**Combining nitrogen fertilization and biostimulant application in durum wheat: effects on morphophysiological traits and grain production**

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Nitrogen (N) fertilization is a pivotal agronomic practice to obtain both high yields and grain quality in durum wheat. However, since the overuse of synthetic fertilizers is raising a global concern for the environment, new crop nutrition strategies are needed to accomplish the goal of “producing more by consuming less”. The use of biostimulants was suggested as a sustainable option to promote crop yield, since they are able to improve nutrient use efficiency and tolerance to stresses. Information about the relationship between biostimulant application and N fertilization of durum wheat in field conditions is still limited.

A field experiment was conducted under rainfed conditions in Viterbo (Italy), during two growing seasons, to explore the possible interaction between the effect of biostimulants application and N fertilization. A split-plot design with three replicates was used. Nitrogen fertilization level was the main treatment, while biostimulant application was the sub-treatment. Durum wheat cv. ‘Iride’ was used, and three N fertilization rates were tested: 50, 100 and 150 kg ha-1. In sub-plots, three experimental products containing different biostimulants (e.g., seaweed extracts, glycine betaine, micronized vaterite and rizhobacteria) were compared among them and with the control treatment (no biostimulant application). Total N dose was split in three times: at sowing, tillering and the beginning of the stem elongation. For each plot, the following traits were recorded at different growth stages: length (cm), area (cm2), volume (cm3), and diameter (mm) of roots using WinRHIZO software; chlorophyll content (Chl) using the spad meter; grain yield at maturity.

Wheat plants treated with biostimulant products outperformed the control plants for both root development (more than doubled in length) and chlorophyll content, this latter was evident especially in late growth stages (from +75% to +82% Chl). Regarding grain yield, application of biostimulants produced a 9% to 24% increase. No interaction between treatments were observed for measured traits except for root area and volume.