



# IL MUSTARD FOR 2007

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## Background

The results of research conducted across NSW over the past 15 years has shown that oilseed mustard has the potential to be a more reliable alternate crop than canola in the low rainfall districts particularly in western NSW. Under the drought conditions experienced in 2006, mustard again performed well

Mustard trials were sown at 12 locations across NSW in 2006. Unfortunately, the adverse seasonal conditions experienced last year resulted in harvest being possible at only 5 of the sites. However, even though harvesting of the trials could not be justified, at most sites the mustard lines outperformed the canola lines in the trials producing at least some seed..

## Benefits of mustard

Mustard produces a high quality, healthy oil which is low in saturated fatty acids. It is also high in alpha-linolenic acid, an omega-3 fatty acid, which is an important component in a healthy diet. In fact, mustard oil is significantly better than canola oil in this regard because it contains about 15 per cent omega-3 fatty acid compared to canola oil's 10 per cent.

In addition to its healthy benefits, mustard also has a number of important agronomic advantages particularly when compared to canola. These include:

- vigorous seedling growth - it is significantly better than canola.
- quick ground covering ability - helping in earlier and better weed competition.
- a high tolerance of heat and drought - in drier areas this enables the crop to finish particularly when the season cuts out early.
- more resistant to shattering - there is potential for the crop to be direct headed which can be a significant cost saving to growers.
- greater resistance to certain diseases, notably blackleg.
- excellent biofumigation benefits resulting in more effective control of cereal root diseases such as take-all and common root rot. The dense canopy also enhances the better breakdown of cereal stubble resulting in the control of crown rot.
- higher yield potential than canola in low rainfall environments.

The heat and drought tolerance was a very strong feature of the mustard lines included in the trials in 2006.

## Types of Mustard

Research is currently being conducted into two different types of Indian mustard based on their quality specifically the condiment and the canola quality types.

### Condiment mustard

Condiment mustards are the traditional 'hot' mustards used in condiment foods such as table mustard. The 'hot' taste comes from the glucosinolates contained in the seed. The glucosinolates are retained only in the meal after the seed is crushed to remove the oil although the oil does retain a distinct 'nutty' flavour. The varieties of condiment mustard being grown in Australia have very low levels of erucic acid in the oil, increasing its value for human consumption.

### Canola quality mustard

Using conventional breeding methods, the national Brassica breeding program has developed oilseed mustard lines with a fatty acid profile similar to canola, which is low in erucic acid, has low levels of glucosinolates and is high in oleic acid. These lines have been named Juncea canola to differentiate them from standard canola.

Varieties fitting these quality characteristics should, eventually, be deliverable into the canola pool but at the same time they will retain all the agronomic advantages of mustard. The first mustard lines meeting the canola quality standards were released for commercial production in Canada in 2002 and in Australia in 2007.

## Current Situation

### Condiment mustard

Currently several lines of condiment type mustard are commercially available but production is based on closed loop marketing systems. Yandilla Mustard Oilseed Enterprises at Wallendbeen have been contracting growers for a number of years with their main variety being Mickey which was named after the late Micky Weatherall the father of the commercial condiment market in Australia.

The release of new varieties will add to the existing lines and enable the condiment mustard market to expand. The line JN028 was released in early 2006 to Palos Verdes in Cowra and following seed increase last year will be grown commercially under contract in 2007. A selection made by NSW DPI from a CSIRO variety is currently under market evaluation in India and negotiations for release through PlantTech are underway. Australian Agricultural Commodities based at Wee Waa will again be offering contracts in 2007 for two lines, Muscon 975 and BM11, which are being grown specifically for the oil to be used for the production of biodiesel.

### Canola quality mustard

The Victorian Department of Primary Industries has released the first of the canola quality varieties for commercial production in 2007. The variety has been named Dune (breeders code JR005) in keeping with its drought tolerance and was the earlier maturing of the two lines included in a number of Central Western Farming Systems trials in 2006. The seed is being marketed by Pacific Seeds who will be arranging for several grain receival sites across the Central Western NSW for the 2007 harvest.

## Varieties

### Condiment Mustard

**Mickey** : Bred and selected by Dr Rex Oram at CSIRO. Standard condiment variety. Mid-maturing, similar to AG-Outback canola in northern NSW. Yielded 118% of canola checks across 3 trials in northern NSW in 2005 and 132% of site mean in 4 trials in northern NSW in 2006. Licensed to Yandilla Mustard Oil Enterprises at Wallendbeen.

**TAM Selection 1:** A NSW DPI selection from Mickey. Early maturing, about 4 days earlier than Mickey. Yielded 121% of canola checks in northern NSW in 2005 and 112% of site mean in northern NSW in 2006.

**TAM Selection 2:** A NSW DPI selection from Mickey. Early maturing, about 4 days earlier than Mickey. Yielded 126% of canola checks in northern NSW in 2005 and 127% of site mean in northern NSW in 2006. Seed increased by PlantTech in 2006 and currently under further market evaluation.

**TAM Selection3:** A NSW DPI selection from Mickey. Very early maturing, about 7 days earlier than Mickey. Yielded 114% of canola checks in northern NSW in 2005 and 119% of site mean in northern NSW in 2006.

