

Potato trials

—evaluation of new lines, 1997/98

A report prepared for

**The New Zealand Vegetable &
Potato Growers Federation**

R Genet & J Anderson
September 1998

Confidential

Copy 10 of 24

Circulation of this report is restricted. Consult the authors and the Institute's Scientific Editor about obtaining further copies. This report may not be copied in part or full.

*New Zealand Institute for Crop & Food Research Limited
Private Bag 4704, Christchurch, New Zealand*



CropInfo Confidential Report No. 537

**Potato trials—evaluation of new
lines, 1997/98**

R Genet & J Anderson

CONTENTS

	Page
1	EXECUTIVE SUMMARY 1
2	INTRODUCTION 3
3	LINCOLN TRIALS 4
3.1	Early harvested trials 4
3.2	Stage Three observation trials 4
3.3	Main crop trials 4
4	SOUTH CANTERBURY CRISPING TRIAL 6
4.1	Observations on individual lines 6
4.2	Conclusions 7
5	SOUTH CANTERBURY FRENCH FRY TRIAL 8
5.1	Observations on individual lines 8
5.2	Summary of evaluation 9
6	BIRDLINGS FLAT EARLY HARVESTED TRIAL 10
6.1	Observations on individual lines 10
6.2	Summary of evaluation 11
7	BOMBAY FIRST EARLY TRIAL 12
7.1	Observations on individual lines 12
7.2	Summary of evaluation 12
8	PUKEKOHE EARLY TRIALS 13
8.1	Observations of individual lines 13
8.2	Summary 14
9	PUKEKOHE EARLY MAIN CROP TRIAL 15
9.1	Observations on individual lines 15
9.2	Summary 16
10	PUKEKOHE MAIN CROP TRIAL 17
10.1	Observations on individual lines 17
10.2	Summary 18
10.3	Pukekohe ground storage trial 18

11	PALMERSTON NORTH MAIN CROP TRIALS	19
	11.1 Summary	19
12	EARLY HARVEST WAIKATO TRIAL	20
	12.1 Observations on individual lines	20
	12.2 Summary	20
13	LATE HARVEST WAIKATO TRIAL	21
	13.1 Observations on individual lines	21
	13.2 Summary	21
14	OHAKUNE FRESH MARKET MAIN CROP TRIAL	22
	14.1 Observations on individual lines	22
	14.2 Summary	22
15	ADVANCED LINES OF MOST INTEREST	23
	15.1 Promising lines	23
16	NEW RELEASES	25

1 EXECUTIVE SUMMARY

This report summarises the past season's trials of new and advanced lines from Crop & Food Research's potato breeding programme. Trials were conducted at the following locations:

Lincoln: Lincoln trials comprised early harvested trials, early generation observation trials and maincrop harvested trials. The hot, dry season resulted in average yields. Physiological disorders were uncommon this season and dry matter contents typically lower, possibly because plants died off earlier than usual. The warm autumn resulted in very low sugar levels.

South Canterbury: A trial to evaluate potential French fry material was planted for the first time. Some very high yields were produced despite the hot dry season, and initial cooking tests indicated high quality. Further cooking tests on stored material will be conducted later in the season.

A trial comprising lines that had shown crisping potential grew well, but was affected by dry conditions. However, some promising material was identified which processed well postharvest. The results of initial post-storage tests were also promising.

Birdlings Flat: This trial site provides us with the opportunity to evaluate early bulking/maturing lines, particularly for the fresh market. Five promising lines were identified.

Bombay: This first early trial is a useful trial in that it evaluates the ability of potato lines to emerge rapidly and grow through harsher winter growing conditions. One line in particular showed real potential as a first early, fresh market potato for the Pukekohe area.

Pukekohe: The Pukekohe trials enable material to be evaluated across a wide range of conditions with four harvest periods—pre Christmas, late summer, early winter, and spring after a long period of ground storage. Material of advanced selections from the main crop trials is used for a range of laboratory tests, including tuber blight resistance testing, soft rot resistance and cool temperature processing suitability. Every second year a trial is also planted at Pukekohe to test foliar resistance to late blight. Yields at Pukekohe were generally lower than usual this year, particularly in the main crop trials, although several lines with potential for a variety of markets were identified.

The **Manawatu** is a major potato production area. For this reason the Aorangi Research Centre near Palmerston North is our third major research site for main crop trials, and in recent years the size of these trials has increased. Lines with good potential for crisping, fresh market and French fry processing were identified.

