Intercropping lentil with spring wheat to improve productivity and income in organic farming

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The food legume lentil is attracting growing interest among organic farmers. However, its productivity is low and very variable notably due to its lodging sensitivity. We analysed the functioning and performances of lentil-spring wheat intercrops (IC) for yield improvement/stabilization. An organic field experiment was conducted at INRA-Toulouse, with 4 lentil cvs. and 2 of spring wheat grown as sole crops (SC) and IC at 4 seeding ratios (67/33%, 100/17%, 100/33% and 100/50% for lentil and wheat resp., compared to SC density). Total IC grain yield was 1.24 t/ha and was higher than the mean yield of the respective SCs, higher than that of lentil SCs (0.87 t/ha) and similar to that of spring wheat SCs (1.29 t/ha). This confirms the interest of IC in organic farming to improve yield due to the species complementarity for use of available resources. Lentil production was often lower in IC than in SC as a result of wheat competition. Hence to favour yield of lentil, the most profitable crop (3-4 times higher price), wheat density must remain low. Even with wheat density as low as 17% lentil lodging was reduced which may increase the amount of lentil harvested in IC vs. in SC. Thus lentil IC could be an efficient system to increase organic farmers net income in comparison to classical lentil SC. "Genotype by density by species" interactions were observed across IC combinations, calling for further study of the different cultivars responses in order to design optimized IC systems.