

# Influence of Fiber Hemp Crop Density on Weeds and Productivity

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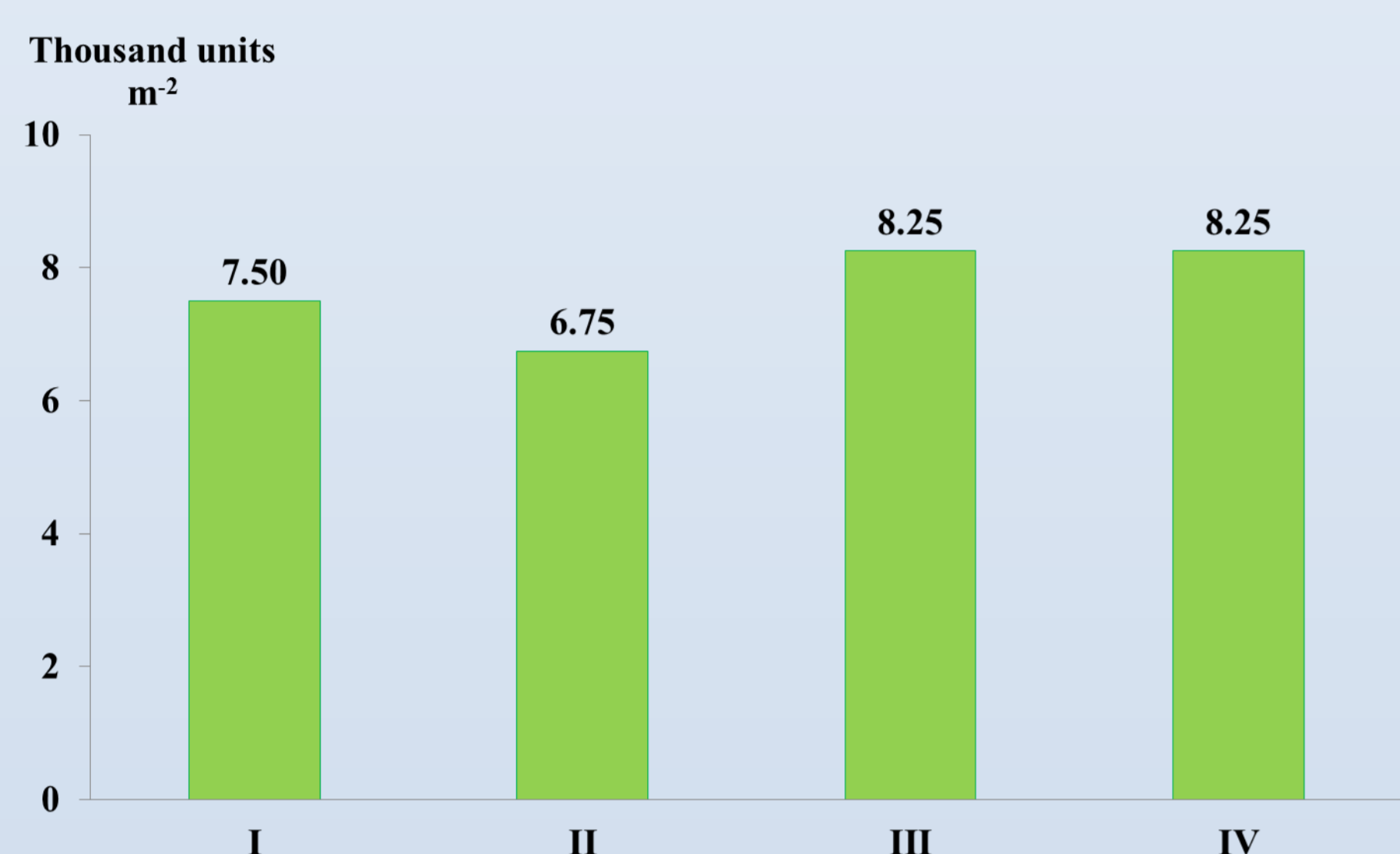
**Rationale:** Relevance of the topic. In Lithuania, hemp has been grown for a long time, but its cultivation technologies have not been widely studied. Therefore, conducting research will allow you to analyze, determine how efficiently sown hemp can be grown.

