Wild Vegetables:

Morphology, Phytochemistry and Utility

Part 2

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Wild Vegetables: Morphology, Phytochemistry and Utility *(Part 2)*

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FOREWORD

Humans are dependent on plants for their food. Total 75% of the food supply to humans is drawn from just 12 crops and five livestock species. However, natural calamities, climate change, and other human activities pose a risk to the productivity of these species, with some potentially facing extinction. The ultimate goal of all scientists and policymakers is to see a hunger-free world. In this scenario, there is a need to expand the food base. Taking this into account, the book titled Wild Vegetables: Morphology, Phytochemistry and Utility by Dr. Ganesh Chandrakant Nikalje, Ms. Apurva Chonde, Dr. Sudhakar Srivastava, and Prof. Penna Suprasanna is a welcome step. In the global scene, there is a vogue to have plants as food from natural sources. I am happy to see the book with detailed information on the plants with their scientific name, names in different languages, their distribution, propagation and recipes. Many wild vegetables, especially leafy vegetables, have several essential elements like magnesium, calcium, sodium, etc. In villages and small towns like Anantapur, where I live, street vendors sell wild vegetables. The book gives detailed information on wild vegetables. The book also gives colour photographs for easy identification of wild vegetables. I am sure this book will be useful to both research scientists and laymen. This book will be a valuable resource for agriculturists and horticulturists to develop high-yielding varieties of these wild vegetables and for developing cultivation techniques. For nutritionists, it will be beneficial to fortify the human diet with vitamins and essential micronutrients.

I must congratulate all the four authors for this excellent book. I am sure this book will get a wider readership. This can be recommended to the students of Food Science and Nutrition.

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PREFACE

Biodiversity is an extremely important and balancing factor for the sustainable environment and ecosystems. Every single individual life form from the bacteria to higher evolved life forms is a component of Earth's ecosystem. Biodiversity refers to the relationship among various organisms and, encompasses diversity and ecosystem. Biodiversity constitutes the life support system for humankind for several needs including food, fodder, fuel, timber, pharmaceuticals and energy, and associated services (i.e. air and water, decomposition of wastes, recycling of carbon and nutrients, regulation of climate, regeneration of soil fertility, and maintenance of biodiversity).

Land use change, alterations in river flow, soil, water, and air contamination, misuse of marine resources, industrial activities, increasing population, and enhancing uniformity of food choices are the threats to biodiversity sustainability. The expansion of urban cities as well as rural agricultural activities has reduced the natural biodiversity-rich regions. The human's ability to adapt to environments and to interact with nature led to the use of wild plants and resources for their consumption in a sustainable manner. With the evolution of humans from the early hunter-gatherers to present times, and across unique variation ranges, plants have assumed extraordinary importance in human societies and, there is an interest in many wild species especially for meals and medicines. However, the increasingly prioritized choice for food sources (grains, fruits or vegetables) has promoted extensive cultivation of a few types of plants, while the rest of the plant types are becoming extinct or restricted.

Presently, nearly thirty domesticated crop species constitute a good-sized part of the dietary range and only three principal cereal grains (rice, wheat, and maize) make contributions to greater than half of the world's calorie consumption. While this is apparent, there are major cultivated vegetables, in which a number of 'fit to be eaten' species remained wild or semiwild, and had been left out during the process of domestication. However, these underutilized safe-to-eat elements have great potential to transform our food bowl in a more nutritious direction. The shift can enable the journey to a sustainable and climate change-resilient cultivation practice. The wild flora has played a very important role in contributing to the nutrition requirements of humankind all over the world and can continue to do so in the near future provided humans are aware of the potential accrued benefits.

Vegetables are consumed throughout the world for edible purposes. However, in the course of social and industrial evolution over the past few centuries, globalization has led to the homogenization of dietary habits. In the course of events, wild local relatives of a number of vegetables have been forgotten by the people and their consumption has decreased over the years. Such genetic resources of wild relatives of vegetables are decreasing and their cultivation is also getting reduced drastically. There is a need to impart knowledge to young students, researchers, and common people about the vast resources of wild relatives of vegetables in India.

This book focuses specifically on the Western Ghats, which is a huge reservoir of genetic reserve of a number of plants. The book provides ethnobotanical details, medicinal applications, phytochemical composition, and culinary notes of more than 120 wild vegetables belonging to 50 families. The information of wild vegetable plants is arranged alphabetically by family name, with each plant described in a consistent format. This book is divided in two volumes; the first volume consists of 23 families (Acanthaceae to Euphorbiaceae) and the second volume contains 27 families (Fabaceae to Zygophyllaceae).

The book shall act as a useful resource material for plant lovers, nature-enthusiasts, researchers and academicians, and those interested in food and nutrition.

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INTRODUCTION

The United Nations Development Programme (UNDP) Sustainable Development Goals aim "to end poverty, protect the planet, and ensure that by 2030, all people enjoy peace and prosperity." However, extreme hunger and malnutrition continue to hinder progress in many parts of the world. In 2022, approximately 9.2% of the global population faced hunger, which increased from 7.9% in 2019, and about 2.4 billion people experienced moderate or severe food insecurity (FAO, IFAD, UNICEF, WFP, and WHO, 2023). Throughout history, humans have utilized a significant number of plant species, estimated between 40,000 and 100,000, for various purposes (IPGRI, 2002). Of these, around 30,000 are considered edible, and approximately 7,000 have been cultivated or collected for food (Asfaw, 2001; Arora, 2014). However, with the Green Revolution, many traditional crops were replaced by high-yielding varieties developed through breeding techniques, jeopardizing the diversity of plant species used for food and other purposes (Ebert, 2014; Guzo *et al.*, 2023). This loss in diversity may contribute to increased hidden hunger and undernourishment (Nikalje *et al.*, 2023). To circumvent such difficulties, diversifying food sources by increasing the usage of wild vegetables offers a promising strategy. Wild vegetables are naturally occurring plants suitable for human consumption, providing unique flavors and valuable nutrients distinct from cultivated plants. Wild vegetables thrive in diverse environments, such as forests, meadows, coastal areas, and deserts, and are often more resilient to harsh conditions, growing at minimal cost (Duguma, 2020). Despite their potential, wild vegetables remain underutilized and unavailable to the public at large, and are often limited to rural areas where they are most abundant (Leakey *et al.*, 2022). Increasing awareness and research on their domestication could promote sustainable agriculture, food security, and economic growth in rural communities (Luo *et al.*, 2022).

Wild vegetables can supplement human diets with proteins, essential minerals, and micronutrients, contributing to nutritional quality (Ogle, 2001). They provide an affordable source of nutrients for rural and semi-urban societies (Ickowitz *et al.*, 2016; Jones, 2017). Diverse diets are crucial for optimal nutrition, health, and well-being (FAO, WFP, and IFAD 2012). However, many low-income families in low- and middle-income countries consume staple-centric diets that lack diversity (Jones, 2017). Including wild edible foods in these diets could improve nutrition in an affordable way (Ickowitz *et al.*, 2016).

For indigenous and non-indigenous populations, wild edible plants serve as staple or complementary foods (Ju *et al.*, 2013). In rural regions, especially in drylands, they play a vital role in food security by filling seasonal gaps and serving as emergency foods during famines (Soromessa and Demissew, 2002). Many indigenous communities believe wild foods better maintain health. During periods of scarcity, over 70% of wild edible plants are consumed as stored food resources dwindle (Teklehaymanot *et al.*, 2010). Raising awareness about these plants could encourage their more frequent inclusion in diets, and support the rural economy.

However, several challenges limit their broader acceptance. The lack of knowledge about their identification, nutritional benefits, and safe preparation can deter people from consuming them. Limited seasonal availability, labour- intensive foraging, and the risk of mistaking

edible plants for toxic look-alikes are additional barriers. Furthermore, some wild vegetables contain antinutritional compounds (*e.g.*, oxalates, tannins, and phytates) that can hinder nutrient absorption if not properly prepared (Ngurthankhumi *et al.*, 2024). Overharvesting can threaten their sustainability, and the absence of formal supply chains limits market availability. Finally, their strong or unfamiliar flavors may not align with consumer preferences, restricting their integration into modern diets.

The main intent of this book is to enhance efforts toward awareness and promote research on the domestication of wild vegetable plants. This could pave way for sustainable agriculture, food and nutritional security, and economic progression in rural areas.

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CHAPTER 1

Wild Vegetables of the Family Fabaceae

INTRODUCTION

This family is often called the legume or bean family. It is estimated to contain around 20,000 species across over 700 genera. The members are a vital source of food for humans and animals worldwide due to its high nutritional value. They are a rich source of plant-based proteins, dietary fibers, carbohydrates, vitamins and minerals including iron, folate, potassium, and phosphorus, *etc.* Some members contain anti-nutritional compounds such as lectins, phytates, tannins, *etc.* (Martín-Cabrejas 2019).

Bauhinia malabarica Roxb.

Botanical name: *Bauhinia malabarica*

Family: Caesalpiniaceae

Local name: Koral, Korat

Vernacular name:

- **Assamese:** Kotora
- **Bengali:** Karmai
- **English:** Malabar bauhinia
- **Hindi:** Amli
- **Kannada:** Basavanapaada
- **Malayalam:** Arampuli
- **Oriya:** Gumbati
- **Sanskrit:** Amlapatrah
- **Tamil:** Puli-y-atti
- **Telugu:** Puli Chinta

Season: June & July

Parts used: younger stem and leaves

Characteristics:

1. Leaves: The leaves are alternate and compound. They are bilobed or bifid, which means the leaf blade is divided into two lobes that are usually rounded or heart-shaped. The lobes are joined near the base, giving the appearance of a butterfly's wings or a cow's hoof, which is a characteristic feature of the *Bauhinia* genus (Sharma *et al.*, 2014) (Fig. **24.1**).

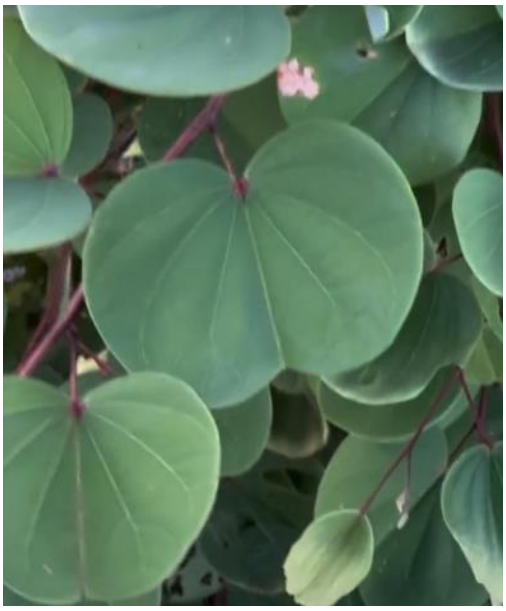

Fig. (24.1). Leaves of *B. malabarica* (PC: Prajkta Nangaonkar).

