



Tropentag, September 15-17, 2021, hybrid conference

“Towards shifting paradigms in agriculture  
for a healthy and sustainable future”

## Allelopathic Potential of Rhizobacteria against *Leptochloa chinensis* (L.) Nees in Rice under Gnotobiotic Conditions

IRAM AFZAL, ZAHIR AHMAD ZAHIR, AYYUB MUHAIMEN, ALI QASIM

*University of Agriculture, Faisalabad, Inst. of Soil & and Environmental Sciences, Pakistan*

### Abstract

Prevailing water crisis, labour shortage, and environmental issues have necessitated the use of alternative rice cultivation methods; however, dealing with associated risks such as weed infestation has become more challenging. *Leptochloa chinensis* (L.) Nees, that emerges simultaneously with rice seedlings has threatened rice productivity under direct-seeded conditions. Therefore, developing a sustainable weed control strategy has become necessary to control production losses by weeds. This study aimed to evaluate the potential of rhizobacteria in the suppression of *L. chinensis*. Isolated rhizobacteria were screened through cyanide production and lettuce seedling *in vitro* bioassay. Eight isolates (IR4-10, IR7-6, IR7-7, IR7-11, IR3-1, IR3-4, IR8-1, IR5-13) were cyanogenic and caused mortality of lettuce seedling up to 14 folds over uninoculated control. Moreover, biochemical, and microbiological characterisation revealed the presence of multiple characteristics in these isolates. Eight cyanogenic isolates were selected for weed suppression trial and growth promotion trial on rice under gnotobiotic conditions. Statistical analysis of data indicated that all isolates were effective in weed suppression; however, four isolates (IR4-10, IR7-6, IR7-7, and IR7-11) suppressed *L. chinensis* most effectively by reducing root length, shoot length, and fresh biomass. The most effective four isolates were not suppressive to rice growth. A few of these promoted growth by improving root length, root diameter, number of tips, shoot length, fresh biomass, dry biomass, and chlorophyll contents. The results may lead to the formulation of bioherbicides for successful suppression of *L. chinensis* under direct-seeded conditions if the capability of selected four allelopathic bacterial isolates is confirmed under field conditions.

**Keywords:** Allelopathic bacteria, bioherbicide, direct seeded rice, *Leptochloa chinensis* (L.) Nees