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RESEARCH PAPER

Inbreeding depression in bottle gourd [*Lagenaria siceraria* (Molina) Standl.]

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Abstract : The present investigation entitled inbreeding depression in bottle gourd [*Lagenaria siceraria* (Molina) Standl.] was carried out at Horticultural Research Farm, Department of Applied Plant Science (Horticulture), Babasaheb Bhimrao Ambedkar University, Lucknow during the year of 2008-10. In the present investigation, fifteen diverse genotypes of bottle gourd were used as experimental materials. The fifteen genotypes were AD-1, DK, PBOG-22, VRBG-1, VRBG-15, VRBG-40, VRBG-44, VRBG-88, VRBG-105, VRBG-107, VRBG-148, Pusa Naveen, PSPL and NDBG-104. The trail was conducted in Randomized Block Design with three replications. The row to row and plant to plant spacing were maintained at 2.0m x 1.0 m, respectively. The cross combination VRBG-112 x Pusa Naveen showed highest inbreeding depression for days to fifty per cent germination, PBOG-22 x Pusa Naveen exhibited highest inbreeding depression for days to first male flower anthesis, VRBG-40 x Pusa Naveen showed maximum inbreeding depression for days to first female flower anthesis, VRBG-18 x NDBG-104 showed maximum inbreeding depression for node number to first male flower, AD-1 x NDBG-104 showed highest inbreeding depression for node number to first female flower, DK x NDBG-104 showed highly inbreeding depression for vine length, VRBG-1 x Pusa Naveen exhibited maximum inbreeding depression for number of node per vine, DK x Pusa Naveen showed highest inbreeding depression for number of primary branches per plant, AD-1 x Pusa Naveen showed maximum inbreeding depression for length of fruit, AD-1 x NDBG-104 showed highest inbreeding depression for weight per fruit, VRBG-1 x PSPL showed maximum inbreeding depression for number of fruit per plant and VRBG-148 x NDBG-104 showed maximum inbreeding depression for fruit yield per plant.

Key Words : Inbreeding depression, Bottle gourd

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INTRODUCTION

Bottle gourd [*Lagenaria siceraria* (Molina) Standl.] belongs to the family Cucurbitaceae. Bottle gourd is monoecious annual having vine with long ribbed stem and strong tendrils. Flower open at night being a monoecious crop bottle gourd is strictly cross pollinated crop. Bottle gourd is a warm season crop. It cannot tolerate high cold and frost. It is highly sensitive to photo period. Short days and humid climatic promote femaleness. It requires 18^0C minimum temperature for seed germination and 20-30^0C for growth and development of the plant.

The inbreeding depression to decrease in fitness and vigour due to inbreeding. The degree of inbreeding is measured by inbreeding coefficient. The inbreeding depression is estimated when both F_1 and F_2 population of the some cross are available. The inbreeding depression may be high, medium, low and nil depending upon the crop-species.

MATERIALS AND METHODS

The experiment was carried out at Horticultural Research Farm, Department of Applied Plant Science (Horticulture), Babasaheb Bhimrao Ambedkar University, Lucknow during the year of 2008-10. In the present investigation, fifteen diverse genotypes of bottle gourd were used as experimental materials.

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The fifteen genotypes *viz.,* AD-1, DK, PBOG-22, VRBG-1, VRBG-15, VRBG-40, VRBG-44, VRBG-88, VRBG-105, VRBG-107, VRBG-148, Pusa Naveen, PSPL and NDBG-104 were used to make crosses in line x testers fashion design to produce 36 crosses. The plant to plant and row to row spacing were maintained at 1.0 m x 2.0 m, respectively. The trial was carried out under Randomized Block Design with three replication. The data were recorded on 12 characters of bottle gourd *viz.,* days to fifty per cent germination, days to first male flower anthesis, days to first female flower anthesis, node number to first male flower, node number to first female flower, vine length (m), number of nodes per vine, number of primary branches per plant, weight per fruit (kg), number of fruits per plant and fruit yield per plant (kg). the inbreeding depression calculated as percentage reduction in performance of F_2 over F_1 populations.

