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Effect of Sulphur and Iron Fertilization on Yield Attribute, Yield and Net Returns of Mungbean [*Vigna radiata* (L.) Wilczeck] in Arid Western Rajasthan

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Mungbean [*Vigna radiata* (L.) Wilczek] is an important source of high quality protein (24.5%). It is the fourth most important grain legumes in India after chickpea, pigeonpea and blackgram. The potential yield level of available improved varieties of mungbean varies between 1200 to 1600 kg ha^{-1}. This indicates a wide gap between the potential yield and average yield being harvested at cultivator's fields. There may be several possible reasons for low yield harvested by the farmers. Lack of optimum mineral nutrition, particularly sulphur and micronutrients management may be one of them. Farmers usually apply nitrogenous and phosphatic fertilizers but sulphur fertilization is lacking in their fertilizer schedule. Further, micronutrients *viz.* zinc and iron deficiencies, now a days are becoming a major limiting factor in harvesting higher yields of crops (Sahu *et al.,* 2007). Pulses not only have high sulphur requirements, but also have the potential to remove sulphur from soil nutrient pool *vis-à-vis* fertilizer applied, as is evident from the radio sulphur investigations (Ganeshamurthy *et al.,* 2005).One of the main reason for the low productivity of greengram is that generally farmers do not apply secondary and micro-nutrients (Ganeshamurthy *et al.*, 2005) Keeping all these factors in mind, the present experiment was conducted at arid Western Rajasthan to study the Effect of sulphur and iron fertilization on productivity of mungbean.

A field experiment was conducted on loamy sand soil at Agronomy Farm, College of Agriculture, SKRAU, Bikaner during *kharif*, 2008. Geographically, Bikaner is situated at 28.01° North latitude and 73.28° East longitudes at an altitude of 234.70 m above MSL. This region falls under agroclimatic zone Ic (Hyper arid partially irrigated north western plain) of Rajasthan. The experiment comprised of four levels of sulphur [control, 40 kg S ha^{-1} as Gypsum, 40 kg S ha^{-1} as elemental sulphur and 40 kg S ha^{-1} as Gypsum + elemental sulphur (1:1)] and four levels of iron [control, 0.5% $FeSO_4$ foliar spray at 25 & 40 DAS, 0.5% $FeSO_4$ + 0.5% citric acid solution spray at 25 & 40 DAS and 25 kg $FeSO_4$ ha^{-1} as basal application] replicated thrice in randomized complete block design. The gross plot size was 4m x 3 m and net harvested plot area was 3.0 m x 1.8 m. Generally after sowing of the mungbean crop, monsoon rains are received during initial establishment stage only. Thereafter, long dry spell occurs and hence two irrigations at pre flowering and pod filling were applied to the crop for proper growth and development during the growing season. Data on seed yield were recorded from the net plots whereas yield attributes from 5 randomly selected plants at harvest.

Effect of Sulphur

Yield attributes and yield : The number of pods per plant and seeds per pod was significant with 40 kg S ha^{-1} as gypsum and gypsum + elemental sulphur (1:1) source while pod length increased significantly with 40 kg S ha^{-1} irrespective of the sulphur source used as compared to control treatment (Table 1). Application of 40 kg S ha^{-1} as gypsum, and gypsum + elemental sulphur (1:1) registered significantly higher seed yield, straw yield and biological yield and harvest index of mungbean compared to control (Table 1). In element sulphur, higher seed yield, straw yield and biological yield and harvest index were higher than control but lower as compared to gypsum alone or in combination. Similar results were reported by Kumawat *et al.* (2006).

Effect of Iron

Yield attributes and yield : Application of 25 kg $FeSO_4$ ha^{-1} as basal dose and foliar applied treatments *viz.*, 0.5% $FeSO_4$, alone and in combination with 0.1 % citric acid has improved the yield attributes, *viz.,* pod length, number of pods per plant, number of seeds per pod (Table 1). Thus cumulative effects were reflected through increased seed yield. Similar finding have also has been reported by Singh *et al.* (1990). The straw and biological yields also showed similar trend. The beneficial effects of iron nutrition on mungbean, these results are supported by Gupta *et al.* (2002) and Kumawat *et al.* (2006).