

Nematode tolerant sugar beet varieties 2013

Nematodtoleranta betsorter 2013

Åsa Olsson

asa.olsson@nordicbeetresearch.nu
+46 (0)709 53 72 62

Borgeby slottsväg 11, SE-237 91 Bjärred

NBR Nordic Beet Research Foundation (Fond)
Højbygårdvej 14, DK-4960 Holeby

Nematode tolerant sugar beet varieties 2013

Sammanfattning

Syftet med detta försök var att prova betsorter för deras tolerans mot betcystnematoder *Heterodera schachtii*.

Resistent kontroll: Sanetta

Tolerant kontroll: Cactus

Mottaglig kontroll: SY Muse och Pasteur.

Provade sorttyper

RZ: 1 sort

RZNT: 25 sorter

RZNE: 1 sort

Försöksplatser: Stävie hage, Isie och Hagestad.

Försöksdesign: Lattice design.

Av de sorter som har testats första året på nematodinfekterad jord, har 3K417 signifikant högre sockerskörd än alla de andra, med undantag för 1K210 och 3K419 (tre försök 2013). 3K417 kombinerar hög rotskörd med hög sockerhalt.

Det fanns inga signifikanta skillnader i blåtal mellan sorterna som testades 2013. Blåtalet var 17 i SY Muse och 18 i Elora KWS samt Lombok. Endast Sanetta, Sherwood och HI1270 hade blåtal över 20.

Av de sorter som har provats två år på nematodinfekterad jord, har 1K210 och 2K298 högst skörd och de kombinerar hög rotskörd med hög sockerhalt.

Av de sorter som har provats tre år på nematodinfekterad jord, har Elora KWS och Lombok högst sockerskörd (nio försök 2011–2013). Lombok godkändes våren 2013. Elora KWS provas tredje året i officiella försök 2013.

Elora KWS och 3K417 har hög sockerskörd 2013, trots en långsam uppkomst vid 50 %.

Jollina KWS har en mycket snabb uppkomst 2013, både vid 50 % och slutlig uppkomst. Sockerskördens ligger på samma nivå som för SY Muse.

Summary

Resistent control: Sanetta

Tolerant control: Cactus

Susceptible control: SY Muse and Pasteur

Tested variety types

RZ: 1 variety

RZNT: 25 varieties

RZNE: 1 variety

Trial locations: Stävie hage, Isie and Hagestad

Trial design: lattice design.

Of the varieties that have been tested for the first year in trials on nematode infested soil, 3K417 has significantly higher sugar yield than all other varieties except 1K210 and 3K419 (3 trials 2013). 3K417 combine high root yield with high sugar content.

There were no significant differences in amino-N between the varieties tested in 2013. Amino N was 17 in SY Muse and 18 in Elora KWS and Lombok. Only Sanetta, Sherwood and HI1270 had amino-N over 20.

Of the varieties that have been tested two years in trials on nematode infested soil, 1K210 and 2K298 combine high root yield with high sugar content and they have the highest sugar yield.

Of the varieties that have been tested three years in trials on nematode infested soil, Lombok and Elora KWS have the highest sugar yield (9 trials 2011–2013). Lombok was approved in spring 2013. Elora KWS is tested for the third year in 2013 official variety trials.

Elora KWS and 3K417 show high sugar yield 2013 despite a somewhat slow emergence at 50%.

Jollina KWS show very good emergence in 2013, both at 50% and final emergence. The sugar yield is on the same level as SY Muse.

Aim

To test sugar beet varieties on soil infected with *Heterodera schachtii*.

Material and methods

Resistent control: Sanetta

Tolerant control: Cactus

Susceptible controls: SY Muse and Pasteur

Tested variety types

RZ: 1 variety

RZNT: 25 varieties

RZNE: 1 variety

Trial locations: Stävie hage, Isie and Hagestad

Trial design: lattice design.

Results and conclusions

Emergence and final plant number

Emergence at 50%: Jollina KWS had the highest emergence rate at Isie and the second highest at Hagestad and Stävie.

