

## NET ASSIMILATION, ACCUMULATION AND UTILIZATION OF ASSIMILATES BY SOME SUNFLOWER GENOTYPES IN THE COURSE OF ONTOGENESIS

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The experiment was performed at the experimental field of the Institute of Field and Vegetable Crops with the following sunflower genotypes: a hybrid NS-H-43 and its parental lines OCMS-22 (♀) and RHA-SNRF (♂), a hybrid NS-H-26-RM and its parental lines CMS-HA.V.8931-3-4 (♀) and RHA-58 (♂). Net assimilation rate (NAR), determined as a ratio of dry mass synthesis and leaf area increase, was measured in the course of plant development. Dynamics of assimilates (carbohydrates) accumulation in plant organs was followed too. Qualitative and quantitative composition of carbohydrates were determined by the system HPLC OPTILAB 5931, with an HSRI detector. Samples of plant material were extracted in a mixture acetonitril-water (3:1) and analyzed after filtration through 0.45 μm filter. The results were expressed on dry mass of seeds.

The purpose of this work was to determine net assimilation rate (NAR), crop growth rate (CGR) and relative growth rate (RGR), as well as the dynamics of carbohydrate accumulation in plant organs in the course of sunflower ontogenesis (Fig. 1).

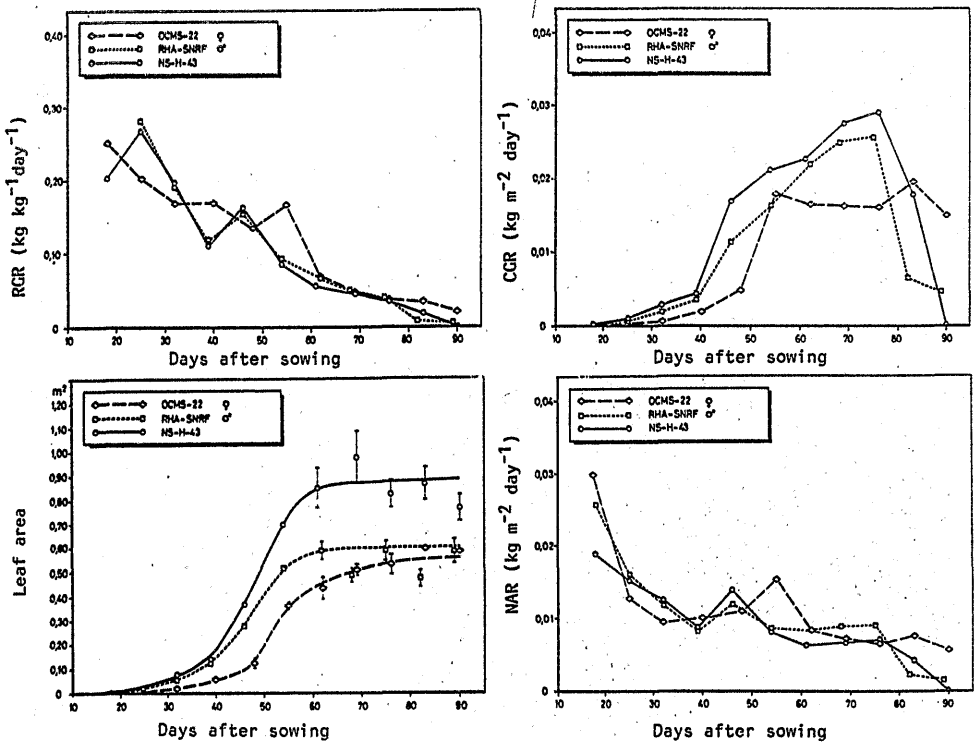


Figure 1. Growth parameters of hybrid NS-H-43 and its parental lines OCMS-22 (♀) and RHA-SNRF (♂) in the course of plant development.

Net assimilation rate was highest at the early stages of plant development; later on (30 days after sowing), it decreased in all examined genotypes. Leaf weight ratio (LWR) increased up to 25 days after sowing, and then decreased in a similar way for all examined genotypes. Specific leaf area, after an initial rise, maintained for some time a constant level, which increased for the hybrid NS-H-43 and decreased for its parental lines during anthesis. Leaf area ratio (LAR), similarly to the leaf weight ratio, showed a decreased accumulation of assimilates in leaves with the ageing of plants.

Relative growth rate decreased in all examined genotypes in the course of vegetation, while crop growth rate increased till the end of anthesis and then declined. Crop growth rate of the hybrids was higher compared with the crop growth rate of the parental lines.

Sugar content varied depending on sunflower genotype, plant organ and stage of development. Special attention was paid to the determination of seed constituents: sugars, oil and fatty acids, proteins and amino acids in the course of seed development. (Fig. 2). It was found that the contents of sugars, decreased while

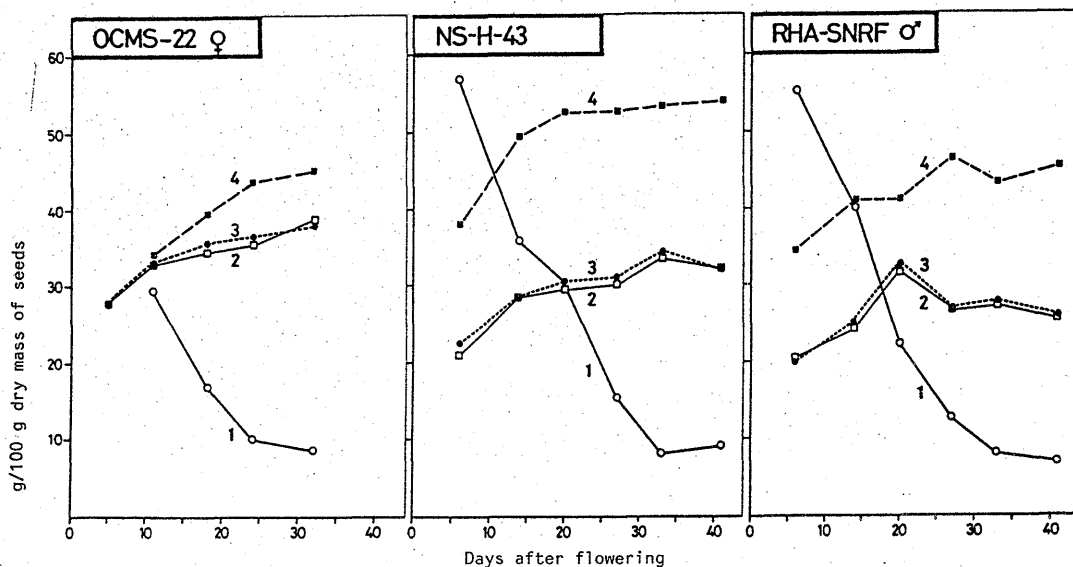


Figure 2. Content of soluble sugars (1), total amino acids (2), protein (3), and oil (4) in the course of formation and filling of sunflower seeds.

the content of oil, proteins and total amino acids increased in the course of seed development in all examined sunflower genotypes. A sharp decrease in sugar content was matched by an increase in the content of oil and proteins. The obtained results are in agreement with the finding that sugars are precursors for oil and protein synthesis in sunflower seeds.