EFFECT OF METHODS OF WEED CONTROL ON THE CONTENT OF TOTAL AND PROTEIN NITROGEN IN POTATO TUBERS

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INTRODUCTION

Modern agriculture poses new challenges for farmers, one of which is the need to produce "safe" and "organic" food. The idea of protecting biodiversity, the natural environment and the consumer is becoming more and more popular and leads to the search for various methods of growing plants while reducing the pressure on the surrounding natural environment. The objective of the research was to determine the effect of herbicides and biostimulants on the content of total nitrogen, protein nitrogen and nitrogen uptake by tubers of edible potato cultivars.

MATERIAL AND METHODS

Research results were obtained in a three-year (2012-2014) field experiment carried out in central-eastern Poland. The experiment was set up as a split-plot arrangement with three replicates.

The factors were as follows:

factor I – three medium-early table potato cultivars - Bartek, Gawin, Honorata,

factor II – five methods of application of herbicides and biostimulants: 1. control object - mechanical weeding – without herbicides and biostimulants, 2. mechanical-chemical weeding and 7-10 days after planting the tubers Harrier 295 ZC (linuron+ clomazone) herbicide - 2.0 dm^3 ha^{-1}, 3. mechanical-chemical weeding and 7-10 days after planting the tubers Harrier 295 ZC (linuron+ clomazone) herbicide - 2.0 dm^3 ha^{-1} + at the end of plant emergence Kelpak SL biostimulant - 2.0 dm^3 ha^{-1}, 4. mechanical-chemical weeding and just before emergence Sencor 70 WG (metribuzin) herbicide - 1.0 kg ha^{-1}, 5. mechanical-chemical weeding and just before emergence Sencor 70 WG (metribuzin) herbicide - 1.0 kg ha^{-1} + Asahi SL biostimulant 1.0 dm^3.

Total nitrogen content was determined in the dry weight of tubers using the Kjeldahl method. The results of the three-year study were subjected to the variance analysis and the significance of the differences between the mean was determined by the Tukey`s test method at the significance level of $p \leq 0.05$.

RESULTS

- Chemical analyzes have shown and statistical calculations have confirmed a significant effect of cultivars, biostimulants and weather conditions in the years of the research on the content of total and protein nitrogen in tubers and on nitrogen uptake by potato tubers.
- The cultivars differed in terms of the accumulation of the discussed components. The Bartek variety was characterized by the highest content of total and protein nitrogen, and the Honorata variety was characterized by the highest nitrogen uptake by potato tubers.
- Tubers of plants sprayed with herbicides in combination with biostimulants were characterized by higher nitrogen and total and protein content.

