Human Ecology
https://doi.org/10.1007/s10745-024-00528-y

The Mystery of Black Rice: Food, Medicinal, and Spiritual Uses of *Oryza glaberrima* by Maroon Communities in Suriname and French Guiana

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Accepted: 1 August 2024

Abstract
During plantation slavery, African rice (*Oryza glaberrima* Steud.) was widely cultivated in the Americas but was soon replaced by Asian rice (*Oryza sativa* L.). Maroons, descendants of Africans who escaped slavery in Suriname and French Guiana, continue to cultivate African rice. Genomic research linked this rice to an *O. glaberrima* variety in the Ivory Coast. Based on interviews with 99 Maroon farmers, of whom 23 cultivate black rice, we describe its diverse uses as (ceremonial) food, offerings, spiritual medicine, and its role during funerals. Maroon oral history accounts on the origin of black rice differ among and within communities: enslaved women brought it from Africa or took it from the plantations where they worked; escaped slaves found it in the savanna; or ancestors encountered it in interior swamps. These multiple and sometimes contradictory accounts of the origins of black rice are related to the diverse ethnic and geographical backgrounds of the Africans brought as slaves to Suriname and their different histories with the crop after marronage. Various characteristics of black rice, including its ability to compete with weeds and grow on poor soils, its shattering seeds, and its visibility to birds explain how this African domesticate survived in the wild in the Amazonian forest. The migration of Maroons to cities, their engagement in gold mining, and their evangelization may lead to the loss of black rice knowledge and practices.

Keywords African rice (*O. glaberrima*) · Cultural keystone crop · Ritual food · Slavery · Maroons · Suriname · French Guiana

Introduction

Rice has two domesticated species: *Oryza sativa* L. (Asian rice) and *O. glaberrima* Steud. (African or black rice). *O. sativa* was domesticated in Asia 9000 years ago and became the world's most important commercial food crop and a primary food source for more than a third of the world's population (Khush, 1997). *O. glaberrima* was domesticated about 3500 years ago from its progenitor *O. barthii* A. Chev. in the inland delta of the Niger River (Portères, 1962; Purseglove, 1976; Wang et al., 2014). African rice is characterized by its few-branched panicle, short and rounded ligule, glabrous grains, and frequently black husks (Burkill, 1985; van der Zon, 1992). The seeds of this species tend to shatter and often have a red pericarp (bran) around the kernel (National Research Council, 1996; Sweeney & McCouch, 2007). *O. sativa* has a much longer and pointed ligule, a highly branched panicle, generally straw-colored husks, and a white pericarp (Sweeney & McCouch, 2007).

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Published online: 14 August 2024

African rice used to be intensively cultivated but is now used only as a subsistence crop by farmers in West Africa (Teeken et al., 2012). It is being replaced by *O. sativa* by African farmers mainly due to its lower yield, shattering, lodging, the difficulty in machine-milling, and the pressure of widespread introduction of high-yielding improved cultivars of Asian rice (Ghesquière et al., 1997). Although Asian rice has higher yields it requires much more water, is less drought-tolerant, and its taste is different (Schneider & Ash, 2020). The presence of Asian rice in West Africa dates to the early sixteenth century when Portuguese traders introduced tropical *japonica* varieties (*O. sativa* var. *japonica*) from the Philippines and Malaysia (Eltis & Richardson, 1995; Nawani, 2013; Gilbert, 2015).

According to Carney (2001), *O. glaberrima* was probably first introduced to the southern United States between 1685 and 1696 via slave ships from West Africa, when it was shipped as food during the Middle Passage, together with crops such as yams, okra, and bananas (Carney & Rosomoff, 2011). In this period, 'red rice' was among the first types grown in the Carolina colony. Carney argues that this must have been *O. glaberrima* as this species often has a red pericarp that is difficult to remove. However, many traditional landraces of *O. sativa* exist in West Africa that also have a red pericarp (Teeken et al., 2012), so this early 'red rice' in the Americas could also have been *O. sativa*. No written sources referring to the (black) husk color of this 'red rice' and no physical evidence of *O. glaberrima* in the form of archaeological remains or herbarium specimens have been found in the United States.

Evidence of *O. glaberrima* in the Americas was found in botanical collections in El Salvador (Portères, 1960) and archival records from Suriname describing the early presence of *O. glaberrima*. Governor Van Sommelsdijck wrote in 1688 that "the rice that grows here is much better than what is sent to us from Holland, of which there are two kinds: a white type and a black type, which is known in the fatherland as red" (Elfrink et al., in press, Fig. 1). The white type was probably *O. sativa*, while the rice varieties with the red pericarp and the black husk can only be *O. glaberrima*. In the 1680s, the first Maroons had already escaped from the plantations and settled in the forested interior of Suriname (Price, 1996; Dragtenstein, 2023). In 1712, it was observed that Maroons were growing large quantities of rice for their subsistence (National Archives, SVS, nr. 129, NL-HaNA_1.05.03_129_0252–1712; Dragtenstein, 2002). However, the color of the rice found in Maroon fields was not mentioned in the archival documents.

Today, Suriname and French Guiana are home to six Maroon groups: the Saamaka (estimated population size ~ 82,500), Okanisi or Ndjuka (~ 82,500), Matawai (~ 6800), Paamaka (~ 11,000), Aluku or Boni (~ 11,000) and Kwinti (~ 1000). All still live in the forested interior except the Matawai and the Kwinti, who have largely migrated to Paramaribo, the capital of Suriname (Price, 2013). Every Maroon village has a captain and each Maroon group has its paramount chief.

The earliest written evidence of the presence of black-husked rice in Maroons fields in Suriname was documented by the plantation owner, part-time botanist, and fierce defender of slavery F.W. Hostmann, who wrote that "among the bush negroes, a rice variety with a black husk is found in the wild. It could become important to them if they were not so superstitious because they claim that it was sown by angry forest spirits" (Hostmann, 1850: 265). The name for this wild rice was 'joerka aleisi' (*yorka alisi*, spirit rice). Almost a century after Hostmann a rice variety with a black husk and red pericarp was collected in an Aluku Maroon village in French Guiana by the French agronomist M. Vaillant, who referred to a legend that female ancestors had hidden rice in their hair in Africa and thus transported it to French Guiana (Vaillant, 1948). An herbarium specimen of it was later identified by Portères (1955) as *O. glaberrima*. Unfortunately, this specimen, first housed at Muséum National d'Histoire Naturelle in Paris, can no longer be located.

