

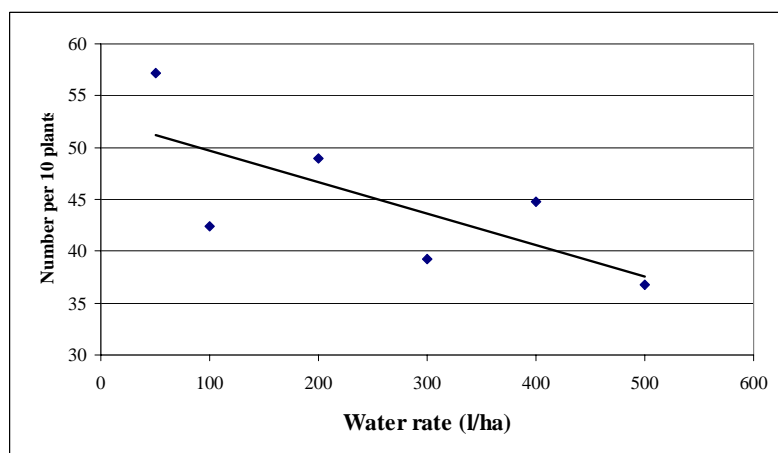
**Water spray rate trial in onions**

Tony Napier, NSW DPI, Yanco

A number of trials have been conducted over the last few years to help determine the most appropriate water rate when spraying to control thrips in onions. For a foliar insecticide application to be effective there needs to be adequate spray coverage over the entire plant. The 2006 spray water rate trial was conducted at Yanco Agricultural Research station in a crop of Creamgold onions. The crop was sown on 01/07/06 and sprayed for thrips when the crop had begun to bulb at approximately 8 weeks before harvest.

Six different spray water rates were trialled including 50, 100, 200, 300, 400 and 500L/ha as well as one unsprayed control. All treatments (except the control) received a rate of 20ml/ha of Lambda-cyhalothrin (Karate®) which is half the recommended rate and applied with Agral® at 25 mL/100 litres of water. Half rates of Karate® were used to reduce its efficacy and make it easier to detect any water rate effect. Each spray treatment was replicated 5 times. Each plot was one bed wide (1.5m) and 12m long with neighbouring blocks separated by an unsown (bare) bed. The post spraying assessment was conducted 4 days after applying the treatments by checking a random 10 plants in each plot for adult and juvenile thrips.

Graph 1: Mean density of juvenile thrips observed four days after water rate treatments.



Note:- The control plots averaged 205 juvenile thrips/10 plants but are not shown in this graph

Post spraying counts showed that the unsprayed plots averaged 205 juvenile thrips/10 plants while all other plots averaged between 37 and 57 juvenile thrips/10 plants. These results demonstrated that Karate® was effective against onion thrips regardless of the spray water rate. The control of adult thrips was also statistically significant with a large reduction in adult thrips numbers between the non-sprayed plots compared to all the Karate® treated plots. The unsprayed plots had over 6 times the adult thrips numbers compared to any of the Karate® treated plots.

Post spraying counts showed that the plots sprayed with the highest spray water rate still had 37 juvenile thrips/10 plants and the plots sprayed with the lowest water rate still had 57 juvenile thrips/10 plants. All plots sprayed with Karate® were similar with no statistical effect detected between plots. Even though the trial showed statistical similar results between all spray water rates, a trend between spray water rate and thrips density was observed. The trend showed an increase in thrips control as the spray water rate increased.

The trial was established to demonstrate an effect of spray water rate when controlling thrips, unfortunately no statistical effect was observed. A possible reason may have been that the Karate® rate was still high enough to mask any such effects or that biological counts may not be reliable for detecting such effects. For more information, contact the District Horticulturist at Yanco Agricultural Institute on (02) 6951 2611.



