

THE SENSE AND NONSENSE OF COMMERCIAL GLYPHOSATE RESISTANT *LOLIUM SPP.*

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X. Belvaux¹, I. Brants² and R. De Prado³

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GLYPHOSATE TOLERANT PERENNIAL RYEGRASS



Naturally Occurring, Scientifically Selected

What was the first step in developing Jacklin's exciting new product? We tried to kill it!

When this Jacklin experimental perennial variety did not die after a research trial was completed -- even after two applications of Glyphosate at 32 fl.oz./acre (2.3 Liter/hectare), we knew we had something special.

Mother Nature had given it a unique resistance to Glyphosate. Samples from this sturdy variety were entered into Jacklin's breeding program to enhance turf quality while keeping the Glyphosate resistance.

After decades of scientific breeding, and multiple research trials in locations around the world, and practical experience on elite golf courses, Jacklin Gly-Ryes are now ready for you!

Oregon State
University, USA



Tested Around The World

Jacklin Gly-Ryes have been tested under real world conditions on golf courses and by independent researchers in multiple trials for its glyphosate tolerances. The experiences and data collected has been used to develop the Jacklin Gly-Rye guidelines.

Italy



Washington, USA



In Europe, **Semillas Fito** commercializes the variety **Replay** (Gly tolerant *perennial Lolium*) in Spain, Portugal, Italy, France, Turkey.

Recommended dose rate of 1,6 L/ha (576 g ae/ha) at 4 leaf stage and no stress; a dose of 0.8 L/ha to control grass in turf.

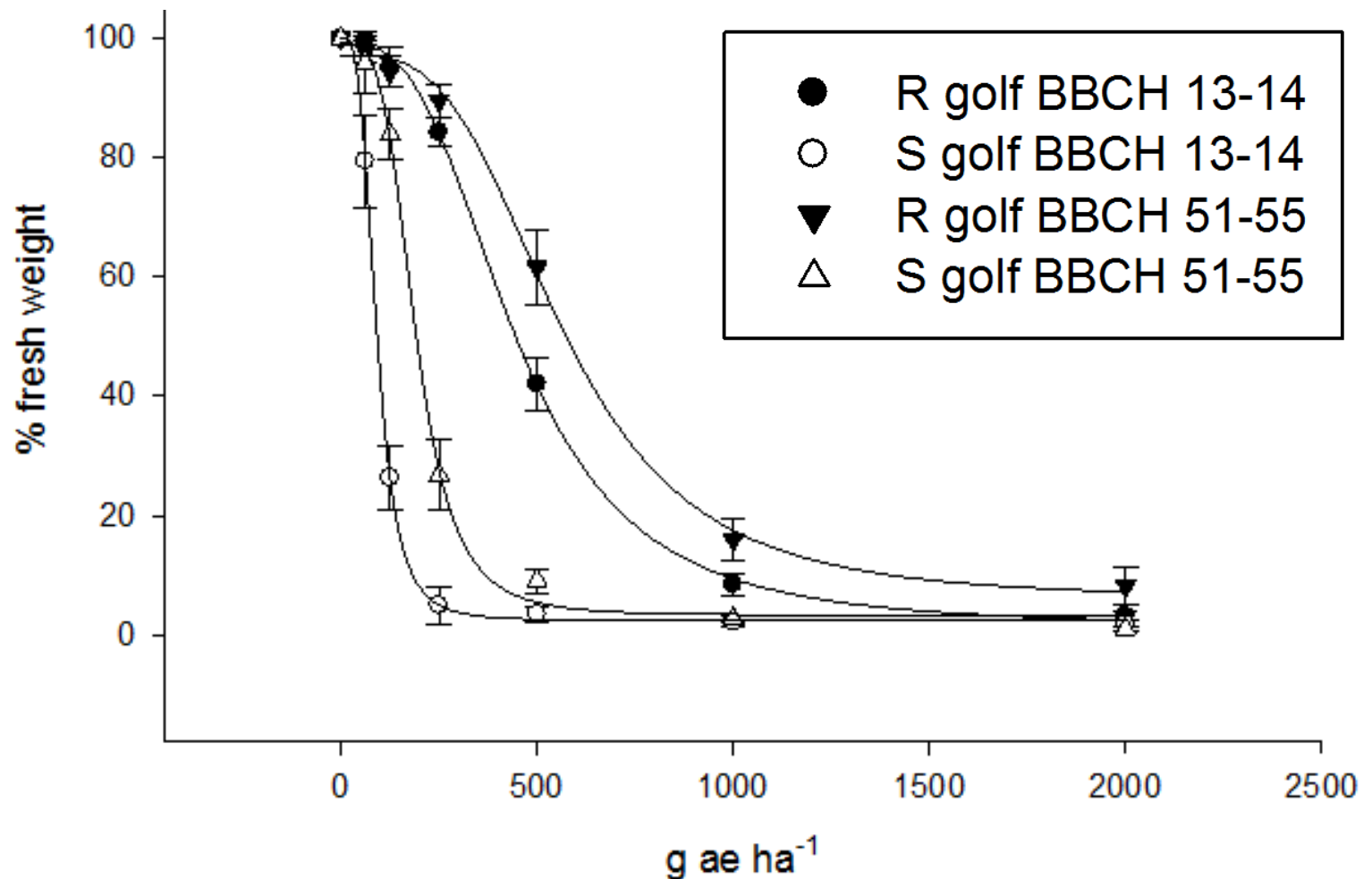
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- ✓ Additional characterization (by UCO team)
- ✓ Glyphosate use stewardship
- ✓ Potential impacts on glyphosate resistance.

