

# Combining Ability Studies in Okra (*Abelmoschus esculentus* L.): Understanding Genetic Architecture for Better Breeding

**Kailash Ram**

Assistant Professor, Ag. Botany

Government Degree College, Jakhini, Varanasi, UP, India

**Abstract:** Okra (*Abelmoschus esculentus* L.) stands as one of the most valuable vegetables which people cultivate during warm seasons throughout tropical and subtropical regions. Breeding programs need to establish base genetic knowledge about parental gene interactions to achieve successful results in both yield and quality development. The article analyzes okra research through combining ability study methods which use general combining ability and specific combining ability to identify superior parent plants and hybrid combinations. Researchers discovered through their diallel and line  $\times$  tester crossing systems that both additive and non-additive gene actions control important traits such as fruit yield, days to first flowering, plant height, and fruit length. The relative importance of each gene action varies by trait and environment. Breeders who understand these patterns can make smarter decisions about which parents to cross, which hybrids to develop, and which selection strategies to adopt. The article investigates how combining ability research impacts both hybrid seed programs and population improvement programs which focus on okra development.

**Keywords:** combining ability, specific combining ability, gene action, okra, general combining ability, diallel analysis

