

<b>Project title:</b>	Onions - Independent assessment of field and storage potential of varieties
<b>Project number:</b>	FV 348c
<b>Project leader:</b>	Bruce Napier, NIAB
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<b>Industry Representative:</b>	Tom Will, VCS
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The results and conclusions in this report are based on an investigation conducted over a one-year period. The conditions under which the experiments were carried out and the results have been reported in detail and with accuracy. However, because of the biological nature of the work it must be borne in mind that different circumstances and conditions could produce different results. Therefore, care must be taken with interpretation of the results, especially if they are used as the basis for commercial product recommendations.

## **AUTHENTICATION**

We declare that this work was done under our supervision according to the procedures described herein and that the report represents a true and accurate record of the results obtained.

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# GROWER SUMMARY

## Headline

- New varieties add positively to the choices available to growers offering excellent storage potential; a broader range of red varieties; and mildew resistance.
- There is a good range of set varieties in both colour and maturities giving choices and options to spread their harvest windows. Mildew resistant varieties are available.

## Background

The aim of the work is to provide independent assessment of the yield, quality and storage potential of new onion varieties, propagated from both seed and sets, that meet grower requirements e.g. high yield, disease resistance, good quality and storability.

There are direct comparisons of new and established varieties.

Drilled onions account for approximately 70% of the area grown in the UK. Early maturing varieties such as Hytech, Centro and Vision are becoming increasingly popular. Maincrop varieties e.g. Arthur, Hybelle and Renate, still hold a large proportion of the acreage. Late maturing varieties such as Armstrong are still important in extending the harvest window.

Onions grown from sets ensure an early crop which avoids potentially damaging autumn harvest conditions and the earliest of these can attract a premium. Newer entries have brought new genetics - in particular varieties bringing early maturity or mildew resistance. However there are bolting risks associated with some early material.

‘Sturon type’ varieties continue to dominate the brown set maincrop maturity varieties. However there are very early maturing varieties which produce high yields that are suitable for the autumn markets. The mildew resistant variety Santero also has good storage potential and is a valuable addition for organic growers. Red Baron has previously dominated the red set market but there is strong competition from early maturing material such as Red Emperor and high quality hybrids.

Overwintered onions are still grown on a small scale but there are not enough varieties to warrant evaluation trials.

## Results of the Variety Trials

The following results/conclusions are a selection from the comprehensive Full Trial Report.

### ***Trial site details***

The trials were hosted by (with thanks) and located as follows:

- A W Mortier Farms, nr Leiston, Suffolk - set onions
- R Oldershaw Farms, nr Weston, Lincolnshire – set onions
- J Raker Farms, Croxton, Norfolk – drilled onions
- P G Rix Farms, nr Higham, Colchester, Essex – drilled onions

Storage was at NIAB in an ambient store and at P G Rix in commercial CE store.

### ***Trial records and data collected –set trials***

Table A lists the set varieties in trials in maturity order and selected yield and storage data.

*A full set of data tables is appended to the main report.*

An early set trial was planted at the Suffolk site. A warm March but cold April was the most likely cause of bolting issues later in the season. Some of the new early maturing varieties were particularly prone to bolting (details in main report). A wet summer meant that the Suffolk crop suffered from high mildew levels. The Lincs. trial also had bolting and mildew issues.

The trials were harvested on 26<sup>th</sup> July and 7<sup>th</sup> August (Suffolk) and 2<sup>nd</sup> and 16<sup>th</sup> August (Lincs.). Yields were below average in Suffolk but were average in Lincolnshire.

## **Discussion - Set trials**

Sets still attract a premium as they are earlier to market than drilled crops and fill a gap when stores are becoming empty.

Santero which is mildew resistance was not in trial but commercially did very well. A wet summer meant that mildew was an issue in both of the trials.

Alpha was the earliest maturing brown variety and the latest was Setton, 3 weeks later. Later maturing varieties such as Santero were not in trial. The earlier maturing varieties were 1 to 2 weeks later than expected due to the cool summer.

In the red material ESC1100 was the earliest and the rest were 1 week later. As with the browns the cool summer seems to have compressed the range of harvest maturities.

The highest yielding brown varieties were Jagro and the Sturon types.

In the red sets the early variety Red Emperor has good yield potential and the main crop Red Baron had the highest yield.

The storage assessments were later than normal due to the cold winter. Some varieties performed less well than normal due to a high percentage of rots. The Sturon types all have good storage potential. Red Baron and ESC 1100 had the highest numbers of marketable bulbs of the reds, but generally the reds did not store as well as the browns. There was a difference between the two sources of Red Baron but this was due to disease pressure rather than genetic potential.

### ***Trial records and data collected –drilled trials***

*Table B shows key areas of interest - selected yield storage data.*

*A full set of data tables is appended.*

The trials were harvested on 25<sup>th</sup> Sept (Norfolk) and 9<sup>th</sup> and 13<sup>th</sup> Sept (Essex). The wet August meant that harvest was slightly delayed both in the trials and on many commercial holdings.

### **Discussion - Drilled trials**

There is a good range of maturities allowing growers to spread their harvest period.

For organic growers and for high disease pressure years the mildew resistant varieties Santero and Hylander both offer potential.

There were problems with establishment in March. Seed going into good seedbeds early in the month established and matured as expected. Later drilled material suffered from the cold and wet conditions in April with poor establishment and crops maturing several weeks later than expected.

Hybing was the earliest maturing variety of the drilled trials. However the wet autumn meant that some varieties matured out of sequence.

Mildew was a major problem in Essex and was not fully controlled until mid-July. The mildew came in later in Norfolk and was at low enough levels to be kept under control by regular fungicide applications.

In both trials the yields were significantly below the 10 year averages due to the cool, wet season.

In the Essex trial the mildew resistant variety Santero was the highest yielding brown. Red Baron and Red Tide were the highest yielding red varieties.

In the Norfolk trial Hytech, NIZ 37-84 and Sem 13 were the highest yielding browns. Red Planet and 1.11 were the highest yielding red varieties.

There were some rots and defects in the harvested material of both the drilled trials but not as much as was expected from the harvest after very wet conditions. There were not many doubles or bolters.

Motion and some of the new coded varieties had high percentages of single centres.

Storage assessments in an ambient store, were recorded in late-April and late-May 2013.

Storage potential continues to be a key factor for drilled crops. As in 2011/12, Wellington, Vision and Motion had above average percentages of sound bulbs at the late-May assessment. NIZ37-89, Santero, ONL 346 and BGS 290 also performed above average in 2012/13.

Redspark and Red Tide continued to perform well in storage as did 1.11 in the reds.

Stored bulb quality was generally very good throughout most of the varieties.

The highest percentage of sound bulbs from CE storage was in BGS 289 and Vision. Hytech, Wellington, NIZ 37-89, Santero, Motion ONL 346 and BGS290 also performed well in CE store.

Red Tide had the highest percentage of sound bulbs in the reds but the bulbs were starting to soften as were other the reds. Red Planet and Redspark had the firmest bulbs of the red varieties.



## Main Conclusions

The yield data in the drilled trials is not conclusive enough to select varieties solely on this alone. There are bigger differences in the set material.

Varieties should be selected on maturity (to stagger the harvest season); storage potential (to extend the availability of UK onions); disease resistance (i.e. mildew resistance); and single centres (for onion ring production which attracts a premium).

Selected varieties have been commented on in the results section.

**Table A:** NIAB Spring Planted Onion Trial from Sets 2012 – Varieties, Maturities, Yield & Storage *Varieties in maturity order (mean of both sites)*

Variety	set source	Seed source	Maturity	Yield	Storage
			Date of 80% foliage fallover	marketable (t/ha)	% sound bulbs at end Mar
			Suffolk	Mean	Mean
<b>Early Browns</b>					
Alpha	Allium Seeds UK Ltd	Allium Seeds UK Ltd	17-Jul	60.0	n/a
Jagro (AS)	Allium Seeds UK Ltd	Bejo/De Groot en Slot	26-Jul	57.7	n/a
Jagro (ESC)	English Set Company	Bejo/De Groot en Slot	26-Jul	61.2	n/a
<b>Means (all vars)</b>				<b>55.9</b>	
<b>Early Reds</b>					
Red Emperor (AS)	Allium Seeds UK Ltd	Enza Zaden	28-Jul	39.2	n/a
Red Emperor (ESC)	English Set Company	Enza Zaden	31-Jul	38.3	n/a
<b>Means</b>				<b>38.8</b>	
<b>Maincrop Browns</b>					
VCS 6005	English Set Company	Confidential	01-Aug	55.5	52
VCS 6004	English Set Company	Confidential	02-Aug	48.5	50
Sturon (ESC)	English Set Company	Confidential	03-Aug	59.0	51
Setton	Allium Seeds UK Ltd	Allium Seeds UK Ltd	06-Aug	52.1	53
Rumba	Allium Seeds UK Ltd	Allium Seeds UK Ltd	-	76.1	59
<b>Means</b>				<b>55.5</b>	<b>53</b>
<b>Maincrop Reds</b>					
ESC 1100	English Set Company	Confidential	01-Aug	38.3	58
Kamal	English Set Company	Advanta	05-Aug	29.7	55
Red Ray F1	Broer/Elsoms	Bejo/De Groot en Slot	06-Aug	32.8	32
Red Baron (ELS)	Broer/Elsoms	Bejo/De Groot en Slot	07-Aug	34.5	27
Red Baron (ESC)	English Set Company	Bejo/De Groot en Slot	08-Aug	37.3	74
Red Light F1	Broer/Elsoms	Bejo/De Groot en Slot	-	41.3	16
<b>Means</b>				<b>36.3</b>	<b>45</b>

**Table B:** NIAB Spring Sown Onion Trials from seed 2012 – Varieties, Maturities, Yield & Storage

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites)

