

# Crambe- a new crop with potential in southern Australia?

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Hundreds of crops have been domesticated and cultivated by humankind during the history of agriculture, utilised for food, forage, fibre and medicine. However, only a small number provide the bulk of the raw material necessary for human survival. The limited diversity has increased the vulnerability of crops to adverse climatic conditions and fluctuating markets.

In recent years, particularly in Europe and the USA, there has been growing interest in the use of crops as biorenewable industrial feedstocks, for uses such as fuels, lubricants and bioplastics. *Crambe abyssinica* (crambe) is such a crop that has industrial potential.

This season there has been growing interest in the production of crambe, in southern Australia with an Australian/ New Zealand/ UK seed business consortium being established and offering contracts to growers to produce the crop.

Crambe is a member of the same plant family as canola (Brassicaceae), it usually has a shorter growing season than canola (100-105 days). In some overseas trials crambe has proved more resistant to heat and drought stress than canola which may have given rise to the recent interest in the crop in Australia. One possible yield limitation for the crop, however, is the fact that it bears only one seed per pod, unlike the multiple seed characteristic of canola but the crop can be direct headed reducing production costs.

Crambe was first evaluated in Australia by Dr Phil Salisbury in the early 1990's in Wimmera and Mallee environments of Victoria, generally yields were much lower than canola but crambe appeared to perform much better in the Mallee environments. Later trials by Geoff Castleman in the same environments gave yields of crambe of between 500-1300kg/ha. Trials conducted by Dr Sue Knights in the Wimmera in 1998 of several lines of crambe gave yields of around 0.3 t/ha however all lines were affected by a severe frost during the season. Blackleg evaluation trials conducted by Dr Steve Marcroft in 1999 on a limited number of entries indicated that crambe has reasonable resistance to the disease. New varieties of crambe are now available for production in Australia which reportably may yield much better than the older varieties.

The agronomy of crambe is very similar to canola, in fact chemicals registered for use on conventional canola are now registered for use on crambe in Australia. Insects that attack canola will attack crambe such as redlegged earthmites, blue oatmites, Lucerne flea, native budworm, diamond back moth, aphids, Rutherglen bugs. The diseases that may strike crambe are also similar to canola: fusarium, alternaria, sclerotinia, mildew, blackleg (possibly more resistant than canola). The recommended sowing rate for crambe in southern Australian environments is 10-12 kg/ha.

The crop has potential as an industrial fatty acid feedstock as a source of erucic acid. Erucic acid is used mainly as erucamide, an effective non-stick agent in polyolefin films for wrapping food, plastic bags, shrink wraps, etc. It can also be converted to nylon 1313, or hydrogenated to behenic acid, which also has many applications in the manufacture of rubber, pharmaceuticals, cosmetics, fabric softeners, hair conditioners and rinses. High erucic oils are used for the production of lubricants, plasticisers and foam suppressants. Crambe oil is a very effective lubricant, and is much more biodegradable than mineral oils, so it may be used alone or as additives for the textile, steel and shipping industries. Other crop species that could potentially

compete with crambe are those high in erucic acid; high erucic acid rapeseed and other *Brassica* species.

In 2005 3,000-4,000 ha of crambe were contracted by Seed Production Australia agents around southern Australia with the seed being crushed at Riverland Oilseeds in Numurkah, Victoria, utilising varieties that had been bred in the UK. These contracts were quite attractive to growers as they were made on an area basis.

Crambe has been successfully grown, processed and marketed on a commercial scale in North Dakota, USA, since 1990. A major reason for its success has been a multidisciplinary team involved in the research, development and commercialisation of the species through the auspices of the High Erucic Acid Development Effort (HEADE).

In North Dakota, ecologically, crambe has offered a unique opportunity for farmers to diversify their crop rotations as it shares few pests with more commonly grown crops. It also shows tolerance to a wide range of insects and is produced using standard small grain equipment. However, crambe has one short fall, as due to its low-test weight it is only economic to process it locally.

In recent years, the production of crambe in North Dakota has fluctuated as the commercial players involved in the industry have changed. Its future will depend upon both the future of biorenewable resources together with innovative research to develop additional markets for the crop.