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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

- This assessment of onion varieties will allow growers to compare the range of new and old varieties and make informed choices for both seeds and sets.

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. 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.

Early maturing drilled varieties such as Hybing, Centro, Wellington and Vision are becoming increasingly popular. Maincrop varieties e.g. Arthur, Boston, Hybelle, Sunskin 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.

'Sturon type' varieties continue to dominate the brown set maincrop maturity varieties. However there are very early maturing varieties such as ABS101 and VCS6003 which produce high yields that are suitable for the autumn markets. The mildew resistant variety Santero also has good storage potential and is 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 Reddawn and high quality hybrids.

Summary of the results and main conclusions

Table A: NIAB Spring Planted Onion Trial from Sets 2010 - Varieties

Varieties in maturity order (mean of both sites)

Variety	set source		Maturity
			Date of 80% foliage fallover
BROWNS			Mean
VCS6003	English Set Company	UK	27-Jun
ABS 101	Allium Brassica Supplies	Holland	27-Jun
ABS 106	Allium Brassica Supplies	Holland	28-Jun
Forum F1	Broer/Elsoms	Holland	30-Jun
Alpha	Allium Brassica Supplies	Holland	01-Jul
Jagro (ESC)	English Set Company	UK	09-Jul
Elite Jagro (ABS)	Allium Brassica Supplies	Belgium	12-Jul
Sturon (ABS)	Allium Brassica Supplies	Belgium	16-Jul
Elite Rumba	Allium Brassica Supplies	France	17-Jul
Elite Setton	Allium Brassica Supplies	France	17-Jul
Stur BC 20	Broer/Elsoms	Holland	17-Jul
VCS6004	English Set Company	UK	18-Jul
VCS6005	English Set Company	UK	19-Jul
Sturon (ESC)	English Set Company	UK	19-Jul
Santero	English Set Company	UK	27-Jul
Hylander F1	Broer/Elsoms	Holland	01-Aug
Means			12-Jul
REDS			
Red Emperor (ABS)	Allium Brassica Supplies	Belgium	04-Jul
Red Emperor (ESC)	English Set Company	UK	05-Jul
Reddawn F1	Broer/Elsoms	Holland	15-Jul
Kamal	English Set Company	UK	22-Jul
Elite Garnet	Allium Brassica Supplies	France	23-Jul
Hyred F1	Broer/Elsoms	Holland	24-Jul
Elite Red Baron (ABS)	Allium Brassica Supplies	France	24-Jul
Romy	English Set Company	UK	25-Jul
Red Queen	Allium Brassica Supplies	Holland	25-Jul
Red Baron (ESC)	English Set Company	UK	26-Jul
Means			19-Jul

Lincs. trial planted 12th March except Red Queen 19th March.

Suffolk trial Browns and Red Emperor's planted 25th Feb

Elsoms browns and other reds planted 9th March except Red Queen 19th March.

Table B. NIAB Spring Sown Onion Trials from seed 2010 – Maturity and Yield data

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites) Main trial data first then Preliminary trial data

Preliminary varieties only single replicate of data (shown in italics)

Variety	Source	Mean Maturity 80% foliage fallover	marketable yield (t/ha)			% sound in May 2010			% sound 3 weeks out of CE storage
			Essex	Norfolk	Mean	Essex	Norfolk	Mean	Essex
BROWNS									
Hybing	Bejo	23-Aug	74.8	70.3	72.5	13.9	21.4	17.6	31.0
NIZ 37-71	Nickerson	28-Aug	63.9	60.4	62.2	15.4	21.8	18.6	36.0
Vision	Syngenta	29-Aug	71.9	70.0	70.9	27.4	36.5	31.9	44.0
Attraction	Syngenta	30-Aug	64.0	75.7	69.9	31.4	23.1	27.2	36.0
Wellington	Syngenta	31-Aug	70.1	70.4	70.2	38.4	34.0	36.2	71.0
Hytech	Bejo	01-Sep	76.1	66.5	71.3	22.1	25.0	23.5	32.0
Centro	Nickerson	02-Sep	68.9	73.2	71.0	24.3	21.7	23.0	36.0
Napoleon	Syngenta	02-Sep	70.6	68.7	69.6	18.8	28.3	23.5	42.0
Premito	Seminis	02-Sep	70.1	69.8	70.0	10.9	17.3	14.1	34.3
Hybound	Bejo	04-Sep	76.8	72.7	74.8	17.4	16.5	16.9	33.3
Sunnito	Seminis	06-Sep	69.3	65.1	67.2	9.1	17.2	13.1	24.0
Sunskin	Syngenta	07-Sep	80.1	77.1	78.6	20.9	29.0	24.9	42.0
Motion	Syngenta	07-Sep	70.4	72.0	71.2	40.7	21.2	30.9	49.0
Arthur	Advanta	12-Sep	73.9	74.1	74.0	16.1	21.0	18.6	19.0
Hylander	Bejo	14-Sep	72.5	74.9	73.7	10.9	11.0	11.0	34.0
Santero	Nickerson	15-Sep	63.5	61.7	62.6	23.9	21.0	22.4	46.0
<i>Sherman</i>	<i>Bejo</i>	<i>25-Aug</i>	<i>88.7</i>	<i>85.1</i>	<i>86.9</i>	<i>7.9</i>	<i>19.0</i>	<i>13.5</i>	<i>59.0</i>
<i>Pegase</i>	<i>Sakata</i>	<i>04-Sep</i>	<i>71.9</i>	<i>79.8</i>	<i>75.9</i>	<i>0.9</i>	<i>9.1</i>	<i>5.0</i>	<i>1.0</i>
<i>NIZ 37-70</i>	<i>Nickerson</i>	<i>08-Sep</i>	<i>68.0</i>	<i>69.0</i>	<i>68.5</i>	<i>15.0</i>	<i>17.0</i>	<i>16.0</i>	<i>33.0</i>
<i>NIZ 37-82</i>	<i>Nickerson</i>	<i>09-Sep</i>	<i>59.6</i>	<i>55.6</i>	<i>57.6</i>	<i>25.0</i>	<i>29.0</i>	<i>27.0</i>	<i>34.0</i>
<i>SVS 69497</i>	<i>Seminis</i>	<i>09-Sep</i>	<i>67.9</i>	<i>75.0</i>	<i>71.4</i>	<i>33.0</i>	<i>12.1</i>	<i>22.6</i>	<i>35.0</i>
<i>NIZ 37-84</i>	<i>Nickerson</i>	<i>12-Sep</i>	<i>78.1</i>	<i>70.0</i>	<i>74.0</i>	<i>17.2</i>	<i>13.1</i>	<i>15.2</i>	<i>36.0</i>
<i>Hytide</i>	<i>Bejo</i>	<i>13-Sep</i>	<i>72.5</i>	<i>83.8</i>	<i>78.2</i>	<i>16.7</i>	<i>14.0</i>	<i>15.3</i>	<i>49.0</i>
means		04-Sep	71.5	71.3	71.4	19.9	20.8	20.4	37.2
REDS									
Grenada	ProVeg Seeds	31-Aug	49.2	53.4	51.3	3.0	9.0	6.0	24.0
Red Tide	Bejo	02-Sep	67.2	59.3	63.2	13.9	7.4	10.6	22.0
Redspark	Bejo	09-Sep	66.5	64.9	65.7	25.8	28.2	27.0	43.0
Red Baron	Bejo	11-Sep	64.3	61.6	63.0	12.1	11.7	11.9	31.0
<i>Red Queen</i>	<i>Allium Brassica Supplies</i>	<i>11-Sep</i>	<i>53.6</i>	<i>54.0</i>	<i>53.8</i>	<i>29.0</i>	<i>26.7</i>	<i>27.9</i>	<i>43.0</i>
<i>Renato</i>	<i>Nickerson</i>	<i>12-Sep</i>	<i>64.3</i>	<i>49.9</i>	<i>57.1</i>	<i>8.0</i>	<i>12.0</i>	<i>10.0</i>	<i>26.0</i>
<i>Garnet</i>	<i>Allium Brassica Supplies</i>	<i>14-Sep</i>	<i>54.9</i>	<i>59.1</i>	<i>57.0</i>	<i>15.1</i>	<i>10.1</i>	<i>12.6</i>	<i>43.0</i>
<i>9.125 F1</i>	<i>Allium Farms</i>	<i>17-Sep</i>	<i>63.4</i>	<i>49.2</i>	<i>56.3</i>	<i>20.7</i>	<i>20.5</i>	<i>20.6</i>	<i>44.0</i>
means		10-Sep	60.4	56.4	58.4	16.0	15.7	15.8	34.5

Table C. NIAB Spring Planted Onion Trial from Sets 2010 – 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	marketable yield (t/ha)			% sound in February		
	Lincs	Suffolk	Mean	Lincs	Suffolk	Mean
BROWNS						
VCS6003	38.5	58.8	48.6	7.3	41.4	24.3
ABS 101	42.5	55.1	48.8	9.4	17.2	13.3
ABS 106	39.4	52.7	46.1	8.8	47.1	27.9
Forum F1	50.4	68.0	59.2	7.6	11.8	9.7
Alpha	35.2	62.9	49.0	22.5	77.5	50.0
Jagro (ESC)	50.0	82.8	66.4	2.0	33.8	17.9
Elite Jagro (ABS)	48.3	59.0	53.7	1.6	8.3	5.0
Sturon (ABS)	48.3	79.4	63.9	17.8	79.2	48.5
Elite Rumba	52.8	77.7	65.3	17.5	77.3	47.4
Elite Setton	53.8	72.2	63.0	26.8	65.4	46.1
Stur BC 20	52.9	68.0	60.5	7.3	12.9	10.1
VCS6004	47.0	68.2	57.6	12.5	83.6	48.0
VCS6005	38.2	61.6	49.9	16.5	45.6	31.0
Sturon (ESC)	54.1	73.1	63.6	19.0	47.3	33.1
Santero	31.8	32.7	32.2	16.5	29.4	22.9
Hylander F1	43.0	44.8	43.9	18.2	27.2	22.7
Means	45.4	63.6	54.5	13.2	44.1	28.6
REDS						
Red Emperor (ABS)	45.7	71.8	58.7	1.1	9.2	5.1
Red Emperor (ESC)	46.9	62.7	54.8	6.5	12.3	9.4
Reddawn F1	55.3	54.2	54.8	3.7	4.5	4.1
Kamal	47.6	61.6	54.6	11.5	28.7	20.1
Elite Garnet	46.3	69.2	57.8	25.4	20.6	23.0
Hyred F1	39.6	50.5	45.1	12.8	40.7	26.7
Elite Red Baron (ABS)	49.1	67.3	58.2	15.7	26.1	20.9
Romy	41.9	53.5	47.7	16.8	40.0	28.4
Red Queen	47.1	59.1	53.1	12.3	41.8	27.0
Red Baron (ESC)	40.8	58.4	49.6	14.5	32.7	23.6
Means	46.0	60.8	53.4	12.0	25.7	18.8

Lincs. trial planted 12th March except Red Queen 19th March.Suffolk trial Browns and Red Emperor's planted 25th FebElsoms browns and other reds planted 9th March except Red Queen 19th March.

