

Kala Matar (Black Pea): Reviving a Forgotten Super Food from the Himalayas

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ABSTRACT

Black pea (*Pisum sativum* ssp. *arvense*), locally known as kala matar, is an underutilised indigenous legume traditionally cultivated in the cold desert regions of the Indian Himalayas, particularly the Spiti Valley. Despite its high nutritional value and exceptional climate resilience, this hardy pulse has gradually declined due to the replacement of subsistence crops with commercial green peas. The present article highlights the ecological, nutritional, cultural, and economic significance of black peas, emphasizing their adaptation to low temperatures, limited rainfall, and poor soils, along with their role in biological nitrogen fixation and sustainable farming systems.

INTRODUCTION

Pea *Pisum sativum* var. *arvense*, (Kala matar), belongs to the family Leguminosae (Fabaceae) and primarily found in Asia, Europe, the Mediterranean, and Central Asia. The family has diverse varieties which are recognized globally. Lthough the crop has high nutritional value but its potential remained underutilised (Sharma and Gupta,

2023). Among various species, *Pisum sativum* ssp. *arvense* is least explored and is restricted to the cold regions between the Mediterranean region and the tropics of Cancer. It is popularly known as 'black pea' because its seeds are blackish or brown in colour. It is hardy crop pulse crop characterized by its dark brown to black seed coat unlike green peas.

Being an indigenous pulse crop found in the cold deserts of the Trans-Himalayas, especially the Spiti Valley in Himachal Pradesh, the plant can tolerate low temperatures ranging from 10-23°C, limited rainfall, and poor soils, making it well-suited for climate-stressed regions and changing weather patterns. Like other legumes, it fixes atmospheric nitrogen through root nodules, improving soil fertility and reducing dependence on chemical fertilizers. It can be grown with minimal external inputs, aligning well with natural farming and organic agricultural practices. For small farmers, especially in hilly and semi-arid regions, Kala matar is a reliable crop with low water demand, supporting both livelihoods and soil health.

Black peas have long been used in simple home-style dishes including slow-cooked curries, soups, and dals. When ground into flour, these can be used in chapatis, snacks, bakery products, and gluten-free foods. Their protein and starch properties also make them suitable for plant-based foods, including protein blends and health mixes. With minimal processing, black peas can become a versatile ingredient for both rural and urban diets. For local communities, it was not merely food but part of daily life, religious offerings, and traditional hospitality. Native people make various traditional Himalayan cuisines like dal, sattu, soups, hot drinks and sprouts. During the 1980s, many farmers shifted from subsistence crops to commercial green peas grown for outside markets. As a result, kala matar gradually declined and now faces the risk of disappearing altogether and is considered under threat of extinction.

Overshadowed over time by green peas and high-input crops, this pulse is now being rediscovered for its nutritional power, resilience to climate stress, and role in sustainable food systems. As climate change, malnutrition, and water scarcity challenge

global food systems, black peas offer nutrition, resilience, and sustainability. Additionally, black peas are also gaining attention as a functional food ingredient. Reviving such underutilized crops is not about going backward, it is about using traditional wisdom to build a healthier and resilient future.

Morphology and nutritional strength

Black peas are grain legumes characterized by seed coat (testa), serving as natural shield. The black or deep purple colour comes from pigments rich in antioxidants, important in human health by reducing oxidative stress. Compared to many modern pulses, black peas retain more of their natural fiber and bioactive compounds because they are usually grown and consumed in less processed forms. These compounds help the seed survive under harsh conditions. Seeds are rich source of protein- and starch-rich cotyledons, which make black peas both filling and nourishing. Black peas are naturally high in protein (20–25%), providing around one-fifth of their weight as plant protein. These contain high amount of fibres and aiding in improving digestion and regulating blood sugar. These also contain natural antioxidants that support overall health by maintaining healthy muscles, bones and cartilage. These also provide essential minerals such as zinc, iron, potassium, magnesium, and nutrients often lacking in cereal-based diets. Because of its nutritional rice content, it helps in boosting immunity by regulating sugar cholesterol levels and promotes gut health and can fight infectious influenza. Black peas also contain zinc, an essential trace mineral play significant role in vision and help reduce risk for macular degeneration and protect against night blindness. Besides nutritional value, black peas also offer other functional properties including prebiotic potential, anti-inflammatory effects, moderate emulsifying and foaming capacity and good water absorption capacity.

Case study:

The work was led by Jaggi, alongside advisor Shripad Tuljapurkar of the Stanford School of Humanities and Sciences, with support from the Stanford Doerr School of Sustainability (Jaggi et al., 2025). This research highlights the untapped potential of black peas (sanmoh nako), as a resilient and nutritious alternative to standard green peas. The study, led by Stanford researchers in collaboration with local farmers and the Central Food Technological Research Institute, revealed the benefits of this "forgotten" crop through three main lenses:

- 1. Climate resilience and survival:** Unlike green peas, black peas are perfectly adapted to the cold, dry desert ecosystem of the Himalayas. Field experiments across varied elevations showed better survival rates and reproductive success of black peas. Due to significantly less water requirement, the crop is less vulnerable to the "vagaries of climate change" compared to other commercial crops.
- 2. Nutritional superiority:** The biochemical analysis revealed that black peas are considered as "superfood" in their own right. Local communities mix powder with tea to provide energy for hours of high-altitude trekking.
- 3. Economic and conservation impact:** Currently, only 10% of local families grow black peas because there is no established market for them. To change this, addressing the high nutritional value of black peas, the income of marginal farmers can be boosted by attracting new buyers. Overall, the study also underscores their importance for

agrobiodiversity conservation and recommends policy and market support, including recognition under Globally Important Agricultural Heritage Systems.

CONCLUSION

In the hills and drylands of India, black peas represent a powerful example of how forgotten crops can offer solutions to modern challenges. Being rich in protein, fibres, minerals, and natural antioxidants, the crop supports human health while remaining affordable and accessible. The ability to grow under low-input, rainfed, and stress-prone makes it valuable in context of climate change and low water conditions. Reviving black peas is not merely about dietary diversity; it is about strengthening food and nutrition security, restoring soil health, and supporting sustainable livelihoods for small and marginal farmers. By bringing this resilient pulse from the margins back to our fields, a resilient and sustainable source of food can be established by using traditional knowledge with modern nutritional needs.

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Legends to Figures

Fig. 1 (a): Black pea (*Pisum sativum* ssp. *arvense*) grown in the fields of Kaza under high-altitude Himalayan region, highlighting its adaptation to cold, rainfed, and low-input environments; and **(b)** Black pea seeds showing characteristic dark seed coat, a key feature associated with high nutritional and antioxidant value.

