

# *Kalo Nunia: The Indigenous Scented Rice Cultivar from the Northern Parts of Bengal*

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## **ABSTRACT**

The recently designated Geographical Indication (GI) Tag for *Kalonunia*, originating from Northern parts of West Bengal, underscores its significance as a high-quality aromatic rice variety cultivated in the Hill and Tarai agroclimatic zones of the State. Distinguished by its unparalleled aroma, texture, and taste, *Kalonunia* has gained popularity among consumers. Beyond its sensory attributes, the rice variety holds deep cultural roots in this region, and its distinctive black-colored grains contribute to its nomenclature. Despite exhibiting lower yield potential, *Kalonunia* demonstrates resilience to various pests, diseases, and climatic fluctuations, making it an environmentally robust cultivar. Notably, the rice variety necessitates a reduced fertilizer input. This popular article provides a concise overview of the morphological characteristics, quality attributes, and cultivation practices associated with *Kalonunia*, contributing to a comprehensive understanding of this black-husked rice variety.

## INTRODUCTION

**K**alonunia, regarded as a prominent cultivar of aromatic non-basmati black-husked rice, holds significant value and is predominantly grown in the northern region of West Bengal. The nomenclature "Kalonunia" stems from the Bengali words 'Kalo,' signifying black, and 'Nunia,' denoting an indigenous rice variety. Distinguished by its black lemma, palea, and awns, this cultivar has garnered acclaim for its distinctive attributes (Ghosh *et al.*, 2022).

Primarily cultivated in the districts of Cooch Behar, Alipurduar, Jalpaiguri, and selected areas of Darjeeling and Kalimpong, specifically in the Hill and Terai agroclimatic zones of the State, *Kalonunia* has recently been bestowed with a Geographical Indication (G.I.) tag in 2024. The map showing the area cultivation of *Kalonunia* is presented in Fig 2. Historically cultivated by the *Rajbangshi* community, *Kalonunia* was first documented by Hunter (1876) in his work "A Statistical Account of Bengal: Districts of Darjiling and Jalpaiguri, and state of Kuch Behar, Vol. X."

With an enticing flavor, pleasing texture, vibrant appearance, and non-sticky characteristics, *Kalonunia* has gained popularity among consumers. Its distinctive and robust aroma further enhances its appeal. Despite its relatively low yield, the cultivar exhibits resilience against blast and adverse climatic conditions, adding to its advantages. Local culinary specialties such as *Payesh* and *Patishapta* are crafted using this scented rice, which is an excellent alternative to *Gobindobhog* rice (GI Registry, Govt of India, 2024).

Cultivated as an *aman* paddy across 30,000 hectares in North Bengal, *Kalonunia* occupies a crucial position in cropping sequences of North Bengal, for example, *Jute-Kalonunia-Mustard* and *Kalonunia-Wheat* (GI Registry,

Govt of India, 2024). Given the ongoing loss of traditional landraces, there exists a collective responsibility to conserve *Kalonunia* for future generations.



**Fig 1: *Kalonunia* paddy in the field**  
(Source: Rai, 2024)

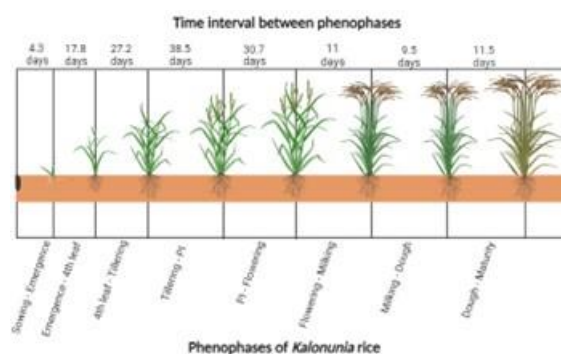


**Fig 2: The area of cultivation of *Kalonunia* rice in North Bengal**

### Morphology of *Kalonunia* rice:

The morphological attributes of *Kalonunia* rice are quite distinguishing from other varieties. *Kalonunia* is a medium to long-duration scented rice variety. The various phenophases of the crop are depicted in Fig 3. The structure of the plant is strong with an average height of 140-150 cm and medium-thick stems. The absence of anthocyanin pigment in the nodes and internodes of the stem is a distinguishing feature (GI Registry, Govt of India, 2024). Like other aromatic rice, the leaf is narrow and of medium green in colouration. The ligules of the leaf are light purple and the auricles are sickle-shaped. The

prominent photosynthesis contributing leaf i.e. the flag leaf is erect initially while later it is semi-erect. Inflorescence of rice, i.e. panicle is around 30 cm in length and the flowers are bisexual composed of six yellow-coloured stamens and one white feathery stigma. The colour of the grain is the main characteristic feature of this rice. During the opening of the flowers, the lemma and palea are reddish black while turn black upon maturation. Even the awns are blackish, unlike normal rice varieties (Ghosh *et al.*, 2021).