2. Flowers: The flowers are large and showy, typically 3-5 cm in diameter. They are bisexual and have five petals that are often white, cream, or pale yellow in color. The petals are arranged in a shape resembling an open butterfly, with one petal larger and broader than the others (Sharma *et al.*, 2014).

3. Inflorescence: The flowers are arranged in terminal or axillary racemes or panicles. They form clusters of several flowers, which bloom sequentially along the inflorescence (Sharma *et al.*, 2014).

4. Fruits: The fruit is a legume or pod. It is elongated, flattened, and woody when mature. The pod contains several seeds and often splits open when ripe to release the seeds (Sharma *et al.*, 2014).

5. Bark and Branches: The bark is smooth and grayish-brown in color. The branches are slender and spread out in a zigzag pattern (Sharma *et al.*, 2014).

Distribution:

Indo-Malesia; Indian distribution- Assam, Madhya Pradesh, Meghalaya, Odisha. Maharashtra: Nasik, Pune, Raigad, Sindhudurg, Thane.

Propagation: Seed and Cuttings

Chemical constituents:

Seven flavonols, including 6,8-di-C-methyl kaempferol 3-methyl ether, kaempferol, afzelin, quercetin, isoquercitrin, quercitrin, and hyperoside were isolated from the methanol extract of leaves (Rawiwun *et al.*, 2008).

Recipe:

Ingredients: Moong dal, Korla leaves, mustard, cumin, green or red chilies, turmeric powder, hing, garlic.

Method: Cooked with soaked moong dal. Use only leaves; remove tough veins, mainly the central ones from mature leaves. Wash, and chop the leaves. Heat oil, add a small amount of mustard and cumin, then hing (or garlic, whichever is preferred), green/red chilies. Add the soaked dal (drain first) and then the leaves, turmeric, and salt to taste. Cook until it becomes tender.

Uses:

1. Traditional Medicine: Various parts of plants, including the bark, leaves, flowers, and roots, have been used in traditional medicine systems for their potential medicinal properties. It possesses antioxidant, anti-inflammatory, antimicrobial, analgesic, and anti-diabetic properties. The plant has been used to treat fever, wounds, skin infections, digestive disorders, respiratory ailments, diabetes, *etc.* (Thenmozhi *et al.*, 2013; Sharma *et al.*, 2014).

2. The young shoots of *B. malabarica* are edible and are commonly prescribed to treat cough, gout, glandular swellings and goiter, haemorrhage, leprosy, menorrhagia, scrofula, urinary disorders, wasting diseases, worm infestations and for liver disorders (Venkatachalapathi *et al.*, 2015).

3. Wound Healing: The bark is often used in traditional medicine for its potential wound-healing properties. It may be applied topically to wounds and injuries to promote healing and reduce inflammation (Ahmed *et al.*, 2012).

4. Ornamental Plant: It is also cultivated as an ornamental plant for its attractive flowers. The showy, butterfly-shaped flowers and the overall aesthetic appeal of

CHAPTER 2

Wild Vegetables of the Family Lythraceae

INTRODUCTION

The Lythraceae family, commonly known as the loosestrife family, comprises approximately 620 species within 32 genera (Xu and Deng 2017). The members are rich in antioxidant compounds such as flavonoids, triterpenoids, and phenolic compounds.

Ammannia baccifera L.

Botanical name: *Ammannia baccifera* L.

Family: Lythraceae

Local name: Dhan bhaji, Aginbuti, Bharajambhula

Vernacular name:

- **Assamese:** Agnigarbha
- **Bengali:** Banmarich
- **English:** Blistering Ammania
- **Hindi:** Aginbuti, Jungli Mehendi
- **Kannada:** Kaadugida
- **Malayalam:** Kallur Vanchi
- **Sanskrit:** Agnigarbha, Kshetrabhusha, Pasanabheda
- **Tamil:** Kal-l-uruvi
- **Telugu:** Agnivendapaku

Season: Flowering and Fruiting: August to January

Parts used: Leaves

Characteristics:

1. Habit: It is an annual or perennial herbaceous plant (Fig. **25.1**).

Fig. (25.1). Whole plant of *A. baccifera* (PC: Vishnu Birajdar).

2. Stem: The stem is erect or decumbent, branched, and often reddish in color. It can grow up to 50 centimeters in height (Flora of North America Editorial Committee, 1997).

3. Leaves: The leaves are opposite, simple, lanceolate to linear-lanceolate in shape, and usually sessile or short-petiolate. They are green or reddish and may have toothed margins.

4. Flowers: The flowers are small, pink, or reddish in color, and occur in clusters in the leaf axils or at the stem tips. Each flower has four or five petals and numerous stamens.

5. The fruits are small, globose to ellipsoid capsules, which contain numerous tiny seeds (Wiart, 2006; Weeds Identification and Knowledge in the Western Indian Ocean).

Distribution:

It has a wide distribution and is native to tropical and subtropical regions. It is found in various countries across Africa, Asia, Australia, and the Americas.

Propagation: Seed

Chemical constituents:

It is rich in flavonoids, triterpenoids, and phenolic compounds. It consists of hentriacontine, dotriacontanol, betulinic acid, lupeol, ellagic acid, quercetin, and lawsone (Joshi, 2007).

Recipe:

Ingredients: Younger leaves, finely chopped onion, 5-6 garlic cloves, salt, green chilies, curry leaves, Asafoetida, grated coconut, mustard seeds, turmeric, Jaggery, gram dal, *etc.*

Method: Peel the stalks of the leaves, wash one judy leaf, and chop finely. Heat oil in the pan and fry asafoetida, mustard seed, curry leaves, crushed garlic cloves, and finely chopped onion. When the onion turns slightly yellow, add the chopped vegetables, chili, turmeric powder, soaked dal, jaggery and salt to taste; lightly beat water and cover, and cook over low flame. After the vegetables have finished cooking, sprinkle grated wet coconut over them.

Uses:

1. Edible Leaves: The leaves are consumed as a leafy vegetable and used in traditional culinary preparations (Nirmal *et al.*, 2011).

2. Anti-inflammatory Activity: Plant extract have shown potential in reducing inflammation and related conditions (Nirmal *et al.*, 2011).

3. Antioxidant Activity: The extracts have exhibited antioxidant activity, which can help neutralize harmful free radicals in the body and protect against oxidative stress-related damage (Vijayakumar *et al.*, 2012).

4. Wound Healing: Traditional medicinal uses include its application on wounds to promote healing. The plant extract has shown wound-healing properties in animal studies (Rajasekaran *et al.*, 2012)

5. Skin: The fresh, bruised leaves have been used in skin diseases as a rubefacient and as an external remedy for ringworm and parasitic skin affection (Nirmal *et al.*, 2011).

CHAPTER 3

Wild Vegetables of the Family Malvaceae

INTRODUCTION

The Malvaceae, commonly referred to as the mallow or hibiscus family, is a diverse group of flowering plants that includes over 4,225 species across 244 genera (Erarslan and Koçyiğit 2019). Some members are a good source of proteins, vitamin C, and minerals like potassium, phosphorous, magnesium, calcium, sodium, iron, *etc.*

Abelmoschus ficulneus (L.) Wight & Arn. ex Wight

Botanical name: *Abelmoschus ficulneus*

Family: Malvaceae

Local name: Ran Bhendi

Vernacular name:

- **Common name:** White Wild Musk Mallow, Native rosella
- **Hindi:** Jangli bhindi
- **Marathi:** Ran bhendi
- **Tamil:** Kattu-vendai
- **Telugu:** Nella benda, Parupubenda
- **Kannada:** Sanna bende

Season: flowering & fruiting: November-February

Parts used: Leaves, fruit, seeds

Characteristics (Native Rosella, 2008; White Wild Musk Mallow, 2010)

1. Plant Habit: It is a perennial herbaceous plant that can grow up to 2 meters in height. It may have a shrub-like growth form.

2. Leaves: The leaves are alternate and palmately lobed or divided. Each leaf typically has 3 to 7 lobes or divisions. The lobes are usually elongated and lanceolate in shape.

3. Flowers: The flowers are typically white in color, although they may have slight variations in shades. The flowers are large and showy, with a characteristic hibiscus-like appearance. They have five petals and a prominent central column of stamens (Fig. **26.1**).

Fig. (26.1). Flower and fruits of *A. ficulneus* (PC: Apurva Shankar Chonde).

4. Fruit: After flowering, the plant produces fruit capsules. These capsules are generally round or ovoid in shape and contain numerous seeds (Fig. **26.1**).

5. Seed Characteristics: The seeds are small and often flattened or disc-shaped. They may have a dark coloration.

Distribution:

Asia: India, Malaysia, Pakistan, Sri Lanka; Africa: Madagascar; Australasia.

Propagation: Seed

Chemical constituents:

Leaves have beta-sitosterol and beta-D glucoside. Flowers have anthocyanins. Petals have beta-sitosterol, its glucoside, and the flavonoid myricetin. The seeds

have an essential oil containing farnesol, palmitic acid, acetic acid, furfural, lactose, and amaretto acid (Sharma, 1993).

Recipe:

Ingredients: Bhendi, onion, garlic cloves, green chilies, grated coconut, turmeric powder, asafoetida, salt, oil.

Method: Heat oil in a pan, add onion, and sauté 1 minute, now add garlic, chilies, asafoetida, turmeric, Bhendi, and salt mix well. Take a lid, and cook the Bhendi on low flame, keep on checking in between and stir continuously, so that Bhendi does not stick to the bottom of the pan. When the Bhendi is cooked, add coconut and mix well. It can be served with roti or chapati.

Uses:

1. The whole plant is utilized in traditional medicine to treat conditions such as sprains, bronchitis, and toothache (Mohite *et al.*, 2019; Dashputre *et al.*, 2021).

2. It exhibits various pharmacological activities, including its potential in treating jaundice and other serious illnesses (Florence, 2019).

3. White Wild Musk Mallow is known to have therapeutic effects on upset stomach and diarrhea. Drinking a morning tea prepared from its leaves can provide relief (Sharma, 1993).

