Domesticating wild plants - Challenges and Chances

S. Karpagam

Domestication of plants was the turning point in human evolution making him a settled man from a nomadic hunter/gatherer life style. Plant domestication is a co-evolution between man and plants and is a continuing process. Man invents and tries various formulations both fertilizers and protective chemicals to enhance growth and to safeguard the plants in return for food and other necessities. Changing climatic conditions is a threat to the crop plants since they are the most vulnerable than the wild counterparts. The wild plants would have adapted to the climatic change and more resilient. In this chapter an attempt was made to domesticate the Phasey bean a member of the pea family and a relative of green gram. Phasey bean, with the scientific name *Macroptilium lathyroides* (Fabaceae) is a species of flowering plant in the pea family, native to the America's and seen as a weed worldwide. It has fast growth spreading and covering the entire ground with dark green foliage. It is a fodder plant that enriches the soil with its nitrogen fixing ability. In this chapter, the yield, growth conditions, germination percentage, nutritive value of the gram was analysed and the suitability of the plant for intense cropping was studied. *Microptilium lathyroides* was studied and presented in this chapter as an experimental specimen for plant domestication.

Keywords: *Ethnobotany, ethnogynaecology, tribals, ethnomedicines, folklore medicinal plants, traditional knowledge*

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Introduction

Domestication of plants and animals has been the most crucial part of human civilization. Nomadic life had challenges in getting food at regular intervals for human sustenance, and they were exposed to the environmental factors. Domestication provided numerous benefits for the settled life of man. It led to the rise and flourish of art and architecture and in the development of settled communities. Food Security was the main achievement in domestication of plants, that provided reliable food source. Domestication allows for a consistent and reliable source of food, reducing dependence on hunting and gathering.

Food production increased, when the domesticated plants were bred for desirable traits, leading to increased yields and improved food quality. Domestication led to stable economy with settled agriculture, supporting the growth of cities and complex societies. Domesticated plants and animals can be traded, facilitating economic exchange and barter system slowly leading to trade, commerce and building up of wealth and reflected in the cultural and social development of mankind. Domesticating wild plants involves selecting and cultivating plants that grow in their natural habitats for various purposes, such as for food, medicine, or ornamentation. This process can have several benefits and implications.

A domesticated plant differs from the wild relative for it is dependent on man for care and protection. Wild plants have the capacity to withstand water scarcity, nutrient deficiency and defence against predators. Whereas domesticated plants slowly lose its efficiency like water retaining capacity, escaping adverse environmental conditions, adaptations against gracing by animals. Crops completely depend on man for irrigation, nutrient supply and protection. Man needed the plants for food, clothing and other necessities, whereas the plants needed him for survival and thereby a relationship occurred between both of them for centuries and there was co-existence and eo-evolution between farmers and plants.

Taming of plants is a long process with repeated selection for superior traits and both of them benefit from each other through a mutualistic relationship. The result of thousands of years of this type of relationship came to be known as coevolution. In the modern civilized and urbanized world, due to fast phase of agriculture, the procedure of domestication of wild plants has drastically reduced, even we can say as null in recent years.

Coevolution of both plants and human dates back to millennia, and is a tiresome process which needed patience and repetition of the process without any sufficient scientific background or advanced tools. Still man was able to identify the plants that could be useful for him and cultivated them with limited resources. Early man did not have mechanised equipment's or irrigation system to boost him up. He literally would have depended on his intuition and environmental changes. He could not have done the domestication process in a single lifetime of one farmer. The knowledge would have been transmitted from generation after generation to the successor. When he saw benefit in a crop, he retained and propagated it, when he did not see much advantage, he would have discarded it. It would have been a simple technique of selection and propagation. What we now see as a mango (sweet) or a banana (seedless) is the hard work of generations of farmers, while the counterpart wild species is not as sweet or seedless as that of the species of the cultivated variety.

