the inside rows were beginning to turn. Following are the yield data:

	Tons per Acre	% Sugar	% Purity
Outside rows	35.64	14.92	88.55
Inside rows	26.88	16.30	89.84
Average	31.26	15.61	89.20

We have had some individual plot yields which gave 41 and a fraction tons per acre. It would appear that under good conditions a 40 ton per acre average yield could be obtained from a good field.

DISCUSSION

At the present time this system of growing beets results in a lower sugar content. Depending on the season, it will range from 3/4 to 1-1/2 percentage points lower than a solid planted field. Yield response of beets will be up to 50% increase in yield for 4 row strips and up to 75% increase in two row strips. At the present time the 2 row strip method may result in up to 2.0 percentage points lower sugar content. Much work needs to be done on this problem. Some tests to be made are: (1) Effect of high population - up to 180 beets per 100 ft. of row; (2) Effect of high phosphorous and potash with low nitrogen application, and (3) Effect of planting rye grass or rye to utilize nitrogen before beet harvest. These and other tests will be made in 1963.

It is apparent that, with strip-cropping, we must reassess our agronomic practices, especially regarding fertilizer use. Some definite practice must be found which will maintain the sugar content.

MECHANICAL PROCEDURE

All rows are 28 inches in width. Beets are planted as early in the spring as soil conditions permit. White pea beans (field beans) are planted between May 25 and June 10, depending on variety.

Where four row strips are used, seeding can be accomplished by two methods. Use of a long marker on the drill when planting beets or use regular marker and drill one way only driving the opposite direction to mark only. When ready to plant beans, the vacant strip is worked once with spring tooth and/or spike drag. An iron bar is attached to the front of the tractor in such a manner that a light chain will drag on a beet row. This is used as a guide in planting the beans.

At harvest, the four rows of beans are pulled into one windrow and picked up with an eight or 10 foot combine.

Where two row strips are used, the sugar beets are planted with the two center units of a 4-row drill. The two rows for beans can be worked with a section of spring teeth fastened to a cultivator bar on the tractor. The beans are then drilled, using the two outside units of a 4-row drill by straddling the beet rows.

Harvesting is accomplished by pulling the two rows of beans into a windrow then harvesting with a 10 foot combine by straddling beet rows and removing the pick-up teeth from the center section of the combine over the beet rows.

This system of growing beets has also been tried with corn as the companion crop. This is not satisfactory. The method has not been tried with any other row crop.