4. The Native Rosella species is used to treat scorpion bites by applying crushed roots directly to the affected area and consuming juice made from the crushed roots (Sharma, 1993).

5. Native Rosella is beneficial for stomach health as it strengthens the stomach muscles and promotes proper gastric function (Sharma, 1993).

6. It aids in liver function by enhancing its activity. People with jaundice can experience faster recovery by consuming crushed roots of the plant with water, twice a day (Sharma, 1993).

7. Consuming a cup of decoction made from the leaves (or roots for a stronger effect) in the morning can help open airways and assist in managing asthma (Sharma, 1993).

8. It has a cooling effect on the body, inducing a sense of calmness when a decoction of its leaves and roots is consumed (Sharma, 1993).

CHAPTER 4

Wild Vegetables of the Family Menispermaceae

INTRODUCTION

The Menispermaceae family, commonly known as the moonseed family, is distinguished by a unique combination of features including woody climbers, palmate or pinnate venation, small and inconspicuous flowers, crescent-shaped seeds, *etc.* This family is represented by about 70 genera and 520 species (Chinh *et al.*, 2015). The members are rich in alkaloids.

Tinospora cordifolia (Willd.) Miers

Botanical name: *Tinospora cordifolia*

Family: Menispermaceae

Local name: Guduchi, Gulvel

Vernacular name:

- **English:** Gulancha/ Indian Tinospora
- **Sanskrit:** Guduchi, Madhuparni, Amrita, Chinnaruha, Vatsadaani, Tantrika, Kundalini & chakralakshanika.
- **Hindi:** Giloya, Guduchi
- **Bengali:** Gulancha
- **Telugu:** Thippateega
- **Tamil:** Shindilakodi
- **Gujarathi:** Galo
- **Kannada:** Amrita balli, Madhupa

Season: November to June

Parts used: Leaves, stem, root

Characteristics: (Upadhyay *et al.*, 2010):

1. Climbing Vine: *T. cordifolia* is a deciduous climbing vine that grows by twining around trees or other supports. It has a robust and woody stem with characteristic aerial roots that attach to surfaces for support.

2. Heart-shaped Leaves: The leaves of *T. cordifolia* are heart-shaped or cordate, hence the species name "cordifolia." The leaves are simple, alternate, and have a smooth or slightly wavy margin. They are typically green in color and can vary in size, with prominent veins running through them (Fig. **27.1**).

Fig. (27.1). Leaves of *T. cordifolia* (PC: Apurva Shankar Chonde).

3. Greenish-yellow Flowers: *T. cordifolia* produces small, unisexual flowers that are greenish-yellow in color. The flowers are typically arranged in axillary racemes or clusters.

4. Fleshy Stem: The stem of *T. cordifolia* is succulent and fleshy, with a pale green or brownish color. It is usually cylindrical, with nodes and internodes along its length.

5. Bitter Taste: When the stem of *T. cordifolia* is broken or crushed, it exudes a bitter taste.

Distribution: Bangladesh, Borneo, China, India, Indonesia, Malaysia, Myanmar, North Africa, Philippines, Sri Lanka, South Africa, Thailand, Vietnam and West Africa (Singh *et al.*, 2003).

Propagation: Seeds and cuttings.

Chemical constituents:

Alkaloids- Berberine, Columbin, Jatrorrhizine, Palmarin, Tetrahydropalmatine; Diterpenoid Lactones- Tinosporin, Tinosporide, Tinosporaside; Steroids- Gilosterol, Tinosporic acid, Tinosporol, Tinosporon, Beta-sitosterol; Arabinogalactan; Tinocordiside & Tinosporidine; Giloside; Syringin *etc.* (Upadhyay *et al.*, 2010; Saha and Ghosh, 2012).

Recipe:

Ingredients: leaves, chopped onion and garlic, oil, chili powder, salt, *etc.*

Method: Wash and chop the leaves. Fry onions and garlic in oil until they turn red. Then add the chopped vegetables, red chili powder, and salt. Sauté everything well. Steam and cook the vegetables.

Uses:

1. Immune System Support: *T. cordifolia* is believed to have immunomodulatory properties, meaning it helps regulate and support the immune system. It is traditionally used to enhance the body's natural defense mechanisms and strengthen immunity (Rege *et al.*, 1993; Nagarkatti *et al.*, 1994).

2. Fever and Respiratory Infections: *T. cordifolia* has been traditionally used to manage fever and respiratory infections, including common cold, flu, and cough. It may have antipyretic and antimicrobial properties (Sharma, 2001; Chunekar *et al.*, 2006).

3. Digestive Health: *T. cordifolia* is known for its digestive benefits. It may support healthy digestion, improve appetite, and help manage gastrointestinal disorders such as indigestion, bloating, and constipation (Sharma, 2001).

4. Antioxidant and Anti-inflammatory Effects: *T. cordifolia* contains various bioactive compounds that possess antioxidant and anti-inflammatory properties. These properties help combat oxidative stress, reduce inflammation, and may have a protective effect against chronic diseases (Stanely *et al.*, 2001; Wesley *et al.*, 2008).

5. Liver Health: *T. cordifolia* is used in traditional medicine to support liver health and promote detoxification. It has hepatoprotective properties and may help in managing liver disorders (Karkal *et al.*, 2007).

CHAPTER 5

Wild Vegetables of the Family Moraceae

INTRODUCTION

The Moraceae family, often called the fig or mulberry family, has several key distinguishing characteristics such as milky sap, syconium fruit and unisexual flowers. The members are mostly tropical trees and consist of 37 genera and 1100 species (Francis 2004).

Ficus racemosa L.

Botanical name: *Ficus racemosa*

Family: Moraceae

Local name: Umber, Goolar

Vernacular name:

- **Hindi:** Goolar
- **Manipuri:** Heibong
- **Telugu:** Paidi
- **Sanskrit:** Udumbara
- **Malayalam:** Atti
- **Tamil:** Atti
- **Kannada:** Atti, Rumadi
- **Oriya:** Dimri
- **Nepali:** Gular, Dumri
- **Mizo:** Theichek

Season: Flowering: January- April; Fruiting: March-July

Parts used: All parts

Characteristics:

1. Size and Growth Habit: *F. racemosa* is a large deciduous tree that can reach heights of up to 30 meters (98 feet). It has a spreading canopy and a dense crown (Kirtikar *et al.*, 1975).

2. Trunk and Bark: The trunk of *F. racemosa* is typically straight and cylindrical, with a grayish-brown to dark brown bark. The bark may have vertical fissures or irregular patterns (Kirtikar *et al.*, 1975).

3. Leaves: The leaves of *F. racemosa* are alternate and simple, with an elliptical to obovate shape. They are leathery and glossy, measuring around 10-20 cm (4-8 inches) in length. The leaves have prominent veins and a smooth margin (Kirtikar *et al.*, 1975).

4. Fruits: One of the distinctive features of *F. racemosa* is its fig-like fruits, which grow in clusters along the branches and trunk. These figs are small, round to pear-shaped, and turn from green to yellow or orange when ripe. Each fig contains numerous tiny flowers (Kirtikar *et al.*, 1975) (Fig. **28.1**).

Fig. (28.1). Fruits of *F. racemosa* (PC: Apurva Shankar Chonde).

5. Roots: *F. racemosa* is known for its aerial roots, which are characteristic of many fig tree species. These roots grow down from the branches and trunk and

can form striking aerial root structures, especially in older trees (Kirtikar *et al.*, 1975).

Distribution:

China, India, Indonesia, Myanmar, Nepal, Papua New Guinea, Pakistan, Sri Lanka, Thailand, Vietnam, Australasia.

Propagation: Seed, Tip cuttings

Chemical constituents:

It contains tannin, wax, saponin gluanol acetate, β-sitosterol (A), leucocyanidin- 3 – O – β – D - glucopyrancoside, leucopelargonidin – 3 – O – β – D - glucopyranoside, leucopelargonidin – 3 – O – α – L - rhamnopyranoside, lupeol (C), ceryl behenate, lupeol acetate, α-amyrin acetate(B), leucoanthocyanidin and leucoanthocyanin from trunk bark lupeol, β-sitosterol and stigmasterol were isolated (Husain *et al.*, 1992).

Recipe:

Ingredients: Cleaned and chopped seed removed gooler, roasted chickpeas flour or sattu, minced ginger, garlic and green chilies, garam masala, coriander and mint greens, salt, ghee, *etc.*

Method: Boil the cleaned gooler in sufficient water until it becomes soft, then drain and allow it to cool. Mash it together with the other ingredients, excluding the ghee, to create a dough-like mixture. Shape the mixture into lime-sized balls and flatten them between your palms. Arrange the flattened balls to be shallow-fried in batches, using ghee or any oil of your choice. Serve them hot with green chutney or tamarind chutney.

Uses:

1. Medicinal: Various parts of *F. racemosa*, including the bark, leaves, and fruits, are used in traditional medicine for their potential health benefits. The plant possesses anti-inflammatory, analgesic, anti-diabetic, and antimicrobial properties. It is used to treat conditions such as diarrhea, dysentery, skin diseases, diabetes, and respiratory disorders. Tender fruits are astringent, stomachic, refrigerant, dry cough, loss of voice, diseases of kidney and spleen, astringent to bowel, styptic, tonic, useful in the treatment of leucorrhea, blood disorder, burning sensation, fatigue, and urinary discharges (Ahmed and Urooj 2010).

CHAPTER 6

Wild Vegetables of the Family Musaceae

INTRODUCTION

The Musaceae family, also known as the banana family, has unique morphological characteristics such as large herbaceous growth, pseudo stem, large elongated leaves with prominent midrib and entire margin, berry fruits, and spadix inflorescence covered with spathe. It consists of 6 genera and 130 species (Qamar and Shaikh 2011). The members are rich in carbohydrates in the form of simple sugars (fructose, sucrose, glucose, *etc.*) and starch, vitamin B, Minerals-potassium, magnesium, manganese, phosphorus, and pectin fibers. Some members contain antinutritional compounds such as tannins, lactins, phytic acid, *etc.* (Qamar and Shaikh 2011).

