

Assessing the effect of grassland type on invertebrates

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As a result of human activities, biodiversity is under pressure. This is of concern to society since biodiversity is the fundament of a multitude of ecosystem services provided to society. Many of these ecosystem services are related to grasslands and valued by stakeholder groups. In the Netherlands, society is especially concerned about the decreasing numbers of meadow birds, like the black-tailed godwit and the northern lapwing. Possible reasons for this decrease are increasing land use intensity, decreasing diversity in grasslands, less available feed (invertebrates: insects and worms), predation and the continuing urbanisation. This research focuses on occurrence of invertebrates in grasslands as indicator of biodiversity and as indicator for available feed for meadow birds.

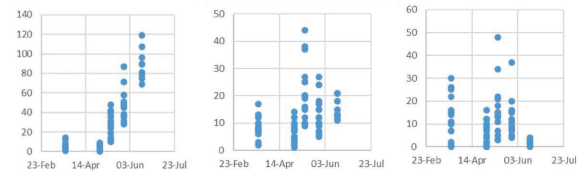


Figure 1. Number of insects per sticky trap (left), insects per pit fall (middle) and worms per soil sample (right) according to the protocol at 'Aeres Farms' in 2021

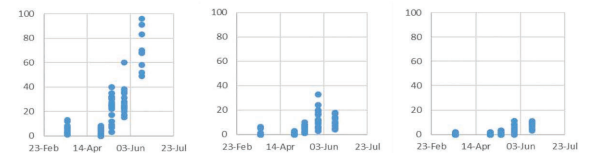


Figure 2. Number of insects per sticky trap in the size category < 4 mm (left), 4-10 mm (middle) and > 10 mm (right) according to the protocol at 'Aeres Farms' in 2021

METHODS

5 grass mixtures: perennial ryegrass and red clover, perennial ryegrass and white clover (2x), perennial ryegrass and seven herbs, tall fescue and seven herbs. Herbs were (1) *Trifolium pratense*; (2) *Trifolium repens*; (3) *Onobrychis viciifolia* (common sainfoin); (4) *Carum carvi* (caraway); (5) *Cichorium intybus* (common chicory); (6) *Lotus corniculatus* (birdsfoot trefoil); and (7) *Plantago lanceolata* (ribwort plantain).

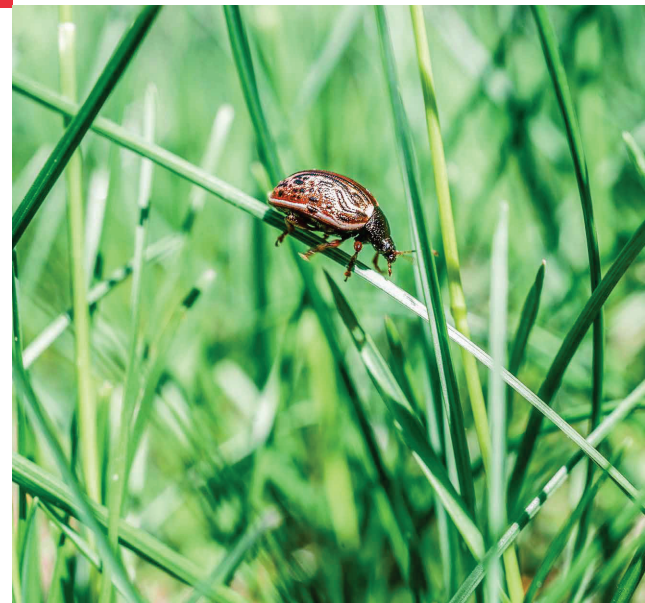
Monitoring different layers of grasslands with protocol:
above soil (flying insects) – sticky traps
on soil (walking insects) – pitfall traps
in soil (worms) – soil sample

RESULTS

Robust and easy to use protocol based on counting the number of invertebrates facilitated by a monitoring app.

An analysis of variance showed significant main effects of time of measurement (five moments in the period March to May) and of grassland paddock on number of invertebrates. There were, however, also significant interactions between time of measurement and grassland paddock on the number of invertebrates ($P < 0.001$, $P = 0.016$ and $P = 0.144$, for sticky traps, pitfall traps and worms, respectively).

The number of invertebrates was highest in late spring and early summer. Especially the number in spring is important since this is when the meadow birds are present and the young birds are hatched.



CONCLUSIONS

This study developed a protocol and a monitoring app for monitoring easily the occurrence of invertebrates at grasslands of commercial dairy farms. Results of research with this protocol within one farm showed no clear effect of grassland with different botanical composition on number of invertebrates. Measurements need to be prolonged to study temporal variation.