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 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 Bures, Essex – drilled onions

Trial records and data collected – set trials

The trials established well in good conditions. A dry spring meant that the Suffolk crop needed irrigating earlier than normal. The Lincs. trial had no irrigation.

The trials were harvested on 5th August (Suffolk) and 29th July (Lincs.). The bulbs were dried and cured before grading – problems with drying and curing resulted in a higher percentage of rots in the trial material than was seen commercially.

Trial records and data collected – drilled trials

The trials were harvested on 14th Sept (Norfolk) and 22nd Sept (Essex). The August and early September were very wet and meant that harvest was significantly delayed both the trials and on many commercial holdings. The wet harvest meant that some of the earlier maturing varieties suffered from a higher proportion of rots than normal. There were some problems with vigour in the very dry spring.

A study of seed treatments and coatings investigated the effect of four different combinations of treatments on three varieties.

Tables A lists the set varieties in trials in maturity order.

Tables B and C have key areas of interest - selected yield and storage data. The full report has a full set of data tables (appended).

Set trials - results

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

Mildew resistance

Santero is the first commercially produced mildew resistance set but there was not enough mildew in either trial to show its full potential. Hylander, seen for the first time as a set, also has claimed mildew resistance.

Maturity

VCS6003, ABS101 and ABS106 were the earliest maturing brown variety and the latest was Hylander over a month later.

In the red material Red Emperor was the earliest and Red Baron (and others) was the latest just over 3 weeks later.

Yield

The highest yielding variety (see tables) was Jagro. The Sturon types also gave high yields. Some of the earlier maturing varieties are disadvantaged slightly by being planted with the later maturing varieties. Generally they have high yields commercially and would be sent straight for sale or processing and not be held as long as these trial methods dictate.

The early reds Red Emperor and Reddawn gave high yields but need to go straight to market as they are not ideal for storage.

Storage potential

Earlier maturing varieties are prone to rotting as they tend to have thinner skins and softer tissue but this is only a problem if growers are considering storing them – which is not how these varieties should be targeted.

Alpha had the highest percentage of sound bulbs, of the brown varieties, at the final storage assessment in February. The Sturon types and VCS 6004 all have good storage potential. Red Queen had the highest numbers of marketable bulbs of the reds, but generally the reds did not store as well as the browns.

Drilled trials - results

Mildew resistance

Santero and Hylander both have claimed mildew resistance but there was not enough mildew in either trial to test these claims.

Maturity

Hybing was the earliest maturing varieties of the drilled trials. Sherman, in the preliminary trials was also very early to mature.

Yield

Sunskin and Hybound were the highest yielding. The preliminary varieties Sherman and Hytide had very high yields.

Redspark was the highest yielding red variety consistent with its high yields in 2009 trials.

Storage potential

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

Bulb quality was generally very good throughout most of the varieties. Pegase, Grenada and 9.125 F1 were all slightly soft. Sherman and Pegase were thin skinned and some skins were lost at grading.

Wellington, Vision and Motion had the highest percentage of sound bulbs at the early-May storage assessment. The preliminary variety NIZ 37-82 also had very good storage results. The preliminary variety Pegase is not suitable for ambient storage.

Redspark had the best storage results of the reds in the main trial plots (as in 2009) and the preliminary varieties Red Queen performed well in the preliminary trials.

Rots in storage material, in an ambient store, were mainly due to neck rot in Essex material and bacterial in the Norfolk material.

The quality out of CE store was generally as good as the material was going into storage. There were more rotten bulbs than in previous years due to the wet harvest conditions. The browns, Wellington, Vision, Motion, Santero Sherman and Hytide and the reds Redspark, Red Queen, Garnet and 9.125 F1 had a high number of marketable bulbs (out of CE storage).

Primed seeds

Primed seed consistently had better early vigour and higher early populations. The early populations were reflected in the final populations but the yields were better aligned by variety rather than by treatment.

While there is no immediate quantifiable yield effect. The use of primed seed is likely give a more predictable establishment which can be used at drilling to plan the desired population.

Financial benefits

The yield potential of varieties can vary greatly. In the drilled trials this was >15t/ha between the highest and lowest mean yields. In the set trials the difference was >30t/ha.

Yield out of store is also important. Drilled material show a difference of 30% between the best and worst storage potential while in the sets this was over 60%.

Mildew resistant varieties require fewer and or cheaper fungicide programmes.

Action points for growers

- 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.

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. Independent trials provide a direct comparison of new and established varieties and afford growers 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 Hybing, Centro, Wellington and Vision are becoming increasingly popular. Maincrop varieties e.g. Arthur, Boston, Hybelle, Sunskin 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. Interest in set trials has increase in recent years with large numbers of new entries with new genetics. Particularly varieties bringing earlier maturity and/or mildew resistance.

‘Sturon type’ varieties continue to dominate the brown set maincrop maturity varieties. However there are very early maturing varieties such as ABS101 and VCS6003 which produce high yields that are suitable for the autumn markets. The mildew resistant variety Santero also has good storage potential and is 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 Reddawn and high quality, maincrop maturity, hybrids.

Materials and methods

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 store.

The trials were hosted and located, with thanks, 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, Stoke-by-Nayland, Essex – drilled onions

Production details

All trials adopted the local host farm practice.

Suffolk sets

Site near east coast on a South-east facing slope.

Sandy soil

No major weed issues

No major foliar diseases

Hand planted at 42 plants per square metre

Irrigated throughout season

Lincolnshire sets

Site open flat field

Silty soil

No major weed issues

No major foliar diseases

Hand planted at 42 plants per square metre

Norfolk drilled seed

Site on flat field

Light sandy silt soil

Mid-season bloom of weeds requiring hand weeding

No major foliar diseases

Drilled browns at 48/m² and reds 44/m²

Late harvest due to wet August and September

Essex drilled seed

Site on South facing slope

Light silt soil

No major weed issues

No major foliar diseases

Drilled browns at 55/m² and reds 48/m²

Irrigated early season to keep trial growing through very dry spring

Late harvest due to wet August and September

Trial design

The main trials were a randomized complete block design.

The set trials had two replicates, of 5 m² plots.

The drilled trials had three replicates, 11 m² plots, in the main trials. Varieties classed as 'preliminary' in the drilled trials were not-replicated but were randomised in a single block.

Presented data is mean values.

The drilled trials had additional plots looking at seed treatments and coatings.

Thanks to Elsoms who provided 3 varieties with 4 different seed treatments / applications.

2 trials, each of 3 replicates, were drilled in Essex and Norfolk alongside the HDC / seed company variety trial plots.

Trial records and data collected –set trials

The Suffolk set trial browns and the two Red Emperor entries were planted on 25th Feb., the remaining reds and the Elsoms entries were planted on 9th Mar, except for Red Queen which was planted on 19th Mar.

The Lincs set trial site was too wet for an early planting. All varieties were planted on 12th Mar. except for Red Queen which was planted on 19th Mar.

The trials established well in good conditions. A dry spring meant that the Suffolk crop needed irrigating earlier than normal. The Lincs. trial had no irrigation.

Plant establishment, vigour, disease incidence, bolters and plant maturity for harvest were all recorded in the field.

The trials were harvested on 5th August (Suffolk) and 29th July (Lincs.). The bulbs were dried and cured before grading – problems with drying and curing resulted in a higher percentage of rots in the trial material than was seen commercially. Yields were adjusted to give yield potential excluding rots.

Grading fractions records included weight by grade size, number of rots, defects and bulb quality. A sample of 100 bulbs from each plot was stored (ambient store) and assessed twice to record the number of sound bulbs, sprouted bulbs, rots and bulb quality.

Trial records and data collected –drilled trials

The drilled trials were sown on 17th March in Essex and 18th March in Norfolk. Although the trials went into good soils the spring was very dry and the Essex trial was slow to establish.

Additional assessments were recorded of vigour, emergence and plant population to capture differences in the seed treatment experiment.

The trials were harvested on 14th Sept (Norfolk) and 22nd Sept (Essex). The August and early September were very wet and meant that harvest was significantly delayed both the trials and on many commercial holdings. The wet harvest meant that some of the earlier maturing varieties suffered from a higher proportion of rots than normal.

The adverse harvest conditions affected the storage potential of the Essex trial and this was reflected in the storage assessments. The Essex trial not storing as well as the material from the lighter soils of the Norfolk trial.

An exceptionally cold November meant ambient stores may have needed some heating to keep them frost free.

Tables 1 and 9 (also appended) list groups of varieties (main trial then preliminaries; browns then reds) in maturity order.

Table 1. NIAB Spring Sown Onion Trials from seed 2010 – varieties

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites) Main trial data first then Preliminary trial data

Preliminary varieties only single replicate of data

Variety	Status	Source	Maturity		
			Date of 80% foliage fallover		
			Essex	Norfolk	Mean
BROWNS					
Hybing	C	Bejo	25-Aug	21-Aug	23-Aug
NIZ 37-71	2	Nickerson	30-Aug	26-Aug	28-Aug
Vision	R	Syngenta	31-Aug	26-Aug	29-Aug
Attraction (ONL295)	1	Syngenta	01-Sep	28-Aug	30-Aug
Wellington	C	Syngenta	02-Sep	28-Aug	31-Aug
Hytech	C	Bejo	06-Sep	27-Aug	01-Sep
Centro	R	Nickerson	03-Sep	01-Sep	02-Sep
Napoleon	R	Syngenta	09-Sep	27-Aug	02-Sep
Premito	2	Seminis	05-Sep	31-Aug	02-Sep
Hybound (BGS 266)	1	Bejo	08-Sep	30-Aug	04-Sep
Sunnito	2	Seminis	07-Sep	05-Sep	06-Sep
Sunskin	R	Syngenta	10-Sep	03-Sep	07-Sep
Motion (ONL301)	1	Syngenta	08-Sep	06-Sep	07-Sep
Arthur	C	Advanta	14-Sep	10-Sep	12-Sep
Hylander	2	Bejo	16-Sep	12-Sep	14-Sep
Santero	4	Nickerson	14-Sep	15-Sep	15-Sep
<i>Sherman</i>	<i>P</i>	<i>Bejo</i>	<i>24-Aug</i>	<i>27-Aug</i>	<i>25-Aug</i>
<i>Pegase</i>	<i>P(2)</i>	<i>Sakata</i>	<i>03-Sep</i>	<i>05-Sep</i>	<i>04-Sep</i>
<i>NIZ 37-70</i>	<i>P(2)</i>	<i>Nickerson</i>	<i>10-Sep</i>	<i>07-Sep</i>	<i>08-Sep</i>
<i>NIZ 37-82</i>	<i>P</i>	<i>Nickerson</i>	<i>12-Sep</i>	<i>06-Sep</i>	<i>09-Sep</i>
<i>SVS 69497</i>	<i>P</i>	<i>Seminis</i>	<i>12-Sep</i>	<i>06-Sep</i>	<i>09-Sep</i>
<i>NIZ 37-84</i>	<i>P</i>	<i>Nickerson</i>	<i>15-Sep</i>	<i>09-Sep</i>	<i>12-Sep</i>
<i>Hytide</i>	<i>P</i>	<i>Bejo</i>	<i>16-Sep</i>	<i>10-Sep</i>	<i>13-Sep</i>
means			07-Sep	02-Sep	04-Sep
REDS					
Grenada	1	ProVeg Seeds	03-Sep	29-Aug	31-Aug
Red Tide	1	Bejo	03-Sep	01-Sep	02-Sep
Redspark	C	Bejo	09-Sep	10-Sep	09-Sep
Red Baron	C	Bejo	10-Sep	13-Sep	11-Sep
<i>Red Queen</i>	<i>P</i>	<i>Allium Brassica Supplies</i>	<i>12-Sep</i>	<i>10-Sep</i>	<i>11-Sep</i>
<i>Renato</i>	<i>P</i>	<i>Nickerson</i>	<i>11-Sep</i>	<i>14-Sep</i>	<i>12-Sep</i>
<i>Garnet</i>	<i>P</i>	<i>Allium Brassica Supplies</i>	<i>14-Sep</i>	<i>15-Sep</i>	<i>14-Sep</i>
<i>9.125 F1</i>	<i>P</i>	<i>Allium Farms</i>	<i>16-Sep</i>	<i>18-Sep</i>	<i>17-Sep</i>
means			09-Sep	10-Sep	10-Sep