Ensete superbum (Roxb.) Cheesman

Botanical name: *Ensete superbum*

Family: Musaceae

Local name: Raankel, Chaveni

Vernacular name:

- **Assamese:** Lobong keng tong
- **Gujarati:** Jangli kela
- **Hindi:** Jangli kela
- **Kannada:** Bettabale, Kaadubale, Kallubale
- **Konkani:** Jangli keli, Raan kyaanle
- **Malayalam:** Kalluvazha, Kattuvazha, Malavazha
- **Marathi:** Chaveni, Kavadara, Raankel
- **Rajasthani:** Jangli kelo
- **Sanskrit:** Bahubija
- **Tamil:** Kal-valai, Kattu-valai, Malai-valai
- **Telugu:** Adavi arati
- **Tulu:** Kallubare

Season: June to August

Parts used: whole plant

Characteristics (Vasundharan *et al.*, 2015; Sethiya *et al.*, 2019):

1. Plant Size and Habit: *E. superbum* is a large perennial herbaceous plant with a pseudostem that can reach a height of up to 10 meters (33 feet) or more. The pseudostem is formed by tightly overlapping leaf sheaths and lacks a true woody stem.

2. Leaves: The leaves of *E. superbum* are large and elongated, typically measuring between 1.5 to 4 meters (5 to 13 feet) in length. They are arranged spirally around the stem and have a prominent midrib. The leaves are leathery in texture and may have a bluish-green color.

3. Inflorescence: *E. superbum* produces a large and showy inflorescence borne on a long, erect stalk. The inflorescence consists of numerous individual flowers that are arranged in a dense, cone-shaped cluster.

4. Flowers: The flowers of *E. superbum* are small and inconspicuous. They are usually yellow or pale green in color. The individual flowers are unisexual, meaning they are either male or female, and are grouped together within the inflorescence.

5. Fruits: After successful pollination, *E. superbum* produces clusters of green to reddish-brown fruits. The fruits are elongated and can measure up to 12 centimeters (4.7 inches) in length. They contain numerous small seeds (Fig. **29.1**).

Distribution:

It is native to the tropical regions of Southeast Asia, including countries like India, Myanmar (Burma), Thailand, and Malaysia. It is commonly found in moist forested areas, including valleys, ravines, and rocky slopes.

Propagation: seeds, corms

Chemical constituents:

Alkaloids, saponins, tannins, phenols, flavonoids, anthraquinone glycosides, steroids and amino acids. (Mishal *et al.*, 2020).

Fig. (29.1). Fruits of *E. superbum* (PC: Apurva Shankar Chonde).

Recipe:

Ingredients: flower, green peas, onion, cumin seeds, hing, jaggery, masala, kokum, salt, *etc.*

Method: Clean the banana blossom or plantain flower and chop the florets finely. Soak them in diluted buttermilk or plain water. Add turmeric and salt to the buttermilk and let it soak overnight in the refrigerator, or for at least 30 minutes. Prepare the Malvani masala as per the recipe and keep it ready. Heat a saucepan with oil, add cumin seeds and mustard, and let them crackle for 10 seconds. Add asafoetida, chopped garlic, and onions, and fry until the onions turn translucent. Once done, add the chopped florets (without the soaking liquid) and the Malvani masala, along with salt to taste. Toss the ingredients together, add jaggery and kokum, and sauté until the florets soften and cook. You can sprinkle some water, cover the pan with a lid, and cook further. Make sure to keep sautéing to prevent sticking at the bottom of the pan. Serve the Maharashtrian Style Kelfulachi Bhaji alongside the Khandeshi Dal Recipe or Khichdi for a wholesome and healthy lunch.

Uses:

1. Ornamental Plant: *E. superbum* is often cultivated as an ornamental plant in gardens and landscapes due to its large, tropical foliage and dramatic appearance.

CHAPTER 7

Wild Vegetables of the Family Nelumbonaceae

INTRODUCTION

This family is also known as the Lotus family with unique features such as aquatic habitat, large peltate and floating leaves, and flowers- large, solitary, conspicuous with numerous petals with colors ranging from white, yellow, pink or red. It consists of one genus and two species (Xue *et al.*, 2012). The members are a rich source of carbohydrates, proteins, and minerals including potassium, phosphorus, manganese, magnesium, iron, vitamins, and fibers. However, they also possess antinutritional contents such as nelumbone alkaloids and tannins (Sujitha *et al.*, 2013).

***Nelumbo nucifera* Gaertn.**

Botanical name: *Nelumbo nucifera*

Family: Nelumbonaceae

Local name: lotus

Vernacular name:

- **Tamil:** Ambal, Thamarai, Padma, Pankaja
- **German:** Indischelotosblume
- **Gujrat:** Suriyakamal
- **Malayalam:** Tamara
- **Bengal:** Padma
- **French:** Nelumbo
- **Sanskrit:** Ambuja
- **Hindi:** Kanwal, Kamal
- **Persian:** Nilufer

Season: April to September

Parts used: Flower, Stem

Characteristics:

1. Aquatic Plant: *N. nucifera* is an aquatic perennial plant that grows in freshwater environments, such as ponds, lakes, and slow-moving rivers. It has adapted to thrive in wetland habitats (Mukherjee *et al.*, 1996) (Fig. **30.1**).

(a) **(b)**

Fig. (30.1). *N. nucifera* a) whole plant b) rhizome (PC: Apurva Shankar Chonde).

2. Rhizomatous Growth: The plant has a thick, fleshy rhizome (underground stem) that anchors it in the soil or mud at the bottom of water bodies. From the rhizome, long petioles (stalks) and leaves emerge above the water surface (Mukherjee *et al.*, 1996) (Fig. **30.1**).

3. Leaves: The leaves of *N. nucifera* are large, round, and circular in shape. They are borne on long, sturdy petioles that rise above the water. The leaves can reach a diameter of up to 60 centimeters. The upper surface of the leaves is smooth, while the lower surface is covered with tiny hairs (Mukherjee *et al.*, 1996).

4. Flowers: *N. nucifera* produces beautiful, showy flowers that are considered sacred and culturally significant in many regions. The flowers are large, with a diameter of about 20 to 25 centimeters. They have numerous petals arranged in multiple layers, giving them a distinctive appearance. The petals can be white, pink, or pale yellow, depending on the variety. The flowers emit a pleasant fragrance (Mukherjee *et al.*, 1996) (Fig. **30.1**).

5. Fruits: The fruits are rounded or oval in shape and have a unique appearance. They consist of multiple chambers, each containing a single seed embedded in a

hard, woody shell. The fruits are typically green when young and turn brown or black as they mature (Mukherjee *et al.*, 1996).

6. Cultural and Symbolic Significance: *N. nucifera* holds great cultural and religious significance in various societies. It is often associated with purity, enlightenment, and spiritual awakening. The plant is widely featured in art, literature, and religious practices.

Distribution:

Asia- India, China, Japan, Sri Lanka, Thailand, Vietnam, Cambodia, Myanmar, and Bangladesh, North America, Australia, Africa, Europe.

Propagation: Seed, dividing rhizomes

Chemical constituents:

Anonaine, ß-sitosterol, Dauricine, Demethylcoclaurine, Dehydroanonaine, Ginnol, Gluconic acid, Hyperin, Kaempferol-3-O-ß-glucuronide, Linalool, Lotusine, Luteolin, Luteolin glucoside, Malic acid, N-noramepavine, Nornuciferine, Nuciferine, Pronuciferin, Quercetin, Roemerrine, Rutin, Tartaric acid (Paudel *et al.*, 2015).

Recipe:

Ingredients: Lotus stem, onions, curd, ginger-garlic paste, coriander powder, turmeric powder, red chili powder, salt and cumin powder, water, *etc.*

Method: Put the lotus stem slices in a pressure cooker and add 1 cup of water. Cook them until they become soft. Cook them for one whistle on high heat and two whistles on low heat. Then, add onions, ginger-garlic paste, curd, coriander powder, turmeric powder, red chili powder, salt, and cumin powder. Add half a cup of water and fry the masala until the oil separates on the side of the pan. Next, add the cooked lotus stems along with the water. Cover and cook for 10 minutes. Remove the lid and increase the heat to high. Cook until all the water has evaporated and the vegetable becomes dry and nicely cooked.

Uses:

1. Cultural and Spiritual Significance: *N. nucifera* holds great cultural and religious significance in many societies, particularly in Asia. It is considered a sacred symbol of purity, enlightenment, and spiritual awakening. The lotus is often depicted in religious artwork, architecture, and ceremonies (Shen-Miller, 2002).

CHAPTER 8

Wild Vegetables of the Family Nyctaginaceae

INTRODUCTION

The Nyctaginaceae family, also known as the four-o'clock family consists of 33 genera and 290 species (Xu and Deng 2017). Some members contain alkaloids, phenolic compounds, flavonoids, glycosides, tannins, saponins, *etc.* (Pooja *et al.*, 2017).

Boerhavia diffusa L.

Botanical name: *Boerhavia diffusa* L.

Family: Nyctaginaceae

Local name: Gadapushpa, Punarnava

Vernacular name:

- **Common name:** Red hogweed, Tar Vine, Red Spiderling, Wineflower
- **Hindi:** Punarnava, Satha
- **Kannada:** Adakaputta, Adakaputtana gida, Komme, Gonajaali, Sanaadikaa Balavadike, Belavadaka, Shavaata, Shivaata, Shivaatike, Nadumurukana balli
- **Nepali:** Punarnavaa, Punarvaa, Laal Punarnavaa, Saano Paate, Laal Gaj Purnee, Aule Saag
- **Sanskrit:** Punarnavaa

Season: Flowering: April – June; Fruit ripening: July - August

Parts used: Whole plant

Characteristics:

1. Growth Habit: It is a perennial herbaceous plant that typically grows upright or prostrate. It can reach a height of up to 1 meter (Thakur *et al.*, 1989).

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2. Leaves: The leaves are simple, alternate, and usually have a long petiole. The leaf shape can vary, but they are generally ovate to lanceolate with pointed tips. The leaf margins are often smooth or slightly toothed (Thakur *et al.*, 1989).

3. Flowers: *B. diffusa* produces small, pink or white flowers that are arranged in clusters or spikes. The flowers have a five-lobed tubular structure and are often fragrant (Thakur *et al.*, 1989) (Fig. **31.1**).

(a) **(b)**

Fig. (31.1). *B. diffusa* a) Whole plant b) Inflorescence (PC: Ganesh Pawar).

4. Root System: The roots are fibrous and can penetrate deep into the soil. They may have a reddish-brown color (Thakur *et al.*, 1989).

Distribution:

Africa- Nigeria, Ghana, Sudan, Ethiopia, Tanzania, and South Africa, Asia- India, Pakistan, Bangladesh, Sri Lanka, Myanmar, Thailand, Malaysia, Indonesia, and the Philippines, Americas- Central America, South America, and the Caribbean, Other countries- Mexico, Brazil, Colombia, Ecuador, Peru, Venezuela, and Jamaica.

