



Seedless watermelons in the Riverina

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- Production of seedless watermelons continues to expand with aggressive marketing, improved varieties and increased consumer demand.
- NSW DPI variety trials have demonstrated that many of the currently available varieties are suitable for production in local Riverina conditions.

Seedless watermelons have been grown for many years in Australia and with aggressive marketing, improved varieties and increased consumer demand, production has continued to expand. The Riverina produces about 300 ha of watermelons annually of which the majority are seedless varieties. Riverina production currently accounts for about 7% of national watermelon production.

Seedless watermelons have a high sugar content and excellent flavour, and have a longer shelf life than seeded watermelons. The energy saved by not producing a seed means that the plant can put more energy into producing higher sugar levels. The absence of seeds also contributes to the increased shelf life as break down of flesh in seeded watermelons often occurs in the vicinity of the seeds.

Seedless watermelons are self-sterile hybrids that develop normal-looking fruits without developing any seeds. The breeding technique to create a seedless watermelon comes in multiple steps. A normal diploid plant (with two sets of chromosomes) is crossed with a genetically altered tetraploid plant (with four sets of chromosomes). The seeds from this cross produce triploid plants (with three sets of chromosomes) that when pollinated by normal diploid plants, produce seedless fruit.

Growing seedless watermelons

To grow seedless watermelons from triploid plants, farmers must interplant their crop with a pollinating diploid watermelon. This is necessary to pollinate the male sterile triploid plant. It is common to use normal seeded type watermelons as pollinators but super-pollinators are also being used. Seedless watermelon



Figure 1: NSW DPI staff members (left-right) Meryl Snudden, Andrew Watson and Lee Browne harvesting the seedless watermelon trial in February 2009.



Table 1: Seedless watermelon varieties evaluated in the 2008–09 variety trial

Variety	Seed Supplier
Royal Armada	Lefroy Valley
TWT27010	Terranova Seeds
TWT27011	Terranova Seeds
Nightshade	Jarit
Diamondback	South Pacific Seeds
Eloura	Seminis Vegetable Seeds
Crunch	Seminis Vegetable Seeds
Red Crunchie	Clause

Table 2: Fruit sizes and total yield: 2008–09 Riverina seedless watermelon variety trial

Variety	Large fruit (t/ha)	Medium fruit (t/ha)	Small fruit (t/ha)	Total Yield (t/ha)
Royal Armada	17.7	28.1	6.2	52.1 a
TWT27010	22.8	16.4	2.4	41.6 a
TWT27011	19.4	20.7	6.9	46.9 a
Nightshade	30.6	18.1	3.0	51.7 a
Diamondback	18.0	20.2	5.6	43.8 a
Eloura	16.7	9.0	12.7	38.5 a
Crunch	2.3	18.1	22.0	42.3 a
Red Crunchie	15.2	22.7	5.3	43.3 a

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

Table 3: Average fruit size, sugar content and fruit firmness: 2008–09 Riverina seedless watermelon variety trial

Variety	Average size of fruit (kg)	Sugar content (Brix %)	Flesh firmness (kg/cm ²)
Nightshade	5.76 b	10.5 a	1.05 a
TWT27010	5.71 b	10.5 a	1.13 ab
Diamondback	5.46 b	11.1 a	1.14 ab
Red Crunchie	5.41 b	10.5 a	1.65 bc
Royal Armada	5.32 ab	11.1 a	1.34 ab
TWT27011	5.08 ab	11.1 a	1.00 a
Eloura	4.99 ab	10.4 a	1.09 a
Crunch	3.95 a	9.6 a	1.92 c

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

crops are sown with a ratio of about three male sterile triploid plants to one diploid pollinator. Super-pollinators can be used but they do not produce any marketable fruit. It is more common to use normal seeded type watermelons as the fruit can also be collected at harvest and sold.

Pollination is necessary to set fruit and it is important to ensure adequate bees are present to make this happen. A minimum of six bee visits per flower is required for normal fruit development of both seeded and seedless varieties. The general recommendation is to provide one bee for each 100 flowers in the field. To achieve this, bee hives are placed around a seedless watermelon crop at a rate of about two hives per hectare.