Two trials of advanced lines are grown in **Waikato** each season; the first is harvested relatively early in the season in March or April and the second later in July or August. Two lines stood out as potential crispers and other lines were identified as promising for the fresh market and French fry production.

A trial was grown at **Ohakune** for the first time this season. This area has become increasingly important in recent years for supplying fresh market potatoes to the North Island, mainly for washing. Several lines did not perform as expected and will be re-evaluated to see if the performance is consistent.

Three new cultivars, Fraser, Crop 11 and Crop 13, have been released in 1998, and nine advanced lines have been selected for more widespread trial and commercial evaluation by the New Zealand potato industry.

2 INTRODUCTION

A major part of Crop & Food Research's potato breeding programme is the evaluation of new genetic material developed through numerous crosses and multiplied to provide sufficient tubers for comparisons. A small number of lines originate from imported breeding lines or finished cultivars. Initially this material is screened at Lincoln and Pukekohe, and then promising lines from these trials are re-evaluated at these sites as well as being trialled at other sites around New Zealand. This report summarises trials conducted during the 1997/98.

3 LINCOLN TRIALS

About 450 potato lines were evaluated for yield and quality characteristics at Lincoln over the 1997/98 season. The site, on land leased from AgResearch, was a Templeton silt loam. Trial designs were modified alpha designs. Five replicates of the more advanced lines and four replicates of more recent material were planted.

3.1 Early harvested trials

The early harvested trials were planted with a cup planter on 22 September 1997. The trials established well and grew rapidly. Controls for these trials were cv. Ilam Hardy and cv. Rocket. The trial was irrigated three times before harvesting in the second week of January. Total yield was measured, and size, shape, skin set, and general appearance were noted. Samples from the most promising lines were measured for specific gravity before steaming and crisping tests were conducted.

In the early harvested trials the control, Ilam Hardy, averaged yields of 38 t/ha while Rocket averaged 49 t. The highest yield achieved for the trial lines was 60 t/ha. Few disorders, either external or internal, occurred.

3.2 Stage Three observation trials

One, eight tuber replicate of all 512 Stage 3 lines was planted in September, and two other replicates were planted in October. These were harvested in January and March. After considering approximate total yield weights and general observations almost half these lines were dropped from the programme.

3.3 Main crop trials

Advanced lines for maincrop trials, which were planted on 15 October 1998, were grouped according to their end-use. Less advanced material was planted later in that week. The trials established well and grew rapidly although lack of rainfall meant irrigation was needed at fortnightly intervals. Unfortunately, a soil pan in a slight hollow resulted in a waterlogged area which may have affected some lines. Most lines had died off by early April, probably in response to the hot dry season. The crisping and French fry lines were harvested on 20 April, while fresh market and less advanced lines were harvested around 7 May.

After harvest, the bags of potatoes were stored in a shed at around 10°C till they were graded during May and June. Tubers were sorted into three grades— <100 g, >100 g and rejects (physiological disorders)—and then weighed. Twenty tubers were cut to check for hollow heart or fleck, and eye-depth, shape, skin, flesh, size, and general appearance were noted. A sample was taken to determine specific gravity and then set aside for cooking tests.

In the maincrop trials, the control cultivars, Ilam Hardy and Rua, yielded 68 t/ha of table grade tubers on average, while the top lines yielded up to 99 t. Generally, tuber conformity was good with only slight second growth apparent. The internal disorders, hollow heart and fleck, were uncommon this season. Dry matter contents were slightly lower than normal while sugars remained low because of the warm autumn weather.

4 SOUTH CANTERBURY CRISPING TRIAL

This trial was conducted within a commercial crop of several cultivars grown by Raymond Bowen for crisping at Bluebird Foods, Timaru. The site, which was a Taitapu silt, was well prepared and clod free. The tubers were hand planted into prepared ridges. The trial design was a randomized block of four rows/replicates with 14 potato lines selected for their crisping potential in previous trials, plus cv. Ilam Hardy and cv. Kaimai as controls.

Although planted slightly later than usual (6 November) the trial established well with virtually 100% emergence. Early growth was good but difficulties in maintaining the supply of water for irrigation affected yields. The low coefficient of variation confirms that conditions across the trial were similar.

