

Evaluation of new processing tomato cultivars

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Introduction

The 2005-06 season embraced a change in the trialling and assessment of cultivars for the industry. Observation lines were still established and accessed for paste and whole peel in the early and mid-season planting times across both states. The major change was in the assessment of promising lines from the previous year in establishing semi-commercial plantings (700-800 metres of bed) that were machine harvested, individually weighed and quality assessed by the factory if delivered to SPC Ardmona Ltd.

Methods

Machine harvest trials were established at eleven sites in the major production regions in southern NSW and central north Victoria (Table 1) to evaluate a range of commercial cultivars. Sites were selected to represent early and mid-season production areas as well as different methods of establishment and irrigation. All sites were established on time, with the exception of the November transplanting in central Victoria which was delayed up to 10-14 days due to 60mm of rain across the region during the month.

Observational trials were established at five sites (Table 2) using cultivars supplied by seed companies and local seed distributors.

Table 1 Trial sites (machine harvest) 2005-06

Season/State	Region	Establishment/Irrigation	Planted-Harvested
Early Paste			
Victoria	Kerang	Seeded/Drip	20/9/05 -2/2/06
	Boort	Seeded/Drip	6/10/05 -1/3/06
NSW	Hillston	Seeded/Drip	8/9/05 -28/2/06
	Darlington Point	Seeded/Furrow	24/9/05 -16/2/06
Mid Season Paste			
Victoria	Pearcedale	Transplanted/Drip	12/11/05 -17/3/06
	Cedenco	Transplanted/Drip	10/12/05 -17/4/06
NSW	Jerilderie	Seed/Furrow	23/10/05 -28/2/06
	Jerilderie	Seed/Furrow	18/11/05 -07/4/06
Mid Season Whole Peel			
Victoria	Colbinabbin	Transplanted/Drip	23/11 -4/4/06
	Corop	Transplanted / Drip	14/11 -20/3/06
NSW	Barooga	Seeded/Drip	12/10 -16/2/06

Table 2. Trial Sites (observation cultivars) 2005-06

Season/state	Region/number of cultivars	Establishment/irrigation	Planted-harvested
Early Paste			
Victoria	Kerang (27)	Transplanted/Drip	21/9/05 -27/1/06
NSW	Darlington Point (28)	Seeded/Furrow	22/9/05 -6/2/06
Mid Season Paste			
Victoria	Pearcedale (34)	Transplanted/Drip	11/11/05 -7/3/06
NSW	Barooga (28)	Seeded/Drip	12/10/05 -7/2/06
Mid Season Whole Peel			
Victorian	Colbinabbin (30)	Transplanted/Drip	23/11/05 -28/3/06
NSW	Barooga (26)	Seeded/Drip	12/10/05 -7/2/06

All observational trials were sampled prior to field days; soluble solids data were provided to all attendees at the field day that assisted with visually rating all entries on fruit and plant characteristics. Seed company representatives attended all field days along with processor representatives, providing commercial comments on the suitability of advancing cultivars to the next stage of evaluation.

Results

Early Machine Harvest Trials

Eleven varieties were assessed over four sites (Table 3) in the full row machine harvest and paste trials. The Hillston site was harvested in late February 2006, with HZ 7204 yielding 80.7 t/ha

and also recording the highest yield solids/ha of 4.4 t/ha. The variety with the highest percentage of TSS was HZ 3002 with 5.8%.

The trial at Darlington Point was not machine harvested due to poor plant stand. Hand harvests of 7m plots were taken for quality testing and yield estimation. The two varieties with the highest percentage TSS were HZ 7204 at 5.2% and HZ 3002 at 5.1%.



Kerang Field Day

In Victoria the two sites at Kerang and Boort followed a similar trend. At Kerang all three Heinz varieties produced total solid yields/hectare greater than 4.0 with HZ 3002 the highest at 4.35 t/ha solids. The trials at Boort were harvested in early March (almost a mid-season trial), with HZ 3202 and HZ 7204 yielding 5.17 and 5.71 t/ha solids. AB2 was high-yielding, however the robust bush made harvesting very difficult and unsuitable for Australian conditions. TOP 4519 was only entered in the Boort trial resulting in an inflated figure in Table 3.

Figure 1 (Early-season paste machine harvest all sites) highlights the consistent performance of HZ 7204, HZ 3002 and HZ 3202 over the four sites. The other three varieties that yielded greater than 4.5 t/ha solids were only entered at one site. The line represents 4.5 t/ha solids, and varieties above this line are the ones which show the greatest potential.

