Inheritance of Pentafoliate Character in Groundnut (*Arachis hypogaea* L.)

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Hybridization between Spanish bunch and Virginia genotypes is the most common tool employed for creation of variability for various morphological and physiological attributes in groundnut. In this process, some morphological variants that are uncommon in Spanish or Virginia groups do appear in the segregating populations of such crosses. A pentafoliate single plant selection was made in segregating populations of an infraspecific cross, Tirupati 1/ICGV86398 in which both parents had tetrafoliate (paripinnate) leaves. Tirupati 1 is a high yielding variety suitable for kharif cultivation under rainfed conditions in drought prone areas of Andhra Pradesh. Its leaflets are narrow and moderately long with ashy coat on their surface. ICGV86398 is a Virginia bunch genotype obtained from ICRISAT. It is resistant to jassids and tolerant to *Spodoptera* (Vasanthi and Padmavathammas, 2000). The pentafoliate selection was assigned accession number, TCGS635. The pentafoliate (imparipinnate) character was reported earlier in groundnut (Patil, 1966; Ashri, 1970; Mouli and Kale, 1981). A variant with imparipinnate but with normal leaflet size was isolated from one of the F3 progenies of the cross TG16 X TG17 by Mouli and Kale (1981) in which both parents had paripinnate leaves and it bred true in succeeding generations. The variant, TCGS635 had 33 to 40% of the leaves that expressed pentafoliate character while the variant isolated by Mouli and Kale (3) had only 12% of the leaves that were pentafoliate. The radiation induced short mutant with small leaflets obtained by Patil (1966) showed 45% of the leaves that were imparipinnate. An attempt is made to understand the mode of inheritance of pentafoliate character, which could be of great value as a good morphological marker in groundnut breeding programme.

All the F1s had tetrafoliate leaves indicating the dominant nature of tetrafoliate leaf character. In F2, the segregation data in all the five crosses was a good fit to a phenotypic ratio of 15 tetrafoliate: 1 pentafoliate plants (Table 1). It shows that pentafoliate leaf character is expressed when the genes are in recessive condition and is governed by two duplicate genes present in different chromosomes which are independently inherited. Hammons (1973) in his review on qualitative inheritance in groundnut expressed that qualitatively inherited traits are probably controlled by at least duplicate genes due to alloploid nature of the crop which tends to confirm the theory of two genomes in *Arachis hypgaea.* Many of the earlier studies also showed involvement of two duplicated genes in inheritance of many qualitative traits in groundnut. Branch and Hammons (1981) reported digenic inheritance for flop trait in groundnut. Present study corroborates the involvement of at least two genes in expression of another character in groundnut.

In F3 generation, progenies from pentafoliate plants were all pentafoliate and they didn't segregate. It confirmed the recessive nature of pentafoliate leaf character in groundnut, which is a rare feature.

An understanding of the physiological/biochemical mechanisms which lead to the expression of pentafoliate character would be an interesting study. The pentafoliate leaf character helps in increasing the canopy density that increases photosynthetically active leaf area, which could be of value in kharif rainy season.

Table 1. F2 Segregation pattern for pentafoliate leaf character in groundnut (*Arachis hypogaea* L.)

Cross	F1 phenotype	F2 segregation		x^2 for 15:1 ratio	P value
		Plants with tetrafoliate	Plants with pentafoliate leaves		
Tirupati-3 X TCGS-635	Tetrafoliate	257	13	0.9491	0.50-0.20
TCGS-320 X TCGS-635	Tetrafoliate	363	27	0.3015	0.95-0.50
TCGS-245 X TCGS-635	Tetrafoliate	594	52	3.3471	0.10-0.05
TCGS-596 X TCGS-635	Tetrafoliate	368	27	0.2306	0.95-0.50
TCGS-645 X TCGS-635	tetrafoliate	630	41	0.2240	0.95-0.50
Pooled		2212	160	0.9934	0.50-0.20

References

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