The trial was dug with a lifter on 28 April by which time all the tops had senesced. Tubers were hand picked and graded into three grades. Yields were reasonable in view of the drought conditions that prevailed. The yields of most lines exceeded the yields of controls although only three lines produced yields that were significantly higher. (Note: the yield figures presented were calculated as tonnes per hectare based on a row width of 76 cm rather than the 90 cm provided here. Physiological disorders were rare in the trial—perhaps reflecting the lack of irrigation towards the end of the season).

4.1 Observations on individual lines

(Yield of marketable tubers relative to Ilam Hardy = 100%)

Ilam Hardy: Marketable grade yields of 55t/ha. Medium-large tubers with a tendency towards second growth. Medium dry matter with low sugar levels.

Kaimai: Yield (107%). Even tubers with few rejects but several small. Very high dry matter, but sugars just above acceptable levels.

White Delight: Exceptional yield (144%), but many small tubers; the overall sample was uneven in size. High dry matter but sugar levels were too high.

Fraser: Yield (101%). Good appearance. No rejects in the sample. High dry matter and low sugars.

Dawn: Yield (118%). Low number of rejects but sample was uneven in size. Dry matter was low but sugar levels were also low.

2852-5: Yield (121%). Few rejects. Sample was of good appearance and even size. High dry matter and low sugar levels.

2889-2: Yield (106%). Good looking tubers but possibly too oval for crisping. High dry matter and low sugars.

578/37: Yield (127%). Good looking tubers. High dry matter and medium sugar levels.
724/22: Yield (132%). Good looking tubers. High dry matter and low sugars.
810/7: Yield (138%). Attractive tubers. High dry matter and low sugars.

4.2 Conclusions

The trial was satisfactory considering the drought. A number of lines have now been rejected for various reasons. Samples held in long-term storage at Bluebird Foods are yet to be tested and the results will need to be assessed before final decisions are made. The three most promising lines from this trial, taking other trial results into account, are 2852-5, 724/22 and 810/7.

5 SOUTH CANTERBURY FRENCH FRY TRIAL

The trial was planted in a commercial crop of Russet Burbank potatoes grown by Scott Brothers under contract to McCain Foods, Timaru. The site, which was on a Waimakariri silt, was well prepared and free of clods with large prepared ridges into which the trial potatoes were hand planted. The trial design was a randomized block design of four row/replicates with 15 lines selected for their French fry potential in previous trials. Cv. Rua was the trial control while cv. Russet Burbank from the surrounding crop was sampled at harvest for comparison.

Although planted slightly later than average for the district on 6 November the plants established quickly with vigorous early growth. The dry season created a high demand for water which could not be met later in the season, possibly affecting potential yields. While it was unfortunate that the irrigator tracked down the trial, the wide row spacing meant that damage was not as severe as it could have been.

The trial was hand dug on 4 April and graded into marketable, smalls and rejects. At this stage half the lines were dead, while remaining lines were almost dead. The surrounding Russets had been dead for almost four weeks. Despite the drought, yields were high and apart from some second growth most lines looked good. (Note: yield figures are calculated as tonnes per hectare based on 76 cm rows rather than the 90 cm provided here).

5.1 Observations on individual lines

(Yield of marketable tubers relative to Rua = 100%).

Rua: Marketable grade yields were 65 t/ha, lower than all lines in the trial. Some second growth but good processing characteristics.

2849-2: Yield (118%). Slight second growth. Good dry matter content. No after cooking greying or sugars.

2850-6: Yield (132%). No rejects. Good steaming scores and no sugars. Slight blight in one replicate.

2571-27: Yield (131%). Slight second growth but long tubers with good processing characteristics.

2885-1: Yield (151%). Slight second growth. Good dry matter. Very low greying and sugars.

2886-3: Yield (183%). No rejects. Slight scab in one replicate. Medium (20%) dry matter, no greying or sugars.

2890-1: Yield (169%). No rejects. Medium dry matter and sugars but some stem-end greying.

718/6: Yield (141%). Slight second growth and one replicate with some scab. High dry matter content and low sugars but some after-cooking greying.

719/44: Yield (175%). No rejects, but some tuber blight and low dry matter content (17.8%). Sugars marginal. More suited to fresh market.

813/28: Yield (133%). No rejects. Medium dry matter and low sugars, but some stem-end darkening.

817/10: Yield (164%). Some blight and eelworm but no rejects. Medium dry matter and low sugars. Some stem-end darkening.