List of Domesticated Plants

1. Many cereals, pulses were domesticated for human consumption.
2. Fruits and vegetables: Many common fruits and vegetables, such as strawberries and lettuce, were domesticated from wild ancestors.
3. Herbs and spices: Plants like basil, mint, and turmeric have been domesticated for their culinary and medicinal properties.
4. Ornamental plants: Wildflowers and other ornamental plants are often domesticated for their beauty and used in gardening and landscaping.
5. The history of domestication (Hirst, 2019) shows the hard work of our nameless ancient ancestors for whom we have to be grateful. Some examples of domesticated plants are given in table 1.

Table 1. Showing the list of Domesticated Plants with year of domestication.

S.No.	Plant name/ Botanical name	Location	Date BCE (Before Common Era)
1.	Emmer Wheat – *Triticum dicoccum*	Near East	9000 BCE
2.	Fig trees – *Ficus carica*	Near East	9000 BCE
3.	Foxtail Millet – *Setaria italica*	East Asia	9000 BCE
4.	Flax – *Linum usitatissimum*	Near East	9000 BCE
5.	Peas – *Pisum sativum*	Near East	9000 BCE
6.	Einkorn wheat – *Triticum monococcum*	Near East	8500 BCE
7.	Barley – *Hordeum vulgare*	Near East	8500 BCE
8	Chickpea – *Cicer arietinum*	Anatolia	8500 BCE
9	Bottle gourd – *Lagenaria siceraria*	Asia	8000 BCE
10	Pumpkins - *Cucurbita pepo*	Central America	8000 BCE
11	Rice – *Oryza sativa*	Asia	8000 BCE
12.	Potatoes – *Solanum tuberosum*	Andes Mountains	8000 BCE
13.	Beans – *Phaseolus* sp.	South America	8000 BCE
14.	Squash melon – *Cucurbita maxima*	Central America	8000 BCE
15.	Maize – *Zea mays*	Central America	7000 BCE
16.	Water Chestnut – *Trapa natans*	Asia	7000 BCE
17.	*Perilla frutescens*	Asia	7000 BCE
18.	Burdock – *Arctium lappa*	Asia	7000 BCE
19.	Rye – *Secale cereale*	Southwest Asia	6600 BCE
20.	Broomcorn millet – *Panicum miliaceum*	East Asia	6000 BCE
21.	Bread wheat – *Triticum aestivum*	Near East	6000 BCE
22.	Manioc/ Cassava – *Manihot esculenta*	South America	6000 BCE
23.	*Chenopodium album*	South America	5500 BCE
24.	Date Palm – *Phoenix dactylifera*	Southwest Asia	5000 BCE
25.	Avocado – *Persea americana*	Central America	5000 BCE
26.	Grapevine – *Vitis vinifera*	Southwest Asia	5000 BCE
27.	Cotton – *Gossypium* sp.	Southwest Asia	5000 BCE
28.	Bananas – *Musa* sp.	Island Southeast Asia	5000 BCE
29.	Beans – *Phaseolus* sp.	Central America	5000 BCE
30.	Opium poppy – *Papaver somniferum*	Europe	5000 BCE
31.	Chili peppers – *Capsicum annuum*	South America	4000 BCE
32.	*Amaranthus* sp.	Central America	4000 BCE
33.	Watermelon – *Citrullus lanatus*	Near East	4000 BCE
34.	Olives – *Olea europaea*	Near East	4000 BCE
35.	Cotton – *Gossypium* sp.	Peru	4000 BCE
36.	Apples – *Malus domestica*	Central Asia	3500 BCE
37.	Pomegranate – *Punica granatum*	Iran	3500 BCE
38.	Garlic – *Allium sativum*	Central Asia	3500 BCE
39.	Hemp – *Cannabis sativa*	East Asia	3500 BCE
40.	Cotton – *Gossypium* sp.	Mesoamerica	3000 BCE
41.	Soybean – *Glycine max*	East Asia	3000 BCE
42.	Azuki Bean – *Vigna angularis*	East Asia	3000 BCE
43.	Cocoa – *Theobroma cacao*	South America	3000 BCE
44.	Sago Palm – *Cycas revoluta*	Southeast Asia	3000 BCE
45.	Squash melon – *Cucurbita maxima*	North America	3000 BCE
49.	Sweet potato – *Ipomoea batatas*	Peru	2500 BCE
50.	Pearl millet – *Pennisetum glaucum*	Africa	2500 BCE

