

## Heterosis in cytoplasmic male sterility based hybrids of pigeonpea

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### SUMMARY

Thirty eight hybrids obtained from crossing of new cms and restorer lines are grown to find out the heterosis over the standard check for the characters number of pods per plant and grain yield per plant (g). The heterosis in positive direction for number of pods per plant varied from 1.95% to 79.19% and for grain yield per plant (g) 0.97% to 59.68 over the check. The crosses AK-120-2A x AKPR-219, GT-33A x AKPR-297 and GT-288A x AKPR-192 showing highest heterosis over the check for the characters number of pods per plant and grain yield per plant (g).

**Key words :** CMS, Heterosis, Pigeonpea, Cytoplasmic male sterility

India ranks first in area and production of pigeonpea. However, the average productivity of pigeonpea in the country is low at around 650 kg per ha. Exploitation of heterosis through  $F_1$  hybrid breeding is one of the ways to exploit the phenomenon of heterosis. In the year 1991, the research on this breeding approach was started with the world's first genetic male sterility (GMS) based pigeonpea hybrid ICPH-8. This was followed by the release of additional GMS based hybrids. These hybrid performed well but they are not commercialized because of their limitations of 50% robbing in the seed production. Now the other alternative is to go for cytoplasmic genetic male sterility that would overcome the seed production problem of the GMS based hybrids.

### MATERIALS AND METHODS

Stable cytoplasmic genic male sterility from *Cajanus scarabaeoides* (Tikka *et al.*, 1997) has been used for diversification into different genetic backgrounds (Anonymous, 2004). These diversified cytoplasmic genetic male sterile lines were crossed with the identified highly fertile individual plants from the potential fertility restorers (Wanjari and Patel, 2003).

The present investigation was carried out at Pulses Research Unit, Dr. PDKV, Akola. The crosses were made during *kharif* 2007-08 and the  $F_1$  seed of possible 38 crosses was obtained. In the year 2008-2009, 38 crosses along with check (TAT-10) was grown in the plots

of two rows of 3 m length planted at 60 x 20 cm spacing in the RBD design. Individual plants were tested for pollen fertility. The data for the characters number of pods per plant and grain yield per plant (g) were recorded. Heterosis over the male parent, over the mid parent and over the standard parent (TAT-10) were calculated.

### RESULTS AND DISCUSSION

Data on heterotic response for pod number per plant and grain yield per plant (g) over the male parent, over the mid parent and over the standard parent are represented in Table 1. The average pod number of check (TAT-10) was 110.5. The range of mean for hybrids for the character pod number per plant was 43.5 to 198.16. The per cent heterosis over the male parent in the positive direction ranges from 11.24 to 396.43. The per cent heterosis over the mid parent ranges from 8.64 to 138.61. The heterosis over the standard check ranges from 1.95% to 79.19%.

For the character number of pods per plant, the highest heterosis over the male parent was obtained in cross GT-288A x AKPR-107 (396.43%) followed by cross AK-120-1A x AKPR-370 (391.00%) and cross GT-33A x AKPR-239 (337.32%). The highest heterosis over the mid parent was in hybrid GT-288A x AKPR-192 (138.61%) followed by GT-288A x AKPR-107 (127.87%) and GT-288A x AKPR-370 (123.63%). The highest heterosis for the hybrid over the check was found in the hybrid AK-120-2A x AKPR-219 (79.19%) followed by cross GT-33A x AKPR-297 (77.51%) and for the cross GT-288A x AKPR-192 (55.34%). Thus the hybrid GT-288A x AKPR-107 showed highest heterosis over male parent and second highest for the heterosis over mid parent. The cross GT-288A x AKPR-192 showed the highest heterosis over the mid parent and third highest over the check, for the character number of pods per plant.

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