

RESEARCH IN THE GROWING TECHNOLOGY OF CULTIVATED CRANBERRIES AND BUSH BLUEBERRIES

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Annotation. The total area of the plantations of cultivated cranberries in Latvia is continually growing. Plantations of bush blueberries are laid out the total area of which is expected to exceed 100 ha already this year. The areas of plantations will increase respectively which produce berries and the yields of these berries. A still unsolved problem is availability of the machinery for the cultivation, gathering and processing of cultivated cranberries and bush blueberries which adapted to the Latvian conditions and volume of production. The report offers a review of the growing and processing technologies of cultivated cranberries and bush blueberries, as well as the machinery applied on the Latvian farms. Its consistency is analysed to the volumes of production and ecological demands, its profitability.

Keywords: big cranberries, high bush blueberries, mechanisation of processes, profitability.

Introduction

The end product of Latvian agriculture contains only 1 % of fruits and berries although the conditions for growing various fruits and berries in Latvia are quite suitable. The mass of profit from one hectare of fruit and berry plantations is considerably higher than from the other agricultural crops. The Latvian farmers have been growing the products of unconventional branches, including big cranberries and high bush blueberries for more than ten years. No systematic analysis has been made of this branch and its technical provision not only in the Latvian but also the European context. The factors, hampering the branch are the small volumes of production and the undeveloped sales and processing system of the products. Growing cultivated cranberries in Latvia is continually evolving, and an issue becomes urgent not only about the growing and gathering the berries but also about their storing and preparation for selling. The cultivated cranberries are mainly sold in a freshly frozen, dried (raisins), sugared (cranberries) form or as juices. At present there are about 120 ha plantations of cultivated cranberries in Latvia, 100 ha of them are on the farms which have joined in the Latvian Cranberry Growers' Association. The plantations start producing berries in the fourth year, reaching full yield in the eighth year. At the present time there are about 70 ha of plantations producing berries. The total areas of the plantations continue increasing, and it is expected that they will reach 140 ha in the year 2008. Although in a small extent, the bush blueberries were grown in Latvia already in earlier times and, as an agricultural commercial crop, they have produced berries since 2001. During the recent years the areas of plantations have expanded rapidly, and now they reach 200 ha. The plantations of bush blueberries are generally laid out in recultivated peatbogs. The members of the Cranberry Growers' Association alone have approximately 900 ha of areas that can be used for cultivated cranberries and bush blueberries. Considering the fact that the market is still unsaturated, further increase in the areas of the cultivated cranberries and bush blueberries is expected by 50-80 ha. The desirable properties of soil and the conditions for growing bush blueberries are similar to those for growing cultivated cranberries. Therefore the cranberry growers lay out also bush blueberry plantations, along with cranberries. The problems connected with laying out and management of bush blueberries and their technical provision are almost the same as with growing cultivated cranberries. With the increase in the cultivated areas, certain experience has been accumulated, and the laying out and cultivation technologies of plantations acquired.

Research methods

The data used in the research on the total areas of cultivated cranberries and bush blueberries, and the areas which produce berries were obtained from studying the farms of different regions of Latvia and the information obtained from the Latvian Cranberry Growers' Association and the Ziemeļoga cooperative farm. The structure and amount of the machinery required for mechanised cultivation of the plantations were determined during the visits of the farms and field experiments with a chronometer, the obtained data being processed by means of the applied programme Excel and technological charts. The service life of machines and tools was accepted in the calculus as being

10 years. The gross wage was assumed as 3.5 Ls/h. The labour quality indices were estimated according to the agrotechnical standard methodologies.

Results

The plantations of cultivated cranberries and bush blueberries in Latvia occupy altogether about 330 ha. They are grown on more than 50 farms of various sizes, most of which have joined into the Latvian Cranberry Growers' Association. As it is evident from Fig. 3, the small growers, who grow berries mainly for self-consumption, occupy about 2 % of the areas. But on the farms with the plantations over 2 ha, which grow products for the market, these areas occupy approximately 90 %, and they continue evolving. The areas of cultivated cranberries and bush blueberries, including those already producing berries, and the dynamics of their growth are shown in Fig. 1.

