

The origin and spread of 'Emperor's rice'

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Black rice has a rich cultural history; called "Forbidden" or "Emperor's" rice, it was reserved for the Emperor in ancient China and used as a tribute food. In the time since, it remained popular in certain regions of China and recently has become prized worldwide for its high levels of antioxidants. Despite its long history, the origins of black rice have not been clear. Black rice cultivars are found in locations scattered throughout Asia. However, most cultivated rice (species *Oryza sativa*) produces white grains, and the wild relative *Oryza rufipogon* has red grains. The color of rice grains is determined by which colored pigments they accumulate (or fail to accumulate, in the case of white rice). For instance, the pro-anthocyanidins that give wild rice grains their characteristic red color are not produced in white rice due to a mutation in a gene controlling pro-anthocyanidin biosynthesis. The color in black rice is known to be due to anthocyanin pigments, but how these came to be made in the grains was not known.

A paper to be published this week in *The Plant Cell* reveals the answer to the long-standing question of how [black rice](#) became black and, moreover, traces the history of the trait from its molecular origin to its spread into modern-day varieties of rice. Researchers from two institutions in Japan collaborated to meticulously examine the genetic basis for the black color in [rice grains](#). They discovered that the trait arose due to a rearrangement in a gene called Kala4, which activates the production of anthocyanins. They concluded that this rearrangement must have originally occurred in the tropical japonica subspecies of rice and that the black rice trait was then transferred into other varieties (including those found today) by crossbreeding.

According to the study's lead scientist, Dr. Takeshi Izawa, "The birth and spread of novel agronomical traits during crop domestication are complex events in plant evolution." This new work on black rice helps explain the history of domestication of rice by ancient humans, during which they selected for desirable traits including grain color.

Provided by American Society of Plant Biologists

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