

Promotion of earthworms to increase leaf degradation to reduce apple scab inoculum in organic orchards

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Introduction

The EU project Reppo aimed to control scab, caused by *Venturia inaequalis*, in organic apple production. One of the strategies was to reduce numbers of overwintering spores in fallen leaves. Because several earthworm species forage on fallen leaves, they can contribute to a decrease in overwintering inoculum. Stimulating earthworm populations might enhance leaf degradation.

Methods

During three consecutive years plots were fertilized with organic mulch, mushroom manure and cattle manure, and compared to the standard fertilization with chicken manure. In all of the fertilization treatments 60 kg nitrogen per ha per year were applied.



Figure 1: Sampling of earthworms in the orchard (Gunn, 1992; Zaborski, 2003).



Figure 2: Leaf degradation was measured with leaves in nettings placed in plots amended with different organic fertilizers.

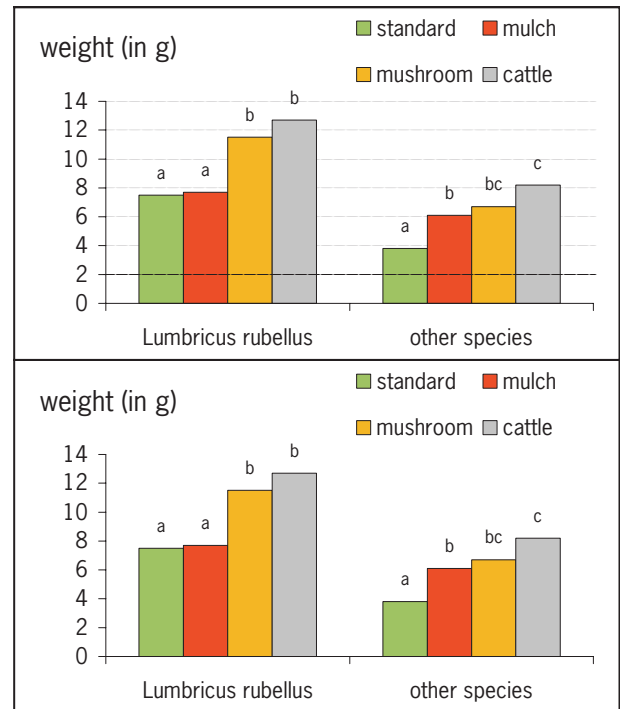


Figure 3: Average numbers and weight of the earthworm *Lumbricus rubellus* and other earthworm species in plots fertilized during 3 years with standard (= chicken manure), grass mulch, mushroom manure and cattle manure.

Results

A limited number of earthworm species was found in larger quantities. *Lumbricus rubellus* was the dominant leaf eating earthworm found. Relatively high numbers of burrows of the major leaf eating earthworm, *Lumbricus terrestris* were found. But only low numbers were caught with the combined mustard oil and hand sorting method.

Conclusions

- Mulching the weed free strip under the apple trees did not have an effect on numbers and fresh weight of leaf eating earthworms.
- Fertilization with mushroom manure or cattle manure resulted in increased populations of *Lumbricus rubellus* and other earthworm species with respect to the standard fertilization with chicken manure.
- In spite the increase of leaf eating earthworms, no effect could be demonstrated on leaf degradation.

References

- Gunn, A., 1992 The use of mustard to estimate earthworm populations. *Pedobiologia* 36:65-67.
Zaborski, E.R., 2003 Allyl isothiocyanate: an alternative chemical expellant for sampling earthworms. *Applied Soil Ecology* 22:87-95.