Development of indian mustard as an oilseed crop

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Indian mustard (Brassica juncea) is recognised in several northern hemisphere countries as being more tolerant of heat and drought than the closely related rapeseed species. High yields have been observed in Australia, e.g. in the Victorian Mallee (1). The zero erucic acid oil type was discovered in this Division almost a decade ago (2), but the low glucosinolate type is not yet readily available although reports of its discovery have been received from Canada, China and Pakistan. Canada is now investing heavily in mustard research. This paper describes, firstly,the establishment of a new industry in N.S.W. which produces a mild flavoured, low erucic acid oil for cooking and salads, and secondly, the progress made towards creating the low glucosinolate type.

The "Yandilla Mustard Oil Enterprise"

Mr and Mrs H.M. Weatherall contracted farmers at Wallendbeen to produce 17 tonnes of mustard seed in 1987 and about 150 tonnes in 1988. The Weatheralls also installed screw presses and a filter from India, and extracted, bottled and sold cold-pressed oil in N.S.W. under the "Yandilla" label. Their oil will be available under the "Maharajah's Choice" label in other States from 1989. The seed is produced from 3 cultivars developed by crossing the original zero-erucic accession with high erucic accessions from China (early cultivar), India (mid-season) and Canada (late), followed by pedigree selection. All are yellow-seeded and resistant blight. Less than 60% of the oil is extractable by cold-pressing. The resulting meal contains 23% oil and 25% protein, but the high glucosinolate content limits its use to ruminant feed. Research into detoxification is continuing. Overseas markets may develop and increase the demand to a few thousand tonnes of oil per year.

Reduced glucosinolate accessions and mutants

Spontaneous variants with about 70% of the wild type concentration of glucosinolates in their seed meal have been found in an Indian accession, PI 183117 (3) and in a Chinese accession. A mutant with a similar reduction in glucosinolates has been found in the M_2 generation, (following treatment with the chemical mutagen, ethy1 methanesulfonate), of F_2 seeds from the cross Synthetic Yellow x a selection from Zem 1. Synthetic Yellow contains the low glucosinolate alleles from the B. campestris cultivar, Candle. These three reduced glucosinolate variants have been intercrossed to determine whether their alleles can be recombined to give a further reduction in glucosinolate concentration. The variants have been mutagenised again, and also crossed to low glucosinolate cultivars of B. napus from N.S.W. and to a reduced glucosinolate accession of B. carinata from Ethiopia. These sources may be sufficient to create the low glucosinolate form of B. juncea. Low erucic acid, low glucosinolate cultivars then could be bred for wide scale cultivation in southern and eastern Australia, thus improving Australia's competitive position in the world markets for Brassica oilseeds.

1. Castleman, G.H.(1987), Proc. 6th Aust. Rapeseed Agron. And Breeders Workshop, 46.

2. Kirk, J.T.O., and Oram, R.N. (1981), J. Aust. Inst. Agric. Sci. 47, 51-2.

3. Palmer, M.V., Sang, J.P., Oram, R.N., Tran, D.A. and Salisbury, P.A. (1988). Aust. J. Exp. Agric. 28, 779-82.