881/4: Yield (139%). Some rough tubers and marginal sugar levels. Medium dry matter.

Russet Burbank: Yield (109%). No rejects, but tubers small. Medium dry matter.

5.2 Summary of evaluation

The trial was very productive, showing some material with the potential to outperform the standards in the field and possibly also in the processing factory. Among the most promising French fry lines were 2885-1 and 2886-3.

6 BIRDLINGS FLAT EARLY HARVESTED TRIAL

This trial was conducted within a commercial crop of cv. Ilam Hardy and cv. Rocket potatoes grown by Michael Bailey for harvest in November-December for the Christchurch fresh market. The site, which is a Taumutu yellow brown sand, has a low risk of frost but little water-holding capacity, necessitating frequent irrigation. The trial design was a randomized block of four row/replicates with 28 lines. Ilam Hardy and Rocket were used as controls.

The trial was planted on 1 August and grew well. It was irrigated frequently over the warm dry spring. The trial was dug on 11 December when Ilam Hardy was just beginning to turn yellow. The plots were sorted into two grades: marketable tubers (greater than 60 g) and the remaining small and reject tubers. Tuber characteristics were noted and cooking samples taken.

6.1 Observations on individual lines

(Yield of marketable tubers relative to Ilam Hardy = 100%).

Ilam Hardy: Yield 37 t/ha of marketable tubers. Very skinned and deepish eye. Results of cooking test were only marginal.

Rocket: Yield (95%). Deep heel but firm skin and reasonable appearance. Steamed well.

2558-1: Yield (109%). Large with good appearance and firm skin. Low dry matter but steamed well.

2880-2: Yield (92%). Long-oval purple tubers with soft skins. Good dry matter and perfect steam score.

2810-5: Yield (87%). Firm skin but slight growth cracks. Steamed well.

Crop 11: Yield (51%). Unexplainable low yield. Good looking round tubers which cooked very well.

719/44: Yield (98%); Late maturing oval tubers which steamed well.

733/12: Yield (84%). Very soft skin but high dry matter. Steamed well.

847/7: Yield (98%). Good looking tubers with firm skin, but slight sloughing in steaming test.

848/6: Yield (86%). Good looking tubers with reasonable skin. Very good steaming test results.

912/3: Yield (113%). Relatively late maturing with soft skin and slightly spongy immature tubers. Low dry matter but steamed well.

6.2 Summary of evaluation

The trial was satisfactory at a site where Ilam Hardy always yields well but was easily surpassed in appearance. The most promising lines were 2558-1, 2880-2, 719/44, 847/7 and 912/3, although the latter really matures too late for this type of production.

7 BOMBAY FIRST EARLY TRIAL

This trial was planted in a commercial crop of Ilam Hardy potatoes grown by Wilcox Bros. The trial, which was a modified alpha design with 16 lines and three replicates, was planted on 21 May and harvested on 11 November.

7.1 Observations on individual lines

(Yield of marketable tubers relative to Ilam Hardy = 100%).

Ilam Hardy: The control yielded well with a marketable yield of 55.7 t/ha (100%), higher than any other line in the trial. However, it had a slightly deep eye, and when 20 of the larger tubers were cut 20% had hollow heart.

759/3: Yield (95%). No internal defects and a clean skin making it much more attractive as a washing potato than Ilam Hardy. In the previous two seasons, it had out-yielded Ilam Hardy in this trial.

733/12: Yield (85%). This line has yellow flesh and high resistance to both PCN species, and has also previously exceeded the yield of Ilam Hardy in this trial.

2880-2: Yield (78%). A purple skin line which in this trial had anthocyanin discolouring in the flesh. Not suitable for this time slot.

Driver and Crop 11: Yield (71%) and (70%). Both small tubers and disappointing yields considering previous good performance in this trial. Planting stock may be running out as Crop 11 PT seed performed very well in the area, mainly with slightly later planting.

719/44: Yield (67%). Disappointing yield considering its high yield in many other trials. Probably prefers warmer growing conditions.

All other lines in this trial produced marketable yields less than two-thirds that of Ilam Hardy.

7.2 Summary of evaluation

The trial was satisfactory, but it was disappointing that many lines did not yield well relative to Ilam Hardy. The best line was clearly 759/3 which shows real potential as a first early, fresh market potato for the Pukekohe area.

