

Sprout uniformity in growing brussels sprouts*

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Summary

The influence of planting distance (60 × 60 and 60 × 30 cm), of topping early in the season and of prepicking were determined on the quality (size and scattering of size) of brussels sprouts. The wider planting distance gave the best results. Topping and prepicking had hardly any influence on the crop uniformity from plants on 60 × 60 cm. Combinations of closer planting, topping and prepicking were always unfavourable.

Introduction

Brussels sprouts are an important crop in the northwestern part of Europe. The labour requirements of brussels sprouts are rather low in the first part of the growing period; in the second part the picking requires 70 % of all the labour. Sprouts have to be picked in the wet and cold part of the year which makes the work unattractive. Even when high wages are paid it is rather difficult to find the manpower for picking. Picking can be mechanized (Kronenberg, 1967a) provided that the sprouts along the stem are sufficiently uniform and that all plants in the field can be harvested at the same time. Introduction of the hybrid cultivars reduced the differences between the individual plants and improved the possibilities of mechanical harvesting. Differences in sprout size along the stems remain a problem.

Normally sprouts differ in size along the stem: at the base sprouts are 4 cm and even (much) larger; at the top they are about 2 cm and smaller. Close spacing and removal of the shoot tip both should promote a more even growth of the sprouts along the stem (Nieuwhof, 1962; Garthwaite, 1968). Closer planting reduces the light intensity of the basal parts of the plants, while topping stimulates the growth of the upper sprouts.

Some growers start picking the larger, basal sprouts rather early in the season, when they are still firm. This may stimulate the growth of the more apical sprouts and thus give a more even distribution of size and a heavier crop.

The experiments described below give information on the uniformity of the sprouts when the above mentioned different cultural methods of spacing, topping and 'prepicking' are applied.

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Materials

Earlier experiments (unpublished, 1966) with plants from seed give unreliable results although 3×100 plants were used. The only way to get reliable results seemed to work with vegetatively propagated plants.

The method of vegetative propagation was described earlier (Kronenberg, 1967b). In 1965 one plant of the late cultivar 'Sandra' with a 'good' size distribution was selected and propagated vegetatively. In 1967 a clone of more than 300 plants was available. The plants from cuttings used in the experiment were taken from the stock plants on 15 April; the plants were potted on 15 May, brought in the open on 6 June and planted out on 20 June.

Methods

Plants were planted either at normal space (60×60) or at 60×30 cm. Half of the plants were topped early in the season (20 Sept.). Half of the plots were picked twice: the larger sprouts four weeks before the others. The final harvest was on three dates 30 Oct., 21 Nov. and 2 Jan. This gave 24 different combinations of cultural methods. With one replication this resulted in 48 plots of 5 plants each. The plots were separated by rows of sprout plants from seed (sown 1 May, planted out 20 June). All sprouts larger than 2 cm were measured at harvest time (about 50 sprouts/plant). The first step in arranging these figures was to calculate the mean value $\bar{x} = \Sigma x/n$ of all sprouts from the 10 plants of the two replications. Subsequently to get an impression of the scatter the standard deviation $s = \sqrt{\Sigma (x-\bar{x})^2/n}$ was calculated. The coefficient of variation $v = 100 s/\bar{x}$ can be used to give an impression of the uniformity of the picked sprouts, as with small sprouts only a small value of s is acceptable; with larger sprouts a large value can be accepted. The lower v , the greater the uniformity of the sprouts.

Results and conclusions

From Table 1 presented above it appears that:

Table 1. Coefficients of variation of Brussels sprouts

Treatment	From plants spaced 60×60 cm			From plants spaced 60×30 cm			
	Picking dates	10 Oct.	27 Nov.	2 Jan.	10 Oct.	27 Nov.	2 Jan.
Control (no topping, no prepicking)		1.8	1.5	1.3	2.2	2.0	1.4
Topping (20 Sept.) no prepicking		1.8	1.5	1.1	2.9	2.3	1.7
No topping, prepicking		2.4	1.3	0.9*	7.0	4.8	1.0**
Topping (20 Sept.) prepicking		3.6	4.7	2.9	0.9	4.0	3.4

* Small crop; ** Very small crop.

SPROUT UNIFORMITY IN GROWING BRUSSELS SPROUTS

1. Sprout uniformity was better at a planting distance of 60×60 than at 60×30 cm;
2. Topping had a slight or no influence on uniformity at 60×60 , a bad influence at 60×30 cm;
3. Prepicking had later in the season a favourable influence at 60×60 , a rather bad influence at 60×30 cm.
4. Topping and prepicking applied together reduced uniformity both at 60×60 and 60×30 cm.
5. Later in the season sprout uniformity became better.

Discussion

Within older sprout cultivars and between cultivars differences in sprout size distribution occur along the stems. Work by Nieuwhof (1962) and Garthwaite (1968) was done with older and early cultivars. With these cultivars closer planting resulted in a more even sprout size distribution along the stem. With the clone used in the above mentioned experiments, selected from a late variety with a more even sprout size distribution along the stem, closer planting led to a more uneven crop pattern.

In a sprout plant there is an apical dominance (see for instance Verhey, 1970) which seems to work longer in late varieties than in early ones. In these early varieties growth of basal sprouts starts early and of top sprouts late. In a late variety or a variety with a more even sprout size distribution apical dominance stays long and sprout growth starts more simultaneously in all axils. In early sprouts closer planting leads to a lower photosynthesis of the lower leaves, resulting in a not too good sprout growth of the lower sprouts and a more even size distribution. In the above used variety growth of the basal sprouts stayed behind as well, but this led to a more uneven size distribution. Topping in an early variety ends the apical dominance; in a late variety topping has a very slight or no influence, because apical dominance is of less importance in these cultivars. Prepicking leads in a early variety to a more even size distribution after taking away the biggest sprouts. In a late variety prepicking means that less sprouts are left on the stems and to more influence of the smaller top sprouts on s. Later in the season sprouts in the top of the plants grow bigger and the value of v will be lower.

Results reported above and those obtained earlier now seem understandable.

To get a good size distribution pattern along the stems the growing of modern varieties with a more even size distribution along the stems must be done on the normal space (60×60 cm) and without topping.

References

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