

## Labour consumption in blackcurrant production

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**Abstract.** Twenty-nine blackcurrant growers participated in the study, which took place between 1977–1980. The purpose of the study was to establish how much time was spent in preparing the fallow ground, planting, cultivating and harvesting blackcurrants. The total area of blackcurrant cultivation included in the study was 136,7 ha.

The work involved in establishing an area of one hectare for blackcurrant cultivation took 147,0 man hours using methods which were only slightly mechanized and 98,5 man hours using more mechanized methods. The corresponding tractor hours were 37,0 and 38,0. In the normal fruit-bearing years (following the third growth period) cultivating tasks took 158,5 man hours and 9,5 tractor hours using slightly mechanized methods. With more mechanized methods, the labour consumption was 95,0 man hours and 24,0 tractor hours per hectare. Harvesting with a mechanical harvester took 37,5 man hours, 6,0 harvester hours and 8,0 tractor hours per hectare. The corresponding average yield was 3 300 kg/ha. An average of 4 000 kg/ha were harvested by baton, accounting for 400,0 man hours and 6,0 tractor hours per hectare. The bushes were hand-picked after mechanical harvesting. 800 kg/ha were picked in 210,5 hours.

### Introduction

The purpose of the 1977–1980 study was to establish the amount of working time consumed in the various stages of blackcurrant production, viz. in the planting summer, the summer after planting, first fruiting year and fruiting years. The different cultivation and harvesting methods were treated separately.

### Material and methods

Of the total of 29 growers participating in the study, the number taking part each year varied from 7 to 21. Correspondingly the total area of blackcurrant cultivation was 136,7 ha, while the area studied in an individual year varied from 27,8 ha to 50,2 ha. The area per farm varied from 0,2 ha to 14,0 ha and the average area per farm was 3,0 ha. Besides growing blackcurrant, most of the farmers were engaged in traditional farming and forestry or they had other work outside the farm. The farms were situated in south-west, east and central Finland. The variety Öjebyn was the most commonly cultivated, but Roodknop and Brödrtorp were also grown to a lesser extent.

The study method was the same as that in the study on the consumption of working time in strawberry cultivation. This method was reviewed in the publication YLÄRANTA and RYYNÄNEN (1981).

## Total labour and its distribution

### 1) The fallow period and the planting

Though it is recommended that the ground lie fallow for a period of two years before planting, in practice this period is often no more than one year. The bushes are planted in the autumn, at the end of September or the beginning of October. The labour consumption during this fallow period and the planting summer is broken down in Table 1. The planting machine used was either a forest planter or a planting machine constructed specially for garden plants.

Table 1. Labour consumption (h/ha) in establishing a blackcurrant cultivation.

Task	Man hours	Tractor hours
Ground preparation	31,0	22,5
Fertilizing	10,0	5,5
Planting:		
A. Tractor-drawn plough+shovel	86,0	9,0
B. Tractor-drawn planting machine	37,5	10,0
Diverse	20,0	—
Total:		
A.	147,0	37,0
B.	98,5	38,0

In method A the bushes were planted in furrows ploughed by a tractor drawn plough. They were planted in intervals of 0,5–0,9 m and the rows were 3,5–4,0 m apart. The average number of plants per hectare was 4 000. The average labour output using planting method A was 47 plant per hour and 107 plant per hour using method B.

### 2) The summer following planting

Seven farms had one-year old cultivations covering a total area of 15,3 ha. Table 2 presents the average amount of labour involved in the various tasks.

Most of the labour involved went to weed control (42 %). As frost has raised the plants during the winter, they had to be banked up with top soil in the spring. This was done using a tractor-drawn board and a shovel. There was little need for pruning at this phase of growth. Diverse work included frost protection. The average yield was only 200 kg/ha.

### 3) The first fruiting year

The two-year-old cultivations were classified in a group of their own, as the yield and the need for pruning differ greatly from those of later years. The labour

Table 2. Labour consumption (h/ha) in blackcurrant cultivation during the summer following planting.