Table 9. NIAB Spring Planted Onion Trial from Sets 2010 - Varieties
Varieties in maturity order (mean of both sites)

Variety	Set source		Maturity		
			Date of 80% foliage fallover		
			Lincs	Suffolk	Mean
BROWNS					
VCS6003	English Set Company	UK	19-Jun	05-Jul	27-Jun
ABS 101	Allium Brassica Supplies	Holland	18-Jun	06-Jul	27-Jun
ABS 106	Allium Brassica Supplies	Holland	21-Jun	05-Jul	28-Jun
Forum F1	Broer/Elsoms	Holland	25-Jun	06-Jul	30-Jun
Alpha	Allium Brassica Supplies	Holland	26-Jun	07-Jul	01-Jul
Jagro (ESC)	English Set Company	UK	26-Jun	22-Jul	09-Jul
Elite Jagro (ABS)	Allium Brassica Supplies	Belgium	01-Jul	24-Jul	12-Jul
Sturon (ABS)	Allium Brassica Supplies	Belgium	03-Jul	29-Jul	16-Jul
Elite Rumba	Allium Brassica Supplies	France	05-Jul	29-Jul	17-Jul
Elite Setton	Allium Brassica Supplies	France	06-Jul	29-Jul	17-Jul
Stur BC 20	Broer/Elsoms	Holland	06-Jul	29-Jul	17-Jul
VCS6004	English Set Company	UK	05-Jul	31-Jul	18-Jul
VCS6005	English Set Company	UK	09-Jul	29-Jul	19-Jul
Sturon (ESC)	English Set Company	UK	08-Jul	31-Jul	19-Jul
Santero	English Set Company	UK	19-Jul	05-Aug	27-Jul
Hylander F1	Broer/Elsoms	Holland	28-Jul	05-Aug	01-Aug
Mean			02-Jul	22-Jul	12-Jul
REDS					
Red Emperor (ABS)	Allium Brassica Supplies	Belgium	02-Jul	07-Jul	04-Jul
Red Emperor (ESC)	English Set Company	UK	29-Jun	11-Jul	05-Jul
Reddawn F1	Broer/Elsoms	Holland	04-Jul	26-Jul	15-Jul
Kamal	English Set Company	UK	13-Jul	31-Jul	22-Jul
Elite Garnet	Allium Brassica Supplies	France	15-Jul	01-Aug	23-Jul
Hyred F1	Broer/Elsoms	Holland	17-Jul	31-Jul	24-Jul
Elite Red Baron (ABS)	Allium Brassica Supplies	France	15-Jul	03-Aug	24-Jul
Romy	English Set Company	UK	17-Jul	03-Aug	25-Jul
Red Queen	Allium Brassica Supplies	Holland	17-Jul	03-Aug	25-Jul
Red Baron (ESC)	English Set Company	UK	18-Jul	04-Aug	26-Jul
Means			11-Jul	27-Jul	19-Jul

Lincs. trial planted 12th March except Red Queen 19th March.
Suffolk trial Browns and Red Emperor's planted 25th Feb
Elsoms browns and other reds planted 9th March except Red Queen 19th March.

Results

Tables 2 – 8 and 10 - 14 which have all the yield and other performance data are appended at the end of the report (Tables 1 and 9 are repeated above).

Discussion

Discussion - Drilled trials

The Preliminary varieties are only a single plot at each site and so all data should be treated with caution.

Santero and Hylander both have claimed mildew resistance but there was not enough mildew in either trial to test these claims.

There were some problems with vigour in the very dry spring. In hindsight irrigation would have been beneficial to get the crops off to a good start.

Vigour and plant characteristics data are recorded but are not analysed (Table 5). There were no problems with vigour.

Hybing was the earliest maturing variety of the drilled trials. Sherman, in the preliminary trials was also very early to mature.

Sunskin and Hybound were the highest yielding. The preliminary varieties Sherman and Hytide had very high yields.

Redspark was the highest yielding red variety consistent with its high yields in 2009 trials.

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

Table 4 details the bulb quality assessments prior to storage.

A small sample of bulbs are cut open to record the numbers of single centres (Table 6) – the sample size is too small to do more than give an indication of which varieties are best suited to producing single centres.

Storage assessments (Tables 6 and 7), in an ambient store, were recorded in mid-March and early-May. Many of the rots were due to neck rot in Essex material and bacterial in the Norfolk material.

Wellington, Vision and Motion had the highest percentage of sound bulbs at the early-May assessment. The preliminary variety NIZ 37-82 also had very good storage results.

The preliminary variety Pegase is not suitable for ambient storage.

Redspark had the best storage results of the reds in the main trial plots (as in 2009) and the preliminary varieties Red Queen performed well in the preliminary trials.

Bulb quality was generally very good throughout most of the varieties. Pegase, Grenada and 9.125 F1 were all slightly soft. Sherman and Pegase were thin skinned and some skins were lost at grading.

A sub-sample of most varieties was stored in a CE store (courtesy of Rix Farms), -0.05°C, 80-85% relative humidity. Bulbs were taken out of store on 5th June and the final assessment on 28th June has been reported (table 8).

The quality out of CE store was generally as good as the material was going into storage. There were more rotten bulbs than in previous years due to the wet harvest conditions.

The browns, Wellington, Vision, Motion, Santero Sherman and Hytide and the reds Redspark, Red Queen, Garnet and 9.125 F1 had a high number of marketable bulbs (out of CE storage) .

Discussion - Seed treatment and coating

The data below are the means of the two trials. The results have been grouped by variety and then by the mean of each treatment.

Primed seed consistently had better early vigour and higher early populations. The early populations were reflected in the final populations but the yields were better aligned by variety rather than by treatment.

While there is no immediate quantifiable yield effect, the use of primed seed is likely to give a more predictable establishment which can be used at drilling to plan the desired population.

We were fortunate to be able to drill within a few days of receiving the treated seed and were therefore able to store the primed seed at the appropriate temperature. It was not possible to investigate what potential loss of performance there might be if primed seed was stored for a longer period before drilling which may occur commercially.

Dry conditions after drilling meant that emergence was generally slow. There were no capping issues. Pelleted seed is easier to drill (with the NIAB drill) but in dry conditions the

evenness of emergence can be an issue in some years. The similarity in early and late populations suggests this was not the case in these trials.

There was no analysis of cost. Some growers prefer to use naked seed as they feel that the cost differential is greater than the benefits.

		Early vigour	Early pop.	Vigour	Estab't	Plant pop.	Maturity	Yield (t/ha)
Hybelle	pellets+primed	2.0	47.4	6.3	7.8	49.6	08-Sep	81.3
Hybelle	pellets	1.5	43.5	6.3	7.7	47.7	07-Sep	80.7
Hybelle	bejofilm+primed	2.0	47.3	6.6	7.0	49.8	06-Sep	80.3
Hybelle	bejofilm	1.5	43.0	5.9	6.6	46.3	09-Sep	77.5
Hyfort	pellets+primed	2.2	49.6	6.5	7.7	49.3	01-Sep	74.0
Hyfort	bejofilm	1.5	42.8	6.2	6.8	47.8	03-Sep	73.5
Hyfort	pellets	1.3	44.6	6.3	7.3	49.0	01-Sep	70.5
Hytech	pellets	1.5	44.5	6.3	7.0	48.0	01-Sep	78.0
Hytech	bejofilm	1.8	41.3	6.2	6.3	43.6	03-Sep	74.8
Hytech	pellets+primed	2.0	44.4	6.3	7.2	46.9	01-Sep	73.3
	pellets+primed	2.1	47.1	6.4	7.6	48.6	03-Sep	76.2
	bejofilm	1.6	42.4	6.1	6.6	45.9	05-Sep	75.3
	pellets	1.4	44.2	6.3	7.3	48.2	03-Sep	76.4
	bejofilm+primed	2.0	47.3	6.6	7.0	49.8	06-Sep	80.3

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.

All varieties were planted at the same spacing and some varieties such as Jagro would probably be planted at a high density commercially to keep the bulb size down.

Santero is the first commercially produced mildew resistance set but there was not enough mildew in either trial to show its full potential. Hylander, seen for the first time as a set, also has claimed mildew resistance.

VCS6003, ABS101 and ABS106 were the earliest maturing brown variety and the latest was Hylander over a month later.

In the red material Red Emperor was the earliest and Red Baron (and others) was the latest just over 3 weeks later.

The highest yielding variety (see table 10) was Jagro. The Sturon types also gave high yields. Some of the earlier maturing varieties are disadvantaged slightly by being planted with the later maturing varieties. Generally they have high yields commercially and would be sent straight for sale or processing and not be held as long as these trial methods dictate.

A small sample of bulbs are cut open to record the numbers of single centres (Table 12) – the sample size is too small to do more than give an indication of which varieties are best suited to producing single centres.

The early reds Red Emperor and Reddawn gave high yields but need to go straight to market as they are not ideal for storage.

Earlier maturing varieties are prone to rotting as they tend to have thinner skins (table 11) and softer tissue but this is only a problem if growers are considering storing them – which is not how these varieties should be targeted.

Storage assessments, in an ambient store, were recorded in late-January and late-February.

Alpha had the highest percentage of sound bulbs, of the brown varieties, at final assessment in February. The Sturon types and VCS 6004 all have good storage potential. Red Queen had the highest numbers of marketable bulbs of the reds, but generally the reds did not store as well as the browns.

