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Effect of Plant Diversity and Nutrient Resource on Weed Composition and Density in Different Cropping Systems

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Abstract

In order to investigate the effects of plant diversity and nutrient resource on weed composition, density and dry matter in different cropping systems, an experiment was conducted as split plot based on complete randomised block design with 3 replications at the agricultural research station, Ferdowsi University of Mashhad, Iran, during 2006 and 2007. Treatments included manure and chemical fertilisers in main plots and intercropping of 3 soybean varieties (Williams, Sahar and Gorgan3), intercropping of 3 millet species (common millet, foxtail millet and pearl millet), intercropping of millet, soybean, sesame (*Sesamum indicum*) and intercropping of millet, sesame, fenugreek (*Trigonella foenumgraecum*), and ajowan (*Trachyspermum ammi*) in sub plots.

Results indicated that nutrient resource affected weed dry matter and weed density. In the first year of the experiment, chemical fertilisers resulted in a 1.3 and 1.8 folds higher weed dry matter and the weed density, respectively if compared to manure application. In the second year, weed dry matter on manure fields and with chemical fertilisers was 173.2 and 300.2 g m⁻² and weed density was 98.6 and 84.9 plants per m⁻², respectively.

With increasing crop diversity, weed dry matter and density decreased and intercropping systems had the lowest weed dry matter. Crop species affected weed dry matter in monocultures. There was a negative correlation between diversity and weed dry matter. In the first year Shannon diversity index was highest in sesame and Ajowan monocultures (0.75 and 0.72, respectively). Different intercropping systems had the lowest Shannon index. In the second year, Shannon index was highest in soybean (Sahar variety) monoculture (0.72) and 3 Millet species intercropping (0.71). more researches on the effects of crop diversity on weed population is needed in mixtures.

Keywords: Intercropping, Shannon index, species diversity, weeds