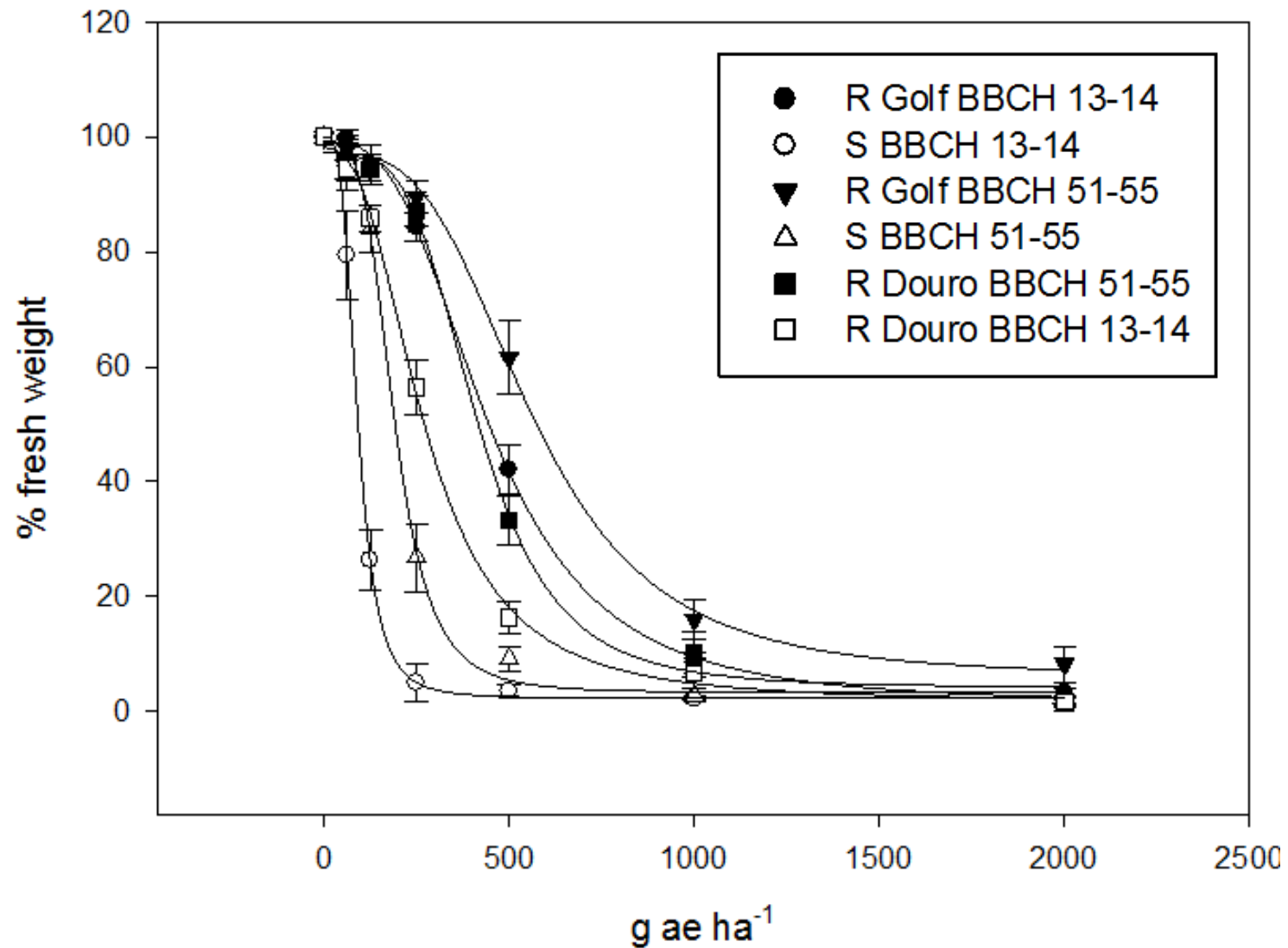


Additional characterization

Increasing glyphosate resistance with development stage (both S and R)