Conclusions

Conclusions – Drilled trials

There is a good range of maturities allowing growers to spread their harvest period. Earlier maturing material suffered from the wet August and September which resulted in some commercial crops not being lifted for several weeks.

For organic growers and for high disease pressure years the mildew resistant varieties Santero and Hylander both offer potential. Neither of the drilled trials had any significant level of mildew and therefore the mildew resistance was not demonstrable.

Hybing was the earliest maturing varieties in the established brown varieties and Sherman in the preliminary varieties. Sunskin and Hybound were the highest yielding. The preliminary varieties Sherman and Hytide had very high yields.

Redspark was the highest yielding red variety consistent with its high yields in 2009 trials.

There were some rots and defects in the harvested material of both the drilled trials but not as much as was expected from the late harvest after very wet conditions. Many of the rots were due to neck rot in Essex material and bacterial in the Norfolk material.

Long term storage in CE storage had more rots than in previous years.

Storage potential continues to be a key factor for drilled crops.

Bulb quality was generally very good (table 3). Most varieties have good skin finish, bulb shape and firmness. This reflects an improvement as newer material comes through breeders trials – exceptions to this were Pegase and Sherman which both had poor skin finish. Pegase is high yielding but should not be stored.

Storage potential continues to be a key factor for drilled crops. The majority of material stores well, in ambient store, until March and early April but then the differences start to appear.

Wellington, Vision and Motion had the highest percentage of sound bulbs at the early-May assessment. The preliminary variety NIZ 37-82 also had very good storage results.

The preliminary variety Pegase is not suitable for ambient storage.

Redspark had the best storage results of the reds in the main trial plots (as in 2009) and the preliminary varieties Red Queen performed well in the preliminary trials.

The browns, Wellington, Vision, Motion, Santero, Sherman and Hytide and the reds Redspark, Red Queen, Garnet and 9.125 F1 had a high number of marketable bulbs, out of CE storage.

Conclusions – Set trials

Sets still attract a premium as they are earlier to market than drilled crops and fill a gap when stores, of the previous season's crop, are becoming empty.

Santero and Hylander offer mildew resistance. A dry summer meant that mildew was not an issue in either of the trials.

VCS6003, ABS101 and ABS106 were the earliest maturing brown variety and the latest was Hylander over a month later.

In the red material Red Emperor was the earliest and Red Baron (and others) was the latest just over 3 weeks later.

The highest yielding varieties were Jagro and the Sturon types. Earlier maturing varieties have high yields commercially but need to go straight to market (for sale or processing).

Alpha had the highest percentage of sound bulbs, of the brown varieties, at the final storage assessment in February. The Sturon types and VCS 6004 all have good storage potential. Red Queen had the highest numbers of marketable bulbs of the reds, but generally the reds did not store as well as the browns.

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 Lincolnshire – July 2010,
2. Drilled crop field open day in Essex – August 2010,
3. Set crop harvested produce open day at NIAB, Cambridge – September 2010,
4. Drilled crop harvested produce open day at NIAB, Cambridge – November 2010.

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.

APPENDICES

Table 1. NIAB Spring Sown Onion Trials from seed 2010 – varieties

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites) Main trial data first then Preliminary trial data

Preliminary varieties only single replicate of data

Variety	Status	Source	Maturity		
			Date of 80% foliage fallover		
			Essex	Norfolk	Mean
BROWNS					
Hybing	C	Bejo	25-Aug	21-Aug	23-Aug
NIZ 37-71	2	Nickerson	30-Aug	26-Aug	28-Aug
Vision	R	Syngenta	31-Aug	26-Aug	29-Aug
Attraction (ONL295)	1	Syngenta	01-Sep	28-Aug	30-Aug
Wellington	C	Syngenta	02-Sep	28-Aug	31-Aug
Hytech	C	Bejo	06-Sep	27-Aug	01-Sep
Centro	R	Nickerson	03-Sep	01-Sep	02-Sep
Napoleon	R	Syngenta	09-Sep	27-Aug	02-Sep
Premito	2	Seminis	05-Sep	31-Aug	02-Sep
Hybound (BGS 266)	1	Bejo	08-Sep	30-Aug	04-Sep
Sunnito	2	Seminis	07-Sep	05-Sep	06-Sep
Sunskin	R	Syngenta	10-Sep	03-Sep	07-Sep
Motion (ONL301)	1	Syngenta	08-Sep	06-Sep	07-Sep
Arthur	C	Advanta	14-Sep	10-Sep	12-Sep
Hylander	2	Bejo	16-Sep	12-Sep	14-Sep
Santero	4	Nickerson	14-Sep	15-Sep	15-Sep
<i>Sherman</i>	<i>P</i>	<i>Bejo</i>	<i>24-Aug</i>	<i>27-Aug</i>	<i>25-Aug</i>
<i>Pegase</i>	<i>P(2)</i>	<i>Sakata</i>	<i>03-Sep</i>	<i>05-Sep</i>	<i>04-Sep</i>
<i>NIZ 37-70</i>	<i>P(2)</i>	<i>Nickerson</i>	<i>10-Sep</i>	<i>07-Sep</i>	<i>08-Sep</i>
<i>NIZ 37-82</i>	<i>P</i>	<i>Nickerson</i>	<i>12-Sep</i>	<i>06-Sep</i>	<i>09-Sep</i>
<i>SVS 69497</i>	<i>P</i>	<i>Seminis</i>	<i>12-Sep</i>	<i>06-Sep</i>	<i>09-Sep</i>
<i>NIZ 37-84</i>	<i>P</i>	<i>Nickerson</i>	<i>15-Sep</i>	<i>09-Sep</i>	<i>12-Sep</i>
<i>Hytide</i>	<i>P</i>	<i>Bejo</i>	<i>16-Sep</i>	<i>10-Sep</i>	<i>13-Sep</i>
means			07-Sep	02-Sep	04-Sep
REDS					
Grenada	1	ProVeg Seeds	03-Sep	29-Aug	31-Aug
Red Tide	1	Bejo	03-Sep	01-Sep	02-Sep
Redspark	C	Bejo	09-Sep	10-Sep	09-Sep
Red Baron	C	Bejo	10-Sep	13-Sep	11-Sep
<i>Red Queen</i>	<i>P</i>	<i>Allium Brassica Supplies</i>	<i>12-Sep</i>	<i>10-Sep</i>	<i>11-Sep</i>
<i>Renato</i>	<i>P</i>	<i>Nickerson</i>	<i>11-Sep</i>	<i>14-Sep</i>	<i>12-Sep</i>
<i>Garnet</i>	<i>P</i>	<i>Allium Brassica Supplies</i>	<i>14-Sep</i>	<i>15-Sep</i>	<i>14-Sep</i>
<i>9.125 F1</i>	<i>P</i>	<i>Allium Farms</i>	<i>16-Sep</i>	<i>18-Sep</i>	<i>17-Sep</i>
means			09-Sep	10-Sep	10-Sep

Table 2. NIAB Spring Sown Onion Trials from seed 2010 - Yield data

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites) Main trial data first then Preliminary trial data

Preliminary varieties only single replicate of data

Variety	Population & Yield											
	plant pop. (plants / sq. m)			marketable yield (t/ha)			% Rots			total % defects (inc rots)		
	Essex	Norfolk	Mean	Essex	Norfolk	Mean	Essex	Norfolk	Mean	Essex	Norfolk	Mean
BROWNS												
Hybing	49.3	47.9	48.6	74.8	70.3	72.5	0.5	0.3	0.4	0.8	0.6	0.7
NIZ 37-71	41.7	43.2	42.5	63.9	60.4	62.2	0.0	1.5	0.7	0.7	1.5	1.1
Vision	47.1	43.3	45.2	71.9	70.0	70.9	0.9	0.8	0.9	1.6	1.5	1.5
Attraction	37.8	38.6	38.2	64.0	75.7	69.9	0.0	0.8	0.4	1.0	1.7	1.3
Wellington	39.8	42.2	41.0	70.1	70.4	70.2	0.0	0.7	0.3	0.6	1.7	1.1
Hytech	49.1	48.4	48.7	76.1	66.5	71.3	0.3	0.1	0.2	1.3	0.4	0.9
Centro	45.8	45.9	45.8	68.9	73.2	71.0	0.3	0.3	0.3	0.8	0.8	0.8
Napoleon	45.7	46.6	46.2	70.6	68.7	69.6	0.0	0.6	0.3	1.6	1.3	1.4
Premito	43.7	42.7	43.2	70.1	69.8	70.0	1.0	0.8	0.9	3.4	1.0	2.2
Hybound	51.6	45.9	48.8	76.8	72.7	74.8	0.0	0.0	0.0	0.0	0.3	0.2
Sunnito	44.3	43.5	43.9	69.3	65.1	67.2	0.3	0.0	0.2	2.0	0.8	1.4
Sunskin	49.3	44.9	47.1	80.1	77.1	78.6	0.0	0.5	0.2	1.6	1.1	1.4
Motion	46.1	44.8	45.5	70.4	72.0	71.2	0.3	0.3	0.3	0.5	1.0	0.7
Arthur	46.8	45.0	45.9	73.9	74.1	74.0	0.1	0.5	0.3	1.1	1.7	1.4
Hylander	45.8	46.6	46.2	72.5	74.9	73.7	0.2	0.2	0.2	2.1	0.3	1.2
Santero	44.1	42.0	43.1	63.5	61.7	62.6	0.0	0.4	0.2	0.8	1.0	0.9
<i>Sherman</i>	<i>49.9</i>	<i>50.4</i>	<i>50.2</i>	<i>88.7</i>	<i>85.1</i>	<i>86.9</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.4</i>	<i>0.2</i>
<i>Pegase</i>	<i>37.4</i>	<i>35.0</i>	<i>36.2</i>	<i>71.9</i>	<i>79.8</i>	<i>75.9</i>	<i>0.6</i>	<i>9.3</i>	<i>4.9</i>	<i>0.6</i>	<i>9.3</i>	<i>4.9</i>
<i>NIZ 37-70</i>	<i>48.2</i>	<i>43.7</i>	<i>45.9</i>	<i>68.0</i>	<i>69.0</i>	<i>68.5</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>1.8</i>	<i>1.0</i>	<i>1.4</i>
<i>NIZ 37-82</i>	<i>48.9</i>	<i>41.5</i>	<i>45.2</i>	<i>59.6</i>	<i>55.6</i>	<i>57.6</i>	<i>0.0</i>	<i>1.0</i>	<i>0.5</i>	<i>0.0</i>	<i>1.6</i>	<i>0.8</i>
<i>SVS 69497</i>	<i>47.8</i>	<i>48.0</i>	<i>47.9</i>	<i>67.9</i>	<i>75.0</i>	<i>71.4</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.5</i>	<i>0.2</i>
<i>NIZ 37-84</i>	<i>48.2</i>	<i>41.7</i>	<i>45.0</i>	<i>78.1</i>	<i>70.0</i>	<i>74.0</i>	<i>1.8</i>	<i>0.0</i>	<i>0.9</i>	<i>1.8</i>	<i>1.0</i>	<i>1.4</i>
<i>Hytide</i>	<i>47.1</i>	<i>46.9</i>	<i>47.0</i>	<i>72.5</i>	<i>83.8</i>	<i>78.2</i>	<i>0.5</i>	<i>0.0</i>	<i>0.2</i>	<i>2.8</i>	<i>0.0</i>	<i>1.4</i>
means	45.9	44.3	45.1	71.5	71.3	71.4	0.3	0.8	0.5	1.2	1.3	1.2
REDS												
Grenada	32.5	31.6	32.1	49.2	53.4	51.3	1.3	1.2	1.3	3.2	3.3	3.3
Red Tide	42.5	39.9	41.2	67.2	59.3	63.2	0.0	0.2	0.1	0.5	0.6	0.5
Redspark	44.3	42.4	43.3	66.5	64.9	65.7	0.3	0.0	0.2	0.8	0.3	0.6
Red Baron	38.2	40.8	39.5	64.3	61.6	63.0	0.0	0.4	0.2	0.4	1.1	0.7
<i>Red Queen</i>	<i>39.4</i>	<i>39.8</i>	<i>39.6</i>	<i>53.6</i>	<i>54.0</i>	<i>53.8</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.5</i>	<i>0.3</i>
<i>Renato</i>	<i>47.8</i>	<i>39.8</i>	<i>43.8</i>	<i>64.3</i>	<i>49.9</i>	<i>57.1</i>	<i>0.5</i>	<i>0.0</i>	<i>0.2</i>	<i>1.4</i>	<i>0.0</i>	<i>0.7</i>
<i>Garnet</i>	<i>39.4</i>	<i>39.8</i>	<i>39.6</i>	<i>54.9</i>	<i>59.1</i>	<i>57.0</i>	<i>0.5</i>	<i>1.6</i>	<i>1.1</i>	<i>5.5</i>	<i>2.2</i>	<i>3.8</i>
<i>9.125 F1</i>	<i>24.4</i>	<i>19.2</i>	<i>21.8</i>	<i>63.4</i>	<i>49.2</i>	<i>56.3</i>	<i>2.7</i>	<i>0.0</i>	<i>1.3</i>	<i>7.1</i>	<i>2.2</i>	<i>4.7</i>
means	38.5	36.7	37.6	60.4	56.4	58.4	0.7	0.4	0.5	2.4	1.3	1.8