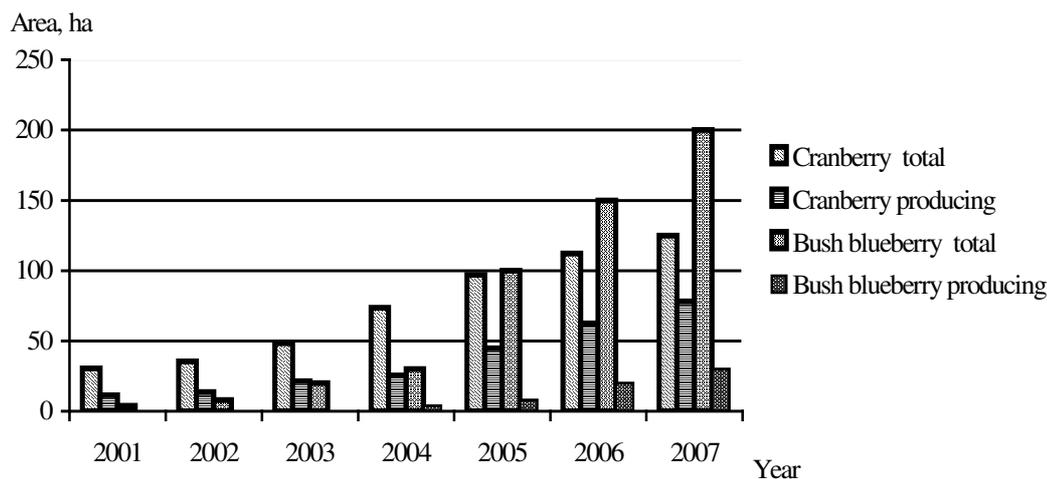


Fig. 1. Dynamics of the growth of cranberry and bush blueberry plantations

Although most growers of cultivated cranberries and bush blueberries have joined in associations and cooperatives, their farms are scattered all around the Latvian territory, and the distances between them hamper cooperation in the purchase and usage of the machinery. Considerable areas are situated and continue to develop in Latgale, the south eastern part of Latvia, which may promote the development of this region.

The farms growing their products for the market cannot operate and develop successfully without adequate means of mechanisation. Their development is limited by the need for specific small machines and tools for the cultivation of plantations and harvesting the yield which are mostly not available in the Latvian and European markets. The more active growers of cranberries and bush blueberries acquire the missing machines and equipment without which the development of production is impossible by mutual cooperation in the USA and Canada - the traditional countries where the cultivated cranberries are grown - and then make their adapted copies. A part of the samples of machines which are necessary for processing berries are purchased also in Belarus. The equipment that is suitable for the Latvian conditions and growing technologies but cannot be bought is designed and made in an individual way on the farms or cooperating with the local production enterprises and research institutions. In cooperation with the members of the Latvian Cranberry Growers' Association the Research Institute of Agricultural Machinery, Latvia University of Agriculture, has worked out and made a sand and peat distributor on the basis of the distributor of organic fertilisers, several specimens of the high weed control machines, an equipment for filling the trenches, which are made for planting bush blueberries, with substratum, and a propeller pump for level regulation in contour trenches.

However, in spite of these activities on the farms, a considerable part of them are not ensured with adequate machinery, and they are forced to use manual work to perform the operations. Provision of the Latvian growers of cultivated cranberries with appropriate machinery is shown in Fig. 2.

