

PRODUCT DATA SHEET

Undersowing with cereals

A key element for implementing individual, location-specific agricultural strategies

Nearly all grass and clover species can be used for undersowing with cereals, both on their own and in mixtures. The standard window for undersowing is early spring; however, sowing can also be done in autumn. Regardless of whether conventional, ecological or regenerative agricultural practices are followed, undersowing with cereals represents an important element of consistent and sustainable crop cultivation strategies that have become essential for operators. The increased application of undersowing in commercial cereal operations is largely thanks to its agricultural, economic and ecological advantages.



Benefits at a glance

▸ Quick soil cover and row closure

- Protection from erosion due to extensive ground coverage by the undersown crop, both during the growing phase and after harvest of the cover crop
- Effective suppression of weeds and weed grass through soil shading

▸ Soil protection

- Improved soil tilth → Improved bearing capacity of the soil
- Improved soil structure → Crumbly texture

▸ Groundwater protection

- Nutrient fixation → Additional ground coverage protects against nutrient loss via leaching

▸ Humus formation in line with carbon farming

▸ Promotes crop diversity and biodiversity

▸ Boosts forage production

▸ Cover crop protects the undersown crops

- Worldwide, the majority of grass and clover propagation is carried out under cereal cover crops

▸ Economic advantages

- Cost reduction by reducing tractor runs or preparatory operations
- Seed savings due to a lower seeding rate for the cover crop and the undersown crop
- Avoids labour peaks

Act as boundary for overseeding crops

- Fields with extremely high weed pressure, particularly due to root-propagating weeds

Climate & soil requirements

- No explicit limitations per se
- It is important for the undersown crop to be compatible with the cover crops so that both can easily cope with local conditions

Soil preparation

- Soil preparation depends on the cultivation aim and stand density: The denser the intended crop establishment, the earlier the need for ploughing in order to prepare a clean soil bed before sowing

Weighting of 0.3 for ecologically sensitive areas (OVF)



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Sowing

► Cover crop species selection

- Many of our native cereal varieties are suitable as cover crops
 - Winter wheat, winter triticale and winter rye are preferable to winter barley as they can withstand harrow-weeding better and exhibit slower row closure
 - Summer cereals can also be used; summer wheat is preferred over spring oats or spring barley since it is more stable and tolerant of harrow-weeding
- Cover crops should be selected based on the growth rate, height and winter hardiness of the desired undersown crop
 - Rule of thumb: slow-growing undersown crops under weak cover crops, fast-growing undersown crops under strong cover crops
 - White clover goes well with summer cereals
 - Grass mixtures with red clover and hairy vetch or winter feed peas go well with winter cereals or winter rye

► Cover crop variety selection

- Varieties with erectophile leaf angle distribution (→ less shading) are more effective
- Choose varieties with better single ears rather than ones with high stand density
- Very high stability is required
- Good health status

► Selecting undersown varieties

- Many of our tried and tested agricultural grass species (for instance, perennial ryegrass, Italian ryegrass, hybrid ryegrass, meadow fescue, smooth-stalked meadow grass, cocksfoot, red fescue, etc.) are suitable for both autumn and spring sowing
- Annual ryegrass is generally too dominant over the cover crop during its early development owing to its very fast establishment and high mass formation
- Many small-grain legumes, especially the well-known clover species (such as white clover, red clover, crimson clover, etc.) are suitable
 - Undersowing with small-grain legumes is recommended in the spring due to the relatively late sowing periods of winter cereals beginning in late September (decreasing day length, sunshine hours and accumulated air and soil temperatures)



Red clover as an undersown crop with cereals



Hairy vetch as an undersown crop with cereals

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▸ Sowing period

- Rule of thumb: The lower the weed pressure and the more vigorous the cover crop and undersown crop, the earlier planting should occur
- Autumn: No significant advantages except in the case of species requiring vernalisation
 - No late sowing so as to allow sufficient pre-winter development of the undersown crop
- Early spring: Easier handling in terms of crop protection
 - Sowing in early spring is particularly suitable for undersown clover → Clover can then grow through the warm season

▸ Seeding rate

- The standard seeding rate should be reduced when planting a cover crop for an undersown crop
- The degree of reduction depends significantly on the reason for planting the undersown crop and whether it will subsequently be used as livestock feed or biogas plant substrate
 - If the intended subsequent use is livestock feed or biogas plant substrate, then the seeding rate should be considerably reduced relative to the rate for undersown crops that are intended purely for greening, green fallowing, green manuring or biodiversity purposes
 - The following table provides indicative values of appropriate seeding rates for common cover crops:

Cover crop	Seeding rate (seeds/m ²)
Winter barley	220-240
Winter rye - population variety	150-200
Winter rye - hybrid variety	140-160
Winter triticale	200-220
Winter wheat	270-300
Spring barley	250-260
Spring oats	270-280



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▪ Recommended seeding rates (kg/ha) and sowing periods for undersowing with cereals:

Species/mixture	Seeding rate (kg/ha)	Winter barley/ Winter rye	Winter wheat/ Winter triticale	Summer cereals	Intended use**
Autumn undersowing					
Perennial ryegrass, dip.*	10-15	Nov.	Nov./Dec.		GF, S, P
Meadow fescue	12-15	Early Nov.	Nov.		GF, S, P
Cocksfoot	8-10	Oct./Nov.	Nov.		GF, S, P
Red fescue	8-10	sown together	sown together		GF, S, P
Smooth-stalked meadow grass	8-10	sown together	sown together		GF, S, P
Spring undersowing					
Perennial ryegrass, dip.*	10-15	Feb./March	March	As early as possible	GF, S, P
Meadow fescue	12-15	Feb./March	Feb./March	As early as possible	GF, S, P
Cocksfoot	8-10	Feb./March	March	As early as possible	GF, S, P
Red fescue	8-10	Feb./March	Feb./March	As early as possible	GF, S, P
Italian ryegrass, dip.*	14-16	April	April/May	From 3-leaf stage	GF, S, P
Hybrid ryegrass, dip.*	12-15	April	April/May	From 3-leaf stage	GF, S, P
White clover	6-8	Feb./March	Feb./March	As early as possible	B, GM
Red clover	10-15	From March	From March	From 3-leaf stage	B, GF, GM
Black medick	6-8	From March	From March	As early as possible	B, GM
Subterranean clover	5-8	From March	From March	As early as possible	B, GM
Lucerne (alfalfa)	9-13	From March	April	As early as possible	B, GF, GM, S
Serradella (common bird's foot)	14-18	From March	From March	As early as possible	B, GF, GM, S
Bird's-foot trefoil	6-8	From March	From March	As early as possible	B, GM
Standard A3* + P	15-20	April	April/May	From 3-leaf stage	G, GM, S, P
Standard A7	10-15	Feb./March	March	As early as possible	G, GM, S, P
MehrGras BG 50*	25-30	From March	April	From 3-leaf stage	G, GM, S, P
MehrGras BG 55*	15-20	From March	April	From 3-leaf stage	G, GM, S, P
Perennial ryegrass* + white clover	12+4	Feb./March	Feb./March	As early as possible	B, G, GM, S, P
Perennial ryegrass* + red clover	12+6	From March	From March	From 3-leaf stage	B, G, GM, S, P
* for tetraploid varieties: 25% higher sowing quantity					
** B = biodiversity, GF = green fodder, GM = green manuring, S = silage, P = pasture					

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▸ Sowing technology

- Sowing management depends on the available sowing technology to a greater extent than other processes

Sowing technologies	Overseeding performed by seed broadcasting	Interseeding
Notes	Pneumatic fertiliser or slug pellet spreader, mounted on a harrow if needed	<ul style="list-style-type: none"> ▸ Broadcasting, followed by mechanical seed placement, often in combination with at least twice the distance between cereal rows ▸ Using mechanical or pneumatic seed drill in the space between seed rows, or, better, transverse to the drill direction of the cover crop (particularly suitable for planned long-term or multi-year usage of the undersown crop as fodder)



Source: PÖTTINGER

▸ Row spacing and sowing depth

- Depending on available sowing technology
 - Especially if the undersown crop is intended for long-term or multi-year fodder usage, the crop-specific seed sowing depth should be maintained for both the cover crop and the undersown crop; sowing should ideally be carried out using a seed drill

In addition to crops sown on their own, seed mixtures (grass or clover-grass mixtures) can be considered for undersowing

Strong mixtures for strong undersowing

- MehrGras BG 50 Biogasexpress Undersowing Coated Seed
- MehrGras BG 55 Biogasexpress Undersowing Coated Seed
- PROGREEN® FU 7 Landsberger Mixture

Many of the MehrGras permanent pasture (all GV mixtures) or Futterexpress mixtures (all A1, A1 WZ, A3, A5 and A7 mixtures; ProGreen® FU 1, FU 3 and FU 4) can also be used as undersowing mixtures.



PROGREEN® FU 7 Landsberger Mixture



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Crop protection

Weed control

- Herbicide strategy depending on the sowing window

Autumn sowing	Spring sowing
<ul style="list-style-type: none">▸ If sowing and undersowing with small-grain legumes is carried out simultaneously, then most herbicides that target dicotyledonous weeds cannot be used, since the undersown clover needs to be protected▸ If undersowing is carried out after the emergence of the cover crop, foliar herbicides should be applied no later than 10 days before the planned application of the undersown crop▸ Measures against dicotyledonous weeds can be carried out if the undersown crops are all grasses using hormone weedkillers beginning at the 3-leaf stage▸ Mechanical weed control by harrowing can be performed until row closure by the cover crop	<ul style="list-style-type: none">▸ Autumn treatment with herbicide is possible under normal circumstances▸ After-treatment with foliar herbicides in early spring can also be carried out up to 10 days before application of the undersown crop▸ Measures against dicotyledonous weeds can be carried out if the undersown crops are all grasses using hormone weedkillers beginning at the 3-leaf stage▸ Mechanical weed control by harrowing can be performed until row closure by the cover crop

Pest control

- Undersown crops are preferentially attacked by snails and slugs under the moist, shaded conditions created by a cover crop
 - Regular monitoring of damage by slugs and snails is advisable
 - Slug pellets can only be used for undersown crops outside ecologically sensitive areas

Fertilisation


- Basic fertilisation based on soil testing
- Site-specific N fertilisation strategy that accounts for all relevant fertilisation regulations
- N fertilisation is to be avoided on sites where a leguminous plant forms more than 50% of the stand



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Cutting, harvesting and treatment

- Field crop is harvested only if it is intended for usage as fodder
- Two basic uses are possible:

Using the entire crop	Grain production
Usage as fresh green cuttings or whole plant silage after being chopped up	Threshing the cereals and, if required, grains of the undersown crop (using a high cutting process if needed) → The straw should be cleared immediately after harvesting the cover crop to ensure that it continues to grow uniformly and quickly
	

Summary

Undersowing with cereals is possible...

- ... when there is a readiness for lower revenues from the cover crop but substantial advantages for subsequent crop yield
- ... in extensive arable feed crop production operations seeking additional forage sources, particularly during dry years
- ... in organic or regenerative farming operations, particularly those that do not have any organic farm manure from animal husbandry
- ... in conventional farming operations with maize fields in conservation areas that wish to reduce the application of chemical plant protection agents in maize cultivation and to reduce or eliminate mineral fertilisers

Do you have any questions? Please feel free to contact us!

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