The Journal of Phytopharmacology 2025; 14(5):370-373
Online at: www.phytopharmajournal.com

Review Article

ISSN 2320-480X
JPHYTO 2025; 14(5): 370-373
September- October
Received: 15-08-2025
Accepted: 28-09-2025
Published: 30-11-2025

doi: 10.31254/phyto.2025.14511

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Nutritional and health benefits of heirloom plants and their importance

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ABSTRACT

Heirloom plants are traditional crop cultivars of heritage value, grown for hundreds of years and preserved by regional people. They are open pollinated, non-hybrid varieties. Heirloom crop cultivars are found in specific geographical region and called as folk, traditional, native varieties, land races or desi cultivars. These plants are hardy in nature and are well-suited to local climate hence they are important for small scale farmers. Heirloom plants and their products have unique name, appearance, aroma, colour, taste and are often rich in minerals and vitamins. They hold cultural value in lives of regional people and are used in local cuisines. The seeds of these plants are saved and tradition of their cultivation is passed from generation to generation through folk knowledge. These crops were widely cultivated in India before the introduction of high yielding hybrid varieties. However, gradually they are vanishing and many heirlooms crops no longer exist due to competition with hybrid varieties. This paper discusses the importance of heirloom plants, their nutritional and health benefits and why their cultivation is important. GI tagging of these crops and growing awareness about their unique qualities are proving economic catalyst for them. Many of our heirloom cultivars are on the verge of extinction. Strategies should be developed for their revival.

Keywords: Heirloom crops, Landraces, Traditional varieties, Native crops, Heritage crops.

INTRODUCTION

In late 1960s, after green revolution, India became self-sufficient in food grain production with the introduction of high-yielding hybrid varieties. However, these hybrids required fertilizers, pesticides along with lot of water. Due to government policies and subsidies, high demand by the consumer, this started the monoculture of cultivating hybrid varieties of staple food crops like rice and wheat. This led to gradual loss of local varieties grown by marginal farmers. The traditional knowledge associated with these heirloom crops started fading away [1-4].

Heirloom plants are open pollinated non hybrid indigenous crops found in a specific geographical region. These crops are also called as folk, traditional, native varieties, land races or desi cultivars. These crops hold heritage and cultural value and are passed on from generation to generation. India has a rich diversity of heirloom crops. These crops are used in delectable local cuisines. Native varieties of crops are hardy and do not require much care as these are well-suited to the climate of that area. They produce well without much fertilizers and pesticides.

Before the advent of Green revolution in 1960s, a large number of native varieties of rice were cultivated in our country. But after Green Revolution, the cultivation of these folk varieties declined drastically. Many of our native indigenous varieties are slowly disappearing [3]. The loss of landrace means loss of a treasure of tradition and knowledge associated with them. If not cultivated, these heirloom seeds lose their germination ability after one year [5]. Many of these plants like rice are very hardy in nature and resistant to pests, insects, drought, flood & salt. Their cultivation should be revived due to changing climate [6]. These native varieties have been used by tribal and rural people for hundreds of years. Many of these landraces contain high levels of B complex vitamins, micronutrients, antioxidants, phenols and flavonoids not found in modern high yielding hybrids [4]. Ray et al. (2021) have suggested to include these landraces in India's food and agriculture policy to ensure nutritional security for poor farmers. This will help not only in conserving these treasure troves but also in utilizing their full potential [4].

Heirloom Rice cultivars

Sub-Himalayan Terai region of our country is rich in heirloom rice cultivars [7]. These varieties have unique aroma, colour and taste and they are highly resistant to blast disease. Mondal et al. (2021) have reported that *Kataribhog*', '*Sadanunia'* and '*Chakhao*' are not only rich in nutritional content but also resistant to blast disease. *Bhutmuri*, meaning "ghost's head", rice cultivar is grown in West Bengal [7]. This folk rice is rich in iron and contains certain B complex vitamins. Starch from this indigenous rice is

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believed to cure peripartum anaemia in women. According to local people, water containing starch from cooked *Bhutmuri* rice restores blood in pregnant anaemic women and after childbirth. Another indigenous rice variety from West Bengal called *Paramai-sal*, meaning "longevity rice," promotes growth in children. This variety has high concentration of antioxidants, micronutrients and labile starch, which can be converted rapidly to energy [6]. An endangered rice variety named *Agni-sal* is called so because of red grain (fire) and strong stem which could withstand storms has become extinct from West Bengal.

