RYEGRASS Z-SEED IS **NOT** HERBICIDE RESISTANT

Ryegrasses, such as Italian ryegrass, are frequently used in forage production. However, inadequate crop management can cause problems with these grasses, and herbicide resistances are suspected to be developing. The results of the following trial demonstrate that this is unfounded and they highlight which rules should be observed in practice.

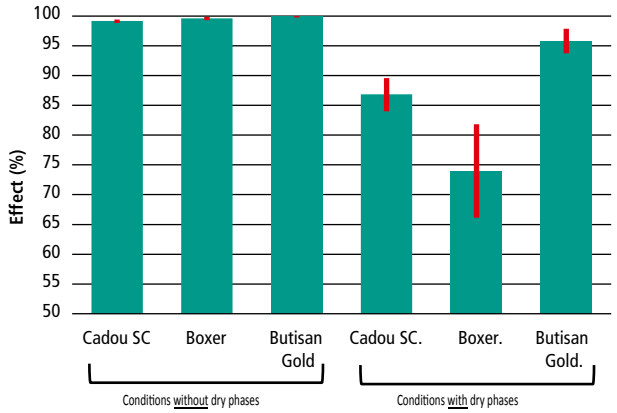
Ryegrass, such as Italian ryegrass (Lolium multiflorum), is a crop that has been optimised for very rapid and vigorous development. It is preferably used in field forage production, e.g. in the Landsberg mixture (TerraLife® ForageRooter), or for short-term meadow utilisation on arable land. However, Italian ryegrass also has the potential to emerge as a weed. This means that it develops as an aggressive competitor plant through seed dispersal, e.g. by crossing of combine harvester, or from an existing soil seed stock in the cultivated crop. This unintentional way of spreading has been documented in England since the mid-18th century. Currently, Italian ryegrass occurs as a weed in almost all arable farming regions worldwide. Problem areas with heavy, widespread infestations have been reported in France and Australia, for example. In addition to its high competitive power, the main problem is the ability of Italian ryegrass to develop herbicide resistances rapidly and on a large scale.

TAB. 1: STRUCTURE OF SENSITIVITY TESTING

Herbicide	Active ingredient	Application	Dates	Dose (l/ha)
Soil herbicides				
Boxer	Prosulfocarb	Cereals, potatoes, field beans, field peas, sunflowers, lupins	Pre	5.00
Butisan Gold	Metazachlor+ Quinmerac	Winter oilseed rape	Pre	2.50
Cadou SC	Flufenacet	Winter cereals	Pre	0.50
Leaf herbicides				
Atlantis OD	Mesosulfuron+ Iodosulfuron	Winter cereals	Post	1.20
Axial 50	Pinoxaden	Cereals	Post	1.20
Broadway	Pyroxsulam+ Florasulam	Cereals	Post	0.28
MaizeTer Power	Foramsulfuron+ Iodosulfuron+ Thiencarbazone	Maize	Post	1.00
Select 240 EC+ Radiamix	Clethodim	various broadleaf crops	Post	0.50+ 1.00
Roundup PowerFlex	Glyphosate	Pre-sowing and stubble treatment	Post	2.50

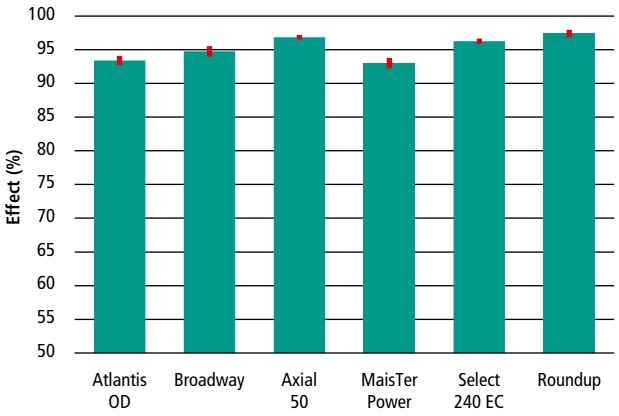
Pre = pre-emergence, Post = post-emergence in BBCH 12-13

FIG. 1: EFFECT OF SOIL-ACTIVE HERBICIDES AGAINST 20 VARIETIES OF ITALIAN RYEGRASS IN COMPARISON



Mean value and standard deviation, greenhouse test, Bingen 2023 & Freising 2024

FIG. 2: EFFECT OF LEAF-ACTIVE HERBICIDES AGAINST 20 VARIETIES OF ITALIAN RYEGRASS IN COMPARISON



Mean value and standard deviation, greenhouse test, Bingen 2023 & Freising 2024

This phenomenon has been evident throughout Germany for several years. Individual farms are exposed to high weed infestations of Italian ryegrass, which can no longer be controlled in a purely chemical way. In these cases, the suspicion repeatedly arises that commercially available seed may already be equipped with herbicide resistances. The Bavarian State Research Centre for Agriculture (LfL) Freising took up this topic in cooperation with the Technical University (TH) Bingen in 2023.

