Jasmonate Hormone

January 27, 2021

In News: A team of scientists at National Institute of Plant Genome Research (NIPGR), New Delhi suggested that targeting a specific plant hormone Jasmonate (JA) would help rice plants have greater tolerance to potassium (K) deficiency and improve productivity.

Findings

- The overexpression of a gene called OsJAZ9 helped make rice plants more tolerant of potassium deficiency.
- There was an enhanced accumulation of JA-Ile – a bioactive form of the hormone Jasmonate (JA), in OsJAZ9 overexpressing rice, on potassium deficiency.
    - The JA-lle helps in modulating various K transporters and root system architecture.
    - JA-Ile contributes to several aspects of plant growth and development and levels increase under stress conditions.
- The study suggests that targeting research towards JA could help achieve both, nutrient- efficient crops and protection against pests.
- JA is often associated with the plant's defence against biotic factors like insects, pests and other pathogens.

National Institute of Plant Genome Research (NIPGR)

- The National Institute of Plant Genome Research (formerly known as National Centre for Plant Genome Research) is an autonomous institution aided by the Department of Biotechnology, Government of India.
- The Institute's establishment coincides with the 50th anniversary of India's independence as well as the birth anniversary of Prof. (Dr.) J. C. Bose.
- The formal announcement was made on November 30th 1997.
- This Institute has already placed India among the major

contributors to plant genomics.

- It is hoped that in coming years, the ongoing efforts of NIPGR will allow India to emerge as one of the most important national and international resource institutes for material, knowledge and technologies in the areas of functional, structural, evolutionary and applied genomics of plants, including crop plants

Potassium (K)

Potassium (K) is considered a macronutrient for plants and is the most abundant cation within plant cells.

Significance of Potassium

- Plants require, among other things, a high and stable concentration of potassium ion to activate many enzymes that are involved in respiration and photosynthesis.
- Potassium is also involved in key cellular processes such as energy production, and cell expansion.
- Cell expansion is the process of taking cells extracted from tissue, culturing them in the lab and encouraging them to reproduce.

Potassium Deficiency

- It affects plants by inhibiting the growth of the roots and the shoots.
- Studies have shown that plants that are deficient in potassium are more susceptible to salt, drought, chilling and other abiotic and biotic stresses.
- Potassium deficiency occurs frequently in plants grown on sandy soils resulting in a number of symptoms including curling of leaf tips and yellowing (chlorosis) of leaves, as well as reduced growth and fertility.

Potassium Availability to plant Roots:

- Despite being among the most abundant minerals in the soil, its availability to plants is limited.

- This is because most of the soil potassium (about 98%) is in bound forms and its release into the soil solution is far slower than the rate of its acquisition by the roots.
- The availability of potassium in the soil solution or exchangeable form depends on multiple factors like soil acidity, presence of other monovalent cations like sodium and ammonium ions and the type of soil particles