51.	Sesame – *Sesamum indicum*	Indian subcontinent	2500 BCE
52.	Marsh elder – *Iva annua*	North America	2400 BCE
53.	Sorghum – *Sorghum bicolor*	Africa	2000 BCE
54.	Sunflower - *Helianthus annus*	North America	2000 BCE
55.	Saffron – *Crocus sativus*	Mediterranean	1900 BCE
56.	*Chenopodium* sp.	China	1900 BCE
57.	Chocolate - *Theobroma cacao*	Mesoamerica	1600 BCE
58.	Coconut – *Cocos nucifera*	Southeast Asia	1500 BCE
59.	Tobacco – *Nicotiana tabacum*	South America	1000 BCE
60.	Eggplant – *Solanum melongena*	Asia	1st century BCE
61.	Maguey – *Agave americana*	Mesoamerica	600 CE
62.	Edamame (Young soybean pods) – *Glycine max*	China	13th century CE
63.	*Vanilla planifolia*	Central America	14th century CE

Information courtesy: ThoughtCo.com

There are immense number of plants whose origin of domestication is obscure. The benefits of plant domestication ranges from food security to ornamental value to medicinal uses. Domesticating wild plants can provide new sources of nutritious food, enhancing food security and dietary diversity. Many wild plants have medicinal properties, and domesticating them can make these benefits more accessible. Wild plants can be domesticated for their aesthetic value, adding beauty to gardens and landscapes. Domestication can help conserve wild plant species by reducing the need for wild harvesting and promoting sustainable use and thereby conservation of wild vegetation without disturbing them.

The most challenging issues during the domestication of plants is the adaptability of the plants. Sometimes the wild plants are recalcitrant, they require specific conditions to thrive, and adapting them to domestic environments can be challenging. Domesticating wild plants often involves selective breeding to enhance desirable traits, which can be time-consuming and require expertise. Domesticating wild plants can provide numerous benefits while also requiring careful consideration of the challenges and potential impacts on the ecosystem. Plant domestication has several challenges that can impact the success and sustainability of agricultural practices. Some of the key challenges are loss of genetic diversity, inbreeding depression, reducing crop yields and viability. soil degradation, susceptibility to pests and diseases, development of pesticide resistance (Bohra et al., 2022: Kumar et al., 2022). Domestication can lead to loss of genetic diversity, making crops more vulnerable to disease and pests. Repeated selection for desirable traits can lead to loss of variability.

Domesticated crops may be more susceptible to changing environmental conditions, such as rising temperatures and altered precipitation patterns. Intensive agriculture leads to soil degradation, reducing soil fertility and affecting crop yields. Domesticated crops can be more susceptible to pests and diseases, requiring increased use of pesticides and other chemicals. Overuse of pesticides leads to the development of pesticide-resistance in pests, reducing the effectiveness of pest management strategies. Domestication makes the plants dependent on external inputs, such as fertilizers and irrigation, which makes the agricultural purposes costly and unsustainable. In the previous centuries, before the advance of intensive agriculture, crop rearing mostly depended on the monsoon rainfall and natural organic fertilizers. Intensive agriculture has resulted in loss of traditional knowledge. The focus on intense agriculture had led to the loss of traditional knowledge and practices related to wild plant use and management. Domesticated crops may be subject to market fluctuations, either overproduction or lesser demand, affecting the economic viability of agricultural practices.

Challenges due to advanced genetic manipulation techniques

Genetic modification concerns: The use of genetic modification techniques in plants raise concerns about the potential environmental and health impacts. Acceptance of genetically modified (GM) food by the consumers and long-term impacts are still issues in discussion. Conservation of wild relatives of the domesticated plants is very important in maintaining the genetic variability of the plant, for the potential future crop improvement endeavours.

