

Effects of plant protection intensity and pruning method on functional arthropod biodiversity and the effectiveness of natural pest control in vineyards

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Despite ongoing efforts to reduce pesticide and fungicide use in viticulture, the economic and ecological stability of vineyards is still limited by intensive plant protection measures. One promising approach for a sustainable intensification of viticulture could be growing fungus resistant grape varieties as a semi-minimal pruned hedge (SMPH). This practice can reduce the fungicide-input by up to two thirds. Additionally, in contrast to the traditional trellis system (TS), the SMPH offers a structurally more diverse habitat and a different microclimate, therefore potentially offering new niches for pest and beneficial arthropods.

Using the beat sheet method and baits made from grape berry moth (*Lobesia botrana*) eggs, we investigate the effects of reduced plant protection intensity and the pruning method SMPH on the functional biodiversity in the vineyard and its effects on natural pest control.

Predatory arthropods, particularly spiders and predatory mites, benefit from minimal pruning and reduced plant protection respectively. Consequently, the predation pressure on *L. botrana* eggs is increased. Pest mites follow the opposite pattern, showing an increase following more intense plant protection measures.

The actual predator-prey interactions in this ecosystem have yet to be examined, but it is likely that pest mite populations are directly controlled by predatory mites and therefore depend on their numbers.

Spiders are important predators in all terrestrial ecosystems and are very likely to also play a big role as natural pest control agents in viticulture. Promoting their abundance and biodiversity can contribute to a stable vineyard community that is less susceptible to pest arthropods and arthropod-transmitted diseases.