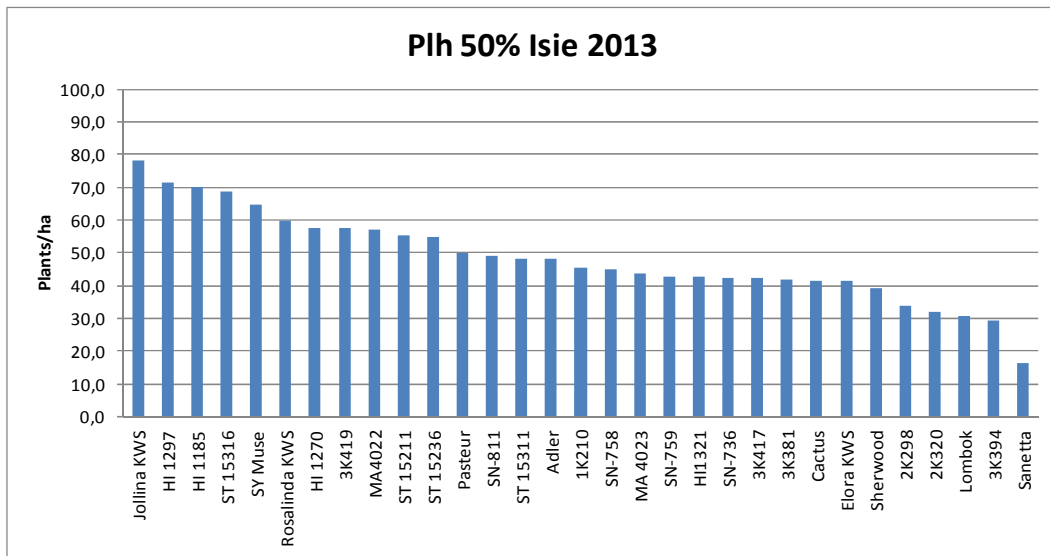


Figure 1. Plant number at 50% emergence at Isie.

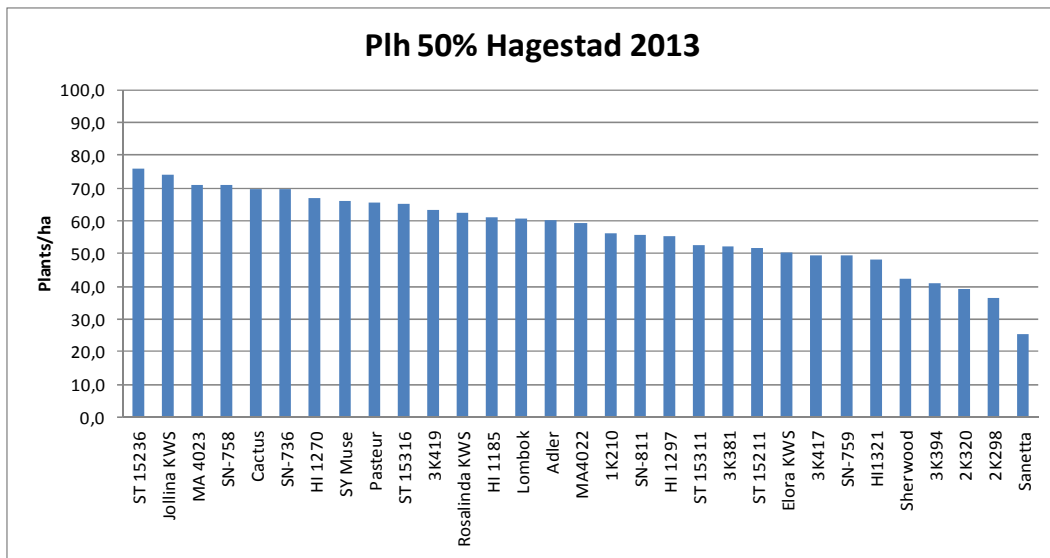


Figure 2. Plant number at 50% emergence at Hagestad.