Advantages of plant domestication

1. Improved crop yields: Domestication leads to increased crop yields, enhancing food security and reducing hunger.
2. Increased nutritional value: Domesticated crops can be bred for enhanced nutritional content, improving human health.
3. Food diversity: Domestication can promote the cultivation of a wider range of crops, increasing food diversity and reducing reliance on a few staple crops.

Economic Benefits

1. Income generation: Plant domestication can provide new income opportunities for farmers, rural communities, and industries.
2. Job creation: Domestication often leads to new opportunities for researchers and plant breeders.
3. Economic growth: Plant domestication can contribute to economic growth by increasing agricultural productivity and promoting trade.
4. Improved human health: Domesticated crops can be bred for enhanced medicinal properties, improving human health.

Environmental Benefits

1. Sustainable agriculture: Domestication can promote sustainable agriculture practices, reducing the environmental impact of collecting forest produce from wild.
2. Conservation of genetic resources: Domestication help conserve genetic resources, reducing the loss of biodiversity.
3. Climate resilience: Domesticated crops can be bred for climate resilience, improving their ability to withstand changing environmental conditions.
4. Cultural exchange: Plant domestication can facilitate cultural exchange and cooperation, promoting the sharing of knowledge and best practices.

Emerging Trends

1. Genomic selection: The use of genomic selection can accelerate the domestication process, enabling breeders to select for desirable traits more efficiently.
2. Gene engineering techniques: Many advanced molecular biology techniques and sophisticated instruments make it possible to introduce superior traits to cultivated crops (Kumar et al., 2022).
3. Urban agriculture: Plant domestication can be applied to urban agriculture, promoting local food production and increasing food security in urban places.

Global warming, increased pollution rates, depletion of soil fertility and sudden changes in climate, extreme weather conditions can affect plant growth, productivity, and distribution. Temperature stress can alter plant growth rates, flowering times, and seed production. Drought and water scarcity, changes in precipitation patterns can lead to droughts, reducing plant growth and productivity. Changes in the precipitation pattern, wind direction and development of fungicide and pesticide resistance in microorganisms leads to increased incidence of pests and diseases, impacting plant health. Variation in seasonal changes due to *el nino* and *la nina* effects and alters the growing seasons, affecting plant growth and development. It may lead to reduced crop yields and crop suitability for a particular region. Climate-related impacts on agriculture can lead to increased food price, volatility, affecting food access and affordability.

Adaptation and Resilience

1. Breeding climate-resilient crops: Developing crops that can tolerate changing environmental conditions can help ensure food security.
2. Sustainable agriculture practices: Implementing sustainable agriculture practices, such as agroforestry and conservation agriculture, can help build resilience to changing climatic conditions of a location.
3. Climate-smart agriculture: Climate-smart agriculture involves using climate information to inform agricultural decision-making, reducing the risks associated with climate change.

With this background on the domestication of plants, an attempt was made to domesticate a wild weed plant belonging to the legume family. Phasey bean is native of America and is a fast-growing plant. The plant was seen as a widespread weed in Queen Mary's College campus during the year 2023-2025. An attempt was made to study the nutritive value of the seeds and the domestication of the plant. The seeds were collected from the wild and subjected to growth in controlled condition for 5 generations and the results are tabulated (Table 2)

Classification

- Kingdom: Plantae
- Clade: Angiosperms
- Clade: Eudicots
- Clade: Rosids
- Order: Fabales
- Family: Fabaceae
- Subfamily: Faboideae
- Tribe: Desmodieae
- Genus: *Macroptilium*
- Species: *M. lathyroides*

Some synonyms for *Macroptilium lathyroides* include: - *Phaseolus lathyroides* L. - *Phaseolus semierectus* L. - *Macroptilium lathyroides* var. *semierectum* (L.) Urb. - *Lotus maritimus* Vell.

