



Competition and yield advantages in mixed intercropping of barley and wheat under stress levels of moisture deficit

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Mixed intercropping of barley and wheat has been reported as the practice of smallholder farmers in some dryland areas of Ethiopia. However, this cropping system has not yet received the attention of research. Therefore, this study was conducted to determine the level of competition and yield advantage in barley and wheat mixed intercropping under different stress levels of moisture deficit. One pot and one field experiments were conducted to address these objectives. In the pot experiment, three irrigation water levels (75-80, 50-55, and 25-30% depletion of soil available water), five intercropping ratios (%) of barley to wheat in a replacement series (100/0, 75/25, 50/50, 25/75, and 0/100), and four planting densities (4, 8, 12 and 16 plants/pot) were studied in a split-split plot design and had three sets so as to harvest at tillering, heading and maturity stages. In the field, the five intercropping ratios and the four water levels supplied by sprinkler irrigation system were studied in a split-plot design. Intra- and inter-specific competition decreased with decreasing stress levels of moisture deficit; but increased with increasing planting densities in all harvesting stages in the pot experiment. However, both competition types were higher at tillering stage but progressively decreased in later harvesting stages. Intraspecific competition was more important for barley at early stages and for wheat at later stages of the growing period. Both pot and field experiments proved that barley was less competitive than wheat towards the reproductive stage. Yield advantage of mixed intercropping of barley and wheat increased with increasing stress levels of moisture deficit under study. Yield advantage and productivity tended to be dominated by the higher yielding crop species in the mixture. This result suggests mixed intercropping of barley and wheat is not a priority in areas where moisture is not limiting in amount and distribution. It is advisable to use 50%barley + 50%wheat ratio since it is difficult to predict which crop performs better than the other in such unpredictable rainfall conditions of the drylands.