

National Vegetable Industry Centre Newsletter

Powdery Mildew Trial on Carrots

Andrew Watson, I&I NSW, Yanco

Powdery mildew has now been found on carrot crops in three states of Australia. The disease was first found in the Murrumbidgee Irrigation Area of New South Wales in 2007. It has subsequently been found in Tasmania and South Australia in 2008. The organism causing the disease is commonly found in parsnip crops but powdery mildew has not previously been recorded on carrots in Australia.



Powdery mildew infection can be seen on the carrots where no treatments were applied

The causal agent is *Erysiphe heraclei*, a fungus that usually affects members of the Apiaceae family which includes carrots, parsnips and parsley. Preliminary information has indicated that this is a different form of *E. heraclei* that does not infect parsnip or parsley, indicating that it may be specific to carrots. The disease affects the foliage and stems with patches of white, fluffy fungus appearing on the lower leaves first, and then spreading to the terminal growth. The fungus often covers entire leaves with its masses of white mycelium and powdery spores. Infected foliage becomes brittle, and may eventually turn brown, shrivel, and die. Severe infection will result in loss of foliage which may result in lower yields and poor seed quality in seed crops.

Fungicide trials in New South Wales and Tasmania have shown that applications of sulphur, Amistar[®] or Folicur[®] can help control powdery mildew on carrots. Sulphur has a general vegetable registration, Amistar[®] has a minor-use permit valid until May 2014 while Folicur[®] has a permit valid until March 2011. These products don't stop the disease totally, but they do significantly reduce disease levels. Alternative products still need to be investigated, as resistance to fungicides can develop especially to products such as Amistar[®]. Therefore a complete control package needs to consider fungicide options and timing.

Initial trials conducted in the field have shown no significant yield loss due to powdery mildew infections. However this needs to be further tested as glasshouse trials have shown a yield reduction of 20% when powdery mildew was left uncontrolled. A yield loss has also been shown to occur where the carrots are lifted from the ground by the leaves. This was due to the leaves being weakened by powdery mildew and breaking off during harvest thus leaving some carrots in the ground.

To assist control of the disease, growers should consider:

- careful monitoring young crops regularly. Powdery mildew is very difficult to see on leaves early. Once powdery mildew is seen infecting many leaves, control is not as successful.
- limiting the movement of machinery and chippers from infected paddocks to non-infected properties or carrot crops. Powdery mildew can be easily spread and preventative action can help limit the spread of the disease throughout the district.
- maintain proper crop nutrition to optimise leaf development.

The powdery mildew trial was funded by I&I NSW and HAL. For more information on powdery mildew in carrots, contact Andrew Watson at Yanco Agricultural Institute on (02) 6951 2611.



Industry &
Investment



Potato Industry Snapshot

Stephen Wade, I&I NSW, Bathurst

The revised 2005-06 census has been released by the Australian Bureau of Statistics (ABS). In 2005-06 the NSW potato industry produced 139,544 tonnes of potatoes on 5,845 hectares, worth \$53.3 million.

Table 1. The Australian potato industry (2005-06).

State	Gross Value (\$)	Production (t)	Area (ha)	Growers (no)
Victoria	146,998,150	342,332	10,743	293
South Australia	143,012,345	372,898	10,078	134
Tasmania	88,310,618	317,236	7,075	489
NSW	53,314,313	139,544	5,845	149
Queensland	47,956,761	95,137	3,848	179
Western Australia	45,961,153	102,356	2,554	97
Australia	525,553,340	1,369,503	40,143	1,341

Source: ABS (2008).

The NSW potato industry can be classified by 'growing districts' or 'market sectors' (see Tables 2 and 3).

Table 2. The NSW potato growing districts (2005-06).

Growing District	Gross Value (\$)	Production (t)	Area (ha)	Growers (no)
Coastal	3,716,226	9,478	410	59
Tablelands	12,247,070	27,971	1,171	70
Riverina	37,351,017	102,095	4,263	21
NSW	53,314,313	139,544	5,845	149

Source: ABS (2008).

Table 3. The NSW potato market sectors (2005-06).

Market Sector	Gross Value (\$)	Production (t)	Area (ha)	Growers (no)
Fresh	25,609,283	48,541	2,451	122
Processing	23,729,126	82,393	2,695	40
Seed	3,975,904	8,610	699	77
NSW	53,314,313	139,544	5,845	149

Source: ABS (2008).

