

Category	: International Rice Research Conference
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Keyword 1	: Genotype x Environment Interactions
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Title of Entry	: Performance evaluation of rice MAGIC lines using early growth parameters as indicators
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Select only one type of presentation	: 15 minute oral presentation
Abstract	: Multi-parent advanced generation inter-cross (MAGIC) strategy promotes shuffling of the genome and provides increased recombination and mapping resolution. However, screening for desirable traits requires multi-factor evaluation. We hypothesized that the final grain yield is highly dependent on early growth characteristics. To test this hypothesis, a field experiment was conducted in the dry season of 2016 at IRRI Experiment Station at Los Banos, Laguna, Philippines using 40 varieties that includes 28 lines randomly selected from 1,200 lines of the indica MAGIC population, eight were parents and four were popular checks. Crop was grown under two water managements: 1) continuously flooded, and 2) alternate wetting/drying with zero to full nitrogen fertilizer supply. Experimental results showed that growth parameters such as leaf area index (LAI), aboveground biomass accumulation (AGB), growth duration (GD), and daily increase of AGB (AGBdi) did not significantly affect the final yield before maximum tillering and after grain filling stages. The best indicators for high final grain yields were AGB and AGBdi during the panicle initiation to flowering, and maximum leaf area index (mLAI). As expected, AGB and panicle biomass after grain filling stage showed significant correlation to final yield. In contrast, the early indicators did not determine superior performance. The ratio of panicle to total above ground biomass at flowering, grain filling and physiological maturity, and the GD of vegetative and reproductive stages surprisingly did not show significant correlation with grain yield. The 'still-green' properties illustrated significant correlation to final grain yield only under the non-stressed environment. Two out of 28 MAGIC varieties consistently performed well over all other tested varieties across different environments. If only one of the growth parameters mentioned were considered and if grain yield was evaluated in only one environment, the two MAGIC lines would fall outside the top 10% of all tested varieties. However, if all parameters were combined across all tested environments, these two MAGIC lines proved superior in terms of grain yield in both growing environments. These two lines also showed 25% advantage in stressed environment, but did not necessarily have the lowest yield penalty in stress environments.

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