Table 3. NIAB Spring Onion Trials from seed 2010 – Bulb Quality data

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites) Main trial data first then Preliminary trial data

Preliminary varieties only single replicate 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		
	Essex	Norfolk	Mean	Essex	Norfolk	Mean	Essex	Norfolk	Mean	Essex	Norfolk	Mean	Essex	Norfolk	Mean
BROWNS															
Hybing	5.0	6.0	5.5	5.0	5.0	5.0	5.0	5.0	5.0	7.0	7.0	7.0	7.0	6.0	6.5
NIZ 37-71	6.0	6.5	6.3	6.5	6.0	6.3	5.0	5.0	5.0	7.0	6.5	6.8	7.0	7.0	7.0
Vision	6.0	6.0	6.0	6.5	7.0	6.8	5.0	5.0	5.0	7.0	6.0	6.5	7.0	7.0	7.0
Attraction	6.0	6.0	6.0	6.5	7.0	6.8	5.0	5.0	5.0	6.5	6.0	6.3	7.0	7.0	7.0
Wellington	6.0	6.0	6.0	6.5	7.0	6.8	5.0	5.0	5.0	6.0	6.0	6.0	7.0	7.0	7.0
Hytech	5.0	6.0	5.5	5.5	6.0	5.8	5.0	4.5	4.8	6.0	6.0	6.0	7.0	7.0	7.0
Centro	6.5	7.0	6.8	7.0	7.0	7.0	5.0	5.0	5.0	6.5	6.5	6.5	7.0	7.0	7.0
Napoleon	5.0	6.0	5.5	6.5	6.5	6.5	5.0	4.5	4.8	6.5	6.5	6.5	7.0	7.0	7.0
Premito	6.0	6.5	6.3	6.0	6.5	6.3	5.0	5.0	5.0	6.0	6.0	6.0	7.0	7.0	7.0
Hybound	6.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	6.5	6.5	6.5	7.0	7.0	7.0
Sunnito	6.0	6.5	6.3	6.5	6.5	6.5	5.0	4.5	4.8	6.5	6.0	6.3	7.0	7.0	7.0
Sunskin	5.0	6.0	5.5	6.0	6.0	6.0	5.0	4.5	4.8	6.5	6.0	6.3	7.0	7.0	7.0
Motion	6.0	6.0	6.0	6.5	6.5	6.5	5.0	5.0	5.0	6.5	6.0	6.3	7.0	7.0	7.0
Arthur	6.0	6.5	6.3	6.5	6.5	6.5	5.0	4.5	4.8	6.0	6.0	6.0	7.0	7.0	7.0
Hylander	5.0	5.0	5.0	5.5	6.0	5.8	5.0	5.0	5.0	6.0	6.0	6.0	7.0	7.0	7.0
Santero	6.0	7.0	6.5	6.0	6.5	6.3	5.0	5.0	5.0	6.0	6.0	6.0	7.0	7.0	7.0
<i>Sherman</i>	6.0	6.5	6.3	3.5	4.0	3.8	6T	6T	6T	6.5	7.0	6.8	6.0	6.0	6.0
<i>Pegase</i>	7.0	7.0	7.0	3.5	4.0	3.8	7.0	7.0	7.0	7.0	7.0	7.0	5.0	5.0	5.0
<i>NIZ 37-70</i>	5.5	6.0	5.8	5.5	5.5	5.5	5.0	4.5	4.8	6.0	6.0	6.0	7.0	7.0	7.0
<i>NIZ 37-82</i>	7.0	7.0	7.0	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>SVS 69497</i>	6.0	6.0	6.0	6.0	6.0	6.0	5.0	5.0	5.0	6.0	6.0	6.0	7.0	7.0	7.0
<i>NIZ 37-84</i>	6.0	6.0	6.0	6.5	6.0	6.3	5.0	5.0	5.0	6.5	6.5	6.5	7.0	7.0	7.0
<i>Hytide</i>	5.0	5.5	5.3	5.5	6.0	5.8	5.5	5.0	5.3	6.0	6.0	6.0	7.0	7.0	7.0
means	5.8	6.2	6.0	5.9	6.1	6.0	5.1	5.0	5.0	6.4	6.2	6.3	6.9	6.8	6.8
REDS															
Grenada	6.5	7.0	6.8	5.0	5.0	5.0	5.0	4.5	4.8	5.5	5.0	5.3	5.0	5.0	5.0
Red Tide	6.5	7.0	6.8	6.0	6.0	6.0	4.5	5.0	4.8	6.0	6.0	6.0	6.0	6.0	6.0
Redspark	6.5	7.0	6.8	6.5	6.0	6.3	4.5	4.5	4.5	7.0	6.0	6.5	6.0	6.0	6.0
Red Baron	6.5	7.0	6.8	5.0	5.0	5.0	4.5	5.0	4.8	5.0	5.0	5.0	6.0	6.0	6.0
<i>Red Queen</i>	6.5	7.0	6.8	5.5	5.5	5.5	5.0	5.0	5.0	6.0	6.0	6.0	6.0	6.0	6.0
<i>Renato</i>	6.5	7.0	6.8	6.0	6.0	6.0	4.5	4.5	4.5	5.5	5.0	5.3	6.0	6.0	6.0
<i>Garnet</i>	6.5	7.0	6.8	6.0	6.0	6.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	5.5	5.8
<i>9.125 F1</i>	6.0	7.0	6.5	5.0	6.0	5.5	5.0	5.0	5.0	6.5	6.0	6.3	5.0	5.0	5.0
means	6.4	7.0	6.7	5.6	5.7	5.7	4.8	4.8	4.8	5.8	5.5	5.7	5.8	5.7	5.7

Table 4. NIAB Spring Sown Trials from seed 2010 – vigour and plant characteristics

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites) Main trial data first then Preliminary trial data

Variety	Vigour 1-9			Leaf cranking			Leaf fineness			Habit/density		
	Essex	Norfolk	Mean	Essex	Norfolk	Mean	Essex	Norfolk	Mean	Essex	Norfolk	Mean
BROWNS												
Hybing	8.0	7.0	7.5	7.7	4.3	6.0	6.7	6.7	6.7	7.0	5.3	6.2
NIZ 37-71	7.3	6.3	6.8	7.3	3.7	5.5	5.7	8.0	6.8	7.0	7.3	7.2
Vision	7.7	6.0	6.8	7.7	3.0	5.3	7.0	6.7	6.8	7.7	4.7	6.2
Attraction	7.0	5.0	6.0	7.3	3.0	5.2	7.0	6.0	6.5	7.0	6.3	6.7
Wellington	7.3	5.3	6.3	8.0	3.0	5.5	7.0	6.3	6.7	7.0	5.3	6.2
Hytech	8.0	7.0	7.5	7.7	3.7	5.7	6.3	7.0	6.7	7.0	6.0	6.5
Centro	8.0	6.0	7.0	8.0	3.7	5.8	5.7	7.3	6.5	7.0	6.0	6.5
Napoleon	7.7	6.3	7.0	7.0	3.0	5.0	6.3	7.7	7.0	7.0	7.3	7.2
Premito	7.7	6.0	6.8	7.3	2.7	5.0	6.3	7.0	6.7	7.0	5.7	6.3
Hybound	8.0	7.0	7.5	8.0	4.3	6.2	6.7	8.0	7.3	7.3	7.3	7.3
Sunnito	7.3	6.3	6.8	7.3	3.0	5.2	6.3	7.7	7.0	7.0	6.0	6.5
Sunskin	7.7	6.0	6.8	8.0	3.7	5.8	6.0	7.0	6.5	7.3	7.0	7.2
Motion	7.7	5.7	6.7	8.0	4.0	6.0	6.3	6.7	6.5	7.0	6.7	6.8
Arthur	7.7	5.3	6.5	8.0	4.0	6.0	6.7	7.0	6.8	7.3	5.3	6.3
Hylander	8.0	7.0	7.5	8.0	3.7	5.8	7.0	7.3	7.2	7.3	6.0	6.7
Santero	7.7	5.3	6.5	7.3	3.3	5.3	5.3	7.3	6.3	7.0	6.0	6.5
<i>Sherman</i>	8.0	8.0	8.0	8.0	5.0	6.5	5.0	6.0	5.5	7.0	6.0	6.5
<i>Pegase</i>	8.0	5.0	6.5	8.0	4.0	6.0	4.0	7.0	5.5	6.0	8.0	7.0
<i>NIZ 37-70</i>	8.0	6.0	7.0	7.5	3.0	5.3	7.0	6.0	6.5	7.0	5.0	6.0
<i>NIZ 37-82</i>	8.0	5.0	6.5	8.0	5.0	6.5	6.0	6.0	6.0	7.0	6.0	6.5
<i>SVS 69497</i>	8.0	7.0	7.5	8.0	4.0	6.0	6.0	7.0	6.5	7.0	7.0	7.0
<i>NIZ 37-84</i>	8.0	6.0	7.0	7.5	4.0	5.8	6.0	6.0	6.0	8.0	5.0	6.5
<i>Hytide</i>	8.0	6.0	7.0	7.0	5.0	6.0	7.0	6.0	6.5	8.0	5.0	6.5
means	7.8	6.1	6.9	7.7	3.7	5.7	6.2	6.9	6.5	7.1	6.1	6.6
REDS												
Grenada	5.7	5.0	5.3	8.0	2.3	5.2	6.0	7.3	6.7	6.3	6.0	6.2
Red Tide	7.7	6.7	7.2	7.7	4.3	6.0	7.0	7.0	7.0	8.0	5.0	6.5
Redspark	8.0	6.3	7.2	8.0	4.3	6.2	7.7	6.7	7.2	8.0	5.7	6.8
Red Baron	7.7	6.3	7.0	7.7	3.3	5.5	8.0	6.0	7.0	8.0	4.7	6.3
<i>Red Queen</i>	8.0	5.0	6.5	8.0	4.0	6.0	7.0	6.0	6.5	8.0	5.0	6.5
<i>Renato</i>	8.0	6.0	7.0	8.0	4.0	6.0	6.0	7.0	6.5	7.0	7.0	7.0
<i>Garnet</i>	8.0	4.0	6.0	7.5	3.0	5.3	8.0	6.0	7.0	8.0	6.0	7.0
<i>9.125 F1</i>	8.0	5.0	6.5	7.0	4.0	5.5	8.0	8.0	8.0	8.0	8.0	8.0
means	7.6	5.5	6.6	7.7	3.7	5.7	7.2	6.8	7.0	7.7	5.9	6.8

