RESEARCH NOTE

JOURNAL OF AGRICULTURAL SCIENCE IN FINLAND
Maataloustieteellinen Aikakauskirja
Vol. 59: 37—40, 1987

STUDIES ON PRODUCTION TECHNIQUES OF SOME HERB PLANTS

II Row spacing and cutting height of dill herb (*Anethum graveolens* L.)

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Abstract. A study was undertaken to determine the row spacing and cutting height of dill to produce a good quality herb in terms of high proportion of leaves. The row spacings were 12.5 or 25 cm, and the herb was harvested to the stubbles of 7.5, 11 or 15 cm.

The greatest dry leaf yield, 8 kg/100 m², was achieved with the narrow row spacing and lowest stubble. The proportion of leaves of the dry herb was highest (68 %) when cut to the highest stubble. The difference in the yields between the cuttings of 7.5 and 15 cm was significant, only. The relation between the dry and fresh yields (11 %) remained unaffected.

Index words: cutting, dill, herb yield, row spacing

Introduction

Many studies have been carried out to determine the optimum plant density for horticultural crops, however, only few of those are for herb plants. Plant density influences the plant growth and yield. Generally, with increasing plant density the dry matter content and mean plant and fruit size decreases. At the same time the total yield increases (e.g. FRANZ and FRITZ 1978 and GARRABRANTS and CRAKER 1986). HEEGER and SCHRÖDER (1958) and PUTIEVSKY and BASKER (1977), on the other hand, found marjoram yield (*Origanum majorana* L.) not respond to row spacing.

There is growing interest in the Nordic countries to produce dill herb for drying in addition to fresh use. Thick stems have caused problems because they retard drying and lenghten the drying time. Leaves, instead, will dry in shorter period of time and might lose color and volatile oils during the long drying period. Good quality dill herb consists mainly of leaves. A study was carried out at the University of Helsinki in purpose to produce abundant and good quality dill yield in terms of high proportion of leaves. The effect of row spacing and cutting height of the herb was investigated.

Materials and methods

The row spacings were 12.5 and 25.0 cm which are commonly used in mechanical dill

production. The crop was harvested at leaf stage, before flower bud formation. The three cutting heights were 7.5, 11.0 and 15.0 cm. The lowest cutting was the practical minimum in mechanical harvesting and the highest one supposed to leave largest proportion of stems in the field.

Dill ('Dura') was sown at the rate of 200 g/100 m² on a humous loamy soil on June 2. Compound fertilizer (0.8—0.8—1.6 kg NPK/100 m²) was broadcast before sowing dill, weeds were controlled by linuron before germination of dill, and the field was irrigated during the dry periods.

Plant density, height of the crop stand and diameter of stems (basal end of the cut herb) were measured, fresh and dried herb yields were weighed. The stems and leaves were separated and weighed before and after drying. The herb was freeze-dried as described by MÄKINEN et al. (1986).

The field trials were set up using a split-plot (4.5 m² each) design in quadruplicate. Statistical analysis was done using the analysis of variance and the means were separated by Tukey's and Student-Newman-Keuls' tests (STEEL and TORRIE 1980).

Results and discussion

The plants reached a height of 30 cm by the harvest time on July 15. The row spacing did not affect the height of the dill crop. There were no significant differences in the number of plants (1342—1446 plants/m²) per unit area between the row spacings. The density was 90 plants/m at a row spacing of 12.5 and significantly ($p < 0.05$) larger, 168 plants/m, at a spacing of 25 cm.

The total fresh herb yields ranged from 80 to 138 kg/100 m² (Table 1). The relation of the dry and fresh yields accounted for 9.9—11.6 %, the total dry herb yield being 7.0—16.7 kg/100 m². The proportion of the leaves in the total herb ranged from 55.9—70.2 %.

The total dry yields were 13.1 and 9.9 kg/100 m², and the separated leaf yields (dry) 7.8 and 6.1 kg/100 m² with the row spacings of 12.5 and 15 cm, respectively. The differences were significant ($p < 0.1$) (Fig. 1). FRANZ and FRITZ (1978) and GARRABRANTS and CRAKER (1986) have also reported on larger yields of aromatic plants when grown with narrow row spacings.

Table 1. Total herb and leaf yields (fresh and dry) and diameters of fresh stems in relation to cutting height of dill (Tukey 0.05) (Helsinki 1986).

Stubble cm	YIELDS (kg/100 m²)				DIAMETER of stems mm
	Fresh		Dry		
	Total	Leaves	Total	Leaves	
7.5	138.2a	63.5a	14.6a	8.1a	2.8a
11	106.5b	56.4a	11.5b	7.1ab	2.9a
15	80.3c	50.8b	8.4c	5.7b	2.4b

The yields were the larger the lower the crop was cut, and inversely, proportion of the leaves increased the higher the crop was cut. The highest proportion of leaves, 68 %, was in the herb which was cut at 15 cm. The figures are presented in Table 1 and Figure 2.

The diameters of the fresh stems ranged from 2.4 to 2.9 mm (Table 1). The figures being lowest when cut to the stubble of 15 cm. The difference was significant ($p < 0.05$).

