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Short Communication

Isolation and inheritance of suborbicular and lupinus leaflet mutants in groundnut (*Arachis hypogaea* L.)

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Leaflet shape is described as cuneate, elliptic, suborbicular, orbicular, ovate, oblong and lanceolate in the descriptors for groundnut [1]. In our induced mutagenesis study, two mutants having suborbicular leaflets (TGM 38) and lupinus leaflets (TGM 61) were isolated after gamma ray irradiation of cultivar 'TAG 24' [2]. The inheritance pattern of suborbicular leaflet and lupinus leaflet has not been reported yet. In this communication, isolation of two mutants having suborbicular and lupinus leaflets in groundnut and their inheritance is reported.

TGM 38 was isolated by gamma ray (250 Gy) irradiation with 0.05% mutation frequency based on M_2 population. The mutant leaflets were near-circular with acute tip that is suborbicular leaflets as compared to oblong-elliptic shape in parent. This was evident from significant reduction in leaflet index (a ratio of leaflet length to leaflet width, 1.6 Vs 2.1) by maintaining similar width (2.2cm Vs 2.5cm) and lesser length (3.6cm Vs 5.2cm) than parent based on pooled mean over four seasons. Further TGM 38 had shorter height (27cm Vs 45cm), similar number of branches (7.0 Vs 8.0), seed size (52.6g Vs 55.6g/100 seeds), shelling out turn (71.0% Vs 71.3%), oil content (47.3% Vs 47.9%) and lower pod yield (19.2g Vs 32.6g/plant) compared to TAG 24'. All the F_1 plants in the crosses involving TAG 24' and TGM 38 had oblong-elliptic leaflet like in parent. Plants in the F_2 generation segregated into 3 oblong-elliptic: 1 suborbicular leaflet (Table 1). F_3 segregation fitted well to an expected ratio of l (all oblong-elliptic leaflets): 2 (3 oblong-elliptic: 1 suborbicular leaflets): l (all suborbicular leaflets). Segregation in F_2 and F_3 generations confirmed that suborbicular leaflet trait was due to single recessive gene.

TGM 61 mutant with lupinus leaflets was obtained by gamma ray (150 Gy) irradiation with 0.02% mutation frequency. The mutant leaves had greater leaflet length (7.7cm Vs 5.2cm), leaflet width (3.7cm Vs 2.5cm), rachis length (4.1cm Vs 1.5cm petiole length (10.7cm Vs 5.2cm) and stipule length (5.8cm Vs 3.3cm) in comparison with the parent. TGM 61 was also taller (55cm Vs 45cm) with similar number of branches (7.4 Vs 8.0), larger seed (75.3g Vs 55.6g/100 seeds) and lower shelling out turn (65.0% Vs 71.3%), oil content (45.3% Vs 47.9%) and pod yield (27.2g Vs 32.6g/plant) than 'TAG 24. In the cross, 'TAG 24' x TGM 61, all the F_1 plants had normal leaflets as that of 'TAG 24'. In the F_2 plants segregated in the ratio of 13 normal leaflet: 3 lupinus leaflet (Table 1). The F_3 generation derived from the two F_2 populations fitted well to the expected ratio of 7 (all normal leaflet): 2 (3 normal leaflet: 1 lupinus leaflet): 4 (13 normal leaflet: 3 lupinus leaflet): 2 (1 normal leaflet: 3 lupinus leaflet): 1 (all lupinus leaflet). Both phenotypic and genotypic segregations revealed that lupinus leaflet was due to suppressive gene action.

References

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2. **Badigannavar A. M. and Murty G. S. S.** 2007. Genetic enhancement of groundnut through gamma ray induced mutagenesis. Plant Mutation Rep., **1**: 16-21.

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Table 1. Segregation of suborbicular and lupinus leafet in F_2 and F_3 generations from mutant x parent crosses in groundnut

Cross	No. of progenies	Parental type	Mutant type	Expected ratio	χ^2	p
Suborbicular leaflet						
F_2 generation						
TAG 24 x TGM 38	2	67	17	3:1	1.015	0.313
TGM 38 x TAG 24	4	93	23	3:1	1.655	0.198
Total					2.670	0.263
Pooled		160	40	3:1	2.666	0.102
Homogeneity					0.040	0.841
F_3 generation						
TAG 24 x TGM 38	24	480	-	-	-	
	41	494	164	3:1	0.002	0.964
	19	-	144	-	-	
	84	χ^2 for 24:41: 19		1:2:1	0.642	0.725
TGM 38 x TAG 24	5	130	-			
	10	107	41	3:1	0.576	0.447
	4	-	70			
	19	χ^2 for 5:10:4		1:2:1	0.157	0.924
Lupinus leaflet						
F_2 generation						
TAG 24 x TGM 61	2	59	21	13:3	2.953	0.085
F_3 generation						
TAG 24 x TGM 61	24	449	-	-		
	15	211	87	3:1	2.796	0.094
	24	439	98	13:3	0.088	0.766
	11	14	52	1:3	0.504	0.477
	6	-	42	-		
	80	χ^2 for 24:15:24:11:6		7:2:4:2:1	7.057	0.132