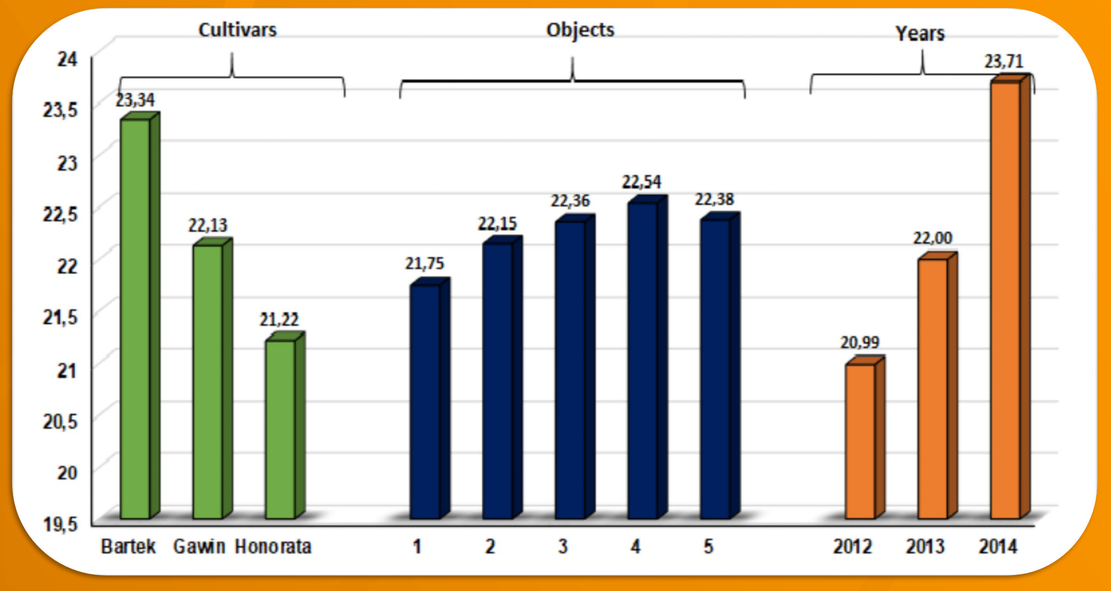

Figure 1. The content of total nitrogen in potato tubers

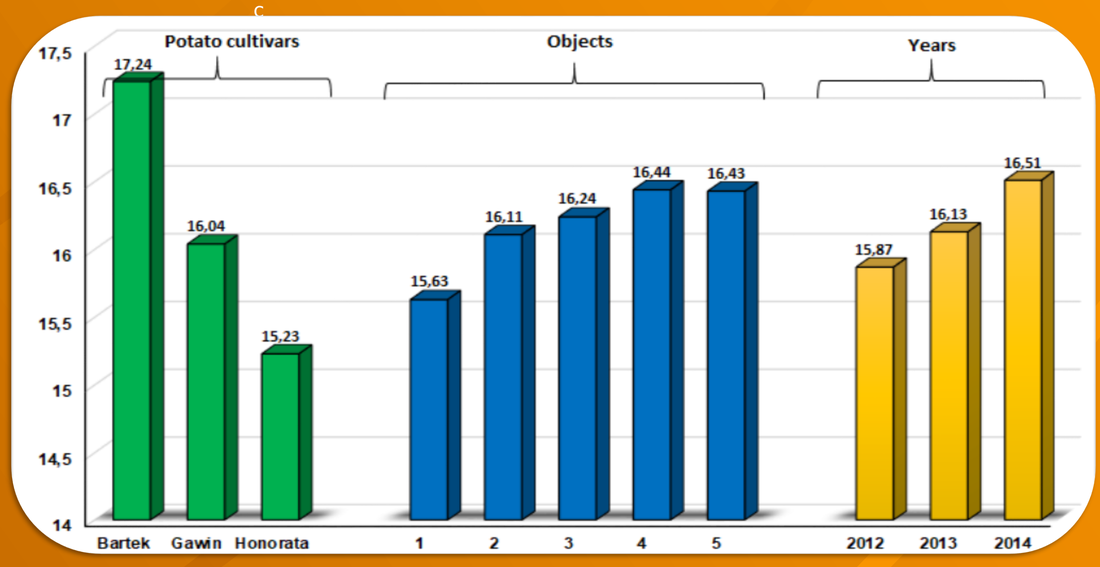

Figure 2. The content of protein nitrogen in potato tubers

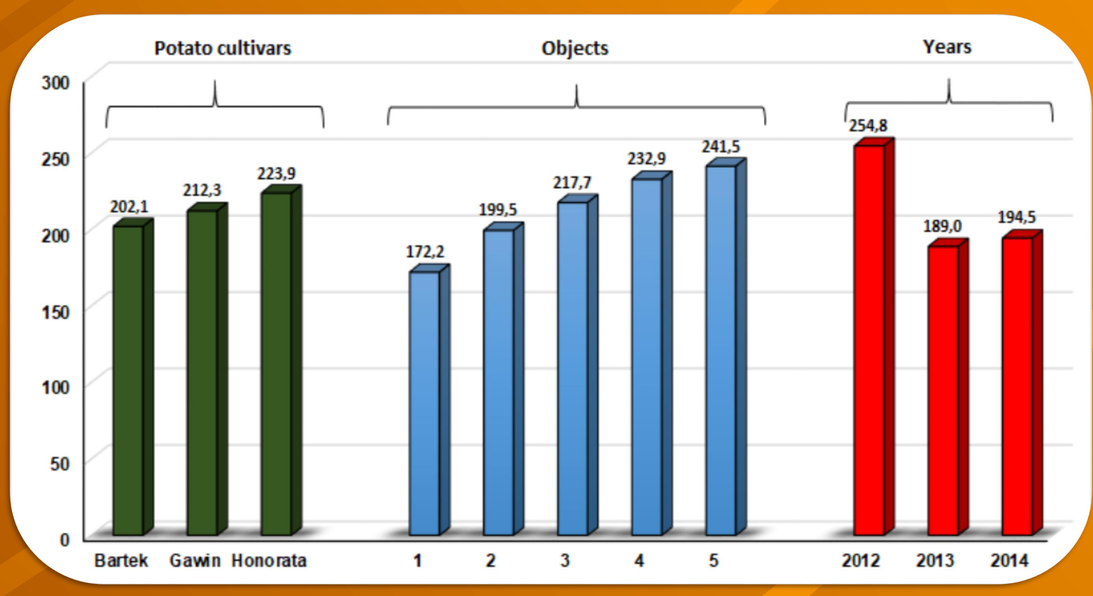

Figure 3. Uptake by potato tubers