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A synthetic species : *Brassica caudatus*

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Abstract

A amphidiploid has been developed from the cross made between *Brassica tounefortii* and *Raphanus caudatus*. Its pre-flowering phenotypic characters are towards *Brassica* species and its reproductive phenotypic characters swings towards *Raphanus* species.

Keywords : Amphidiploids, *Brassica tounefortii, Raphanus caudatus, Brassica caudatus.*

Introduction

Wild turnip, *Brassica tournefortii* Gouan (2n=20, TT), a elementary species (Olsson, 1954) occurs as weed/wild plant and can grow in areas with a rainfall of only 200-250 mm. It is sometime cultivated for oil in arid regions in the North-Western regions of the Indian sub continent. It is an annual herb, the plants flower early, small in size, dull yellow self pollinated flowers are inconspicuous compared to most other true mustard. Is siliquae are shattering tolerant and it has not hybridized in nature with other species of the genus to for alloploids (Prakash and Narain, 1971). Rawat and Anand (1979) reported a CMS of spontaneous origin in *B. juncea*. Later, Pradhan et al.,1991 gave evidence from *mt*DNA profiles and suggested that this CMS cytoplasm come from *B. tournefortii* and a hybrid variety of *B.napus* PGSH-51 was released from tour CMS system and has 20% yield advantage (Banga et al., 1995).

Rat tail radish *Raphanus caudatus syn. Raphanus sativus var. caudatus* L. Nilmorin (2n= 18 RR) is identical to the common radish. *Raphanus caudatus* is used for its long slender unripe pods (up to 12 inches) for vegetable purpose having 10-14 seeds. Its test weigh is 9-10 g. Is flowers are self incompatible type. The CMS line in radish (Ogura, 1968) and their restorer was reported by Singh and Bala, 1973and Heyn, 1978.

In rabi 1991-92 a successful conventional cross between monogenomic generic species *B. tournefortii* and *R. caudatus* was carried out. The resultant hybrid was sterile. An amphidiploids was developed by the application of 1% colchicines solution on apical meristem on F_1. In 1993-94 amhidiploid plants showed fertility. This distant hybrid was registered as an amphidiploids (*B. tournefortii x R. caudatus*) by Plant Germplasm Registration Committee of ICAR on 23rd October, 2003 under INGR No. 03067 and National Identity No. IC 296597. This amphidiploid is designated as *Brassica caudatus*. It has pedicillate leaves and hair on abxial side. Plants are bushy in nature and posses up to 17 primary branches. The self-pollinated flowers having white colour petals and slightly smaller in size than of *R. caudatus*.The pods (9.3 cm) of this amphidiploids have very peculiar feature *i.e.* it bears bi-carpillary siliquae up to 4.0 cm in length with *caudatus* type tip up to 5.3 cm in length. The siliquae have only 0-8 seeds and remain non-dehiscient. Seeds are round in shape and blackish brown in colour with average 1000

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seed weight around 7.2 g.27-28% oil content was recorded (Kumar, 1994, 1999, 2001, 2005,2010 and 2012). Quios, 1995 opined that in the classification of some of the species in the tribe *Brassicaceae* in different genera often does not correspond to their crossing ability. In many instance, it is possible to successfully hybridize Brassica species with those of different genera as Karpenchenko, 1928 polpularized wide hybridization experiments in *Brassica* by creating '*Raphno-brassica'* after crossing raddish and cabbage. Bijral *et.* al. 1995 successfully produced hybrid between *B. juncea* and *Moricandia arvensis*. Li *et al* 1995 and Fu *et al* 1995 developed hybrid between *B. napus* and *Orychophragmus violaceous*. Similarly, by crossing *B. tounefortii* and *R. caudatus* gives this amphidiploid which can be utilized in breeding programme for its unique feature despite of its poor seed yield. It might be helpful in development of hybrid in R&M based CMS and incompatibility system, a reasonable procedure in commercial hybrid seed production owing to the carrier of these procedures in their parents.