Table 5. NIAB Spring Sown Onion Trials from seed 2010 - Onion Ring Data
Sites: Rix (Essex) and Raker (Norfolk)

Variety	Essex			Norfolk			Both sites		
	% Bulbs with no of centres:			% Bulbs with:			% Bulbs with:		
	Single	Double	Three+	Single	Double	Three+	Single	Double	Three+
BROWNS									
Hybing	40	50	10	90	10	0	65	30	5
NIZ 37-71	43	53	3	90	10	0	67	32	2
Vision	33	47	20	80	17	3	57	32	12
Attraction	40	50	10	63	30	7	52	40	8
Wellington	37	53	10	80	20	0	58	37	5
Hytech	30	57	13	73	27	0	52	42	7
Centro	40	53	7	90	7	3	65	30	5
Napoleon	27	60	13	87	13	0	57	37	7
Premito	20	73	7	67	33	0	43	53	3
Hybound	63	37	0	90	10	0	77	23	0
Sunnito	57	40	3	77	23	0	67	32	2
Sunskin	53	37	10	87	13	0	70	25	5
Motion	47	53	0	97	3	0	72	28	0
Arthur	33	57	10	87	13	0	60	35	5
Hylander	40	50	10	90	10	0	65	30	5
Santero	73	23	3	97	3	0	85	13	2
<i>Sherman</i>	67	33	0	67	20	13	67	27	7
<i>Pegase</i>	53	33	13	73	27	0	63	30	7
<i>NIZ 37-70</i>	27	67	7	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
<i>NIZ 37-82</i>	60	40	0	47	53	0	53	47	0
<i>SVS 69497</i>	47	50	3	67	27	7	57	38	5
<i>NIZ 37-84</i>	53	27	20	67	33	0	60	30	10
<i>Hytide</i>	80	20	0	67	33	0	73	27	0
Means	46	46	8	79	20	2	63	33	5
REDS									
Grenada	33	33	33	73	27	0	53	30	17
Red Tide	37	40	23	90	10	0	63	25	12
Redspark	53	47	0	83	17	0	68	32	0
Red Baron	47	33	20	90	10	0	68	22	10
<i>Red Queen</i>	73	20	7	73	27	0	73	23	3
<i>Renato</i>	73	27	0	80	20	0	77	23	0
<i>Garnet</i>	40	53	7	73	27	0	57	40	3
<i>9.125 F1</i>	60	40	0	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>	<i>n/a</i>
Means	52	37	11	80	20	0	66	28	6

Varieties in maturity order (mean of both sites) Main trial data first then Preliminary trial data

Table 6. NIAB Spring Sown Onion Trials from seed 2010 – Storage data (Ambient)

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites) Main trial data first then Preliminary trial data

Variety	% sound March 2010			% sound May 2010		
	Essex	Norfolk	Mean	Essex	Norfolk	Mean
BROWNS						
Hybing	97.3	93.3	95.3	13.9	21.4	17.6
NIZ 37-71	87.2	85.0	86.1	15.4	21.8	18.6
Vision	68.7	95.0	81.9	27.4	36.5	31.9
Attraction	97.7	95.3	96.5	31.4	23.1	27.2
Wellington	87.9	94.3	91.1	38.4	34.0	36.2
Hytech	93.0	96.7	94.8	22.1	25.0	23.5
Centro	96.0	91.7	93.8	24.3	21.7	23.0
Napoleon	92.8	96.3	94.5	18.8	28.3	23.5
Premito	86.6	85.7	86.1	10.9	17.3	14.1
Hybound	89.3	98.0	93.7	17.4	16.5	16.9
Sunnito	85.2	91.2	88.2	9.1	17.2	13.1
Sunskin	89.4	92.0	90.7	20.9	29.0	24.9
Motion	98.3	95.5	96.9	40.7	21.2	30.9
Arthur	81.8	93.2	87.5	16.1	21.0	18.6
Hylander	87.6	93.0	90.3	10.9	11.0	11.0
Santero	94.7	93.0	93.9	23.9	21.0	22.4
<i>Sherman</i>	83.2	82.0	82.6	7.9	19.0	13.5
<i>Pegase</i>	34.6	14.1	24.4	0.9	9.1	5.0
<i>NIZ 37-70</i>	98.0	92.0	95.0	15.0	17.0	16.0
<i>NIZ 37-82</i>	100.0	96.0	98.0	25.0	29.0	27.0
<i>SVS 69497</i>	98.0	98.0	98.0	33.0	12.1	22.6
<i>NIZ 37-84</i>	83.8	91.9	87.9	17.2	13.1	15.2
<i>Hytide</i>	92.2	95.0	93.6	16.7	14.0	15.3
Means	88.0	89.5	88.7	19.9	20.8	20.4
REDS						
Grenada	45.5	60.8	53.1	3.0	9.0	6.0
Red Tide	87.8	94.6	91.2	13.9	7.4	10.6
Redspark	83.9	90.0	87.0	25.8	28.2	27.0
Red Baron	84.6	93.3	88.9	12.1	11.7	11.9
<i>Red Queen</i>	92.0	98.0	95.0	29.0	26.7	27.9
<i>Renato</i>	82.0	92.0	87.0	8.0	12.0	10.0
<i>Garnet</i>	68.6	94.9	81.8	15.1	10.1	12.6
<i>9.125 F1</i>	72.1	81.8	76.9	20.7	20.5	20.6
Means	77.1	88.2	82.6	16.0	15.7	15.8

Table 7. NIAB Spring Sown Onion Trials from seed 2010 – Storage data (Ambient)

Sites: Rix (Essex) and Raker (Norfolk)

Varieties in maturity order (mean of both sites) Main trial data first then Preliminary trial data

Variety	Skin quality (1-9) 1=poor May 2010			Total % unmarketable			% rots		
	Essex	Norfolk	Mean	Essex	Norfolk	Mean	Essex	Norfolk	Mean
BROWNS									
Hybing	5.0	4.8	4.9	86.1	71.9	79.0	4.0	10.0	7.0
NIZ 37-71	6.8	6.5	6.7	84.6	63.2	73.9	21.5	14.7	18.1
Vision	7.0	6.8	6.9	72.6	58.6	65.6	35.6	6.0	20.8
Attraction	7.0	7.0	7.0	68.6	72.2	70.4	4.0	5.0	4.5
Wellington	7.0	7.0	7.0	61.6	60.3	61.0	18.0	5.7	11.8
Hytech	6.0	5.7	5.8	77.9	71.6	74.8	12.0	3.3	7.7
Centro	6.8	6.8	6.8	75.7	70.0	72.8	6.3	7.7	7.0
Napoleon	6.8	6.2	6.5	81.2	68.0	74.6	11.7	5.1	8.4
Premito	6.3	5.3	5.8	89.1	68.3	78.7	16.9	14.0	15.5
Hybound	6.7	6.0	6.3	82.6	81.5	82.1	16.4	2.0	9.2
Sunnito	7.0	6.0	6.5	90.9	77.7	84.3	19.5	10.1	14.8
Sunskin	7.0	6.2	6.6	79.1	63.0	71.1	16.3	8.7	12.5
Motion	7.0	7.0	7.0	59.3	74.2	66.8	3.7	4.5	4.1
Arthur	6.3	6.5	6.4	83.9	72.1	78.0	20.1	6.8	13.5
Hylander	6.5	6.0	6.3	89.1	82.0	85.5	13.1	6.7	9.9
Santero	7.0	6.5	6.8	76.1	72.1	74.1	6.7	7.0	6.8
<i>Sherman</i>	3.0	3.0	3.0	92.1	63.0	77.5	46.5	18.0	32.3
<i>Pegase</i>	5.0	3.0	4.0	99.1	5.1	52.1	65.4	74.7	70.1
<i>NIZ 37-70</i>	7.0	6.5	6.8	85.0	75.0	80.0	2.0	8.0	5.0
<i>NIZ 37-82</i>	7.0	6.5	6.8	75.0	67.0	71.0	0.0	4.0	2.0
<i>SVS 69497</i>	6.5	6.0	6.3	67.0	85.9	76.4	3.0	2.0	2.5
<i>NIZ 37-84</i>	7.0	6.5	6.8	82.8	78.8	80.8	17.2	8.1	12.6
<i>Hytide</i>	5.0	4.0	4.5	83.3	81.0	82.2	6.9	5.0	5.9
Means	6.4	5.9	6.1	80.1	68.8	74.5	16.0	10.3	13.1
REDS									
Grenada	4.7	3.8	4.3	97.0	51.8	74.4	53.5	37.2	45.4
Red Tide	6.0	4.8	5.4	86.1	87.3	86.7	16.2	5.0	10.6
Redspark	5.3	4.3	4.8	74.2	61.8	68.0	20.8	10.6	15.7
Red Baron	5.3	5.3	5.3	87.9	81.6	84.8	17.1	6.3	11.7
<i>Red Queen</i>	5.0	4.5	4.8	71.0	71.3	71.1	7.0	2.0	4.5
<i>Renato</i>	6.0	4.0	5.0	92.0	80.0	86.0	22.0	6.0	14.0
<i>Garnet</i>	6.0	5.0	5.5	84.9	84.8	84.9	33.7	5.1	19.4
<i>9.125 F1</i>	6.0	4.5	5.3	79.3	61.4	70.3	27.9	18.2	23.1
Means	5.5	4.5	5.0	84.0	72.5	78.3	24.8	11.3	18.0

