

Chalkiness in Rice

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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](#)

