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National Vegetable Industry Centre Newsletter

Seedless watermelon trial

Stephen Wade 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 replicated variety trial was sown at Jamie and Marie Schembri's property "Greenview" near Cowra in the 2004-05 season (see Table 1).

Table 1. Seedless watermelon trial varieties.

Variety	Company	Shape	Skin Colour
Apollo	Seminis	oval	medium green skin, dark green stripe
Classic	Jarit	oval	light green skin, medium green stripe
Cutwell	Jarit	oblong	light green skin, medium green stripe
Grande	Westranell Horticultural Solutions	oval	dark green skin, dark green stripe
Kryptonite	Terranova seeds	round	medium green skin, dark green stripe
Nightshade	Jarit	round to oval	dark green skin
Pinto	Lefroy Valley	oval	medium green skin, dark green stripe
Prado	Westranell Horticultural Solutions	round	medium green skin, dark green stripe
Royal Armarda	Lefroy Valley	oval	dark green skin
Silhouette	South Pacific Seeds	oval	dark green skin

The trial was located on a brown silty loam soil beside the Lachlan River. It was direct seeded on the 23 November, 2004. A seeded watermelon variety Red Tiger (Syngenta Seeds) was planted every fourth row to pollinate the seedless varieties. Normal farm management practices were followed over the growing season. The melons were sown on 2.5 metre wide raised beds, with one row per bed and 0.75 metre plant spacings. They were grown on black plastic mulch (Polyam) and watered with surface drip irrigation (T-Tape®). The trial was picked 100 days after sowing on the 2 March, 2005. Five medium sized fruits were taken from each trial plot for post-harvest measurements of total soluble solids and flesh firmness (see Table 2).

Table 2. Seedless watermelon trial results.

Variety	Market Yield (t/ha)	Fruit Size (kg)	Total Soluble Solids (%)	Flesh Firmness (kg/cm^2)
Royal Armarda	97.8	6.28	11.7	1.60
Apollo	87.2	6.31	11.9	1.32
Cutwell	83.7	5.51	11.9	1.56
Nightshade	70.7	6.28	11.8	1.70
Silhouette	70.1	5.27	11.6	1.53
Classic	67.4	5.49	12.0	1.65
Kryptonite	65.9	5.95	12.7	1.16
Grande	61.1	6.45	12.2	1.20
Pinto	59.8	6.63	12.0	1.27
Prado	48.1	6.42	11.8	1.32
Average	**71.2**	**6.05**	**12.0**	**1.43**

1. Market Yield is the yield of fruit which is larger than 4 kilograms.
2. Total Soluble Solids or Brix is an indication of the fruit sugar content.
3. Flesh Firmness is the resistance of the flesh to a penetrometer fitted with an 11 millimetre diameter plunger.

There were no significant statistical differences between the varieties for market yield, fruit size and total soluble solids. Nightshade, Classic, Royal Armarda, Cutwell and Silhouette had the firmest flesh. As firmer flesh is associated with a longer shelf life in cut melons, these results could provide a guide to the potential keeping quality of each variety. When the current market preference for oval or round seedless watermelons is considered, then Royal Armarda, Nightshade, Silhouette and Classic were the best performing varieties in the trial over the widest range of traits.

For further information on this trial, please contact Stephen Wade, District Horticulturist, NSW Department of Primary Industries at Bathurst on (02) 6330 1216 or Greg Kocanda, Technical Sales Representative, Ace Ohlsson at Canowindra on 0428 442 349.

NSW DEPARTMENT OF PRIMARY INDUSTRIES

Nasonovia resistant lettuce varieties

Tony Napier

As reported in last issue, the currant-lettuce aphid, *Nasonovia ribis-nigri* is established in mainland Australia and spreading across Victoria. It is expected that this pest will become endemic across the entire country over time. Managing this species of aphid will be a greater challenge for growers, as they are much harder to control than other species of aphids. Instead of infesting the outside leaves, the lettuce aphid tends to colonise the centre of the lettuce where it is very difficult to reach with foliar applied insecticides.

There are a number of options available for growers to control this pest. The most widely accepted option is the use of imidacloprid (Confidor®) applied as a seedling drench. The seedling drench treatment has the advantage of being taken up systemically to control the aphids deep inside the heart. Another option used by a few growers is the implementation of an IPM system. This strategy involves regular crop monitoring and the use of selective insecticides to preserve the population of beneficial insects. The IPM strategy is currently not preferred as it restricts marketing options due to a number of interstate trading protocols.