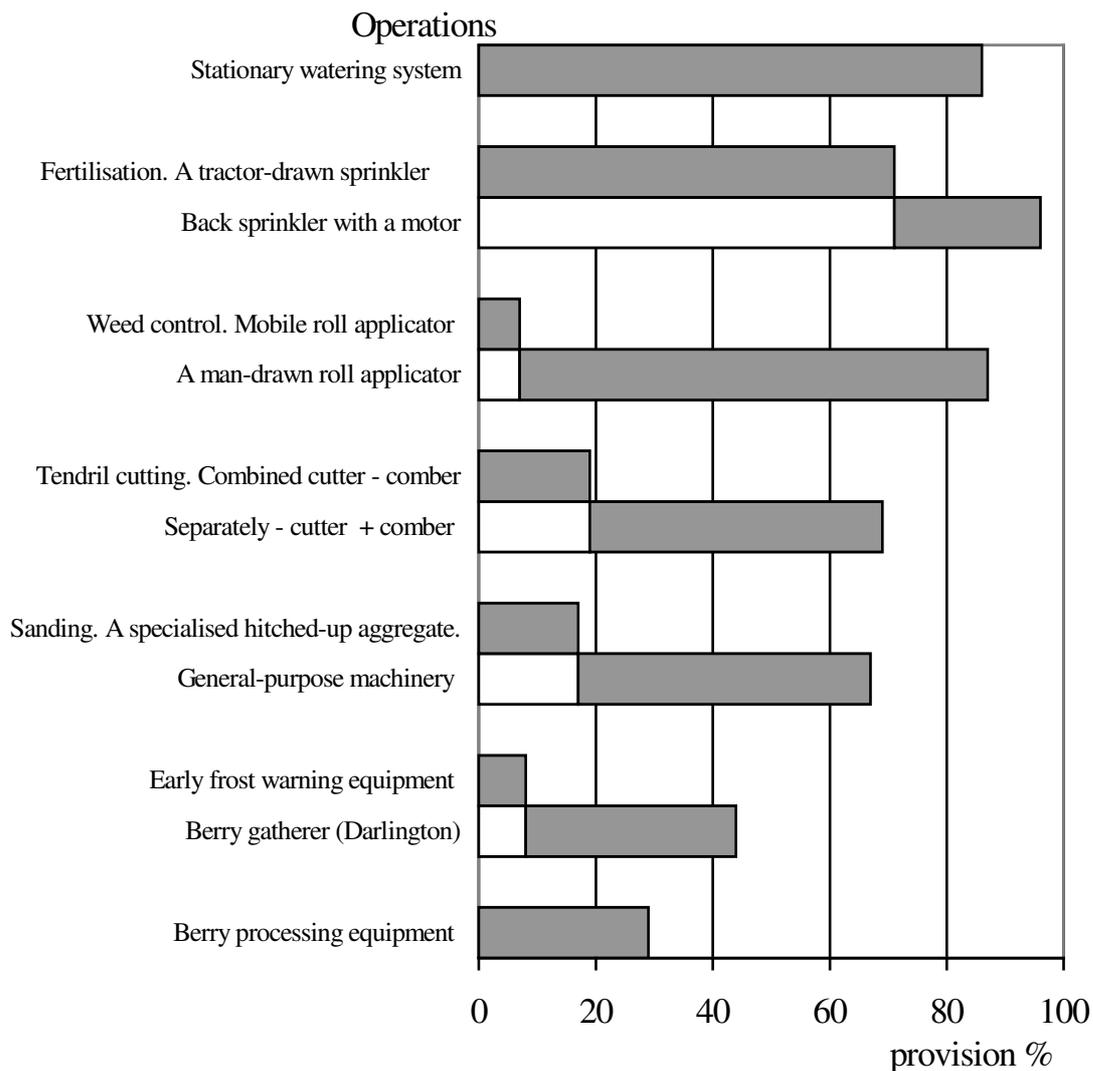


Fig. 2. Provision of the Latvian cultivated cranberry growing farms with machinery

As the analysis of the obtained data shows, a part of the technological processes are provided comparatively well with the means of mechanisation. Watering of plantations, which is particularly important in order to protect the plantations from spring frosts in the flowering time, is solved on most farms where the areas of more than 1 ha are cultivated and the berries are produced for the market.

