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Development of Climate Resilient Sorghum-Sudangrass Hybrids to Address the Livestock Feed Security in Extreme SummerS

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Abstract

Farmers of the developing countries in South-East Asia are facing acute deficiency of green fodder throughout the year, a situation becoming worst during summer season. An ideal production of quality animal feed is only achievable through interaction of potential genotypic expression and optimal environmental conditions. Among the environmental factors, water is the most important factor and drought stress steadily diminish crop production all over the world. Pakistan has a variety of summer fodder crops as corn, sorghum, millets, sudangrass and cowpeas but existing genotypes cannot tolerate abrupt and extreme changes of climate especially a raise in temperature of above 50°C during June and July. Sorghum-sudangrass hybrids have the ability to provide fodder from April to October once sown in March and can tolerate extreme high temperatures and drought stress. Punjab Agricultural Research Board, Pakistan has funded a project PARB-288 to develop climate resilient multicut/multi-tillering sorghum-sudangrass hybrid combinations. This research project presents effects of drought stress on sorghum grasses at the physiological level (water potential, turgor pressure, photosynthetic efficiency, glycine betain content and proline content) and shows the possibility of combining genes for high fodder yield with better nutritional quality. 100 hybrids were developed and evaluated for multiple cuttings under drought stress for green fodder yield and fodder quality components (crude protein, crude fiber, sugar contents and TDN). It was concluded that drought stress has several undesirable effects on growth of sorghum hybrids as reduced forage yield, decreasing palatability lignification, and reduced availability of total digestible nutrients, and digestibility. This research gives insight to better exploit the genetic potential of intraspecific hybridisation in sorghum-sudangrass. In this way plants having the ability of efficient water use utilisation, will be developed. This will be helpful to tackle issues of food security through breeding fodder crops.

Keywords: Sorghum hybrids, climate resilient, crude protein, drought stress, fodder yield, TDN

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