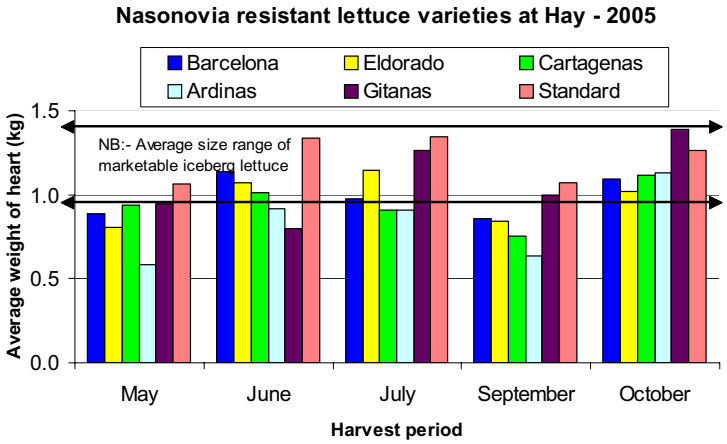
Using Nasonovia resistant varieties is another method gaining acceptance for the control of this pest. Plant breeders around the world have been busy developing and selecting cultivars resistant to the lettuce aphid. New resistant varieties are being developed each year with a focus on developing cultivars for different areas and different seasons.

Observation trials at Hay

Five lettuce variety trials were established at Hay during the 2005 growing season. The primary objective of the trials was to give people an opportunity to see some of the new Nasonovia resistant varieties grown under local conditions. The trials also helped establish the most suitable time slot for each variety.

Observation plots with five of the Nasonovia resistant lettuce varieties were established at different grower's properties. The trials were sown in the grower's commercial crop and were treated as part of that crop until harvest. The trial varieties were harvested within a few days of when the commercial crop was harvested. Yield measurements and subjective assessments were made at harvest. These were compared to the grower's standard variety used at that time.

Gitanis was the only trial variety recommended for a winter harvest while the others are recommended for a warmer time slot. A summary of the yield performance for each of the five lettuce varieties are shown in the adjacent graph.



Continuing onion thrips research

Jianhua Mo

The current project on developing management strategies for controlling onion thrips in onions is producing some excellent results. This includes helping towards the successful application of a permit for Karate, which has been an urgent issue of the Australian Onion Associations for several years. Details on the Karate permit (PER-7496) can be found on the APVMA website at www.apvma.gov.au

Other works recently conducted by the project team includes monitoring the seasonal patterns of onion thrips and a field efficacy trial of foliar-spray insecticides in Queensland. The Queensland efficacy trial results were similar to that obtained in NSW last year. The results found Karate was having an immediate knock-down effect on adults and juveniles and CJX (a recently developed product) having a delayed effect on juveniles.

Monitoring results from last season did not show any major invasion events of onion thrips into onion fields. Changes in adult numbers were gradual over the monitoring periods. Both adult and juvenile thrips density from start to peaking can be satisfactorily described by exponential growth. This suggests that thrips infestations in onion are largely due to

natural reproduction of local populations. The fact that onion thrips were able to complete six generations in an onion season in southern Australia, with shorter generation times at higher temperatures, shows the great reproduction potential of the insect.

Two efficacy trials of foliar insecticides and one soil-drench chemicals are currently in progress in NSW. Early results showed the application rate of the adjuvant for CJX (Hasten) may be halved without significantly affecting the efficacy with Confidor® showing promise as a soil application insecticide. For further information on the national onion thrips project, contact Mark Hickey or Dr Jianhua Mo at Yanco Agricultural Institute on (02) 6951 2611

Evaluating new processing tomato cultivars

Tony Napier

The processing tomato variety evaluation program is undergoing a change of focus for the 2005/06 season. Mike Titley from "Applied Horticultural Research" is now leading the project with the trials located in NSW still to be co-ordinated and harvested by NSW DPI.

The method of trialling new varieties will now focus on two main levels of evaluation. This includes small observation plots and larger machine harvest rows. The first look at most varieties will still be in the small unreplicated observation plots which will be visually assessed just prior to harvest. The most promising lines will be sown directly into much larger plots that are to be harvested by machine. These larger plots will vary in size, with an aim of one bed wide by the full length of a paddock (depending on seed availability). Two replicated small plot trials were also sown this year for extra statistical data.

The last of the variety trials were sown in mid November with a total of four observation trials, five machine harvest trials and two replicated trials being established in NSW. The photo on the left shows the first of the machine harvest trials being sown near Griffith on the 8 September 2005.

