



Pest control and plant protection in grasslands

Goal	Sustainable grassland management regarding pest populations and weed control.
Target group	Farmers or advisors managing extensive systems with grasslands.
Description of the measure	<p>The presence of plant species regarded as unproductive is usually reduced through mechanical methods, which may include levelling, harrowing, rolling, mowing and mulching or through the use of herbicides.</p> <p>Considering the potential for negative side-effects on the productive grass species and on non-target species, the use of herbicides should be avoided. Only when the undesired weeds cannot be controlled by mechanical measures or when highly problematic weeds have become established should the option be considered.</p> <p>Two types of herbicides are usually applied: residual and contact. Residual herbicides seal the ground and inhibit the development of wild plant species. Contact herbicides disrupt the metabolism of emerging plants. Herbicides may also be regarded as total or specific. Total herbicides target any plant species. Specific herbicides target only particular plant species.</p> <p>Reseeding is also used when a jagged sod is the reason for the spreading of undesired plant species.</p> <p>All of these agricultural practices, being of a mechanical or chemical nature, have effects on biodiversity. Depending on the region, different approaches may be considered. In Central and Northern Europe, reducing the presence of weeds using mechanical measures has less negative effects on the environment compared to the use of herbicides. In Southern Europe, avoiding tillage and preserving the existing soil organic matter is necessary and frequently complemented with localized and precise use of agrochemicals (with lower persistence due to less tillage) (Basch et al., 2015).</p> <p>Integrated Pest Management (IPM) is a cornerstone of the European Union's Directive on the sustainable use of pesticides (2009/128/EC) (EU, 2009). All available information, tools and methods must be considered so that the healthy development of crops is attained with the least possible disruption of agro-ecosystems and using natural pest control approaches, if possible. This way, IPM aims at keeping the use of pesticides and other associated approaches within the levels that are economically and ecologically justified, reducing or minimising health and environmental risks. Whenever sustainable, biological and physical (non-chemical) methods provide satisfactory pest control, they should be chosen.</p> <p>The application of IPM includes measures such as:</p> <ul style="list-style-type: none"> a) crop rotation; b) the adequate use of cultivation techniques; c) the reasonable use of resistant/tolerant cultivars and standard/certified seed and planting material; d) the use of balanced fertilisation, liming and irrigation/drainage practices; e) the adoption of hygiene measures (such as the regular cleansing of machinery and

	<p>equipment) in order to prevent the spreading of harmful organisms;</p> <p>f) the protection and enhancement of important beneficial organisms (using plant protection measures or ecological infrastructures inside and outside production sites).</p> <p>The use of mechanical weeding is recommended in order to substitute pre-emergence herbicides. Pesticides which are dangerous to pollinating insects, such as bees, and other beneficial organisms must never be used.</p>
Suitable sites	<ul style="list-style-type: none"> ■ Farms with natural, permanent, semi-natural and sown pastures.
How a good implementation looks like	<ul style="list-style-type: none"> ■ In the absence of measures resorting to chemicals or in the presence of exclusively highly precise amounts of specific herbicides and pesticides, in precise locations, high levels of biodiversity are observed in the farm (including pollinating insects and other beneficial organisms); ■ The nests of early breeding birds, such as the wood lark (<i>Lullula arborea</i>) are kept safe; ■ Buffer zones of at least 10 meters or higher (if the Member State requires so) next to the water bodies, have been respected; ■ Hygiene measures are employed; ■ The presence of harmful organisms is frequently monitored; ■ The success of the applied plant protection measures is frequently monitored.
Effects on biodiversity (ecosystems, species, soil biodiversity)	<div>  <ul style="list-style-type: none"> ■ Clean and healthy water bodies allowing for richer and more stable trophic webs of plant and animal communities; ■ Higher Soil Organic Matter (SOM) allowing for richer soil and insect biodiversity; </div> <div>  <ul style="list-style-type: none"> ■ Trophic webs based on the floral diversity that is present and is not prejudicial (even if not part of the crops) are present and stable. </div>
Other positive effects/benefits for the farmer	<ul style="list-style-type: none"> ■ Significant increase in human health of the local population and farm workers; ■ Reduced risk of diseases usually facilitated when individuals are exposed to chemicals (herbicides or pesticides); ■ Higher SOM and therefore higher crop and pasture growth, yield and quality (palatability, digestibility and nitrogen content); ■ Reduced impact on trophic webs; ■ Prevention of diffuse pollution.
Indicator/key data	<ul style="list-style-type: none"> ■ SOM measured in the soil; ■ Soil biodiversity; ■ Flora and fauna observed in local ecological structures and water bodies; ■ Available reports regarding the monitoring of harmful organisms and the appli-

	cation of plant protection measures.
Risk and further recommendations	<ul style="list-style-type: none"> Water legislation restricts the application of some extensively used herbicides, and of those with high risks of leaching due to their application times. A careful application of pesticides is essential to minimize collateral damages.
Timeframe (When to start a measure and anticipated time for implementation)	Measures should be applied when the undesired plant species is still in the growing stage and therefore more vulnerable. If the plant to be controlled is an annual, then it should be controlled at its smallest average size. Perennial species frequently have deep roots and therefore measures should be applied during the rosette stage (new growth).
Additional special resources/ equipment/ skills needed	<ul style="list-style-type: none"> Digging up or pulling out individual weeds before they seed is recommended; In larger plots, if highly precise amounts of specific herbicides and pesticides are to be unavoidable, only well maintained machinery should be used and exclusively by competent and qualified operators; Any machinery used (e.g., sprayers) must be checked every year.
References	<ul style="list-style-type: none"> Basch, G., Friedrich, T., Kassam, A., Gonzalez-Sanchez, E., 2015. Conservation Agriculture in Europe, in: Farooq, M., Kadam, H.S. (Eds.), Conservation Agriculture. Springer International Publishing, Basel, Switzerland, pp. 357–390. EU, 2009. Directive 2009/128/EC of the European Parliament and of the Council of 21 October 2009 establishing a framework for Community action to achieve the sustainable use of pesticides. Off. J. Eur. Union L 309, 71–96.

Further information: [Knowledge pool](#)

This Action Fact Sheet belongs to the training package for advisors of standard organisations and companies and was developed within the project: “Biodiversity in Standards and Labels of for the Food Industry”. The main objective of the project is to improve the biodiversity performance of standards and sourcing requirements in the food industry by helping standard organisations to integrate efficient biodiversity criteria into their schemes and motivating food processing companies and retailers to include comprehensive biodiversity criteria into their sourcing guidelines.

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