Main varieties 3 replicates; *Preliminary varieties 2 replicates of data*

Variety	Source	Maturity Date of 80% foliage fallover	Yield marketable (t/ha)	% Bulbs with single centres	Ambient Storage % sound bulbs at end May	CE storage % sound bulbs at end July
<b>BROWNS</b>						
Hybing	Bejo	27-Aug	59.6	50	38	49
Hybound	Bejo	28-Aug	57.3	63	58	24
Hytech	Bejo	30-Aug	64.5	44	53	53
<i>Sem 13</i>	<i>Seminis</i>	<i>02-Sep</i>	<i>63.7</i>	<i>75</i>	<i>64</i>	<i>24</i>
Silverado	Advanta	02-Sep	58.8	37	43	34
Medaillon	Syngenta	05-Sep	55.3	54	63	38
Bennito	Seminis	05-Sep	56.9	46	37	14
Paradiso	Advanta	06-Sep	61.2	36	56	23
Wellington	Syngenta	06-Sep	51.7	56	67	64
<i>BGS 289</i>	<i>Bejo</i>	<i>06-Sep</i>	<i>54.1</i>	<i>60</i>	<i>63</i>	<i>74</i>
Napoleon	Syngenta	07-Sep	53.3	51	58	23
NIZ37-84	Nickerson	07-Sep	62.3	40	44	42
<i>Sem 12</i>	<i>Seminis</i>	<i>07-Sep</i>	<i>59.1</i>	<i>77</i>	<i>56</i>	<i>30</i>
Vision	Syngenta	07-Sep	57.7	37	77	73
SVS 69497	Seminis	07-Sep	61.6	37	45	27
Sunskin	Syngenta	08-Sep	58.4	49	58	47
<i>NIZ37-89</i>	<i>Nickerson</i>	<i>08-Sep</i>	<i>57.8</i>	<i>77</i>	<i>77</i>	<i>58</i>
Santero	Nickerson	09-Sep	65.0	41	67	53
Motion	Syngenta	10-Sep	59.2	73	83	64
NIZ37-83	Nickerson	10-Sep	60.7	53	53	27
Centro	Nickerson	10-Sep	58.7	58	50	23
<i>BGS 301</i>	<i>Bejo</i>	<i>11-Sep</i>	<i>57.8</i>	<i>80</i>	<i>59</i>	<i>46</i>
<i>Sem 11</i>	<i>Seminis</i>	<i>12-Sep</i>	<i>59.3</i>	<i>55</i>	<i>47</i>	<i>11</i>
ONL346	Syngenta	13-Sep	58.3	51	82	56
<i>Sem 10</i>	<i>Seminis</i>	<i>13-Sep</i>	<i>52.5</i>	<i>53</i>	<i>54</i>	<i>9</i>
Arthur	Advanta	13-Sep	58.7	46	39	20
<i>BGS 290</i>	<i>Bejo</i>	<i>14-Sep</i>	<i>59.9</i>	<i>52</i>	<i>67</i>	<i>51</i>
<b>Mean</b>		<b>06-Sep</b>	<b>57.7</b>	<b>52</b>	<b>56</b>	<b>38</b>
<b>REDS</b>						
Red Planet	Allium Farms	04-Sep	44.3	60	53	42
1.11	Allium Farms	12-Sep	45.9	84	69	35
Red Tide	Bejo	14-Sep	44.3	52	73	61
Redspark	Bejo	15-Sep	42.1	63	61	36
Red Baron	Bejo	15-Sep	44.7	76	58	35
Retano	Nickerson	18-Sep	35.7	79	44	22
<b>Mean</b>		<b>13-Sep</b>	<b>41.0</b>	<b>61</b>	<b>51</b>	<b>33</b>

## SCIENCE SECTION

### Introduction

The aim of the work is to provide independent assessment of the yield, quality and storage potential of new onion varieties propagated from both seed and sets. There are direct comparisons of new and established varieties and growers have the opportunity to inspect the trials at key stages.

Plant breeders continue to develop improved varieties with characteristics that meet grower requirements e.g. high yield, disease resistance, good quality and storability.

Drilled onions account for approximately 70% of the area grown in the UK. Early maturing varieties such as Hytech, Centro and Vision are becoming increasingly popular. Maincrop varieties e.g. Arthur, Hybelle and Renate, still hold a large proportion of the acreage. Late maturing varieties such as Armstrong are still important in extending the harvest window.

Onions grown from sets ensure an early crop which avoids potentially damaging autumn harvest conditions and the earliest of these can attract a premium. In recent years there have been large numbers of new entries with new genetics - in particular those varieties bringing early maturity or mildew resistance. However there are bolting risks associated with some early material.

‘Sturon type’ varieties continue to dominate the brown set maincrop maturity varieties. However there are very early maturing varieties which produce high yields that are suitable for the autumn markets. The mildew resistant variety Santero also has good storage potential and is a valuable addition for organic growers. Red Baron has previously dominated the red set market but there is strong competition from early maturing material such as Red Emperor and high quality hybrids.

Overwintered onions are still grown on a small scale but there are not enough varieties to warrant evaluation trials.

*Varieties and numbered selections included*

**Table C:** NIAB Spring Planted Onion Trial from Sets 2012 – Varieties, Maturities, Yield & Storage

Varieties in maturity order (mean of both sites)

Variety	Set source	Seed source
<b>Early Browns</b>		
Alpha	Allium Seeds UK Ltd	Allium Seeds UK Ltd
ESC 1002	English Set Company	Confidential
Jagro (AS)	Allium Seeds UK Ltd	Bejo/De Groot en Slot
Jagro (ESC)	English Set Company	Bejo/De Groot en Slot
Helanus (AS)	Allium Seeds UK Ltd	Confidential
Helanus (ESC)	English Set Company	Confidential
Global	ProVeg Seeds	Confidential
<b>Means</b>		
<b>Early Reds</b>		
Red Emperor (AS)	Allium Seeds UK Ltd	Enza Zaden
Red Emperor (ESC)	English Set Company	Enza Zaden
<b>Means</b>		
<b>Maincrop Browns</b>		
VCS 6005	English Set Company	Confidential
VCS 6004	English Set Company	Confidential
Sturon (ESC)	English Set Company	Confidential
Setton	Allium Seeds UK Ltd	Allium Seeds UK Ltd
Rumba	Allium Seeds UK Ltd	Allium Seeds UK Ltd
<b>Means</b>		
<b>Maincrop Reds</b>		
ESC 1100	English Set Company	Confidential
Kamal	English Set Company	Advanta
Red Ray F1	Broer/Elsoms	Bejo/De Groot en Slot
Red Baron (ELS)	Broer/Elsoms	Bejo/De Groot en Slot
Red Baron (ESC)	English Set Company	Bejo/De Groot en Slot
Red Light F1	Broer/Elsoms	Bejo/De Groot en Slot
Garnet	Allium Seeds UK Ltd	Allium Seeds UK Ltd
<b>Means</b>		

Global and 2 Red Emperors planted with maincrop but data with early maturity varieties

Lincs. trial planted browns 24<sup>th</sup> Feb, reds 22<sup>nd</sup> March

Suffolk trial planted earlies 27<sup>th</sup> Jan, main browns 21<sup>st</sup> Feb, reds 20<sup>th</sup> March

**Table D.** NIAB Spring Sown Onion Trials from seed 2012 – Varieties, Maturities, Yield & Storage

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites)

Main varieties 3 replicates; *Preliminary varieties 2 replicates of data*

Variety	Source
<b>BROWNS</b>	
<i>Globall</i>	<i>ProVeg</i>
Hybing	Bejo
Hybound	Bejo
Hytech	Bejo
<i>Sem 13</i>	<i>Seminis</i>
Silverado	Advanta
Medaillon	Syngenta
Bennito	Seminis
Paradiso	Advanta
Wellington	Syngenta
<i>BGS 289</i>	<i>Bejo</i>
Napoleon	Syngenta
NIZ37-84	Nickerson
<i>Sem 12</i>	<i>Seminis</i>
Vision	Syngenta
SVS 69497	Seminis
Sunskin	Syngenta
<i>NIZ37-89</i>	<i>Nickerson</i>
Santero	Nickerson
Motion	Syngenta
NIZ37-83	Nickerson
Centro	Nickerson
<i>BGS 301</i>	<i>Bejo</i>
<i>Sem 11</i>	<i>Seminis</i>
ONL346	Syngenta
<i>Sem 10</i>	<i>Seminis</i>
Arthur	Advanta
<i>BGS 290</i>	<i>Bejo</i>
<b>Mean</b>	
<b>REDS</b>	
Red Planet	Allium Farms
<i>Testa Rossa</i>	<i>ProVeg</i>
1.11	Allium Farms
Red Tide	Bejo
Redspark	Bejo
Red Baron	Bejo
Retano	Nickerson
<b>Mean</b>	

### ***Trial site details***

Sites were agreed with HDC/BOPA through a steering group, storage was at NIAB in an ambient store and at P G Rix in commercial CE store.

The trials were hosted by (with thanks) and located as follows:

- A W Mortier Farms, nr Leiston, Suffolk - set onions
- R Oldershaw Farms, nr Weston, Lincolnshire – set onions
- J Raker Farms, Croxton, Norfolk – drilled onions
- P G Rix Farms, nr Higham, Colchester, Essex – drilled onions

### ***Trial records and data collected –set trials***

Table A lists the set varieties in trials in maturity order and selected yield and storage data. *A full set of data tables is appended.*

The trials established well in good conditions. An early set trial was planted at the Suffolk site. A warm March but cold April was the most likely cause of bolting issues later in the season. Some of the new early maturing varieties were particularly prone to bolting. A wet summer meant that the Suffolk crop suffered from high mildew levels. The Lincs. trial also had bolting and mildew issues.

The trials were harvested on 26<sup>th</sup> July and 7<sup>th</sup> August (Suffolk) and 2<sup>nd</sup> and 16<sup>th</sup> August (Lincs.). The bulbs were dried and cured before grading. Yields were below average in Suffolk but were average in Lincolnshire. Storage assessments were assessed later than normal due to the cold winter in late-February and late-March 2013.

## Discussion - Set trials

**Table E:** NIAB Spring Planted Onion Trial from Sets 2012 – Varieties, Maturities, Yield & Storage

Varieties in maturity order (mean of both sites)

varieties in maturity order (mean of both sites)			Maturity	Yield	Storage
Variety	set source	Seed source	Date of 80% foliage fallover	marketable (t/ha)	% sound bulbs at end Mar
			Suffolk	Mean	Mean
Early Browns					
Alpha	Allium Seeds UK Ltd	Allium Seeds UK Ltd	17-Jul	60.0	n/a
ESC 1002	English Set Company	Confidential	22-Jul	-	n/a
Jagro (AS)	Allium Seeds UK Ltd	Bejo/De Groot en Slot	26-Jul	57.7	n/a
Jagro (ESC)	English Set Company	Bejo/De Groot en Slot	26-Jul	61.2	n/a
Helanus (AS)	Allium Seeds UK Ltd	Confidential	26-Jul	-	n/a
Helanus (ESC)	English Set Company	Confidential	27-Jul	44.6	n/a
Global	ProVeg Seeds	Confidential	25-Jul	-	n/a
Means				55.9	
Early Reds					
Red Emperor (AS)	Allium Seeds UK Ltd	Enza Zaden	28-Jul	39.2	n/a
Red Emperor (ESC)	English Set Company	Enza Zaden	31-Jul	38.3	n/a
Means				38.8	
Maincrop Browns					
VCS 6005	English Set Company	Confidential	01-Aug	55.5	52
VCS 6004	English Set Company	Confidential	02-Aug	48.5	50
Sturon (ESC)	English Set Company	Confidential	03-Aug	59.0	51
Setton	Allium Seeds UK Ltd	Allium Seeds UK Ltd	06-Aug	52.1	53
Rumba	Allium Seeds UK Ltd	Allium Seeds UK Ltd	-	76.1	59
Means				55.5	53
Maincrop Reds					
ESC 1100	English Set Company	Confidential	01-Aug	38.3	58
Kamal	English Set Company	Advanta	05-Aug	29.7	55
Red Ray F1	Broer/Elsoms	Bejo/De Groot en Slot	06-Aug	32.8	32
Red Baron (ELS)	Broer/Elsoms	Bejo/De Groot en Slot	07-Aug	34.5	27
Red Baron (ESC)	English Set Company	Bejo/De Groot en Slot	08-Aug	37.3	74
Red Light F1	Broer/Elsoms	Bejo/De Groot en Slot	-	41.3	16
Garnet	Allium Seeds UK Ltd	Allium Seeds UK Ltd	-	-	51
Means				36.3	45

Global and 2 Red Emperors planted with maincrop but data with early maturity varieties

Lincs. trial planted browns 24<sup>th</sup> Feb, reds 22<sup>nd</sup> March

Suffolk trial planted earlies 27<sup>th</sup> Jan, main browns 21<sup>st</sup> Feb, reds 20<sup>th</sup> March

Sets still attract a premium as they are earlier to market than drilled crops and fill a gap when stores are becoming empty.

