Selection of Elite Hybrids of Rice Based on Combining Ability and Heterosis

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The general combining ability (GCA) of the parents and specific combining ability (SCA) and **standard** heterosis, mid parent heterosis and heterobeltiosis of the hybrids of rice were analyzed in an experiment involving16 $\mathbf{F}_1$ hybrids and their parents (Cytoplasmic male sterile lines CMS91, CMS117, CMS73, CMS25) and restorer lines, (Res156, Res160, Res316 and Res290). All the crosses and parents were evaluated along with three standard check rice varieties, BG403, BG357 and BG304. The observations were recorded on 11 morphological and agronomic traits including, productive tillers per hill, 1000 grain weight, number of filled grains per panicle, plant height, panicle length, days to 50% flowering, flag leaf length, flag leaf width, root dry weight, root volume and yield per hill. The crosses were categorized as three months, 3.5 months and four months hybrid lines, based on 50% flowering data. The study revealed significant differences among the parents for most of the characters except yield per hill, productive tillers per panicle, filled grains per panicle, root volume per hill and root dry weight. CMS73, CMS25 and Res 160 exhibited positive significant GCA values for thousand grain weight, flag leaf length and flag leaf width, respectively. SN290 exhibited a significant negative GCA value for plant height. None of the parents or hybrids showed significant GCAor SCA effects in the desired direction for all the traits studied. Evaluation of the overall performance of hybrids obtained for standard heterosis, heterobeltiosis and specific combining ability, with respect to yield related traits revealed, CMS91 x Res316, CMS117 x Res160,CMS117 x Res316, CMS73 x Res160, CMS73 x Res316, CMS25 x Res160 and CMS25 x Res156 to be elite hybrids. CMS73 and CMS117 and CMS25 were identified as good testers and Res160 and Res316 were found to be better performing lines or restorers.

Keywords: GCA, SCA, Combining ability, Heterosis, Hybrid rice