AGRONOMIC AND YIELD PERFORMANCE OF CHILI (*Capsicum annuum* L.) F1 HYBRIDS OVER COMMERCIAL F1 VARIETIES

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ABSTRACT

Chili (*Capsicum annuum* L.) is one of the high-value condiments in Sri Lanka, and its productivity is greatly constrained due to lack of high-yielding varieties. The development and evaluation of F1 hybrids represent an effective approach to identify novel, commercially viable cultivars with superior agronomic and yield performance. Therefore, the study was conducted at the Research and Development farm of Onesh Agri (Pvt) Ltd, Giriulla, to evaluate the agronomic and yield superiority of newly developed 199 F1 chili hybrids over 5 commercial varieties available in the market namely, CH218, CH224, MICH HY, Rajini and *Daiyya*. The experimental materials were evaluated for key agronomic and yield-related traits across five harvesting cycles. Data were analyzed using hierarchical cluster analysis to group similarly performing hybrids, followed by analysis of variance (ANOVA) and Tukey's HSD test to compare mean differences at the 5% level of significance. The results revealed that the hybrids were primarily grouped into six distinct clusters, exhibiting highly significant variation among genotypes for all measured traits across the entries within each cluster. Across all six groups, F1 hybrids consistently outperformed the commercial checks in total fruit number, fruit weight, and yield per plant. In Group 1, hybrids CH450, CH304, CH451, CH427, and CH459 recorded the highest yield, surpassing the commercial checks CH218 and CH224. A similar trend was observed in Groups 2 and 3, where hybrids CH418, CH282, CH322, CH341, CH501, CH321, CH361, CH423, CH328, and CH346 ranked among the top performers, while the commercial checks MICH HY and *Daiyya* recorded significantly lower yields. Similarly, in Groups 4, 5, and 6, the F1 hybrids CH400, CH301, CH281, CH305, CH414, CH335, CH259, CH360, CH296, CH363, CH313, CH317, CH325, CH320, and CH323 consistently ranked among the highest performers. Overall, the newly developed F1 hybrids exhibited pronounced heterosis, demonstrating superior yield potential, adaptability, and field resistance compared to the commercial varieties. The elite hybrids identified, particularly CH450, CH304, CH451, CH427, and CH459, represent promising candidates for multi-location trials, while associated parental lines constitute valuable genetic resources for future chili breeding programs aimed at improving productivity and sustainability in Sri Lanka.

Keywords: Commercial varieties, F1 hybrids, heterosis, yield components

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