8 PUKEKOHE EARLY TRIALS

The early trials at Pukekohe were planted on 22 August and harvested over the period 18-23 December. A total of 142 lines, named cultivars, advanced and medium stage lines were evaluated in three replicate trials, and a further 172 lines were evaluated in two replicate trials. The two controls were cv. Ilam Hardy and cv. Driver. The performance of the highest yielding lines in the trial together with that of the more advanced lines is outlined below.

8.1 Observations of individual lines

Ilam Hardy: Had a marketable yield of 42.9 t/ha (97%). Tubers had a slightly deep eye and 10% had hollow heart. Cooking quality, both in steaming and crisping tests, was acceptable.

Driver: Had a marketable yield of 45.1 t/ha (103%). Tubers were oval with no defects. Steaming tests were very good but the results of crisping tests were slightly marginal.

The performance of other lines that have been retained and that produced a marketable yield of more than 90% of the mean of the controls is shown below.

912/3: Yield (130%). Very high yield with moderately attractive bold tubers: Waxy with very low dry matter and very high sugars. Good steaming quality.

719/44: Yield (111%). Attractive bold tubers with good steaming quality. Slightly low dry matter and some potential as a general purpose fresh market potato.

847/7: Yield (98%). Problems with hollow heart in this trial.

2571.27: Yield (98%). French fry type. Marginal sugar and dry matter.

817/10: Yield (96%). Attractive splash pink with fresh market and French fry potential.

2558.1 (Crop 14-): Yield (94%). Attractive bright potato. Good waxy steaming potato with high sugar.

2910.3: Yield (94%). Good fresh market potato.

724/22: Yield (93%). Later maturing crisping potato.

733/12: Yield (93%). Fresh market potato with higher dry matter.

759/3: Yield (93%). Good general purpose fresh market with bright skin.

875/9: Yield (91%). Late maturing, main crop crisper. Sugars still high in this trial.

Dawn: Yield (90%). Good steaming and fry quality. A hint of fleck.

839/3: Yield (90%). French fry type. Processed well.

8.2 Summary

This was a useful trial. 912/3 and 719/44 stood out for yield while Crop 14 and 759/3 had good bright skins and show potential for washing.

9 PUKEKOHE EARLY MAIN CROP TRIAL

The Pukekohe early main crop trial was planted on 22 September 1997, and harvested on 27 February 1998. There were 80 lines and three replicates in the trial. At the same time, 534 early generation second clonal lines were assessed in two replicate trials. Yields in this trial were lower than usual.

The controls were cv. Ilam Hardy and cv. Rua. The yield of Ilam Hardy was very poor with a marketable yield of 25.6 t/ha (76%). Tubers were unattractive, and it sloughed on steaming, despite a dry matter content of only 19.2%. Rua produced a marketable yield of 41.2 t/ha (124%), the tubers were attractive and performed well in both steaming and fry tests. The performance of other retained lines in the trial with marketable yields higher than 120% of the control mean is shown below.

9.1 Observations on individual lines

875/9: Yield (165%). Oval with light yellow flesh; 23.1% dry matter and fried well. Sloughed on steaming.

724/22: Yield (164%). Large round-oval tubers. Fried well but 20% of tubers were hollow.

719/44: Yield (146%). Large tubers steamed and fried well but dry matter (18.5%) was too low to process. Light yellow flesh.

White Delight: Yield (141%). Reasonably attractive. Good frying but sloughed on steaming.

915/25: Yield (141%). Light yellow flesh, French fry potato. Also steamed well.

810/7: Yield (140%). Good dry matter content (21.7%) Steamed and fried well. Crisping potential.

2886.3: Yield (136%). Oval-shaped tubers. Fried and steamed well. Yellow flesh.

2885.1: Yield (127%). French fry potential. Yellow flesh. Steamed and fried well.

915/23: Yield (123%). Round oval, attractive bright tuber, but sloughed on steaming.

2852.5: Yield (120%). Good crisping potato, also steamed well.

Crop 13: Yield (120%). Slightly flaky skin but steamed and fried well.

813/28: Yield (120%). Oval tubers. Steamed and fried well, but dry matter (18.5%) was too low for processing.

9.2 Summary

This was another useful trial. Several lines showed fleck and hollow heart. The best lines overall were 875/9, 719/44, White Delight, 915/23 and 810/7.