This species is native to Tropical and Subtropical America, and has been naturalized in other parts of the world, including Western Australia. *Macroptilium lathyroides* is an annual to short-lived perennial plant growing up to 150 cm tall. The habit can range from erect branching to trailing and in shady region, they have lush growth twining into other plants. The plant is sometimes harvested from the wild for local use as a food. It can be grown as a green manure and cover crop.

Description

Macroptilium lathyroides is a species of flowering plant in the pea family (Fabaceae). It has compound leaves with 3-5 leaflets that are lance-shaped and pointed at the tip. The flowers are dark purple, yellowish-green, and arranged in raceme. The plant produces long, slender pods that contain several seeds. It grows in wet environments, such as along streams, rivers, and lake shores. *Macroptilium lathyroides* is found from low elevations in the subtropics up to elevations of 2,000 metres in the tropics. It is adapted to a wide mean annual rainfall range from 500 - 3,000 mm. The optimum day/night temperature for growth is 35/20°C. Prefers a sunny place but is tolerant of light to moderate shade. The plant is adapted to acid and alkaline soils, and a wide range of soil textures from sand (given reliable rainfall) to heavy clay. The plant can be seen thriving in any type of soil, and can tolerate moderate salinity, since it is growing in the college campus which is located very close to Marina beach, Chennai. If flourishes well in neutral soil conditions but could tolerate acidic to alkaline soil. The seeds are dispersed to long distances by cracking of the loculicidal capsule. Although it has become widely naturalised, it is rarely considered a serious weed. The plant is considered to be invasive in several Pacific Islands (US Forest Service, 2012) and in northern Australia. The plant survives drought by shedding its seed, which can lie dormant in the soil until wet weather returns. This species has a symbiotic relationship with nodule forming bacteria and fix atmospheric nitrogen. Some of this nitrogen is utilized by the growing plant but some can also be used by other plants growing nearby.

Ecological role

The ecological role of this plant is many, since it belongs to legume family and can form root nodules. As a legume, *M. lathyroides* has the ability to fix nitrogen in the soil, making it available to other plants. This process contributes to the fertility of the soil and supports the growth of other plant species.

Conservation status

Macroptilium lathyroides is not considered a threatened species, However, its habitats are under threat due to deforestation, urbanization, and other human activities.
It has several uses.

- **Forage:** It's a valuable forage crop, providing high-quality feed for livestock, especially during the dry season.
- **Soil Improvement:** As a legume, it has nitrogen-fixing properties, enriching the soil and promoting healthy plant growth.
- **Erosion Control:** Its trailing stems help hold soil in place, preventing erosion and soil degradation (Whiteman et al., 1984)
- **Companion Planting:** It can be used as a companion plant to improve soil fertility and structure, benefiting other crops
- **Medicinal Purposes:** Although not extensively documented, *M. lathyroides* has been mentioned in some medical contexts, potentially exhibiting antioxidant activity.

Environmental impact

N-fixing legume, cover crop and biodiversity: Phasey bean is an N-fixing legume that modulates freely with native rhizobia, making seed inoculation unnecessary. Its association with a grass species *Paspalum commersonii* (scrobic) increased forage grass yield by 77% and was found equivalent to the application of

800 kg/ha sulphate of ammonia. After a 3-year cultivation, phasey bean increased soil N content by 10-15% at a depth of 60-90 cm (FAO, 2012). Phasey bean is often cited as a potential cover crop, especially under flooded conditions (Whiteman et al., 1983: Werner and Newton, 2005). It can also be used in wildlife-food plantings to provide seeds for quail and forage for deer and cattle (Newman et al., 2002).