The story of a type of wild rice that was present in the interior when the first Maroons arrived has also been documented by later scholars. Anthropologist Price (1983, 1991)

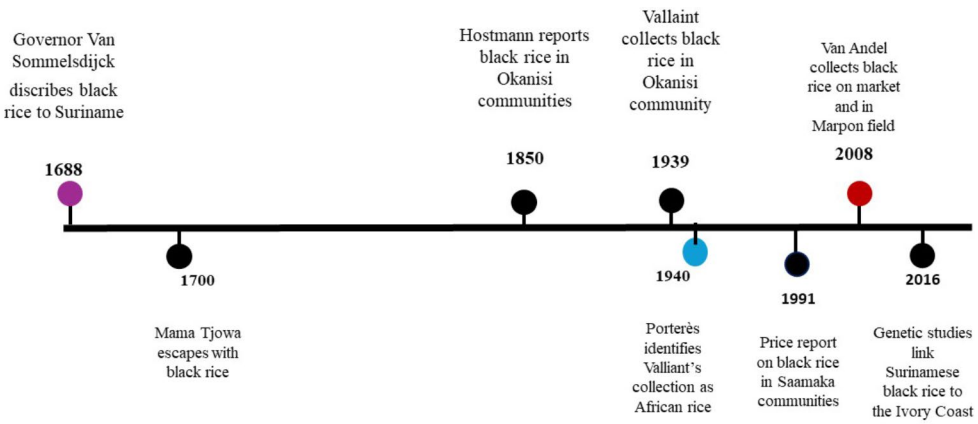

Fig. 1 Timeline of the reports on African rice (*O. glaberrima*) in Suriname. Our team started rice research in 2017

mentioned that the Saamaka cultivated *mátu alísi* (forest rice) only for ritual food offerings and that it was first encountered in the provision field of an *apuku* (forest spirit) by a forefather of the Saamaka named Gbagidi. Gbagidi allegedly discovered a mysterious swamp surrounded by wild rice, bananas, and other crops, referred to as *Gaán Goón* behind the village of Dangogo (Price, 1983). When special meals were prepared for their eighteenth-century ancestors at the shrine of *awónênge* (African-born ancestors) in the village of Dangogo, it was always *mátu alísi* they offered (Price, 1991). Price also wrote that it was unclear from the eighteenth-century missionary documents whether the Saamaka people cultivated this type of rice or gathered it where it grew near swampy places in the forest. He also speculated that, until new rice varieties were brought to their villages around 1739 by a recently escaped woman named Paanza, *mátu alísi* was their only rice (Price, 1983).

Anthropologist Fleury (2013, 2016) documented how rice occupied a very special place in the culture of the Aluku Maroons, evidenced by its presence in their offerings to ancestors at the end of a mourning period. According to Fleury's Maroon collaborators, their ancestors had found rice growing wild by the water's edge in savannahs. The Aluku also referred to stories about African women who, before boarding slave ships, hid grains of rice in their hair and thus transported rice from Africa to America, similar to the reports of Hostmann, Vaillant, and Price.

Baumgart et al. (1998) reported that *matu alisi* was specifically "thrown for the birds" and planted at the edges of agricultural plots to distract birds from eating the rest of the rice. He described it as poor-quality rice with a red pericarp softened after cooking and set once it cooled.

In 2008, evidence of the cultivation of *Oryza glaberrima* by Saamaka Maroons in Suriname was provided by van Andel (2010). She noticed that in Paramaribo *mátu alísi* or *baaka alisi* ('black rice') was sold in small bags at the herbal market for ancestor rituals during which food is offered to deceased family members. Several specimens were collected and identified by experts as African rice. The Saamaka claimed their forefathers collected this *mátu alísi* first in a mysterious open swamp that belonged to a forest spirit (van Andel, 2010; van Andel & Ruysschaert 2011). In 2013 and 2017, *O. glaberrima* was collected among Okanisi Maroons in Suriname and French Guiana (van Andel et al., 2016, 2019).

Genomic analysis proved that the single *O. glaberrima* variety known by Maroons as *matu alisi*, *baaka alisi*, *yorka alisi*, *busi alisi*, or *apuku alisi* is a fully domesticated crop similar to landraces from the Upper Guinean region of West Africa and almost identical to a landrace from the western part of the Ivory Coast (van Andel et al., 2016; Veltman et al., 2019). Our research describes in more detail the cultivation practices and uses of black rice by the Okanisi, Aluku, Saamaka, Paamaka, and Matawai Maroon communities and we discuss the different legends surrounding the origin of black rice in Maroons' oral history.

Methods

We conducted semi-structured interviews with 99 Maroon rice farmers in Suriname and French Guiana, about general rice cultivation (almost all women) in 2017, 2021, 2022, and 2023. We collected 10 herbarium and seed specimens of black rice (Supplementary Table). Saamaka, Matawai, Okanisi, and Paamaka collaborators were recruited through snowball sampling: the only inclusion criterion was that they were rice growers. Here, we present only the data on black rice from those interviews. The other interview data is published elsewhere (Van Andel et al., 2023; Pinas et al., 2023; Maat et al., 2023). Information about black rice among the Aluku was extracted from previously published sources (Vaillant, 1948; Fleury, 2013, 2016). No fieldwork was carried out in Kwinti communities because this group is quite small and mainly lives in the capital. We had no indication of rice being grown by the few Kwinti who still live along the interior Coppename River.

We obtained written permission from the traditional Maroon authorities to conduct our research and oral consent from each farmer. We asked farmers specifically if they had *O. glaberrima* in stock or planted, how they obtained it, how it came into the community, whether they knew specific recipes for ritual dishes or offerings that needed black rice, and what it was used for in daily life and during funerals. Farmers were compensated for their time spent with the researchers. We documented local names, their translations, and meanings, and recorded songs and stories about Maroon rice and its origins on a voice recorder. The stories that Maroon farmers told us varied in detail and length. We later discussed the interview data with the paramount chiefs of the Okanisi, Saamaka, and Matawai Maroon communities and several elder Maroon men and women, including village captains, specialists in traditional music or plant use, both in Suriname and the Netherlands. The story of Saamaka traditional healer Edje Doekoe was collected by personnel of the Saamaka Museum in Pikin Slee (Geeske Verbree, pers. comm.). Data were also retrieved from Ising (2022), an M.A. student participating in this project.

