GCA and SCA

 low GCA value, positive or negative, shows that the mean of a parent in crossing with the other does not vary largely from the general mean of the crosses. In contrast, a high GCA value shows that the parental mean is superior or inferior to the general mean. This indicates a potent evidence of desirable gene flow from parents to offspring at high intensity and represents information regarding the concentration of predominantly additive genes.[56](https://medcraveonline.com/BBIJ/principles-and-utilization-of-combining-ability-in-plant-breeding.html#ref56) A high GCA estimate indicates higher heritability and less environmental effects. It may also result in less gene interactions and higher achievement in selection.[2](https://medcraveonline.com/BBIJ/principles-and-utilization-of-combining-ability-in-plant-breeding.html#ref2),[30](https://medcraveonline.com/BBIJ/principles-and-utilization-of-combining-ability-in-plant-breeding.html#ref30) One of the main features of the elite parent with high GCA effect is its large adaptability. A parent good in per se performance may not necessarily produce better hybrids when used in hybridization.[3](https://medcraveonline.com/BBIJ/principles-and-utilization-of-combining-ability-in-plant-breeding.html#ref3),[38](https://medcraveonline.com/BBIJ/principles-and-utilization-of-combining-ability-in-plant-breeding.html#ref38),[57](https://medcraveonline.com/BBIJ/principles-and-utilization-of-combining-ability-in-plant-breeding.html#ref57) Concurrently, it also indicated that one parent of the worst combination could make the best combination if the other parent was selected properly.[9](https://medcraveonline.com/BBIJ/principles-and-utilization-of-combining-ability-in-plant-breeding.html#ref9)

In GCA determination, SCA usually acts as a masking effect. By using genetically broad testers or increasing number of testers, SCA impact can be decreased.[58](https://medcraveonline.com/BBIJ/principles-and-utilization-of-combining-ability-in-plant-breeding.html#ref58) Parental choice only on the basis of SCA effect has limited value in breeding programs. Therefore, SCA effect should be used in combination with a high performance per se hybrid, favourable SCA estimates, and involving at least one parent with high GCA[13](https://medcraveonline.com/BBIJ/principles-and-utilization-of-combining-ability-in-plant-breeding.html#ref13),[41](https://medcraveonline.com/BBIJ/principles-and-utilization-of-combining-ability-in-plant-breeding.html#ref41),[44](https://medcraveonline.com/BBIJ/principles-and-utilization-of-combining-ability-in-plant-breeding.html#ref44),[56](https://medcraveonline.com/BBIJ/principles-and-utilization-of-combining-ability-in-plant-breeding.html#ref56)