



Summer-autumn Cultivation of Dill (*Anethum graveolens*)

INTRODUCTION

Dill (*Anethum graveolens* L.) is an annual plant originally native to Mediterranean area. Most suitable term for dill open field cultivation ranges from April to October. Dill herb is extremely valuable in various natural pigments especially in chlorophyll and carotenoids.

However, due to physiological traits leafy plants are without question, those vegetables with the highest accumulation of nitrates which are major undesirable compounds in human diet. Objective of research was about establishing relation among quality of dill from different harvest terms, based on content of natural pigments and macroelements.

MATERIAL AND METHODS

The dill cultivars i.e 'Lukullus' and 'Moravan' are destined to all-year round cultivation were used in the present experiment.

The experiment was carried out on the experimental field in Wilanów in the years 2012 and 2013 in the summer (I), autumn (II) term [Table 1]. Field experiment was design in the random blocks system in three replications. Seeds were sown directly in open field on June 08-10 and July 22-28.

Samples of fresh cut dill (15-20 cm height) precisely prepared for analyses ranged among 10 g for nitrates and sugars, 0.25-0.26 g for total carotenoids. Contamination of dry matter was measured in 5 g of raw material. The determination of the weight loss was performed by the drying method at the temperature of 105 °C, results presented in the mass fraction [%]. Accumulation of nitrates (NO₃) was determined with spectrophotometer Tecator FIAstar 5010 with the wavelength 540 nm, results presented in mg×100 g⁻¹ of fresh weight. Overall sugars were measured with Luff-Schoorl method, results presented in mg×100 g⁻¹ of fresh matter. The content of overall carotenoids were investigated using the 80% acetone extraction method with results presented in µg×1 g⁻¹ for chlorophylls as well carotenoids µg×100 g⁻¹ according to dry matter. The obtained results were analysed statistically with the two factor analysis of variance at the significance level of α=0,05 (programme ANOVA 2). The comparison of means was done using the Tukey's test.

Table 1. Terms of sowing and harvest of dill grown in the field

Step	Year	Summer term (I)	Autumn term (II)
Sowing	2012	10.VI	20.VII
	2013	08.VI	28.VII
Harvest	2012	01.VIII	19.IX
	2013	09.VIII	23.IX

RESULTS

Total carotenoids were significantly higher in autumn harvest term 09 2013 in 'Lukullus' (3.09 µg). Investigation showed the lowest amount of chlorophyll b in every term of harvest. Significantly higher concentration of chlorophyll a was observed in 'Lukullus' and 'Moravan', 1.40µg; 1.29µg, respectively (Fig. 3). Moreover, experiment demonstrate content of dry matter was situated on similar ratio but was significant higher in 3rd term compared to rest combination (Fig. 2). Autumn term of cultivation significantly affect accumulation of nitrates. Illustrating results, the highest accumulation of nitrates was observed in 'Lukullus' in 4th harvest term (258.0 mg×100 g⁻¹) (Fig. 4). The experiment had shown that the significantly highest amount of total sugars was in 'Lukullus' (0.41 mg×100 g⁻¹). However, overall sugars maintain on similar level on each term (Fig. 1).

CONCLUSIONS

1. Significant amount of investigations are necessary to gain a full picture of research. Collected data also confirm the dogma of low light intensity radiation in autumn term causing high accumulation of nitrates in plant tissue.
2. Cultivar Lukullus characterise with highest level of total sugar situated in similar ratio on every term of harvest.
3. Both terms of harvest influence positively on total carotenoids as well as chlorophyll a content.

Figure 1. Influence of term of cultivation on total sugar content (mg × 100g⁻¹ g fw) in fresh dill

