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Effect of rock phosphate, biofertilizers and FYM on growth, yield and economics of wheat (*Triticum aestivum* L.) under North Gujarat condition

■ K.G. VYAS, A.M. PATEL¹, C.H. RAVAL¹ AND P.K. BHATT¹

AUTHORS' INFO

Associated Co-author :

¹S.D. Agricultural University,
SARDARKRUSHINAGAR
(GUJARAT) INDIA

Author for correspondence :

K.G. VYAS
AICRP for Dryland Agriculture,
S.D. Agricultural University,
SARDARKRUSHINAGAR
(GUJARAT) INDIA
Email : kgvyas09@gmail.com

ABSTRACT : A field experiment was conducted at Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar during *Rabi* 2010-11 on loamy sand soil to assess the agronomic feasibility of Udaipur rock phosphate (URP) sources (URP 31% and URP 34%), incubation methods (No incubation, incubation with farmyard manure, incubation with phosphate solubilizing bacteria, incubation with farmyard manure + phosphate solubilizing bacteria) and farmyard manure (zero and ten tonnes ha⁻¹) on wheat. The agronomic efficacy of the sources of URP 31 per cent and 34 per cent was not found significant in all the aspects. However, effect of incubation methods influenced the productivity, quality of wheat and available nutrient status of soil after harvest of the crop. Application of FYM @ 10 tonnes ha⁻¹ also had direct significant influence in improving growth attribute, yields (grain and straw) and quality of wheat crop. Application of P₂O₅ @ 40 and 60 kg ha⁻¹ was found to be at par, while both the sources of P (*i.e.* Diammonium phosphate and Udaipur rock phosphate) were found equally effective. In terms of economics, highest net return was recorded with the application of DAP @ 60 kg P₂O₅ ha⁻¹ closely followed by incubation of URP with FYM + PSB and incubation of URP with FYM + PSB + 10 t FYM ha⁻¹.

Key Words : FYM, Phosphate solubilizing bacteria, Udaipur rock phosphate, Wheat

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Wheat is the World's single most important cereal crop not only in quantitative but in qualitative terms too and considered to be integral component of food security system of several nations and to feed the increasing population production is to be increased. Phosphorus is one of the important major nutrients required by the crop and in many soils its availability limits the crop yield due to intensive cropping and adoption of high yielding varieties in irrigated agriculture. The agronomic efficacy of rock phosphate as a direct phosphorus fertilizer along with certain acidulants was evaluated in wheat by Pareek *et al.* (2004) and Soni and Aery (2004). The results indicated that acidulants such as farmyard manure, vegetable waste, saw dust etc. resulted in enhancement in crop production over the absolute control. Therefore, present investigation was conducted to find out the effect of applied Udaipur rock phosphate sources incubated through various methods in presence and absence of farmyard manure on productivity, quality of wheat and soil available nitrogen and phosphorus status.

RESEARCH PROCEDURE

The field experiment was conducted during the *Rabi* season of 2010-11 at Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar, Gujarat (INDIA). The soil was loamy sand in texture having available nitrogen (Jackson, 1978 Method) 149 and 138 kg ha⁻¹ and available phosphorus (Olsen method, Jackson, 1978) 29.35 and 31.20 kg ha⁻¹ from 15 cm and 30 cm depth, respectively. The soil was slightly saline in reaction (pH 7.2 - 7.7). Eighteen treatments were evaluated, *viz.*, two sources of Udaipur rock phosphate (31 and 34%) @ 60 kg P₂O₅ ha⁻¹, four incubation methods (No incubation, incubation with farmyard manure, incubation with phosphate solubilizing bacteria and incubation with farmyard manure + phosphate solubilizing bacteria) and two farmyard manure levels (zero and ten tonnes ha⁻¹) along with two checks (40 and 60 kg P₂O₅ ha⁻¹ through diammonium phosphate). Recommended dose of nitrogen @ 120 kg ha⁻¹ was applied to wheat crop through urea.

Before incubation a fixed quantity of 300 kg soil of