Figure 1. Early season paste machine harvest - all sites

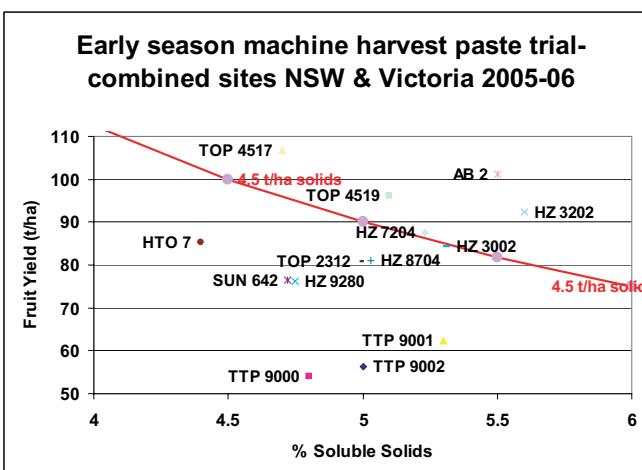


Table 3. Combined site results – machine harvest early paste trials

Cultivar	Source	Fruit Yield t/ha	Soluble Solids %	Solids Yield t/ha
HZ 8704	Heinz	80.96	5.03	4.07
HZ 7204	Heinz	87.47	5.23	4.57
HZ 3002	Heinz	84.4	5.31	4.48
HZ 3202	Heinz	92.3	5.6	5.17
AB2	AB Seeds	101.2	5.5	5.57
SUN 624	HSC	76.53	4.72	3.61
HTO 7	HSC	85.3	4.4	3.75
TOP 2312	Lefroy Valley	80.77	4.99	4.03
TOP 4519 (only in Boort trial)	Lefroy Valley	96.2	5.1	4.91
TTP 9000	Terranova Seeds	53.99	4.8	2.59
TTP 9001	Terranova Seeds	62.38	5.3	3.31

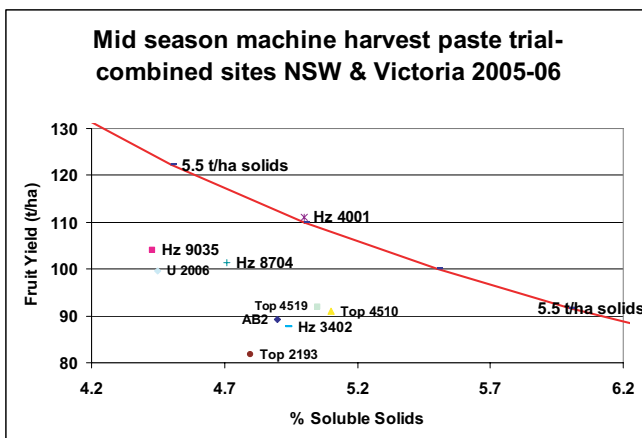
Early Paste Observational Trials

Out of the 27 varieties entered in the early observational trials at Darlington Point and Kerang only four varieties were assessed as requiring further evaluation. These were TOP 4517, SPS 536-4, SPS 539-4 and TOP 4000.

Mid Season Paste Machine Harvest Trials

Table 4 (Combined site results – mid-season paste) and Figure 2 illustrate the high yield of solids from HZ 8704, HZ 9035 and HZ 4001, especially in the two trials in the Rochester area. The two high-yielding TOP varieties 4519 and 4510 suffered from breakdown especially after treated with Ethrel. The mid-season trials at Jerilderie NSW were lower-yielding than those in Victoria, with the better of the two averaging 63.9 t/ha whilst the Victorian trials averaged 93.9 and 105.6 t/ha respectively.

Figure 2. Mid-season machine harvest paste – all sites



Mid-season Observational Trials

From the 34 varieties assessed in the two trials at Pearcedale and Barooga only six varieties were considered for further evaluation: HZ 7404, NDM 553, TOP 5117, TOP 5120, TOP 5056 and TTP 9005.

Table 4. Combined site results – Machine harvest mid-season paste trials

Cultivar	Source	Fruit Yield t/ha	Soluble Solids %	Solids Yield t/ha
HZ 8704	Heinz	101.27	4.71	4.77
HZ 3402	Heinz	87.60	4.94	4.33
HZ 9035	Heinz	104.03	4.43	4.61
TOP 4511	Lefroy Valley	75.3	5.38	4.05
TOP 4519	Lefroy Valley	91.90	5.05	4.64
AB 2	AB Seeds	89.27	4.90	4.37
U 2006	Unilever	99.50	4.45	4.43
TOP 2193	Lefroy Valley	81.70	4.80	3.92
HZ 4001	Heinz	111.00	5.00	5.55
TOP 4510	Lefroy Valley	91.10	5.10	4.65

Mid-season Whole Peel Machine Harvest Trials

The whole peel machine harvest trial in NSW (Barooga) was harvested in mid February 2006 with highest-yielding varieties being Falcorosso and HZ 8704 at 94.3 t/ha. HZ 9614 yielded the



