Alternative Oilseeds

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Take home messages

- *Juncea canola varieties, with the advantage of lower production costs, are being bred for the lower rainfall districts to provide a Brassica break crop option. Further breeding is required to improve the yield potential of these varieties.*
- *Identity preservation schemes, involving the contracted production for a particular market, are required for the production of specialty oils, either for human consumption (eg Monola™) or industrial use (eg Hemola™). Growers need to carefully consider the price premiums (above canola) and the agronomic performance of these varieties. Unfortunately, currently there is very limited independent evaluation of this material.*

Introduction

Considerable interest exists in the diversification of crop rotations through the use of *Brassica* species. Biofumigation of major cereal root diseases by canola break crops has been reported to provide up to a 20 per cent yield benefit for wheat after a canola crop (Angus et al., 2001) compared to wheat grown after wheat. At present, there are four main alternatives to traditional (B. napus) canola, viz:

1. Canola quality *B. juncea* "Juncea canola".
2. Monola™, in which *B. napus* canola has been bred for high oleic acid and relatively low linolenic acid levels resulting in canola oil with exceptional stability on frying.
3. Condiment and industrial quality oilseeds, including both high glucosinolate *B. juncea* (condiment mustards) and high erucic acid *B. napus* (rapeseed).
4. Forage brassicas, principally *B. napus* varieties but potentially other *Brassica* species.

B. juncea has both yellow and brown seed; both types are reputedly well suited to Australian conditions, with a reputation for:

- Good level of Blackleg resistance
- Suited to later sowing than Canola
- Much more drought and heat resistant than canola (stress tolerant)
- Yield better in lower rainfall areas
- Excellent seedling vigour
- Better ground cover and weed competition than canola
- Good lodging resistance
- Good soil bio-fumigation effects due to the high level of glucosinolates in the condiment mustard types.

The first Juncea canola variety "Dune" was released in 2007, but there is very limited farmer experience with this variety in terms of agronomic performance and grain marketing. Breeding work for the Juncea canola is continuing at DPI-Horsham, with two new, CLEARFIELD™ types being evaluated by BCG this year for herbicide tolerance. MUSCON™ is the trademark for condiment mustards bred from *B. juncea* and includes both brown and yellow seeded forms, reputedly well suited to Australian conditions.

HEMOLA™ is the trademark for specialty types of rapeseed (*B. napus*) whose oil comprises a high level (around 50%) of erucic acid compared to Canola, bred for low erucic acid (<2%). This oil profile is of increasing interest for a wide range of specialty non-food products, including bio-diesel. HEMOLA™ varieties have very similar agronomic characteristics to Canola, but represent an alternative marketing option.

Forage Brassicas represent a Brassica grazing option; varieties of forage Brassica have been evaluated in other BCG projects and did not form part of this investigation.

Trials were conducted by the BCG to evaluate a range of these alternative oilseed options.

Methods

A trial was sown at Manangatang on 18 May 2007 using a conventional seeder with 50mm points. 60 kg/ha SupremeZ (S) was used as a basal fertiliser for all treatments at both sites. TriflurX (1.2L/ha) and endosulfan (500mls/ha) was applied immediately post sowing and incorporated by rolling harrows. Plots were 25m in length and 2.5m from centre to centre with 0.175m row spacing.

Seed of some alternative oilseed varieties was obtained from DPI-Horsham, NuGrain and Australian Agricultural Crop Technologies (AACT) for evaluation. The varieties and their characteristics are presented in Table 1.

Table 1: Origins and descriptions of varieties included in evaluation trials

Species	Variety	Description	Origin
B. napus	Hyola50	Early – Mid, Hybrid Canola	
B. napus	AV-Jade	Early-Mid, Conventional Canola	
B. napus	BravoTT	Early – Mid, TT Canola	
B. napus	TT Monola NMT310	Monola	NuGrain
B. napus	Monola NMC116	Monola	NuGrain
B. juncea	Dune	Juncea canola	DPI-Horsham
B. juncea	JC06019	Juncea canola	DPI-Horsham
B. juncea	Var.MY05	Condiment mustard	AACT
B. juncea	Var.M973	Condiment mustard	AACT
B. juncea	Var.HE805	Rapeseed	AACT
B. juncea	Var.MB11	Rapeseed	AACT

Plant establishment counts were conducted eight weeks after sowing, and harvest yields recorded by direct heading.

Results

Plant establishment was variable due to the presence of header rows and some poor seed quality (Table 2), particularly Var.HE805 and yield results for this variety should be viewed with caution.

As described in the BCG Trial and Demonstration Overview in this manual, rainfall was very low after May, with only 35 mm during July, August, September and October. Consequently, yields were low for all varieties (Table 2) although significant differences in yields were recorded. The conventional canola variety AV-Jade was the highest yielding, whilst the yields of the newly released Juncea canola variety Dune and the condiment mustards were disappointing. Yields of the industrial quality rapeseed varieties Var.MB11 was similar to the conventional canola variety AV-Jade.

Whilst direct heading was used, it is unlikely that any variety was disadvantaged by this technique as shattering and lodging were minimal.

Table 2: Plant establishment and grain yield at Manangatang.

Variety	Establishment (plants per m^2)	Grain Yield (t/ha)
Hyola50	85	0.172
AV-Jade	75	0.294
Bravo	78	0.157
TT Monola NMT310	72	0.240
Monola NMC116	64	0.236
Dune	72	0.101
JC06019	62	0.191
Var.MY05	58	0.078
Var.M973	91	0.180
Var.HE805*	10	0.164
Var.MB11	78	0.269
Lsd (5%)	**23.3**	**0.096**

**low germination percentage led to poor plant establishment*

Commercial practice

Juncea Canola and Muscon (condiment mustard) varieties need to be evaluated in a farming systems context to determine the true value of *B. juncea*'s greater earlier vigour, reduced shattering and reputed greater tolerance of heat and drought stress. The results presented from the trial at Manangatang provided no evidence to suggest the currently available varieties have yield potentials that are superior to conventional canola varieties in low rainfall, low yielding environments.

Varieties of Muscon, Monola and Hemola must be grown using Identity Preservation Schemes, which involves the contracted production of these varieties for a particular enduser. Price premiums above conventional canola need to be negotiated on a case by case basis and growers need to be aware that for many of these varieties there is very limited independent agronomic evaluation has occurred.

References

Angus, J.F., Kirkegaard, J.A. and Peoples, M.B. (2001). Rotation, Sequence and Phase: Research on Crop Pasture Systems. In: Proceedings of the Australian Agronomy Conference, Australian Society of Agronomy, Hobart.