For further information on the cultivar evaluation project, contact Tony Napier at Yanco Agricultural Institute on (02) 6951 2796

New research focuses on bean and pea diseases

Andrew Watson

Two disease research projects are currently being conducted at Yanco Agricultural Institute. The first project, "Managing Bean Root and Stem Diseases" is a project looking at bean diseases covering NSW, Queensland and Tasmania. The fresh market growing regions of NSW and the processing regions of Tasmania will be particularly targeted. The principal aim of this project is to establish the current disease situation with beans in Australia with a focus on the root and stem diseases. An integrated approach to reducing these diseases will be investigated through the life of the project.

Some observations on bean disease so far in the project have included:

- Beans are very susceptible to root disease during wet conditions.
- Reducing compaction and improving drainage is a high priority. Gypsum may benefit those with heavier clay soils. The effects of a compacted layer are seen in the adjacent photograph.

Bean roots affected by soil compaction

- The main organisms isolated from bean roots and stems are *Fusarium, Pythium* and *Rhizoctonia* species of fungi. *Pythium* and Fusarium appear to be the primary infection agent, infecting and rotting away the stem. The plants are capable of surviving as long as conditions improve and often do this by producing roots above the area that has rotted resulting in yield loss. *Rhizoctonia* causes large lesions on the lower stem.
- Growers report that disease is often serious when replanting in areas that previously had disease. This is most likely due to the pathogens associated with stem rots building up in plant tissue and remaining there when the plants are ploughed in. Improving the breakdown of this material is a priority.
- Clovers are an alternate host for these fungi removal of these from the cropping cycle before beans may be beneficial in disease reduction.

- An observation of bean death in the Coffs Harbour area showed that young and old plants survive after long wet periods whereas plants between these stages appear to be most susceptible. A reason for this is that mature plants have a well developed tough and deep root system and strong stems and therefore more resistant to fungal attack. Young plants still benefit from seed dressings.

The second disease research project now underway is looking at Fusarium wilt of snow peas. This is a collaborative project between DPI NSW, Sydney University and DPI QLD. Snow peas are a valuable commodity for Australia with the vegetable being highly sought after because of its convenience in food preparation. The industry however has concerns with Fusarium wilt. Fusarium wilt of peas was first found in the USA in 1924. The symptoms include wilting of leaves and a progressive yellowing of leaves from the base of the plant upwards with the whole plant eventually dying. The disease has now been found in Australia, especially in the growing regions of Queensland. This new project will look at the races of *Fusarium* involved in disease as well as control options. *Rhizoctonia*, is another soil borne fungus has been identified as an issue in the Sydney Basin. Methods of controlling this disease will be investigated.

Snow peas with symptoms of Fusarium wilt

For further information on either of these projects, contact Andrew Watson at Yanco Agricultural Institute on (02) 6951 2647

Project helps vegetable growers maximise returns from water

A current study of water use in the vegetable industry led by NSW DPI is helping to highlight the importance of water to the long term viability of the industry in Australia. The industry report entitled "*Australian Vegetable Crops – Maximising Returns from Water"* describes how water is used in the major vegetable production regions in Australia. It details the investment made in technology to ensure maximum output and product quality from every ML used in vegetable production and processing.

Drip irrigation is helping to increase water use efficiency

As project leader and District Horticulturist at Yanco, Mark Hickey explained "The Australian Bureau of Statistics estimates that the value return from vegetable production per ML increased from $1,762/ML in 1996/97 to $3,207/ML in 2000/01. The industry report attributes this to increased use of water efficient delivery systems such as drip irrigation, increased use of re-cycling on farm, wide scale adoption of irrigation scheduling and soil moisture monitoring and a tendency towards whole farm planning and soil mapping". "Some part of that increase in value is also likely to be a result of improved product quality resulting in higher prices returned in the marketplace."

The project, funded by Horticulture Australia Ltd, involves six state government agencies and CSIRO who are collaborating in data collection to present a knowledge base on water usage in the vegetable industry across Australia. The value of vegetable production output, and a description of market orientation including domestic, processing and exports are also discussed in the report.

"We also felt it was important to demonstrate in dollar terms the benefits that flow from investment made in more efficient irrigation systems. So we have included technology case studies featuring vegetable growers who have kindly shared experiences, detailing the costs and benefits which flow from a shift to more efficient irrigation systems" Mr Hickey said.

The report is due out in March 2006 and will also identify water-related issues for possible future research which are likely to maximise returns on grower investment of research and development funds. For more information on the HAL funded Vegetable Water project, please contact Mark Hickey at Yanco Agricultural Institute on 02 6951 2523.

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