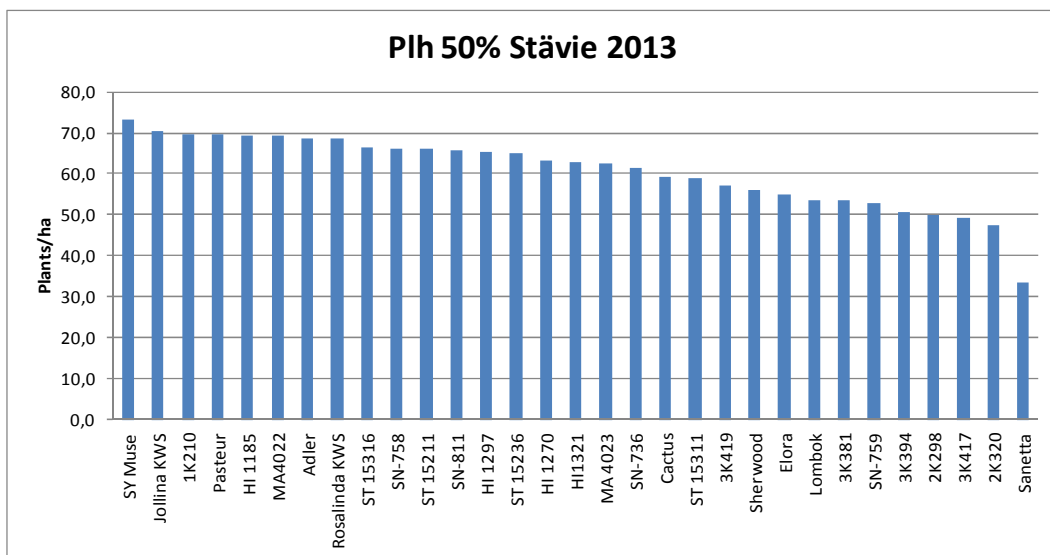


Figure 3. Plant number at 50% emergence at Stävie.

Final plant number was high in all varieties at Isie, more than 100 000 plants/ha.

With two exceptions (Sherwood and Sanetta) all varieties had more than 90 000 plants/ha at Hagestad.

Only six varieties had less than 90 000 plants/ha at final emergence in Stävie: Sherwood, 3K394, Elora KWS, 3K417, SN-750 and Sanetta.

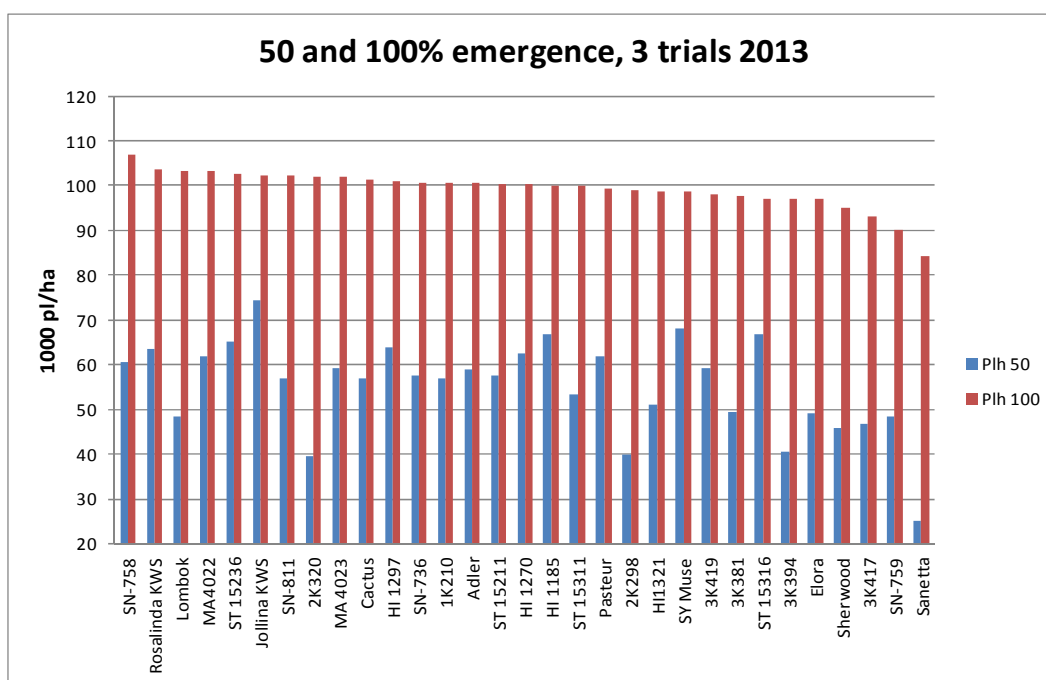


Figure 4. Plant number at 100% emergence, 3 trials 2013.

