



## Response and critical limits of phosphorus for black gram grown in medium black calcareous soils

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### ABSTRACT

A pot culture experiment was conducted by using bulk soil samples collected from different Agricultural Research Station, Junagadh Agricultural university, Junagadh and were categorized as low, medium and high with respect of available phosphorus. Three treatments were imposed in triplicate with common recommended dose of N and three levels of P (0, 20, and 40 mg kg<sup>-1</sup>) in each pots of the low, medium and high P status. Fertilization of P significantly increased grain and fodder yields and P content in leaf as well as in soil. The critical limit of Olson available P<sub>2</sub>O<sub>5</sub> was obtained 24 kg P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> in medium black calcareous soils, while P content in leaf of plant of black gram at 30 DAS was found 0.471 %.

Parmar, K.B., Polara, K.B., Hadiyal, T.M., Babariya, N.B. and Davaria, R.L. (2010). Response and critical limits of phosphorus for black gram grown in medium black calcareous soils. *Asian J. Soil Sci.*, 5(2): 406-410

**Key words :** Critical limits, Black gram, Phosphorus, Calcareous soils

### INTRODUCTION

The essential nutrient has certain specific role to play in the plant and their presence in above critical concentration is a must for a plant to complete its life cycle. The critical limits is quite often employed for a wide variety of soils and crops, even though these critical limits may be different not only for soils and crop species but also for different varieties of a given crop. The medium black calcareous soil is considerably deficient in available phosphorus. Therefore, the crops response to P application is lower. There is need to establish a threshold level of P concentration in soil and plant below which the crop may responded to P application. We have been established the critical limit of P in pearl millet, wheat and groundnut. So far, such information is not available for the black gram crop in this region. Therefore, keeping this in view, a pot experiment was under taken to study the critical limits of phosphorus for black gram grown in medium black calcareous soils.

### MATERIALS AND METHODS

Thirty surface (0-15 cm) soil samples from (*Typic Ustocrept*) a wide variation in soil properties were collected from different research station of Junagadh Agricultural University, Junagadh. Samples were grouped on the basis of their P<sub>2</sub>O<sub>5</sub> status (low <28, medium 28-56 and high >56 kg ha<sup>-1</sup>) and were used for a pot experiment of black gram crop. For the investigation the soils were contained in polythene-lined earthen pots (10.0 kg soil/pot). Each soil received 0, 20 and 40 mg of P per kg air dry soil as KH<sub>2</sub>PO<sub>4</sub>. The experimental design was a CRD with three replications. Nitrogen was applied uniformly to all soils at the rates of 20 mg kg<sup>-1</sup> through urea as basal. The seeds of black gram variety G.U.-1 were sown in each pot and after germination, five healthy plants were maintained. The crop was raised upto maturity. Seed and fodder were oven dried (60 °C) to record yield. The p content in leaf of plant (At 30 DAS) and soils after harvest of crop were determined by standard analytical methods (Jackson, 1973) using UV-visible

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