

The impact of different crop rotations by weed management strategies' interactions on weed infestation and productivity of wheat *Triticum aestivum* L.

ABSTRACT

Weed infestations significantly reduce the growth and yield of field crops. Herbicides are mostly used for weed management due to their quick results. However, resistant biotypes to available herbicides are rapidly increasing around the world. This situation calls for the development of alternative weed management strategies. Crop rotation and allelopathic water extracts are regarded as the most important alternative weed management strategies. Therefore, this two-year study assessed the impact of different annual crop rotations by weed management strategies' interactions on weed infestation and productivity of wheat crop. Wheat was planted in five rotations, i.e., (i) fallow-wheat, (ii) rice-wheat, (iii) cotton-wheat, (iv) mungbean-wheat and (v) sorghum-wheat. The weed management strategies included in the study were (i) false seedbed, (ii) application of 12 L ha⁻¹ allelopathic plant water extracts (1:1:1:1 ratio of sorghum, sunflower, mulberry and eucalyptus), (iii) herbicide application, (iv) weed-free (weed control) and (v) weedy-check (no weed control). Herbicide application was the most effective treatment in lowering weed densities and biomass during both years followed by false seedbed, while allelopathic crop water extracts were least effective. The lowest weed infestation was noted in sorghum-wheat rotation followed by cotton-wheat and mungbean-wheat, while fallow-wheat had the highest weed infestation. Weedy-check treatment caused significant reduction in wheat growth and yield, whereas the highest grain yield was recorded from weed-free and herbicide application treatments. Grain yield of wheat planted after sorghum was suppressed; however, yield improved when wheat was planted after mungbean. Planting wheat after mungbean in a weed-free environment, achieved through chemical and/or mechanical means, is the best strategy to obtain higher wheat yields.

Keyword: Allelopathy; Crop rotation; Weeds; Weed management; Wheat