Sugar yield 2013

Four NT varieties are tested for the third year: Adler, Elora KWS, Lombok and HI1185 (table x).

The relative sugar yield (SY Muse = 100) in three trials 2013 was 104 for Elora KWS and 102 for Lombok.

Table 1. Relative sugar yield in four varieties tested for three years 2013

Variety	Relative sugar yield			
	Isie	Hagestad	Stävie hage	Average 3 trials
	Pi = 6.5	Pi = 5.0	Pi = 3.8	
SY Muse	100	100	100	100
Adler	99	91	105	99
Elora KWS	111	95	105	104
Lombok	105	105	98	102
HI1185	102	100	101	100
Cactus ¹	91	98	99	96

¹Control

The variety with the highest sugar yield in all three trials 2013 was 3K417. This variety is tested for the first year.

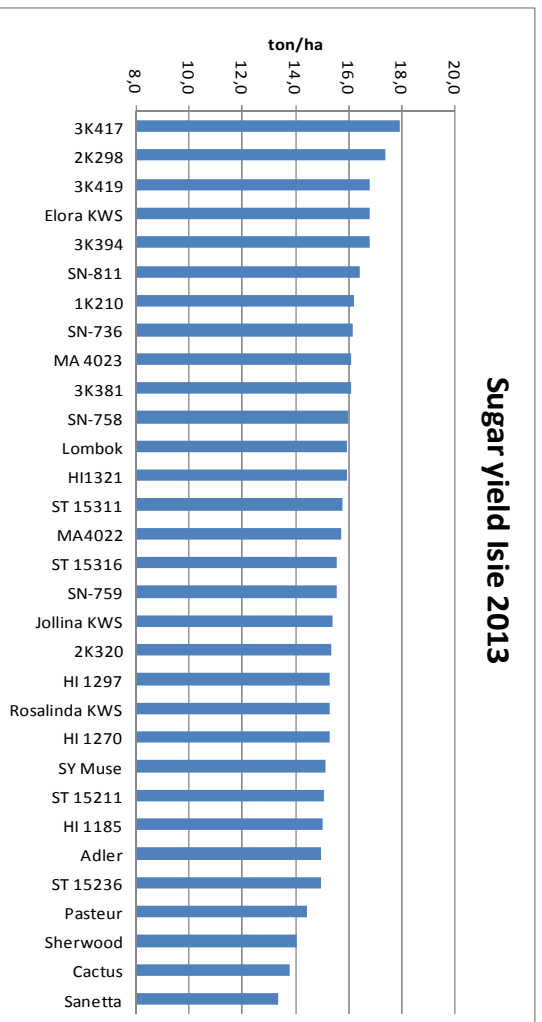


Figure 5. Sugar yield, Isie 2013. LSD 5% = 1.8, Prob. < 0.0001. Average Pi = 6.5.