Santero which is mildew resistance was not in trial but commercially did very well. A wet summer meant that mildew was an issue in both of the trials.

Alpha was the earliest maturing brown variety and the latest was Setton, 3 weeks later. Later maturing varieties such as Santero were not in trial. The earlier maturing varieties were 1 to 2 weeks later than expected due to the cool summer.

In the red material ESC1100 was the earliest and the rest were 1 week later. As with the browns the cool summer seems to have compressed the range of harvest maturities.

The highest yielding brown varieties were Jagro and the Sturon types.

In the red sets the early variety Red Emperor has good yield potential and the main crop Red Baron had the highest yield.

The storage assessments were later than normal due to the cold winter. Some varieties performed less well than normal due to a high percentage of rots. The Sturon types all have good storage potential. Red Baron and ESC 1100 had the highest numbers of marketable bulbs of the reds, but generally the reds did not store as well as the browns. There was a difference between the two sources of Red Baron but this was due to disease pressure rather than genetic potential.

### ***Trial records and data collected –drilled trials***

*Table B shows key areas of interest - selected yield storage data.*

*A full set of data tables is appended.*

The trials were harvested on 25<sup>th</sup> Sept (Norfolk) and 9<sup>th</sup> and 13<sup>th</sup> Sept (Essex). The wet August meant that harvest was slightly delayed both in the trials and on many commercial holdings.



Discussion - Drilled trials

**Table F.** NIAB Spring Sown Onion Trials from seed 2012 – Varieties, Maturities, Yield & Storage

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites)

Main varieties 3 replicates; *Preliminary varieties 2 replicates of data*

Variety	Source	Maturity Date of 80% foliage fallover	Yield marketable (t/ha)	Storage % sound bulbs at end May
<b>BROWNS</b>				
<i>Globall</i>	<i>ProVeg</i>	<i>23-Aug</i>	32.8	13
Hybing	Bejo	27-Aug	59.6	38
Hybound	Bejo	28-Aug	57.3	58
Hytech	Bejo	30-Aug	64.5	53
<i>Sem 13</i>	<i>Seminis</i>	<i>02-Sep</i>	63.7	64
Silverado	Advanta	02-Sep	58.8	43
Medaillon	Syngenta	05-Sep	55.3	63
Bennito	Seminis	05-Sep	56.9	37
Paradiso	Advanta	06-Sep	61.2	56
Wellington	Syngenta	06-Sep	51.7	67
<i>BGS 289</i>	<i>Bejo</i>	<i>06-Sep</i>	<i>54.1</i>	63
Napoleon	Syngenta	07-Sep	53.3	58
NIZ37-84	Nickerson	07-Sep	62.3	44
<i>Sem 12</i>	<i>Seminis</i>	<i>07-Sep</i>	<i>59.1</i>	56
Vision	Syngenta	07-Sep	57.7	77
SVS 69497	Seminis	07-Sep	61.6	45
Sunskin	Syngenta	08-Sep	58.4	58
<i>NIZ37-89</i>	<i>Nickerson</i>	<i>08-Sep</i>	<i>57.8</i>	77
Santero	Nickerson	09-Sep	65.0	67
Motion	Syngenta	10-Sep	59.2	83
NIZ37-83	Nickerson	10-Sep	60.7	53
Centro	Nickerson	10-Sep	58.7	50
<i>BGS 301</i>	<i>Bejo</i>	<i>11-Sep</i>	<i>57.8</i>	59
<i>Sem 11</i>	<i>Seminis</i>	<i>12-Sep</i>	<i>59.3</i>	47
ONL346	Syngenta	13-Sep	58.3	82
<i>Sem 10</i>	<i>Seminis</i>	<i>13-Sep</i>	<i>52.5</i>	54
Arthur	Advanta	13-Sep	58.7	39
<i>BGS 290</i>	<i>Bejo</i>	<i>14-Sep</i>	<i>59.9</i>	67
<b>Mean</b>		<b>06-Sep</b>	<b>57.7</b>	<b>56</b>
<b>REDS</b>				
Red Planet	Allium Farms	04-Sep	44.3	53
<i>Testa Rossa</i>	<i>ProVeg</i>	<i>09-Sep</i>	<i>30.0</i>	0
1.11	Allium Farms	12-Sep	45.9	69
Red Tide	Bejo	14-Sep	44.3	73
Redspark	Bejo	15-Sep	42.1	61
Red Baron	Bejo	15-Sep	44.7	58
Retano	Nickerson	18-Sep	35.7	44
<b>Mean</b>		<b>13-Sep</b>	<b>41.0</b>	<b>51</b>

There is a good range of maturities allowing growers to spread their harvest period. The wet August meant some varieties put on extra leaves putting them out of their normal maturity sequence.

For organic growers and for high disease pressure years the mildew resistant varieties Santero and Hylander both offer potential.

There were problems with establishment in March. Seed going into good seedbeds early in the month established and matured as expected. Later drilled material suffered from the cold and wet conditions in April with poor establishment and crops maturing several weeks later than expected.

Globall and Hybing were the earliest maturing varieties of the drilled trials. However the wet autumn meant that some varieties matured out of sequence.

Mildew was a major problem in Essex and was not fully controlled until mid-July. The mildew came in later in Norfolk and was at low enough levels to be kept under control by regular fungicide applications.

In both trials the yields were significantly below the 10 year averages due to the cool, wet season.

In the Essex trial the mildew resistant variety Santero was the highest yielding brown. Red Baron and Red Tide were the highest yielding red varieties.

In the Norfolk trial Hytech, NIZ 37-84 and Sem 13 were the highest yielding browns. Red Planet and 1.11 were the highest yielding red varieties.

There were some rots and defects in the harvested material of both the drilled trials but not as much as was expected from the harvest after very wet conditions.

There were not many doubles or bolters.

Motion and some of the new coded varieties had high percentages of single centres.

Storage assessments in an ambient store, were recorded in late-April and late-May 2013.

Storage potential continues to be a key factor for drilled crops. As in 2011/12, Wellington, Vision and Motion had above average percentages of sound bulbs at the late-May assessment. NIZ37-89, Santero, ONL 346 and BGS 290 also performed above average in 2012/13.

Redspark and Red Tide continued to perform well in storage as did 1.11 in the reds.

Stored bulb quality was generally very good throughout most of the varieties. Globall and Testa Rossa were slightly soft and loose skinned. Neither of these varieties is suitable for storage.

The highest percentage of sound bulbs from CE storage was in BGS 289 and Vision. Hytech, Wellington, NIZ 37-89, Santero, Motion ONL 346 and BGS290 also performed well in CE store

Red Tide had the highest percentage of sound bulbs in the reds but the bulbs were starting to soften as were other the reds. Red Planet and Redspark had the firmest bulbs of the red varieties.

## **Financial Benefits**

The yield potential of varieties can vary greatly. In the drilled trials this was >30t/ha between the highest and lowest yields. In the set trials the difference was >45t/ha.

Yield out of store is also important. Drilled material show a difference of 80% between the best and worst storage potential while in the sets this was over 50%.

Mildew resistant varieties require fewer and or cheaper fungicide programmes.

## **Action Points**

- Select a range of varieties with different maturities to spread their harvest.
- Select varieties best suited to their storage facilities.
- For varieties not suited to long term storage growers must be able to sell their produce quickly.
- In high disease pressure years growers should take advantage of material with disease resistance e.g. mildew resistance.

## **Knowledge and Technology Transfer**

Updates of trial data were circulated to levy payers by HDC and also to sponsoring breeders and seed companies.

Open days were also hosted on four occasions:

1. Set crop field open day in Suffolk and Lincs – July 2012,

2. Drilled crop field open day in Essex – August 2012,
3. Early set crop harvested produce open day at NIAB, Cambridge – September 2012,
4. Main set and drilled crops harvested produce open day at NIAB, Cambridge – November 2012.

These events were well attended by a number of growers, seed trade, agronomists, research providers, etc. The farming press always attend the open days and there was significant coverage of the results – particularly in The Vegetable Farmer and Horticulture Week.

## Appendices

**Table 1. NIAB Spring Sown Onion Trials from seed 2012 – varieties**

Sites: Rix (Essex) and Raker (Norfolk)  
 Varieties in maturity order (mean of both sites)  
*Preliminary varieties 2 replicates of data*