Propagation: Seed

Chemical constituents:

Tannins, flavonoids, alkaloids (punarnavine), glycosides, steroids, terpenoids, phenolic compounds, rotenoids (Shisode *et al.*, 2011); phenolic compounds, saponins, glycosides (Pooja *et al.*, 2017).

Recipe:

Ingredients: Punarnava bunches, toor dal, tomatoes, onion, green chilies, curry leaves, ginger garlic paste, turmeric powder, red chili powder, water, salt, coriander leaves, mustard seeds, cumin seeds.

Method: In a pressure cooker, add cleaned and washed Punarnava (Galijeru aaku), onions, toor dal, green chilies, curry leaves, ginger-garlic paste, turmeric powder, tomatoes, red chilies, and oil. Mix well and pressure cook the dal for about 2 whistles. Once the pressure is completely released, mash the dal and leaves, and mix well. In another pan, add oil along with mustard seeds, cumin seeds, dry red chilies, crushed garlic, and turmeric powder. Mix well and cook until the tempering releases its aroma. Then, add this tempering to the cooked dal and mix well. Cook for about 2 minutes. Finally, add coriander leaves and mix well. Serve hot with plain rice or even with roti.

Uses:

1. Nutrient Content: *B. diffusa* is reported to contain various nutrients such as proteins, carbohydrates, vitamins (including vitamin C), and minerals (including calcium, iron, and potassium) (Nayak *et al.*, 2016).

2. Diuretic Activity: *B. diffusa* is traditionally known for its diuretic properties. It may increase urine output and promote the elimination of excess fluids from the body (Nayak *et al.*, 2016).

3. Anti-inflammatory Activity: *B. diffusa* possesses anti-inflammatory properties. It may help reduce inflammation and provide relief in conditions such as arthritis and inflammatory disorders (Mudgal *et al.*, 1974).

4. Antioxidant Activity: It has been found to exhibit antioxidant properties, which can help protect against oxidative stress and damage caused by free radicals in the body (Nayak *et al.*, 2016).

5. Hepatoprotective Activity: Plants may possess hepatoprotective properties, potentially helping to protect the liver from damage and support its overall health (Muzila, 2006).

CHAPTER 9

Wild Vegetables of the Family Oleaceae

INTRODUCTION

The Oleaceae family is distinctive, typically consisting of trees or shrubs (rarely lianas), usually featuring peltate secretory trichomes and opposite leaves. Their inflorescences are typically cymes or solitary flowers (Green 2004). It consists of 25 genera and 688 species (Huang *et al.*, 2019). Some members are a valuable source of healthy fats like oleic acid. However, it may also contain a bitter compound *i.e.* oleuropein.

Schrebera swietenioides Roxb.

Botanical name: *Schrebera swietenioides*

Family: Oleaceae

Local name: Mokha

Vernacular name:

- **Common name:** Weaver's Beam Tree
- **Hindi:** Banpalas, Mokhdi, Mokha
- **Kannada:** Bula, Gante, Mogalingamara
- **Malayalam:** Maggamaram, Malamplasu, Muskkakavrksam
- **Marathi:** Mokha, Mokadi, Nakti
- **Oriya:** Mokka
- **Sanskrit:** Ghantapatali, Golidha, Kastapatola
- **Tamil:** Kattupparutticceti, Mogalingam, Makalinkam
- **Telugu:** Bullakaya, Magalinga, Tondamukkudi

Season: Flowering and fruiting: May-June

Parts used: Roots, Bark, Leaves, Fruits, Alkali

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Characteristics (Green 2004):

1. Habitat: This species is typically found in evergreen and deciduous forests, as well as in moist or dry areas. It can be found at elevations ranging from sea level to around 1,500 meters (4,900 feet).

2. Tree: *S. swietenioides* is a medium to large-sized tree that can reach heights of up to 25 meters (82 feet). It has a straight, cylindrical trunk with a rough, fissured bark.

3. Leaves: The leaves are simple, opposite, and usually clustered at the end of branches. They are elliptical or lanceolate in shape, with a glossy green color. The leaf margins are serrated or toothed.

4. Flowers: The tree produces small, fragrant flowers that are borne in axillary or terminal panicles. The flowers have a tubular shape and are usually white or cream-colored. They have four or five petals and are bisexual.

5. Fruits: After successful pollination, *S. swietenioides* produces fleshy, ovoid or ellipsoid fruits. The fruits are initially green and turn yellow or orange when ripe. Each fruit contains a single seed (Fig. **32.1**).

Fig. (32.1). Fruits of *S. swietenioides* (PC: Madhukar).

6. Seeds: The seeds of *S. swietenioides* are round or oval and have a hard, woody coat. They are dark brown or black in color.

Distribution:

India- Western Ghats, Eastern Ghats, Kerala, Karnataka, Tamil Nadu, Maharashtra, and Andhra Pradesh; Sri Lanka, Myanmar, Thailand.

Propagation: Seed

Chemical constituents:

Alkaloids- schreberine, schreberamine, and schreberamine N-oxide, triterpenoids- betulinic acid, oleanolic acid, and ursolic acid, flavonoids- apigenin, luteolin, and quercetin, sterols- β-sitosterol, stigmasterol, essential oils.

Recipe:

Ingredients: Younger leaves, finely chopped onion, 5-6 garlic cloves, salt, green chilies, curry leaves, Asafoetida, mustard seeds, turmeric, gram dal, *etc.*

Method: Wash the leaves and chop them finely. Heat oil in a pan and fry asafoetida, mustard seeds, curry leaves, crushed garlic cloves, and finely chopped onion. When the onion turns slightly yellow, add the chopped vegetables, chili, turmeric powder, soaked dal, and salt to taste. Lightly beat water, cover, and cook over low heat.

Uses:

1. Culinary: The leaves can be used as vegetables (Manda *et al.*, 2009).

2. Medicinal: Various parts of *S. swietenioides*, including the leaves, bark, and roots, have been used in traditional medicine. It possesses medicinal properties such as antipyretic (fever-reducing), anti-inflammatory, analgesic (pain-relieving), and antihelmintic (against worms) effects. It has been used to treat conditions like fever, rheumatism, arthritis, skin diseases, gastrointestinal disorders, and respiratory ailments (Manda *et al.*, 2009; Rasal *et al.*, 2009).

3. Timber: The wood of *S. swietenioides* is used for timber purposes. It is valued for its durability and resistance to termites and is used in construction, carpentry, and furniture making (Rasal *et al.*, 2009).

4. Ornamental Purposes: The attractive foliage and fragrant flowers of *S. swietenioides* make it suitable for ornamental purposes. It is sometimes grown as an ornamental tree in gardens and parks for its aesthetic value (Rasal *et al.*, 2009).

CHAPTER 10

Wild Vegetables of the Family Onagraceae

INTRODUCTION

The Onagraceae, commonly referred to as the evening-primrose or willowherb family, comprises around 17 genera and 650 species of flowering plants, including herbs, shrubs, and trees (Shawky *et al.*, 2021). The edible members are a good source of Vitamin A and C, Gamma-Linolenic Acid, minerals, fibers, *etc.* However, some members contain oxalates, and cyanogenic glycosides, which are anti-nutritional compounds (Shawky *et al.*, 2021).

Epilobium angustifolium L.

Botanical name: *Epilobium angustifolium*

Family: Onagraceae

Local name: Fireweed

Common name: Rosebay Willow-Herb, Fireweed

Season: June to September

Parts used: Leaves, flowers, roots

Characteristics:

1. Plant Height and Growth Habit: *E. angustifolium* is a tall perennial herbaceous plant that can reach heights of up to 1.5 to 2 meters (5 to 6.5 feet). It has an erect and branching growth habit (Myerscough, 1980; Broderick, 1990; Buchwald *et al.*, 2006; Wiese *et al.*, 2012).

2. Leaves: The leaves of *E. angustifolium* are narrow and lance-shaped, giving rise to its specific epithet “angustifolium,” which means “narrow-leaved.” The leaves are alternate, simple, and usually have smooth margins. They are typically between 5 to 10 centimeters (2 to 4 inches) long (Myerscough, 1980; Broderick, 1990; Buchwald *et al.*, 2006; Wiese *et al.*, 2012).

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3. Stem: The stems of *E. angustifolium* are erect, slender, and usually reddish or purplish in color. The stems are typically hairy and may have fine hairs or glandular pubescence.

4. Flowers: *E. angustifolium* produces showy, terminal spikes of flowers. The flowers are usually pink to magenta in color, but can also be white or purplish. Each flower has four petals and four sepals. The petals are notched at the tips, giving them a fringed appearance (Myerscough, 1980; Broderick, 1990; Buchwald *et al.*, 2006; Wiese *et al.*, 2012) (Fig. **33.1**).

Fig. (33.1). Inflorescence of *E. angustifolium* (PC: Gaytri Chonde).

5. Inflorescence: The flowers of *E. angustifolium* are arranged in dense, elongated clusters or spikes at the top of the stem. The inflorescence can be quite tall and can contain numerous individual flowers (Myerscough, 1980; Broderick, 1990; Buchwald *et al.*, 2006; Wiese *et al.*, 2012).

6. Fruits: After flowering, *E. angustifolium* produces slender seed capsules that contain numerous small seeds. The capsules split open to release the seeds, which are dispersed by wind (Myerscough, 1980; Broderick, 1990; Buchwald *et al.*, 2006; Wiese *et al.*, 2012).

Distribution:

It is a widespread plant found in various habitats, including open meadows, roadsides, disturbed areas, and burned areas. It is native to northern regions of the Northern Hemisphere, including North America, Europe, and Asia.

Propagation: Seed

Chemical constituents:

Flavonoids- quercetin, kaempferol, and their glycosides, tannins, phenolic acids- gallic acid, ellagic acid, and caffeic acid, phytosterols- beta-sitosterol, essential oils containing linalool, geraniol, and alpha-pinene.

Recipe:

Ingredients: Younger leaves, finely chopped onion, 5-6 garlic cloves, salt, green chilies, curry leaves, Asafoetida, mustard seeds, turmeric, gram dal, *etc*.

Method: Peel the stalks of the leaves and wash the young leaves. Chop them finely. Heat oil in a pan and fry asafoetida, mustard seeds, curry leaves, crushed garlic cloves, and finely chopped onion. When the onion turns slightly yellow, add the chopped vegetables, chili, turmeric powder, soaked dal, and salt to taste. Lightly beat some water, cover the pan, and cook over low flame.

