Selection of Superior Genotypes at Early Stage of the Rubber (*Hevea brasiliensis*) Breeding Cycle

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Abstract

The hybridization and selection procedure of *Hevea brasiliensis* play an important role in the genetic improvement of planting material with a wide range of genetic diversity aim to develop superior *Hevea* clones. Time is the critical factor of the conventional breeding programs, as it needs around 20-25 years to complete one cycle. Early selection is very important to shorten the *Hevea* breeding program. However, the selections are needed to be strengthened through a thorough analysis of all possible yield parameters. This study mainly aimed at the precise selection of genetically superior genotype(s) at the early stage of the *Hevea* breeding cycle (first evaluation stage) to reduce the evaluation period of the breeding cycle. Four high yielding genotypes which were already selected as outstanding genotypes and 4 low yielding genotypes based on their yield belong to 2011 hand pollination progeny were taken to the study. Yield performance was measured using other yield traits such as girth, bark thickness and bark anatomical parameters (number of latex vessels/unit area (density), number of latex vessel rows and diameter of latex vessels). Each parameter was analyzed with their yield performance. These genotypes analyzed to verify the previous selections to develop the correlation of these parameters. Regression analysis, cluster analysis and two-sampled t-tests in Minitab 17 version were used to analysis data. A 39.3% positive and 4.6% negative correlations were observed for girth and bark thickness, respectively with yield. Strong positive correlations 81.9% and 91.7% were reported respectively for latex vessels' density and number of latex vessel rows with yield. In addition to 57.4%, a negative correlation was observed between the yield and diameter of latex vessels. In the cluster analysis with yield, girth and all the bark anatomical parameters, three clusters showed significant difference. Out of four outstanding genotypes, only the 2011HP-42 separated from the other three genotypes showing higher outstanding characters while the other three genotypes showed moderate characters. All four low yielding genotypes separated to cluster three showing the lowest performances. Results clearly showed that the early selection procedure can be strengthened by taking more yield parameters and their correlations which will be helpful to develop yield index in the future.

Keywords: Bark anatomy**,** Early selection, *Hevea brasiliensis*, *Hevea* breeding
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