Bhutmuri, Rangi and *Kelas* rice cultivars from West Bengal are drought tolerant. *Lal getu*, *Nona bokra* and *Talmugur* rice cultivars from West Bengal are salt tolerant. Heirloom rice cultivars like *Bahurupi* and *Kerala Sundari* have yield comparable to hybrid varieties *Swarna*. *Pokkali* rice varieties from Kerala are salt and flood resistant. *Korgut* from Goa is saline-resistant [8]. Unique features of some folk rice cultivars and other heirloom plants are mentioned in table 1.

Table 1: Some heirloom crops and their unique feature

S. No.	Name of land race	Place of growth	Unique feature
1	*Kataribhog* & *Sadanunia'*	West Bengal	Unique aroma, high antioxidant activity, Resistant to blast disease
2	'*Chakhao*'	Manipur	Unique aroma, Resistant to blast disease
3	*Bhutmuri, Kelas*, *Dudhé bolta* rice	West Bengal	Rich in Iron & B complex vitamins, Restores blood in pregnant anaemic Women
4	*Agni-sal* rice	West Bengal	Red grain & strong stem & withstands storm
5	*Paramai-sal* rice	West Bengal	Promotes Longevity in Children
6	*Athikaraya*, *Dudh-sar*, *Kayamé*, *Neelam samba*, *Srihati*, *Maharaji* and *Bhejri* rice cultivars	Odisha	Enhances milk production in lactating mothers
7	*Kelas*, *Dudhé bolta* and *Bhutmoori* rice	West Bengal	Rich in iron, cure peripartum anaemia in women
8	*Bardhaman Sitabhog, Joynagarer moa, Kanakchur rice*	West Bengal	Very sweet
9	*Kala Jeera*	Odisha	Increases haemoglobin levels and improves metabolism in the body
10	*Pokkali* rice	Kerala	Flood and Salt Resistant
11	*Kanteimundi* Brinjal	Odisha	Contain more seeds, unique taste, short quick cooking time, resistant to disease and pests
12	Heirloom radish *gya-labuk*	Ladakh	Withstands severe cold & Shelf life of 5-6 months
13	Heirloom turnip *nyungma*	Ladakh	Withstands severe cold & Shelf life of 5-6 months
14	Heirloom Swede *tamnyung*	Ladakh	Withstands severe cold & Shelf life of 5-6 months
15	Kehari corn	Gujarat	Red grains, drought and pest resistant

Ray et al. (2021) have reported that some of the indigenous rice cultivars grown in West Bengal and Odissa are critically endangered. Some examples are *Bardhaman Sitabhog, Joynagarer moa, Kanakchur* grown in Bengal and known for their sweetness are on the verge of extinction [4]. They are grown by only a handful of marginal farmers and if not cultivated can became extinct. These heirloom cultivars are immensely beneficial. Landraces like Athikaraya, *Dudh-sar*, *Kayamé*, *Neelam samba*, *Srihati*, *Maharaji* and *Bhejri* are used in traditional medicine to enhance milk production in lactating mothers. Landraces like *Kelas*, *Dudhé bolta* and *Bhutmoori* are rich in iron. Ray et al. (2021) suggest to include these land races in mothers' diet to treat post-partum anaemia [4].

Heirloom seed banks

Many activists and farmers are working to conserve indigenous rice varieties through live seed banks at grass root level. A seed bank called 'Vrihi' was started by ecologist Dr. Debal Deb in 1997 has collected over 1440 varieties of indigenous rice and gives heirloom seeds to farmers in exchange with another traditional cultivar [4]. These heirloom cultivars are cultivated in 'Basudha' farm in Odisha in supervision of Dr. Deb. Forum of Indigenous Agricultural Movement (FIAM) in West Bengal supports farmers who want to cultivate traditional rice seeds. In Assam, an "indigenous seed saving library" has collected over 250 varieties of heirloom rice seeds [8]. "OOO Farms" is a community farming initiative to revive indigenous seeds. They work with local farmers in Maharashtra & Gujrat and gives heirloom seeds to tribal farmers without any cost. They have established one seed bank in Maharashtra and two in Gujarat and have collected almost 150 varieties of heirloom corn from various regions of our country. They have conserved them on Jashvantpur village in Gujrat. OOO Farms have helped in the revival of *Kehari* heirloom corn in this region which had almost vanished. They have also helped in the revival of folk varieties of rice, wheat, *toor*, corn, beans etc. [9]. Babulal Dahiya from Madhya Pradesh, a recipient of Padma Shri for innovative natural farming has collected more than 110 varieties of folk rice cultivars and has been running a campaign to save traditional seeds [10].

