Chapter 6
Summary and Conclusion
Chapter-VI

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The present investigation was carried out during summer, rainy and winter season of 2008-2009 at ICAR-Research Complex for Eastern Region, Research Centre Ranchi with 32 genotypes of guava (*Psidium guajava* L.) to characterize the germplasm based on morphological and phenological parameters and their relationship with yield. Estimation of genetic divergence was also done based on their growth characters and correlation study was done between different growth and phenological characters with yield.

The salient findings and conclusions are summarized as follows:

- Among 32 guava germplasm the tallest genotype was Guatemala whereas Allahabad Safeda was most dwarf.
- During summer season, the genotype Guatemala showed its consistency in increasing plant height at a higher rate. But genotype Chittidar A.C. showed the maximum per cent increase in plant height during summer.
- During rainy season the genotypes viz., Guatemala, Behat Coconut, White Fleshe, Mild Fleshe, Sangam and Pear Shaped were found consistent with respect to higher growth in plant height.
- The genotypes Spear Acid and CHG-3 showed consistency with respect to higher value of per cent increase in plant height during winter season crop.
- The genotypes Allahabad Collection and Florida Fleshe were consistent in their per cent increase in canopy spread E-W during summer season crop.
- The genotypes viz., Barkhana, Allahabad Collection, Florida Fleshe and Kairala Seedling were consistent with respect to per cent increase in canopy spread E-W as rainy season crop.
- During winter, the genotype Smooth Green was consistent for higher per cent change of canopy spread E-W.
- The genotypes viz., White Fleshe, Behat Coconut, Guatemala, Apple Colour, CHG-1, Barbados Superior, Surkhaguddi, and Superior showed their consistency for higher growth in canopy spread N-S in summer season.
• The genotypes viz., Kairala Seedling, Florida Fleshedd, Barkhana and Allahabad Collection showed consistency with respect to higher value of per cent increase in canopy spread N-S during winter season crop.
• The genotype Behat Coconut showed its consistency for higher increase in girth of main trunk during summer season crop.
• The genotypes viz., Florida Fleshedd, Chittidar A.C., Allahabad Collection, Barkhana, CHG-5, Allahabad Safeda, Seed Drop, Sindh, Sangam, and Nasik, were consistent with respect to per cent increase in girth of main trunk during summer season crop.
• The genotypes Behat Coconut and Guatemala showed consistency for higher growth in girth of main trunk during rainy season crop.
• The genotypes viz., Kairala Seedling, Florida Fleshedd, Chittidar A.C., Barkhana, Allahabad Collection, Sardar, CHG-5, Allahabad Safeda, Sindh, CHG-3 and CHG-1 were consistent with respect to higher value of per cent increase in girth of main trunk during rainy season crop.
• The genotypes Behat Coconut and Guatemala exhibited consistency with respect to higher increase in girth of main trunk during winter season crop.
• The genotypes viz., Kairala Seedling, Florida Fleshedd, Chittidar A.C., Barkhana, Allahabad Collection, CHG-5, CHG-3, Seed Drop, CHG-1 and Sangam were consistent with respect to higher values of per cent increase in girth of main trunk during the winter season crop.
• The genotype Allahabad Collection, which was at par with Kairala Seedling, CHG-2, Barkhana, Sardar, Harijha, Florida Fleshedd showed consistency with respect to higher values of per cent increase in girth of primary branches during winter season crop.
• White Fleshedd genotype was consistent in higher increase in girth of secondary branches during the summer season crop.
• Kairala Seedling genotype showed consistency with respect to per cent increase in girth of secondary branches during summer season crop.
• In all seasons and both the years the girth of main trunk was significant. It clearly indicated that the girth of main trunk is a stable character on which predictability could be drawn.
• There was no change in average length of primary and secondary branches. This result indicated that once branching is formed there will be only radial expansion of growth.