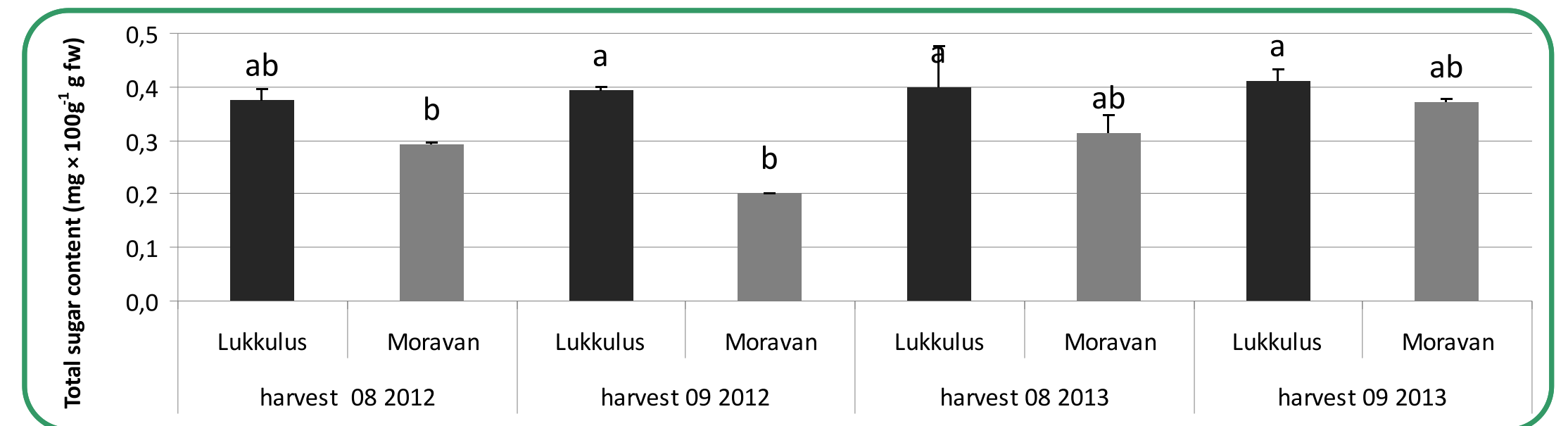


Figure 2. Influence of term of cultivation on dry matter content (%) in fresh dill

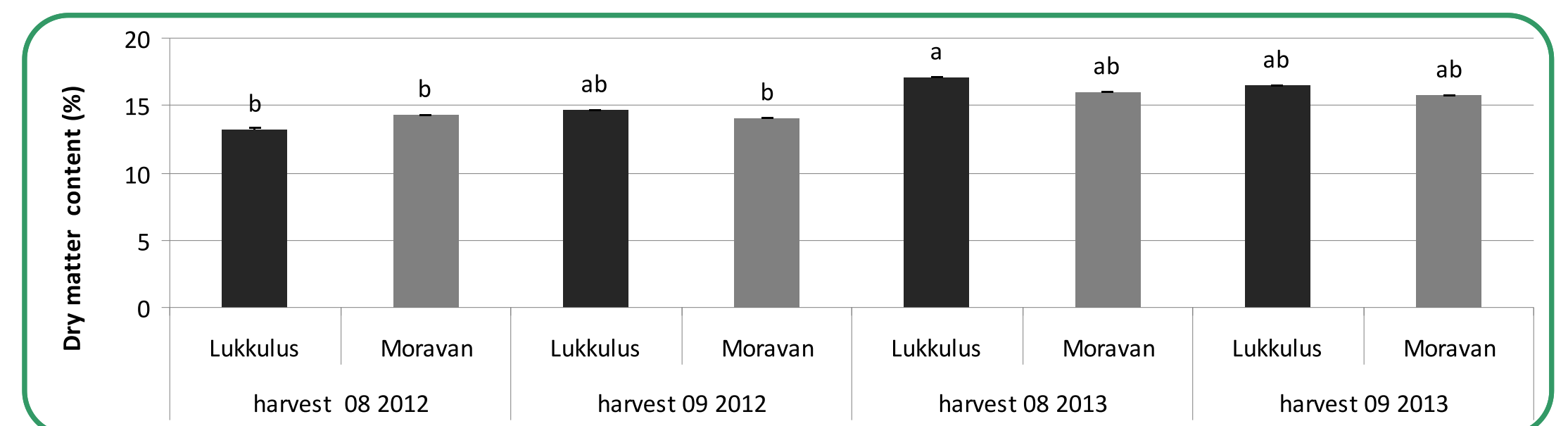


Figure 3. Influence of term of cultivation on chlorophyll a and b (µg × 1g⁻¹ dw) and total carotenoids (µg × 100g⁻¹ dw) content in fresh dill

