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Durum wheat in an olive orchard: impact on yield, yield components and morphology of different durum wheat cultivars

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In the Mediterranean region, durum wheat productivity is mainly affected by heat stress and drought and this situation is expected to intensify in the near future (Moriondo et al. 2007). Is-it possible to mitigate such stress by cultivating durum wheat in olive orchards?

Durum wheat was sown for 3 years, at INRA Mauguio (South of France), in 3 conditions: a yearly pruned olive orchard (AF), a never pruned olive orchard (AF+), and in open field (C). The average yield was reduced in AF (-43%) and AF+ (-83%), with % reduction in line with literature (Artru et al. 2017; Dufour et al. 2013), but this reduction varied greatly according to the cultivar. Despite a similar sowing density, final density was higher (+22%) in AF treatment than in C. The most affected component was the number of grains/spike (-37% in AF, -62% in AF+), then the number of spikes/plant (-32% in AF); the TGW was higher in AF compared to C (+12%). Harvest index was 6% higher in AF treatment compared to C. Plant height and spike length were significantly decreased in the two AF treatments, whereas the distance between the flag leaf and the spike was greater in AF compared to C. A wide genetic variability was observed: modern pure lines reached higher yield and yield components, compared to populations and ancient pure lines in C; but in AF treatment populations reached higher yield than modern and ancient pure lines. These data conduct to frame ideotypes needed to implement an AF-oriented breeding program.

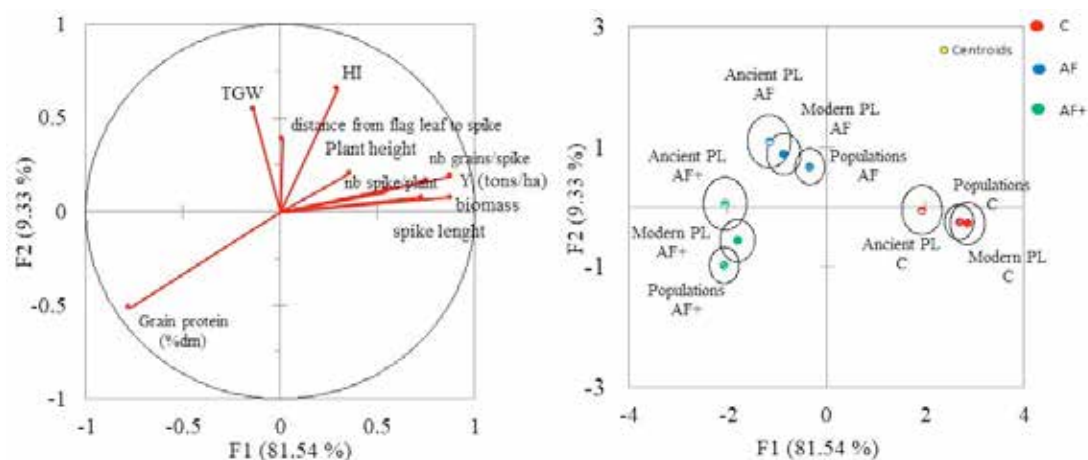


Figure 1. Principal component analysis (PCA; left) with variable loadings, and discriminant analysis (DA; right) for the 3 durum wheat genetic profiles considered in the study (ancient pure lines (PL), populations and modern well-known pure line (PL) varieties) within C, AF and AF+ treatments.

Keywords: durum wheat, number of grains per spike, genetic variability.

References:

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3. Moriondo et al., 2007, ITAL J AGROMETEOROL, 5-12