
POSTER – PHOTOSYNTHETIC PHENOTYPE OF TWO CICHORIUM INTYBUS L. CULTIVARS: THYLAKOID ULTRASTRUCTURE, PHOTOCHEMISTRY AND CARBON ISOTOPIC ANALYSIS

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Red chicory (*Cichorium intybus* L., Asteraceae) is an important winter crop widely cultivated in Northern Italy. The Chioggia Precoce and Treviso Precoce varieties are the most common chicories grown along the eastern coast of Emilia Romagna. These cultivars, shaped through empiric selection methods, show notable differences in the shoot morphology, including leaf orientation, suggesting the selection of distinct morpho-functional photosynthetic phenotypes. To investigate this hypothesis, a combination of chloroplast ultrastructure analysis, chlorophyll a fluorescence measurements, and $\delta^{13}\text{C}$ isotopic ratio analysis was performed. The research was conducted on plants grown in neighboring fields along the Ferrara coast, with samples collected between December 2023 and January 2024. Chloroplast shape and thylakoid organization were different between the two varieties. In Chioggia, chloroplasts were generally elliptical with a well-organized thylakoid system; in Treviso, they were more globular with highly variable thylakoid architectures, even within the same cell, including elongated single thylakoids, grana of varying sizes, and distinctive "thylakoid circles". While the two cultivars did not differ with respect to the thylakoid appression degree, Treviso had grana with a wider stacking repeat distance (SRD) than Chioggia. Chioggia, on the other hand, displayed greater granum cross-sectional irregularity (GSI), reflecting a tendency for thylakoid disks to slide laterally (Mazur et al. 2021). Photochemical parameters, measured in the field with Handy-PEA and MultispeQ devices, indicated a lower efficiency in Treviso than Chioggia. However, interestingly, $\delta^{13}\text{C}$ isotopic analyses of roots, stems, and leaves showed similar or slightly more favorable values in Treviso (More et al., 2022). In conclusion, the photosynthetic phenotyping of Treviso and Chioggia chicory likely reflects specific adaptations developed during the varietal selection process (Barcaccia et al., 2016). Whether these adaptations are linked to the special characteristics of the coastal environment will be assessed in comparative studies with similar varieties from other regions.

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