The research was carried out in a field experiment in Varkaliai village, Plungė district. The research was conducted in 2019. The experiment was performed in 3 replicates. There are a total of 9 fields for each plant. The initial size of the fields is 20 m<sup>2</sup> (10 x 2 m) and the accounting size is 15 m<sup>2</sup> (10 x 1.5 m). The experiment variation fields are arranged randomized. The protective strip of the field is 4.5 m wide, and between repetitions - 9 m wide.

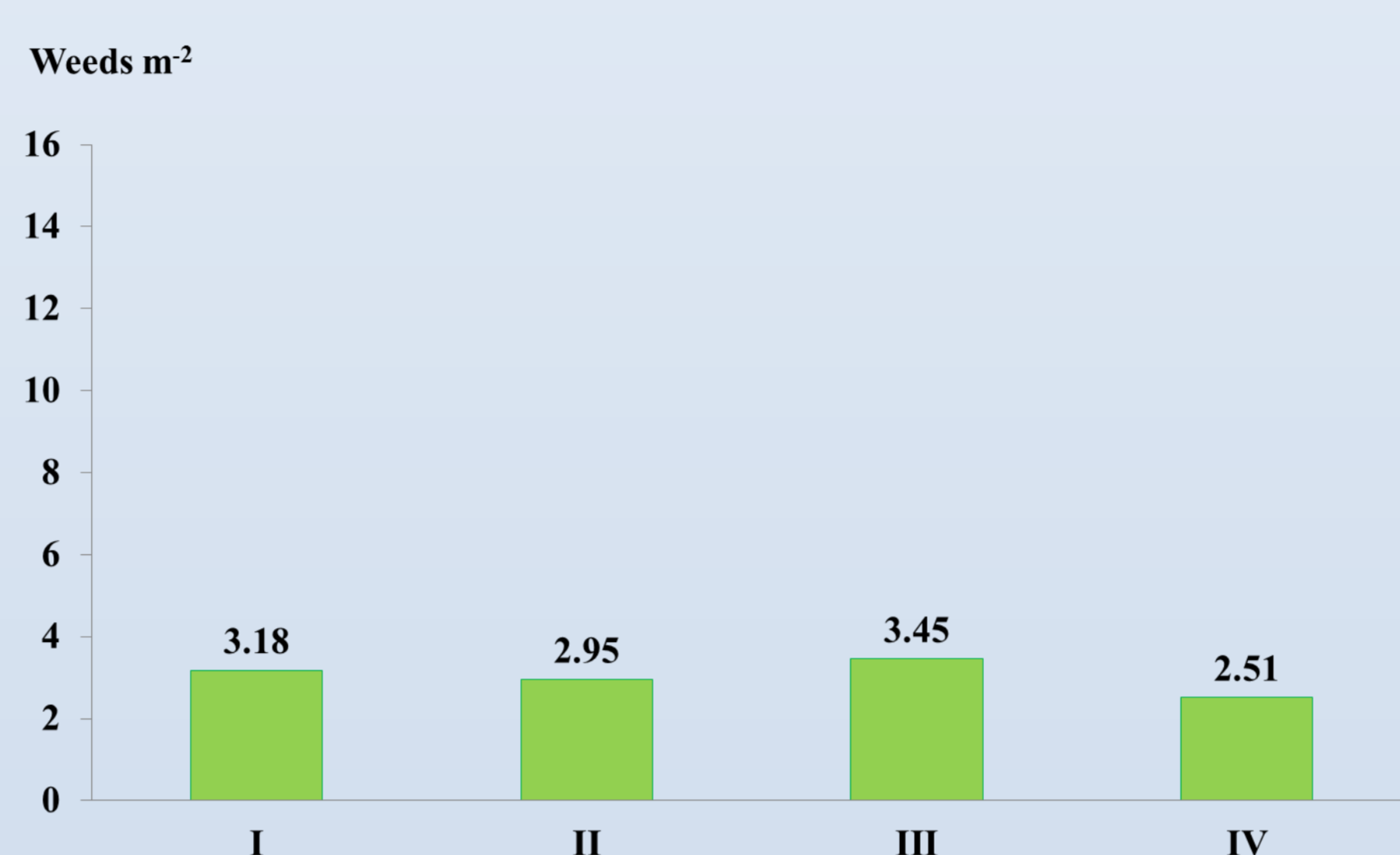
**The aim** of this study was to evaluate the influence of sowing rates on the weediness and productivity of sown hemp crops. "Sowing hemp": variety - "FUTURA 75". Seed rate - 5 kg ha<sup>-1</sup>, 25 kg ha<sup>-1</sup>, 16 kg ha<sup>-1</sup>, 69.12 kg ha<sup>-1</sup>. Sowing depth - 2 cm.



