Chalkiness in Rice

Prelims – *Current events of national and international importance | Science & Technology.*

Why in News?

Recently, scientists in China discovered a gene that helps prevent rice grains from breaking during milling.

Layers of Rice
• **Husk** – The *outermost layer of the rice* that has to be removed. • **Bran** – It is *inside of husk* that is also removed to whiten the rice. • **Removal of layers** – Traditionally, these were removed by pounding the paddy rice with grinders in a mortar, then winnowing the grains from the chaff. • Currently, mechanical rollers graze the layers by a process called *milling*.

- **Chalkiness –** It is a trait found in rice grains that significantly increases breakage during milling.
- **Chalky grain rate –** It is measured by the *proportion of chalky grains among all rice grains* and the degree of chalkiness, which reflects the extent of chalkiness in them.
- **Properties –** Chalky rice grains have an *opaque appearance after milling* and a *brittle structure*, which leads to higher breakage during milling.
- **Determinants –** Chalkiness in rice varieties is influenced *by many genes and by environmental factors* like high temperature and nutrient availability.
- **Small stretch DNA on chromosome 9**
  - **If present** - Strongly *associated with low chalkiness*
  - **If absent** – It is associated with *high chalkiness*.
- Low-chalkiness varieties showed *higher expression of Chalk9 in endosperms* compared to high-chalkiness varieties.

*The **endosperm** is the part of the paddy grain that makes up the bulk of the milled rice.*

- **Impact** - Higher chalkiness leads to *more breakage during milling*, *reduces the yield* and affects rice quality**.**
- It *disappears during cooking* and does *not affect the taste & aroma*.
- **Modern breeding technique** – It has selected for the low-chalkiness version (Chalk9-L), improving rice quality over time.
- Breeders can directly introduce the Chalk9-L variant into high-chalkiness varieties to reduce breakage and enhance grain quality.

Reference

The Hindu| Chalkiness in Rice

