Improved Rhizomania Resistance

KWS
Seeding the future since 1856
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 RZ² 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 RZ² 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 RZ² 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.
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.

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

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 Double Resistance will provide a safer way of securely delivering the high yielding crops that the sugar industry requires.

The widespread adoption of 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.

Why should I grow RZ².0 Double Resistant Varieties?
The UK’s first RZ2.0 Double Resistant variety – Isabella KWS will be commercially available for the very first time in 2012 – this major new RZ2.0 Double Resistant introduction will give UK growers the chance to test the new material on their own soil for the very first time.

**Relative data**

**Mean of (C) varieties = 100**

<table>
<thead>
<tr>
<th>Sugar yield %</th>
<th>Adjusted tonnes %</th>
<th>Root yield %</th>
<th>Sugar content %</th>
<th>Establishment</th>
<th>Agronomic characters</th>
<th>Disease resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean of (C) varieties</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td>18.77</td>
<td>93</td>
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<td>ISABELLA KWS</td>
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<td>19.08</td>
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<td>18.87</td>
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<td>718</td>
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<tr>
<td>BULLFINCH (C)</td>
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<td>100.6</td>
<td>101.6</td>
<td>18.61</td>
<td>94</td>
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</tbody>
</table>

**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 RZ2.0 variety ever available to UK growers.
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