10 PUKEKOHE MAIN CROP TRIAL

The Pukekohe main crop trials were planted on 30-31 October 1997 and harvested over the period 18 May to 4 June 1998. There were 204 named and advanced breeding lines grown in three replicate trials, and 318 earlier generation lines grown in two replicate trials. The performance of the highest yielding lines in the trial and the performance of the more advanced lines is outlined below. Yields in this trial were lower than usual.

The controls were Ilam Hardy and Rua. Ilam Hardy had a marketable yield of 34.5 t/ha (102%). Tubers were unattractive and sprouted. Steaming tests were satisfactory but fry colour was marginal. Rua had a marketable yield of 33.0 t/ha (98%), and had satisfactory steaming and fry tests. The performance of other retained lines in the trial with a marketable yield higher than 110% of the control mean is shown below.

10.1 Observations on individual lines

719/44: Yield (146%). Large tubers. Good steaming and fry test. Light yellow flesh.

810/7: Yield (138%). Good crisping line. Slight greying in steaming test.

2886.3: Yield (128%). Good crisping line. Slight sloughing in steaming. Light yellow flesh.

2852.5: Yield (122%). Round with flaky skin. Good overall cooking. Yellow flesh.

724/22: Yield (121%). Round with slightly deep eye. Good cooking.

2885.1: Yield (121%). Round oval but slightly rough. Good overall cooking. Yellow flesh.

578/37: Yield (120%). Round. Good overall cooking. Light yellow.

2850.6: Yield (119%). Oval. Slightly low DM. Good overall cooking.

Red Rascal: Yield (118%). Light red. Good overall cooking.

Pacific: Yield (116%). Round. Good overall cooking. Light yellow.

759/3: Yield (116%). Round with moderate eye. Sprouted. Cooked well.

Karaka: Yield (113%). Round oval with good cooking.

718/6: Yield (110%). Round oval with good overall cooking. Yellow flesh.

10.2 Summary

Overall this was an average trial with lower yields. The best lines were 719/44 as fresh market, and 810/7 and 2886.3 as potential crisping lines.

10.3 Pukekohe ground storage trial

This trial of 32 lines and three replicates was planted on 5 December 1997. It was still to be harvested when this report was compiled.

11 PALMERSTON NORTH MAIN CROP TRIALS

The Palmerston North trials were planted at the Aorangi Research Station at Kairanga on a heavy clay soil on 13 October 1997, and harvested on 21-22 April 1998. There were 116 lines in three replicate trials. The performance of the highest yielding retained lines in the trials and the performance of the more advanced lines is outlined below. The controls were cv. Ilam Hardy and cv. Rua. Ilam Hardy had a marketable yield of 47.8 t/ha (95%). Tubers were round-oval with moderately deep eyes. Rua had a marketable yield of 52.5 t/ha (105%) with round-oval tubers. Both controls had good steaming tests and marginally satisfactory fry tests. The performance of other retained lines in the trial with a marketable yield higher than 110% of the control mean is shown below.

2890.1: Yield (146%). Round tubers with flaky skin. Some rot and fleck in tubers.

724/22: Yield (142%). Round -oval tubers with slightly flaky skin. Crisped well.

2885.1: Yield (134%). Round-oval tubers. High dry matter and cooked well in both steaming and crisping tests. Light yellow.

719/44: Yield (125%). Round-oval tubers with good overall cooking tests. Light yellow flesh.

2886.3: Yield (121%). Oval tubers. Good sugar and dry matter. Good yellow flesh, French fry line.

718/6: Yield (112%). Performance as for previous line.

810/7: Yield (112%). Round, slightly flaky tubers. Good overall cooking tests. Crisping potential.

2850.6: Yield (112%). Oval tubers. Slight greying and marginal fry test in this trial. Yellow flesh.

817/10: Yield (110%). Oval, splash pink tubers. Good French fry potential. Fried well but sloughed on steaming.

2917.6: Yield (110%). Round large tubers. Overall good cooking. Light yellow flesh.

11.1 Summary

This was a good trial. Lines with potential were 2885.1 for crisping, 719/44 for fresh market, and 2886.3 as a yellow-fleshed, French fry line.

