10th AISTEC Conference

Grains for feeding the world

Jointly organized with ICC
On the occasion of the World Expo Milan 2015

BOOK OF ABSTRACTS

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P12. Tillage and crop sequence effects on productivity and technological and nutritional quality of durum wheat

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Conservation agriculture involves soil management practices (i.e., minimum tillage, mulch tillage, no-till) that have the potential to generate both economic and environmental benefits, including mitigation of soil erosion (Jordan *et al.* 2000), reduction of energy use and C emissions, timeliness of planting, and saving labor and time. The improvements generated by the adoption of conservation tillage techniques often have positive effects on crop growth and yield but the variability in the results found in the literature shows that these effects are likely to be highly site specific. Moreover, little research has been conducted to investigate the effects of conservation agriculture on technological and nutritional quality of crop productions. Thus, a field experiment has been performed in a typical Mediterranean environment to study the effects of the continuous use (for more than 20 years) of three tillage techniques (conventional tillage, CT; reduced tillage, RT; and no tillage, NT) on durum wheat grain yield and quality within three crop sequences (continuous wheat, WW; faba bean–wheat, WF; and berseem clover–wheat, WB). The experiment was carried out at the Pietranera farm (Sicily, Italy; 37°30′ N, 13°31′ E; 178 m asl) on a deep, well-structured soil classified as a Chromic Haploxerert (Vertisol), and was set up as a strip-plot design. More details on how the trial was performed are reported in Amato et al. (2013). Here we report data from two consecutive growing seasons (2012/13 and 2013/14, i.e., after 21-22 years of continuous application of the treatments) on grain yield and some technological and nutritional quality parameters (protein and gluten contents, gluten index, yellow index, alveographic parameters, bioactive compounds) of durum wheat. On average, grain yield was higher with CT than NT, but the effects of tillage varied greatly by crop sequence. In particular, NT caused a greater decrease in wheat grain yield than CT in WW and WF than in WB. The average grain yield of wheat with RT fell between the other two tillage systems. On average, NT caused a decrease in both grain protein and gluten contents with respect to CT when wheat was grown after faba bean, whereas no differences between NT and CT were observed for these traits for continuous wheat or berseem clover. Significant interactions between tillage system and crop sequence were observed for alveographic parameters and for both polyphenols and carotenoids contents. On the contrary, no effect on ash content, yellow index, and betaglucans content was found due to the applied treatments.

Keywords: durum wheat, no tillage, grain quality, alveographic parameters, bioactive compounds

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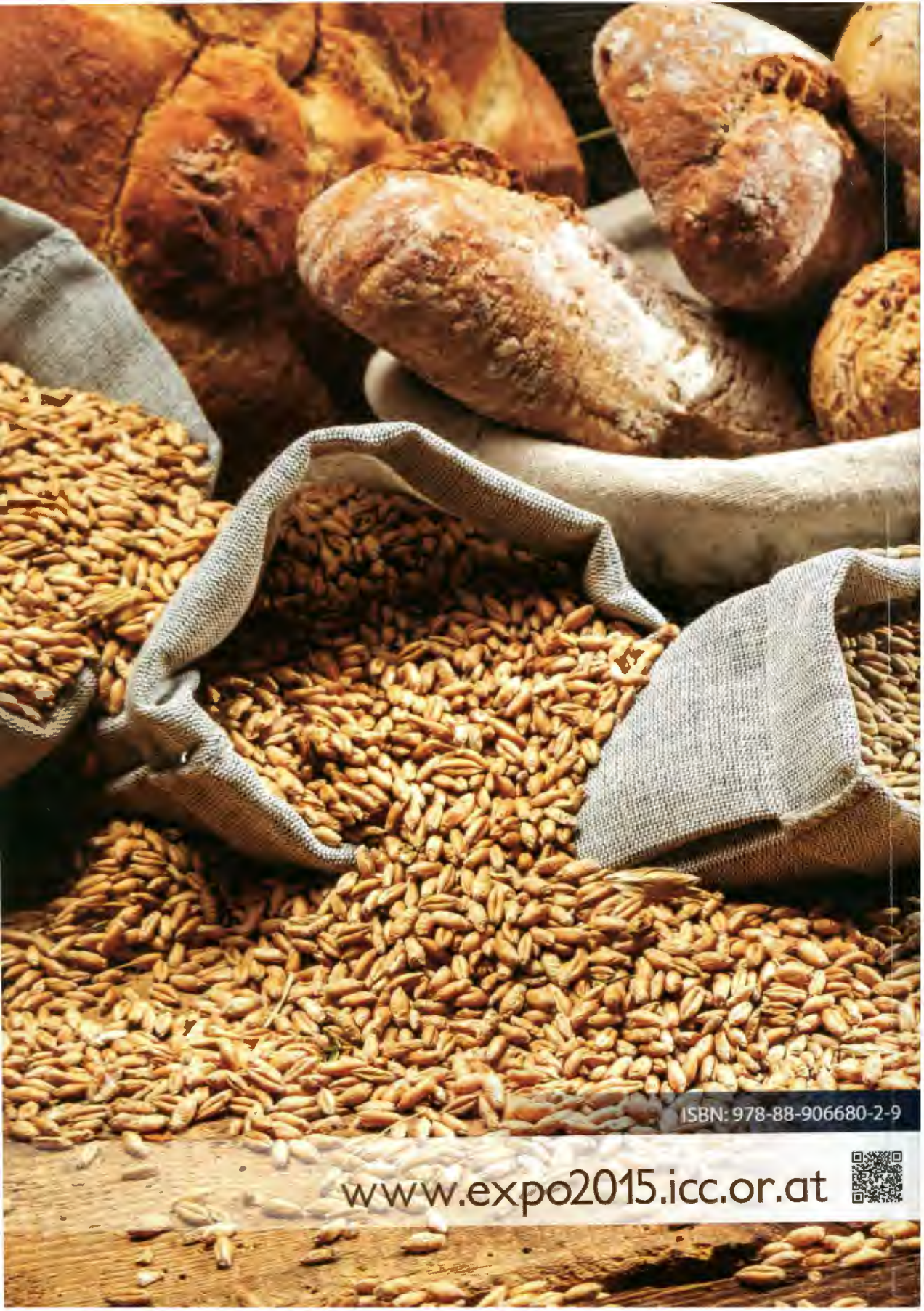

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