Variety	Status	Source	Maturity		
			Date of 80% foliage fallover		
			Essex	Norfolk	Mean
<b>BROWNS</b>					
<i>Globall</i>	<i>P</i>	<i>ProVeg</i>	<i>20-Aug</i>	<i>27-Aug</i>	<i>23-Aug</i>
Hybing	C	Bejo	21-Aug	03-Sep	27-Aug
Hybound	3	Bejo	21-Aug	03-Sep	28-Aug
Hytech	C	Bejo	28-Aug	01-Sep	30-Aug
<i>Sem 13</i>	<i>P</i>	<i>Seminis</i>	<i>22-Aug</i>	<i>13-Sep</i>	<i>02-Sep</i>
Silverado	1	Advanta	27-Aug	08-Sep	02-Sep
Medaillon	1	Syngenta	27-Aug	14-Sep	05-Sep
Bennito	R	Seminis	27-Aug	13-Sep	05-Sep
Paradiso	1	Advanta	29-Aug	14-Sep	06-Sep
Wellington	R	Syngenta	29-Aug	14-Sep	06-Sep
<i>BGS 289</i>	<i>P</i>	<i>Bejo</i>	<i>01-Sep</i>	<i>11-Sep</i>	<i>06-Sep</i>
Napoleon	R	Syngenta	28-Aug	18-Sep	07-Sep
NIZ37-84	2	Nickerson	28-Aug	17-Sep	07-Sep
<i>Sem 12</i>	<i>P</i>	<i>Seminis</i>	<i>29-Aug</i>	<i>17-Sep</i>	<i>07-Sep</i>
Vision	C	Syngenta	30-Aug	14-Sep	07-Sep
SVS 69497	1	Seminis	31-Aug	15-Sep	07-Sep
Sunskin	R	Syngenta	31-Aug	16-Sep	08-Sep
<i>NIZ37-89</i>	<i>P</i>	<i>Nickerson</i>	<i>04-Sep</i>	<i>13-Sep</i>	<i>08-Sep</i>
Santero	R	Nickerson	31-Aug	18-Sep	09-Sep
Motion	3	Syngenta	01-Sep	19-Sep	10-Sep
NIZ37-83	2	Nickerson	02-Sep	18-Sep	10-Sep
Centro	R	Nickerson	03-Sep	16-Sep	10-Sep
<i>BGS 301</i>	<i>P</i>	<i>Bejo</i>	<i>03-Sep</i>	<i>19-Sep</i>	<i>11-Sep</i>
<i>Sem 11</i>	<i>P</i>	<i>Seminis</i>	<i>04-Sep</i>	<i>21-Sep</i>	<i>12-Sep</i>
ONL346	1	Syngenta	04-Sep	23-Sep	13-Sep
<i>Sem 10</i>	<i>P</i>	<i>Seminis</i>	<i>04-Sep</i>	<i>23-Sep</i>	<i>13-Sep</i>
Arthur	C	Advanta	04-Sep	22-Sep	13-Sep
<i>BGS 290</i>	<i>P</i>	<i>Bejo</i>	<i>05-Sep</i>	<i>22-Sep</i>	<i>14-Sep</i>
<b>Mean</b>			<b>30-Aug</b>	<b>14-Sep</b>	<b>06-Sep</b>
<b>REDS</b>					
Red Planet	1	Allium Farms	26-Aug	14-Sep	04-Sep
<i>Testa Rossa</i>	<i>P</i>	<i>ProVeg</i>	<i>22-Aug</i>	<i>28-Sep</i>	<i>09-Sep</i>
1.11	1	Allium Farms	04-Sep	21-Sep	12-Sep
Red Tide	3	Bejo	04-Sep	25-Sep	14-Sep
Redspark	C	Bejo	03-Sep	28-Sep	15-Sep
Red Baron	C	Bejo	06-Sep	25-Sep	15-Sep
Retano	2	Nickerson	06-Sep	29-Sep	18-Sep
<b>Mean</b>			<b>01-Sep</b>	<b>24-Sep</b>	<b>13-Sep</b>

**Table 2. NIAB Spring Sown Onion Trials from seed 2012- Yield data**

Sites: Rix (Essex) and Raker (Norfolk)  
 Varieties in maturity order (mean of both sites)  
 Preliminary varieties 2 replicates of data

	Population & Yield											
Variety	plant pop. (plants / sq. m)			marketable yield (t/ha)			% Rots			total % defects (excl. rots)		
	Rix	Raker	Mean	Rix	Raker	Mean	Rix	Raker	Mean	Rix	Raker	Mean
<b>BROWNS</b>												
<i>Globall</i>	45.6	41.4	43.5	27.3	38.3	32.8	0.0	1.3	0.6	0.2	2.1	1.2
Hybing	50.0	48.0	49.0	53.6	65.6	59.6	0.0	0.0	0.0	0.6	0.0	0.3
Hybound	52.2	45.2	48.7	52.5	62.1	57.3	0.0	0.0	0.0	0.1	0.0	0.1
Hytech	52.3	49.0	50.6	58.1	70.9	64.5	0.2	0.3	0.2	0.2	1.6	0.9
<i>Sem 13</i>	49.0	46.8	47.9	56.7	70.8	63.7	0.2	0.5	0.3	0.0	1.2	0.6
Silverado	53.9	51.8	52.9	52.2	65.5	58.8	0.0	0.6	0.3	0.3	2.7	1.5
Medaillon	51.0	43.8	47.4	51.7	59.0	55.3	0.3	0.6	0.5	1.4	0.5	1.0
Bennito	52.7	46.1	49.4	53.8	60.0	56.9	0.0	0.0	0.0	0.6	1.2	0.9
Paradiso	53.8	47.7	50.7	56.4	66.0	61.2	0.0	0.6	0.3	0.0	0.5	0.2
Wellington	49.3	45.4	47.3	47.0	56.4	51.7	0.0	0.3	0.1	1.2	0.7	1.0
<i>BGS 289</i>	55.8	45.4	50.6	41.7	66.5	54.1	0.0	0.7	0.4	0.0	1.2	0.6
Napoleon	54.1	44.6	49.4	53.2	53.4	53.3	0.0	0.0	0.0	0.6	2.1	1.3
NIZ37-84	52.7	48.7	50.7	53.7	70.9	62.3	0.4	0.8	0.6	0.9	1.6	1.3
<i>Sem 12</i>	57.1	48.7	52.9	58.3	59.9	59.1	0.1	1.2	0.7	0.0	0.9	0.4
Vision	46.4	38.5	42.4	53.9	61.5	57.7	0.3	1.0	0.6	1.4	2.2	1.8
SVS 69497	56.0	44.1	50.0	55.2	67.9	61.6	0.0	0.6	0.3	0.1	1.2	0.7
Sunskin	55.0	46.9	51.0	53.3	63.5	58.4	0.1	0.9	0.5	0.1	1.4	0.8
<i>NIZ37-89</i>	47.2	46.7	47.0	51.0	64.6	57.8	0.0	0.4	0.2	0.5	1.2	0.8
Santero	56.5	52.2	54.4	62.2	67.9	65.0	0.1	0.2	0.2	0.3	1.3	0.8
Motion	49.8	47.1	48.4	50.8	67.6	59.2	0.0	0.5	0.2	0.6	1.0	0.8
NIZ37-83	48.3	46.5	47.4	54.1	67.3	60.7	0.0	0.5	0.2	0.2	0.5	0.3
Centro	46.3	45.9	46.1	52.6	64.8	58.7	0.0	0.7	0.4	0.0	1.2	0.6
<i>BGS 301</i>	55.1	50.2	52.6	50.6	65.0	57.8	0.0	0.7	0.3	0.0	0.6	0.3
<i>Sem 11</i>	51.3	47.5	49.4	55.8	62.8	59.3	0.0	0.4	0.2	2.2	2.1	2.1
ONL346	43.4	39.1	41.2	50.5	66.0	58.3	0.2	0.9	0.5	0.0	0.4	0.2
<i>Sem 10</i>	56.6	52.1	54.4	47.9	57.1	52.5	0.0	0.7	0.3	1.8	0.8	1.3
Arthur	56.2	49.9	53.1	52.0	65.5	58.7	0.0	0.7	0.3	2.2	2.2	2.2
<i>BGS 290</i>	47.8	50.5	49.1	52.9	66.8	59.9	0.0	1.0	0.5	0.5	0.0	0.2
<b>Mean</b>	<b>51.6</b>	<b>46.8</b>	<b>49.2</b>	<b>52.1</b>	<b>63.3</b>	<b>57.7</b>	<b>0.2</b>	<b>0.6</b>	<b>0.4</b>	<b>0.6</b>	<b>1.1</b>	<b>0.9</b>
<b>REDS</b>												
Red Planet	45.5	40.4	42.9	38.0	50.7	44.3	0.1	0.9	0.5	1.0	0.5	0.7
<i>Testa Rossa</i>	35.8	22.7	29.3	24.9	35.2	30.0	0.4	1.1	0.7	3.1	5.0	4.1
1.11	48.5	39.0	43.7	39.2	52.6	45.9	0.0	0.5	0.3	0.0	1.7	0.8
Red Tide	40.4	32.6	36.5	40.5	48.1	44.3	0.0	0.8	0.4	0.4	0.3	0.3
Redspark	43.9	35.7	39.8	37.9	46.3	42.1	0.3	0.0	0.1	0.3	0.6	0.5
Red Baron	41.5	35.8	38.7	40.7	48.7	44.7	0.0	0.4	0.2	0.7	2.3	1.5
Retano	45.2	33.4	39.3	39.2	32.2	35.7	0.0	0.4	0.2	0.2	2.4	1.3
<b>Mean</b>	<b>43.0</b>	<b>34.2</b>	<b>38.6</b>	<b>37.2</b>	<b>44.8</b>	<b>41.0</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.8</b>	<b>1.8</b>	<b>1.3</b>

**Table 3. NIAB Spring Sown Onion Trials from seed 2012- rots by category**

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites)

*Preliminary varieties 2 replicates of data*

	Population & Yield											
Variety	% Base Rots			% Neck Rots			% Bacterial Rots			% Penicillium		
	Rix	Raker	Mean	Rix	Raker	Mean	Rix	Raker	Mean	Rix	Raker	Mean
<b>BROWNS</b>												
<i>Globall</i>	0.0	1.3	0.6	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0
Hybing	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.3	0.2	0.0	0.0	0.0
Hybound	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0
Hytech	0.2	0.0	0.1	0.2	0.0	0.1	0.0	0.5	0.2	0.0	0.0	0.0
<i>Sem 13</i>	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Silverado	0.0	0.4	0.2	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0
Medaillon	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bennito	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.2	0.0	0.0	0.0
Paradiso	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Wellington	0.0	0.3	0.1	0.0	0.4	0.2	0.2	0.4	0.3	0.3	0.0	0.1
<i>BGS 289</i>	0.0	0.3	0.1	0.0	0.7	0.4	0.0	0.3	0.1	0.0	0.0	0.0
Napoleon	0.0	0.0	0.0	0.1	0.6	0.4	0.0	0.1	0.1	0.0	0.0	0.0
NIZ37-84	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.0	0.0	0.0
<i>Sem 12</i>	0.1	0.2	0.2	0.0	0.2	0.1	0.0	0.7	0.3	0.1	0.0	0.1
Vision	0.2	0.2	0.2	0.0	0.0	0.0	0.0	0.4	0.2	0.0	0.0	0.0
SVS 69497	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0
Sunskin	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.3	0.2	0.0	0.0	0.0
<i>NIZ37-89</i>	0.0	0.0	0.0	0.0	0.5	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Santero	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
Motion	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.5	0.3	0.0	0.0	0.0
NIZ37-83	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0	0.1	0.1
Centro	0.0	0.6	0.3	0.0	0.3	0.2	0.0	0.5	0.2	0.0	0.2	0.1
<i>BGS 301</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.3	0.0	0.0	0.0
<i>Sem 11</i>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.3	0.0	0.0	0.0
ONL346	0.2	0.0	0.1	0.0	0.8	0.4	0.0	0.2	0.1	0.0	0.0	0.0
<i>Sem 10</i>	0.0	0.0	0.0	0.0	0.2	0.1	0.2	0.2	0.2	0.0	0.0	0.0
Arthur	0.0	0.0	0.0	0.0	0.3	0.1	0.1	0.4	0.3	0.0	0.0	0.0
<i>BGS 290</i>	0.0	0.0	0.0	0.0	0.5	0.2	0.0	0.2	0.1	0.0	0.0	0.0
<b>Mean</b>	<b>0.0</b>	<b>0.2</b>	<b>0.1</b>	<b>0.0</b>	<b>0.2</b>	<b>0.1</b>	<b>0.0</b>	<b>0.3</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>
<b>REDS</b>												
Red Planet	0.0	0.2	0.1	0.0	0.4	0.2	0.0	0.2	0.1	0.0	0.0	0.0
<i>Testa Rossa</i>	0.4	0.4	0.4	0.0	0.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0
1.11	0.0	0.0	0.0	0.0	0.2	0.1	0.0	0.2	0.1	0.0	0.0	0.0
Red Tide	0.0	0.2	0.1	0.0	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.0
Redspark	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Red Baron	0.0	0.0	0.0	0.0	0.4	0.2	0.2	0.1	0.2	0.0	0.0	0.0
Retano	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<b>Mean</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.0</b>	<b>0.2</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>