Uses:

1. Medicinal Purposes: *E. angustifolium* has a long history of traditional use in herbal medicine. It is believed to have anti-inflammatory, anti-allergic, anti-atherogenic, anti-microbial, anti-viral, anti-proliferative, and immunomodulatory properties. It has been used in the treatment of various conditions, including gastrointestinal disorders, urinary tract infections, prostate issues, skin irritations, and respiratory ailments (Vitalone *et al.*, 2001; Feldman, 2005; Okuda, 2005; Holderness *et al.*, 2008; Stagos *et al.*, 2012; Vogl *et al.*, 2013; Gollucke *et al.*, 2013; Korkina *et al.*, 2013; Chirumbolo, 2014; Ratz-Lyko *et al.*, 2015).

2. Herbal Tea: The leaves and flowers of *E. angustifolium* can be used to prepare herbal tea. The tea is often enjoyed for its mild flavor and potential health benefits. It is sometimes used as a calming and soothing beverage (Kalle *et al.*, 2020).

3. Culinary: The young shoots and leaves of *E. angustifolium* are edible and can be used as a food source. They can be added to salads, soups, stir-fries, or used as a green vegetable in various culinary preparations (O'Keefe, 2016).

CHAPTER 11

Wild Vegetables of the Family Orchidaceae

INTRODUCTION

The Orchidaceae family, commonly known as the orchid family, is celebrated for its remarkable diversity and beauty. It is one of the largest families in angiosperms with about 850 genera and 20000 species (Gantait *et al.*, 2021). Some members contain carbohydrates, proteins, fiber, and essential minerals such as potassium, calcium, zinc, copper, iron, *etc.* In addition, some members contain antinutritional compounds such as phytates, oxalates, and condensed tannins.

***Nervilia concolor* (Blume) Schltr.**

Botanical name: *Nervilia concolor*

Family: Orchidaceae

Local name: ekpani, duduki

Season: May - September

Parts used: leaves, tubers

Characteristics (Lipińska *et al.*, 2022):

1. Leafless Terrestrial Orchid: *N. concolor* is a leafless orchid species that grows on the ground. Unlike most orchids, it lacks prominent leaves and instead relies on underground structures for nourishment (Fig. **34.1**).

2. Underground Tubers: The plant has fleshy, bulbous underground tubers that serve as storage organs. These tubers are typically rounded or oblong in shape and help the plant survive during periods of dormancy or adverse conditions.

3. Flowering Stem: From the underground tubers, *N. concolor* produces a single flowering stem that rises above the ground. The stem is slender and erect, usually reaching a height of around 10 to 20 centimeters.

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Fig. (34.1). Aerial parts of *N. concolor* (PC: Dnyanesh Kamkar).

4. Inflorescence: At the top of the flowering stem, *N. concolor* produces a solitary flower or occasionally a small cluster of flowers. The flower is relatively small, typically measuring about 1 to 2 centimeters in diameter.

5. Flower Structure: The flowers of *N. concolor* have a unique structure. They consist of three petals and three sepals that are similar in appearance and often fused together, forming a tubular or hood-like structure. The flower color is typically white, occasionally with a hint of pink or lavender.

6. Lip or Labellum: The most distinctive feature of *N. concolor* flowers is the lip or labellum, which is the modified petal that is different in shape and color from other petals. The labellum is usually broader and more elaborate, often displaying intricate patterns, markings, or fringed edges.

Distribution:

Asia- China, Japan, Taiwan, Thailand, Myanmar, Cambodia, Vietnam, Malaysia, Indonesia, and the Philippines, Australia, the Pacific Islands, and Africa.

Propagation: Seed

Chemical constituents:

Nervisone, 3,5,7-trimethoxyflavone, 3,7-dimethoxy-5-hydroxyflavone, 5,7-dihydroxy-30,40-dimethoxyflavone, 5,7-dimethoxy-40-hydroxyflavone, 5,7-dimethoxyflavone, 5-hydroxy-7-methoxyflavone, rhamnetin, tetramethylscutellarein (4',5,6,7-tetramethoxyflavone) (Ganbold *et al.*, 2019).

Recipe:

Ingredients: Leaves, finely chopped onion, 5-5 garlic cloves, salt, green chilies, curry leaves, Asafoetida, mustard seeds, turmeric, gram dal, *etc.*

Method: Wash the leaves and chop them finely. Heat oil in a pan and fry the asafetida, mustard seeds, curry leaves, crushed garlic cloves, and finely chopped onion. When the onion turns slightly yellow, add the chopped vegetables, chili, turmeric powder, soaked dal, and salt to taste. Lightly beat water, cover the pan, and cook over low heat.

Uses:

1. Ornamental Plant: *N. concolor* is valued for its attractive and delicate flowers. It is cultivated and used as an ornamental plant in gardens, parks, and greenhouses, adding beauty and diversity to floral displays (Kumar and Boopathi, 2018).

2. Traditional Medicine: Some species of *Nervilia*, including *N. concolor*, are used in traditional medicine systems. Different parts of the plant, such as tubers or rhizomes, may be used in herbal remedies for various purposes. It is believed to possess medicinal properties and is used in remedies for conditions like cough, asthma, and rheumatism. (Dohnal, 1977; Raju *et al.*, 2011a, Raju *et al.*, 2011b; Kumar and Boopathi, 2018; Anand and Basavaraju, 2020).

CHAPTER 12

Wild Vegetables of the Family Oxalidaceae

INTRODUCTION

The Oxalidaceae (570 species), commonly known as the wood sorrel family, is a small group of flowering plants with typically trifoliate leaves in clover-like arrangement and thickened leaf bases of leaflets. Many members show "sleep movements" *i.e.*, the leaflets get folded together during the night or in response to stress or touch. Some members are rich in Vitamin C, and potassium. The presence of oxalic acid gives a 'sour' taste to the plant (Christenhusz and Byng 2016).

***Oxalis corniculata* L.**

Botanical name: *Oxalis corniculata*

Family: Oxalidaceae

Local name: Aambushi

Vernacular name:

- **Hindi:** Amrul
- **Kannada:** Pullampuruche, Pullampurachi, Pullampuriche Hulihulise, Neerugoli, Chaangeri
- **Manipuri:** Yensil
- **Tamil:** Paliakiri
- **Bengali:** Amrulshak
- **Malayalam:** Poliyarala
- **Nepali:** Charee Amilo
- **Mizo:** Siakthur
- **Sanskrit:** Changeri

Season: Flowering: June-August. Fruiting: September-October

Parts used: Leaves

Characteristics:

1. Habit: It is a low-growing perennial herb with a prostrate or creeping growth habit. The stems are slender and spread along the ground, often forming dense mats (Hall *et al.*, 1996; Mary *et al.*, 2001; Saha 2017).

2. Leaves: The leaves of *O. corniculata* are trifoliate, meaning they consist of three leaflets. Each leaflet is heart-shaped or clover-like, with smooth margins and a prominent central vein. The leaflets are usually green but can have purple or reddish markings (Hall *et al.*, 1996; Mary *et al.*, 2001; Saha 2017).

3. Flowers: The flowers of *O. corniculata* are small, about 1 centimeter in diameter, and have five bright yellow petals. The petals often have red or purple streaks near the base. The flowers are borne on slender stalks, rising above the leaves (Hall *et al.*, 1996; Mary *et al.*, 2001; Saha 2017) (Fig. **35.1**).

Fig. (35.1). *O. corniculata* plant with flower (PC: Apurva Shankar Chonde).

4. Reproduction: *O. corniculata* reproduces both by seeds and by small bulbils that form at the leaf axils. The bulbils can detach from the plant and produce new plants when they come into contact with the ground (Hall *et al.*, 1996; Mary *et al.*, 2001; Saha 2017).

5. Roots: The roots of *O. corniculata* are fibrous and shallow, allowing the plant to spread and colonize various types of soil (Hall *et al.*, 1996; Mary *et al.*, 2001; Saha 2017).

Distribution:

India: Andhra Pradesh, Assam, Bihar, Gujarat, Jammu and Kashmir, Madhya Pradesh, Maharashtra, Manipur, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh; South Europe.

Propagation: Seed

Chemical constituents:

Oxalic acid, flavonoids, anthocyanins, phenolic compounds, *etc.*

Recipe:

Ingredients: Aambushi leaves, Turdal (or green gram, lentils), Danekoot, green chili paste, oil, dal flour, garlic cloves, mustard, asafoetida, turmeric, jaggery, *etc.*

Method: Sauté the garlic in oil. In a cooker, cook the mango and dal together. Knead the mixture and add dal flour. Add vegetables to the mixture. Then, incorporate crushed chili paste, salt, ground nuts, and jaggery. Cook the mixture until done.

Uses:

1. Culinary: The leaves of *O. corniculata* are edible and can be consumed in salads, soups, and stir-fried dishes. The plant has a tart and tangy taste due to its oxalic acid content, which adds a unique flavor to culinary preparations (Badwaik *et al.*, 2011).

2. Traditional Medicine: In traditional herbal medicine systems, *O. corniculata* has been used for various medicinal purposes. It has shown diuretic, antiscorbutic (vitamin C-rich), and antimicrobial properties. It has been used to treat ailments such as coughs, fevers, gastrointestinal issues, and skin conditions (Badwaik *et al.*, 2011; Sharma *et al.*, 2011).

3. Ornamental Plant: *O. corniculata* is often grown as an ornamental plant in gardens or as a ground cover. It is valued for its attractive trifoliate leaves and delicate yellow flowers, which add aesthetic appeal to landscapes (Sarkar *et al.*, 2020).

CHAPTER 13

Wild Vegetables of the Family Phyllanthaceae

INTRODUCTION

The Phyllanthaceae family, abundant in Southeast Asia and warm regions worldwide, includes 2000 species across 59 genera. These plants vary widely, from tiny herbs to towering trees, with some even being climbers. They can be distinguished by having two ovules per ovary chamber and lacking the milky latex sap found in their close relatives, the Euphorbiaceae. Phyllanthaceae members can be a good source of vitamins like C, A, and B complex, along with minerals like calcium, iron, and potassium (Xu and Deng 2017).

***Phyllanthus amarus* Schum. & Thonn.**

Botanical name: *Phyllanthus amarus*

Family: Phyllanthaceae

Local name: Bhuiavla

Vernacular name:

- **Hindi:** Bhuiavla
- **Bengali:** Bhuiamla
- **Malayalam:** Kilanelli
- **Manipuri:** Chakpa heikru
- **Sanskrit:** Bahupatra
- **Kannada:** Kiru Nelli
- **Telugu:** Nela usiri

Season: June to October

Parts used: Leaves and fruits

Characteristics (Ghosh *et al.*, 2022):

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1. Plant Morphology: *P. amarus* is a small, erect annual herb that typically grows up to 30-60 cm in height. It has a slender and branched stem with a green coloration (Fig. **36.1**).