RESULTS AND DISCUSSION

The percentage reduction in performance of F_2 over F_1 was recorded as inbreeding depression and given in Table 1. The magnitude of inbreeding depression for days to fifty per cent germination ranged from -20.90 per cent (VRBG-112 x Pusa Naveen) to 23.63 (VRBG-40 x NDBG-104). The cross combinations VRBG-112 x Pusa Naveen (-20.90%) followed by VRBG-18 x NDBG-104 (-20.61%), VRBG-1 x Pusa Naveen (-18.71%), DK x NDBG-104 (-16.66%) and VRBG-107 x NDBG-104 (-15.52%) showed maximum inbreeding depression for days to fifty per cent germination. The inbreeding depression ranged from -18.26 per cent (PBOG-22 x Pusa Naveen) to 18.35 per cent (VRBG-18 x PSPL) for days to first male flower anthesis. The cross combination PBOG-22 x Pusa Naveen (-18.26 %) followed by VRBG-44 x Pusa Naveen (-16.24%),VRBG-1 x PSPL (-13.84%), VRBG-112 x Pusa Naveen (-12.72 %) showed highest inbreeding depression for days to first male flower anthesis. The inbreeding depression ranged from -14.21per cent (VRBG-40 x Pusa Naveen) to 18.71 per cent (Ad-1 x NDBG-104) for days to first female anthesis. The cross combinations VRBG-40 x Pusa Naveen (-14.21%) followed by VRBG-112 x Pusa Naveen (-11.84%), DK x Pusa Naveen (-10.91 %), VRBG-44 x Pusa Naveen (-9.18%) and AD-1 x PSPL (-8.58%) exhibited maximum inbreeding depression for days to first female flower anthesis. The inbreeding depression ranged from -92.30 per cent (VRBG-18 x NDBG-104) to 32.22 per cent (VRBG-1 x PSPL). The cross combination VRBG-18 x NDBG-104 (-92.30%) followed by PBOG-22 x NDBG-104 (-81.61%), AD-1 x NDBG-104 (92.30%) followed by PBOG-22 x NDBG-104 (-81.61%), Ad-1 x NDBG-104 (-76.70%), VRBG-40 x NDBG-104 (41.01%) and VRBG-107x NDBG-104 (-40.18%) showed maximum inbreeding depression for node number to first male flower. The inbreeding depression ranged from -54.67 per cent (Ad-1 x NDBG-104) to 61.91 per cent (PBOG-22x NDBG-104). The cross combinations AD-1 x NDBG-104 (-54.61%) followed by VRBG-18 x NDBG-104 (-49.02%), VRBG-107 x Pusa Naveen (-30.70%), AD-1 x Pusa Naveen (-22.72%) and DK x NDBG-104 (-20.56%) showed maximum inbreeding depression for node number to first female flower. The inbreeding depression for node number to first female flower. The inbreeding depression ranged from -65.68 per cent (DK x NDBG-104) to 48.27 per cent (VRBG-44 x Pusa Naveen). The cross combinations DK x NDBG-104 (-65.68 %) followed by PBOG-22 x NDBG-104 (-40.31%),VRBG-112 x NDBG-104 (-24.65%), VRBG-107 x NDBG-104 (-23.56%) and PBOG-22 x PSPL (-21.73%) showed maximum inbreeding depression for vine length. The inbreeding depression ranged from -15.02 per cent (VRBG-1 x Pusa Naveen) to 12.69 (VRBG-88 x NDBG-104) for number of nodes per vine. The cross combination VRBG-1 Pusa Naveen (-15.02%) followed by VRBG-105 x NDBG-104 (-12.68 %), VRBG-40 x NDBG-104 (-10.95%), PBOG-22 x NDBG-104 (-9.78%) and VRBG-40 x Pusa Naveen (-9.64%) recorded maximum inbreeding depression for number of nodes per vine. The inbreeding depression ranged from -59.93 per cent (DK x Pusa Naveen) to 32.65 per cent (VRBG-148 x Pusa Naveen). For number of primary brunches per plant. The cross combination DK x Pusa Naveen (-59.93%) followed by VRBG-40 x NDBG-104 (-35.58%), VRBG-148 x NDBG-104 (-34.93%), VRBG-105 x NDBG-104 (-33.94%) and VRBG-18 x NDBG-104 (-28.08%) showed maximum inbreeding depression for number of primary branches per plant. The inbreeding depression ranged from -8.85 per cent (AD-1 x Pusa Naveen) to 11.26 per cent (AD-1 x PSPL). The cross combination AD-1 x Pusa Naveen (-8.85%) followed by VRBG-88 x Pusa Naveen (-8.26%), DK x Pusa Naveen (-8.06%), AD-1 x NDBG-104 (-7.27 %) and PBOG-22 x NDBG-104 (-6.69%). The inbreeding depression ranged from -47.65 per cent (AD-1 x NDBG-104) to 33.46 per cent (VRBG-112 x PSPL). The cross combination AD-1 x NDBG-104 (-47.65%) followed by VRBG-148 x NDBG-104 (-37.40%), DK x Pusa Naveen (-36.36%), DK x NDBG-104 (-22.85%) and VRBG-107 x Pusa Naveen (-20.57%) showed maximum inbreeding depression for weight per fruit. The inbreeding depression ranged from -50.61 per cent (VRBG-1 x PSPL) to 28.26 per cent (VRBG-107 x Pusa Naveen) for number of fruit per plant. The cross combination VRBG-1 x PSPL (-50.61%) followed by VRBG-112 x NDBG-104 (-49.88%), VRBG-88 x Pusa Naveen (-38.44%), DK x PSPL (37.20%) and VRBG-105 x NDBG-104 (-34.25%) showed highest inbreeding depression for number of fruit per plant and inbreeding depression ranged from -41.90% (VRBG-148 x NDBG-104) to 32.78 per cent (AD-1 x NDBG-104). The cross combination VRBG-148 x NDBG-104 (41.90%) followed by DK x PSPL (-23.63%), VRBG-18 x Pusa Naveen (-11.35%), VRBG-44 x PSPL (-10.28%) and AD-1 x Pusa Naveen (-9.15%) showed maximum inbreeding depression on for fruit yield per plant. Pandey *et al.* (2003) and Yadav and Kumar (2011) had worked on heterosis and inbreading depression in bottle gourd related to the present investigation.

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