



Improved Rhizomania Resistance

Seeding the future
since 1856

KWS



Introduction

Rhizomania is a soil borne disease that cannot be eradicated and which, in the absence of resistant varieties, can cut yields up to 40 - 50%.

Varietal resistance to the main A and B strains of rhizomania has come from the resistant Holly gene, introduced into high yielding beet material since the late 1980's.

This has been a major success story, initially offering resistance to rhizomania infestation and enabling beet production to continue unhindered in infested areas for over 20 years.

In recent seasons in the UK, notably in the Woodbridge area of Suffolk, as well as in other parts of Europe, one of the two dominant rhizomania strains – the A-type - has mutated. As a result, beet with the Holly gene is no longer offering the resistance required and is showing varying degrees of yield loss.

Researchers have now identified a new major gene source that also provides resistance to rhizomania, the C48 gene. By introducing this new C48 gene, KWS has developed new beet varieties which have both genetic sources of resistance.

As a result, these **RZ^{2.0}** Double Resistant types offer the best possible protection in areas of high rhizomania pressure and against the evolving rhizomania virus, ensuring beet production is not compromised.



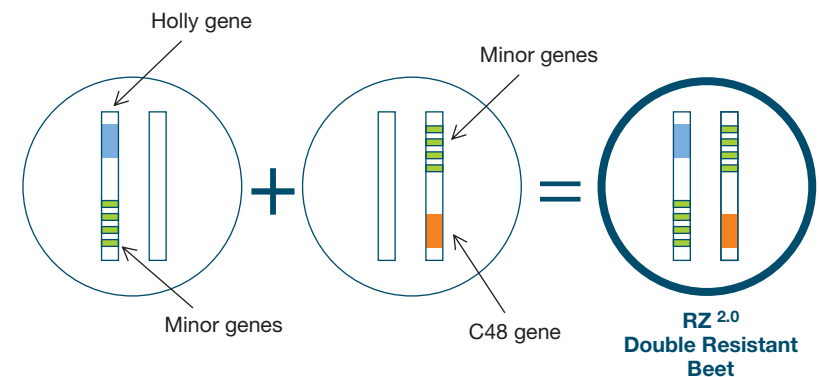
What is **RZ^{2.0}** Double Resistance?

Until now, virtually all rhizomania resistant varieties have gained their resistance from one major gene – the Holly gene, first introduced into Europe in the 1980's.

The new double resistant varieties are different. They incorporate the existing Holly gene with the new C48 gene, which is also derived from the wild beet source *Beta maritima*, and then introduce this into commercial lines providing the best possible protection against the mutating disease and reducing further spread of the virus.

The mechanism with which the C48 gene provides rhizomania resistance is not completely understood though it is similar to that of the Holly gene and is typically characterised by reduced accumulation of the rhizomania virus in the tap root of the beet plant.

These new **RZ^{2.0}** Double Resistant varieties fully utilise both these two major genes – and in addition incorporate minor genes on the same chromosome from both sources which also offers some additional resistance benefits.

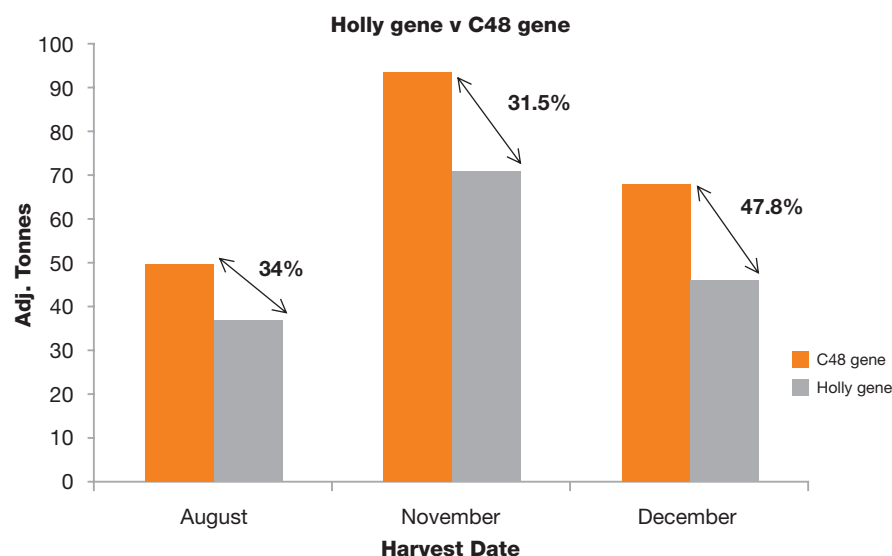


Why should I grow **RZ^{2.0}** Double Resistant Varieties?