Fig. (36.1). Whole plant of *P. amarus* (PC: Apurva Shankar Chonde).

2. Leaves: The leaves of *P. amarus* are small and alternate in arrangement. They are oblong or elliptical in shape and have a smooth margin. The leaves are light green and possess a glossy texture.

3. Flowers: The flowers of *P. amarus* are small, inconspicuous, and greenish-yellow in color. They are usually unisexual and have a cluster-like arrangement in the leaf axils or at the ends of the branches.

4. Fruits: *P. amarus* produces small, round-shaped fruits that are typically green or yellow in color when ripe. The fruits contain seeds and have a smooth texture.

5. Roots: The roots of *P. amarus* are shallow and fibrous.

Distribution: Asia, India, China, Thailand, Malaysia, Indonesia, Sri Lanka, and the Philippines, Africa- Nigeria, Ghana, South Africa, Kenya, and Tanzania. Australia, America- Brazil, Colombia, Mexico, and the Caribbean, Europe- Spain and Portugal.

Propagation: Seeds

Chemical constituents:

Alkaloids, flavonoids, hydrolysable tannins (ellagitannins), lignans, polyphenols, sterols, and triterpenes (Patel *et al*, 2011).

Recipe:

Ingredients: Younger leaves, finely chopped onion, 5-6 garlic cloves, salt, green chilies, curry leaves, Asafoetida, mustard seeds, turmeric, gram dal, *etc.*

Method: Peel the stalks of the leaves, wash the leaves, and chop them finely. Heat oil in a pan and fry asafoetida, mustard seeds, curry leaves, crushed garlic cloves, and finely chopped onion. When the onion turns slightly yellow, add the chopped vegetables, chili, turmeric powder, soaked dal, and salt to taste. Lightly beat water, cover, and cook in a cooker for 20 minutes.

Uses:

1. Liver Health: *P. amarus* is widely used to support liver health and promote liver detoxification. It is believed to have hepatoprotective properties and may help in managing liver disorders like hepatitis, jaundice, and liver damage caused by toxins (Ogunmoyole *et al.*, 2020; Tiwari, 2021).

2. Kidney Health: *P. amarus* is used to support kidney health and urinary tract function. It is believed to have diuretic properties and may help in treating urinary tract infections, kidney stones, and other kidney-related conditions (Foo *et al.*, 1992; Cartaxo *et al.*, 2010; Ogunmoyole *et al.*, 2020).

3. Digestive Health: It is traditionally used to promote digestive health and alleviate digestive disorders such as indigestion, acidity, and constipation. *P. amarus* is believed to have gastroprotective and anti-inflammatory properties (Mahishi *et al.*, 2005; Shanmugam *et al.*, 2009; Upadhyay *et al.*, 2010).

4. Antiviral and Antimicrobial Activity: *P. amarus* exhibits antiviral and antimicrobial properties and is used to combat viral and bacterial infections. It may be used to support the immune system and help in managing conditions like colds, flu, and respiratory infections (Calixto *et al.*, 1998; Demain *et al.*, 2000; Kassuya *et al.*, 2005; Ramandeep *et al.* 2017).

5. Anti-inflammatory and Antioxidant Properties: It is believed that *P. amarus* possesses anti-inflammatory and antioxidant properties, which may help in reducing inflammation and oxidative stress in the body (Fauré *et al.*, 1990; Demain *et al.*, 2000; Kassuya *et al.*, 2005; Biswas *et al.*, 2020).

CHAPTER 14

Wild Vegetables of the Family Plantaginaceae

INTRODUCTION

The Plantaginaceae family, or plantain family, includes over 1,900 species across about 90 genera. Found worldwide, especially in temperate zones, these plants range from common herbs like plantains and foxgloves to ornamental snapdragons. They lack vertical partitions in leaf hairs, have variable flower structures, and typically spiral or opposite leaves. Some members, like Foxglove, are used in medicine for heart treatments (Hamed *et al.*, 2014).

Bacopa monnieri (L.) Wettst.

Botanical name: *Bacopa monnieri*

Family: Plantaginaceae

Local name: Brahmi

Vernacular name:

- **Assamese:** Brahmi
- **Bengali:** Brahmisaka
- **Gujarati:** Baam, Brahmi, Jalanevari, Kadavi luni
- **Hindi:** Baam, Brahmi, Jalbuti, Jalnim, Nirbrahmi, Safed chamani
- **Kannada:** Brahmi, Jala brahmi, Niru brahmi
- **Konkani:** Brahmi
- **Malayalam:** Brahmi
- **Manipuri:** Brahmi-sak
- **Marathi:** Brahmi, Jalabrahmi, Nir brahmi
- **Oriya:** Brahmi, Prusni parnni
- **Sanskrit:** Brahmi, Tiktalonika
- **Tamil:** Nir-p-pirami, Piramiyam, Taray
- **Telugu:** Sambrani aku

Season: Flowering: May-October

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Parts used: Whole plant, leaves

Characteristics (Khan *et al.*, 2021):

1. Plant Morphology: It is a small, prostrate, or creeping herb that typically grows in moist or wet environments. It has succulent stems with opposite leaves that are sessile (without stalks). The leaves are small, fleshy, and arranged in pairs along the stem. They are oblong or obovate in shape, with rounded or slightly notched tips (Fig. **37.1**).

Fig. (37.1). Flowering twig of *B. monnieri* (PC: Shivshankar Chapule).

2. Flowers: It produces small, white, or bluish-purple flowers that are solitary or arranged in clusters in the leaf axils. The flowers are typically five-petaled and have a tubular shape. They bloom throughout the year in favorable conditions.

3. Fruits: After flowering, the plant develops small, round, and capsule-like fruits. These fruits contain tiny, ovoid-shaped seeds.

Distribution: It has a wide geographical distribution. It is native to the wetlands of India, Nepal, Sri Lanka, China, Taiwan, and Vietnam. However, it has been introduced and cultivated in various other regions around the world.

Propagation: Seeds and stem cuttings

Chemical constituents:

Bacosides, alkaloids- brahmine, herpestine, and nicotine, flavonoids- apigenin, luteolin, and quercetin and sterols- stigmasterol, beta-sitosterol, daucosterol, *etc.*

Recipe:

Ingredients: Crushed peanuts, leaves, mustard, cumin, green or red chilies, turmeric powder, hing, garlic.

Method: Use leaves, mainly the central ones from mature leaves. Wash and chop the leaves. Heat oil, and add a small amount of mustard and cumin seeds. Follow with hing or garlic, depending on your preference, and turmeric. Add green or red chilies. Next, introduce the leaves and crushed peanuts. Season with salt to taste. Cook until tender.

Uses:

1. Cognitive Enhancement and Memory Improvement: It has been traditionally used as a memory-enhancing herb and for its potential cognitive benefits. It may support learning, memory retention, and overall cognitive function (Aguiar and Borowski, 2013).

2. Anxiety and Stress Relief: It has been used traditionally as an adaptogen, helping the body and mind cope with stress and anxiety. It may have an anxiolytic effect, promoting a sense of calm and relaxation (Bhattacharya *et al.*, 2000).

3. Neuroprotection: It possesses neuroprotective properties, which may help protect against oxidative stress and neuronal damage. It may have antioxidant effects and can support the health and function of the nervous system (Sairam *et al.*, 2002).

4. Anti-inflammatory and Antioxidant Effects: It contains compounds with anti-inflammatory and antioxidant properties, which may help reduce inflammation and oxidative stress in the body (Sairam *et al.*, 2002).

5. Anti-Epileptic Properties: It has been used traditionally for its potential anti-epileptic effects. It possesses anticonvulsant properties, although further research is needed to understand its mechanisms of action (Sairam *et al.*, 2002).

CHAPTER 15

Wild Vegetables of the Family Plumbaginaceae

INTRODUCTION

The Plumbaginaceae family, or leadwort family, includes about 650 species across 27 genera. Found worldwide, especially in salty environments like coasts and steppes, these plants are known for their vibrant pink and blue blooms. They feature chalk glands to expel excess salt, perennial herbaceous forms with basal leaves, and five-petaled flowers. While some have medicinal uses, their primary value is ornamental, with thrift (Armeria) being a popular example (Kubitzki 1993).

Plumbago zeylanica L.

Botanical name: *Plumbago zeylanica*

Family: Plumbaginaceae

Local name: Chitrak

Vernacular name:

- **Common name:** Chitrak, Plumbago, White leadwort
- **Hindi:** Chitrak
- **Assamese:** Boga agechita
- **Manipuri:** Telhidak angouba
- **Tamil:** chittiramoolam Karimai
- **Malayalam:** Vellakoduveli
- **Kannada:** Chitramula, Chitramulike, Chitraka, Vyaala, Agni
- **Bengali:** Safaid-sitarak
- **Oriya:** Ogni

Season: December to March

Parts used: Roots, leaves and milky juice

Characteristics:

1. Growth Habit: *P. zeylanica* is a perennial herbaceous plant that can grow as a subshrub or groundcover. It has a sprawling or scrambling growth habit, spreading horizontally along the ground or climbing with the help of nearby support (Kapoor, 1990; Roy *et al.*, 2017).

2. Leaves: The leaves of *P. zeylanica* are simple, alternate, and elongated, with an oblong to lanceolate shape. They are smooth-edged, have a glossy texture, and are arranged spirally along the stem (Kapoor, 1990; Roy *et al.*, 2017).

3. Inflorescence: The flowers of *P. zeylanica* are arranged in loose, elongated racemes that emerge from the leaf axils or at the tips of the branches. The racemes can be several inches long and bear multiple flowers (Kapoor, 1990; Roy *et al.*, 2017).

4. Flowers: The plant produces small, tubular-shaped flowers that are typically white or pale blue in color. The flowers are borne in terminal clusters or spikes known as racemes. Each flower has five petals and a slender tube-like corolla (Kapoor, 1990; Roy *et al.*, 2017) (Fig. **38.1**).

Fig. (38.1). Flowering twig of *P. zeylanica* (PC: Shivshankar Chapule).

5. Fruits: After the flowers are pollinated, *P. zeylanica* forms small, rounded capsules that contain multiple seeds. The capsules are green initially but turn

brown as they mature. When mature, they split open to release the seeds (Kapoor, 1990; Roy *et al.*, 2017).

