Results and Discussion

Out of ninety, the results of ten best crosses exhibiting heterosis for yield are discussed here. The range of heterosis was comparatively high for grain yield per plant (20·2–98·9%), clusters per plant (2·2–93·7%), and harvest index (11·6–39·2%), and low for pods per cluster (3·2–13·8%) and test weight (1·5–5·9%). The highest heterosis of 98·9% for yield was recorded by the cross 6,426 × 59. The other nine crosses in descending order were 109 × 32 (55·8%), 6,426 × 32 (50·6%), 109 × K21 (50·0%), 109 × T77 (46·4%) 109 × 55 (40·7%), 109 × 14 (31·4%), 109 × 59 (26·3%), 109 × 128 (24·4%) and 6426 × T65 (20·2%).

Out of these ten crosses, two involved low × low yielding parents (6,426 × T65 and 6,426 × 32), four high × low combinations (6,426 × 59, 109 × 14, 109 × 32 and 109 × 128) and four high × high (109 × K21, 109 × T77, 109 × 55 and 109 × 59). Thus six crosses involved at least one of the parents as low yielder for heterosis in yield. This suggests that the phenotypic superiority of the parent is not always an indication of a good genotype.

It was observed that heterosis in yield resulted mainly due to heterosis in clusters per plant and harvest index as also reported by earlier workers[1-3]. It is, therefore, suggested that heterosis in these two characters will be helpful in improving the productivity of blackgram.

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IMPARIPINNATE LEAF WITH NORMAL SIZE LEAFLET IN GROUNDNUT

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Groundnut (*Arachis hypogaea*, L.) leaf is paripinnate with two pairs of leaflets (Fig. 1A). Variations in leaflet arrangement are rare in this crop. Short mutants with reduced size of leaflets having imparipinnate[1-3], and three-paired leaflet[4] arrangements were reported earlier. In the present study a variant similar to the imparipinnate but with normal leaflet size was isolated in one of the F_3 progenies of a cross, TG–16 X TG–17. Both parents had paripinnate leaves. Characteristics of the variant and its inheritance are reported.

Trombay Groundnut[5,6] varieties (TG)–16 and 17 having branch habit and leaflet size similar in Spanish Improved (SP) variety (Fig. 1C) were crossed in 1977. F_1 plants and their leaves resembled the TG–16 parent. F_2 progenies of this cross segregated for only the parental types, *viz.*, TG–16 and 17 and all had paripinnate leaves. In F_3, one of the progenies segregated for plants having imparipinnate leaf (Fig. 1B). There were 22 plants with normal leaves and 7 with imparipinnate leaves. All the plant progenies from the segregating family were grown in F_4 and some in F_6 to study phenotypic and genotypic segregation. The results summarized in Table I showed that the imparipinnate leaf trait was governed by a single recessive gene which was confirmed by the 1 : 2 : 1 genotype segregation (X^2 in F_4 0·09, P = 70–80; in F_6 X^2 = 1·46, P = 20–30).

Fig. 1A–C. A. Paripinnate leaf; B. Imparipinnate leaf; C. Parents; D. Mutant, with incurved leaflets,

TABLE I

Segregation of leaf arrangement

Generation	Number of progenies	Number of plants: Paripinnate	Number of plants: Imparipinnate	X^2 3 : 1	*P* value
F_3	1	22	7	0·01	80–90
F_4	8	180			
	14	187	49	2·22	10–20
	7		80		
F_5	35	482			
	56	553	167	1·46	20–30
	26		296		

The variant after isolation in F_3 bred true in the succeeding generations. Plant growth, branching habit and flowering pattern were similar to SP and TG–16. Plant height was slightly reduced with thick stem and branches as in TG–17[6]. The leaves were dark green having waxy lamina. As shown in Fig. 1 the terminal leaflet was smaller in size compared to paripinnate leaflets. The first imparipinnate leaf developed at the 6th or 7th node on the stem. Subsequently, several imparipinnate leaves developed on the stem as well as on branches. On the stem, 25% of the leaves were imparipinnate, while such leaves were absent in the parents and SP. However, only 12% of leaves expressed the imparipinnate character in this variant unlike 45% of the leaves in the radiation-induced imparipinnate mutant[1]. In addition, 10% of the leaves had accessory leaflets at the basal pair. At seedling stage this resembled TG–16. During subsequent growth the new leaflets were elongated with apiculate tip. The curving of the leaflet margin towards dorsal side (Fig. 1D) in this variant resembled that in the lupinus mutant[7].

The pod setting, yielding and other economic factors in the variant were inferior to those of the parents indicating its importance only as a genetic marker.

The parents used in the cross had normal leaflets and hence the occurrence of the variant in F_3 generation could not be due to recombination. It is, therefore, presumed to be a result of spontaneous mutation.

March 2, 1981.

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ADAPTIVE SIGNIFICANCE OF SEED POLYMORPHISM IN *LAGERSTROEMIA PARVIFLORA* ROXB.

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THE phenomenon of genetic polymorphism in various organisms has been defined and discussed at length by earlier workers[1,2]. Somatic polymorphism in seeds of higher plants, is the production by individual plants of two or more sizes or shapes of seeds. Recently, herbaceous weeds[5] in particular have received attention. An association of seed polymorphism with differences in germination behaviour and its ecological significance have also received some attention[4–6]. Germination polymorphism in *Rumex crispus* and *Rumex obtusifolius* in relation to seed position on the plant[3] and that in *Chenopodium album* wherein seeds of different colour and size categories, having different germination requirements[4], are all related to the ability of the species to germinate and establish under diverse micro-environmental situations.

The present study deals with the germination behaviour of three different seed types in *L. parviflora* and a discussion on the adaptive significance of this phenomenon. The collection of mature fruits was made in March 1978 from a single tree from two different forest types at Tura, Meghalaya and Korba, Madhya Pradesh to ascertain the ubiquity of the phenomenon in this species. Replicates of fruits (10) were collected from each tree, each replicate having 5 fruits randomly sampled. The seeds extracted from the fruits, were segregated into three different types (Fig. 1) on the basis of size, weight and wing characteristics of seeds: (i) Large and heavy seeds with solid wing (type A), (ii) small and heavy seeds with solid wing (type B) and (iii) Large and light seeds with scaly wing (type C). The seed characteristics of the three types as mentioned above along with the frequency of occurrence of these within the seed population are shown in Table I. It may also be noted from this table that type C is most frequent in the seed