Task	Man hours	Tractor hours
<b>1. Cultivation</b>		
Fertilizing	5,0	2,5
Pruning	6,5	—
Disease and vermin control	3,0	2,0
Weed control	35,0	3,5
Banking up the plants	16,0	6,0
Diverse	18,0	2,0
Total	83,5	16,0
<b>2. Harvesting</b>		
	56,0	Yield 200 kg/ha

consumption in cultivation and harvesting tasks are presented in Table 3. Pruning, disease and vermin control and weed control each accounted for 21 % of the total labour consumption. Two harvesting methods were used. The most common method with cultivations of this age (3 years) is the baton-picking. Batons consist of 40–50 cm long pieces of rubber or plastic tubing. The branches are struck with a baton and the berries drop off into a large fibre-glass vessel. Hand picking was applied only in those bushes in which the yield was very low.

Table 3. Labour consumption (h/ha) and yield in the first fruiting year of blackcurrant cultivation.

Task	Man hours	Tractor hours		
<b>1. Cultivation</b>				
Fertilizing	3,5	0,5		
Irrigation	6,5	0,5		
Pruning	18,0	1,5		
Disease and vermin control	7,5	6,0		
Weed control	18,0	3,0		
Diverse	18,0	0,5		
Control	16,0	—		
Total	87,5	12,0		
<b>2. Harvesting</b>				
	Man	Tractor	Yield	
	h/ha	h/1 000 kg	h/ha	harvested kg/ha
A. Hand picking	218,0	242,2	1,0	900
B. Baton picking <sup>1</sup>	210,0	116,5	2,0	1800
Diverse	11,5	—	—	—
Total harvesting h/ha				
Method	A.		1,0	
— " —	B.		2,0	

<sup>1</sup> Including cleaning the berries.

#### 4) Fruiting years

Labour consumption in cultivating full-grown blackcurrant bushes is presented in Table 4. The bushes are at least four years old. All the cultivations were planted in rows sufficiently far apart to allow mechanical harvesting. Methods of fertilizing, pruning, disease, vermin and weed control and harvesting varied from farm to farm. These tasks could be classified as slightly mechanized, on small farms (A) and as highly mechanized on large farms (B). Fertilizing was done by hand (A) or by spreader (B). Pruning was done using short and long-handled shears (A) or using shears and a mechanical trimmer (B). The most commonly used mechanical trimmer was the Finnish 'Joonas'. Labour consumption in pruning includes breaking up the trimmings or collecting them, taking them away and burning. Disease and vermin control was done by knapsack motor sprayer (A) or by tractor sprayer (B). Knapsack sprayer (A) or tractor and knapsack sprayers (B) were used in weed control.

On farms cultivating small areas blackcurrants (less than a hectare) baton picking was applied in harvesting; on the large farms harvester and baton. The method used also depended on the amount of berries on the bushes. Two types of harvesters — English Pattenden Straddle Harvester or Finnish Joonas Harvester — were used. Picking by baton required 4–6 pickers per hectare. The pickers worked in pairs. The labour output (kg/man/hour) was 88 kg/h with a harvester, 10 kg/h with batons and 4 kg/h by hand.

Table 4. Labour consumption (h/ha) and yield (kg/ha) in blackcurrant cultivation during fruiting years.

Task	Method A		Method B		
	Man hours	Tractor hours	Man hours	Tractor hours	
<b>1. Cultivation</b>					
Fertilizing	9.0	—	6.0	2.5	
Irrigation	11.0	4.0	11.0	4.0	
Pruning	65.0	4.0	30.0	6.5	
Disease and vermin control	31.0	—	8.5	6.0	
Weed control	17.5	—	14.5	3.5	
Diverse	13.0	1.5	13.0	1.5	
Control	12.0	—	12.0	—	
Total	158.5	9.5	95.0	24.0	
<b>2. Harvesting</b>					
	Man h/ha	Man h/1000 kg	Tractor h/ha	Harvester h/ha	Yield kg/ha
A. Baton <sup>1</sup>	400.0	100.0	6.0	—	4 000
B. Harvester	37.5	11.5	8.0	6.0	3 300
(Hand picking <sup>2</sup> )	(210.5)	(263.1)	(1.0)	(—)	(800)
Supervision	16.5				
Diverse	8.0				
<b>Total</b>					
A.	424.5		6.0	—	
B.	62.0		8.0	6.0	

<sup>1</sup> Including cleaning the berries.

<sup>2</sup> After mechanical harvesting.