12 EARLY HARVEST WAIKATO TRIAL

This trial of 16 lines and three replicates was grown on silt soil near Matamata in a crop grown by A S Wilcox & Sons. It was planted on 13 October 1997 and harvested on 6 April 1998. The Rua control had a marketable yield of 39.7 t/ha. It had round oval tubers with satisfactory crisp and frying tests. The performance of other retained lines with a marketable yield more than 20% higher than the yield of Rua is shown below.

12.1 Observations on individual lines

875/9: Yield (159%). High dry matter (21.%). Round oval tubers with excellent crisping and steaming tests.

810/7: Yield (145%). Round tubers with acceptable dry matter content (20.2%). Excellent fry test, but slight greying and stem end blackening on steaming.

813/28: Yield (143%). Attractive oval tubers with excellent all round cooking quality.

Crop 14: Yield (133%). Attractive round oval tubers with a hint of fleck. Excellent steaming quality.

817/10: Yield (133%). Oval, splash pink tubers. Excellent frying, but slight greying and stem end blackening on steaming.

763/7: Yield (124%). Round-oval. Highest dry matter content (21.7%), but slightly disappointing fry test. Sloughed on steaming.

12.2 Summary

This was a useful trial. 875/9 and 810/7 stood out as potential crispers, 813/28 as a fresh market potato, and 817/10 for French fry production.

13 LATE HARVEST WAIKATO TRIAL

This trial of 16 lines and three replicates was grown near Te Poi in a crop grown by COEL. It was planted on 18 November 1997 and harvested on 5 August 1998. The only cooking test done on this trial was a fry test. The Rua control had a very acceptable yield of 51.8 t/ha. It had round oval tubers with a dry matter content of 18.7%. Fry colour was satisfactory. The performance of retained lines at least equal to Rua in yield is shown below.

13.1 Observations on individual lines

810/7: Yield (133%). Round tubers . Excellent fry colour but disappointing dry matter (17.7%).

2885.1: Yield (132%). Round oval tubers with a slight sprout and yellow flesh. Low dry matter (17.2%).

2852.5: Yield (128%). Round oval tubers with a slightly deep eye. Excellent fry colour.

718/6: Yield (118%). Oval tubers with yellow flesh. Highest dry matter content in trial (19.5%). Fair fry test.

724/22: Yield (113%). Round tubers with 100% hollow and slight fleck.

813/28: Yield (100%). Attractive oval tubers. Fair fry colour and low dry matter (16.0%).

13.2 Summary

This trial yielded well. Many lines showed good fry colour but slightly low dry matter.

14 OHAKUNE FRESH MARKET MAIN CROP TRIAL

For the first time a potato cultivar evaluation trial was planted at Ohakune this season in a crop grown by DJ Whitfield. The trial was of 16 lines in three replicates. It was planted on 6 December 1997 and harvested on 6 July 1998. The controls were cv. Rua and cv. Nadine. The Rua had a disappointing marketable yield of 23.5 t/ha (82%). It had oval tubers with a clean skin. Steaming quality was good but fry colour was unacceptable. Nadine had a marketable yield of 34.0 t/ha (118%). Tubers were a moderately attractive round oval shape, but there was a moderate level of internal fleck. The steaming test was satisfactory while the fry test was predicably very poor. The performance of other retained lines is shown below.

14.1 Observations on individual lines

2852.5: Yield (177%). Round oval, yellow fleshed tubers. Slight greying in steaming test and satisfactory fry test.

2910.3: Yield (177%). Oval tubers. Bad greying in steaming test but good fry colour.

2885.1: Yield (165%). Oval, yellow fleshed tubers with slight fleck.

White Delight: Yield (162%). Clean, round oval tubers. Excessive greying in steaming test and unacceptable fry colour.

Crop 14: Yield (159%). Moderately attractive round oval tubers but 10% had hollow heart. Dry matter and cooking quality similar to that of Nadine.

Crop 13: Yield (152%). Round oval tubers with 15% hollow heart, the most severe internal defects ever seen in this line. Slight greying and marginal fry colour.

813/28: Yield (152%). Attractive clean oval tubers, but with only slightly less fleck than Nadine. This was the first time that fleck has been observed in this line. Good steaming test and satisfactory fry colour.

Driver: Yield (141%). Round oval tubers with a hint of fleck. Skin only of brushing standard. Satisfactory steaming but poor fry colour.

14.2 Summary

Overall 2852.5 was the best line in the trial. Several lines did not perform as expected and it will be worthwhile to evaluate some again in this trial to see if the performance is consistent.

