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Cover crops as mulching to manage weeds in organic rice cultivation

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Cover crops sowing after rice harvesting has begun to spread in organic rice cultivation in Italy as a practice to improve soil fertility and weed management. A study aimed at evaluating the use of cover crops during winter in organic rice production and to estimate the effect of the technique on weeds and rice yield was carried out at two sites in NW Italy. In both experiments, the following cover crops were compared: *Vicia villosa*, *Lolium multiflorum*, and a mixture of *V. villosa* (40%) and *L. multiflorum* (60%). A plot without cover crops was added as a reference. Cover crops were sown in October and let grow until spring. In May, rice was broadcasted in the standing cover crops and the cover crops were terminated immediately after. Roller-crimping and shredding were compared as termination techniques. After cover crop termination, the plots were flooded for about 10 days in order to start cover crop decay and stimulate the production of phytotoxic compounds that may hamper weed infestation. Afterwards, rice field was dried to favor rice rooting. Rice was then grown organically with continuous flooding. Cover crop density was assessed after establishment, while weed density was assessed before cover crop termination and during rice growing season. Rice yield was also recorded for each plot. Weed density assessed in June showed that in both experiments the control plots were the most infested (> 900 plants m⁻²), while the plots with *L. multiflorum* both crimped or shredded were the less infested (< 60 plants m⁻²), followed by the plots hosting *V. villosa*. Rice yield was higher for *V. villosa* (3.4 t ha⁻¹) plots, while lowest for mix plots (1.1 t ha⁻¹), regardless the cover crop termination technique.