Barooga Field Day

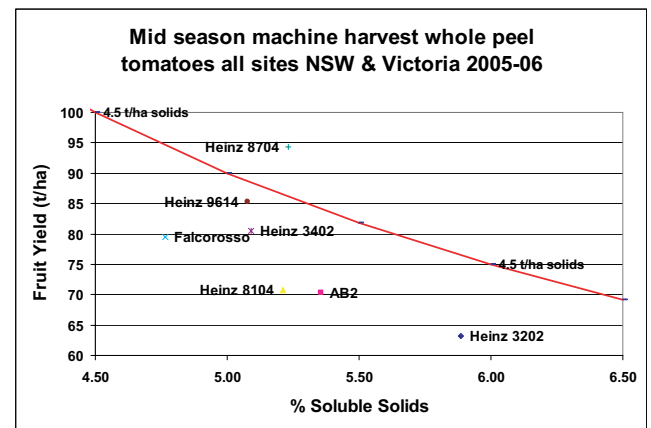
highest solids/ha with 5.7 t/ha and HZ 3202 having the highest percentage TSS at 6.5%.

The Victorian results from Corop and Colbinabbin were lower-yielding than Barooga as both crops were sprayed off with Ethrel and harvested in late March 2006. In addition the Colbinabbin trial was lower-yielding than Corop due to a mild infection of bacterial canker. Figure 3 highlights the relative performance of all machine harvest whole peel varieties. The average fruit size of AB2 at Colbinabbin of 84.89g excluded this variety from being suitable for whole peel.

Table 5. Combined site results – machine harvest mid-season whole peel trials

Cultivar	Source	Fruit Yield t/ha	Soluble Solids %	Solids Yield t/ha
HZ 3402	Heinz	80.49	5.09	4.10
HZ 3202	Heinz	63.16	5.89	3.72
HZ 9614	Heinz	85.27	5.08	4.33
AB 2	AB Seeds	70.40	5.36	3.77
HZ 8104	Heinz	70.78	5.21	3.69
Falcorosso	HSC	79.47	4.77	3.79

Figure 3. Mid-season machine harvest whole peel – all sites



NSW Hand Harvest

Discussion

It was very important to establish back-up trials in each region, as two of the sites failed. All harvested trial sites gave commercially acceptable yields with the exception of the early paste trial at Hillston, which would have benefited from an earlier harvest.

The performance of the varieties varied between sites. Further work is needed before firm recommendations can be made.

All the companies were eager to supply varieties for trialling that, in many instances, had not been evaluated before under local conditions. The future of these observation trials will be discussed with the R&D committee before next season because many of the varieties were seen to be unsuitable for trialling in machine plots.

The machine harvest trials were all well grown and data collected from the 700 metre beds at harvest provided valuable information on all the varieties as shown in the figures on combined sites.



Machine harvest in NSW

Summary

During the 2005-6 processing tomato season in southern NSW and north central Victoria cultivar evaluation continued with observation plots (7 metres) for new varieties and larger (700 metre long beds) machine harvest plots for semi-commercial assessment.

Machine harvest plots were established and harvested at eleven sites. Highest-yielding varieties in the early paste trials (Total Soluble Solids/ha) were HZ 3202, HZ 3002, HZ 7204 and TOP 4519 (one site only). The highest-yielding (TSS/ha) mid-season paste varieties were HZ 4001, HZ 8704 and HZ 9035. The highest-yielding (TSS/ha) mid-season whole peel varieties were HZ 8704, HZ 9614 and HZ 3402. The total yield/hectare for the Victorian whole peel trial was lower than NSW due to the crops being sprayed with Ethrel in late March or infected with bacterial canker during the season.

The observation plots resulted in the following varieties being highlighted for further evaluation:

- Early Paste: TOP 4517, SPS 536-4, SPS 539-4 & TOP 4000
- Mid Season Paste: HZ 7404, NDM 553, TOP 5117, TOP 5120, TOP 5056 & TTP 9005
- Mid Season Whole Peel: TTP 9005, HTO 70, HTO 54 & SPS 698-4

The initiative of the research committee to direct the variety evaluation programme into harvesting up to 700 metres of bed (approximately 2000 transplant cells) was embraced by all the cooperating suppliers. The plots were harvested mechanically and assessed for quality at a laboratory at Yanco and in the respective factories.

With all three processing factories focusing on solids the presentation of data in the report has reflected this with variety performance being benchmarked against total soluble solids/ hectare in a 'scatter' diagram.

Acknowledgement is made to the cooperating suppliers, three seedling nurseries, local and international seed companies and distributors, field staff from three processing companies and Liz Mann (Industry Development Manager, APTRC Inc.)



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Variety	Hold	Solids	Canker Tolerant	Peel / Dice	Early	Colour
H4001		✓				
H4401	✓	✓				✓
H8704	✓			✓		
H9035	✓			✓		
H9144	✓		✓	✓		
H9280					✓	
H9507	✓			✓	✓	
H9509	✓	✓	✓	✓		✓
H9614	✓	✓	✓	✓		✓
H9723		✓		✓		

Be sure to see these varieties and possible new releases at any of the Heinz trial sites.

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