Identification of Parental Mungbean Lines for Production of Hybrid Varieties

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ABSTRACT

Five mungbean (Vigna radiata (L.) Wilczeck) varieties from China (CM1 to CM5), two from Thailand (KPS1 and KPS2), and one from Korea (K7) were used as parents to produce 34 F_1s. Hybrids were evaluated along with their parents in the field of the Asian Regional Center of the Asian Vegetable Research and Development Center (ARC-AVRDC), Kasetsart University, Kamphaeng Saen, Nakhon Pathom, Thailand. The hybrid vigor was determined from both heterosis and heterobeltiosis for major agronomic characters, including yield and yield components. Considering overall characters, the superior F_1s were CM5 x K7, CM4 x K7, CM4 x KPS1 and CM3 x K7 while the most promising parental line for future hybrid production was K7. Although K7 per se had low seed yield per plant, its F_1s gave significant heterobeltiosis in most crosses.

Key words: Vigna radiata, Mungbean, Hybrid varieties

INTRODUCTION

The success of hybrid varieties

Whether dominance or overdominance gene action conditions the hybrid vigor, Crow (1952) concluded that there is a decrease of vigor on inbreeding and a gain on outcrossing. Thus, crossing between 2 parental lines carrying diverse genotypes, i.e. each having dominant alleles on different loci should produce a vigorous F_1. With this concept, heterosis has been utilized in commercial hybrid maize production since the 1930s as double cross hybrids (Shull, 1946). He proposed the word heterosis to describe the unusual vigor of the F_1 resulting from hybridization of two inbred lines of maize. Presently, hybrid varieties are produced in economic crops including maize, sunflower, sorghum, cotton, wheat, barley, rice, castorbean, sugar beet, some *Brassica* crops, onion, tomato, etc. Some of these crops are self-pollinating (such as cotton, sorghum, wheat, barley, rice and tomato) but they either have a high rate of random outcrossing or easily cross and produce a fairly large amount of seed that hybrid cultivars can be economically produced (Simmonds and Smart, 1999).