# Phosphorous Availability under Continuous Point Source Irrigation. (S02-bengal105047-Oral)

**Authors:**

- A.Ben-Gal - *Arava Research and Development*
- L.M.Dudley - *Utah State University*

## Abstract:

Much of the positive effect found in the practice of micro-irrigation can be attributed to maintenance of relatively high soil moisture through highly frequent irrigation events. Stress to plants, otherwise caused during drying and wetting cycles, is thus minimized. Another major benefit of micro-irrigation is achieved as the water application system is used to apply fertilizers as well. Highly frequent irrigation and continuous, low-flow water applications have been found to associate with positive plant response. Little is known concerning soil chemical and nutrient status under continuous irrigation regimes. Phosphorus fertilizer application is often inefficient as much of the P adsorbs to surfaces or forms insoluble precipitates. This project investigates the hypothesis that continuous, low-intensity irrigation offers an opportunity to provide plants with available phosphorus in a matter more efficient than traditional irrigation and fertilization. Objectives of the study were; to characterize water and phosphorus distribution in soil where water is provided by a continuous, low-volume, point source, and to maintain an appropriate level of available phosphorus to plants using continuous irrigation technology, and therefore increase P fertilizer efficiency. A pulsed irrigation regime giving water for 4 hours once every two days was compared with application of the same amount of water continuously in both a water-solute

simulation model (Hydrus-2d) and in a greenhouse-lysimeter experiment. The greenhouse experiment was repeated with a growing corn crop. Results from both the simulation and the lysimeter-soil irrigation study show that the hypothesized zones of increased available P with continuous application do actually materialize when P-laden water is applied to a soil profile continuously at low very low application rates. Extractable P concentrations in the soil immediately surrounding the point source were found to be 20-25% higher in continuously irrigated soil as compared to pulsed irrigation. Corn plants grown under continuous fertigation yielded 20% greater biomass than plants irrigated with the same water quantity and quality once every two days. Phosphorus content of corn leaves was 33% greater for the continuous treatment as compared to the pulsed treatment after 15 days of growth and 26% greater after 30 days.

**Corresponding Author Information:**

Alon Ben-Gal
Arava Research and Development
mobile post Eilot , Israel 88820
Israel

phone: 972 8 6355744
fax: 972 8 6355730
e-mail: bengal@agri.huji.ac.il

## Presentation Information:

Presentation Date: Thursday, November 14, 2002
Presentation Time: 9:00 am

## Keywords:

phophorous, continuous irrigation, point source, resource efficiency