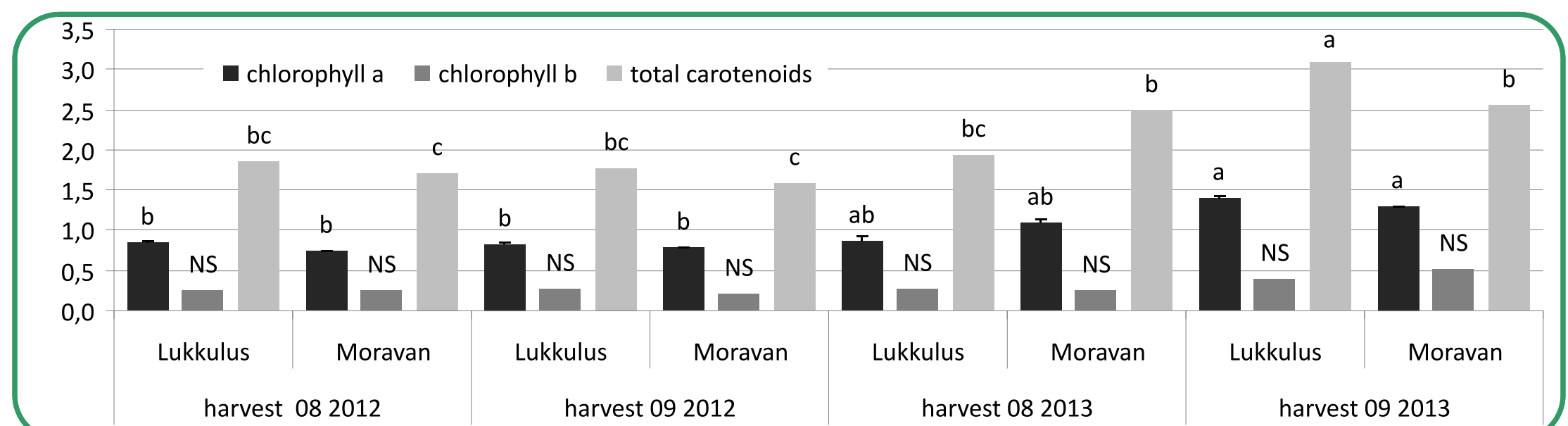
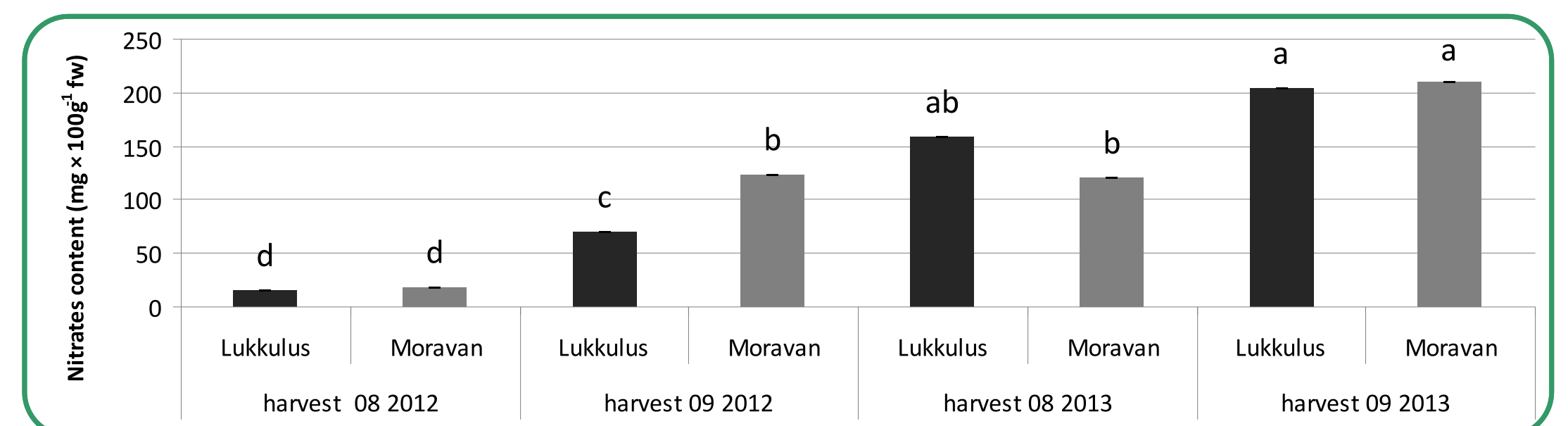


Figure 4. Influence of term of cultivation on nitrates content (mg × 100g⁻¹ fw) in fresh dill



NS, not significant (p.>0.05)



author



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