From 2000 to 2005, NSW potato production dropped from 166,381 to 139,544 tonnes, mainly due to the drought. The prices paid to NSW potato growers fell from an average of \$447 to \$382 a tonne, a drop of 14 percent over the period. During the same period, NSW potato growers increased their crop yields by four percent and their productivity by 31 percent. Although these achievements lifted the growers' gross returns by 12 percent, 83 growers left the NSW potato industry during 2000-05.

Table 4. NSW potato industry trends (2000 to 2005).

NSW Potato Industry	2000-01	2005-06	Change (%)
Gross Value (\$)	74,303,568	53,314,313	-28
Production (tonnes)	166,381	139,544	-16
Area (hectares)	7,250	5,845	-19
Growers	232	149	-36
Price (\$/tonne)	447	382	-14
Yield (tonnes/hectare)	23	24	4
Productivity (tonnes/grower)	717	937	31
Gross Returns (\$/grower)	320,274	357,814	12

Source: ABS (2008).

Further information on the NSW potato industry is available in the NSW DPI agnote 410 "The potato industry in New South Wales" (www.dpi.nsw.gov.au/agriculture/horticulture/vegetables/industry/primefacts) or contact Stephen Wade, District Horticulturist at Bathurst Primary Industries Centre on (02) 6330 1216.

Processing Beetroot Variety Trials

Donald Irving, Alan Boulton (I&I NSW, Yanco) and Stephen Wade (I&I NSW, Bathurst)

Beetroot come in a range of varieties, although the processing standard is still ‘Detroit Dark Red’ or selections of this variety, such as ‘Detroit Supreme’. ‘Detroit Dark Red’ has performed well in the past, but it is important to continue to evaluate new varieties under Australian conditions, given the impact of climate change and the need to respond to changing quality demands by processors and consumers.

In this trial, varieties were planted within a commercial beet crop near Cowra. The seeds were planted in 10 meter-long by 1.5 meter-wide beds with 3 rows per bed, 37.5 cm between rows, and 4.8 cm between seeds. A representative 1 m length of row was hand-harvested from each of 3 replicates.

Table 1. Cowra beetroot stand management trial. For planting 1 (P1), beets were planted on 12/02/08 and harvested on 27/05/08. For planting 2 (P2), beets were planted on 26/02/08 and harvested on 17/07/08.

Variety	Yield ¹ (t/ha)		Circularity (%)		Crown area (%)		TSS (° Brix)	
	P1	P2	P1	P2	P1	P2	P1	P2
TBT 9116	49	-	10	-	28	-	14.2	-
Crimson Glory	48	38	13	11	21	21	14.9	17.9
Pablo (F1)	47	40	11	11	21	15	15.5	18.4
Boro (F1)	45	39	11	11	25	17	15.1	18.3
Action (F1)	45	44	11	11	26	15	15.9	17.7
Red Cloud (F1)	44	40	10	8	25	20	16.2	18.9
BEE 6006	43	-	12	-	26	-	18.1	-
TBT 9115	42	-	10	-	30	-	17.3	-
New Globe	41	37	14	11	25	19	16.5	19.5
Rhonda (F1)	41	38	12	11	26	20	17.5	19.5
Orbit	41	-	12	-	29	-	17.1	-
Detroit Supreme	40	30	13	11	24	21	15.6	18.8
TBT 9114	36	-	14	-	24	-	16.7	-
Early Wonder Tall Top	34	30	11	10	37	31	17.2	19.9
Red Comet	29	28	12	11	36	29	18	21.5

¹Yield =total weight of beets/ha, Circularity = percent difference between wide and narrow diameter (a small % indicates a rounder beet), Crown area = area of crown/ average diameter, TSS = total soluble solids level.



Figure 1. Beetroot ready for assessment of circularity and crown area

The main traits desired in assessing beetroot quality for processing are yield, seedlings per seed cluster, circularity, area of the crown where leaves attach to the root (Figure 1), soluble solids concentration, and uniformity of colour.

Some varieties yielded higher than ‘Detroit Supreme’ but all produced 1.25 to 1.5 seedlings per cluster. Most varieties were of similar shape (circularity) to ‘Detroit Supreme’, being slightly oval or tapered rather than spherical. The crown area was larger in ‘Red Comet’ and ‘Early Wonder Tall Top’ (a pink-skinned bunching beet) than in ‘Detroit

Supreme’ or the others. This large crown contributed to the cone-shape of this beet. Total soluble solids concentrations were consistently higher in ‘Red Comet’ than in the other varieties, but levels were acceptable for processing in all and colour was uniform except in ‘Early Wonder Tall Top’. The earlier planting (in warmer weather) produced greater total yield, but the later planting (in cooler weather) produced higher soluble solids.

