



'ABASIN-95', A NEW OILSEED RAPE CULTIVAR DEVELOPED THROUGH INDUCED MUTATIONS

Brassica oilseeds are the second most important source of vegetable oil in Pakistan. Due to the low priority attached to these crops in the past, no systematic breeding work was undertaken to develop improved varieties of rapeseed/mustard, resulting in a narrow genetic base of these crops. At the Nuclear Institute for Food and Agriculture (NIFA), gamma radiation was used to induce genetic variability in traits of economic importance thus diversifying the genetic base of indigenous/exotic cultivars of Brassica oilseeds. About 10,000-15,000 dry seeds of oilseed rape (*Brassica napus* L.) cultivar 'Tower', having about 10% moisture, were irradiated at 1.0, 1.2 and 1.4 kGy gamma rays (^{60}Co) in 1988. The treated seeds were planted directly in the field in isolation as M_1 generation. Selection for desirable mutants was carried out in M_2/M_3 generations and a useful mutant, RM-152-2, was selected in M_3 . To speed up the breeding process two generations a year were raised, one at NIFA in winter and the other in summer at Hill Agricultural Research Station, Kaghan,. This shuttle breeding programme resulted in significant achievements in a short time span. The M_5 mutants were tested in preliminary yield trials during 1990-91, at NIFA and mutant RM-152-2 significantly outyielded the parent variety and a commercial cultivar 'PR-7', by producing 2 t/ha grain yield, against 1.4 t/ha of control. This mutant was tested in advanced yield trials under irrigated as well as rainfed conditions during 1991-92. RM-152-2 again significantly outyielded the control cultivars under both environments and produced 1.8 and 1.67 t/ha yield of the control. Based on its excellent performance in these trials, RM-152-2 was assessed simultaneously in a multilocation yield trial in North West Frontier Province (NWFP), and in a 30-entry National Uniform Rapeseed Yield Trial (NURYT) for two consecutive years i.e. 1992-93 and 1993-94. In the multilocation trial in NWFP, RM-152-2 significantly outyielded the control cultivar at all locations in both years, producing 1.8 t/ha grain yield (Table 1). It is very clear that RM-152-2 significantly outyielded the control cultivars under both irrigated and rainfed conditions in both years. The mutant line produced 3rd highest yield of 1.62 t/ha (average of two years) amongst 30 entries (candidate varieties) consecutively for two years in the National trials. These results clearly indicated genetic stability of RM-152-2 over years and locations. RM-152-2 outclassed all the commercially grown cultivars by wide margins i.e. 'Pak cheen' by 13.3% and 'DGL' by 5.2% (two non canola cultivars), and 'Shiralee' and 'Westar' (both canola type) by 10.2% and 18.4% respectively.

Table 1. Yield and other characteristics of Abasin-95 and commercial cultivars in NURYT, 1992-93 and 1993-94 (average of 15 sites)

Cultivars	Maturity (days)	Plant height (cm)	1000 seed wt. (g)	Yield (kg/ha)	Yield increase of Abasin-95 (%)
RM-152-2 (Abasin-95)	172.6 (164-184)	162.4 (150-180)	4.4 (3.7-5.1)	1605.1 (potential 3.3 t)	-
Pak cheen	175.9 (160-184.5)	156.3 (133-175.7)	3.8 (2.8-5.0)	1416.3 (potential 2.0 t)	13.3
DGL	177.0 (166-186)	151.6 (124.1-175.1)	4.1 (3.1-5.7)	1526.3 (potential 2.5 t)	5.2
Shiralee	179.3 (168-188)	159.6 (134-197)	3.4 (2.9-4.2)	1456.9 (potential 2.4 t)	10.2
Westar	178.7 (158-187)	156.9 (131-185)	3.6 (2.9-4.9)	1355.2 (potential 2.2 t)	18.4

* Ranges are given within parenthesis



RM-152-2 matured significantly earlier than control cultivars at different irrigated and rainfed sites in the National trials. The earliness in maturity ranged from 6 to 18 days at different sites, however, it matured a week earlier than the controls (average of 15 sites for two years). Plant height of RM-152-2 (162 cm) is almost the same as that of parent and other check cultivars. The mutant is also moderately resistant to *Alternaria* blight (*Alternaria brassicae*) and *Sclerotinia* stem rot (*Sclerotinia sclerotiorum*) and completely resistant to downy mildew (*Peronospora parasitica*) and white rust (*Albupo cruciferarum*).

Results regarding oil content, erucic acid and glucosinolates (courtesy: NARC, Islamabad) indicated that RM-152-2 possesses 46% oil (range 43-47% at different sites) as against 42% of Tower and 43% of Pak Cheen (Table 2). It contains less than 3% erucic acid (C_{22:1}) and 25 micromoles total glucosinolates per gram of oil free meal. Based on its quality characteristics, RM-152-2 falls in to the Canola standard for Pakistan (which require less than 5% erucic acid in oil and less than 40 micromoles of total glucosinolates per gram of oil free meal).

Table 2. Oil content, erucic acid and total glucosinolate content of RM-152-2 (Abasin-95), Pak Cheen and Tower varieties analysed by the Oilseed Analytical Laboratory, NARC, Islamabad)

Entry name	Oil content (%) [*]	Erucic acid (%) [*]	Glucosinolates (μ mole/g)
RM-152-2 (Abasin-95)	46.0 (43-47)	2.98	25.0
Pak Cheen	43.5 (41-44)	33.52	68.8
Tower (Parent variety)	42.3 (41-43)	10.31	41.9

* Ranges are given within parenthesis

RM-152-2 is uniform, stable and morphologically distinct from the parent cultivar Tower. Based on its superb performance in different yield trials and its wide adaptability to diversified climates, RM-152-2 has recently been approved by the NWFP Provincial Seed Council for normal Rabi (winter) planting in irrigated and rainfed areas of NWFP under the name of Abasin-95.

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'GORNOORIAHOVSKA KAPIA F₁'* - A NEW HYBRID PEPPER VARIETY BASED ON RADIATION INDUCED MALE STERILITY

The female parent line 'Zlaten medal *ms-8*' was obtained by Daskalov [1] as a gamma rays induced mutant of pepper (*Capsicum annum* L.). Dry seeds of the initial variety 'Zlaten medal' were irradiated with 135 Gy gamma rays and after screening of a large M₂ population