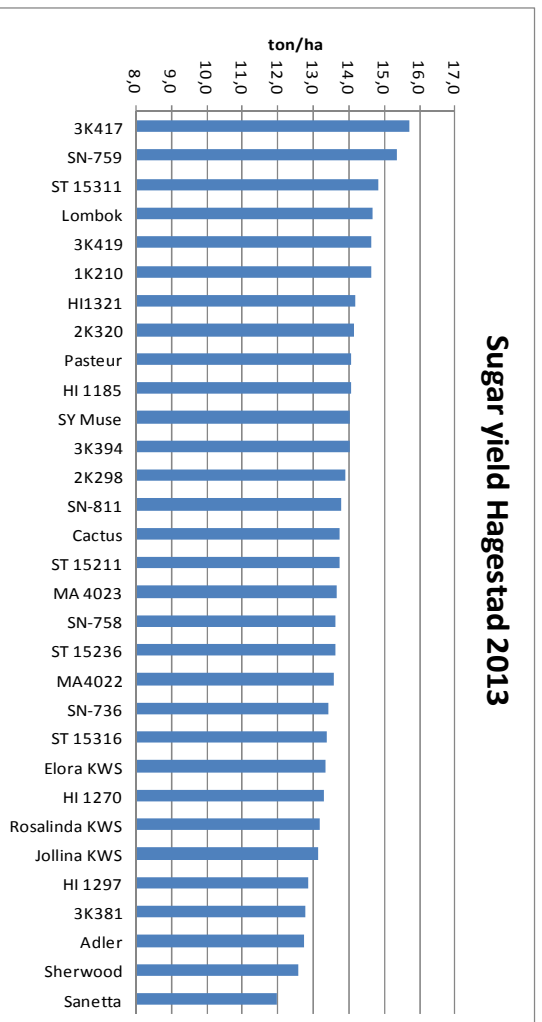


Figure 6. Sugar yield, Hagestad 2013. LSD 5% = 1.8, Prob. < 0.0001. Average Pi =5.0.

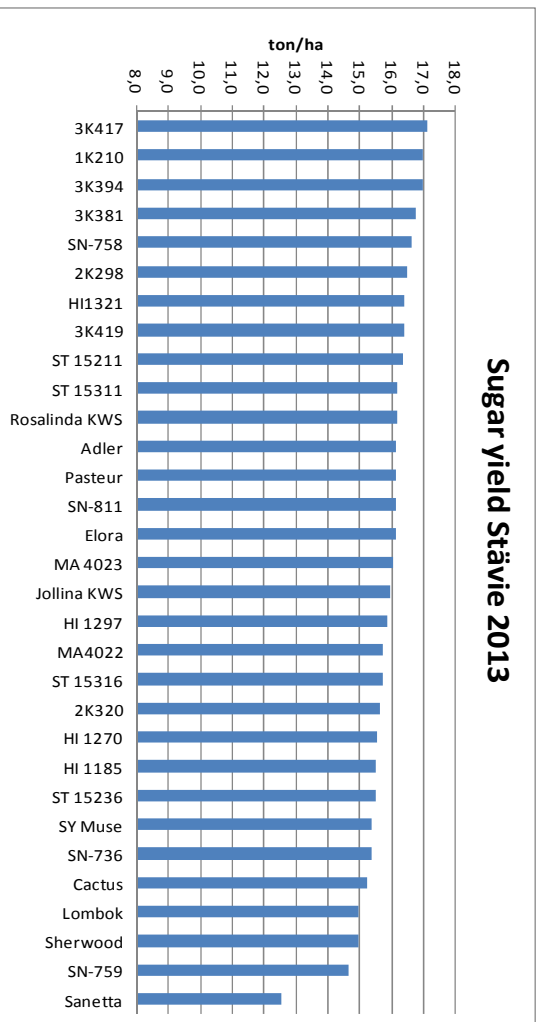


Figure 7. Sugar yield, Stävie 2013. LSD 5% = 1.69, Prob. < 0.0001. Average Pi =3.8.

Sugar yield 2013

3K417 has significantly higher sugar yield than all other varieties except 1K210 and 3K419.