**Table 4. NIAB Spring Onion Trials from seed 2012 – Bulb Quality data**

Sites: Rix (Essex) and Raker (Norfolk)  
 Varieties in maturity order (mean of both sites)  
 Preliminary varieties 2 replicates of data

Variety	Bulb Quality (1-9)														
	Skin Colour 1=pale 9=dark			Skin Protection 1=poor 9=good			Bulb Shape 1=flat 5=round 9=elongate			Uniformity 1=poor 9=good			Firmness 1=poor 9=good		
	Rix	Raker	Av	Rix	Raker	Av	Rix	Raker	Av	Rix	Raker	Av	Rix	Raker	Av
<b>BROWNS</b>															
<i>Globall</i>	6.0	6.0	6.0	4.0	3.0	3.5	5.5	5.5	5.5	6.5	6.0	6.3	7.0	7.0	7.0
<i>Hybing</i>	5.5	5.5	5.5	6.5	6.5	6.5	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>Hybound</i>	5.5	5.0	5.3	7.0	7.0	7.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>Hytech</i>	5.0	5.0	5.0	7.0	7.0	7.0	5.0	5.0	5.0	7.0	6.5	6.8	7.0	7.0	7.0
<i>Sem 13</i>	5.0	5.5	5.3	7.0	7.0	7.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>Silverado</i>	5.5	5.5	5.5	7.0	7.0	7.0	5.0	5.0	5.0	7.0	6.5	6.8	7.0	7.0	7.0
<i>Medaillon</i>	5.5	4.5	5.0	7.0	7.0	7.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>Bennito</i>	5.5	5.0	5.3	7.0	6.0	6.5	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>Paradiso</i>	5.0	5.5	5.3	7.0	6.5	6.8	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>Wellington</i>	5.5	5.5	5.5	7.0	7.0	7.0	5.0	5.0	5.0	6.5	7.0	6.8	7.0	7.0	7.0
<i>BGS 289</i>	5.5	5.5	5.5	7.0	6.5	6.8	5.5	5.0	5.3	7.0	7.0	7.0	7.0	7.0	7.0
<i>Napoleon</i>	5.0	5.0	5.0	7.0	7.0	7.0	5.0	5.0	5.0	6.5	6.5	6.5	7.0	7.0	7.0
<i>NIZ37-84</i>	5.5	5.0	5.3	7.0	7.0	7.0	5.0	5.0	5.0	7.0	6.5	6.8	7.0	7.0	7.0
<i>Sem 12</i>	5.5	5.5	5.5	7.0	6.5	6.8	5.0	5.0	5.0	6.5	7.0	6.8	7.0	7.0	7.0
<i>Vision</i>	5.5	5.5	5.5	7.0	7.0	7.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>SVS 69497</i>	5.0	5.0	5.0	7.0	7.0	7.0	5.0	5.0	5.0	7.0	6.5	6.8	7.0	7.0	7.0
<i>Sunskin</i>	5.0	4.5	4.8	7.0	6.5	6.8	5.0	5.0	5.0	6.5	7.0	6.8	7.0	7.0	7.0
<i>NIZ37-89</i>	5.5	6.0	5.8	7.0	7.0	7.0	5.0	5.0	5.0	6.5	7.0	6.8	7.0	7.0	7.0
<i>Santero</i>	5.0	5.0	5.0	7.0	7.0	7.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>Motion</i>	5.5	5.5	5.5	7.0	7.0	7.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>NIZ37-83</i>	5.5	5.5	5.5	7.0	7.0	7.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>Centro</i>	5.5	5.5	5.5	7.0	7.0	7.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>BGS 301</i>	5.5	5.0	5.3	7.0	6.5	6.8	5.0	5.0	5.0	6.5	7.0	6.8	7.0	7.0	7.0
<i>Sem 11</i>	5.5	5.5	5.5	7.0	7.0	7.0	4.5	5.0	4.8	7.0	7.0	7.0	7.0	7.0	7.0
<i>ONL346</i>	6.0	6.0	6.0	7.0	6.5	6.8	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>Sem 10</i>	5.5	5.5	5.5	7.0	7.0	7.0	5.0	5.0	5.0	7.0	6.5	6.8	7.0	7.0	7.0
<i>Arthur</i>	6.0	5.5	5.8	7.0	7.0	7.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>BGS 290</i>	6.0	5.0	5.5	7.0	6.5	6.8	5.0	5.0	5.0	7.0	7.0	7.0	7.0	7.0	7.0
<b>Mean</b>	<b>5.5</b>	<b>5.3</b>	<b>5.4</b>	<b>6.9</b>	<b>6.7</b>	<b>6.8</b>	<b>5.0</b>	<b>5.0</b>	<b>5.0</b>	<b>6.9</b>	<b>6.9</b>	<b>6.9</b>	<b>7.0</b>	<b>7.0</b>	<b>7.0</b>
<b>REDS</b>															
<i>Red Planet</i>	5.5	6.0	5.8	7.0	7.0	7.0	5.0	5.0	5.0	6.5	6.0	6.3	7.0	7.0	7.0
<i>Testa Rossa</i>	4.5	5.0	4.8	4.0	3.0	3.5	4.0	4.0	4.0	7.0	7.0	7.0	7.0	7.0	7.0
<i>1.11</i>	6.0	6.5	6.3	7.0	7.0	7.0	5.0	5.0	5.0	6.5	7.0	6.8	7.0	7.0	7.0
<i>Red Tide</i>	6.5	7.0	6.8	7.0	7.0	7.0	5.5	5.0	5.3	6.5	7.0	6.8	7.0	7.0	7.0
<i>Redspark</i>	6.5	7.0	6.8	7.0	7.0	7.0	5.0	5.0	5.0	6.5	7.0	6.8	7.0	7.0	7.0
<i>Red Baron</i>	6.5	7.0	6.8	7.0	7.0	7.0	5.0	5.0	5.0	6.0	6.0	6.0	7.0	7.0	7.0
<i>Retano</i>	7.0	7.5	7.3	7.0	7.0	7.0	5.0	5.0	5.0	6.5	7.0	6.8	7.0	7.0	7.0
<b>Mean</b>	<b>6.1</b>	<b>6.6</b>	<b>6.3</b>	<b>6.6</b>	<b>6.4</b>	<b>6.5</b>	<b>4.9</b>	<b>4.9</b>	<b>4.9</b>	<b>6.5</b>	<b>6.7</b>	<b>6.6</b>	<b>7.0</b>	<b>7.0</b>	<b>7.0</b>



**Table 5. NIAB Spring Sown Trials from seed 2012 – vigour and plant characteristics**

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites)

*Preliminary varieties 2 replicates of data*

Both trials had a full fungicide programme so mildew is only recorded as present or absent at Norfolk and as the maximum percentage recorded in Essex

	Early vigour 1-9 9=vigorous			Establishment %			Habit/density (July) 1-9 9=dense			Mildew (% or presence)	
variety	Rix	Raker	Mean	Rix	Raker	Mean	Rix	Raker	Mean	Rix	Raker
<b>BROWNS</b>											
<i>Global</i>	7.0	7.0	7.0	95	90	92	7.0	7.0	7.0	27.5	
Hybing	7.3	6.7	7.0	95	100	97	7.3	6.7	7.0	6.3	yes
Hybound	8.0	7.3	7.7	93	100	96	8.0	7.3	7.7	3.7	
Hytech	8.0	7.0	7.5	88	93	90	8.0	7.0	7.5	3.7	yes
<i>Sem 13</i>	8.0	7.5	7.8	95	95	95	8.0	7.5	7.8	7.0	
Silverado	7.3	7.0	7.2	96	100	98	7.3	7.0	7.2	3.7	
Medaillon	7.0	6.7	6.8	90	90	90	7.0	6.7	6.8	2.3	yes
Bennito	7.0	7.0	7.0	100	95	97	7.0	7.0	7.0	5.0	
Paradiso	7.3	7.7	7.5	95	96	95	7.3	7.7	7.5	5.7	yes
Wellington	7.0	7.0	7.0	95	95	95	7.0	7.0	7.0	4.3	
<i>BGS 289</i>	8.0	7.0	7.5	95	100	97	8.0	7.0	7.5	7.0	yes
Napoleon	7.0	7.0	7.0	100	96	98	7.0	7.0	7.0	3.0	
NIZ37-84	8.0	7.0	7.5	95	93	94	8.0	7.0	7.5	3.7	yes
<i>Sem 12</i>	7.7	7.5	7.6	95	100	97	7.7	7.5	7.6	4.3	
Vision	7.3	7.0	7.2	93	91	92	7.3	7.0	7.2	4.3	yes
SVS 69497	7.3	7.0	7.2	96	100	98	7.3	7.0	7.2	5.7	yes
Sunskin	7.0	7.3	7.2	95	98	96	7.0	7.3	7.2	4.3	
<i>NIZ37-89</i>	7.0	7.5	7.3	92	100	96	7.0	7.5	7.3	5.0	
Santero	7.7	7.0	7.3	100	93	96	7.7	7.0	7.3	0.0	
Motion	8.0	7.3	7.7	96	96	96	8.0	7.3	7.7	4.3	yes
NIZ37-83	7.3	7.0	7.2	95	100	97	7.3	7.0	7.2	5.0	
Centro	7.3	7.3	7.3	93	100	96	7.3	7.3	7.3	6.7	yes
<i>BGS 301</i>	7.5	7.0	7.3	100	100	100	7.5	7.0	7.3	5.0	
<i>Sem 11</i>	7.5	7.0	7.3	95	95	95	7.5	7.0	7.3	4.0	
ONL346	7.7	7.0	7.3	91	90	90	7.7	7.0	7.3	3.0	
<i>Sem 10</i>	7.0	7.0	7.0	100	100	100	7.0	7.0	7.0	3.0	
Arthur	7.0	7.0	7.0	98	100	99	7.0	7.0	7.0	4.3	yes
<i>BGS 290</i>	7.0	7.0	7.0	97	95	96	7.0	7.0	7.0	4.0	
<b>Mean</b>	<b>7.4</b>	<b>7.1</b>	<b>7.3</b>	<b>96</b>	<b>97</b>	<b>96</b>	<b>7.4</b>	<b>7.1</b>	<b>7.3</b>	<b>5.2</b>	
<b>REDS</b>											
Red Planet	7.0	7.3	7.2	93.3	93.3	93.3	7.0	7.3	7.2	5.0	yes
<i>Testa Rossa</i>	7.0	7.5	7.3	82.5	75.0	78.8	7.0	7.5	7.3	17.5	yes
1.11	7.0	7.3	7.2	91.7	93.3	92.5	7.0	7.3	7.2	9.0	yes
Red Tide	7.0	7.3	7.2	85.0	83.3	84.2	7.0	7.3	7.2	4.3	yes
Redspark	7.7	6.7	7.2	96.7	96.7	96.7	7.7	6.7	7.2	9.0	yes
Red Baron	7.0	7.0	7.0	90.0	87.5	88.8	7.0	7.0	7.0	5.0	yes
Retano	7.3	7.0	7.2	98.3	86.7	92.5	7.3	7.0	7.2	3.0	
<b>Mean</b>	<b>7.1</b>	<b>7.2</b>	<b>7.2</b>	<b>91.1</b>	<b>88.0</b>	<b>89.5</b>	<b>7.1</b>	<b>7.2</b>	<b>7.2</b>	<b>7.5</b>	