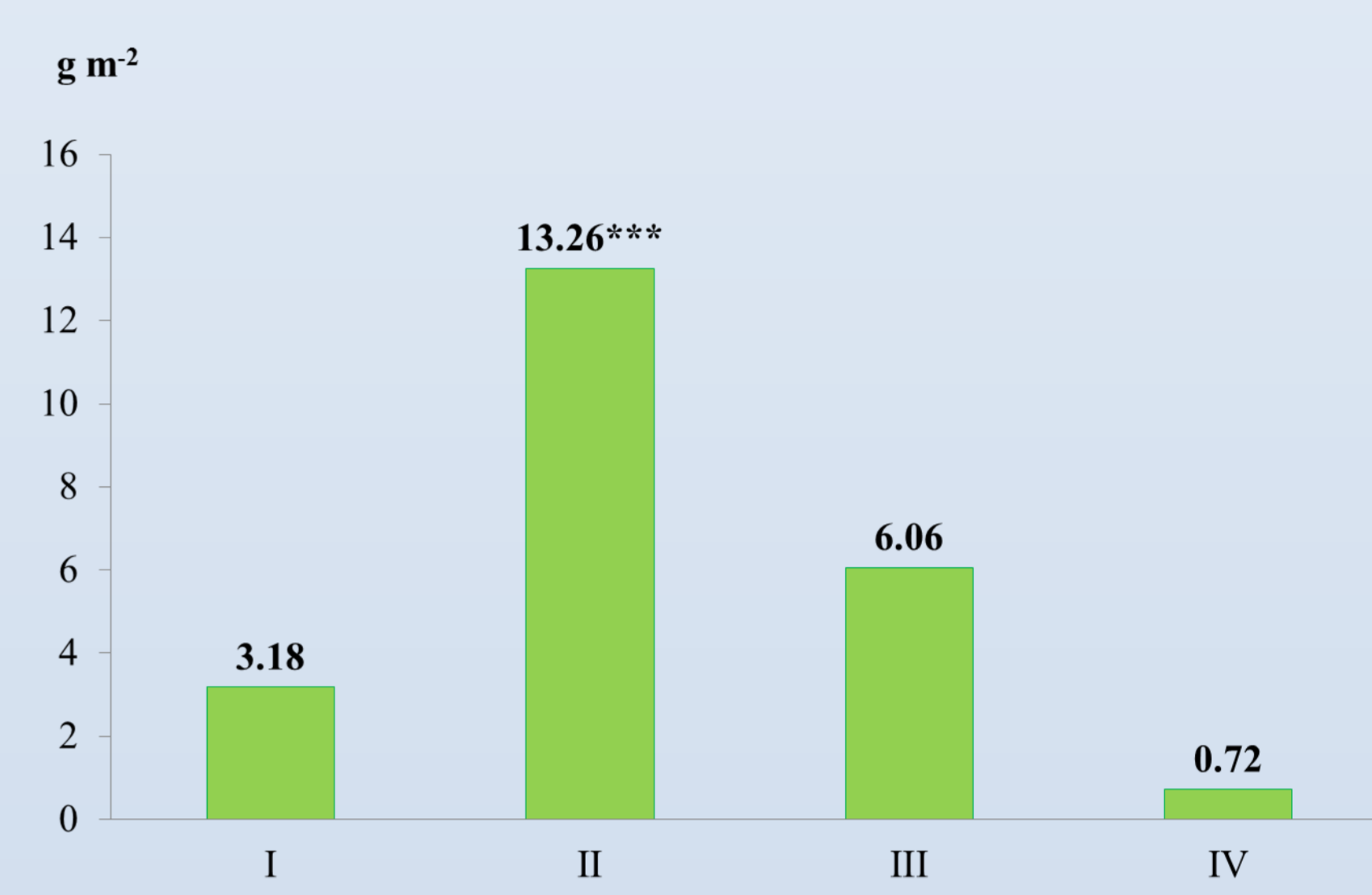
**Figure 1.** The experiment fields of Fiber hemp (*Cannabis sativa* L.)



