Introduction

Sugarcane Production & Breeding background

As one of the global main crops, the sugarcane provided about 180.1 million tons yield in 2019, and accounted for approximate 79% of total global sugar production in the same year (Service, 2021). However, due to the high polyploidy and highly heterozygous genome structure, the breeding outcomes including the rate of selection cycle decrease and genetic gain in the past 20 years were slow. The typical breeding cycle of sugarcane by clonal selections which rely on the end-of-season yields is 12-14 years (Wei and Jackson, 2017).

There are several challenges during the sugarcane breeding.

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Wei, X., and Jackson, P. (2017). Addressing slow rates of long-term genetic gain in sugarcane. Pakistan Sugar Journal *32*, 23.