Heirloom vegetables

Chorol et al. (2018) have reported that the local heirloom root vegetables withstand the severe cold conditions of Ladakh, with higher shelf life securing the food security of the local community [1]. Some common vegetables grown in Ladakh are heirloom radish called *gya-labuk*, heirloom turnip *nyungma* and Swede *tamnyung* which *is* a result of a cross between turnip and cabbage. They have unique taste, bright colour and long shelf life. Long shelf life of vegetables is very important for people living in Ladakh as the season of crop cultivation in this cold desert is only a few months long. These heirloom root vegetables are kept as winter stock in underground pits and have shelf life of 5-6 months. These are also used to treat diseases in humans and animals by local people there. However, these traditional heirloom root vegetables are on verge of extinction after the introduction of new hybrid varieties of vegetables [1].

Heirloom black rice from Manipur known as 'Chakhao', bagged the Geographical Indication (GI) tag in May 2020. It is a glutinous rice rich in protein, fibres with unique aroma and served as Chakhao kheer on special occasions [12].

Kala Jeera rice resembling cumin seeds from Koraput in Odisha has been awarded GI tag recently in January 2024 [11]. This black-coloured heirloom rice variety called as 'Prince of Rice is known for its unique aroma, taste, texture and nutritional value. Tribal farmers of Koraput have preserved them for thousands of years. *Kala jeera* rice helps in increasing haemoglobin levels and improves metabolism in the body.

Kanteimundi Brinjal from Nayagarh in Odisha has also bagged GI tag. The plant is resistant to disease and pests. This heirloom brinjal contain more seeds compared to other varieties and has its own unique taste and relatively short quick cooking time [11].

Heirloom plants to receive GI tag from Bihar include *Mithila Makhana* (*Euryale ferox*) from Mithila region of Bihar. It is a rich source of protein, carbohydrates, fibre, potassium, iron, and zinc, has low content of cholesterol, fat and sodium. It is used as a healthy snack in India. It is also an important part of many ceremonies in Bihar. *Jardalu* Mango and *Katarni Dhaan* (rice) from Bhagalpur, *Maghai Paan* from Nawada and *Shahi Litchi* from Muzaffarpur also received GI tag in year 2022 [13].

Apprehensions with cultivation of Heirloom plants

Some heirloom cultivars take more time to grow and have lower yield. One such example is of rice variety *Tilak Chandan* from Uttar Pradesh. It has long growth period and lower yield compared to high yielding hybrid varieties. Another example is of flood resistant Pokkali rice of Kerala and *Korgut* from Goa. Growing flood resistant *Pokkali* and *Korgut* are labour intensive. Their manual threshing is required and yield is low compared to other hybrid varieties [8]. Because of these reasons farmers are apprehensive of growing them despite their advantage that they can resist flood.

Policy recommendations for promotion and conservation of Heirloom Crops

Heirloom plants are rich repositories of biotic and abiotic resistant genes. Diversity of crops should be considered as national asset by the policy-makers. They should be valued, conserved and cultivated as our heritage crops [14]. Indigenous varieties should be included in India's food and agriculture policy. Seed banks like 'Vrihi' providing free heritage seeds should be recognised and promoted at the national level. Farmers saving and growing heritage seeds should be rewarded with due recognition and support. Indigenous food system should be promoted through 'Buy Local' advertisements in newspapers, social media and television programmes. Marketing campaigns, participation in international trade fairs, and the establishment of GI-specific retail outlets to promote GI-tagged agro-products should be started by government at both national and international level [15,16]. Indian government is already promoting local products thorough 'Vocal for Local', 'Atmanirbhar Bharat' and 'Make in India' campaigns [17]. To promote GI products, Co-operative societies should be formed in places where GI products are manufactured. Eco-Tourism should be promoted in places where GI products are manufactured [17].

CONCLUSION

Our heirloom crops hold heritage value and are rich sources of nutrients. They are reservoirs of genes important for plant breeding. They have huge potential to withstand abiotic stresses and survive in hardy conditions. They are adapted to local climate and are rich in minerals and vitamins. But they are vanishing due to monoculture of hybrid varieties. To conserve and utilise the potential of these heirloom crops, these should be included in India's food and agriculture policy to ensure nutritional security. More and more native crops should be applied for GI tags for global recognition and stronger brand. The government should make action plans for indigenous local communities to provide them a global platform to market their products. The revival of these indigenous crops should be valued beyond the ideas of gains and profit. They should be conserved and cultivated as our heritage crops. Sustainable agriculture and reduction of poverty are two Sustainable development goals (SDG) of United nations. Cultivating heirloom crops can greatly support these goals and can also boost local economy.

Conflict of interest

The authors declared no conflict of interest.

Financial Support

None declared.

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HOW TO CITE THIS ARTICLE

Mishra RR. Nutritional and health benefits of heirloom plants and their importance. J Phytopharmacol 2025; 14(5):370-373. doi: 10.31254/phyto.2025.14511