NSW DEPARTMENT OF  
PRIMARY INDUSTRIES



## **Powdery mildew on carrots**

Andrew Watson, NSW DPI, Yanco

Powdery mildew was recently found on a carrot crop in New South Wales in the Murrumbidgee Irrigation Area (MIA). The disease is the same fungus that affects parsnips and other members of the Apiacea family, *Erysiphe heraclei*. While the organism causing the disease is commonly found in parsnip crops, powdery mildew has not been recorded on carrots before in Australia. As parsnips are a common crop used in rotation with carrots in the MIA, it is possible that the infection originated in a parsnip crop. Weather conditions favouring the disease this season may have contributed to the infection in carrots.

The disease effects foliage, stems, and umbels. Patches of white fluffy fungus appears on lower leaves first and then spreads to the terminal growth. The fungus often covers entire leaves with its masses of white mycelium and powdery spores as shown below in photo 1. Infected foliage becomes brittle and may eventually turn brown, shrivel, and die. Diseased pedicels may turn brown, resulting in the florets' premature death.

Photo 1: White mycelium on carrot leaves



At this stage, powdery mildew has only been found on one property. Severe infection can result in loss of foliage, causing lower yields, and poor seed quality. The latest outbreak has occurred on several different varieties. To reduce the outbreak spreading, growers need to limit 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.

The only registered fungicide for control of powdery mildew in carrots is sulphur. The common recommended rate is 200g/100 litres of water using products with 800g/kg sulphur as active ingredient. The recommendation is a general “vegetables” recommendation and non specific for carrots. Water rates of up to 300 litres/ha on advanced crops may be required to ensure adequate leaf coverage. The effectiveness of sulphur is reduced at temperatures of 18°C or below.

As no other fungicides are currently registered for carrots, NSW DPI is helping to obtain emergency permits for alternative fungicides that would control powdery mildew in carrots. If APVMA approve the permits, they should be available by the beginning of spring. For more information, contact the Plant Pathologist at Yanco Agricultural Institute on (02) 6951 2611.

## **Pumpkin density trial**

Tony Napier, NSW DPI, Yanco

A pumpkin trial was established in the MIA during the 2006/07 season to evaluate the effect of plant density on yield and fruit size. The trial was sown in a commercial grower's crop and included Jarrahdale and Sweet Grey. Jarrahdale pumpkins are an open pollinated variety and considered the standard variety for large grey pumpkins in the MIA. Jarrahdale are a big vining plant that produce a large ribbed fruit. Sweet Grey is a hybrid variety which is also a big vining plant but produce smaller fruit with less pronounced ribbing. Jarrahdale and Sweet Grey varieties are commonly sown at 5,500 to 6,500 plants per hectare in the MIA.

Continued on the next page

## Pumpkin density trial (continued)

The trial was established on 1.8m wide beds and four different plant spacings were evaluated for both varieties. The four different spacings between plants on the beds were 1.2m (4,630 plants/ha), 1.0m (5,555 plants/ha), 0.8m (6,944 plants/ha) and 0.6m (9,260 plants/ha). All mature fruit that had no disease and blemishes were collected and individually weighed at harvest. Fruit that were not considered marketable due to disease, poor appearance, blemish, misshapen or other cosmetic defects were not collected or included in the yield assessment. Fruit was sorted into four size categories including unmarketable (below 2 kg/fruit), smalls (between 2 and 3 kg/fruit), mediums, (between 3 and 6 kg/fruit) and large (greater than 6 kg/fruit). All fruit weighing 2kg or more were considered as saleable yield.

Table 1: Results of MIA pumpkin density trial – 2006/07.