Table 8. NIAB Spring Sown Onion Trials from seed 2010 – Storage data (CE)

Sites: Rix (Essex)

Varieties in final %sound order - Main trial data first then Preliminary trial data

28 th June 2010				
Variety	Quality (1-9) 1=poor	% sound	% sprouted	% rots
BROWNS				
Hybing	6.5	31.0	62.0	7.0
NIZ 37-71	7.5	36.0	64.0	0.0
Vision	7.5	44.0	49.0	7.0
Attraction	7.0	36.0	61.0	3.0
Wellington	6.0	71.0	25.0	4.0
Hytech	5.5	32.0	58.0	10.0
Centro	7.0	36.0	62.0	2.0
Napoleon	6.0	42.0	54.0	4.0
Premito	7.0	34.3	62.9	2.8
Hybound	6.5	33.3	62.6	4.2
Sunnito	5.5	24.0	67.0	9.0
Sunskin	5.5	42.0	55.0	3.0
Motion	7.0	49.0	48.0	3.0
Arthur	5.5	19.0	69.0	12.0
Hylander	6.0	34.0	56.0	10.0
Santero	6.5	46.0	50.0	4.0
<i>Sherman</i>	3.5	59.0	32.0	9.0
<i>Pegase</i>	5.0	1.0	14.0	85.0
<i>NIZ 37-70</i>	5.5	33.0	66.0	1.0
<i>NIZ 37-82</i>	6.5	34.0	57.0	9.0
<i>SVS 69497</i>	6.0	35.0	57.0	8.0
<i>NIZ 37-84</i>	6.0	36.0	61.0	3.0
<i>Hytide</i>	7.0	49.0	47.0	4.0
Means	6.2	37.2	53.9	8.9
REDS				
Grenada	5.5	24.0	63.0	13.0
Red Tide	6.0	22.0	77.0	1.0
Redspark	6.5	43.0	53.0	4.0
Red Baron	5.5	31.0	69.0	0.0
<i>Red Queen</i>	6.0	43.0	53.0	4.0
<i>Renato</i>	6.5	26.0	73.0	1.0
<i>Garnet</i>	7.0	43.0	52.0	5.0
<i>9.125 F1</i>	5.5	44.0	50.0	6.0
Means	6.1	34.5	61.3	4.3

Table 9. NIAB Spring Planted Onion Trial from Sets 2010 - Varieties

Varieties in maturity order (mean of both sites)

Variety	set source		Maturity		
			Date of 80% foliage fallover		
			Lincs	Suffolk	Mean
BROWNS					
VCS6003	English Set Company	UK	19-Jun	05-Jul	27-Jun
ABS 101	Allium Brassica Supplies	Holland	18-Jun	06-Jul	27-Jun
ABS 106	Allium Brassica Supplies	Holland	21-Jun	05-Jul	28-Jun
Forum F1	Broer/Elsoms	Holland	25-Jun	06-Jul	30-Jun
Alpha	Allium Brassica Supplies	Holland	26-Jun	07-Jul	01-Jul
Jagro (ESC)	English Set Company	UK	26-Jun	22-Jul	09-Jul
Elite Jagro (ABS)	Allium Brassica Supplies	Belgium	01-Jul	24-Jul	12-Jul
Sturon (ABS)	Allium Brassica Supplies	Belgium	03-Jul	29-Jul	16-Jul
Elite Rumba	Allium Brassica Supplies	France	05-Jul	29-Jul	17-Jul
Elite Setton	Allium Brassica Supplies	France	06-Jul	29-Jul	17-Jul
Stur BC 20	Broer/Elsoms	Holland	06-Jul	29-Jul	17-Jul
VCS6004	English Set Company	UK	05-Jul	31-Jul	18-Jul
VCS6005	English Set Company	UK	09-Jul	29-Jul	19-Jul
Sturon (ESC)	English Set Company	UK	08-Jul	31-Jul	19-Jul
Santero	English Set Company	UK	19-Jul	05-Aug	27-Jul
Hylander F1	Broer/Elsoms	Holland	28-Jul	05-Aug	01-Aug
Means			02-Jul	22-Jul	12-Jul
REDS					
Red Emperor (ABS)	Allium Brassica Supplies	Belgium	02-Jul	07-Jul	04-Jul
Red Emperor (ESC)	English Set Company	UK	29-Jun	11-Jul	05-Jul
Reddawn F1	Broer/Elsoms	Holland	04-Jul	26-Jul	15-Jul
Kamal	English Set Company	UK	13-Jul	31-Jul	22-Jul
Elite Garnet	Allium Brassica Supplies	France	15-Jul	01-Aug	23-Jul
Hyred F1	Broer/Elsoms	Holland	17-Jul	31-Jul	24-Jul
Elite Red Baron (ABS)	Allium Brassica Supplies	France	15-Jul	03-Aug	24-Jul
Romy	English Set Company	UK	17-Jul	03-Aug	25-Jul
Red Queen	Allium Brassica Supplies	Holland	17-Jul	03-Aug	25-Jul
Red Baron (ESC)	English Set Company	UK	18-Jul	04-Aug	26-Jul
Means			11-Jul	27-Jul	19-Jul

Lincs. trial planted 12th March except Red Queen 19th March.Suffolk trial Browns and Red Emperor's planted 25th FebElsoms browns and other reds planted 9th March except Red Queen 19th March.

Table 10. NIAB Spring Planted Onion Trial from Sets 2010 – 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
BROWNS												
VCS6003	38.0	33.6	35.8	38.5	58.8	48.6	8.5	22.2	15.4	0.0	0.6	0.3
ABS 101	39.6	36.4	38.0	42.5	55.1	48.8	17.0	27.2	22.1	0.0	0.6	0.3
ABS 106	36.5	33.4	34.9	39.4	52.7	46.1	24.2	24.0	24.1	0.9	2.6	1.7
Forum F1	30.7	32.2	31.5	50.4	68.0	59.2	70.7	63.7	67.2	0.4	0.6	0.5
Alpha	36.9	39.2	38.0	35.2	62.9	49.0	6.1	22.5	14.3	0.6	1.0	0.8
Jagro (ESC)	38.9	38.2	38.5	50.0	82.8	66.4	12.8	20.6	16.7	0.0	3.6	1.8
Elite Jagro (ABS)	31.1	27.4	29.3	48.3	59.0	53.7	53.3	35.3	44.3	0.7	2.3	1.5
Sturon (ABS)	37.3	39.7	38.5	48.3	79.4	63.9	13.4	18.9	16.1	0.0	1.3	0.7
Elite Rumba	39.0	37.6	38.3	52.8	77.7	65.3	11.3	18.4	14.8	0.0	0.3	0.1
Elite Setton	40.2	37.8	39.0	53.8	72.2	63.0	13.6	15.4	14.5	0.3	0.3	0.3
Stur BC 20	36.9	36.8	36.8	52.9	68.0	60.5	26.4	19.9	23.1	0.3	0.8	0.6
VCS6004	39.1	35.0	37.1	47.0	68.2	57.6	6.7	11.1	8.9	0.0	0.0	0.0
VCS6005	37.0	38.1	37.6	38.2	61.6	49.9	18.1	13.4	15.8	0.0	0.5	0.3
Sturon (ESC)	39.6	38.6	39.1	54.1	73.1	63.6	13.3	12.3	12.8	0.0	0.0	0.0
Santero	27.5	21.1	24.3	31.8	32.7	32.2	20.2	30.4	25.3	0.0	0.0	0.0
Hylander F1	33.9	31.4	32.7	43.0	44.8	43.9	60.4	34.0	47.2	0.0	0.3	0.2
Means	36.4	34.8	35.6	45.4	63.6	54.5	23.5	24.3	23.9	0.2	0.9	0.6
REDS												
Red Emperor (ABS)	31.4	35.6	33.5	45.7	71.8	58.7	30.3	61.8	46.0	0.0	3.3	1.6
Red Emperor (ESC)	31.9	33.9	32.9	46.9	62.7	54.8	66.1	72.5	69.3	0.0	0.6	0.3
Reddawn F1	35.4	32.3	33.9	55.3	54.2	54.8	73.6	67.2	70.4	0.0	1.3	0.6
Kamal	39.8	37.7	38.7	47.6	61.6	54.6	28.2	29.4	28.8	0.0	0.6	0.3
Elite Garnet	36.0	37.4	36.7	46.3	69.2	57.8	27.5	46.1	36.8	2.4	4.2	3.3
Hyred F1	31.9	32.7	32.3	39.6	50.5	45.1	53.9	32.6	43.2	0.3	0.0	0.2
Elite Red Baron (ABS)	38.8	38.5	38.6	49.1	67.3	58.2	14.6	27.4	21.0	0.8	1.4	1.1
Romy	38.2	37.0	37.6	41.9	53.5	47.7	18.0	25.8	21.9	0.0	0.9	0.4
Red Queen	39.6	38.9	39.2	47.1	59.1	53.1	33.7	26.8	30.2	0.0	0.0	0.0
Red Baron (ESC)	36.1	39.6	37.9	40.8	58.4	49.6	20.4	22.1	21.2	0.0	0.3	0.1
Means	35.9	36.4	36.1	46.0	60.8	53.4	36.6	41.2	38.9	0.3	1.2	0.8

Lincs. trial planted 12th March except Red Queen 19th March.Suffolk trial Browns and Red Emperor's planted 25th FebElsoms browns and other reds planted 9th March except Red Queen 19th March.