**JN028:** Mid maturing, high yielding type. Similar maturity to Rainbow. Good adaptation across a range of environments. May grow too tall if sown too early. Bred by Victorian DPI and released in 2006 under license to Palos Verdes at Cowra.

**BM11** : Early to mid maturing line with brown seed. Limited trial data available. A selection from the old AgSeeds/AgVictoria breeding program and being marketed by Australian Agricultural Commodities.

**Muscon 975:** Mid to late maturity. Limited trial data available. A selection from the old AgSeeds/AgVictoria breeding program and being marketed by Australian Agricultural Commodities.

### Canola Quality Mustard– *Juncea canola*

**Dune (JR055)** : Early-mid maturing, slightly earlier than AG-Spectrum. In trials in Victoria, yields have been similar to and oil content slightly less than AG-Outback. Good oleic acid content with low glucosinolates and erucic acid levels. Taller plant height than AG-Spectrum. Seed increased under irrigation in southern NSW in 2006. Limited data available due to drought impacts over recent years but significantly outperformed canola in the CWFS trial at Merriwagga in 2006. Being marketed by Pacific Seeds.

## Growing mustard

The production methods for mustard are considered to be the same as those for growing canola.

Trials across Australia indicate that mustard is suitable for a wide range of soil types. It appears to have better tolerance to acidic soils than canola but will produce its best yields on better soil types.

Whilst research at Young and Tamworth has shown that adequate inputs of nitrogen, phosphorus and sulphur are essential if high yields are to be achieved research at Young, in Victoria and overseas has shown that fertiliser requirements are not as high as those for canola.

Because the seed is smaller than canola, lower seeding rates can be used and rates of about three kg/ha or less are recommended.

It is recommended that sowing be done at the end of the recommended window for canola so as to avoid the crop growing too tall. All current lines of mustard tend to grow taller than they do in Victoria as they are grown in more northerly latitudes. Whilst mustard is considered to be more tolerant of frost than canola, the fact that it flowers earlier than canola especially with very early sowing can predispose it to some frost damage which is seen as a narrow band of frosted pods along the stem.

Mustard also appears to be more tolerant of some diseases than canola but a major problem in some trials in northern NSW has been the occurrence of virus diseases, including beet western yellows virus and turnip mosaic virus. The risk of these diseases is increased with early sowing due to the presence of summer growing Brassica weeds and increased risk of aphid flights the major vector for virus spread.

The range of herbicides registered for use on mustard crops is limited especially for the control of broadleaf weeds. Although clopyralid (Lontrel®/Archer®) has been used for the control of capeweed and thistles, recent research in Canada and South Australia has shown that it causes a yield reduction of around 10-15%. A permit has been issued to enable the majority of the herbicides registered for the control of grass weeds in canola to be used in mustard. Trials are currently being conducted across Australia testing a range of herbicides to enable full registration to be achieved. The Victorian breeding program is also working on incorporating non-GM herbicide resistance into lines to be released in the future.

Mustard is much less susceptible to shattering losses than canola meaning the crop could be direct headed once it is time to harvest. If the crop grows too tall or is grown in an area where wind or storms are a serious risk at harvest time however, it is recommended that windrowing be undertaken.

Similar guidelines to those used to determine the correct timing for canola apply to mustard - when 40 per cent of the seed has started to change colour. The only difference is that mustard seed will change to a yellow colour (or brown colour for BM11) instead of bronze.

Research in the north of the state has clearly shown that mustard can out yield canola in drier environments. In low yielding situations (0.8 – 1.2 t/ha for canola) trials have shown that mustard can yield up to 50% more. Condiment mustard trial results from northern NSW in 2006 are shown in Tables 1. Results of the few canola quality breeders trials successfully harvested in 2006 are not yet available.

## The future

The continued development and release of improved canola quality mustard varieties will open the door for mustard as a crop in low rainfall cropping regions of NSW.

**Table 1**  
**Summary of 2006 condiment mustard results (t/ha)**

<b><i>Mustard</i></b>	<b>Rowena</b>	<b>Coonamble</b>	<b>Bellata</b>	<b>Tamworth</b>	<b>Mean</b>	<b>% site mean</b>
Micky	1.44	0.63	1.23	1.2	1.13	132
Kaye	0.97	0.45	0.31	0.67	0.6	71
99Y	1.15	0.54	0.61	0.73	0.76	89
352	1.16	0.45	0.61	0.72	0.74	86
JN04	1.06	0.57	0.78	0.97	0.85	99
397	0.92	0.43	0.76	0.89	0.75	88
JN28	1.01	0.43	0.72	0.83	0.75	88
Muscon 973	0.93	0.38	0.57	0.69	0.64	76
Selection 1	1.2	0.65	1	0.95	0.95	112
Selection 2	1.26	0.68	1.34	1.04	1.08	127
Selection 3	1.26	0.49	1.24	1.06	1.01	119
<b><i>Canola:</i></b>						
Outback	1.28	0.17	0.92	1.39	0.94	111
Opal	1.11	0.17	0.84	1.12	0.81	95
BLN2026*SL902	1.2	0.31	0.85	1.3	0.92	108
Canola mean	1.2	0.22	0.87	1.27	0.89	105
<b>Site mean</b>	1.14	0.45	0.84	0.97	0.85	100

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