Sprinklers are used for regular fertilisation through the leaves. This is general-purpose equipment and it is available. For the high weed control various self-made hang-on (roll-type) applicators or manual applicators (on smaller areas) are mainly used.

In order to harvest the yield of berries by means of mechanical tools, tendrill cutting and combing are necessary. The cut tendrills are used as a material for planting. Mechanisation of this operation is still underdeveloped. Only on some farms there are self-made combined aggregates which allow performing the operations of tendrill cutting, collecting and combing of the plants in one pass. On most farms adapted machines and tools are used to perform separate operations, which increase the damage of the plantations and produce worse results. Taking into consideration also the high price of the machines made in an individual manner, calculations show that the use of a combined aggregate pays back already starting from 1.5 ha areas of plantations. Manual work is applied on the areas under 0.3 ha.

The plantation sanding is necessary once in 3 years, therefore the use of one aggregate is possible by cooperation, which is already being done. A part of farms use general-purpose means of transport and manual work.

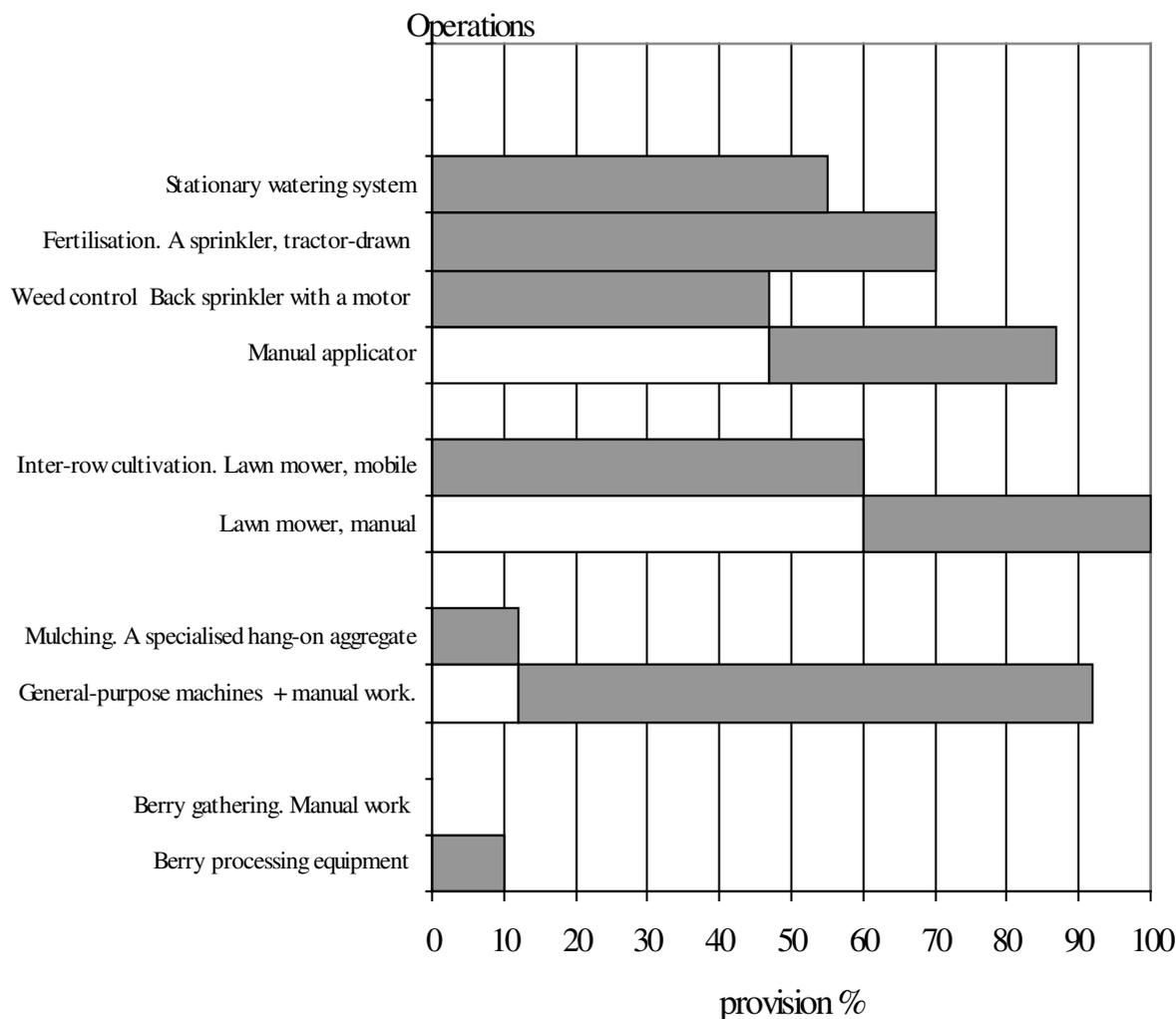


Fig. 3. **Provision of the high bush blueberry growing farms with machinery**

An urgent problem is the protection of plantations against spring frosts and timely warning about the possibility of frosts in the plantations, transmitting the information to the operator's place. For the time being, such experimental automatic early warning equipment about the spring frosts exists only on one farm.

Very urgent is the problem of mechanised berry gathering. This topic has been solved by purchasing specimens (the Darlington harvester and Furford picker-pruner) in Canada and making adapted analogs on the farms. As the data analysis and calculations show, in spite of the cost of the berry picker, which is 3000 Ls, its use pays back already when the area of the plantations is 0.2 ha. The berry picker replaces the manual work of 80-100 people, which is important in order to observe optimum terms of gathering berries. The fact that the berries must be gathered in a certain term limits the possibility for the farms to cooperate.

