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Biomass production and distribution in seedlings of *Coffea Arabica* genotypes under contrasting nursery environments in southwestern Ethiopia

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ABSTRACT
In Ethiopia, the natural forests with the occurrence of wild Arabica coffee gene pools are under constant threats, largely due to anthropogenic activities. The study was conducted to compare the variability among the wild arabica coffee genotypes in biomass assimilation and allocation patterns under varying light and irrigation conditions at the Jimma Research Center, southwestern Ethiopia. The treatments included irradiance (moderate and full sunlight), irrigation (well watered and water stressed) regimes and twelve coffee genotypes of different geographical areas. One-year-old seedlings were used to record dry mass of leaves, main stem, primary branches and root growth. Each organ was separately oven-dried and total dry matter production and allocation patterns were measured and analyzed. The results depicted highly significant differences between the contrasting irradiance and irrigation regimes as well as among coffee genotypes. Significantly the lowest and highest stems dry mass values recorded for Berhane-Kontir and Harenna genotypes, respectively. Most accessions had relatively lower assimilations in shade as compared to full sun light conditions. Likewise, coffee seedlings significantly differed in root dry mass and root to shoot ratio, dry matter partitioning due to the main and combined treatment effects. Overall, total biomass assimilation and partitioning were higher for unshaded, water stressed and Harenna genotypes from the respective treatment groups. Conversely, leaf dry matter, leaf share was significantly high under moderate shade environments. The total dry matter share varied for the seedling growth parts (root = 22%, leaf = 35%, stem = 43% and whole shoot = 78%). The root growth followed the order of Harenna > Yayu > Bonga > Berhane-Kontir populations. The reverse was true for the leaf and whole-shoots, demonstrating the completion between above and below ground growth parts and thus the need to consider both dry matter assimilation and partitioning patterns in identifying desirable genotypes and optimum environments for future breeding program in Ethiopia.

KEYWORDS
Ecological Physiology; Environment; Genetic Diversity; Seedling Growth Response; Wild Ethio-pian Coffee Population

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