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THE DYNAMICS OF ASSIMILATORY PIGMENTS IN WHEAT

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Introduction

Because the productivity of agricultural plants is directly related with their photosynthetic activity, modern integrated approaches of physiological and biochemical studies require a proper insight into the function of the photosynthetic apparatus. Leaf photosynthetic pigments are key variables in characterizing the photosynthetic response; since they are relatively easily accessible for common analytical approaches, carotenoids and chlorophylls are usually targeted in studies [1, 3]. Being one of the most widely cultivated cereal crops and a staple food source, wheat (*Triticum aestivum L.*) was used in this research.

Research objectives

The aim of the work was to study the changes in the photosynthetic apparatus of three wheat genotypes, by monitoring the content of photosynthetic pigments in key stages during the vegetation period.

Materials & Methods

In field experiments carried out at the Research & Development Station for Agriculture (RDSA) Turda, Romania, three wheat varieties (Andrada, Codru and Ciprian) were monitored for the contents of total carotenoids, chlorophyll a and chlorophyll b.

Leaf samples were analyzed in days 7, 14, 21, 28, 35 and 42 from booting; from these, pigments' extraction was accomplished using acetone, being followed by vacuum filtration and spectrophotometric assessment (using aT80+ UV/VIS spectrophotometer – PG Instruments Ltd), the absorbance of extracts being measured at 470 nm, 646 nm and 663 nm [2]. Dry weight was determined by oven drying, at 105^0C.
All the determinations were accomplished in triplicates and average values were considered. Data analysis was performed using Microsoft Excel.

Results

The comparative analysis of the assimilatory pigments' content in wheat leaves revealed different dynamic patterns for the three varieties, with the following ranges of variations: 1.55-1670.4 mg chlorophyll a/ 100 g DW, 0.65-1103.2 mg chlorophyll b/ 100 g DW and 4.72 -278.4 g/ 100 g total carotenoids/ 100 g DW.

Figure 1. The dynamics of assimilatory pigments in Andrada wheat genotype

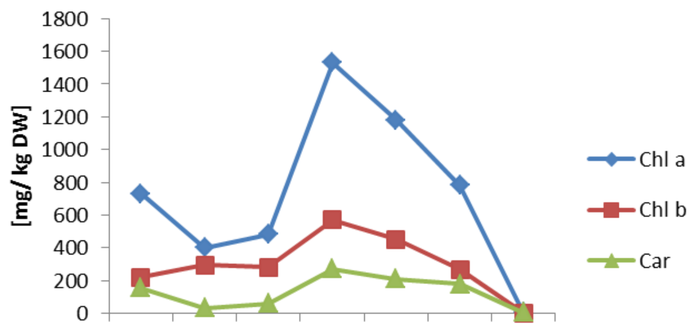


Figure 2. The dynamics of assimilatory pigments in Ciprian wheat genotype

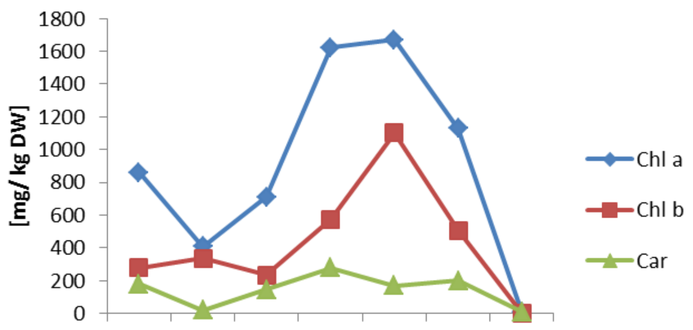
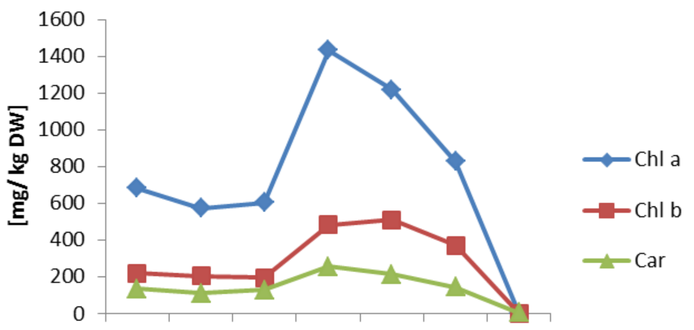


Figure 3. The dynamics of assimilatory pigments in Codru wheat genotype



During the vegetation period, chlorophylls a and b showed a continuous accumulation until day 28 for Andrada variety/ day 35 for Codru and Ciprian varieties; all three varieties reached the maximum carotenoid content after 28 days from booting.

The content of the studied pigments decreased up to the end of the vegetation period as a result of senescence, the fastest degradation being recorded in Ciprian variety; this one proved to have also the highest amounts of chlorophyll *b* and total carotenoids.

References

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