During 2008 and 2009, rhizomania symptoms were confirmed in current varieties with the old single gene resistance mechanism in parts of Suffolk, Norfolk and Essex.

In Brooms Barn trials conducted in the 2010 growing season, the new C48 gene has been tested alongside current resistant varieties containing the Holly gene at a Woodbridge site where the mutated rhizomania strain has been detected.

In this situation, the new C48 gene technology provided an average yield increase of 36% over beet containing the Holly gene alone.



Data source: Brooms Barn data with KWS own data from trial in Chillesford, Suffolk, 2010

This clearly demonstrates the importance of selecting the best new technology where new strains of rhizomania are being seen.



The C48 variety, dark green strips, grown alongside Holly variety. Chillesford, Suffolk

At the same time though, while you may not yet be seeing a decline in performance from current rhizomania resistant varieties it is important that this new technology is adopted on farm as soon as it is available.

First, and foremost we need to maintain high levels of crop performance and **RZ^{2.0}** Double Resistance will provide a safer way of securely delivering the high yielding crops that the sugar industry requires.

The widespread adoption of **RZ^{2.0}** Double Resistant varieties - by reducing the availability of host plants - will also help to slow the development and multiplication of the known and recently detected strains of rhizomania in the soil.

By growing second generation rhizomania resistant varieties, and adopting the most comprehensive rhizomania resistance package available, growers can insure against the further development of the current resistant strains of the disease.

As a result, you can be confident that you will gain the rhizomania protection you need to maintain best possible beet crop performance wherever you farm.

Introducing **Isabella KWS – RZ^{2.0}**




ISABELLA KWS

The UK's first **RZ^{2.0}** Double Resistant variety – **Isabella KWS** will be commercially available for the very first time in 2012 – this major new **RZ^{2.0}** Double Resistant introduction will give UK growers the chance to test the new material on their own soil for the very first time.

What can Isabella KWS do for me?

- No yield penalty outside of rhizomania infestation
- Protects against major sub-clinical damage
- Reduces multiplication of the disease
- Ensures top yields under rhizo infestation
- Slows down spread of rhizomania

So, if you have concerns over the performance of your crop and wish to negate any potential effects of rhizomania, then in 2012 it is time to test the first new **RZ^{2.0}** variety ever available to UK growers.

	Relative data Mean of (C) varieties = 100			Juice quality	Establishment	Agronomic characters		Disease resistance	
	Sugar yield %	Adjusted tonnes %	Root yield %	Sugar content %	Establishment in field trials %	Bolters per ha		Rust	Powdery mildew
						Early sowing (4 yr mean)	Normal sowing	1=v.low 9=v.high	1=v.low 9=v.high
Mean of (C) varieties	100.0	100.0	100.0	18.77	93	433	17	5	2
ISABELLA KWS	100.8	101.0	99.0	19.08	92	326	7	6	8
ROSALINDA KWS	102.5	102.7	101.9	18.87	95	718	39	7	7
BULLFINCH (C)	100.7	100.6	101.6	18.61	94	283	22	4	3

Data source: BBRO/NIAB RL of Sugar Beet Varieties, 2012



Seeding the future
since 1856



KWS Sugar Beet Contacts

Simon Witheford

Product Manager Sugar Beet

Overall responsibility and technical advice:

Essex, South Suffolk, South Cambridgeshire.

Based at Thriplow.

Tel: 01763 207304

Mobile: 07717 844441

E-mail: simon.witheford@kws-uk.com

Martin Lainsbury

Technical advice in the area:

South and East Norfolk,

North Suffolk, Cantley Factory.

Mobile: 07985 725423

Email: martin.lainsbury@kws-uk.com

Angus Kennedy

Technical advice in the area:

South Cambridgeshire,

Bedfordshire and Suffolk.

Wissington and Bury

St. Edmunds Factories.

Mobile: 07976 610838

Email: angus.kennedy@kws-uk.com

James Kennedy

Technical advice in the area:

Lincolnshire, North and West Norfolk,

and North Cambridgeshire,

Newark and Wissington Factories.

Mobile: 07813 662847

Email: james.kennedy@kws-uk.com

KWS UK LTD

56 Church Street, Thriplow, Nr Royston, Herts SG8 7RE

www.kws-uk.com