**Table 6. NIAB Spring Sown Onion Trials from seed 2012 - Onion Ring Data**

Sites: Rix (Essex) and Raker (Norfolk)  
 Varieties in maturity order (mean of both sites)  
*Preliminary varieties 2 replicates of data*

	% Bulbs with single centres		
Variety	Essex	Norfolk	Mean
<b>BROWNS</b>			
<i>Global</i>	13	10	12
Hybing	47	53	50
Hybound	67	60	63
Hytech	38	50	44
<i>Sem 13</i>	80	70	75
Silverado	40	33	37
Medaillon	49	60	54
Bennito	29	62	46
Paradiso	33	38	36
Wellington	62	50	56
<i>BGS 289</i>	70	50	60
Napoleon	51	51	51
NIZ37-84	38	42	40
<i>Sem 12</i>	67	87	77
Vision	33	40	37
SVS 69497	40	33	37
Sunskin	49	49	49
<i>NIZ37-89</i>	<i>n/a</i>	77	77
Santero	44	38	41
Motion	76	71	73
NIZ37-83	67	40	53
Centro	58	58	58
<i>BGS 301</i>	87	73	80
<i>Sem 11</i>	47	63	55
ONL346	53	49	51
<i>Sem 10</i>	53	53	53
Arthur	42	49	46
<i>BGS 290</i>	60	43	52
<b>Mean</b>	<b>52</b>	<b>52</b>	<b>52</b>
<b>REDS</b>			
Red Planet	60	60	60
<i>Testa Rossa</i>	10	<i>n/a</i>	10
1.11	84	84	84
Red Tide	53	51	52
Redspark	58	69	63
Red Baron	71	80	76
Retano	71	87	79
<b>Mean</b>	<b>58</b>	<b>72</b>	<b>61</b>

**Table 7. NIAB Spring Sown Onion Trials from seed 2012 – Storage data (Ambient) Assessments May/June 2013**

Sites: Rix (Essex) and Raker (Norfolk)  
 Varieties in maturity order (mean of both sites)  
*Preliminary varieties 2 replicates of data*

Variety	% sound Late May			% sound Late June			% sprouted Late May		
	Rix	Raker	Mean	Rix	Raker	Mean	Rix	Raker	Mean
<b>BROWNS</b>									
<i>Globall</i>	14	11	13	8	3	6	76	81	79
Hybing	39	36	38	19	19	19	57	54	55
Hybound	57	59	58	25	35	30	40	37	38
Hytech	63	43	53	34	18	26	33	48	41
<i>Sem 13</i>	62	66	64	36	42	39	31	29	30
Silverado	41	45	43	18	22	20	54	52	53
Medaillon	56	70	63	29	36	32	39	24	31
Bennito	36	38	37	14	14	14	61	60	60
Paradiso	52	61	56	29	37	33	44	35	39
Wellington	69	66	67	38	33	36	26	26	26
<i>BGS 289</i>	52	74	63	28	50	39	20	21	20
Napoleon	49	67	58	22	31	26	48	30	39
NIZ37-84	36	51	44	16	25	21	57	47	52
<i>Sem 12</i>	50	62	56	26	32	29	47	35	41
Vision	79	75	77	52	33	43	17	20	19
SVS 69497	45	46	45	22	21	21	52	50	51
Sunskin	49	67	58	23	33	28	47	29	38
<i>NIZ37-89</i>	78	75	77	54	42	48	20	22	21
Santero	71	63	67	42	36	39	27	36	31
Motion	85	81	83	58	58	58	13	15	14
NIZ37-83	52	54	53	27	29	28	45	41	43
Centro	55	45	50	30	21	26	40	51	45
<i>BGS 301</i>	48	70	59	21	41	31	48	28	38
<i>Sem 11</i>	33	61	47	16	44	30	58	34	46
ONL346	79	85	82	50	59	54	19	10	14
<i>Sem 10</i>	45	64	54	26	33	29	50	29	39
Arthur	34	44	39	14	26	20	59	53	56
<i>BGS 290</i>	57	77	67	32	45	39	41	21	31
<b>Mean</b>	<b>53</b>	<b>59</b>	<b>56</b>	<b>29</b>	<b>33</b>	<b>31</b>	<b>42</b>	<b>36</b>	<b>39</b>
<b>REDS</b>									
Red Planet	51	55	53	33	32	33	39	39	39
<i>Testa Rossa</i>	0	0	0	0	0	0	85	83	84
1.11	63	75	69	41	55	48	12	13	13
Red Tide	68	78	73	44	58	51	21	11	16
Redspark	49	73	61	27	50	38	34	12	23
Red Baron	59	58	58	36	45	41	27	26	27
Retano	42	46	44	20	26	23	37	22	30
<b>Mean</b>	<b>47</b>	<b>55</b>	<b>51</b>	<b>29</b>	<b>38</b>	<b>33</b>	<b>36</b>	<b>30</b>	<b>33</b>

**Table 8. NIAB Spring Sown Onion Trials from seed 2012 – Storage data (Ambient) Assessments Apr/May 2013**

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites)

*Preliminary varieties 2 replicates of data*

Variety	Skin finish (1-9) 1=poor Late April/May			Bulb Firmness (1-9) 1=soft Late April/May			Mean % rots by type			
	Rix	Raker	Mean	Rix	Raker	Mean	Neck	Basal	Penicillin	Bacterial
<b>BROWNS</b>										
<i>Global</i>	4.0	3.8	3.9	4.5	4.5	4.5	0	0	3	5
Hybing	6.5	6.3	6.4	6.3	6.2	6.2	4	0	2	1
Hybound	6.7	6.4	6.5	6.8	6.7	6.8	1	0	1	1
Hytech	6.7	6.3	6.5	6.5	6.1	6.3	3	0	2	2
<i>Sem 13</i>	7.0	6.6	6.8	7.0	6.8	6.9	3	0	2	1
Silverado	6.3	6.1	6.2	6.4	5.9	6.2	2	0	2	1
Medaillon	7.0	6.8	6.9	6.9	6.7	6.8	4	0	0	2
Bennito	6.9	6.4	6.7	6.6	6.1	6.3	1	0	1	0
Paradiso	6.5	6.2	6.3	6.6	6.8	6.7	1	0	1	2
Wellington	6.8	6.8	6.8	7.1	6.8	6.9	3	0	1	3
<i>BGS 289</i>	6.3	6.5	6.4	5.9	6.6	6.3	4	1	4	9
Napoleon	6.9	6.7	6.8	7.0	6.2	6.6	2	0	1	1
NIZ37-84	6.8	6.8	6.8	6.8	6.7	6.7	2	0	1	1
<i>Sem 12</i>	6.6	7.0	6.8	6.8	7.1	6.9	2	0	0	1
Vision	7.0	6.8	6.9	7.1	6.9	7.0	2	0	1	2
SVS 69497	6.7	6.2	6.4	6.5	6.3	6.4	2	0	1	1
Sunskin	6.7	6.8	6.7	6.9	6.6	6.7	3	0	0	0
<i>NIZ37-89</i>	7.0	6.8	6.9	7.5	6.9	7.2	1	0	0	1
Santero	7.2	6.5	6.8	7.3	7.0	7.1	1	0	1	0
Motion	7.0	7.0	7.0	7.3	7.5	7.4	2	0	1	1
NIZ37-83	6.8	6.8	6.8	6.4	6.8	6.6	3	0	0	1
Centro	7.0	7.0	7.0	6.8	6.7	6.8	3	0	1	1
<i>BGS 301</i>	7.0	7.0	7.0	6.5	6.6	6.6	2	0	0	1
<i>Sem 11</i>	6.8	6.3	6.5	6.1	6.0	6.1	5	0	1	1
ONL346	7.2	6.8	7.0	7.4	6.9	7.2	2	0	0	1
<i>Sem 10</i>	6.3	6.8	6.5	6.8	6.5	6.6	3	1	1	1
Arthur	6.4	6.5	6.5	6.4	6.2	6.3	3	0	0	1
<i>BGS 290</i>	6.4	6.3	6.3	6.0	6.0	6.0	1	0	0	1
<b>Mean</b>	<b>6.6</b>	<b>6.5</b>	<b>6.6</b>	<b>6.6</b>	<b>6.5</b>	<b>6.6</b>	<b>2</b>	<b>0</b>	<b>1</b>	<b>2</b>
<b>REDS</b>										
Red Planet	6.2	6.3	6.2	6.6	6.5	6.5	3	0	2	2
<i>Testa Rossa</i>	6.0	5.0	5.5	4.0	6.5	5.3	0	0	3	13
1.11	5.3	5.8	5.6	6.1	6.3	6.2	3	1	6	8
Red Tide	5.8	6.3	6.0	6.2	6.2	6.2	4	1	2	4
Redspark	6.1	6.3	6.2	5.6	5.8	5.7	5	1	3	7
Red Baron	5.6	6.3	5.9	5.3	5.6	5.4	4	1	2	8
Retano	5.6	6.5	6.0	6.1	6.5	6.3	9	1	4	12
<b>Mean</b>	<b>5.8</b>	<b>6.1</b>	<b>5.9</b>	<b>5.7</b>	<b>6.2</b>	<b>5.9</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>8</b>

**Table 9. NIAB Spring Sown Onion Trials from seed 2012 – Storage data (CE) Assessments July 2013**

Sites: Rix (Essex) – in store until end June 2013

Varieties in maturity order (mean of both sites)