We would like to acknowledge SPC Ardmona, Horticulture Australia, and the various seed companies for supporting these trials. For further information on this beetroot variety trial, contact: Donald Irving, Research Horticulturist at Yanco Agricultural Institute on (02) 6951 2611.

Seedless Watermelon Variety Trial in the Riverina – 2008/09

Tony Napier and David Troidahl, I&I NSW, Yanco

A seedless watermelon variety trial was recently conducted on a property near Whitton in the Riverina Region of NSW. The trial was established to evaluate current commercial varieties for their suitability to the local area and to take measurements of yield, fruit size, total soluble solids and flesh firmness. The trial consisted of eight varieties from six different seed companies and was conducted within a grower's commercial crop of Royal Armada using furrow irrigation. The seedless varieties were sown on the 18th November 2008 as transplants with the pollinator (Red Tiger) sown by seed on the same day. All varieties were harvested on 11th Feb 2009 giving 85 days from transplanting to harvest. The pollinator ratio was 3:2 with transplants sown at 0.9 m spacing's on 1.8 m wide beds. Normal practice for the grower is to conduct a second pick about a week later giving time for the smaller fruit to completely ripen and increase in size. This trial was totally harvested in one pass on the same day the grower commenced harvesting his surrounding commercial crop of Royal Armada.

Table 1: Yield, fruit size and TSS results of the NSW seedless watermelon variety trial 2008/09

Variety	Fruit yield (t/ha)	Average fruit size (kg)	TSS (%)
Royal Armada	52.1 a	5.32 ab	11.1 a
Nightshade	51.7 a	5.76 a	10.5 a
TWT27011	46.9 a	5.08 ab	11.1 a
Diamondback	43.8 a	5.46 a	11.1 a
Red Crunchie	43.3 a	5.41 a	10.5 a
Crunch	42.3 a	3.95 b	9.6 a
TWT27010	41.6 a	5.71 a	10.5 a
Eloura	38.5 a	4.99 ab	10.4 a

Treatments sharing a common letter are not significantly different by Tukey's test at P=0.05.

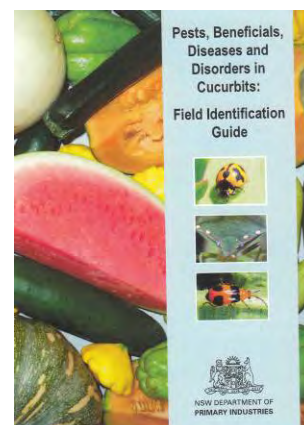
Bolded numbers indicate highest value for each assessment

Royal Armada produced the highest fruit yield with 52.1 t/ha but there was no statistical difference in yield between any of the varieties evaluated. Results indicated that many of the current available varieties are suitable for production in local Riverina conditions. Other assessments within the trial indicated differences in fruit size, skin pattern and colour and length of growing time. The trial showed that Royal Armada, Diamondback, TWT27010 and TWT27011 had a slightly shorter growing time than Nightshade, Eloura and Crunch (only a few days) whereas Red Crunchie required a much longer growing time (about a week). For more information, or a full copy of the trial report, contact the District Horticulturist at Yanco Agricultural Institute on (02) 6951 2611.

Field Identification Guide for Cucurbits

During 2009, NSW DPI released a field identification guide titled "Pests, Beneficials, Diseases and Disorders in Cucurbits". The guide is compact, waterproof and suitable for use in the field with more than 270 full colour images of common pests, beneficials, diseases and disorders. The images have been compiled with associated information about each pest, beneficial, disease and disorder into a 150 page booklet. The ute guide has been sent to every known levy paying cucurbit grower in Australia, so if you have not received one of these ute guides, and you are a levy paying cucurbit grower, please fax or email your contact details to Tony Napier at Yanco Agricultural Institute and one will be sent out to you. Non-levied cucurbit growers (such as watermelon and rockmelon growers) and other interested people are able to purchase the field guide through the NSW DII bookstore for \$30.80 plus postage at

<http://www.dpi.nsw.gov.au/aboutus/resources/bookshop/cucurbits-field-id-guide>



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