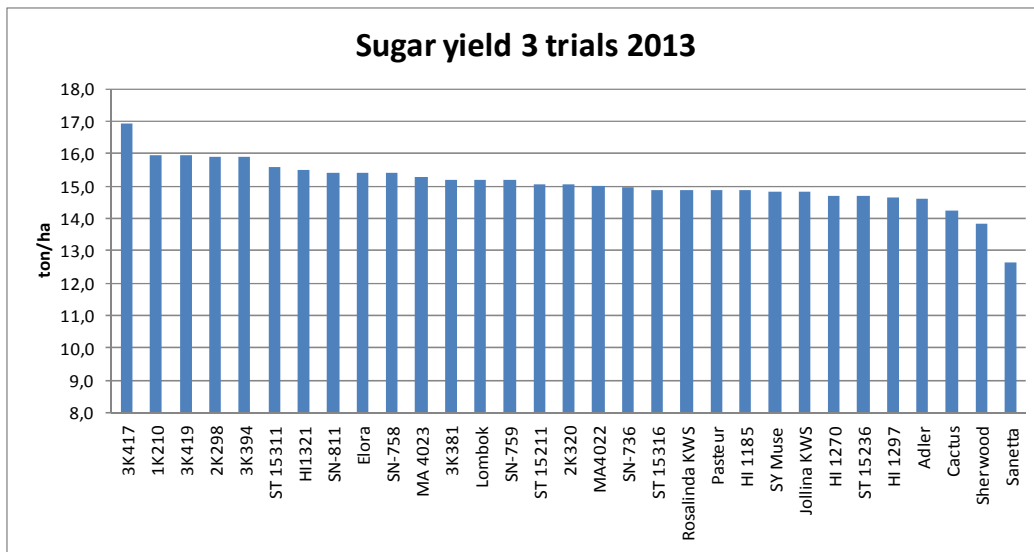


Figure 8. Sugar yield, 3 trials 2013. LSD 5% = 0.99, Prob. < 0.0001.

There were no significant differences in amino-N between the varieties tested in 2013. Amino N was 17 in SY Muse and 18 in Elora KWS and Lombok. Only Sanetta, Sherwood and HI1270 had amino-N over 20.

Sugar yield 2012–2013

17 varieties have been tested in six trials 2012 and 2013. Two varieties have significantly higher yield than SY Muse: 1K210 and 2K298.

Elora KWS has significantly higher sugar yield than Rosalinda KWS, Pasteur, Sherwood and Cactus.

Lombok has significantly higher sugar yield than Pasteur, Sherwood and Cactus.

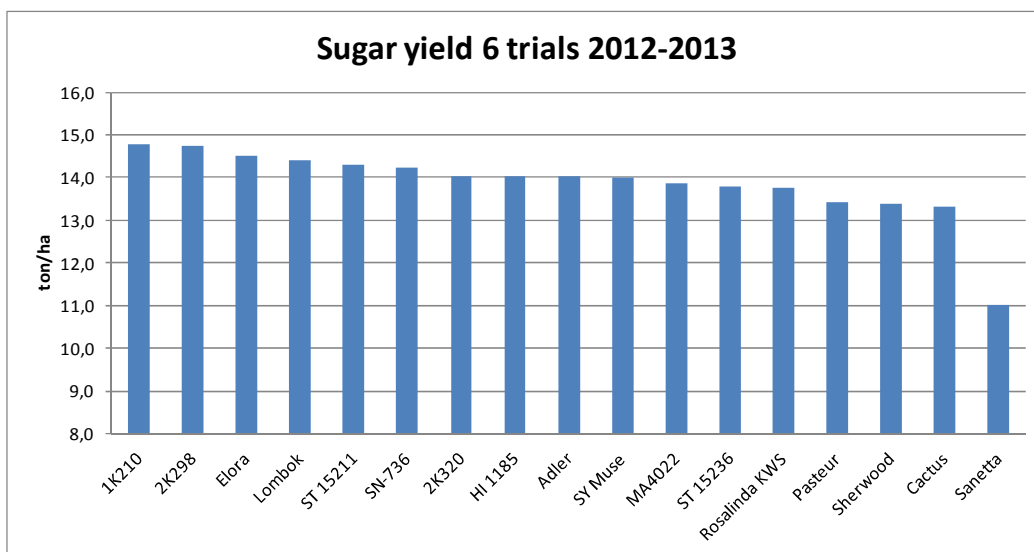


Figure 9. Sugar yield, 6 trials 2012–2013. LSD 5% = 0.72, Prob. < 0.0001.

Sugar yield 2011–2013

Seven varieties have been tested in nine trials 2011–2013. Lombok and Elora KWS had the highest sugar yield, significantly higher than Cactus and Sanetta.