Treatment	Density (plants/ha)	Large fruit (t/ha)	Medium fruit (t/ha)	Small fruit (t/ha)	Saleable yield (t/ha)	Average size of saleable fruit (kg/pumpkin)	Average number of saleable fruit per plant
Sweet Grey at 0.6m	9,260	12.6	42.2	8.8	63.6 a	4.26 b	1.61 de
Sweet Grey at 0.8m	6,944	18.7	33.2	6.6	58.5 a	4.51 b	1.87 e
Sweet Grey at 1.0m	5,555	15.3	37.4	7.2	59.9 a	4.50 b	2.40 f
Sweet Grey at 1.2m	4,630	12.4	36.8	6.2	55.4 ab	4.31 b	2.78 g
Jarrahdale at 0.6m	9,260	37.2	16.9	1.9	56.1 ab	6.38 a	0.95 a
Jarrahdale at 0.8m	6,944	36.7	9.0	3.8	49.5 bc	6.38 a	1.12 ab
Jarrahdale at 1.0m	5,555	37.0	9.3	2.3	48.5 bc	6.55 a	1.33 bcd
Jarrahdale at 1.2m	4,630	33.8	10.1	1.8	45.7 cd	6.80 a	1.45 cd

Numbers in the same column sharing a common letter are not significantly different by LSD test at P = 0.05.

The highest yielding plot was Sweet Grey sown at a plant spacing of 0.6m between plants. It yielded 63.6 t/ha of saleable fruit but this was statistically similar to all other Sweet Grey plots and the Jarrahdale plot sown at 0.6m between plants. A general increase in saleable yield was recorded as plant density increased for both varieties. Sweet Grey showed an 8.2 t/ha increase (14.8%) when doubling the plant density from 4,630 to 9,260 plants/ha while Jarrahdale showed a 10.4 t/ha increase (22.7%) when doubling the plant density from 4,630 to 9,260 plants/ha.

All Jarrahdale plots had a higher proportion of large fruit (66 to 76%) than all the Sweet Grey plots (20 to 32%). All Jarrahdale plots had significantly higher average pumpkin weight than all Sweet Grey plots. The average pumpkin weight for all the Jarrahdale plots were about 40 to 50% larger than all the pumpkins in the Sweet Grey plots.

Sweet Grey sown at a density of 4,630 plants/ha produced the most amount of saleable fruit/plant with an average of 2.78 pumpkins per plant. Jarrahdale sown at a density of 9,260 plants/ha produced the least amount of saleable fruit/plant with an average of 0.95 pumpkins per plant but was significantly similar to Jarrahdale sown at a density of 6,944 plants/ha. As plant density increased in both varieties, there was a general decrease in the number of marketable fruit per plant.

The pumpkin density trial demonstrated that Jarrahdale produce a significantly bigger fruit than Sweet Grey, independent of planting density. The trial also demonstrated that Sweet Grey produce a higher saleable yield per hectare than Jarrahdale when sown at similar densities. A trend of increasing saleable yield with increasing plant densities was observed for both varieties. For more information, contact the District Horticulturist at Yanco Agricultural Institute on (02) 6951 2611.

### Is it worth considering planting at higher densities?

This trial showed a yield increase of about 20% for Jarrahdale's when increasing the sowing density from 4,500 to 9,000 plants/ha. If a commercial crop of 35 t/ha produced even a 10% yield increase when sown at higher densities, then the extra cost for seed (approximately \$120/ha) would make it a worthwhile exercise.

## Handling practices effect external appearance of melons

Gerard Kelly, NSW DPI, Dareton

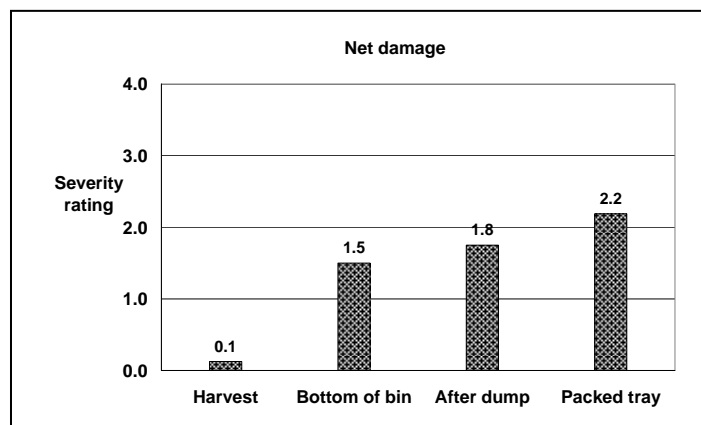
The netting of rockmelons can be damaged during harvesting, grading and packing and later shows up as external blemish which degrades the appearance of fruit. Harvesting and handling practices of rockmelons were studied as part of a melon industry project, "Improving melon supply chain handling practices". Rockmelons that were tracked from harvest to retailers, and then held at 20°C, developed sunken, discoloured areas and rots on fruit after 2 to 5 days. The holding temperature of 20°C reflected retail display conditions. The sunken areas seemed to correspond to areas where the netting of rockmelons was rubbed or damaged during handling.