15 ADVANCED LINES OF MOST INTEREST

As a result of this season's trials and previous regional trials, the following advanced lines are considered to show considerable potential for more widespread trial and commercial evaluation by the New Zealand potato industry. All these lines have been submitted for heat treatment this season in the first stage of the 'PT' scheme, and if they continue to show promise will be candidates for 'fast track' multiplication in 1999.

15.1 Promising lines

719/44 (1858.21 x V394): An early to main crop fresh market potato that consistently produces very high yields in trials. Tubers tend to be large but are still attractive, and internal defects have not been a problem. Has light yellow flesh and is excellent for all domestic end uses. Dry matter tends to be too low for it to have a potential for processing. High bruise resistance. Probably has potential as an export domestic or seed potato.

759/3 (178/4 x B113-6): A promising first early and early potato with short dormancy and high early yield potential. Has a firm and bright skin that sets early, making it suitable as an early washing or brushing replacement for Ilam Hardy or Nadine, particularly in the Pukekohe area. Possibly also good for double cropping. No internal defects and good steaming quality. Inclined to be too irregular in shape for a main crop potato. Has Ro PCN resistance.

810/7 (Pacific x 427/13): A main crop potato with consistently high yield. Major niche is as a crisping potato with some fresh market potential. Consistently good fry colour, with low dry matter a concern in just one trial. Has long dormancy. High resistance to Pa PCN.

813/28 (354/7 x Fianna): A main crop, fresh market potato with consistently high steaming and fry quality. Yields down this season on previous high levels, but stock could be running out slightly. Attractive oval tubers that may be suitable for washing. Only internal defect ever observed was some fleck in the Ohakune trial. Dry matter slightly low for widespread commercial French fry production. Has long dormancy and resistance to both species of PCN.

817/10 (354/7 x Maria Huanca): A main crop potato, mainly for French fry production with some potential for the fresh market. Tubers are often an attractive splash pink. Reasonable yield potential. Major concern is a slight tendency to after-cooking greying and long dormancy. Has very high resistance to Pa PCN.

2558-1 (1053-57 x Baille): An early maturing line with the ability to yield very heavily. Attractive, round-oval tubers with white flesh. Dry matter content is low (similar to Nadine) so boiling quality is reliable, but unsuitable for processing.

2850-6 (Agria x Rua): A mid-season potato line with oval-long tubers and yellow flesh. Low sugar levels and medium dry matter.

2852-5 (Agria x 1975-12 (Fraser)): A mid-season potato with attractive, cream-fleshed tubers. High dry matter and low sugars. Suitable for crisping or baking.

2880-2 (Red Rascal x Picador): An early mid-season potato with purple skin and white flesh. Medium sized tubers suitable for fresh market with good boiling characteristics.

16 NEW RELEASES

The following cultivars have been released in 1998:

Fraser (676.34 x Whitu): A main crop crisping potato, with potential for long term storage. Fraser has round oval tubers of moderately high dry matter and stable low sugars. It is intended as a replacement for Whitu with better yield potential and less risk of internal defects than Whitu. The agent appointed for Fraser is A B Annand & Co. Ltd.

Crop 11 (993.60 x V394): An early fresh market potato similar to Ilam Hardy in maturity and seasonal slot, but with more attractive tubers and less internal defects. It sets a high tuber number and has the potential to be an excellent pre-pack potato with good eating quality. Highly resistant to both PCN species, and its resistance to most other diseases is at least on a par with that of Ilam Hardy. Of 18 growers who evaluated 'fast track' Crop 11 last year, 11 were enthusiastic about the line, six neutral and only one negative. The agent appointed for Crop 11 is a partnership between A B Annand & Co. Ltd and Turners & Growers Fresh Ltd.

Crop 13 (1463.1 x V394): A main crop fresh market potato, which matures earlier than Rua. Round oval to oval in shape with some potential also for French fry production. Physiological defects are rare, and it has good eating quality. Skin is sometimes slightly flaky making Crop 13 more suitable for the brushing rather than the washing market. Crop 13 has good resistance to late blight, powdery scab and both PCN species. Of 16 growers who evaluated 'fast track' Crop 13 last year, ten were enthusiastic about the line, three neutral, and three negative. The agent appointed for Crop 13 is a partnership between the Ruahine Syndicate (through Morgan Laurenson Ltd) and Dawe's Produce Ltd.