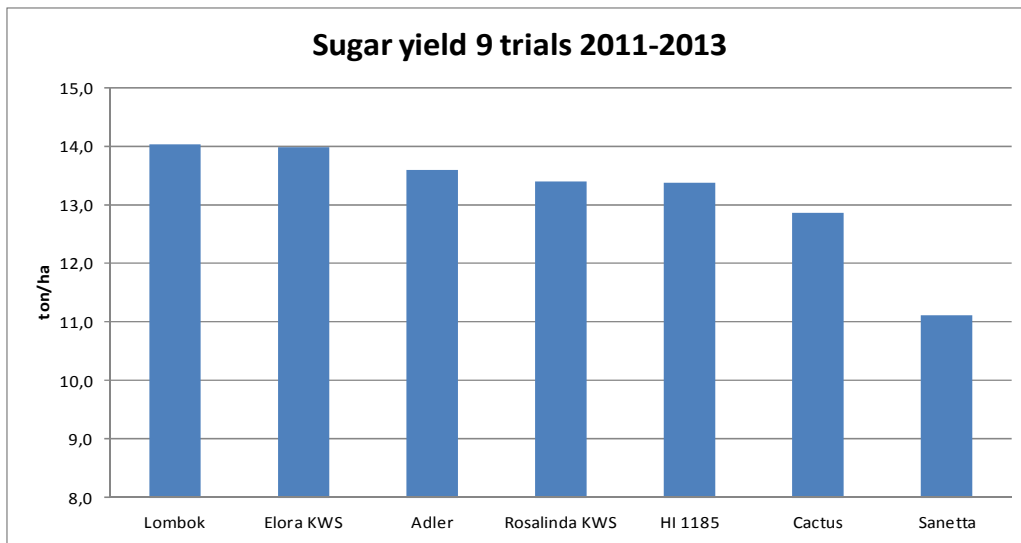


Figure 10. Sugar yield, 9 trials 2011-2013. LSD 5% = 0.67, Prob. < 0.0001.

Multiplication rates

The average multiplication rate 2012–2013 for the standard varieties were 10.4 EaL/g soil for Pasteur, 6.9 for SY Muse, 5.3 for Cactus and 0.9 for Sanetta.

The average multiplication rate 2011–2012 for Julietta (NT) was 3.2.

The multiplication rate at different Pi levels for each variety is shown in figures 11–14.

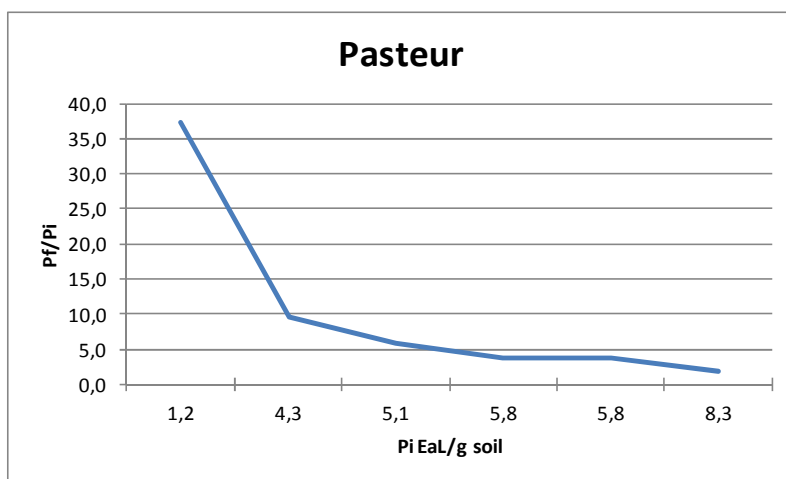


Figure 11. Pf/Pi plotted against Pi for Pasteur 6 trials 2012-2013.

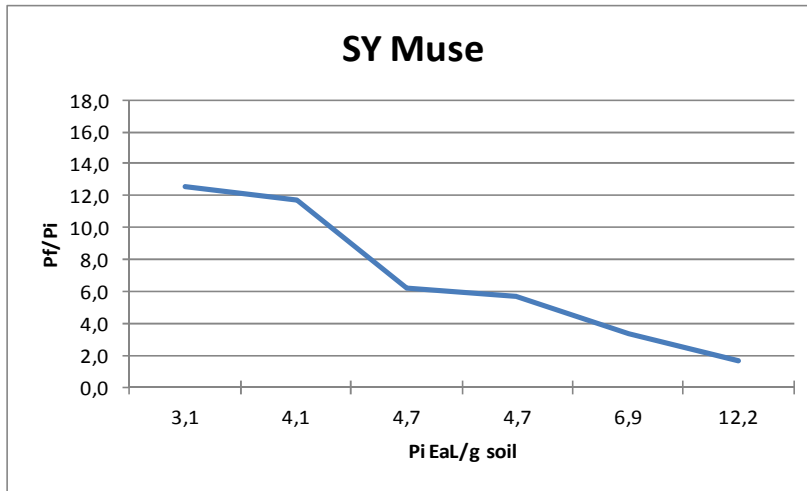


Figure 12. Pf/Pi plotted against Pi for SY Muse 6 trials 2012–2013.