Preliminary varieties 2 replicates of data

Variety	25 <sup>th</sup> July			
	Bulb firmness (1-9) 1=soft	% sound	% sprouted	% rots
<b>BROWNS</b>				
<i>Globall</i>	5	17	82	1
Hybing	7	49	51	0
Hybound	7	24	74	2
Hytech	7	53	46	1
<i>Sem 13</i>	7	24	76	0
Silverado	7	34	63	3
Medaillon	8	38	60	2
Bennito	7	14	79	7
Paradiso	7	23	77	0
Wellington	7	64	36	0
<i>BGS 289</i>	7	74	26	0
Napoleon	7	23	74	3
NIZ37-84	7	42	56	2
<i>Sem 12</i>	7	30	70	0
Vision	8	73	27	0
SVS 69497	7	27	73	0
Sunskin	8	47	53	0
<i>NIZ37-89</i>	7	58	40	2
Santero	8	53	46	1
Motion	8	64	34	2
NIZ37-83	8	27	70	3
Centro	7	23	75	2
<i>BGS 301</i>	7	46	54	0
<i>Sem 11</i>	7	11	88	1
ONL346	7	56	42	2
<i>Sem 10</i>	7	9	89	2
Arthur	7	20	80	0
<i>BGS 290</i>	7	51	48	1
<b>Mean</b>	<b>7</b>	<b>38</b>	<b>60</b>	<b>1</b>
<b>REDS</b>				
Red Planet	7	42	58	0
<i>Testa Rossa</i>	-	0	95	5
1.11	6	35	65	0
Red Tide	6	61	38	1
Redspark	7	36	64	0
Red Baron	6	35	65	0
Retano	6	22	76	2
<b>Mean</b>	<b>6</b>	<b>33</b>	<b>66</b>	<b>1</b>

**Table 10. NIAB Spring Planted Onion Trial from Sets 2012 - Varieties**

Varieties in maturity order (mean of both sites)

				Maturity
Variety	set source	Seed source		Date of 80% foliage fallover
<b>Early Browns</b>			Lincs	Suffolk
Alpha	Allium Seeds UK Ltd	Allium Seeds UK Ltd	-	17-Jul
ESC 1002	English Set Company	Confidential	-	22-Jul
Jagro (AS)	Allium Seeds UK Ltd	Bejo/De Groot en Slot	-	26-Jul
Jagro (ESC)	English Set Company	Bejo/De Groot en Slot	-	26-Jul
Helanus (AS)	Allium Seeds UK Ltd	Confidential	-	26-Jul
Helanus (ESC)	English Set Company	Confidential	-	27-Jul
Global	ProVeg Seeds	Confidential	23-Jul	25-Jul
<b>Early Reds</b>				
Red Emperor (AS)	Allium Seeds UK Ltd	Enza Zaden	28-Jul	28-Jul
Red Emperor (ESC)	English Set Company	Enza Zaden	30-Jul	31-Jul
<b>Maincrop Browns</b>				
VCS 6005	English Set Company	Confidential	03-Aug	01-Aug
VCS 6004	English Set Company	Confidential	02-Aug	02-Aug
Sturon (ESC)	English Set Company	Confidential	04-Aug	03-Aug
Setton	Allium Seeds UK Ltd	Allium Seeds UK Ltd	-	06-Aug
Rumba	Allium Seeds UK Ltd	Allium Seeds UK Ltd	02-Aug	-
<b>Maincrop Reds</b>				
ESC 1100	English Set Company	Confidential	03-Aug	01-Aug
Kamal	English Set Company	Advanta	-	05-Aug
Red Ray F1	Broer/Elsoms	Bejo/De Groot en Slot	-	06-Aug
Red Baron (ELS)	Broer/Elsoms	Bejo/De Groot en Slot	-	07-Aug
Red Baron (ESC)	English Set Company	Bejo/De Groot en Slot	-	08-Aug
Red Light F1	Broer/Elsoms	Bejo/De Groot en Slot	-	-
Garnet	Allium Seeds UK Ltd	Allium Seeds UK Ltd	-	-

Global and 2 Red Emperors planted with maincrop but data with early maturity varieties

Lincs. trial planted browns 24<sup>th</sup> Feb, reds 22<sup>nd</sup> March

Suffolk trial planted earlies 27<sup>th</sup> Jan, main browns 21<sup>st</sup> Feb, reds 20<sup>th</sup> March

**Table 11. NIAB Spring Planted Onion Trial from Sets 2012 – Yield data**

Varieties in maturity order (mean of both sites)

Marketable yields are adjusted to give a truer representation of early varieties - % rots data removed

Variety	Population & Yield											
	plant pop. (plants / sq. m)			marketable yield (t/ha)			% Rots			% defects (not inc. rots)		
	Lincs	Suffk	Mean	Lincs	Suffk	Mean	Lincs	Suffk	Mean	Lincs	Suffk	Mean
<b>Early Browns</b>												
Alpha	-	41.2	41.2	-	60.0	60.0	-	7.1	7.1	-	3.2	3.2
ESC 1002	-	34.2	34.2	-	-	-	-	4.4	4.4	-	86.8	86.8
Jagro (AS)	-	41.4	41.4	-	57.7	57.7	-	13.6	13.6	-	1.9	1.9
Jagro (ESC)	-	41.8	41.8	-	61.2	61.2	-	21	21	-	0.4	0.4
Helanus (AS)	-	42.8	42.8	-	-	-	-	5.4	5.4	-	89.2	89.2
Helanus (ESC)	-	42.9	42.9	-	44.6	44.6	-	29.1	29.1	-	18.9	18.9
Globall	34.1	38.1	36.1	-	-	-	2.5	26.6	14.6	66.8	40.9	53.9
<b>mean</b>	<b>34.1</b>	<b>40.3</b>	<b>37.2</b>	<b>-</b>	<b>55.9</b>	<b>55.9</b>	<b>2.5</b>	<b>15.3</b>	<b>8.9</b>	<b>66.8</b>	<b>34.5</b>	<b>50.7</b>
<b>Early Reds</b>												
Red Emperor (AS)	38.3	40.0	39.1	36.0	42.5	39.2	0.2	10.0	5.1	36.6	17.6	27.1
Red Emperor (ESC)	35.8	39.8	37.8	36.0	40.6	38.3	0.4	13.5	6.9	0.5	1.3	0.9
<b>mean</b>	<b>37.0</b>	<b>39.9</b>	<b>38.5</b>	<b>36.0</b>	<b>41.5</b>	<b>38.8</b>	<b>0.3</b>	<b>11.8</b>	<b>6.0</b>	<b>18.5</b>	<b>9.5</b>	<b>14.0</b>
<b>Maincrop Browns</b>												
VCS 6005	34.6	42.2	38.4	54.2	56.8	55.5	2.0	23.3	12.6	2.5	0.5	1.5
VCS 6004	33.4	44.2	38.8	51.3	45.6	48.5	3.4	43.3	23.4	6.8	0.7	3.7
Sturon (ESC)	39.4	42.6	41.0	67.7	50.3	59.0	1.0	33.9	17.4	1.9	1.2	1.6
Setton	35.5	41.5	38.5	62.3	42.0	52.1	2.0	48.6	25.3	0.8	0.2	0.5
Rumba	37.8	-	37.8	76.1	-	76.1	1.7	-	1.7	3.5	-	3.5
<b>mean</b>	<b>36.2</b>	<b>42.6</b>	<b>39.4</b>	<b>62.3</b>	<b>48.7</b>	<b>55.5</b>	<b>2.0</b>	<b>37.3</b>	<b>19.6</b>	<b>3.1</b>	<b>0.6</b>	<b>1.9</b>
<b>Maincrop Reds</b>												
ESC 1100	32.7	43.2	38.0	30.9	45.7	38.3	0.8	13.6	7.2	3.7	1.5	2.6
Kamal	29.4	41.2	35.3	27.1	32.2	29.7	1.1	12.2	6.6	2.2	0.6	1.4
Red Ray F1	30.3	31.7	31.0	35.8	29.9	32.8	1.0	16.8	8.9	4.3	0.2	2.3
Red Baron (ELS)	29.0	35.6	32.3	38.8	30.1	34.5	2.8	27.9	15.4	2.2	0.8	1.5
Red Baron (ESC)	35.0	41.0	38.0	44.1	30.4	37.3	0.4	20.1	10.2	0.2	1.3	0.8
Red Light F1	29.6	-	29.6	41.3	-	41.3	5.4	-	5.4	0.2	-	0.2
Garnet	36.1	-	-	54.5	-	-	1.2	-	-	4.2	-	-
<b>mean</b>	<b>31.7</b>	<b>38.5</b>	<b>35.1</b>	<b>38.9</b>	<b>33.7</b>	<b>36.3</b>	<b>1.8</b>	<b>18.1</b>	<b>10.0</b>	<b>2.4</b>	<b>0.9</b>	<b>1.7</b>

Globall and 2 Red Emperors planted with maincrop but data with early maturity varieties

Lincs. trial planted browns 24<sup>th</sup> Feb, reds 22<sup>nd</sup> March

Suffolk trial planted earlies 27<sup>th</sup> Jan, main browns 21<sup>st</sup> Feb, reds 20<sup>th</sup> March

**Table 12. NIAB Spring Planted Onion Trial from Sets 2012 - rots by category**

Varieties in maturity order (mean of both sites)

Variety	% Base Rots			% Neck Rots			% Bacterial Rots			% Penicillium		
	Lincs	Suffk	Mean	Lincs	Suffk	Mean	Lincs	Suffk	Mean	Lincs	Suffk	Mean
<b>Early Browns</b>												
Alpha	-	0.0	0.0	-	0.5	0.5	-	3.0	3.0	-	0.0	0.0
ESC 1002	-	0	0	-	0.2	0.2	-	2	2	-	-	0
Jagro (AS)	-	0	0	-	0.2	0.2	-	6.7	6.7	-	-	0
Jagro (ESC)	-	0.2	0.2	-	0	0	-	10.3	10.3	-	-	0.2
Helanus (AS)	-	0	0	-	1.6	1.6	-	1.1	1.1	-	-	0
Helanus (ESC)	-	0.2	0.2	-	2.5	2.5	-	11.8	11.8	-	-	0.2
Globall	0.7	0.2	0.2	0.0	2.9	1.8	1.6	12.6	7.1	0.2	0.0	0.0
<b>mean</b>	<b>0.7</b>	<b>0.1</b>	<b>0.2</b>	<b>0.0</b>	<b>1.1</b>	<b>0.9</b>	<b>1.6</b>	<b>6.8</b>	<b>4.2</b>	<b>0.2</b>	<b>0.0</b>	<b>0.0</b>
<b>Early Reds</b>												
Red Emperor (AS)	0.0	0.0	0.1	0.0	4.4	2.2	0.0	2.1	1.1	0.2	0.0	0.0
Red Emperor (ESC)	0.2	0.0	0.0	0.0	3.6	1.9	0.2	5.1	2.6	0.0	0.0	0.0
<b>mean</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>	<b>0.0</b>	<b>4.0</b>	<b>2.0</b>	<b>0.1</b>	<b>3.6</b>	<b>1.9</b>	<b>0.1</b>	<b>0.0</b>	<b>0.0</b>
<b>Maincrop Browns</b>												
VCS 6005	0.9	0.9	0.7	0.4	3.1	2.0	0.2	10.2	5.2	0.5	0.2	0.3
VCS 6004	1.4	2.0	1.1	0.0	5.3	3.3	1.7	19.1	10.4	0.3	0.0	0.0
Sturon (ESC)	0.5	1.2	0.7	0.0	8.3	4.4	0.4	12.3	6.3	0.2	0.2	0.1
Setton	1.4	1.0	0.5	0.0	8.6	5.0	0.6	21.8	11.2	0.0	0.0	0.0
Rumba	1.2	-	0.0	0.0	-	1.2	0.6	-	0.6	0.0	-	0.0
<b>mean</b>	<b>1.1</b>	<b>1.3</b>	<b>0.7</b>	<b>0.1</b>	<b>6.3</b>	<b>3.7</b>	<b>0.7</b>	<b>15.8</b>	<b>8.3</b>	<b>0.2</b>	<b>0.1</b>	<b>0.1</b>
<b>Maincrop Reds</b>												
ESC 1100	0.2	0.7	0.3	0.3	1.5	0.8	0.3	6.3	3.3	0.0	0.0	0.2
Kamal	0.9	0.3	0.2	0.0	0.8	0.8	0.2	6.5	3.3	0.0	0.0	0.0
Red Ray F1	0.3	0.2	0.1	0.3	1.6	1.0	0.3	8.6	4.5	0.0	0.0	0.2
Red Baron (ELS)	0.8	1.2	1.0	0.2	5.4	3.1	1.0	9.7	5.4	0.8	0.0	0.1
Red Baron (ESC)	0.2	0.4	0.2	0.0	2.4	1.3	0.2	10.3	5.3	0.0	0.0	0.0
Red Light F1	3.3	-	0.3	0.2	-	3.3	1.6	-	1.6	0.3	-	0.2
Garnet	1.2	-	0.0	0.0	-	1.2	0.0	-	0.0	0.0	-	0.0
<b>mean</b>	<b>1.0</b>	<b>0.6</b>	<b>0.4</b>	<b>0.2</b>	<b>2.4</b>	<b>1.7</b>	<b>0.5</b>	<b>8.3</b>	<b>4.4</b>	<b>0.2</b>	<b>0.0</b>	<b>0.1</b>