References

Banga S.S., Banga K. Shashi and Sandhu G.S. 1995. Development and characterization of *tournefortii* CMS system in *Brassica napus* L.. IX th Intl. Rapeseed congress, Cambridge, U.K., 4-7 july 1995, pp 55-57.

Bijral J.S., Sharma T.R. and Kanwal K.S., 1995. Morpho-cytogenetical *Brassica juncea* x *Moricandia arvensis* sexual hybrids. IX th Intl. Rapeseed congress, Cambridge, U.K., 4-7 july 1995, pp 1092-1094.

Fu L. Bo Qu, Li Z. and Lu H. 19955. Cytological and ultra structural studies of intergeneric hybrid between *Brassica napus* and *Orychophragmus violaceous* and their derivatives II. Ultra structural studies. IX th Intl. Rapeseed congress, Cambridge, U.K., 4-7 july 1995, pp 1089-1091.

Heyn F.W. 1978. Introgression of restorer genes from *Raphanus sativus* into cytoplasmic male sterile *Brassica napus* and the genetics of fertility restoration. V th Intl. Rapeseed congress, Malmo. Sweden, 82-83.

Karpecheko G.D. 1928 Polyploid hybrids of *Raphanus sativus* X *Brassica oleracea* L. Zelt Ind. Abst. Ver.48: 1-85.

Kumar C. 1994. Inter-Generic hybridization in *cruciferae*. Cruciferae Newsletter 16: 27.

Kumar C. 1995. New cross combination in *cruciferae*. IX th Intl. Rapeseed congress, Cambridge, U.K., 4-7 july 1995, pp 11001-11003.

Kumar C. 1999. *Brassica caudatus* – A created species of potentiality. IV th Agri. Science Congress. Jaipur,21-24 Feb. 1999, pp 132.

Kumar C. 2001. *Brassica caudatus*: Retrospect and prospects. Diamond Jubilee Symp, Indian society of Genet. And Plant breeding, New Delhi,India.6=9 Nov. 2001. pp 46.

Kumar C. 2005. A synthetic species: *Brassica caudatus*. Sarson News. National Research Centre on Rapeseed – Musatrd, Sewar, Bharatpur, India. 9(1):4.

Kumar C. 2010. Synthetic species: *Brassica caudatus.* National conference on new horizons in Plant Sciences. Deptt. of Botnay, Meerut college, Meerut India.23-24 Oct. 2010, pp 151.

Kumar,C. 2012. A synthetic species : *Brassica caudatus*. National Brassica conference. Society for Rapeseed Mustard Research, Sewar, Bharatpur, India. 2-3 March 2012. Pp 18.

Li Z. Liu H. Liya, Fu and Bo Qu. 1995. *Orchypharagamus violaceous* and their relatives. I cytological studies. IX th Intl. Rapeseed congress, Cambridge, U.K., 4-7 july 1995, pp 1086-1088.

Olsson G. 1954. Cross within the compestris group of genus *Brassica.* Hereditas. 40: 398-418.

Prakash, S. and Narain, A. 1971. Genomic status of *Brassica tournefortii* Theor. Appll. Genet. 41: 203-205.

Ogura H. 1998. Studies on the new male sterile in Japanese radish with special reference to the utilization of this sterility towards the practical raising of hybrid seeds. Men Fac Agric. Kogoshima Univ. 6: 39-78.

Pradhan A. K. Mukhopadhay A. and Pental D. 1991. Identification of the putative cytoplasmic donor of a CMS system in *Brassica juncea*. Plant breeding 106: 204-208.

Quros. C.F. 1995. *Brassica* diversity and wide hybridization. IX th Intl. Rapeseed congress, Cambridge, U.K., 4-7 july 1995, pp 1057-1062.

Rabi Research repot 1991-92. Agricultural Research Station, Sri Ganganagar, India.

Rawat D.S. and Anand I. J. 1979. Male sterility in Indian Mustard. Indian Journal of Genetic and plant breeding. 39: 412- 414.

Shiga T. and Baba S. 1973. Cytoplasmic male sterility in oil seed rape, *B.napus* and its utilization to breeding. Jap.J. Breed. 23: 187-197.