We deposited living seeds of *O. glaberrima* at the SNRI/ADRON rice germplasm institute in Nickerie, Suriname, and herbarium specimens of black rice plants at the National Herbarium of Suriname in Paramaribo (BBS), and Naturalis Biodiversity Center in Leiden (L), the Netherlands. Dead

Fig. 2 Botanical drawing of African rice (*Oryza glaberrima*) collected in Suriname (after collections Jansen-Jacobs 7075, L.3879365 and Van Andel 5634, L.0840072, See Supplementary Table). (**a**) open flower, (**b**) ligule, (**c**) flowering spikelet, (**d**) dehusked grain, (**e**) husked seeds with awns, (**f**) entire plant with panicle. Drawing by Esmée Winkel, Naturalis Biodiversity Center

Fig. 3 African rice grains collected in this study (1) husked seeds and (2) dehusked seeds with red pericarp (seed sample NP339, Naturalis Biodiversity Center)

seed samples are deposited in the Economic Botany collection of Naturalis.

Results

Morphology and Distribution

The African rice we collected in Suriname and French Guiana had single-branched panicles and short and rounded ligules with an average length of 8 mm (Fig. 2). All black rice samples we collected were morphologically similar. Half of the ripe grains had dark brown husks and the other half pale brown. The grains shatter easily from the panicle and have a dark red pericarp (Fig. 3). The grains were glabrous with an awn of an average length of 6 mm.

The average plant height that we measured in 2023 was 160 cm. At this height, they tend to lodge when there is strong wind. We recently measured an average production of 2181 kg/ha on Maroon fields (Pinas et al., 2024), much more than the 700–1000 kg/ha that was estimated previously for Maroon rice in general (Budelman & Ketelaar, 1974).

In 2021 we selected six Maroon rice varieties (one *O. glaberrima* and five *O. sativa*) and asked Maroon farmers to identify them. African rice was recognized by all 20 farmers who participated in the exercise as *baaka alisi* or *matu alisi*, while the Asian rice varieties were not always named correctly when they came from outside their village (Pinas et al., 2023). African rice was grown in most Maroon villages where we carried out fieldwork (Fig. 4). It is notable that we did not encounter black rice among the Paamaka Maroons along the Marowijne River or in the Okanisi community residing in the Cottica area. Adriaan Adawde, a well-established Paamaka pallbearer and traditional funeral specialist, explained to us that rice cultivation has been declining over

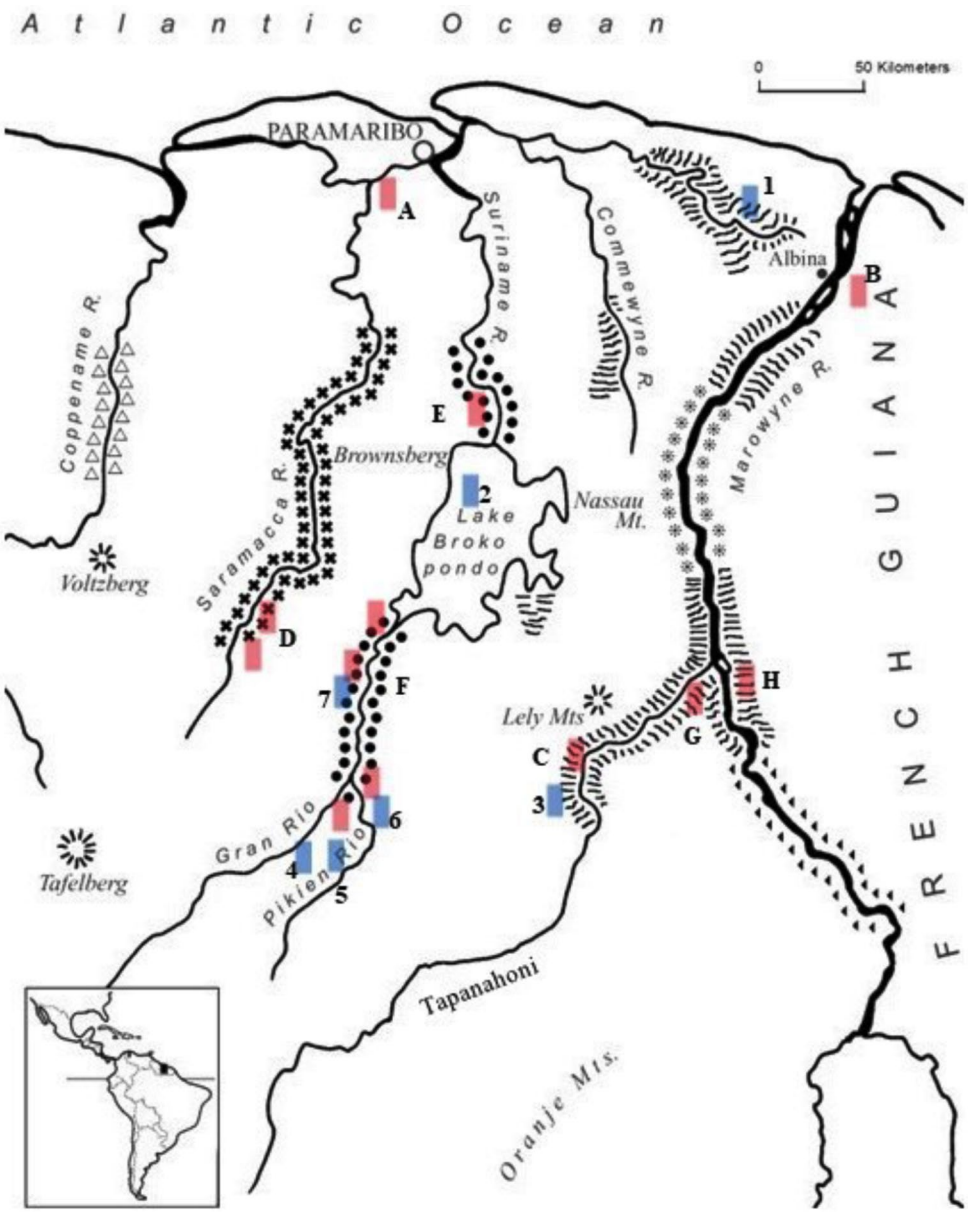

Fig. 4 Map of Suriname (left of the Marowijne River) and French Guiana with locations of the Maroon communities. ΔΔΔΔ Kwinti, ●●●● Saamaka \ \ \ \ Okanisi ✱✱✱✱ Paamaka xxxx Matawai ◀◀◀◀ Aluku. Red squares indicate the Maroon villages where we encountered black rice. Letters represent the names of these communities. A = Santigron, B = Saint Laurent du Maroni, C = Diitabiki, D = Pusugrunu, E = Brokopondo region, F = Saamaka communities along the Suriname River, G = Tyontyon island, and H = Grand Santi. Blue squares indicate the locations where Maroons found black rice in the wild: 1 = Mama Mofu Creek, 2 = Creek submerged by Brokopondo Reservoir, 3 = Tapatosso Creek, 4 = Sopu Creek, 5 = Pukasa granite boulder, 6 = Ananasberg, and 7 = Pikin Slee

the past 30 years in his community since Brazilian miners settled in the area: "The Brazilians prefer *kwak*, a dry cereal-like food made from toasted yellow bitter cassava flour. Paamaka women nowadays focus on planting cassava to produce kwak and marijuana to sell to the miners."