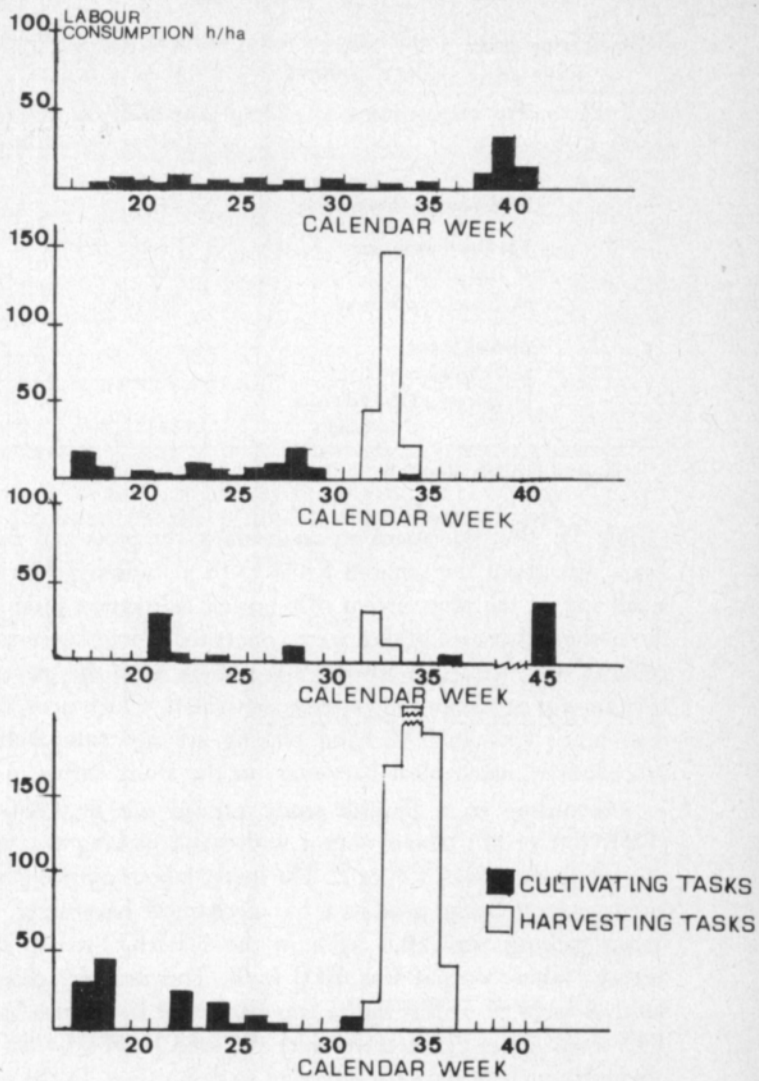


Fig. 1. The distribution of labour (h/ha) in blackcurrant production: planting (above), during the first fruiting year (second) and during normal fruiting years, by mechanical harvester (third) and by baton (below).

##### 5) The distribution of working time per week

The distribution of working time per week is described in Figure 1. The diagram above illustrates the distribution of fallow tasks per week. The bushes had been planted mechanically in week 40. The second diagram illustrates the first fruiting years. Baton and hand picking were the harvesting methods applied at this phase of cultivation. The two last diagrams show the normal fruiting years. In the first case the blackcurrants were harvested mechanically and in the second using batons and by hand.

##### Discussion

Not many studies have been made of the labour consumption in blackcurrant cultivation. KRÅKEVIK (1973) has reported on Norwegian studies. According to his study labour consumption was greater than that in the results presented here

Table 5. Consumption of man hours per hectare and yield (kg/ha) in blackcurrant cultivation according to Norwegian and Finnish studies.

Phase of cultivation	KRÅKEVIK 1973	Present study
Establishment of cultivation:	243	123,0 <sup>1</sup>
The first fruiting year:		
a) Cultivation	99	87,5
b) Harvesting by hand	198 (760)	218,0 (900)
Fruiting years:		
a) Cultivation	222	127,0 <sup>1</sup>
b) Harvesting by harvester		37,5 (3300)
by hand	1492 (7280)	210,5 (800)

<sup>1</sup> averages of methods A and B

(Table 5). The time spent on establishing the plots and cultivations during fruiting years was about the same in KRÅKEVIK's studies in Norway as in this study. The small size of the plots meant that not all cultivation tasks could be mechanized. As far as the full-grown bushes were concerned, about twice as much time was spent on pruning with shears in KRÅKEVIK's study as in the present one. The main reason for this was probably the varieties cultivated, which needed pruning differently. The man hours consumed in hand picking are not comparable, as hand picking was preceded by mechanical harvester on the study farms in Finland.

