

Sown Biodiverse Permanent Pastures Rich in Legumes (SBPPRL)

Goal

Installation of Sown Biodiverse Permanent Pastures Rich in Legumes (SBPPRL)

Short description of the measure

Sown Biodiverse Permanent Pastures Rich in Legumes (SBPPRL) are based on diverse mixtures of about twenty different species, including species and varieties originated from the Mediterranean which may be, in some cases, absent or in lower proportions in spontaneous grasslands (for example, species and/or varieties of legumes) (Teixeira et al., 2011). These species or varieties help to establish a functioning ecosystem with complementary ecological functions and niches (Figure 1). In this manner, the increased biodiversity also allows for increased productivity (Dias, 2017; Teixeira et al., 2015).



Figure 1 – Sown Biodiverse Permanent Pastures Rich in Legumes provide for landscapes diverse in flowering species. Photo credits: © Terraprima

The installation of SBPPRL must be timely performed, i.e., when the soil is still relatively warm, and in well prepared and fertilized plots. No mobilization or fertilization with nitrogen should take place after installation.

During the first winter, grazing is possible and may help to control undesired species, allowing for generous seed production, as long as the soil is able to accommodate cattle treading with no risk of compaction and the plants already have at least 5 to 7 leaves (Figure 2). A high stocking rate may be used for 3 – 5 days and grazing must cease when the first flowers bloom. On irrigated sown pastures, as long the soil allows it, grazing is also possible, throughout the year, preferably in a rotational manner. During the Autumn and Winter, grazing must be highly reduced or absent.

During the Summer, the dried grass must be grazed, as long as seed formation is complete, and no flowers are visible anymore. All the dried grass should be grazed before the first rains of Autumn takes place.

After all the dried grass is removed and before the rain, it is important to fertilize the soil with phosphorous and eventually potassium and other soil improvers in poorer soils and/or with very low pH.



Figure 2 – Grazing in Sown Biodiverse Permanent Pastures Rich in Legumes is possible since the first year of installation but should cease during Autumn and Winter. Photo credits: © Terraprima

Quality elements of soundly implemented biodiversity measures

- After the first year, legumes should be the most predominant species;
- In mature sown pastures (after 5 years) legumes should take up from 25 % to 30 % of plant cover area;
- Legumes should exhibit nitrogen-fixing nodules in the roots;
- A variety of species should bloom every year (not necessarily the same combination every year) (Figure 1).



Figure 1 – A blooming sown biodiverse permanent pasture, rich in legumes. Photo credits: © Terraprima

Effects on biodiversity

(ecosystems, species, soil biodiversity)



- The effects of SBPPRL on wild biodiversity are unclear (Teixeira et al., 2015);
- Soil and insect biodiversity may increase due to:
 - Well managed presence of livestock reduces the need for operations dedicated to controlling shrubs (e.g., tillage);
 - Higher root productivity;
 - Higher Soil Organic Matter (SOM);
 - Higher water retention;
 - Lower soil erosion.

<p>Other positive effects/benefits for the farmer</p>	<ul style="list-style-type: none"> ■ Higher genetic diversity and richness in the pasture; ■ Higher adaptability to climatic, environmental and micro-topographic variations; ■ Higher photosynthetic capacity; ■ Higher yields of quality pasture; ■ Higher stocking rates without comprising the sustainability of the system; ■ Reduced need for concentrated animal feed; ■ Significantly increased of replenished stable SOM (reducing erosion and preventing desertification); ■ Improved soil structure; ■ Potential for the pasture to perform as a carbon sink; ■ Climate change mitigation and adaptation; ■ Decreased surface water runoff; ■ Higher water retention capacity; ■ Decreased pyrophyte shrub vegetation.
<p>Indicator/key data</p>	<ul style="list-style-type: none"> ■ Presence of SBPPRL common species, including legumes; ■ Predominance of legumes; ■ Diverse number of flowering species blooming every year; ■ Nitrogen concentration measured in the soil; ■ SOM measured in the soil; ■ Soil biodiversity.
<p>References</p>	<ul style="list-style-type: none"> ■ Dias, N.F.A., 2017. Sown Biodiverse Permanent Pastures Rich in Legumes as an adaptation tool against climate change. Faculdade de Ciências da Universidade de Lisboa, Lisboa, Portugal. ■ Teixeira, R.F. de M., Proença, V., Crespo, D., Valada, T., Domingos, T., 2015. A conceptual framework for the analysis of engineered biodiverse pastures. Ecol. Eng. 77, 85–97. ■ Teixeira, R.F., Domingos, T., Costa, A., Oliveira, R., Farropas, L., Calouro, F., Barradas, A., Carneiro, J., 2011. Soil organic matter dynamics in Portuguese natural and sown rainfed grasslands. Ecol. Modell. 222, 993–1001.

Further information: [Knowledge Pool](#)

This Action Fact Sheet belongs to the training package for product and quality managers of companies and was developed within the project LIFE Food & Biodiversity (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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