The bush blueberry plantations, intended for the market, as shown in Fig. 1, began to appear several years after the cranberry plantations but now their areas have already surpassed the cranberry plantations. This is due to the demand for this product and lesser investments to lay out the plantations. Like the cultivated cranberries, growing bush blueberries, needs some specific machines and equipment. As this is a new crop in production, the set of the machines and tools that are necessary for its growing is available incompletely. The provision of farms with the required machines is shown in Fig. 3.

Watering of the plantations is necessary during the dry summer periods because bush blueberries consume much water, and their root system is placed shallow. Fertilisation of bush blueberries in the growing period proceeds through the leaves sprinkled with a solution. General-purpose standard

sprinklers, hung on the tractor or on the operator's back, are used. For weed control sprinkling with herbicides is used, the sprinklers being provided with jet directors and screens which protect the leaves of the cultivated plants from the chemical. Weed control proceeds in a technical way, the preparation of soil under the bushes is difficult because of the shallow system of the roots. On smaller areas weeding is applied. In the inter-row spaces (the distance between the rows is 3 m) a lawn is laid out which is regularly cut by means of a mobile or manual lawn mower. Mulching of the plantations is done by individually designed and made aggregates or manually. Berry picking in the bush blueberry plantations is only a manual work. In the USA and Canada - the old growing countries of this crop – mechanisms are used in a very limited measure because the berries gathered in this way cannot be preserved and are fit only for immediate processing. Processing of cranberries and black currants in Latvia is organised on four farms, which cooperate in order to process partly the yield of other farms, as well.

Conclusions

1. Growing cultivated cranberries in Latvia will expand, growing bush blueberries will develop too.
2. Several operations, including planting, tendril cutting and combing, mowing and picking berries should be mechanised also on comparatively areas – 0.2-0.5 ha.
3. In cooperation with the Cranberry and Bush Blueberry Growers' Associations it is necessary to organise designing and making tools, which are adapted to the Latvian conditions.

References

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