

Brinjal (cv. Panchganga)



Recommended PBR: Salicylic acid

Application rate: 10µM/litre

Growing stages for foliar application:

1. 40 Days After Transplanting (DAT)
2. 65 DAT
3. 95 DAT

Enhancement in grain/fruit yield and water productivity with PBRs

Crop	Improvement in grain/fruit yield (%)	Water productivity, WP, (kg m ⁻³)
Wheat (cv HD-2189)	5.9-20.6	1.20-1.35
Sorghum (cv Phule Suchitra)	6.8-18.5	1.16-1.41
Soybean (cv JS-335)	4.2-14.2	1.02-1.12
Onion (cv Bhima Kiran)	10.1-25	7.8-9.6
Eggplant (cv Panchganga)	6.2-20.9	3.1-6.1

Impact and benefits

- ◆ The response of bio-regulators (PBRs) is highly specific crops and environment conditions
- ◆ The application of PBRs enhanced grain yield and water productivity and reduce at least two irrigation

- ◆ The PBRs like thio-urea (10 mM), sodium benzoate (100 mg L⁻¹), potassium nitrate (KNO₃) and salicylic acid (10 µM) helped to alleviate the water stress in wheat, sorghum, onion, soybean and eggplant, respectively
- ◆ PBRs also enhanced nutritional quality of vegetable crops under water deficits
- ◆ Overall, integrating use of bio-regulators with deficit irrigation can enhance substantial productivity and profitability of farmers under water-scarce conditions

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Bio-regulators

A useful tool to enhance crop yield, productivity and quality for resilient agriculture



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Introduction

- ◆ Water deficit is most common abiotic stress in almost 68% cultivated area of India
- ◆ To provide immediate solution to farmers' in semi-arid regions, the concept of Low External Input and Sustainable Agriculture (LEISA) is gaining significant interest
- ◆ LEISA based agriculture system is based upon the options which are ecologically sound, economically feasible and culturally acceptable
- ◆ This is generally achieved through the exogenous application of low concentration of chemicals termed as "Plant Bio-Regulators (PBRs)"
- ◆ PBRs are powerful tools for maximizing yield and quality and increasing net income to farmers under water stress conditions. Accordingly long term field testing using line source sprinkler system was conducted at ICAR-NIASM to evaluate the performance of different PBRs in major crops (wheat, sorghum, soybean, onion and eggplant)
- ◆ Line source sprinkler system (LSS): A unique sprinkler system designed to produce continuously variable water stress levels, depending upon the distance from the main of the LSS

Details of recommended doses of PBRs to specific crop at different growth stages for alleviating the impact of water stress

Wheat (*cv.* HD 2189)



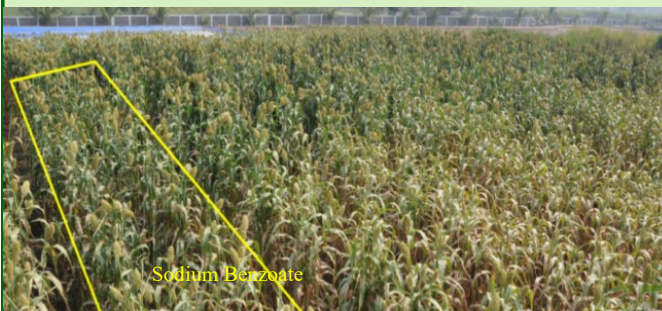
Recommended PBR: Thio-urea

Application rate: 10 mM/litre

Growing stages for foliar application:

1. Crown root initiation (CRI, 20 DAS)
2. Flag leaf (42–45 DAS)
3. Seed milking stages (65 DAS)

Sorghum (*cv.* Phule Suchitra)



Recommended PBR: Sodium benzoate

Application rate: 100 mg/litre

Growing stages for foliar application:

1. Seedling elongation (20–25 DAS)
2. Reproductive (50 DAS)
3. Panicle formation (75 DAS)

Soybean (*cv.* JS-335)



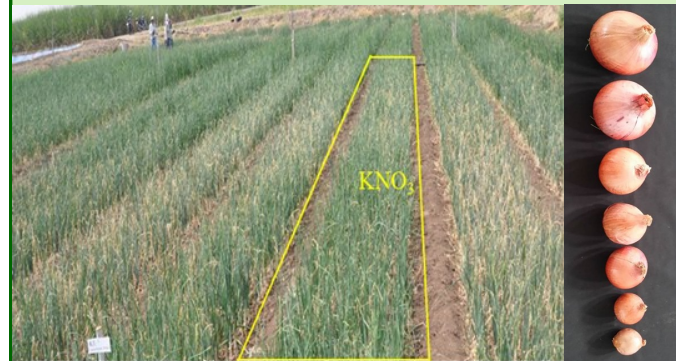
Recommended PBR: Salicylic acid

Application rate: 10µM/litre

Growing stages for foliar application:

1. Flowering stage (35 DAS)
2. Grain formation (55 DAS)

Onion (*cv.* Bhima Kiran)



Recommended PBR: Potassium Nitrate

Application rate: 100 mg/litre

Growing stages for application:

1. Vegetative (40 DAT)
2. Bulb formation (60 DAT)
3. Bulb development (80 DAT)
4. Post development (100 DAT)