**Figure 2.** The amount of weed seeds in the fiber hemp (*Cannabis sativa* L.) crop before harvest. I – 25,00 kg ha<sup>-1</sup>; II – 5,00 kg ha<sup>-1</sup>; III – 16,00 kg ha<sup>-1</sup>; IV – 69,12 kg ha<sup>-1</sup>. P > 0.05



**Figure 3.** Weed content in fiber hemp (*Cannabis sativa* L.) before harvest. I – 25,00 kg ha<sup>-1</sup>; II – 5,00 kg ha<sup>-1</sup>; III – 16,00 kg ha<sup>-1</sup>; IV – 69,12 kg ha<sup>-1</sup>. P > 0.05

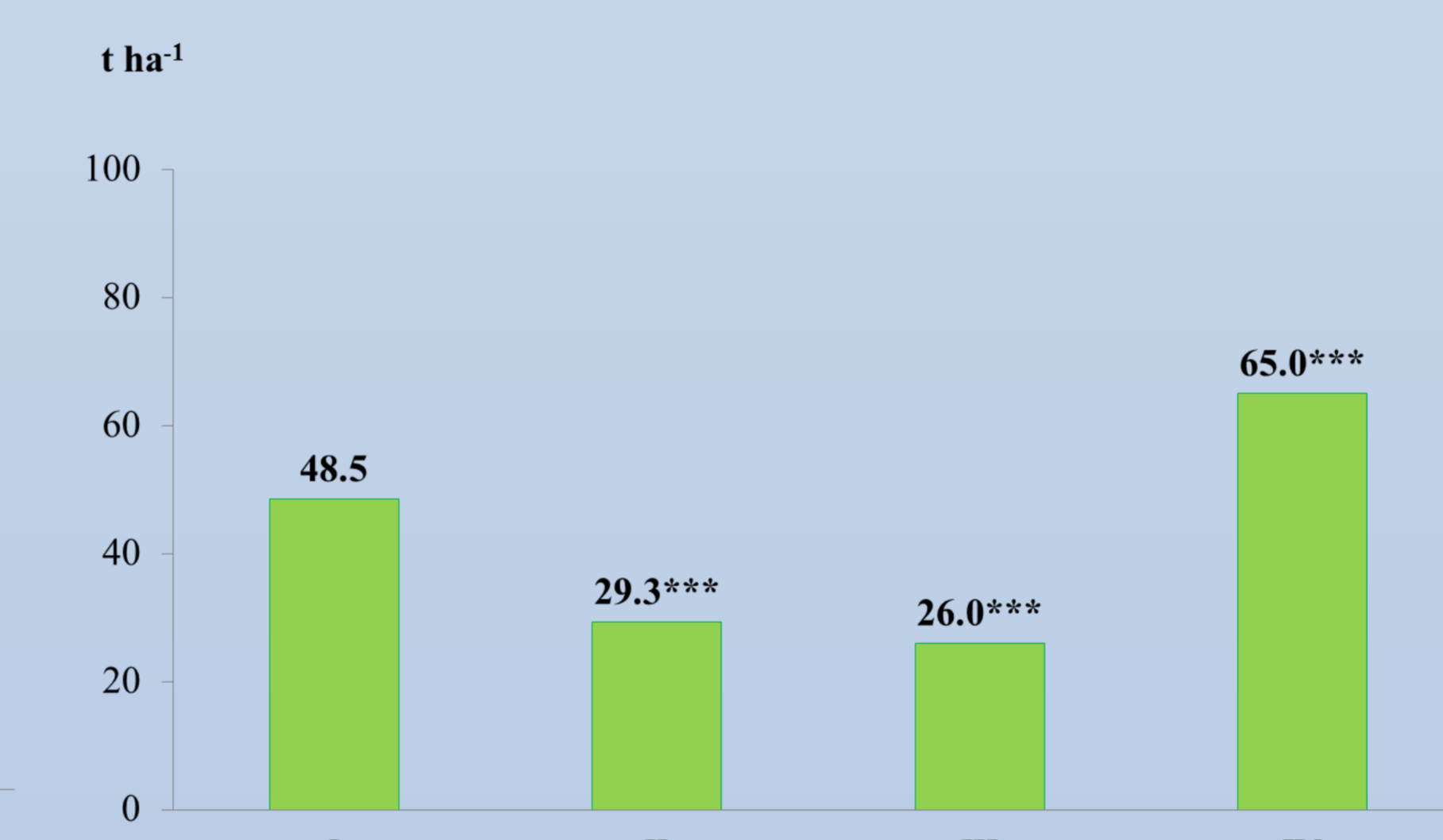


**Figure 4.** Weed mass in hemp fiber (*Cannabis sativa* L.) before harvest. I – 25,00 kg ha<sup>-1</sup>; II – 5,00 kg ha<sup>-1</sup>; III – 16,00 kg ha<sup>-1</sup>; IV – 69,12 kg ha<sup>-1</sup>. Significantly different, \*\*\*99.9% probability level.

**Results.** In the fields where the sowing rates were applied 16.00 kg ha<sup>-1</sup> and 69.12 kg ha<sup>-1</sup> the total amount of weed seeds in the soil was found to be 1.1 times higher, compared to the fields where the seed rate was applied 25.00 kg ha<sup>-1</sup> (Fig. 2). Comparing different sowing rates with the control variant fields, no significant sieves were found (Figure 3). Significantly higher weed biomass was found to be 4.2 times higher in the fields with the lowest crop density compared to the control variant fields (Fig 4.).



**Figure 5.** Green mass of fiber hemp (*Cannabis sativa* L.) flowers. I – 25,00 kg ha<sup>-1</sup>; II – 5,00 kg ha<sup>-1</sup>; III – 16,00 kg ha<sup>-1</sup>; IV – 69,12 kg ha<sup>-1</sup>. Significantly different, \*\*\*99.9% probability level.



**Figure 6.** Green mass of fiber hemp (*Cannabis sativa* L.) stems and leaves. I – 25,00 kg ha<sup>-1</sup>; II – 5,00 kg ha<sup>-1</sup>; III – 16,00 kg ha<sup>-1</sup>; IV – 69,12 kg ha<sup>-1</sup>. Significantly different, \*\*\*99.9% probability level.



**Figure 7.