

# Amount of Rain Until Third Leaf Explain Differences in Irrigated Durum Wheat Yield Between a Conventional and No-Tillage System in a Long-Term Crop Rotation System in Mediterranean Environment

Silva, Paola

Garrido, Marco

Shertzer, Gastón

Acevedo, Edmundo

Crop yields usually respond to crop rotation, but they may interact with tillage system and year (as an integration of variables, mainly in terms of temperature and precipitation). The objective of this study was to evaluate the determinants of the irrigated durum wheat yield under long-term tillage system  $\times$  crop rotation (2000-2008). Tillage factor considered two levels: moldboard plow plus disk harrow (CT) and no-till (NT) and crop rotations factor had three levels: wheat-fallow-canola (W-F-C), wheat-maize (W-M) and wheat-fallow (W-F). Last year, we evaluate a maize crop as a physical soil quality indicator. The tillage system  $\times$  crop rotation interaction was not significant, and the lowest durum wheat yield and biomass were observed in the W-M rotation experimental year (reduction of 18.7%). Tillage system  $\times$  year interaction was significant for wheat yield. Partial least squares analysis indicated that precipitation was high between sowing and 3rd leaf was determinant for yield, and a negative correlation between these variables was observed. Despite the above, no differences were observed in the maize yield directly attributable to physical soil properties. Our study shows that rainfall distribution appears to cause of the tillage system  $\times$  year interaction for durum wheat yield. When the precipitation was higher (160 mm) between sowing and 3rd leaf, yield decreased in NT by 37% compared to CT possible due to a hypoxia condition and/or low plant-available soil nitrogen, with a negative effect over tillering, affecting in the long-term spike number per square meter.