**Fig 3: Length of different phenophases of *Kalonunia* rice (Source: Modified after Roy *et al.*, 2015)**

### Soil and climatic requirements:

*Kalonunia* rice exhibits a preference for terai soil characterized by well-drained sandy loam or clay loam structure, maintaining an optimal pH range of 5.5 to 6.5 (slightly acidic). The crop displays sensitivity to salinity, with even low levels negatively impacting its growth and yield. *Kalonunia* typically thrives in *aman* rice cultivation, occurring from June to October, responding to a specific photoperiod (Roy *et al.*, 2021). Seed sowing in the nursery takes place from mid-June to mid-July, followed by transplantation into the main field in late July (GI Registry, Govt of India, 2024).

Ideal conditions for *Kalonunia* growth involve a warm and humid summer, complemented by substantial kharif season rainfall. The crop necessitates well-distributed rainfall, totaling approximately 1500-2000 mm throughout the

growing season. Prolonged waterlogging poses a significant threat, as extended submergence can lead to the release of toxic gases such as  $H_2S$  and phosphine, adversely affecting root development. Therefore, ensuring effective drainage is imperative for the successful cultivation of *Kalonunia*, emphasizing the critical importance of meeting specific soil and climate prerequisites (Karki *et al.*, 2023).

### Growth and yield attributes:

The growth and yield attributing characters and yield of *Kalonunia* vary under different conditions. The plant height when cultivated in the Darjeeling district was found to be 128.6 cm (Barma *et al.*, 2018). A similar result (plant height of 131 cm) was obtained when it was experimented in the Jalpaiguri district (Paul *et al.*, 2021). The aerial dry biomass accumulated at 84 days after transplanting was  $502.41 g/m^2$ .

Major yield parameters like panicle length (24-27 cm), No. of panicles/  $m^2$  (260-280), No. of grain/ panicles (95-110), 1000 grain weight (12-13 g), grain yield (1.5-2.5 t/ha), and straw yield (6.5-7.5 t/ha) are observed under Jalpaiguri field conditions (Paul *et al.*, 2021). Barma *et al.* (2018) reported that the number of effective tillers per plant, number of grains per panicle, and panicle length of *Kalonunia* rice in the Darjeeling district were 12, 128.1, and 27.7 cm respectively.

The yield of *Kalonunia* varied region-wise. The yield ranges between 2-2.5 t/ha. At Darjeeling the yield was observed to be 1.93 t/ha (Barma *et al.*, 2018) while in Jalpaiguri, the yield was 2.07 t/ha -2.48 t/ha (Paul *et al.*, 2021).

### Nutrient requirement:

The requirement of nutrients of *Kalonunia* rice grown in the Northern part of Bengal is generally low as compared to other varieties of rice. The recommended dose of fertilizers of this variety for the northern part of Bengal is

20:40:40/ha @ N: P<sub>2</sub>O<sub>5</sub>: K<sub>2</sub>O (GI Registry, Govt of India, 2024). Since the soil of North Bengal is deficient in micronutrients like boron and zinc hence, 10kg/ha borax and 25 kg/ha zinc sulphate should be added for enhancement in growth and yield. However, the fertilizers should always be scheduled based on soil test data.

### Plant protection requirement:

The *Kalonunia* rice is resistant to blast disease and other biotic stresses. Like other varieties of rice *Kalonunia* is also affected mostly by yellow stem borer (*Scirpophaga incertulas*) and causes dead heart and white ear symptoms, which can be controlled using insecticides like phorate and carbofuran. Having the potential to resist the attack of disease, it is less affected by pathogens. However, *Helminthosporium* leaf spot and blast are common in *Kalonunia* rice cultivars. Treating the seed with carbendazim (fungicide) helps prevent the incidence of aforesaid diseases in field conditions (GI Registry, Govt of India, 2024).