The Cottica Aucans had fewer rice varieties than other Maroons, probably due to the violence experienced in this area during Suriname's civil war between 1986 and 1992 (Pinas et al. unpublished data). Most people in the Cottica area fled to French Guiana, leaving their rice fields unattended for several years. Mame Malonti, a farmer from Wanhatti, told us that after the civil war, she did not see many of the rice varieties that they had before. However, some Cottica Maroons remembered that black rice was once found growing wild near a creek in their territory (Fig. 4).

Black Rice Cultivation

Saamaka rice farmer and English teacher Anne Huur explained to us: "Black rice is sacred, so every village must have a black rice field. When it is needed for medicinal or spiritual purposes, you will see that it is readily available. But it is uncommon that villagers or farmers will tell you readily where it is situated." Despite this, 23 of the 99 rice farmers (23%, all women) in the four Maroon groups we interviewed had black rice either in their fields or in stock: among the Saamaka 15 out of 33 women grew it, six out of 55 Okanisi, and two out of seven Matawai. As we recruited our collaborators via snowball sampling, these percentages cannot be interpreted as representative of the different Maroon groups. The Paamaka no longer cultivate black rice,

but they did so 30 years ago. Fleury (2016) documented black rice cultivation among the Aluku around 1997 but did not mention the percentage of farmers who had it on their fields or in stock. Although unmilled black rice is widely available in the herbal market in Paramaribo, where it is sold for ancestor offerings, farmer Jeanette Pansa explained that it could not be sold among Maroon community members as "you should not ask money for an ancestor crop."

Norma Aserie, a farmer from Tapoeripa (Brokopondo district), reserved a dryland patch in her field close to the forest edge specifically for black rice. She explained that birds would leave other rice varieties alone when black rice was available. This practice was seen also in Abenaston and Nieuw Aurora along the Suriname River by Baumgart et al. (1998). When we asked farmers about their methods to prevent the birds from damaging their rice, they answered: "We don't do anything because birds don't eat everything," although several people owned shotguns. Some farmers used a net or shot at birds with catapults, but others responded: "Well, even the birds have to feed themselves, they have a role to play in nature."

Alieni Faandya, a Saamaka farmer in French Guiana, explained: "Black rice is always sown close to the forest edge, so we do not have to walk through it. The leaves are sharp, and they can cause skin cuts. This is the reason we sow it apart from the rest of our crops." Other farmers planted black rice at the entrance of their fields as an offering and respect for the forest spirits, so the harvest of all other crops would be plenty (Fig. 5A). Three Saramaccan farmers had an entire field allocated to only black rice, a bit further hidden in the forest, away from their fields of cassava, Asian rice, okra, and bananas. One thing all farmers agreed was that black rice should always be sown on dry land that did not flood, even during heavy rains, in contrast to some Asian rice varieties that could withstand flooding or thrive in moist soil (Pinas et al., 2023).

When asked whether indigenous people also grew rice, the Maroon farmers responded that they did not know, had never seen it, or simply that they did not. Although surveying Indigenous agriculture was not part of our project, we also asked this question of two Indigenous men whom we met by chance near Maroon villages. An Arawak man from Alfonsdorp (Marowijne district) said that people in his village grew Maroon rice varieties now and then, "especially the black type, as it has lots of vitamins. We just mill in with a mortar and pestle." A Carib man near St. Laurent du Maroni, French Guiana, said that his ancestors had exchanged rice for cassava with the early runaways, centuries ago. They had grown this rice for a long time on hill slopes. "But recently, our women have been more interested in fancy clothing and polished nails, so they don't like to work the soil anymore." As far as we are aware, the cultivation of rice by indigenous peoples in the Guianas has not been mentioned before in the literature.

Black Rice as Food and in Rituals

Most of our collaborators were adamant that black rice was not used as food. Nevertheless, 15% of the farmers we interviewed reported that they consumed black rice similarly to white (Asian) rice. According to Jermain Keizer, a Saamaka from Jawjaw, large quantities of black rice were grown in his village and consumed similarly to white rice. Even within Maroon communities, the opinions regarding the consumption of black rice could differ. In Pusugrunu, Saramacca River, Matawai farmer Iris Emmanuel cultivated small amounts of black rice in her field of white rice. She regarded black rice as a medicinal plant and could not agree with her aunt in the same field who told her that black rice was perfectly edible. One Saamaka farmer assured us that because of its stiff panicles, black rice was good for making brooms and that was the reason for keeping it.

Fig. 5 (**A**) Saamaka farmer standing in her rice field. Asian rice (yellow bent panicles) can be seen in the front, while African rice (dark erect panicles) can be seen near the forest edge. (**B**) Not fully ripe African rice standing in a Maroon field. Pictures: Harro Maat (**A**), Nicholaas Pinas (**B**)

Saamaka healer Edje Doekoe also agreed that black rice is edible. "Our ancestors ate it more frequently than we do now. Therefore, we should continue planting it. Especially in times of crisis, it is planted: it can be ripe within three months. All the non-Christian Maroon villages grow it. The birds like it more than the other rice, so you have to keep an eye on it to prevent it from being eaten completely. Cooking is done as all other rice varieties: it does not require special treatment. It is very nutritious when you eat it, you will feel full for a long period. The only downside is that if stands long in a pot it becomes hard. However, if you add some water and heat it, it becomes soft again".