20 breeding varieties were tested

In a standardised greenhouse and semi-outdoor trial, 20 varieties of Italian ryegrass were tested for their variety-specific sensitivity to various herbicides. The varieties were selected according to their seed cultivation scope in the 2022 propagation in Germany. The DSV varieties Dolomit, Dorike, Hunter, Lipsos and Sendero were among these frequently propagated ryegrasses. For the herbicide test, the common, grass-effective soil and leaf herbicides in cereal, oilseed rape and maize cultivation were selected (see Table 1). The range was extended by a pure graminicide and a glyphosate preparation. The treatments were carried out at optimum dates in pre-emergence and early post-emergence. In addition to the authorised standard dose, the preparations were also tested at half and double the application rate in order to identify the level of any existing resistance.

In addition to the breeding varieties, the multi-resistant reference origin was also tested. The soil herbicides still achieved an average effect of approx. 70 % against this origin. The selective leaf herbicides, on the other hand, were only effective in a range of 10 to a maximum of 50 %. Only the glyphosate treatment was able to achieve a complete effect against this origin.

Effect potential depending on application conditions

Significant differences in the response of the cultivated varieties were sometimes observed when testing the soil herbicides at the trial sites of the LfL Freising and the TH Bingen. The explanation for this ultimately lies in the trial period. In Bingen, the test was carried out in the summer months of 2023 under semi-outdoor conditions, while the test in Freising was carried out in the greenhouse in the winter of 2023/2024. The intermittent drying of the topsoil in Bingen, which was due to procedural reasons, obviously impaired the effectiveness of individual soil herbicides. This was most evident in the "Boxer" treatment, which also showed greater variation within the varieties. Thanks to the consistently good soil moisture in the greenhouse in Freising, these effects were not recognisable in any way. Applied to practice, nothing unexpected was found other than

VOICES FROM THE FIELD

Even after 50 years of grass seed production, we have neither observed nor detected any resistance. «

Norbert Thiex-Mayer

Chemical and non-chemical measures are essential as part of an integrated pest management strategy for the regulation of Italian ryegrass in cereals.

that soil herbicides have different potential effects on the application conditions or depending on optimal or sub-optimal soil moisture.

In contrast, the effectiveness of the leaf herbicides was absolutely identical at both test sites. Even the variety response against the individual leaf-active herbicides showed only minimal variance. Finally, the preparation- or active ingredient-specific potential effect for the control of Italian ryegrass was determined. With a potential effect of 93 to 97 %, no significant difference in performance can be determined between the preparations.

Suspicion unfounded for commercial varieties

In the end, the test proved that there is no suspicion of existing herbicide resistance in commercialised Z-seed of Italian ryegrass. However, this does not mean that the all-clear can be given for long-term successful regulation or that purely chemical regulation is guaranteed, as soil herbicides can become ineffective in dry conditions and leaf herbicides only have a potential effectiveness of around 95% when applied optimally.

In practice, therefore, the use of herbicides against ryegrasses will regularly result in surviving biotypes which form the basis for a selection process leading to the development of resistances.

Conclusion

In production practice, there are therefore two basic rules for regulating Italian ryegrass:

1. Reliably prevent the survival of old plants.
2. Minimise seed formation in subsequent crops as far as possible.

For both core objectives, chemical and non-chemical measures are indispensable as a strategy of integrated plant protection. The best example of this concept is grass seed production. Here, farms have been and continue to be able to prevent weed infestation with Italian ryegrass by means of cultivation techniques and direct control measures.

» The results show that there is no suspicion of existing herbicide resistance in commercially available Z-seed of Italian ryegrass. «

Klaus Gehring

Farms that cultivate forage crops should always use Z-seed when sowing and plan measures in line with good professional practice. This is because effective management and careful selection of varietes are both essential for regulating undesirable ryegrass population.

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