ABSTRACTS

Utilizing Hexaploid Synthetics for Widening the Genetic Base in Indian Wheats

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Wheat is consumed by more than 60 percent of Indian population in one or the other form. The crop occupies nearly 27 million ha of area, around 70 million tonnes of production and now India stands at second position next to China in the world. However, the ever increasing population of India will need at least 109 million tones of wheat by 2020 AD to meet the domestic requirement. The chances of marginal increase in area under wheat are miniscule and thus the only option left with is the increased productivity. During the last three decades, the wheat production has shown continuous increase at the rate of about one percent per annum even after having a wide array of diverse varieties released for different agro-climatic as well as production conditions. The last quantum jump in yield was attained with the release of variety PBW 343, which presently occupies about 20% of wheat area in the country. Having such a large area under single variety has been a concern for wheat researchers in view of possible threats from various diseases and insects.

The availability of genetic variability in the material is a necessity to make any breeding programme vibrant. The genetic variability is directly correlated with the selection efficiency not only for yield alone but for other biotic and abiotic factors also. In India, a large number of crosses are attempted every year and nearly 600 genotypes developed on active wheat breeding centers are put under testing at national level for yield, disease and quality attributes. Whereas, only few (4-7) genotypes are identified for release and maximum area is covered by few important varieties. This process is further narrowing down the variabilitShoranin each genotype was grown in six row plot of 3 m length keeping 23 cm spacing between the rows. Data on various traits were recorded on 10 randomly selected plants and then means were calculated. The data on spike length and spikelets per spike were taken on main tiller of the plants, whereas, the characters like days to heading, maturity and disease were recorded on plot basis.

The results of study revealed a wide range of variation for most of the traits studied. The range, mean, coefficient of variation (CV) and standard deviation were taken as the parameters to estimate variability. Some of the synthetics have shown longer spike (15.8 cm), bold grain (52 g), high tillering (200/ m), more spikelets/ spike (25) and more seeds per spike (70) as compared to local check (PBW 343). Around 20 synthetics were found resistant to yellow and brown rusts and leaf blight. In addition, some of these accessions have shown promise for root length (23 cm), root spread (13 cm) and root dry matter (1.86 g) along with high shoot biomass. After three years of rigorous evaluation for various yield contributing traits, resistance against rusts and leaf blight, tolerance to heat and salinity, promising lines have been identified and selected.

The Directorate of Wheat Research initiated hybridization programme involving these promising synthetics with modern varieties in a view to widen the genetic base for traits of economic importance. For this purpose, the bread wheat varieties like PBW343, C306, K9107, K9006, WH542, GW273, HUW468, HUW234 and a set of durum varieties like HI8498, PDW233, PBW34, A-9-30-1 have been hybridized with synthetic wheat lines. The segregating materials of different generations are now being evaluated and shared for their wider use at national level. Though there is still need to improve the threshability and grain attributes, the improvement for many of the above mentioned traits is very much visible in the selections made from segregating material. In addition to straight crosses, back crossing approach has also been utilized to further improve the agronomic base of segregating materials. The work done so far has helped to identify sources of economic traits and to widen the genetic base to some extent. Nevertheless, there also exists a good scope for their use in improving some of the other traits like pre-harvest sprouting tolerance, salinity tolerance, and stay green habit to counter the heat stress. The extensive use of synthetics in breeding programme will certainly help wheat breeders to further raise the yield potential of new cultivars and moving closer to meet the anticipated demand of wheat production in the country.