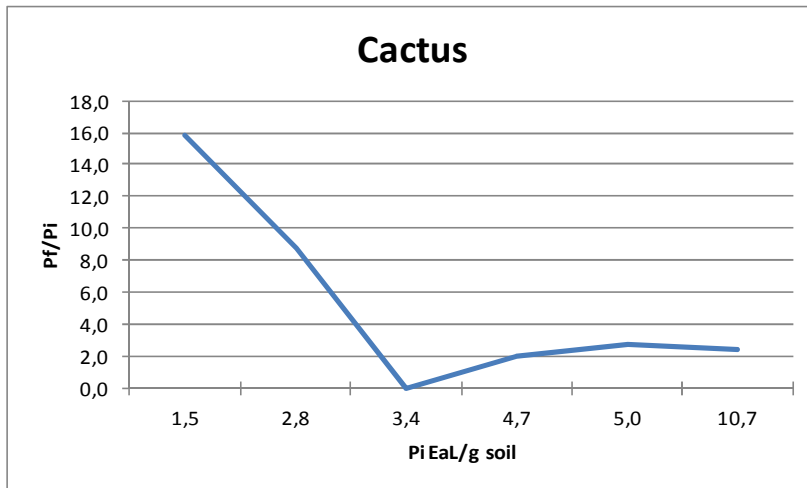


Figure 13. Pf/Pi plotted against Pi for Cactus 6 trials 2012–2013.

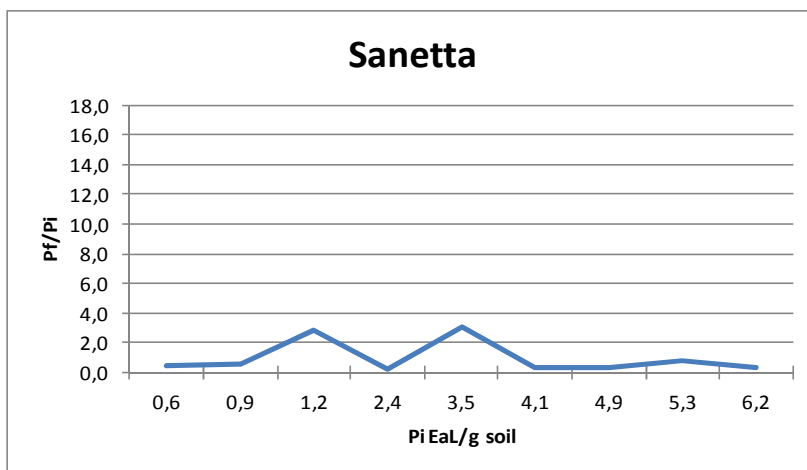


Figure 14. Pf/Pi plotted against Pi for Sanetta 9 trials 2011–2013.

Conclusions

Of the varieties that have been tested for the first year in trials on nematode infested soil, 3K417 has significantly higher sugar yield than all other varieties except 1K210 and 3K419 (3 trials 2013). 3K417 combine high root yield with high sugar content.

There were no significant differences in amino-N between the varieties tested in 2013. Amino N was 17 in SY Muse and 18 in Elora KWS and Lombok. Only Sanetta, Sherwood and HI1270 had amino-N over 20.

Of the varieties that have been tested two years in trials on nematode infested soil, 1K210 and 2K298 combine high root yield with high sugar content and they have the highest sugar yield.

Of the varieties that have been tested three years in trials on nematode infested soil, Lombok and Elora KWS have the highest sugar yield (9 trials 2011–2013). Lombok was approved in spring 2013. Elora KWS is tested for the third year in 2013 official variety trials.

Elora KWS and 3K417 show high sugar yield 2013 despite a somewhat slow emergence at 50%.

Jollina KWS show very good emergence in 2013, both at 50% and final emergence, and the sugar yield is on the same level as SY Muse.

Borgeby in December 2013

Åsa Olsson
Project manager

Robert Olsson
Technical director