

## Sequencing of Sugarcane Genome

### Why in news?

\n\n

A global team of researchers recently announced the sequencing of sugarcane genome.

\n\n

### Why is it so significant?

\n\n

\n

- Sugarcane produces 80% of the world's sugar.
- It has also emerged as the primary crop for biofuel production.
- The sugarcane genome is nearly 20 times bigger than that of rice.
- Its complex genetic makeup has so far posed challenges to classical sequencing approaches.
- So significantly, sugarcane is one of the last crop plants to be genome-mapped.
- In comparison, the rice genome was cracked nearly 14 years ago.

\n

\n\n

### How was it done?

\n\n

\n

- Each of the 10 basic sugarcane chromosomes is duplicated in 8-10 copies with a total of more than 100 chromosomes.
- In comparison, the human genome has just 23 pairs of chromosomes.
- An earlier discovery that the genomic structures of sugarcane and sorghum

\n

being very similar helped here.

\n

- Sugarcane and sorghum share large fragments with numerous genes in the same order.

\n

- So scientists used the sorghum genome (which was sequenced years ago) as a template.

\n

- The template was used to assemble and select the sugarcane chromosome fragments to sequence.

\n

\n\n

## What are the benefits?

\n\n

\n

- Until now, breeding programmes were restricted to hybridisation and was followed by cumbersome field assessments.

\n

- With the recent finding, sugarcane breeding will be able to enter the age of molecular biology.

\n

- The finding will help scientists create a reference genome of sugarcane.

\n

- The reference sequence can help in effectively analysing and comparing variations between various sugarcane varieties.

\n

- It can also help develop new molecular screening techniques to supplement conventional breeding methods.

\n

- Characteristics that contribute to improving a variety rely on the combination of several genes inherited.

\n

- The traits may include yield, drought resistance and ability to withstand pest attacks.

\n

- So if scientists can identify genes associated with these agronomic traits, they can easily be transferred to commercial varieties.

\n

- This in turn could shorten the time required for getting a new variety to the field.

\n

- **Varieties** - Theoretically, the maximum sucrose content that sugarcane can

have is around 25%.

\n

- This could be breached with the knowledge of molecular mechanisms involved in sucrose storage in the plant.

\n

- Very significantly, sugarcane is a known water-consuming crop.

\n

- Genetic sequences linked to enduring water stress can help develop varieties that require lesser water.

\n

\n\n

### **What lies ahead for India?**

\n\n

\n

- The cracking of the sugarcane genome can transform the sector.

\n

- But India needs to clarify its stance on GM foods as India does not currently allow GM food crops.

\n

- This is essential to reap the benefit of the advances in sugar genome sequencing.

\n

- Notably, Brazil (with largest area in the world under sugarcane) recently allowed commercial cultivation of the world's first GM sugarcane.

\n

\n\n

\n\n

**Source: BusinessLine**

\n