Alieni Faandya also consumed black rice, but she said that there were two different types of black rice. In her opinion, the variety she ate (*baaka alisi*) was not the same as *matu alisi*, which was used for spiritual purposes and consumed solely by traditional healers and priests of the Afro-Surinamese *winti* religion who did not eat any Asian rice. We collected Ms. Faandya's black rice (TvA6839, see Supplementary Table), but in-depth genetic research is needed to verify whether it is different from the other samples we took. Augustina Henkie, an elder Matawai woman from Pusugrunu, also said that *matu alisi* was not the same as *baaka alisi*. "*Matu alisi* is a grass that grows wild in forest clearings and savannas. It is not edible and is loved only by birds. *Baaka alisi* is edible and cultivated by people." We were not able to verify which species of wild grass Ms. Henkie indicated as '*matu alisi*' (forest rice), but her explanation shows that Maroons do not always connect this term to the domesticated crop *Oryza glaberrima*.

Farmer Emelina Amalia from Godo-olo, Tapanahoni River, said that black rice was consumed by pallbearers. The family of the deceased receives white and black rice for all the funeral activities. In the end, the leftover black rice is given to those who carry the coffin to the grave to take home for consumption.

Ising (2022) interviewed 12 Saamaka and Okanisi women and all her collaborators agreed that all types of Maroon rice could be used for traditional dishes. However, when asked directly about black rice as a potential ingredient, only three dishes were mentioned that could be prepared with black rice: *maipa sii alísi* (rice cooked in the fat of *Attalea maripa* seeds), *tan ini uwii* (rice cooked with peanuts and plantain in banana leaves) and *pinda alisi* (peanut rice), and were mostly prepared for death-related gatherings. Ising's interview data suggest that black rice is also included in food offerings such as *tuwë njanjan* (lit: throw away food) that take place during funerals and the closing of the mourning period (*puu baáka*).

Herbal Medicine

The majority of collaborators and farmers reported that black rice was a prominent ingredient herbal medicine. However, when we asked whether they could tell us for what health issues it was used, the answers were often vague. Responses such as "for cultural things," "I don't know," "to wash your head or body," "we think for spiritual diseases," "to call a spirit," and "it is used by herbalists and *winti* priests" were common. Our co-author Noeki André Mosis explained: "People do not like to talk about black rice because it is seen as *apuku* [forest spirit] or y*ooka alisi* [rice connected to the spirit of the deceased] and therefore is a sensitive issue."

Even so, we documented a few herbal preparations for physical diseases. For the removal of thorns in the skin, black rice was pounded in a mortar into a smooth powder, applied to the skin, and tied with cloth, causing the thorn to resurface from the skin, making it easier to remove. When someone got burned by fire, black rice was burned to charcoal, ground to powder, and applied to the wounds. This would accelerate the healing process. Mr. Atanso from Gran Santi said that porridge of black rice boiled in a lot of water was used as medicine against diarrhea.

According to Anne Huur, Maroons who practice the *winti* religion believe in reincarnation and that some children are born with a strong connection to their previous life. This was visible in physical symptoms such as sickness or disabilities: "For example, a person with a truncated index finger passes away will be reincarnated into someone with a similar truncated finger." Reincarnation could also be revealed in dreams or visions through a close relative or a traditional healer. To separate the previous life from the current, a healer would prepare an herbal bath consisting of black rice and other herbs. The child would then be bathed at the intersection of two roads at midnight. It was assumed that from that moment on the child would be released from the spirit of the previous person. This separating ritual is known as *prati* or *paati* (Wooding, 1979; van Andel & Ruysschaert, 2011).

Offerings

Spirits of the forest, earth, and the ancestors require food offerings known as *njanjan mofu njan* (food for all mouths) (van Andel & Ruysschaert, 2011). Adriaan Adawde explained: "It must be given so the spirits can continue to protect us or sustain the peace." A food offering for an angry spirit that has attacked someone is also known as *paati*. Adawde described the details: "When someone is troubled by an angry spirit, the person will not sleep properly and see visions of a diseased family member, or have a psychosis. A way to cure the person is by performing a *paati* ritual."

For this, he needed uncooked plantain (*Musa* sp.), yams (*Dioscorea* spp.), napi (*D. trifida* L.f.), black or white rice, placed in a calabash (*Crescentia cujete* L.). "We will take the person to the forest at the bottom of a hill or mountain and split a piece of *neku* liana (a fish poison, *Lonchocarpus* sp.) in the middle, big enough that the person can walk through it. The *neku* is placed strategically so that the person is facing sunrise before the calabash bowl with uncooked food is thrown over his/her head. Afterward, the person walks through the opening in the *neku* that is then closed with a handspun cotton thread. *Paati* is often performed; you can be walking in the forest and see the remains of food on the ground."

Extensive ceremonies are held for the installation of the traditional leaders. Edje Doekoe explained: "The ancestors are called upon for the newly chosen leader and his or her partner. Prominent in the ceremonies are herbal baths, prepared with black rice as one of the main ingredients. Christian villages do not practice those ceremonies anymore." Black rice is also offered at shrines: wooden statues covered with fabric, often situated in the middle of the village (Fig. 6). In Kajana, we saw an offering in which the black rice had already germinated.

Fig. 6 Village shrine in the Saamaka village Kajana, Gran Rio. This is the location where most offerings are made, many of which contain black rice. Picture: Tinde van Andel

Although black rice is no longer cultivated by the Paamaka, rice farmer Eva Ceder explained that food offerings were still common: "A lot of men work in the forest as miners and loggers, so troubling the forest spirits often happens. To settle this, food offerings are given, and they mostly contain black rice." How the men obtained the black rice remained unclear, but they probably bought it from other Maroons in Saint Laurent.

Funerals

We received contradictory answers to our question on how black rice was used during funerals. Most farmers agreed that homegrown white rice should be taken to funerals, but eight of the 99 farmers (both Aucans and Saamaka) were certain that black rice could not be brought to a funeral. However, the term 'funeral' in Maroon communities is not one activity of burying a dead person, but a lengthy series of events (Price, 1990). According to co-author John Jackson: "When a [Saamaka] person is confirmed deceased in a village by a health worker or a *winti* priest, the elders call a public meeting in the *gangasa* (community center) and inform everyone. In this meeting, pallbearers and gravediggers (*olo man*) will be selected. The mourning period (*go a baaka*) starts right away. Family members, friends, and neighbors will rush to the house of the deceased (*dede oso*) to support the close relatives. Every day visitors will be attending until the burial takes place (*beli dey*). The night before the burial a small wake is organized, during which attendees often dance and sing. A week after the burial the *aitidey* (eighth day) is held to commemorate the deceased. A second commemoration is held after six weeks. The closing of the mourning period is known as *puu baáka*. During the mourning period close relatives and the partner of the deceased can only wear black and white clothes. The mourning period used to be between six months and a year, but now many people have migrated to the city, it is often no longer than four months, and obligatory rules like the cutting of hair and the prohibition on perfume and deodorant have been dropped."