According to a Finnish study carried out in 1980 — the HERKO study (LISKOLA et al.) labour output with hand picking was 6,3 kg/h, whereas in the present study it was 3,8 kg/h. The lower labour output in the latter case was due to hand picking being produced by mechanical harvesting. The labour output with baton picking was 16,0 kg/h in the HERKO-study. In the present study the average labour output was 10,0 kg/h. This includes cleaning the berries and idle time. A yield of 5 000 kg/ha was harvested by Joonas harvester in 4,5 hours and 13,5 man hours per hectare were required (LISKOLA et al. 1980). These figures obviously include only the effective working time. In the present study 6,0 machine hours and 37,5 man hours per hectare were consumed when the average yield was 3 300 kg/ha.

The variation in labour consumption is very remarkable and the reasons for this are not easily identified. The cultivation method, cultivation area, size of the yield and the harvesting method account for only appr. 20 % (of) the variation according to regression analysis. In Finland, large scale blackcurrant cultivation is in its very early stages. Less than ten years have elapsed since intensive development started in this field. Growers are just getting to know the different methods, and they have developed their machinery, especially harvesting machines, themselves. Well planned blackcurrant cultivation areas do exist and cultivation and harvesting methods are being rationalized. On the best farms the work done on cultivation was only approx. half the average for both the very slightly mechanized group (A) and the highly mechanized one (B).

Labour consumption in harvesting, will clearly decrease in the future, when cultivations reach normal fruiting level and cultivation methods are developed according to the best known methods.

## References

- KRÄKEVIK, S. 1973. Arbeidsforbruket i solbaerproduksjonen. *Forskn. og fors. i landbr.* 24, 4: 341–356.
- LISKOLA, K., TAHVONEN, R. & HYTÖNEN, T. 1980. Herukan konekorjuu — HERKO. Sitra. Sarja B. 56. 80 p. Helsinki.
- YLÄRANTA, M. & RYYNÄNEN, V. 1981. Consumption of working time in strawberry production. *J. Scient. Agric. Soc. Finl.* 53: 75–82.

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## SELOSTUS

### Mustaherukan työnmenekki

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Vuosina 1977–80 tutkittiin mustaherukanviljelyn työnmenekkiä 29 maatilalla. Tutkimuksessa oli mukana yhteensä 136,7 ha mustaherukkaa.

Työnmenekki selvitettiin erikseen perustamisvaiheessa, hoitokesänä, ensimmäisenä satokesänä ja varsinaisina satokesinä. Sadonkorjuuta koskevat havainnot tehtiin koneellisesta korjuusta sekä patukka- ja käsinpoiminnasta.

Perustamisvaiheen ihmistyönmenekki oli koneellista istutusta käytettäessä yhteensä 98,5 h/ha. Traktoriaralla ajettuihin vakoihin lapiolla istutettaessa ihmistyönmenekki kohosi 147,0 tuntiin hehtaaria kohti. Hoitokesänä viljelys vaati keskimäärin 83,5 h/ha ihmistyötä. Ensimmäisenä satokesänä hoitotöihin kului 87,5 h/ha. Tutkimusajanjakson marjanviljelylle epäedullisten sääolojen takia ensimmäisen vuoden sato käsinpoimituilla lohkoilla jäi 900 kg/ha. Käsinpoimintaan käytettiin 218,0 h/ha. Viljelmillä, joilla käytettiin patukkapoimintaa, sato oli ensimmäisenä kesänä 1 800 kg/ha. Työnmenekki oli 210,0 h/ha. Täysi-ikäisten kasvustojen hoitotöihin kului käytettäessä vähän koneellistettua menetelmää 158,5 h/ha ja käytettäessä koneellistettua menetelmää 95,0 h/ha. Patukkapoimintaan (sato 4 000 kg/ha) käytettiin 400,0 h/ha. Koneelliseen sadonkorjuuseen (sato 3 300 kg/ha) tarvittiin konetyötä 6 h/ha ja 37,5 h/ha ihmistyötä. Konepoiminnan jälkeen suoritettiin vielä jälkipoiminta käsin (sato 800 kg/ha), johon käytettiin työtä 210,5 h/ha. Lisäksi työnjohtoon ja sekalaisiin töihin kului poiminta-aikana 24,5 h/ha.