• The genotypes like Mild Fleshed, Seed Drop, Surkhaguddi, Eskwala, CHG-1 and CHG-2 can be grown as summer, rainy and winter season crops.

• The genotype Barbados Superior is only suitable for rainy season crop.

• Guetamala is a bold seeded genotype. The genotypes like Kairala Seedling, Florida Flesed, Mild Flesed, Surkhaguddi, CHG-5, Nasik and Patiala are small seeded.

• The maximum pulp: seed ratio was found in genotypes Surkhaguddi and Allahabad Safeda.

• Empirical formula for leaf area was developed.

• Early bud breaking genotypes were high yielding.

• Duration of flowering was positively and significantly correlated with yield.

• From quality point of view, the genotypes like Allahabad Safeda, Sardar, Chittidar, Kairala Seedling, Surkhaguddi, Seed Drop, Mild Flesed and CHG-1 were promising under subtropical subhumid condition of Jharkhand.

• The prominent early bud breaking genotypes were Mild Flesed, Chittidar, Sardar, Allahabad Safeda, White Flesed and CHG-1.

• The multivariate analysis using $D^2$ statistic in the population revealed that the genotypes were grouped into six clusters. Cluster II comprised of maximum number of genotypes i.e.11 followed by Cluster III with 9 genotypes, Cluster V with 5 genotypes, Cluster I with 4 genotypes and Cluster VI with 2 genotypes. Only Cluster IV was monogenotypic.

• The maximum genetic divergence ($D^2$) was observed between Cluster VI and Cluster IV (222.41) followed by Cluster VI and Cluster I (140.618) and Cluster V and Cluster IV (125.442). The minimum inter cluster distance was obtained between Cluster II and Cluster I (25.049).

• Superior dwarf and high yielding hybrids can be obtained if crosses would be made between parents of Cluster VI (Sardar and Allahabad Safeda) and Cluster I (Barkhana, Banarasi, Kairala Seedling and Apple Colour).

• Correlation studies indicated significant correlation between yield of different seasons and number of flowers in bearing shoot, per cent fruit set and duration of flowering in respective seasons. These parameters can be effectively used for
prediction of yield in different seasons through the regression equation derived under the study.

- Fruit size, fruit weight and fruit volume were positively and significantly correlated with yield.
- On the basis of fruit weight, fruit size, TSS, ascorbic acid and pulp: seed ratio, it was clear that during summer season promising genotypes were Seed Drop, Surkhaguddi and Eskwala whereas the genotypes Chittidar, Spear Acid, Behat Coconut, Pear Shaped and Allahabad Safeda were promising during rainy season. During winter season the promising genotypes were Sardar and Allahabad Safeda, Kairala Seedling and Chittidar A.C. The genotype Allahabad Safeda accounted for the maximum pulp: seed ratio which indicated the genotype having less seed.
- Based on fruit yield, CHG-1 was the best genotype. But during rainy and winter season genotypes Allahabad Safeda exhibited higher yield.
- From seasonal variation study, it was evident that fruit weight and fruit size gradually increase from summer to rainy season and thereby winter season. TSS and ascorbic acid was low in rainy season, medium in winter season and high in summer season. In case of pulp: seed ratio the average low value was observed in rainy season whereas summer season exhibited medium value. The maximum pulp: seed ratio was found in case of winter crops. Genotype Allahabad Safeda accounted for the highest pulp: seed ratio in winter season.

Hence, it may be concluded that the existing variability among the genotypes of guava available offer ample scope for selection of superior genotypes and genetic improvement. The locally selected genotype CHG-1 (CHES Guava-1) is the most promising genotype followed by Allahabad Safeda and Sardar. Superior dwarf and high yielding hybrids can be obtained if crosses would be made between parents of Cluster VI and Cluster I. A better understanding of relationship between plant morpho-pheno productivity parameters has been developed under this study. Parameters like higher content of chlorophyll in leaf and longer duration of flowering were identified as promising characters during genotype selection for higher productivity in guava.