Globall and 2 Red Emperors planted with maincrop but data with early maturity varieties

Lincs. trial planted browns 24<sup>th</sup> Feb, reds 22<sup>nd</sup> March

Suffolk trial planted earlies 27<sup>th</sup> Jan, main browns 21<sup>st</sup> Feb, reds 20<sup>th</sup> March

*Rumba and Garnet single plots*



**Table 13. NIAB Spring Planted Onion Trial from Sets 2012 – Bulb quality data**

Varieties in maturity order (mean of both sites)

Variety	Neck Finish 1=fine 3=thick		Skin Colour 1=pale 9=dark		Skin Protection 1=poor 9=good		Bulb Shape 1=flat 5=round 9=elongate		Uniformity 1=poor 9=good		Firmness 1=poor 9=good	
	Lincs	Suffk	Lincs	Suffk	Lincs	Suffk	Lincs	Suffk	Lincs	Suffk	Lincs	Suffk
<b>Early Browns</b>												
Alpha	-	1.0	-	5.0	-	6.0	-	5.5	-	6.0	-	7.0
ESC 1002	-	1	-	4.5	-	3	-	5.5	-	-	-	7
Jagro (AS)	-	2	-	7	-	6	-	5	-	6	-	7
Jagro (ESC)	-	2	-	6.5	-	6	-	5	-	6	-	7
Helanus (AS)	-	1	-	5.5	-	5	-	5	-	6	-	7
Helanus (ESC)	-	1	-	6	-	5	-	5	-	6	-	7
Globall	1.0	1.0	6	5	6	5	5	5.5	5	5	6.5	7
<b>mean</b>	<b>1.0</b>	<b>1.3</b>	<b>6.0</b>	<b>5.6</b>	<b>6.0</b>	<b>5.1</b>	<b>5.0</b>	<b>5.2</b>	<b>5.0</b>	<b>5.8</b>	<b>6.5</b>	<b>7.0</b>
<b>Early Reds</b>												
Red Emperor (AS)	1.0	1.0	6	5	5.5	4.5	4.5	4.5	7	6.5	7	6.5
Red Emperor (ESC)	1.0	1.0	6	5	5.5	4.5	4.5	4.5	7	6.5	7	6.5
<b>mean</b>	<b>1.0</b>	<b>1.0</b>	<b>6.0</b>	<b>5.0</b>	<b>5.5</b>	<b>4.5</b>	<b>4.5</b>	<b>4.5</b>	<b>7.0</b>	<b>6.5</b>	<b>7.0</b>	<b>6.5</b>
<b>Maincrop Browns</b>												
VCS 6005	-	-	6.5	7	6	5	4.5	5	6.5	6.5	6.5	6
VCS 6004	-	-	6.5	7	6	6	4.5	5	6.5	6	6.5	6
Sturon (ESC)	-	-	6	7	7	6	4.5	5	7	6	7	6
Setton	-	-	6	7	7	7	5	5.5	7	6.5	7	6.5
Rumba	-	-	5.5		6		5		7		6.5	
<b>mean</b>	<b>-</b>	<b>-</b>	<b>6.1</b>	<b>7.0</b>	<b>6.4</b>	<b>6.0</b>	<b>4.7</b>	<b>5.1</b>	<b>6.8</b>	<b>6.3</b>	<b>6.7</b>	<b>6.1</b>
<b>Maincrop Reds</b>												
ESC 1100	-	-	6	5	6	6	4.5	5	6	6	7	6.5
Kamal	-	-	6	6	6.5	5.5	5	5	6.5	6.5	7	7
Red Ray F1	-	-	6.5	7	7	6.5	5	5	7	6.5	7	6
Red Baron (ELS)	-	-	6.5	7	7	6.5	5	5	6.5	5.5	6.5	6.5
Red Baron (ESC)	-	-	6.5	7	7	6.5	5	5	6.5	5.5	6.5	6.5
Red Light F1	-	-	6.5	-	6	-	5	-	6	-	6	-
Garnet	-	-	7	-	7	-	4.5	-	6.5	-	7	-
<b>mean</b>	<b>-</b>	<b>-</b>	<b>6.4</b>	<b>6.4</b>	<b>6.6</b>	<b>6.2</b>	<b>4.9</b>	<b>5.0</b>	<b>6.4</b>	<b>6.0</b>	<b>6.7</b>	<b>6.5</b>

Globall and 2 Red Emperors planted with maincrop but data with early maturity varieties

Lincs. trial planted browns 24<sup>th</sup> Feb, reds 22<sup>nd</sup> March

Suffolk trial planted earlies 27<sup>th</sup> Jan, main browns 21<sup>st</sup> Feb, reds 20<sup>th</sup> March

**Table 13. NIAB Spring Planted Onion Trial from Sets 2012 – Onion Ring Data**

Varieties in maturity order (mean of both sites)

Variety	% bulbs with single centres		
	Lincs	Suffk	Mean
<b>Early Browns</b>			
Alpha	-	29	29
ESC 1002	-	-	-
Jagro (AS)	-	27	27
Jagro (ESC)	-	16	16
Helanus (AS)	-	-	-
Helanus (ESC)	-	80	80
Global	40	-	40
<b>mean</b>	<b>40</b>	<b>38</b>	<b>39</b>
<b>Early Reds</b>			
Red Emperor (AS)	90	93	92
Red Emperor (ESC)	97	84	91
<b>mean</b>	<b>93</b>	<b>89</b>	<b>91</b>
<b>Maincrop Browns</b>			
VCS 6005	27	36	31
VCS 6004	10	60	35
Sturon (ESC)	9	36	22
Setton	16	27	21
Rumba	13	-	13
<b>mean</b>	<b>15</b>	<b>39</b>	<b>27</b>
<b>Maincrop Reds</b>			
ESC 1100	60	-	60
Kamal	83	89	86
Red Ray F1	67	88	77
Red Baron (ELS)	67	87	77
Red Baron (ESC)	84	93	89
Red Light F1	63	-	63
Garnet	80	-	80
<b>mean</b>	<b>72</b>	<b>89</b>	<b>81</b>

Global and 2 Red Emperors planted with maincrop but data with early maturity varieties

Lincs. trial planted browns 24<sup>th</sup> Feb, reds 22<sup>nd</sup> March

Suffolk trial planted earlies 27<sup>th</sup> Jan, main browns 21<sup>st</sup> Feb, reds 20<sup>th</sup> March

**Table 14. NIAB Spring Planted Onion Trial from Sets 2012 – Storage data (Ambient) Assessments Jan/Mar 2013**

Varieties in maturity order (mean of both sites)

	January			March			March % sprouted		
	% sound			% sound					
	Lincs	Suffk	Mean	Lincs	Suffk	Mean	Lincs	Suffk	Mean
<b>Maincrop Browns</b>									
VCS 6005	75	65	70	62	43	52	19	25	22
VCS 6004	71	61	66	58	42	50	16	26	21
Sturon (ESC)	76	68	72	60	43	51	17	35	26
Setton	87	74	81	56	50	53	16	22	19
Rumba	77	-	77	59	-	59	19	-	19
<b>mean</b>	<b>77</b>	<b>67</b>	<b>73</b>	<b>59</b>	<b>44</b>	<b>53</b>	<b>17</b>	<b>27</b>	<b>21</b>
<b>Maincrop Reds</b>									
ESC 1100	22	67	44	80	37	58	11	26	18
Kamal	78	73	75	66	45	55	10	25	17
Red Ray F1	40	37	38	35	29	32	0	5	3
Red Baron (ELS)	58	41	49	46	7	27	5	7	6
Red Baron (ESC)	48	43	45	79	69	74	4	15	9
Red Light F1	25	-	25	16	-	16	11	-	11
Garnet	77	-	77	51	-	51	30	-	30
<b>mean</b>	<b>49</b>	<b>52</b>	<b>51</b>	<b>53</b>	<b>37</b>	<b>45</b>	<b>10</b>	<b>16</b>	<b>14</b>

**Table 15. NIAB Spring Planted Onion Trial from Sets 2012– Storage data (Ambient) Assessments Jan/Mar 2013**

Varieties in maturity order (mean of both sites)

Variety	March Skin quality (1-9) 1=poor			March Total % rots		
	Lincs	Suffk	Lincs	Lincs	Suffk	Mean
<b>Maincrop Browns</b>						
VCS 6005	3	4	4	19	29	24
VCS 6004	5	4	5	26	32	29
Sturon (ESC)	5	4	5	23	23	23
Setton	6	6	6	28	28	28
Rumba	5	-	5	21	-	21
<b>mean</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>24</b>	<b>28</b>	<b>25</b>
<b>Maincrop Reds</b>						
ESC 1100	6	4	5	16	37	26
Kamal	5	5	5	24	30	27
Red Ray F1	5	6	6	65	66	65
Red Baron (ELS)	5	5	5	48	85	67
Red Baron (ESC)	5	5	5	22	31	27
Red Light F1	5	-	5	72	-	72
Garnet	5	-	5	19	-	19
<b>mean</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>38</b>	<b>50</b>	<b>43</b>

Lincs. trial planted browns 24<sup>th</sup> Feb, reds 22<sup>nd</sup> March

Suffolk trial planted browns 21<sup>st</sup> Feb, reds 20<sup>th</sup> March