Alternative Oilseeds trial

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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. 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. Specialty canola 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). Th latter are not grown commercially at present.
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.

Condiment mustards have also been bred from *B. juncea* and includes both brown and yellow seeded forms, reputedly well suited to Australian conditions. Comdiment

mustards have high levels of glucosinolates in the meal, which gives them the "hot" flavour. In contrast, juncea canola must have very low levels of glucosinolates in the meal if it is to be called 'canola'. Therefore, juncea canola and condiment mustards must be segregated from each other.

High erucic rapeseed (*B. napus*) produces oil comprising a high level (around 50%) of erucic acid compared with canola which was bred for low erucic acid (<2%), and cannot be called 'canola' if this maximum level is exceeded. This oil profile is of increasing interest for a wide range of specialty non-food products, including bio-diesel. High erucic rapeseed varieties have very similar agronomic characteristics to canola, but represent an alternative marketing option, although segregation from canola is critical for the Australian canola industry.

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 (N:P:K:S:Zn 11:22:0:4:1) was used as a basal fertiliser for all treatments at both sites. TriflurX® (1.2L/ha) and endosulfan (500mL/ha) was applied immediately post sowing and incorporated by rolling harrows. Plots were 25 m in length and 2.5 m from centre to centre with 0.175 m row spacing.

Seed of some alternative oilseed varieties was obtained from DPI, Horsham, Nuseed and Australian Agricultural Crop Technologies (AACT) for evaluation (Table 1).

Table 1:

Origins and descriptions of varieties included in evaluation trials

Species	Variety	Description	Breeder	Marketer
B. napus	Hyola50	Early – mid, hybrid canola	Pacific Seeds	
	[AV]Jade	Early-mid, conventional canola	Vic. DPI	Nuseed
	BravoTT	Early – mid, TT canola	Canola Alliance	Nuseed
	NMT310	TT specialty canola	Nuseed	
	NMC116	Specialty canola	Nuseed	
B. juncea	Dune	Juncea canola	Vic. DPI/Viterra	Pacific Seeds
	JC06019	Juncea canola	Vic. DPI/Viterra	Pacific Seeds
	MY05	Condiment mustard	Vic DPI/AgSeed	AACT
	M973	Condiment mustard	Vic DPI/AgSeed	AACT
	MB11	Condiment mustard	Vic DPI/AgSeed	AACT
B. napus	Hemola™805	Rapeseed (high erucic)	Vic DPI/AgSeed	AACT

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

2007 CANOLA & JUNCEA CANOLA TRIALS

Results

Plant establishment was variable due to the presence of header rows and some poor seed quality (Table 2), particularly Hemola™805 and yield results for this variety should be viewed with caution.

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 AVJade was the highest yielding, whilst the yields of the newly released juncea canola variety Dune and the condiment mustards were disappointing, except yields of the condiment mustard variety MB11 was similar to the conventional canola variety AVJade.

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 (plants per m^2) and grain yield (t/ha) at Manangatang. NB: Yield results for this variety should be viewed with caution.

Variety/hybrid	Establishment	Grain yield
Hyola50	85	0.172
AVJade	75	0.294
Bravo	78	0.157
NMT310	72	0.240
NMC116	64	0.236
Dune	72	0.101
JC06019	62	0.191
MY05	58	0.078
M973	91	0.180
MB11	78	0.269
Hemola™805*	10	0.164
LSD (5%)	23.3	0.096

*low germination percentage led to poor plant establishment

Commercial practice

Juncea canola and 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 juncea canola, condiment mustard and specialty canola 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 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.