Nematode sensitivity

Phasey bean hosts knot-root nematode and is very sensitive to them. This can become a problem in nematode control (Rich et al., 2010). The presents work deals with the domestication pattern of *Macroptilium lathyroides*. In the present study, *M. lathyroides* would be analyzed for the nutritive value of the seeds. This would provide for better understanding of the plant and its application as food and fodder. Fresh and healthy plant of *Macroptilium lathyroides* were collected in July 2022 from Queen Mary's College, chennai-600004, Tamil Nadu. The plant was identified based on the morphological characters and confirmed. Seeds were collected from the wild plants and analyzed for the nutritional value. The seeds of the first generation was tested for germination, growth and yield. Similarly seeds of the second generation was used for growth and the procedure continued for 5 generations.

Seed Germination

Day 1-2: Seed Preparation

1. Seed selection: Healthy seeds with no visible damage or rot was chosen.
2. Seed cleaning: Remove any debris, dust, or impurities from the seeds.

Day 3-4: Seed Soaking

1. Seed soaking: Wash the seeds and place the seeds in a bowl of 100 mL of water. Let them soak for 24 hours.
2. The amount of water absorbed by the seeds was recorded by measuring the quantity of water used to soak the seeds and the water remaining after the completion of soaking.

Day 5-6: Seed Sowing

1. Seed sowing: Plant the soaked seeds 1-1.5 cm deep in a seed tray or small pots filled with well-draining seed starting mix.
2. Soil covering: Cover the seeds with a thin layer of soil or hay to retain the moisture, avoid damage to the seeds.
3. Watering: Water the soil gently but thoroughly without disturbing the seedlings.

Day 7-10: Germination

1. Maintain moisture: Keep the soil consistently moist but not waterlogged.
2. Provide warmth: Place the seed tray or pots in a warm location with temperatures between 20-25°C (68-77°F).
3. Monitor germination: Check for seed germination daily.

Seeds germinated

1. Provide light: Once germinated, the seedlings were maintained in indirect light.
2. Fertilization: The seedlings were fertilized with vermicompost.
3. Thinning: Thin the seedlings to 5-7 cm (2-3 inches) apart to prevent overcrowding.

Day 30-60: Vegetative Growth

1. Provide support: Provide support for the plants as they grow, using trellises or stakes.
2. Fertilization: Continue to fertilize the plants with vermicompost.
3. Pest and disease management: Monitor the plants for pests and diseases, and the leaves or plants showing any disease symptom was removed immediately and destroyed to avoid further contamination.

Day 60-90: Flowering and Pod Formation

1. Flowering: The plants produce flowers after 30 to 40 days of growth, which eventually form pods.
2. Pod formation: The pods begin to form and fill with seeds.

Day 90-120: Maturation

1. Seed maturation: The seeds continue to mature and dry.
2. Harvest: The seeds were harvested when the pods are fully dry and brittle.

Table 2. The growth and yield of phasey bean for five generation

Parameters	Generation 1	Generation 2	Generation 3	Generation 4	Generation 5
Seed soaking (water absorbed by seeds)	2 ml	2 ml	2 ml	2 ml	2 ml
Seed germination	100 %	100 %	100 %	100 %	100 %
Vegetative growth (Average height of plants)	500 m	500 m	500 m	500 m	500 m
Onset of flowering (appearance of first flower)	32 d	33 d	30 d	31 d	32 d
Pod setting	35 d	36 d	33 d	33 d	35 d
Seed maturation	112 d	108 d	105 d	108 d	110 d
Yield (Number of seeds per pod)	15-18	15-18	14-19	15-18	15-18
Size of seeds (mm)	5	5	5	5	5
Weight of seeds (mg)	38	40	38	40	40

Table 3. Shows the comparative nutritive value of redgram, green gram and blackgram.