Table 11. NIAB Spring Planted Onion Trial from Sets 2010 – Bulb quality data

Varieties in maturity order (mean of both sites)

Variety	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
BROWNS										
VCS6003	6.0	6.0	3.0	3.0	5.5	6.0	7.0	6.0	6.0	5.5
ABS 101	6.0	6.0	3.0	2.0	5.5	6.0	7.0	6.0	6.0	5.5
ABS 106	6.0	6.0	2.0	2.0	5.5	6.0	6.0	6.0	5.5	5.5
Forum F1	6.0	6.5	4.0	4.0	5.0	5.0	6.0	6.0	5.5	5.5
Alpha	6.5	6.0	6.0	5.0	6.0	5.0	6.0	5.0	7.0	6.5
Jagro (ESC)	5.5	6.0	5.0	5.0	5.0	5.0	5.5	6.0	6.0	5.5
Elite Jagro (ABS)	6.0	6.0	5.0	5.0	5.0	5.0	5.5	5.5	6.0	5.5
Sturon (ABS)	6.0	5.5	7.0	7.0	5.0	4.5	6.0	6.0	6.5	6.5
Elite Rumba	5.5	6.0	6.5	7.0	5.0	4.5	5.5	6.0	6.5	6.5
Elite Setton	6.0	6.0	7.0	7.0	5.0	5.0	6.0	6.5	7.0	6.5
Stur BC 20	6.0	6.0	7.0	7.0	4.5	5.0	6.0	6.0	7.0	6.5
VCS6004	6.0	5.5	6.0	6.5	4.5	5.0	6.0	6.0	7.0	6.5
VCS6005	6.0	6.0	6.0	7.0	5.0	5.0	6.0	6.5	7.0	6.5
Sturon (ESC)	5.5	5.5	7.0	7.0	4.5	5.0	6.0	6.0	6.5	6.5
Santero	6.0	5.5	7.0	7.0	4.5	4.5	6.5	6.5	7.0	7.0
Hylander F1	6.0	5.5	7.0	7.0	4.5	5.0	6.0	6.0	6.5	6.5
Means	5.9	5.9	5.5	5.5	5.0	5.1	6.1	6.0	6.4	6.2
REDS										
Red Emperor (ABS)	6.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	5.0	5.0
Red Emperor (ESC)	6.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	5.0	5.0
Reddawn F1	6.5	6.0	4.0	4.0	4.0	4.0	6.0	6.0	6.0	5.5
Kamal	7.0	6.5	6.0	6.0	4.5	4.5	5.5	5.5	6.0	6.0
Elite Garnet	7.0	6.5	6.0	5.0	4.0	4.5	6.5	5.5	6.0	5.5
Hyred F1	7.0	6.5	6.0	6.0	4.5	5.0	6.0	6.0	6.0	6.0
Elite Red Baron (ABS)	7.0	6.5	6.0	6.0	5.0	5.0	5.5	5.0	6.0	6.0
Romy	7.0	6.5	6.0	6.0	5.0	5.5	6.0	6.0	6.0	6.0
Red Queen	7.0	6.5	6.0	6.0	5.5	4.5	5.5	5.5	6.5	6.0
Red Baron (ESC)	7.0	6.5	6.0	6.0	5.0	5.0	5.5	5.0	6.0	6.0
Means	6.9	6.4	5.4	5.3	4.6	4.6	5.9	5.7	5.9	5.7

Lincs. trial planted 12th March except Red Queen 19th March.Suffolk trial Browns and Red Emperor's planted 25th FebElsoms browns and other reds planted 9th March except Red Queen 19th March.

Table 12. NIAB Spring Planted Onion Trial from Sets 2010 – Onion Ring Data

Varieties in maturity order (mean of both sites)

Variety	Lincolnshire centres			Suffolk centres			Mean of Both Sites centres		
	% Singles	% Double	% Three+	% Singles	% Double	% Three+	% Singles	% Double	% Three+
BROWNS									
VCS6003	100	0	0	67	33	0	83	17	0
ABS 101	100	0	0	100	0	0	100	0	0
ABS 106	100	0	0	100	0	0	100	0	0
Forum F1	-	-	-	-	-	-	-	-	-
Alpha	87	13	0	47	53	0	67	33	0
Jagro (ESC)	87	13	0	20	73	7	53	43	3
Elite Jagro (ABS)	-	-	-	-	-	-	-	-	-
Sturon (ABS)	40	60	0	60	40	0	50	50	0
Elite Rumba	60	40	0	40	47	13	50	43	7
Elite Setton	73	27	0	27	73	0	50	50	0
Stur BC 20	93	7	0	73	27	0	83	17	0
VCS6004	87	13	0	27	67	7	57	40	3
VCS6005	93	7	0	33	67	0	63	37	0
Sturon (ESC)	47	53	0	27	60	13	37	57	7
Santero	-	-	-	-	-	-	-	-	-
Hylander F1	-	-	-	-	-	-	-	-	-
Means	81	19	0	52	45	3	66	32	2
REDS									
Red Emperor (ABS)	100	0	0	-	-	-	100	0	0
Red Emperor (ESC)	-	-	-	-	-	-	-	-	-
Reddawn F1	-	-	-	-	-	-	-	-	-
Kamal	80	20	0	87	13	0	83	17	0
Elite Garnet	80	20	0	-	-	-	80	20	0
Hyred F1	-	-	-	100	0	0	100	0	0
Elite Red Baron (ABS)	87	13	0	67	20	13	77	17	7
Romy	93	7	0	94	6	0	94	6	0
Red Queen	100	0	0	100	0	0	100	0	0
Red Baron (ESC)	87	13	0	100	0	0	93	7	0
Means	90	10	0	91	7	2	91	8	1

Table 13. NIAB Spring Planted Onion Trial from Sets 2010 – Storage data (Ambient)
Ranked by mean of 2 sites in February

Variety	October			January			February		
	% sound			% sound			% sound		
	Lincs	Suffk	Mean	Lincs	Suffk	Mean	Lincs	Suffk	Mean
BROWNS									
VCS6003	98.0	58.0	78.0	46.0	27.2	36.6	7.3	41.4	24.3
ABS 101	96.9	42.0	69.4	74.2	15.7	44.9	9.4	17.2	13.3
ABS 106	96.5	57.0	76.8	63.5	27.9	45.7	8.8	47.1	27.9
Forum F1	86.1	63.5	74.8	44.3	8.8	26.6	7.6	11.8	9.7
Alpha	100.0	86.0	93.0	82.5	44.9	63.7	22.5	77.5	50.0
Jagro (ESC)	98.5	78.0	88.3	69.0	28.4	48.7	2.0	33.8	17.9
Elite Jagro (ABS)	85.8	71.0	78.4	36.2	5.8	21.0	1.6	8.3	5.0
Sturon (ABS)	97.5	83.0	90.3	86.5	44.7	65.6	17.8	79.2	48.5
Elite Rumba	98.0	92.5	95.3	84.0	43.8	63.9	17.5	77.3	47.4
Elite Setton	97.5	96.5	97.0	76.0	35.6	55.8	26.8	65.4	46.1
Stur BC 20	96.0	86.5	91.3	56.5	8.0	32.2	7.3	12.9	10.1
VCS6004	100.0	94.5	97.3	65.5	48.3	56.9	12.5	83.6	48.0
VCS6005	98.5	85.5	92.0	70.0	25.0	47.5	16.5	45.6	31.0
Sturon (ESC)	98.0	90.0	94.0	52.5	24.9	38.7	19.0	47.3	33.1
Santero	92.4	96.5	94.4	55.9	15.1	35.5	16.5	29.4	22.9
Hylander F1	95.5	84.5	90.0	40.0	14.5	27.2	18.2	27.2	22.7
Means	95.9	79.1	87.5	62.7	26.2	44.4	13.2	44.1	28.6
REDS									
Red Emperor (ABS)	95.8	92.0	93.9	37.9	9.2	23.5	1.1	9.2	5.1
Red Emperor (ESC)	90.2	95.0	92.6	31.5	9.9	20.7	6.5	12.3	9.4
Reddawn F1	89.0	91.0	90.0	14.6	2.3	8.5	3.7	4.5	4.1
Elite Garnet	98.0	95.5	96.8	43.5	17.8	30.7	11.5	28.7	20.1
Hyred F1	94.4	92.0	93.2	35.7	12.7	24.2	25.4	20.6	23.0
Kamal	100.0	97.5	98.8	56.5	26.6	41.6	12.8	40.7	26.7
Romy	98.0	94.0	96.0	65.7	16.1	40.9	15.7	26.1	20.9
Red Queen	99.0	96.5	97.8	56.0	24.0	40.0	16.8	40.0	28.4
Elite Red Baron (ABS)	99.0	97.5	98.3	66.0	26.4	46.2	12.3	41.8	27.0
Red Baron (ESC)	98.5	99.0	98.8	64.0	18.4	41.2	14.5	32.7	23.6
Means	96.2	95.0	95.6	47.1	16.3	31.7	12.0	25.7	18.8

Table 14. NIAB Spring Planted Onion Trial from Sets 2010 – Storage data (Ambient)
2 sites in February

Variety	February			February			February		
	Skin quality (1-9) 1=poor			Total % sprouted			Total % rots		
	Lincs	Suffk	Mean	Lincs	Suffk	Mean	Lincs	Suffk	Mean
BROWNS									
VCS6003	3.0	3.0	3.0	26.0	5.2	15.6	55.0	74.3	64.7
ABS 101	3.5	2.0	2.8	58.6	4.0	31.3	78.9	85.9	82.4
ABS 106	2.0	2.0	2.0	40.0	3.4	21.7	27.0	72.5	49.8
Forum F1	4.0	5.0	4.5	45.6	2.9	24.3	50.6	92.2	71.4
Alpha	5.0	5.0	5.0	34.5	12.8	23.7	15.0	56.7	35.8
Jagro (ESC)	4.0	3.5	3.8	66.5	12.9	39.7	26.5	72.6	49.6
Jagro (ABS)	4.0	4.0	4.0	37.8	5.1	21.5	62.2	94.9	78.5
Sturon (ABS)	5.5	5.0	5.3	49.0	8.1	28.6	14.5	57.9	36.2
Elite Rumba	5.5	5.0	5.3	46.5	11.4	28.9	18.5	57.3	37.9
Setton	6.0	5.5	5.8	19.5	2.6	11.1	26.0	66.0	46.0
Stur BC 20	5.0	4.5	4.8	44.0	2.5	23.2	38.0	94.0	66.0
VCS6004	5.0	5.0	5.0	38.0	14.4	26.2	34.5	53.2	43.9
VCS6005	5.0	4.5	4.8	33.5	4.4	19.0	32.5	76.0	54.2
Sturon (ESC)	5.5	5.5	5.5	11.0	3.0	7.0	50.0	75.1	62.6
Santero	6.0	6.0	6.0	32.9	0.0	16.5	48.8	85.7	67.3
Hylander F1	6.0	6.0	6.0	18.2	1.2	9.7	64.5	86.7	75.6
Means	4.7	4.5	4.6	37.6	5.9	21.7	40.2	75.1	57.6
REDS									
Red Emperor (ABS)	3.0	4.5	3.8	36.8	10.8	23.8	60.0	91.7	75.8
Red Emperor (ESC)	3.0	5.0	4.0	28.3	4.9	16.6	62.0	93.8	77.9
Reddawn F1	4.0	5.0	4.5	20.7	6.8	13.8	74.4	97.7	86.1
Garnet	5.5	5.0	5.3	20.5	7.5	14.0	53.5	82.2	67.8
Hyred F1	6.0	5.5	5.8	11.1	3.2	7.1	63.5	88.9	76.2
Kamal	6.0	5.5	5.8	29.0	11.1	20.0	45.5	73.9	59.7
Romy	5.5	5.5	5.5	31.3	5.7	18.5	36.8	84.4	60.6
Red Queen	6.0	5.0	5.5	17.5	6.5	12.0	50.5	77.5	64.0
Red Baron (ABS)	6.0	5.5	5.8	40.0	10.0	25.0	34.5	75.1	54.8
Red Baron (ESC)	6.0	6.0	6.0	35.0	3.1	19.0	36.0	82.7	59.3
Means	5.1	5.3	5.2	27.0	6.9	17.0	51.7	84.8	68.2