PAK. J. SOIL SCI., VOL. 12 (3-4), 1996

IMPROVING GROWTH AND YIELD OF WHEAT WITH PLANT GROWTH-PROMOTING RHIZOBACTERIA

Muhammad Javed[1], Muhammad Arshad and Altaf Hussain[2]

ABSTRACT

Thirty eight isolates of plant growth-promoting rhizobacteria (PGPR) isolated from Faisalabad soils were screened on the basis of their ability to produce auxins (indole-3-acetic-equivalents)* in vitro. *Seeds of two wheat cultivars (Inqlab and LU 26S) inoculated with these isolates were sown in the field, under optimum fertilization (NPK @ 150-75-50 kg ha^{-1}). Data revealed that increases in grain yields of cv. Inqlab and LU 26S due to inoculation with PGPR isolates were upto 15.3% and 18.5%, respectively compared with uninoculated respective controls. Inoculation with PGPR also significantly increased the number of tillers, straw weight and 1000-grain weight in both cultivars. Plant height was increased only in case of wheat LU 26S.

INTRODUCTION

Free living saprophytic rhizosphere bacteria have been investigated for their beneficial effects on growth and yields of crops throughout the 20th century (Chen *et al.*, 1994). The term 'plant growth-promoting rhizobacteria (PGPR)' was coined for the subset of total rhizosphere bacteria colonizing plant roots upon inoculation and have positive effects on plant growth (Kloepper and Schroth, 1978). Research on the use of PGPR to promote plant growth has increased dramatically inoculation. Keeping in view the potential of PGPR for growth promotion, we investigated the growth enhancing ability of various rhizobacteria under soil and climatic conditions of Faisalabad, Pakistan.

MATERIALS AND METHODS

Field trials were carried out in the Department of Soil Science, University of Agriculture, Faisalabad, Pakistan during the years 1992-94. Thirty eight isolates of PGPR were isolated from the maize rhizosphere soil by using the glucose peptone medium. For the isolation of different rhizobacteria dilution plate technique was used. Colonies showing more prolific growth were selected, isolated and purified. These isolates were screened on the basis of auxin (IAA-equivalents) production *in vitro*. Auxin production (Table 1) was determined by inoculating 25 mL broth culture with various inocula, amended with (0.5%) or without L-tryptophan (L-TRP). The incubation was carried out at 28 $\pm$ 1 C for 48 hours. The cultures were filtered and auxin production was measured on spectronic 20 at 535 nm (Sarwar *et al.* 1992). Eleven isolates were selected and were studied for their effects on growth and yield of wheat. The PGPR isolates used in this study were tentatively identified as pseudomonads on the basis of physiological and morphological characteristics