When harvesting seeded and seedless watermelons together in the field, it is necessary to be able to distinguish them apart. Seedless watermelons are usually different in appearance than the seeded types. Seedless watermelons are usually round in shape and weigh about 5–10 kg. The seeded varieties are longer and elongated in shape and can be much larger, weighing up to 20 kg.

Variety trial

The seed to grow seedless watermelons is expensive due to the fact that a tetraploid watermelon plant only produces about 10% as many seeds as a normal diploid plant. A seedless watermelon seed can cost up to 50 times the amount of a normal open pollinated variety. Germination and establishment of seedless watermelons can be a problem therefore transplanting a seedling is the best way to ensure a viable crop establishes in the field. This high cost of producing seedless watermelons means that growers are always looking for the most suitable and high yielding varieties for their district.

NSW DPI conducted a variety trial during the 2008–09 season to identify and evaluate seedless watermelon varieties that would better suit the Riverina area. The trial was conducted in a commercial crop of seedless watermelons in the Riverina near Whitton. The trial evaluated eight varieties, including current commercially grown varieties and some new experimental varieties. The trial evaluated the varieties for yield, fruit size, sugar content and flesh firmness.


The trial was sown 18 November 2008 with seedlings and was harvested at the same time as the commercial crop – 11 February 2009. The watermelons were transplanted into 1.8 m beds at a spacing of 90 cm. There were five plants per plot and four replications. The trial area was sown on three beds with two rows of Red Tiger (pollinator seeded variety) on either side of the trial.

At harvest, the watermelons were separated into four size groups: large (over 6.0 kg), medium (4.0–6.0 kg), small (2.5–4.0 kg) and under undersize (2.5 kg or less). The undersize melons were considered too small to be marketable and were not included in assessment or yield. Normally harvest is conducted in two passes giving the smaller fruit more time to increase in size. This trial had to be harvested in one pass (on the day the commercial harvest commenced) due to logistical reasons. The one pass harvest may have penalised varieties that were longer maturing than the commercial variety. Red Crunchie looked to be the longest maturing variety and needed an extra week of growing time to reach maturity.



Harvest was conducted in early February with very hot temperatures recorded in the last two weeks of growing time. The two week period prior to harvest saw daily temperatures reaching 40°C causing heat stress and harsh growing conditions.

The trial results showed that Royal Armada was the highest yielding variety with 52.1 t/ha but was statistically similar in yield to all other varieties. Nightshade produced the largest average fruit size with an average 5.76 kg/melon but was statistically similar to all other varieties except Crunch with an average of 3.95 kg/melon. The most desirable fruit size is a marketing issue and depends on what the consumer prefers.

Sugar content was statistically similar between all varieties and ranged from 11.1 to 9.6% brix. Crunch had the firmest fruit with a penetrometer reading of 1.92 kg/cm². The results for flesh firmness in this trial need to be interpreted with caution as the varieties demonstrated slightly different maturity times which would have affected the results. In conclusion, the trial demonstrated that all the above varieties performed well in local Riverina conditions under furrow irrigation. 

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Total yield of seedless watermelons & volumes of different fruit sizes

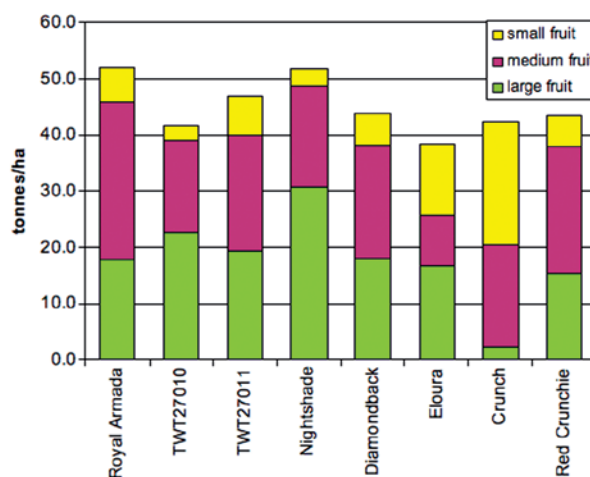


Figure 2: Yield results of 2008–09 seedless watermelon variety trial

Further information

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