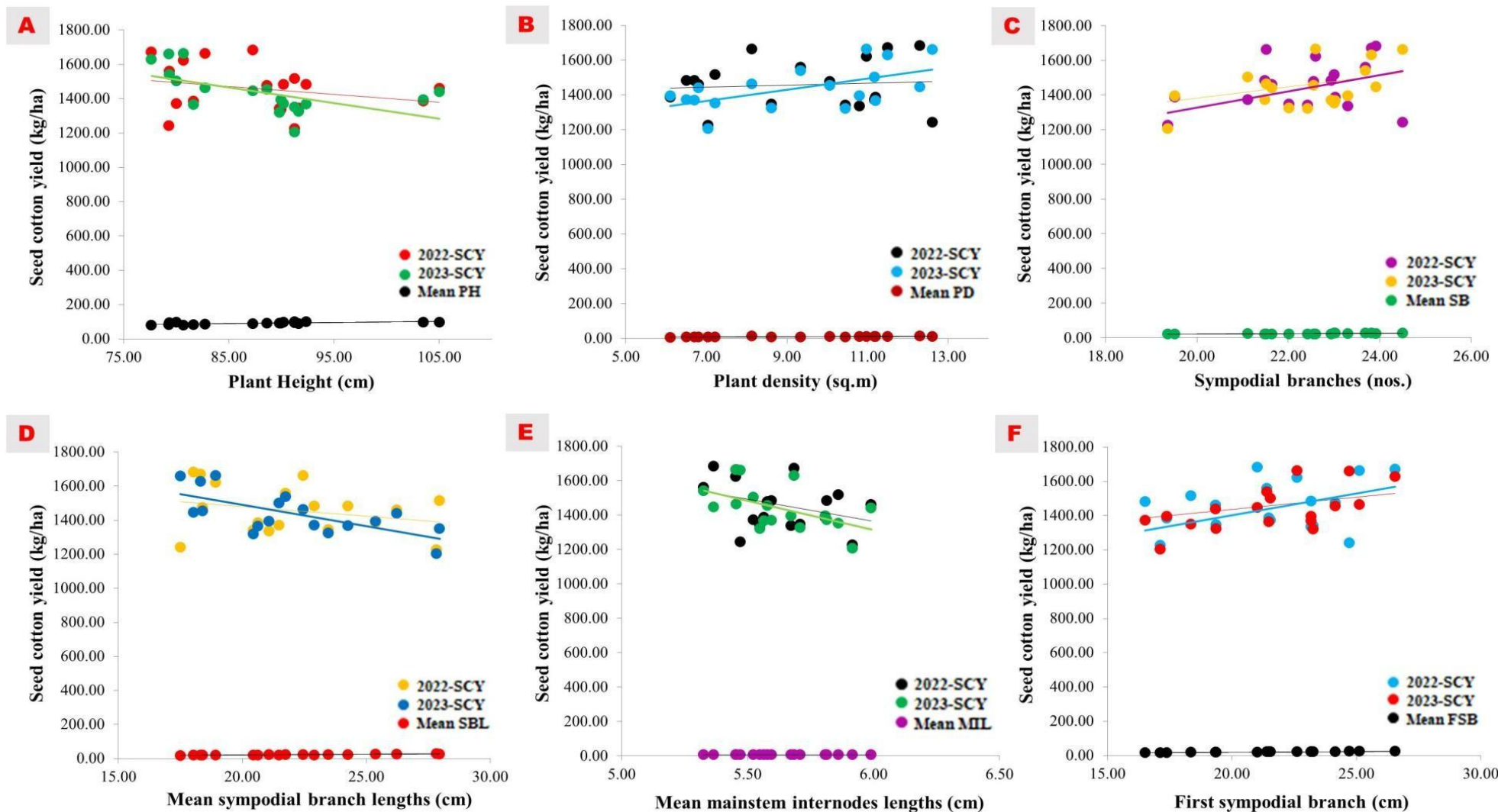


Supplementary Fig. S1. The box and whisker plots compare the trait performance of cotton cultivars in two environments, E1 and E2 (A-N). These plots effectively display the distribution, variability and central tendency of the trait data for each environment (O), facilitating a comprehensive analysis of trait performance across the two growing seasons.



7 **Supplementary Fig. S2.** Scatter-plots represent the correlation between mean of different compact plant architecture traits (A-F) and seed cotton yield
8 in two distinct environments, E1-*Kharif*-2022 and E2-Summer-2023.