Genetic Variability in Exotic Ethiopian Mustard (*Brassica carinata* A Braun)

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Oilseed brassicas are produced and marketed for seed and oil; any increase in these two by whatever means will increase the value of rapeseed and mustard group of crops to the end user. *Brassica carinata* A. Braun believed to be originated in Ethiopian highlands (Vaughan 1956) is another annual mustard with high potential as oil crop for Mediterranean (semi-arid) conditions and as a genetic resource for characters of agronomic importance. In its centre of origin, it is considered as a high yielding, disease- and pest- resistant crop (Getinet *et al.*, 1997). Traditionally, Ethiopian mustard is not grown in India. The cultivated Ethiopian mustard may have been taken from Ethiopia to India by traders along with others crops. Compared with other cultivated *Brassica* species, the range of variation of *B. carinata* is not very high. The collection maintained in the germplasm repositories in India, do not represent the wide genetic diversity. Cultivars of Ethiopian mustard developed so far are shunned because of very tall plant height (>2.5 m), long vegetative period, late in flowering (>80 DAS) and maturity (>160 DAS) with poor seed size (<4g). On average, oil contents of Ethiopian mustard are 3% to 6% lower than the Indian mustard [*B. juncea* (L.) Czern]. Cultivars of Ethiopian mustard have high erucic (*cis*-13-docoenoic; C 22:1 n-9) acid (35-44%) in their oil (Westphal and Marquard 1980) and high total glucosinolate (70-159 micro mole/g seed) in their seed meal (Getinet et *al.*, 1996).

Mutation is both new creating and repetitive process. We present the range of variation observed in Ethiopian mustard through plant genetic enhancement using induced mutagenesis in order to increase its value. A single plant selected from M_5 line cultivar Kiran (selection from HC 5) developed through mutagenesis (using 40 kR gamma rays followed by 1% EMS) for early to flower and reduced plant height was grown in 7 row plot of 5m x 3.5m with 20 x 45cm spacing during 2003-04 by sowing its M_6 seeds. Considerable variation in the 51 progeny of M_6 line was observed for nearly all characters (Table 1) including days to flower (52-61) and mature (141-166), seed yield per plant (7.3-218.2g), plant height (41-158 cm), plant phenotype, leaf form, node number (4-27), primary branches (4-26), 1000-seed weight (3.3-7.1 g), oil content (32.2-39.8%), erucic acid content (35.8-52.3%), linolenic acid content (7.5-26.2%), total glucosinolate content (50.0-101.1 micro mole/g defatted meal) and seed shape and coat colour. Variation from mutagenesis has not undergone selections. The rapid expansion in scientific knowledge about how Ethiopian mustard grows and behaves allows many aspects of the crop to be targeted for genetic enhancement. To expand the current acreage, *carinata* mustard has the potential to increase the production area.

References

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Table 1. Variability for agro-morphological and qualitative traits in Ethiopian mustard cv. Kiran (PBC 9221) during 2003-04

Trait	Range		Mean ± SEm	SD	CV %
	Min	Max			
Days to maturity	141	166	157.37 ± 0.780	5.571	3.5
Plant height (cm)	41	158	111.25 ± 3.505	25.035	22.5
Height to first primary branch (cm)	0	40	5.84 ± 1.166	*8.33*	142.6
Nodes number at first primary baranch	1	12	2.57 ± 0.33	2.377	92.5
Number of primary branch/plant	4	26	14.98 ± 0.759	5.423	36.2
Main shoot length (cm)	13	75	29.86 ± 1.608	11.489	38.5
Silique on main shoot	4	22	13.23 ± 0.634	4.532	34.3
Seed yield/plant (g)	7.3	218.2	43.33 ± 5.475	39.10	90.2
1000-Seed weight (g)	3.3	7.1	4.8 ± 0.125	0.897	18.7
Oil content (%)	32.21	39.90	36.46 ± 0.279	1.993	5.5
Protein content (%)	20.18	25.05	22.11 ± 0.144	1.027	4.6
Total glucosinolate content (micro mole/g defatted meal)	50.0	101.1	77.84 ± 2.080	14.860	19.1