To determine if handling practices during harvesting, grading and packing were related to skin deterioration, rockmelons were sampled at different points during handling and subjected to retail display conditions. Each melon was assessed for net damage after 2 days at 20°C and skin deterioration rated after 2, 5 and 7 days (Graph 1 shows the results after 2 days). Fruit were sampled at from the following sections:

- 1/ the pickers before placing on the harvesting boom (Harvest),
- 2/ the bottom of a field bin before unloading in the packing shed (Bottom of bin)
- 3/ after dumping of melons from the field bin onto the packing line (After dump)
- 4/ from packed trays (Packed trays)

It was found that the further along the handling system the melons were sampled, the higher the amount of damage to the netting. The highest level was present on melons sampled from packed trays. The level of net damage was negligible on melons sampled at harvest. Fruit that were sampled at harvest before being placed onto the harvester conveyor showed little skin deterioration even after 7 days at 20°C. However, fruit sampled from packed trays showed the most skin deterioration with one farm showing 50% of fruit showing damage after 7 days and a second farm 90 % of fruit showing damage after 5 days.

Graph 1. Net damage of rockmelons sampled at different points and held at 20°C for 2 days



Rough handling and excessive drops at any of these points will increase the risk of skin deterioration developing on fruit further along the supply chain. Designing or modifying equipment to minimise impact and abrasion damage and training staff to careful handle fruit can help reduce the risk of skin and net damage to fruit.



The two photos shown here demonstrate the difference in skin deterioration of rockmelons sampled at harvest and from packed trays and held at 20°C for 7 days

## 2006-07 Cowra seedless watermelon trial

Stephen Wade, NSW DPI, Bathurst and Greg Kocanda

The search for seedless watermelon varieties better suited to Australian growing conditions remains an industry priority. To evaluate the latest cultivars, a seedless watermelon variety trial was sown at “Bay View” near Cowra in the 2006-07 season (see Table 1).

**Table 1. 2006-07 Cowra seedless watermelon trial varieties**

Variety	Seed Company	Shape	Skin Colour
Divine	Rijk Zwaan	oval	dark green skin
Eloura	Seminis	round	dark green skin, dark green stripe
Nightshade	Jarit	round to oval	dark green skin
Pacino	Seminis	oblong	medium green skin
Redback	South Pacific Seeds	round	medium green skin, dark green stripe
Royal Armarda	Lefroy Valley	oval	dark green skin
Shadow	South Pacific Seeds	round to oval	dark green skin
Storm	South Pacific Seeds	oblong	medium green skin, light green fleck
Supercrisp	Rijk Zwaan	oval	medium green skin, dark green stripe
Supercrisp 32	Rijk Zwaan	oval	medium green skin, dark green stripe

The seedless watermelon trial was sited in a commercial Nightshade crop grown on a brown, silt loam soil. It was transplanted on the 9<sup>th</sup> November 2006. A super pollinator SP-1 (S&G) was sown between every 3<sup>rd</sup> and 4<sup>th</sup> transplant to pollinate the seedless varieties. The seedless watermelons were planted on 2.0 metre wide raised beds, with one row per bed and 0.9 metre plant spacings.

