

## Insect-rich grasslands - promoting diversity, protecting species

Insects play a key role in our ecosystems: they pollinate plants, decompose organic material, and form the basis of the food web for many other animals. Many ecological interrelationships are still not fully understood. Grasslands, i.e. meadows traditionally used for haymaking or as pasture, constitute an important habitat for insects. These areas provide a wealth of flowering plants that supply nectar and pollen, as well as shelter and nesting sites. Particularly species-rich grasslands make a significant contribution to maintaining biodiversity, which is increasingly under threat in Europe. According to a study by the Entomological Society of Krefeld, the biomass of flying insects in German protected areas has declined by around 75% since the 1990s. The main causes are intensive agriculture, the use of pesticides, and the loss of near-natural habitats. Without sufficient insects, key pollination processes – including those essential for agriculture – are at risk. Other small animals and many bird species that depend on insects as a food source are also affected. The conservation and enhancement of insect-rich grasslands is therefore a key contribution to safeguarding biodiversity and to maintaining the stability of our ecosystems.

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## Intensive management - suitable for only a few species

Industrial agriculture has profoundly altered many grassland areas and intensive management has negative impacts on insect diversity and ecosystem functioning. Frequent mowing (more than twice a year) and overgrazing leave flowering plants little time to bloom and set seed, and often disrupt insect life cycles. The use of pesticides targeting unwanted plants and pests frequently also kills beneficial organisms and thereby weakens the entire ecosystem. Intense fertilization leads to nutrient surpluses that favour competitive species such as grasses and drastically reduce plant diversity. Such homogeneous swards provide little habitat and food for insects. Mulching should be carried out only in exceptional cases, as it results in very high insect mortality; where mulching cannot be avoided, it should at least take place outside the growing season.



## Extensive management of species - rich ecosystems

A first step is to reduce mowing frequency to a maximum of twice per year. Particularly effective is so-called mosaic mowing, in which not the entire area is cut at the same time. This creates refuges where insects can find shelter and food. Strips of tall grass also provide wintering and breeding sites for insects. The use of chemical plant protection products and synthetic fertilizers should be avoided. Ideally, a mosaic of meadows and pastures is created. Extensively managed pastures can offer a refuge once all meadows have been mown, and the flowering period on pasture land is longer than on hay meadows. In addition, grazing animals introduce nutrients via their dung, from which some insect species benefit. Although insect-friendly management requires adjustment and patience, it strengthens the ecological functioning and long-term sustainability of these areas.



< INSECT-FRIENDLY BAR MOWER

< INSECT SCARING DEVICE

## Insect-friendly mowing techniques

In principle, grassland ecosystems must be mown in order to be maintained. However, the mowing process poses a problem for insects, as many individuals are killed and no food plants remain available immediately after cutting. Nevertheless, insects can be promoted despite mowing. The most insect-friendly option is the use of insect-friendly mowing technology such as cutter bar mowers (finger-bar or double-knife systems). These have a horizontally mounted cutting unit and a low mowing speed, so that animals are not sucked in and, in contrast to rotary mowers, are rarely harmed. The use of so-called insect flush bars gives insects the opportunity to escape before the mower reaches them. Insect scaring devices can be used as an addition to any kind of mowing equipment.



Cultural and natural landscapes of the Siegerland



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## Diverse habitats – also for specialists

Management must be adapted to local conditions as some species require specific measures. For example, to promote the dusky large blue (*Phengaris nausithous*), early-season mowing or grazing should be followed by a pause to avoid disturbing the flowering period of its host plant, the greater knapweed (*Centaurea jacea*), in summer. For the violet copper (*Lycaena helle*) and the marsh fritillary (*Euphydryas aurinia*), extensively managed regimes tailored to their life cycles are particularly important; for the latter, mowing should be delayed until early September. Mosaic mowing is ideal for all species, as it always leaves some areas as refuges for butterflies and their larvae. These tailored mowing strategies sustainably protect and promote not only these rare butterflies but also many other animal and plant species.

## Nature conservation and agriculture hand in hand

Insect-rich grasslands benefit both agriculture and the environment. Insects are valuable contributors to ecological balance: they enhance soil fertility by decomposing plant material and releasing nutrients for plant uptake. In particular, wild bees and other pollinators promote seed production and support plant regeneration. Moreover, species-rich meadows are more resilient to extreme weather events such as drought and heavy rain. Through intact plant and soil structures, water can be absorbed and stored better, which also improves erosion control. Reduced fertilisation and the avoidance of chemical inputs contribute to cleaner soils and water bodies, as fewer pollutants are leached. Insect-rich grasslands thus act as a natural environmental and climate protection measure while providing greater stability to agricultural cycles. Scientific studies confirm that extensively managed areas are more stable and resilient to disturbances in the long term.



Photo: igreen/Jonathan Fieber

## Practical tips for promoting insect-rich grasslands

Through targeted maintenance and management, your grassland can once again become a valuable habitat for insects. Even small farms and private landowners can actively contribute to species conservation and support natural cycles:

- Mosaic mowing: Do not mow the entire area at once to create refuges.
- Leave strips of tall grass: These provide shelter and overwintering sites.
- Avoid mulching as much as possible
- Incorporate more extensively grazed pastures
- Promote plant diversity: Targeted sowing of native plant species can enrich the flora.
- Choose the right mowing technology: Cutter bar mowers enable gentle, soil-conserving mowing and give insects and small animals a chance to escape. Insect scaring devices can be used with any mower type.

Get informed! The suitable mowing strategy for your land depends on many factors. For support with insect-friendly mowing techniques under contractual nature conservation schemes, please contact us.



Photo: igreen/Jonathan Fieber



The LIFE4Siegerlandscapes project focuses on the conservation of cultural landscapes in southern Siegerland and implements targeted measures both in grassland habitats and forests. Measures in grasslands include the restoration of grassland on former spruce sites, the optimization and promotion of extensively managed grassland, and actions to maintain insect-rich grassland. An insect-friendly mowing machine is also deployed within the project and can be borrowed within the project framework.



The LIFE Programme of the European Commission has been financing nature conservation projects within the EU since 1992, with a particular focus on the conservation and enhancement of the EU-wide Natura 2000 network of Special Protection Areas and Special Areas of Conservation designated under the Birds and Habitats Directives.



< CUCKOO BUMBLEBEE ON ARNICA MONTANA

Photo: igreen/Jonathan Fieber



### Biologische Station Siegen-Wittgenstein

In der Zitzenbach 2, 57223 Kreuztal-Ferndorf  
Tel. 02732 767734-0

[info@life4siegerlandscapes.de](mailto:info@life4siegerlandscapes.de)

[www.life4siegerlandscapes.de](http://www.life4siegerlandscapes.de)

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#### Sources:

- 1 Entomologischer Verein Krefeld (2017): Langzeitstudie zur Insektenbiomasse in deutschen Schutzgebieten.
- 2 Hallmann et al. (2017): „More than 75 percent decline over 27 years in total flying insect biomass in protected areas“

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