Accordingly, cutting at 15 cm resulted in significantly smaller fresh yields than those at 7.5 and 11 cm, but in the important dry leaf yields the difference was significant only

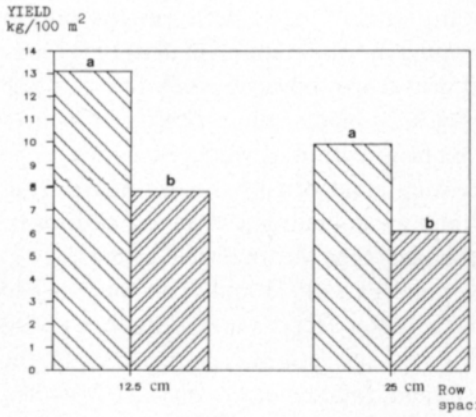
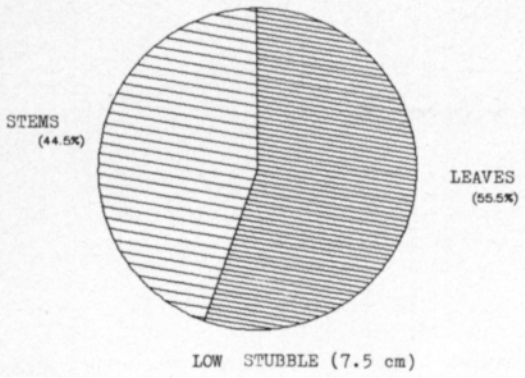
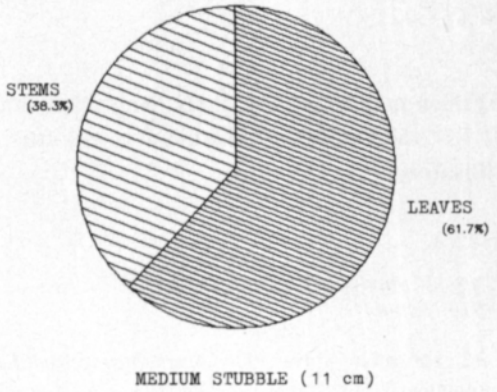


Fig. 1. Total herb (a) and leaf yields (b) (dry) of dill grown at row spacings of 12.5 and 25 cm (Helsinki 1985).





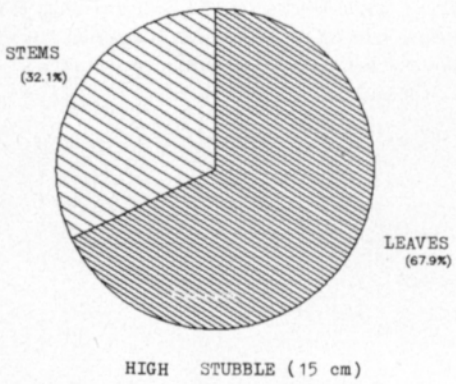


Fig. 2. Proportions of stems and leaves in dill herb harvested to low (7.5 cm), middle (11 cm) and high (15 cm) stubble (Helsinki 1985).

between the cuttings of 7.5 and 15 cm. The largest proportion of leaves and thinnest stems, however, support the cutting of dill herb to a high stubble.

Postharvest handling, specifically the rates and costs of drying with different proportion of stems and leaves, as well the effects of the treatments in different crop stands warrant further investigation to determine the most profitable techniques for the production of dill herb.

Acknowledgements. I wish to thank Leena Puukka and Kirsti Pääkkönen for technical assistance. This work was supported by the Ministry of Agriculture and Forestry and the Tiura foundation.

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Ms received January 29, 1987

Eräiden maustekasvien viljelyteknisiä kokeita. II Rivivälin ja leikkuukorkeuden vaikutus tillisatoon

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Kiinnostus kuivattavan tillin (*Anethum graveolens* L.) tuottamiseen on kasvanut viime vuosina. Yhtenä ongelmana kuivauksessa on kuitenkin ollut tillin paksut varret, jotka kuivuvat hitaammin kuin lehdet ja nostavat siten kustannuksia pidemmän kuivausajan takia. Hyvälaatuisessa kuivatussa yrtissä tulisi lehtien osuuden olla mahdollisimman suuri. Yhtenäiset mausteiden laatukriteerit Suomesta kuitenkin puuttuvat.

Vuonna 1986 selvitettiin Helsingin yliopiston puutarhatieteen laitoksella rivivälin ja leikkuukorkeuden vaikutusta lehtitillin satoon. Rivivälit olivat 12.5 ja 25 cm. Sato leikattiin 7.5, 11 ja 15 cm:n korkeudelta ja kuivattiin pakkaskuivurilla. Suurin kuivattu lehtitillisato (8 kg/ 100 m²) saatiin viljeltäessä 12.5 cm:n rivivälillä ja korjattaessa sato 7.5 cm sänkeen. Lehtien osuus kokonaissadosta oli suurin (68 %) silloin kun sato leikattiin 15 senttimetrin sänkeen.