Additional characterization



Additional characterization

Similar levels of resistance as with wild *L. perenne*

Species (growth stage)		<i>c</i>	<i>d</i>	<i>b</i>	ED ₅₀ (g a.e ha ⁻¹)	<i>pseudo</i> <i>r</i> ^{2b}	<i>P</i> ^c	R. F.
<i>L. perenne</i> Golf (BBCH 13-14)	R	1,35	99,18	2,96	443,76	0.99	<0.0001	4.87
	S	2,33	100,00	3,52	90,92	0.99	<0.0001	
<i>L. perenne</i> Golf (BBCH 51-55)	R	5.92	97.18	3.35	562.44	0.99	<0.0001	2.96
	S	3.23	98.93	3.87	189.84	0.99	<0.0001	
<i>L. perenne</i> Douro vineyard (BBCH 13-14)	R	1,68	98,16	2,59	271,49	0.99	<0.0001	3.01
	S	2,33	100,00	3,52	90,92	0.99	<0.0001	
<i>L. perenne</i> Douro vineyard (BBCH 51-55)	R	4,08	97,22	3,94	414,01	0.99	<0.0001	2.19
	S	3.23	98.93	3.87	189.84	0.99	<0.0001	

Glyphosate use stewardship

- ✓ Registration status :
 - ✓ Over the top use of glyphosate formulations in golf courses currently not approved in Spain. Status to be reviewed in other countries?
 - ✓ Seed variety registration for golf courses only or not specified?

Potential impacts on glyphosate resistance

- ✓ Some risk of seed fall and dissemination beyond the target areas
- ✓ No risk in target area if *Lolium* plants are not allowed to flower
- ✓ Major risk in abandoned golf courses or where *Lolium perenne* is allowed to flower with potential crosses with weedy *Lolium* species
- ✓ The level of tolerance is comparable with the one found with wild *L. perenne* biotypes in Douro (North of Portugal).
- ✓ Risk of spreading into TNV and arable.
- ✓ Risk of use outside golf courses areas (e.g. Italy)

ESTABLISHMENT AND MANAGEMENT

In case mowings are suspended while GLY-RYE plants are alive, their destruction before flowering with effective registered herbicides or tillage is recommended, to avoid that pollen or seed propagate the resistance to glyphosate, according to the recommendations of Directive 2009/128/EC and the Royal Decree 1311/2012.

IMPLANTACIÓN Y MANEJO

- No aplicar dosis de Glifosato superiores a 291 g de Glifosato/Ha y aplicación si hay riesgo de solapes.
- Separar las aplicaciones al menos 4 semanas.
- Para resiembras se recomienda primero escarificar y aplicar el producto 4 días antes de la nueva siembra repitiendo a partir de las 3 semanas desde la siembra de la nueva variedad para tener éxitos del 70%.
- Para nuevas siembras, no aplicar el producto antes de la aparición de la cuarta hoja del Lolium perenne. Evitar tratar en situaciones de estrés, corte por debajo de 1,3 cm, sequía, temperatura por debajo 10°C.
- No mezclar con reguladores de crecimiento ni tratar si se espera lluvia en las próximas horas.
- En caso de que se interrumpan las siegas cuando las plantas de JS501 (GLY RYE) estén vivas, es recomendable su destrucción por herbicidas efectivos autorizados o por labores antes de floración, para impedir que el polen o las semillas propaguen la resistencia al glifosato, de acuerdo con las recomendaciones de la Directiva 2009/128/CE y del Real Decreto 1311/2012.

Enforced?



Conclusion

- ✓ **New sources of glyphosate resistance varieties have been commercially released**
- ✓ **Level of tolerance similar to a wild *Lolium perenne* (Douro)**
- ✓ **Regulatory off-use of the glyphosate formulation and seeding outside golf courses**
- ✓ **Stewardship measures are key to minimize risks and spreading into TNV and arable lands**
- ✓ **Monitoring the deployment with the seed company involved is recommended**