

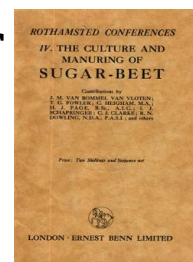
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ROTHAMSTED
RESEARCH

The Culture and Manuring of Sugar-beet

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Summary of Points

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Sir JOHN RUSSELL, in closing the discussion, first of all thanked the speakers and then stressed the twofold object of the Rothamsted Conferences. They were intended, he said, firstly to get the best information of all kinds bearing upon matters of immediate agricultural interest and to spread that information as widely as possible. Secondly, they were meant to obtain, for the Station, problems from the field that required scientific investigation.

Turning to the subject of discussion he said that the present position with regard to yield was obviously unsatisfactory. There seemed to be three lines of attack in the attempt to better it :

(1) Improvement of varieties to suit situations. Much had been done already, but there was hope of still further progress in this line.

(2) Improvement of cultivation and methods of spacing. In this department there was certainly room for very much more experience and experiment. Preparation of seed bed, depth of sowing, width of rows, ridge or flat—all were important matters requiring exact knowledge and probably local modification.

(3) Manuring might prove to be capable of producing most satisfactory results with sugar-beet as with other things, but great discrepancies were bound to occur until the foundations of cultivation for the crop had been established.

The matter of the time of application of nitrogen and its effect in producing an increase of top rather than root seemed to be bound up with the question of the utilization of the nitrogen by the plant. It was desirable to apply, at the right time, just that quantity of nitrogen which the plant could use in the production of the maximum amount of that type of growth which we might require. The extra nitrogen taken to produce unnecessary leaves in the beet was obviously ill applied even though it might be producing an increase in the total weight of the plant.

SUMMARY OF POINTS

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Nature and Position of the Crop

(1) The growing of sugar-beet by a farmer and the making of sugar by a factory are to be regarded as parts of a single process of production. It is necessary for the continued success of either party that the two shall work together in close accord and sympathy.

(2) Sugar-beet being a comparatively new crop to this country there is no traditional method of growing it built up on generations of

field experience. There is much valuable information to be obtained from the Continent, but this must be tested under the local conditions of our own beet-growing districts before it can be used here with full advantage.

(3) The crop at present enjoys a degree of State protection which will decrease in future years. The period of subsidy is to be regarded as a time of education and experiment during which commercial machinery may be established and the growers may accumulate such knowledge and skill as will enable them to compete successfully in the open market.

(4) The yield of beets on many of our farms is unsatisfactory, and the average must be increased from $8\frac{1}{2}$ tons per acre to at least 10 or 11 tons per acre if the industry is to maintain itself in the future.

(5) Beet of high quality can be obtained in many parts of the country, and given good methods of production and adequate manufacturing facilities there is room for a greater development of the crop.

Factory Requirements

(6) In order to work to the best advantage the factory requires a regular supply of beets spread over the manufacturing period from October to the New Year. It is essential that growers should keep closely to the terms of their contract, as the factory organization depends on this.

(7) The factory obtains the best working results from beets containing a high percentage of sugar, and is seriously hindered by consignments which are not properly topped or which contain many bolters or much rubbish in the form of stones, weeds, etc.

(8) The overhead charges of the factory and its permanent staff of all kinds have to be spread over the number of working days in the year. The longer the period of full working the less per ton will these charges be. The English factories enjoy an advantage in that they have a working period of 100 days as compared with 40 to 80 days in some other countries.

Growers' Requirements

(9) Growers require an assured market for their product, and the fact that the price of sugar-beet is fixed in advance of the crop may be of great importance in stabilizing the finances of a farm in difficult times.

(10) At present much local information is needed on such matters as varieties of beet to grow, the best cultivations to use, and the most economical manuring.

(11) Short haulage and a cheap rate of transport to the factory are points of great importance in deciding the success of a crop. Bad roads,

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long journeys to the station and long railway transport with high charges should be considered in detail before the contract with the factory is signed.

(12) An adequate labour supply in the spring and autumn—the critical seasons of the crop—is a matter of the first importance. The chances of obtaining the necessary labour when he wants it should be explored by the grower before he undertakes production of the crop.

(13) At the present time, and on the terms of existing contracts, high gross yield is more important to the grower than high sugar content if these two cannot be obtained together.

Each 1 per cent. of sugar below 15½ per cent. is worth 3s. 5d. per ton, while each 1 per cent. over that figure is paid for by the factory at 2s. 6d. per ton.

(14) The crop employs a good deal of costly labour, and therefore any labour-saving devices which can be applied in any stage of its treatment may have a very great influence in lowering the cost of production per ton.

• The Requirements of the Crop

(15) The yield of the crop will depend very largely upon the number of plants grown to the square yard and the acre. Continental experience suggests that 8 plants per square yard is the optimum number. This is obtained by using narrow rows (14 in. to 16 in.), and singling to 8 in. apart. Many English crops have not more than 4 beets per square yard with a full plant.

(16) Whatever width of row or singling distance is used, it is desirable to obtain a "full plant" and to have as few gaps as possible. To obtain this with certainty a heavy seeding, 15 lb. to 20 lb. of seed per acre, is generally recommended.

(17) The seed bed should be fine and moist at the top, with the lower layers well broken to allow easy penetration of roots. The seed should be sown regularly and at a depth of not more than 1 in. The roller is a very important implement before, during and immediately after the seeding.

(18) Singling of the crop is an operation of critical importance. It should be done carefully and methodically as soon as the plants have four leaves. Each chosen individual should be left well planted at its regular distance from its neighbours.

(19) Hoeing by horse and hand should continue till the leaves of the plants meet in the rows. The exact number of times which the hoes should pass through the crop must depend on the soil, the season and the cleanliness of the field. The skill of the grower must be applied in deciding this in each case.

(20) Distance between rows and the use of flat or ridged seed beds must depend in some degree upon the soil, the local traditions in root

growing, and the grower's equipment of implements, horses and men. It appears that in general the narrower rows produce the best crop both in yield and sugar percentage, but there may be many exceptions to this rule.

(21) The question of subsoiling for the crop has to be considered on thin-skinned soils. A great deal of Continental experience goes to support the idea that on all but the deepest soils subsoiling should be a routine operation in the growing of sugar-beet. A number of English growers with experience are now using subsoiling tines on their ploughs.

(22) In general it may be said that problems of cultivation require to be attended to thoroughly before specific problems of manuring come to be considered. With sugar-beet in England at the present time there is great opportunity to increase the yield of the crop by an improvement of cultural methods.

(23) Good crops of sugar-beet have been grown in many districts with the manuring commonly used for the mangold crop. Sugar-beet being a more highly priced crop than the mangold may pay for a heavier application of fertilizers, but at present there is no special recommendation which suggests that its needs as a plant differ widely from the better-known root crop.

(24) There is need for properly co-ordinated experiments to be conducted throughout the beet-growing areas of the country to investigate the manurial needs of the crop under the very various conditions of soil and climate found within our borders.

(25) The climatic conditions of our country are particularly well suited to the successful production of sugar-beet. The long periods of daylight favour sugar production in the plant. The moderate average temperature during the growing period encourages steady and even growth in the field. The comparatively long period of harvest (100 days) brings a great advantage both to the farmer in his harvesting operations and to the factory in its business of slicing and sugar extraction. The absence of extremes of heat and cold makes it unlikely that the beets will be either severely checked in growth or badly damaged by frost before they can be delivered to the factory.

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