S.No	Nutritional value g/100 g	Redgram (*Cajanus cajan*) (Dhal)	Greengram (*Vigna radiata*)	Blackgram (*Vigna mungo*) Urd dhal
1.	Energy	335 Kcal/100g	212 Kcal/100g	341 Kcal/100g
2.	Total Carbohydrate	58	38.7	58.9

3.	Protein	22	14.2	25.21
4.	Total Fat	2	0.8	1.64
5.	Fibre	1	15.4	18.3
6.	Iron	3	-	7.57
7.	Calcium	73	-	138
8.	Potassium	720	-	983
9.	Phosphorous	304		379

Information courtesy www.medindia.net

Table 4. Shows the nutritional value of Phasey bean for 5 generations

S.No	Nutritional value g/100 g	Generation 1	Generation 2	Generation 3	Generation 4	Generation 5
1.	Energy Kcal/100g	224.34	232.34	222.34	233.34	234.34
2.	Total Carbohydrate	53.92	53.82	54.91	54.02	54.12
3.	Protein	6.95	7.15	7.32	7.61	7.75
4.	Total Fat	4.02	4.13	3.93	4.14	4.23
5.	Fibre	6.34	5.84	5.94	6.14	6.34
6.	Iron	6.13	6.43	6.26	6.52	6.73
7.	Calcium	93.91	94.62	94.22	94.62	94.72
8.	Potassium	715	710	713	716	720

When the nutritive value of phasey bean was compared with that of other three grams namely redgram (*Cajanus cajan*), greengram (*Vigna radiata*) and blackgram (*Vigna mungo)* (Table 3), it clearly shows that the phasey bean seeds are equally nutritious with rich protein, carbohydrate, less amount of fat, high mineral content especially calcium and potassium (Table 4). The nutrition content of phasey bean was consistent throughout the cultivation for 5 generations (Table 4).

Discussion

Macroptilium lathyroides (family Fabaceae) was collected from Queen Mary's College campus in the months of July 2022. They were growing wildly in the fertile soils of the college campus. Healthy plants were collected and preserved for herbarium. The plants were identified based on the morphological characters (Gamble,1956). The seeds were collected from the wild plants and subjected to cultivation in earthen pots for 5 consecutive generations. The nutritive value of the seeds was analysed and was found to be consistent. *Microptilium lathyroides* (Fabaceae), is a small, herbaceous plant that grows up to 30-40 cm in height. The plant was found to have dense foliage, dark green leaves, profusely branching and it covered the entire ground not allowing other plants to grow. It has compound leaves with 3-5 leaflets that are lance-shaped and pointed at the tip. The flowers are large, dark purple very attractive, and arranged in racemose inflorescence with long slender loculicidal capsule at the base of the inflorescence. The plant produces long slender, flat pods that contain several seeds on an average of 10 to 15 seeds per pod. The seeds from the wild plants were collected and germinated. The seeds were viable and the germination percentage was 100 %. It shows that the plant could be cultivated on a regular basis. The nutritive value of the seeds shows that they are rich in nourishment with as high as 7.7 g of protein per 100 g of seeds. More research is needed to confirm the efficacy and safety of *Macroptilium lathyroides* for human use. Silva et al., (2018) monitored the phytochemicals of the plant to investigate if any potentially toxic properties can be assessed by observing the physiological and cellular alterations of the test organism exposed. They evaluated the cytotoxic and genotoxic potential of aqueous extracts of leaves and roots of *M. lathyroides* on the cell cycle of lettuce. Bioassays were conducted only on a qualitative level. They showed that aqueous extracts of *M. lathyroides* reduced mitotic index with increased concentration. They also studied the genotoxic activity and observed cell cycle changes and chromosomal abnormalities. Leôncio et al., (2012), investigated the chemical composition of the stem and branches of *M. lathyroides* and isolated a mixture of β-sitosterol and stigmasterol. The extracts from the roots allowed the isolation of lasiodiplodin, a mixture of stigmast-4-en-6β-ol-3-one and stigmast-4,22-dien-6β-ol-3-one, de-O-methyllasiodiplodin, genistein and lupinalbin A. The structures of the isolated compounds were assigned on the basis of their NMR data, including comparison of their spectral data with values described in the literature. The antibacterial activity of crude extracts from stems, branches and roots was evaluated (Leôncio et al., 2012).

