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Correlation between Yielding Ability and Dry Matter Productivity during Initial Seed Filling Stage in Various Soybean Genotypes

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Abstract: The critical developmental stage, during which the genotypic difference in yield is determined, was identified by analyzing the correlations between seed yield and seasonal crop dry matter productivity in optimally managed fields in four seasons. The fields (fluvial sandy loam or clay loam) were managed with irrigation, pest and weed control and canopy support to prevent lodging whenever necessary. The tested genotypes included 11 Japanese old and modern cultivars, five US cultivars and one non-nodulating line. Four to eight cultivars were studied in each year. Seed yield with 15% moisture (Y) in each experimental plot varied from 255 to 498g m^{-2}. The US cultivars and Japanese modern cultivars tended to have a higher yield than the other cultivars grown in the same year. Y significantly and positively correlated with crop growth rate (CGR) during the 20 d period after the beginning of seed filling (R5), i.e. initial seed filling stage, in all four experiments. On the other hand, correlation of seed yield with CGR before or after this period varied with the year from negative to positive correlations. A close correlation was also observed between pod growth rate during the initial seed filling and Y. These results suggest that the critical stage during which seed yield potential of soybean cultivars is determined is the initial seed filling period and the larger dry matter production during this period is closely associated with the satisfactory growth of reproductive organs and high seed yield.

Keywords: Cultivar difference, Dry matter productivity, *Glycine max* L, Initial seed

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