** Fiber hemp (*Cannabis sativa* L.) cannabidiol content in the flowers. I – 25,00 kg ha<sup>-1</sup>; II – 5,00 kg ha<sup>-1</sup>; III – 16,00 kg ha<sup>-1</sup>; IV – 69,12 kg ha<sup>-1</sup>. Significantly different: \*95% probability level.

Significantly the highest flowering biomass yield obtained in 59.5 t ha<sup>-1</sup> crops was 69.12 kg ha<sup>-1</sup> sowing rate compared to the control variant fields (Fig. 5). The green weight of hemp stems and leaves was found to be significantly 1.3 times higher in the fields where 69.12 kg ha<sup>-1</sup> was applied, compared to the seed rate of 25.00 kg ha<sup>-1</sup> ( Fig.6). Significantly, the highest content of 4.03 cannabidiol (CBD) was found in the fields with the lowest applied seed rate (5.00 kg ha<sup>-1</sup>) (Fig. 7). The minimum amount of 2.28 CBD was found in the fields with the highest seed rate.



**Figure 8.** The experiment fields of Fiber hemp (*Cannabis sativa* L.)

• **Conclusion** Different crop densities did not have a significant effect on weed seed bank compared to the sowing density of 25.00 kg ha<sup>-1</sup>. Lower weed content and biomass were found in the densest (69.12 kg ha<sup>-1</sup>) crop of sowing hemp. Using a seed rate of 16.00 kg ha<sup>-1</sup>, higher weed content and biomass were determined. The rarest (5.00 kg ha<sup>-1</sup>) crop of sown hemp had a different effect on weediness. Significantly higher biomass of sowing hemp flowers, stems and leaves was found in the densest crop (69.12 kg ha<sup>-1</sup>) compared to the control variant fields. The minimum amount of 2.28 cannabidiol (CBD) was found in the fields with the highest seed rate. Significantly, the highest content of 4.03 cannabidiol (CBD) was found in the fields with the lowest applied seed rate (5.00 kg ha<sup>-1</sup>). A higher but insignificant amount of cannabidiol (CBD) was found in the fields where the seed rate was 16.00 kg ha<sup>-1</sup>, compared to the sowing density of 25.00 kg ha<sup>-1</sup>.

• **Key words:** fiber hemp, weediness, cannabidiol.