1. Biodiversity conservation: Wild plants provide habitat and food for various wildlife, supporting biodiversity and ecosystem health. Wild plants or native plants add to the biodiversity of the ecological niche and offer numerous advantages like the ecological and environmental benefits.
2. Soil erosion prevention: Wild plants' roots hold soil in place, preventing erosion and landslides.
3. Water cycle regulation: Wild plants help regulate the water cycle by absorbing and storing water.
4. Climate change mitigation: Wild plants sequester carbon, helping to mitigate climate change.
5. Many wild plants have medicinal properties, such as antibacterial, antiviral, and anti-inflammatory effects.
6. Most wild plants act as Food source for insects and small animals: Wild plants produce berries, nuts, and grains that provide a natural source of nutrition.

Wild plants hold cultural and spiritual significance for many communities, providing a connection to heritage and tradition. They offer numerous benefits, from supporting biodiversity and ecosystem health to providing medicinal, nutritional, and cultural value. Domesticating plants has been a crucial aspect of human development, and it continues to play a vital role in our lives. The reasons why there is a need to domesticate plants is Food Security. In the changing environmental condition reliable food source is a must. Domesticating plants provides a consistent and reliable source of food, at times of climate change new plants tolerant to changing climate need to be domesticated. To Increase the crop yields, selective breeding and cultivation is needed. Domesticated plants can produce higher yields, supporting growing populations. Domestication led to food production and trade: Domesticated plants enable large-scale food production, facilitating trade and commerce that adds to the economic benefits. Plant domestication supports various industries, such as agriculture, horticulture, and forestry, providing employment and income opportunities. By cultivating specific plant species, we can help maintain genetic diversity and conserve endangered species. Climate change mitigation: Certain domesticated plants, like those used in agroforestry, can help sequester carbon and mitigate climate change. Domestication allows us to select and breed plants with desirable traits, such as flavor, texture, and disease resistance. Domesticated plants can be bred to thrive in various environments, expanding their range and versatility. It enables scientists to study plant genetics, leading to advances in breeding, genetics, and biotechnology. By studying domesticated plants, researchers can gain insights into plant evolution, adaptation, and diversification. Domesticating plants has transformed human societies, enabling us to develop settled agriculture, support growing populations, and create complex societies. Taming plants for the benefit of man has resulted in changes in the morphological and physiological aspects of the domesticated plants. The domesticated plant shows marked differences from the wild ancestor, traits in a crop is only favourable for man, whereas the traits found in the wild ancestor is necessary for the survival of the plant in varied environmental stress conditions. Evidence from archaeological remains, genetic analysis and the geographical distribution of wild ancestor plants, has given the broad idea of domestication, diversification and crop improvement (Bohra et al., 2022). Tamed plants are inferior to the wild counterparts for many traits involved in stress management with the environment (Olsen and Wendel, 2013), including drought tolerance (Koziol et al., 2012), resistance to pests and pathogens (Whitehead et al., 2017; Gaillard et al., 2018) and nutrient acquisition (Isaac et al., 2021) interactions with the microbiome (Gutierrez and Grillo (2022).

Conclusion

Agricultural sustainability depends on crops that are able to survive changing environmental conditions and tolerant to stress like draught, nutrient deficiency and carbon sequestration (Luo., 2022). Wild plants have such traits, they can survive harsh conditions, but are low yielding. Whereas in the case of phasey bean, the yield is moderate and could be used to supply protein rich beans. They can be further subjected to breeding trials to increase the productivity. *Microptilium lathyroides* is a plant with significant nutritional value and bioactive compounds that can contribute to human health and well-being. Though plant domestication via artificial selection is not foolproof; complications include long-distance trading and uncontrolled seed dispersal, accidental cross breeding of wild and domesticated plants, and unexpected disease wiping out genetically similar plants; it demonstrates that human and plant behavior can become intertwined. The genetic traits displayed by this legume could be used to cross breed with the Phaseolus spp. Traits like fast growth, branching, more seeds in each pod, could be used for breeding purposes.

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