Although living far apart from one another and belonging to different ethnic groups, Okanisi farmer and wife of a chief Eline Apai from Moitaki (Tapanahoni), and Saamaka farmer Maisini Majokko from Kajana both described the same details of black rice use during funeral ceremonies. "Black rice is always present [at funerals] but it is not used for daily consumption such as other rice varieties. It is kept for the day the deceased will be laid in his or her grave. Just before the coffin is placed in the grave, the pallbearer will cast a handful against the coffin while calling upon the ancestors, so that the deceased may freely enter the afterlife." Thus, black rice is seen as payment for entrance into

the afterlife: a process known as *bai pasi*. In Dangogo, Pikin Rio, Saamaka chief Abini Aboikoni recounted: "Black rice is pounded and at the open grave, when the coffin is already in the hole, a porridge of mashed black rice flour is offered to the deceased". In Langatabiki, a Paamaka village along the Marowijne River, whole grains of black and white rice are placed in the grave when a paramount chief is buried. For common people, this is not done. During the *puu baáka*, all persons who are officially in mourning are taken to a river or creek to bathe. Black rice is also used on this occasion, but we did not get the details.

Ising (2022) also noted that all traditional rice dishes prepared for a funeral or *puu baáka* are a collective endeavor: the ingredients are brought by close family or acquaintances of the deceased, and cooking is done in a group. Offerings (*tuwë njanjan*) either for a funeral or *puu baáka* should contain rice, including black rice. According to Nelda Majokko: "… food offerings only take place in heathen villages like Kajana," but when attending a *puu baáka* in the nearby Christian village of Ligorio we saw a secret food offering placed below the Catholic altar. Several Maroons told us that 'church people' do not offer rice anymore, and sometimes do not go to funerals where '… food is thrown to the ancestors.'

Stories About the Origin of Black Rice

Our Maroon collaborators told several different stories about how their ancestors obtained black rice, and while these differed within and among Maroon communities, three themes emerged: enslaved women carrying it in their hair, ancestors finding black rice in the savanna during their flight from slavery, and the discovery of black rice in interior swamps.

Richenel Adama, a Matawai elder from Bethel, Saramacca River, told us how his ancestor Mama Tjowa escaped from slavery around 1700. She found rice seeds that had fallen from a granary on the plantation she was fleeing, but it was impossible to take a whole bundle, as it would have alerted the slave masters of her escape, so she hid a few rice seeds in her hair. When she and her fellow runaways reached safety, Mama Tjowa removed the rice seeds from her hair and sowed them. After four months the rice was ready for harvest, which provided them with both food security and the possibility to move further away from the plantations. Adama could not recall what variety of rice Mama Tjowa escaped with, but Augustina Henkie told us that it was black rice (van Andel et al., 2023).

Co-author Mosis explained that on slave ships women had more freedom than men. They were tasked with cooking for the enslaved passengers, so they could move around a little. Having access to rice and other crop seeds, they could hide some in their hair or bind it in their clothes. "Even though they were scarcely clothed, for rice you don't need a lot of seeds. They did not know where they were going, but keeping crop seeds with you has been a practice even in Africa." Although he was not sure which type of rice variety the enslaved women hid on the slave ships, he knew black rice was one of them, because it had been so significant for Maroons now and in the past. Edje Doekoe's story of how black rice ended up with the Samaaka people differed slightly. He said that black rice came with his forefathers from Africa in a *kuukuu*, a wicker basket in which people transported important *obias* (spiritual objects): "A *kuukuu* is important to take along, it contains every [ritual] thing that you need."

Okanisi rice farmer Lucia Pasoe from Nieuw Libi, Marowijne River (French Guiana), also knew that enslaved women hid rice on slave ships, but she was sure black rice was not one of those varieties. "During the escape from the plantation, Maroons had to walk long distances to reach safe places. It was on their way that they came across a savannah and saw black rice growing there." Eva Alimeti from Portal Island (French Guiana) knew more details of this story. "A long time ago when our ancestors ran away, in a small group of six or seven people, they saw rice plants on a savanna. They were not sure whether it was edible. One man volunteered to try it out, collected the seeds, peeled them, and ate them. They spent the night there. The next morning, when they noticed the man had survived, they realized that they could eat this crop. They decided to take it along to a place where they would be safe. When they finally reached a good spot, they planted the rice and slowly learned how to process it by making a mortar to mill it and a flat wooden plate to winnow it." This narrative of ancestors finding rice growing wild on a savanna just after their escape was told to us several times by unrelated Maroons.

According to Chief Albert Aboikoni, black rice was found by Gwagidi, one of his forefathers, in the field of a forest spirit. While he was hunting with his dog, Gwagidi discovered a mysterious swamp. "That place had strange vegetation, different than the rest of the forest, we call *it Gado Oso* (God's house). This is not far from Asindohopo where we are now. Gwagidi saw *matu alisi* there, and a type of banana that he had not seen before. He harvested the rice, a bunch of bananas, and a banana sapling, and headed home. Then he realized that his dog was gone, and he was lost in the forest. He apologized to the *apuku* forest spirit for stealing his crops and begged him not to kill him. He said: 'I have a sister Yaya in the village. Take her if you want.' Immediately afterward he found his way back home, and the *apuku* possessed his sister in the village. She asked him for the stolen crops, but Gwagidi had hidden the bananas and the black rice. The *apuku* was angry, but with the intervention of a *winti* priest, it could possess a family member

for many generations." Price (1983) recorded a variation of this story among the Saamaka in the 1960s, and we heard it again from several Maroons, but the location of the *apuku* field differed each time (Fig. 4). Thea Paimi, an Okanisi farmer from the Cottica, told us that her father Johannes Paimi lived in Pina Tjaimi, a village not far from Mama Mofu Creek (Fig. 4). "This creek is a well-known spiritual place. Once my father got lost in the forest and ended up in a swamp that was connected to the source of Mama Mofu Creek. It was full of black rice. He decided to harvest some and bring it back to his village. Shortly after he arrived in the village a couple of people were possessed by forest spirits who complained to the elders that their rice was stolen. The village elders asked for forgiveness on Paimi's behalf, so he could keep the rice, but he swore never to return to that place." According to Saamaka tree spotter Frits van Troon, there used to be a creek that ran down the Brownsberg mountain and ended in the Suriname River. Its lower banks were full of black rice but have now been submerged in the Brokopondo Reservoir. Other Saamaka told us that there was a similar *apuku goon* behind Pikin Slee.