### The aroma of *Kalonunia*:

*Kalonunia* rice is mainly famous for its aromatic grains and the distinctive black husk enveloping each rice grain. The development of its unique aroma is attributed to the presence of 2-Acetyl-1-pyrroline produced during the grain developmental stage, a highly volatile compound that is released when exposed to elevated temperatures. The regulation of this aromatic compound in the rice grain is influenced by various climatic factors, such as low temperature, clear skies, and minimal rainfall during the crucial grain formation period.

The higher temperatures during grain formation contribute to the volatilization of the scented element present in the grain, enhancing the aromatic qualities of *Kalonunia* rice. Predominantly cultivated in the northern

regions of West Bengal, including Cooch Bihar, Alipurduar, Jalpaiguri, and partially in Darjeeling and Kalimpong, *Kalonunia* rice thrives in climatic conditions that align with its specific requirements. The aroma intensity of *Kalonunia* rice is measured between 2.2-2.5, categorizing it as having a medium to strong aromatic profile (GI Registry, Govt of India, 2024).

### Grain Quality:

The grain quality of the *Kalonunia* rice makes it unique from other aromatic rice. *Kalonunia* rice is generally a smaller grain and produces a lower yield but the grain has high market demand due to its excellent aroma and palatability compared to the hybrid rice cultivars. The *Kalonunia* rice shows mean hulling, milling, and head rice recovery rates of 75.9%, 67.3%, and 59.8%, respectively. The milled rice has an average kernel length, breadth, and L/B ratio of 4.82 mm, 1.92 mm, and 2.51, respectively, categorizing it as a medium slender (MS) type grain based on kernel size parameters. The milled rice of *Kalonunia* contains 18.5% amylose, 7.5% protein, an intermediate gelatinization temperature (alkali spreading value of 4.5), a medium elongation ratio of 1.64, and a medium-strong aroma with a score of 2.35 (GI Registry, Govt of India, 2024).

Karki *et al.* (2023), reported that the aroma score *Kalonunia* grain was 1.8, the alkali spreading value scored was 6.0, and the protein value of 7.25% when cultivated in the Hill agroclimatic zone. The quality parameters are depicted graphically in Fig 4.

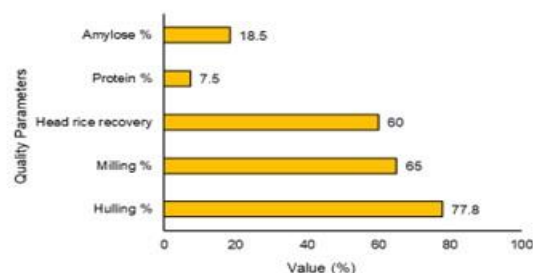


Fig 4: The Quality parameters of *Kalonunia* rice

### Award of GI Tag:

The New Year 2024 has marked remarkable for the people of North Bengal (especially Jalpaiguri, Coochbehar, and Alipurduar) as they received the Geographical Indication (GI) tag for their heritage *Kalonunia* rice. A geographical indication (GI) is a sign employed on products that originate from a specific geographical location and exhibit characteristics or a reputation inherently linked to that particular origin. The application for GI was filed by the State Agricultural & Extension Teaching Institute (SAMETI), Govt. of WB and facilitated by Uttar Banga Krishi Viswavidyalaya, Bidhan Chandra Krishi Viswavidyalaya and Patent Information Centre, West Bengal under class 30 in 2021. Various historical records like folklore and manuscripts of eminent writers proved North Bengal to be the origin of *Kalonunia* rice. Apart from *Kalonunia* rice, Sundarban's honey, and *Tangail*, *Garad*, and *Korial* sarees also got GI tags from West Bengal.

### CONCLUSION:

*Kalonunnia* is a unique variety, distinguished by its aromatic grains and the prominent black husk that encloses each rice grain, which not only endures the challenges of smaller kernel size and lower yield but emerges as a market favorite due to its exceptional taste. It is much preferred by the local people for the preparation of *Payas* during rituals and functions. It can be a better alternative to basmati rice for daily consumption. *Kalonunia* has significant trade value and is widely preferred by consumers due to its pleasant aroma and high palatability. These features made this indigenous variety versatile in the context of Bengal's climate and deserving rice variety for the Geographical Identification tag. The imperative to safeguard this heritage of Bengal necessitates comprehensive conservation efforts both in situ within agricultural fields and ex situ within gene

banks. These measures are essential to mitigate the risk of genotype loss and ensure the preservation of this valuable genetic resource.

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