

RESPONSE OF MUNG BEAN TO INCREASING GROWING SEASON TEMPERATURE IN TWO AGRO-ECOLOGICAL REGIONS UNDER DIFFERENT AGRONOMIC MANAGEMENT PRACTICES

**M.A.P.W.K. Malaviarachchi^{1*}, W.A.J.M. De Costa², J.B.D.A.P. Kumara³,
R.M. Fonseka² and L.D.B. Suriyagoda²**

¹*Field Crops Research and Development Institute, Mahalluppallama, Sri Lanka*

²*Department of Crop Science, Faculty of Agriculture, University of Peradeniya, Sri Lanka*

³*Faculty of Agriculture, Sabaragamuwa University of Sri Lanka, Belihuloya, Sri Lanka*
*wmalavi@yahoo.com

Farmers have failed to realize the potential yield of mung bean under rainfed farming due to many biotic and abiotic stresses. These stresses may be aggravated in a changing climate in the future. Thus, understanding the magnitudes of impact and development of adaptive measures are important. A field experiment was conducted with mung bean (var. MI 6), at the Field Crops Research and Development Institute, Mahalluppallama (MI) and the Peradeniya University Farm, Kundasale (KD) representing agro-ecological regions DL_{1b} and IM_{3a}, respectively during *maha* 2012/2013 season. Four agronomic management packages were tested in a Randomized Complete Block Design with three replicates in each site. Treatment 1 (T1) included the current recommended management practices by the Department of Agriculture. Mulching with current recommended fertilization and crop protection practices were assigned to T2 while T3 included mulching with an integrated pest management (IPM) package with recommended fertilizer management practices. T4 was assigned with mulching and IPM with modified nutrient management, which provided 25% of the N requirement as organic manure. The observed variation of phenology, growth and yield formation of mung bean between the two sites can be attributed primarily to the crops' responses to the mean seasonal temperature difference of 1.4 °C between the two sites (*i.e.* 26.2 and 24.8 °C at MI and KD, respectively) as any water deficits were eliminated by supplementary irrigation. The higher temperatures at MI accelerated the progress towards flowering by 8-14 days. However, the total crop duration (*i.e.* 70 days) was not affected by the temperature variation between two sites. Leaf area index (LAI_{50%}) and total biomass at 50% flowering (TBM_{50%}) in IPM treatments were greater than in non-IPM treatments at KD. In T1, LAI_{50%} and TBM_{50%} were 26% and 27% greater at KD. Agronomic packages which included IPM recorded substantially greater total biomass at final harvest (TBM_f) at KD whereas the opposite was true at MI. Though the higher temperatures at MI during the period up to 50% flowering had a negative effect on growth, T1 at MI was able to achieve a higher crop growth rate with a lower LAI_{50%} indicating a higher photosynthetic efficiency. At each site, the variation of yield among treatments was similar to that of TBM_f. Despite the significant responses of phenology, biomass accumulation, crop growth rates and biomass partitioning to the mean seasonal temperature difference, a significant change in yield was not observed in T1 and T2 (*i.e.* the non-IPM treatments) because the effects of temperature on different aspects of crop growth and development balanced each other out. In contrast to T1 and T2, T3 and T4 performed better at the lower temperatures at KD. Even though the present study indicated that the optimum temperature for mung bean lies within a slightly lower range (25-26 °C) under the sub-humid tropical conditions that prevail in the intermediate and dry zones of Sri Lanka, more work is required across a wider temperature range to have a firm conclusion.