Bono Velanti, the Okanisi paramount chief, explained to us that black rice was found in the Tapatosso Creek long before he was born. This creek is part of the forest trail to Okanisi communities residing in Sara Creek. "It was on one of these journeys that my forefathers saw black rice and awara (*Astrocaryum vulgare*) which they decided to collect and bring home." Maroon gold miners now working in that location had not recently seen black rice.

Although the Paamaka lost their black rice over the last 30 years, Adriaan Adawde could remember his grandfather's stories about how his ancestors encountered it. "When the runaways escaped from slavery, they had little food to eat, until they came across an abandoned field filled with black rice. They knew it was given to them by a forest spirit whose name should not be invoked idly". When Adawde was young, the Paamaka community still organized annual food offerings for this forest spirit. "Now all this tradition is lost. Maybe this is the reason why so many problems are happening, such as children drowning in the river and the many accidents in the gold mines happening to young Paamakan miners."

When asked about an *apuku goon* (forest spirit's field), people described a natural open space in the forest. Saamaka chief Aboikoni explained: "In the dry season, it's just grass, but in the wet season, it can be like a swimming pool." Co-author Jackson once traversed the Tumac Humac mountains to the Brazilian border and encountered open grassy fields in the rainforest. He saw that these were granite boulders with thin soil, supporting grass but not trees. He saw no rice or other crops, only grass seeds eaten by birds, but imagined rice could grow there if dropped. Edith Adjako recounted a story from Okanisi healer Ruben Mawdo: "Runaways always had a *bonuman* [ritual specialist] in their group. They used granite boulders to scout for soldiers. Possibly, they left food remains like awara, cashews, rice, and pineapples. Or they grew crops on these places because they did not need to burn the forest, which would reveal their location."

In July 2022, in our attempt to find an *apuku goon*, Abini Aboikoni and his cousin directed us to a site five kilometers upstream of Dangogo along the Pikin Rio. Although a granite boulder called 'Okoberg' is visible on Google Earth (3°0.54'N 55°0.30'W), we could not locate it after hours of searching, despite seeing flat granite rocks with secondary forest. Our guides then showed us another *apuku goon*, a granite boulder about two kilometers inland from Dangogo (3°0.33'N 55°0.39'W), which they often showed to tourists. (Fig. 7, for a drone video, see https://www.youtube.com/watch?v=yfXQBA8Rgy0).

This mountain is indicated as the *Gaan Goon* (great field) where Gwagidi found his rice in the eighteenth century on a map in Price (1983:64). The slopes were full of small pineapples (*Ananas comosus*) that seemingly grew wild. According to Jabini, they were of a different variety than those cultivated in the village. "You can eat them, but don't take them home, as the *apuku* will become angry." The next day, rice farmer Jaai Pansa explained to us that she once "before the year 2000" encountered the *apuku goon* we went looking for, and it was named *Pukasa* after the creek next to it (Fig. 3). She found cashews, awara, and black rice. "It is not planted by people. It just grows there. When it is ripe, you see it, but on other occasions, you don't see it. I took some of these crops home, that's why you did not find the spot yesterday. The *apuku* is still annoyed."

When walking on the *Ananasberg*, we asked Jabini whether birds could also plant crops. He answered that this indeed happened sometimes. "When my mother had started to plant cassava on her field before sowing other crops, she saw saplings of pepper sprouting spontaneously. They had been dropped there by birds."

According to co-author Mosis, birds were instrumental in distributing rice seeds. "They travel from one region to another with seeds. In a song composed for their Paramount chief Oseisi [1884–1915], you could hear the women's complaints about birds. 'The birds, the birds, oooh. Tata Oseisi, the *andoki* [bird] came and is eating all our rice. That is not a big problem, but when they leave, they will spread our rice varieties to other people.' Those women knew that birds were seed distributors!"

Fig. 7 Slope of the Ananasberg, showing pineapples in the forefront and open, grassy vegetation on granite rock, surrounded by forest. Although Maroons have observed *O. glaberrima* growing wild in similar vegetation types, we did not observe it. Picture: Tinde van Andel

Discussion

The stories about black rice that we collected from the five Maroon communities illustrate how deep the connection is between them, their crops, and their ancestors, preserved through their oral history. However, this does not mean that there is no pressure on traditional knowledge and practices regarding (black) rice. The Paamaka and the Cottica Okanisi no longer plant black rice, and ritual practices that were common some 30 years ago are disappearing. The same is probably true for the Kwinti Maroons. This loss of traditional practices is probably related to the migration of young people to urban areas, the presence of Brazilian miners with different food preferences, but also to people's displacement during the Civil War (1986–1992), when normal life was disrupted and has never fully recovered (Hoogbergen & Polimé, 2002). Another pressure on Maroon (black) rice knowledge and practices is Christianity. In villages that renounced the *winti* religion, food offerings, ancestor veneration, and funeral rituals were abolished or frowned upon, although villagers still know about black rice and its use in traditional practices, and some still grew it for commercial purposes. Despite this pressure, 23 of the 99 Maroon farmers we interviewed had black rice in their fields or stock, which indicates that its cultivation persists in the majority of Maroon communities. With the knowledge that people do not always share stories about black rice, we assume that it is cultivated on a wider scale than we were able to observe.

In many South American plantation societies, women escaped slavery with rice seeds in their hair. Carney (1998) reported the Brazilian version of this story, Vaillant (1948) and Fleury (2013) noted these accounts in French Guiana, and Price (1983) and van Andel et al., (2023) reported this story in Suriname. African rice was present in Suriname as early as 1688, and plantation owners complained that it quickly became a weed and "could ruin a whole plantation" (Elfrink et al., in press). Marronage started very early in the plantation history of Suriname, where it is estimated that c. 250 enslaved Africans escaped every year from the 1650s until close to emancipation in 1863 (Buddingh, 1995). It was common for people to escape in small numbers and join larger groups in the interior. These smaller groups made rice fields that they abandoned when they retreated further. Subsequently, another group of runaways from a different plantation could have encountered rice in such an abandoned field. Rice seeds may have fallen from people's pockets, or more likely, birds could have dropped seeds in swamps close to plantations or in the open white-sand savannah that separates the coastal plantation zone and the forested interior of Suriname. In a study on 383 bird-dispersed plant species in Neotropical forests, most fruits and seeds preferred by birds tended to be black, while colors like brown, yellow, and white were less likely to be dispersed by birds (Wheelwright & Janson, 1985). This confirms the observations of Maroon farmers that birds tend to predate on black rice more than other rice varieties with a yellow or white husk.

