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Studies on combining ability in okra [*Abelmoschus esculentus* (L.) Moench]

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ABSTRACT

A line x tester analysis in okra was carried out with 20 parents (17 lines x 3 testers) and their 51 F_1's, in two different seasons. The combining ability variances indicated the preponderance of non-additive gene action for all the characters. Studies indicated the scope of heterosis breeding in crop improvement in okra. The lines *viz.*, VRO-5, VRO-6, Arka Abhay, IC-218844 and testers like Arka Anamika proved to be the good general combiner and Arka Abhay x Arka Anamika, was the good specific combiner for most of the yield and yield attributing traits.

Key words : Combining ability, Line x tester, Okra, Heterosis, Okra

Okra [*Abelmoschus esculentus* (L.) Moench] is an important vegetable crop in the tropics and sub-tropics parts of the world. There is tremendous scope for improvement in okra. The success of any crop improvement programme depends upon the nature and magnitude of gene action as determined in the form of lines with high combining ability. The lines which produce good progenies on crossing are of immense value to the breeder. Combining ability is an effective tool to identify the suitable parents and crosses for their use in effective crop improvement programme (Sprague and Tatum, 1942). The concept of combining ability plays a pivotal role together with *per se* performance of parents, hybrids and heterotic response helps breeders in selecting potential parents, which combine well in producing promising hybrids for systematic breeding programme. In present research work, the combining ability was carried out through line x tester in order to sort out good combiners that can be utilised in the production of commercial hybrids.

MATERIALS AND METHODS

The present investigation was carried out at Institute of Agriculture Sciences, Banaras Hindu University, Varanasi, in a Randomized Block Design with three replications during two crop seasons. All the recommended practices were followed during experimentation. The experimental material consisted of 51 F_1's, involving 17 lines (IC – 128883, VRO – 5, VRO-6, AC-108, IC – 45806, IC – 218877, IC – 218844, Arka Abhay, IC – 43720, IIVR – 342, IC – 140906, IIVR – 198, EC – 305612, IIVR – 435, IIVR – 401, SA – 2 and IC – 140934) and 3 testers (Arka Anamika, Pusa Sawani and Parbhani Kranti). Observations were recorded on fifteen characters *viz*., plant height (cm), stem diameter (cm), number of branches/plant, number of nodes/plant, internodal length (cm), days to first flowering, days to 50 per cent flowering, number of fruits/plant, single fruit weight (g), fruit length (cm), fruit diameter (cm), fruit yield/plant (g), number of seeds/fruit, number of ridges/fruit and ascorbic acid content (mg/100g). Combining ability analysis was worked out in line x tester design as suggested by Kempthorne (1957).

RESULTS AND DISCUSSION

The analysis of variance (Table 1 and 2) for combining ability indicated that mean sum of square due to lines (females) were highly significant for all the characters indicating genetic diversify among the lines, this highest contribution by these characters towards combining ability. Variation in tester was also significant for 13 characters. The female x male interaction component also emerged significant for all the 15 characters, which proved that the combining ability contributed heavily in the expression of these traits. Similar findings were reported by Singh and Singh (2003), Kumar *et al*. (2005) and Singh *et al.* (2009).

Estimates of GCA effects (Table 3) showed that it was difficult to pickup a good combiner for all the characters together as the combining ability effect were not consistent yield attributing traits. It was not possible because of low or negative association of characters, whereas overall results indicated that seven lines and one tester having positive significant GCA effects for fruit