Influence of sown and spontaneous inter-row vegetation on beneficial arthropods and related ecosystem services in South-Eastern French vineyards

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Résumé

Intensive agriculture has contributed to the loss of biodiversity in European agricultural landscapes. As a perennial crop, vineyards allow the establishment of semi-natural vegetation in inter-rows within vineyards. Species-rich inter-row vegetation provide various resources for arthropods involved in biological control and pollination and may thus favour theses ecosystem services. Due to niche limitation, problematic weeds may also be better controlled. We tested the effects of three inter-row vegetation treatments, differing in composition, diversity and cover, on beneficial arthropods, on larvae predation and on problematic weed species. The study was set up in the Luberon mountains of South-Eastern France using five replicate vineyards per treatment resulting in a total of 15 vineyards. In the first treatment, we sowed 22 flowering plant species of local origin. The second treatment was spontaneous vegetation without tillage, and the last one, soil tillage with largely reduced plant cover. The beneficial arthropod abundance was analysed using direct observation and net sweeping. Lucilia fly larvae pinned on cardboard cards were used as sentinel prey to test predation. The vegetation was analysed to obtain information on plant species composition and the cover of problematic weed species. We found that all analysed beneficial arthropod groups such as hoverflies, ladybirds (larvae and adults), parasitoids, crab spiders and wild bees were more abundant in vineyards with vegetation but differences between sown inter-rows and spontaneous vegetation were not significant. However, predation of sentinel prey was favoured by sown species-rich inter-row vegetation. One of the two tested problematic weed species, *Cynodon dactylon*, was also better controlled in high-diversity inter-row vegetation. The study demonstrated that sowing species-rich inter-row vegetation favours beneficial arthropods and contributed to the control of weeds but further research is needed to improve the establishment of sown high-diversity mixtures.

Mots-Clés: sown and spontaneous inter, row vegetation

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