African rice also shatters much more than Asian rice (Teeken et al., 2012), so we assume that seeds will easily fall from a panicle in the beak of a bird. Because of its broader leaves, African rice is more competitive with weeds, thrives better on poor and dry soils, and has a higher feralization capacity than Asian rice (Teeken et al., 2012). Reports from Sierra Leone mention that African rice also spreads easily in swamps (Richards, 1986). All these attributes combine

to facilitate the dispersal of African rice by birds in open grasslands: either on coastal savannas, weedy creek edges, or the treeless vegetation on the shallow soils of granite boulders deep in the interior forest. The birds probably also dispersed the other crops (cashew, pineapple, awara) that frequently grow on these *apuku* fields. One unique aspect that we encountered is that in Maroon communities birds are seen as part of nature and not persecuted for crop predation on crops as elsewhere. By 'sowing black rice for the birds' or 'for the forest spirit', people seem to respect the role birds still play in seed dispersion of black rice. This was also illustrated by the song composed for the Okanisi chief in which women were not so much complaining about birds devastating their crops, but rather that they dispersed their rice seeds to other distant communities.

The variety in knowledge, practices, and beliefs regarding black rice among present-day Maroons can be explained by the fact that the enslaved Africans who were brought to Suriname had different ethnic and geographical backgrounds. Some came from rice-growing areas in West Africa (currently Senegal, Sierra Leone, Liberia, and Ivory Coast), and were (more or less) familiar with African and Asian rice varieties. Others came from regions without rice cultivation in Central Africa (Turner, 2019) and probably did not recognize it as an edible crop when arriving in Suriname. This was illustrated by the legend of the runaways who did not know whether the rice that they encountered on a savanna was edible.

Within the rice-growing areas in West Africa, people nowadays also have different attitudes and beliefs towards *Oryza glaberrima*. Balanta people in Guinea Bissau recounted that black rice was found growing wild in swamps and brought to their communities by their ancestors (Teeken et al., 2012). Several ethnic groups in Sierra Leone offer rice with red pericarp to local gods of rivers, streams, and trees, and ancestral spirits. In Ghana, The Akpafu only use African rice during marriages and funerals, but not during religious ceremonies, as this is considered a sin in Christian beliefs. Women in Tujereng (Gambia) believed that having some African rice in their fields would lead to a good harvest and bring luck (Teeken et al., 2012). Although many farmers in The Gambia, Guinea Bissau, and Senegal said they would readily abandon African rice as it has low yields, was difficult to pound, and they did not like the red pericarp, the farmers that kept their African rice sometimes told stories almost identical to the ones we collected (Teeken et al., 2012).

Our research was limited to four Maroon ethnic groups. Many collaborators had a unique story on black rice, so we may have missed some stories. It is important to study black rice knowledge and practices among Maroons who have converted to the strict Protestant religion that recently increased its influence in Suriname and French Guiana, as these churches condemn traditional funerals and offerings to the ancestors (Ising, 2022). Little is known about how traditional knowledge is lost among those Maroons who migrated to cities and abroad. Although most Maroon black rice types look identical, further genetic studies could reveal whether Maroons cultivate genetically distinct varieties, and where these varieties originate.

Conclusions

Our research shows the intricate relationship between Maroons and black rice, but also the variations in beliefs and practices concerning its use as a food, medicinal, and spiritual crop. Further research among the Kwinti and Aluku communities on current black rice cultivation and practices is needed, as little is known about these smaller Maroon groups. During times of slavery, enslaved Africans with many different ethnic and geographical backgrounds were brought to Suriname. In this period, different rice varieties were introduced and cultivated on the plantations. Maroon legends illustrate how some ancestors knew (black) rice, brought it along from plantations, and probably recognized it in the coastal swamps or open savannahs, while others were not familiar with rice as an edible crop and hesitated to eat it when found in a grassland or swamp in the middle of the forest. After their escape into the interior, the various runaway groups had different histories with the crop, which resulted in a variety of attitudes towards (black) rice that remains evident in present-day Maroon communities. The special attributes of black rice, such as the ability to spread and compete with weeds, grow on poor soils, either on dry land or in swamps, its shattering seeds, and it preference for birds explain how a fully-domesticated crop could become wild in the forested interior of Suriname and French Guiana. As for some ethnic groups in West Africa, black rice also had a mysterious origin, perhaps some beliefs of black rice did not originate in the Americas. Although we could not unravel the entire mystery of black rice, we can safely say black rice is deeply rooted in Maroons' life.

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10745-024-00528-y.

Acknowledgements We are grateful to all Maroon collaborators and the paramount chiefs for their permission to study rice and interview rice farmers. We thank Harro Maat for his photograph and Esmée Winkel for her drawing. We thank the SNRI/ADRON in Nickerie and the National Herbarium of Suriname for safeguarding our collected rice seeds and specimens.

Author Contributions Conceptual design, fieldwork: TvA, NP; data analysis: NP, TvA, JJ, NAM; manuscript draft: NP; figures: NP and

TvA; supervision: TvA. All authors reviewed the manuscript and agreed with the final version.

Funding This research was financially supported by the Netherlands Organization for Scientific Research (OCENW.Klein.419).

Data Availability The dataset generated from the 99 interviews and analyzed during the current study is available upon reasonable request from, TvA, the corresponding author.

Declarations

Ethical Statement This study followed the general rules of the Netherlands Code of Conduct for Research Integrity (2018). We obtained written permission from the local Maroon authorities (paramount chiefs) to collect samples and interview people from Maroon villages. Before each interview, we obtained oral consent from each farmer to use the shared information for research purposes. Collected rice specimens have been deposited in the ADRON germplasm bank (living seeds) with the associated "rice passport" data: information on the characters and properties of each Maroon landrace, collection locality, and personal data of the farmer, to protect intellectual property rights and preclude patents by commercial breeding companies or germplasm institutes.

Competing Interests The authors declare no competing interests.

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