The watermelon trial was grown on black plastic mulch and watered with surface drip irrigation. Standard management practices were followed over the growing season. The trial was picked 77 days after transplanting on the 24<sup>th</sup> January 2007. Each seedless watermelon variety was measured for marketable fruit yield, average fruit size, total soluble solids and fruit flesh firmness (see Table 2).

**Table 2. 2006-07 Cowra seedless watermelon trial results - top five varieties**

Variety	Market Yield (tonnes/hectare)	Fruit Size (kilograms)	Total Soluble Solids (%)	Flesh Firmness (kilograms/centimetre <sup>2</sup> )
Royal Armarda	128	6.4	13.1	3.3
Pacino	111	7.2	12.9	2.5
Nightshade	109	6.4	12.3	2.7
Redback	105	6.2	12.2	2.3
Eloura	98	6.6	12.7	1.7

Note: Market Yield is the yield of fruit larger than 4 kilograms.  
Fruit Size is the average size of fruit larger than 4 kilograms.  
Total Soluble Solids is a guide to the fruit sugar content.  
Flesh Firmness is the penetrometer resistance of the fruit flesh.

Royal Armarda, Pacino and Nightshade were the best performing seedless watermelon varieties in the trial. Royal Armarda (pictured) had the highest market yield, good fruit size, high total soluble solids and the firmest flesh. Pacino also produced above average results for these traits. As firmer flesh is an indicator of longer shelf life in cut watermelons, the flesh firmness results also provide a guide to the keeping quality of the seedless watermelon varieties.



For further information on the 2006-07 Cowra seedless watermelon trial, please contact the District Horticulturist at Bathurst on (02) 6330 1216.

## Freshcare Quality Assurance Courses

Freshcare is the national, on-farm food safety program for fresh produce growers. Freshcare meets the national AFFA guidelines for On-Farm Food Safety for Fresh Produce and is accepted by major customers such as market agents and supermarkets. It is a HACCP based program and is owned by growers and wholesalers. Check with your agent, buyer or packer specifically what quality assurance system they require or the appropriateness of Freshcare for your business. Workshops cover food safety and quality management practices, produce specifications and produce traceability.



The one day Freshcare On Farm Food Safety training courses are scheduled on demand and can be arranged through the NSW Department of Primary Industries. The course fee is \$275 and the Freshcare workbook and example documents are included. To register for a Freshcare training course visit [www.freshcare.com.au](http://www.freshcare.com.au) or contact the District Horticulturist at Dareton on (03) 5019 8400 or Yanco on (02) 6951 2611.

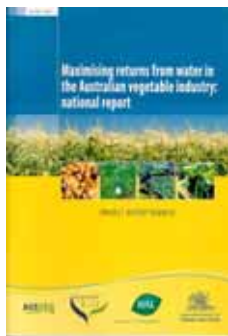
## Changes to staff at NVIC

The National Vegetable Industry Centre at Yanco has seen some changes in recent times. Mark Hickey, formerly district horticulturist for vegetables is now based in Alstonville on the north coast of NSW in a new role as the Industry Leader for tropical horticulture. Dr Mohammad Quadir, research physiologist, resigned from NSW DPI to undertake the position of chemical evaluator with the APVMA in Canberra. The recruitment process for a new vegetable research physiologist has begun and it is hoped that it will be filled by October this year.



All the staff at Yanco would like to thank both Mark and Mohammad for their contribution to the vegetable industry and wish them the best for the future.

## Vegetable irrigation reports released



The first in a series of state based reports on water use in the vegetable industry have been released. NSW DPI worked in collaboration with the other five state agriculture agencies and CSIRO to produce a series of in depth reports on how water is utilised in the major vegetable regions across Australia. The project was funded by Horticulture Australia Limited, and was completed earlier this year.

The Queensland, Tasmanian and New South Wales reports are now available. Please contact the District Horticulturist at Yanco Agricultural Institute on (02) 6951 2611 for further information.