6. Stem and Branches: The stems of *P. zeylanica* are slender, wiry, and often reddish-brown in color. They may have a slightly zigzag pattern and are typically covered in smooth bark (Kapoor, 1990; Roy *et al.*, 2017).

Distribution: South Asia- India, Sri Lanka, Nepal, Bangladesh, and Myanmar, Southeast Asia- Thailand, Laos, Cambodia, and Vietnam, Africa- South Africa, Tanzania, Kenya, and Uganda.

Propagation: Seeds, cuttings, division of older plants.

Chemical constituents:

Plumbagin, coumarins- scopoletin and umbelliferone, flavonoids- apigenin, luteolin, quercetin, and kaempferol derivatives, alkaloids- plumbaginol and plumbaginone, triterpenoids- ursolic acid and oleanolic acid, essential oils containing- limonene, linalool, terpinen-4-ol, and α-pinene

Recipe:

Ingredients: Moong dal, leaves, mustard, cumin, green or red chilies, turmeric powder, hing, garlic, *etc.*

Method: Cook with soaked moong dal. Use only the leaves and remove tough veins, especially the central ones from mature leaves. Wash and chop the leaves. Heat oil and add a small amount of mustard and cumin seeds, followed by hing (or garlic, depending on preference) and green or red chilies. Add the soaked dal (drain it first) and then the leaves, along with turmeric and salt to taste. Cook until tender.

Uses:

1. Digestive Disorders: *P. zeylanica* is traditionally used for digestive issues such as indigestion, flatulence, and stomachaches. It possesses carminative properties that help alleviate these conditions (Shukla *et al.*, 2021).

2. Respiratory Conditions: The plant is used in traditional medicine to treat respiratory ailments like coughs, bronchitis, and asthma. It showed expectorant properties, helping to loosen phlegm and clear the airways (Sheeja *et al.*, 2010; Aleem, 2020).

CHAPTER 16

Wild Vegetables of the Family Poaceae

INTRODUCTION

The Poaceae family, or grasses, comprises over 10,000 species in roughly 700 genera. Dominating grasslands and meadows worldwide, they are essential to many ecosystems. Recognizable by their hollow, linear leaves with parallel veins and spikelet-clustered flowers, Poaceae lack true petals and rely on wind for pollination. This family is vital for food staples like wheat, rice, and corn, and for livestock forage. While some grasses have medicinal uses, their primary value lies in their nutritional content, offering complex carbohydrates, vitamins, and minerals, though some contain anti-nutrients like phytic acid (Khan *et al.*, 2019).

Bambusa arundinacea (Retz.) Willd.

Botanical name: *Bambusa arundinacea*

Family: Poaceae

Local name: Bamboo, Kalaka, Maanga, Baamboo, Velu

Vernacular name:

- **Assamese:** Kotoha-banh, Jaati Baansh
- **Bengali:** Bansha
- **English:** Spiny bamboo, Thorny bamboo
- **Gujarati:** Baambu, Vans
- **Hindi:** Baans
- **Kannada:** Bidiru, Vamsha
- **Kashmiri:** Bons, Bains
- **Malayalam:** Illi, Mula
- **Sanskrit:** Amupah, Ardrapatrakah, Vamsh
- **Tamil:** Kulay-munkil, Mungil
- **Telugu:** Bongu-veduru, Vamsamu
- **Urdu:** Baans, Buns

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Season: Flowering and Fruiting: Once in a lifetime, often during September – May

Parts used: All parts

Characteristics:

1. Plant Morphology: It is a large, clumping bamboo that can reach heights of 15-30 meters (49-98 feet) or even higher. It has thick, hollow culms (stems) with a diameter of 10-20 centimeters (4-8 inches). The culms are typically green when young, turning yellowish-brown or grayish-brown as they mature (Bole and Pathak, 1988) (Fig. **39.1**).

Fig. (39.1). Stems and leaves of *B. arundinacea* (PC: Apurva Shankar Chonde).

2. Leaf Arrangement: The leaves are alternate and occur in dense clusters at the nodes of the culms. Each leaf is lanceolate or linear in shape and can be 10-30 centimeters (4-12 inches) long and 2-5 centimeters (0.8-2 inches) wide.

3. Inflorescence: It produces inflorescences called panicles, which emerge from the upper portion of the culms. The panicles are large, drooping clusters of spikelets, with each spikelet containing multiple florets.

4. Culm Sheaths: The culm sheaths are leathery and have a dark brown or purplish-brown color. They cover the young culms and gradually fall off as the culms mature.

Distribution:

Native to southern Asia (India, Bangladesh, Sri Lanka and Indochina). It is also naturalized in Seychelles, Central America, the West Indies, Java, Malaysia, Maluku, and the Philippines.

Propagation: Rhizome and culm cuttings.

Chemical constituents:

Phenolic compounds- flavonoids and phenolic acids, lignans, dietary fibers, and essential minerals- calcium, potassium, magnesium, and iron.

Recipe:

Ingredients: Chopped sprouts, onion, soaked lentils or gram, red, chili powder, wet coconut, oil turmeric, salt, mustard, asafoetida, *etc.*

Method: Cook the chopped sprouts in a cooker with three to four whistles. Heat oil in a pan, add mustard seeds, asafoetida and fry. Add chopped onion and fry. Then add cooked sprouts and soaked dal. Then add turmeric powder, red chili powder, and salt and saute well. Steam the vegetables and cook. Then spread the grated wet coconut and make dry vegetables. If you want to make thin vegetables, add a little water to the vegetables. Finely chop the wet coconut and saute the vegetables.

Uses:

1. Nutritional: The shoots are consumed as a source of dietary fiber, vitamins, minerals, and other nutrients. They are valued for their low-calorie content and high nutritional value (Nazreen, 2022).

2. Antioxidant Activity: It has been found to exhibit antioxidant activity, which can help protect the body against oxidative stress and associated diseases. The presence of phenolic compounds and flavonoids contributes to its antioxidant potential **(**Nazreen, 2022).

3. Anti-inflammatory Properties: Studies have indicated that extracts possess anti-inflammatory properties. These properties make it a potential candidate for the development of anti-inflammatory drugs **(**Nazreen, 2022).

CHAPTER 17

Wild Vegetables of the Family Polygonaceae

INTRODUCTION

The Polygonaceae family, or knotweed family, includes around 1,200 species across 48 genera. Found globally, especially in temperate zones, they feature swollen stem nodes, alternate leaves with sheath-like stipules, and clustered small flowers. Buckwheat, a nutritious seed and flour source, is a culinary star of the family. Other edible members include rhubarb and sorrel, with some species having medicinal uses. Overall, the family offers nutritional value with seeds rich in protein and fiber, though some members may contain anti-nutrients (Brandbyge 1993).

Rumex vesicarius L.

Botanical name: *Rumex vesicarius*

Family: Polygonaceae

Local name: Aambat chukka

Vernacular name:

- **Hindi:** Chooka, Chukra, Chukrika, Lolika, Shatavedhi
- **Manipuri:** Torong khongchak
- **Tamil:** Cukkan-kirai
- **Tangkhul:** Hangam ashinba
- **Telugu:** Chukka kura, Pulla-prabba
- **Kannada:** Chukki soppu, Chukra
- **Bengali:** Bun palung
- **Nepali:** Amilo bethe, Bhote palungo
- **Urdu:** Tukhm hummaz
- **Assamese:** Chuka sak
- **Sanskrit:** Amlavetasa, Chukram, Chukrika, Lolika, Shatavedhi

Season: Flowering and fruiting: March to May

Ganesh Chandrakant Nikalje, Apurva Chonde, Sudhakar Srivastava & Penna Suprasanna

Parts used: Leaves

Characteristics (Boulos 1999):

1. Leaves: The leaves of *R. vesicarius* are elongated and lanceolate or oblong in shape. They are typically medium to dark green in color and have prominent parallel veins. The leaves are arranged in a basal rosette, meaning they emerge directly from the base of the plant.

2. Stems: The stems of *R. vesicarius* are slender and erect, growing up to about 60 centimeters in height. The stems may have a reddish or purplish tinge and are usually unbranched or sparsely branched.

3. Flowers: *R. vesicarius* produces small, inconspicuous flowers that are arranged in dense clusters called inflorescences. The flowers are typically greenish to reddish-brown in color and lack showy petals. They are wind-pollinated (Fig. **40.1**).

Fig. (40.1). Inflorescence of *R. vesicarius* (PC: Suresh Shingare).

4. Fruits: After flowering, *R. vesicarius* produces small, three-sided fruits called achenes. These fruits are enclosed within reddish or brownish membranous coverings called perianths or tepals. The perianths are often inflated, giving the plant its common name "Bladder Dock."

Distribution:

Africa- Egypt, Libya, Algeria, Morocco, Sudan, Ethiopia, Greece, Cyprus, Turkey, and Israel, also found outside Africa from the Mediterranean east to India.

Propagation: Seeds

Chemical constituents:

Anthraquinones- chrysophanol, emodin, and physcion, tannins, flavonoids, phenolic acids- caffeic acid and ferulic acid.

Recipe:

Ingredients: Ambat Chuka leaves with stems, peanuts soaked in water for 2 hrs, soaked Chana dal, Chana dal flour, jaggery, salt, garlic, cumene, mustard, turmeric powder, oil, *etc.*

Method: Pressure cook the chukka, peanuts, and chana dal together for one whistle. In a wok, heat oil and add mustard seeds. Once they crackle, add cumin seeds, garlic cloves, and green chilies. Add turmeric powder and the cooked chukka mixture. Season with salt and jaggery, and cook for a few minutes. Adjust the water quantity to achieve the desired consistency, usually similar to a dal, which can be eaten with rice. Once the water starts boiling, gradually add besan while stirring continuously. Cook for a few more minutes. Serve hot with bhakri or plain rice.

Uses:

1. Traditional Medicine: In traditional medicinal practices, various parts of *R. vesicarius*, such as leaves, roots, and seeds, have been used for their potential therapeutic properties. It has been traditionally used for treating digestive disorders, including constipation and stomach ailments. The plant is also used as a diuretic and for its potential laxative effects (Boulos, 1983; Litvinenko *et al.*, 2003; Mostafa *et al.*, 2011; Hafaz *et al.*, 2022).

CHAPTER 18

Wild Vegetables of the Family Portulacaceae

INTRODUCTION

The Portulacaceae, or purslane family, recently underwent a taxonomic revision. Previously, it included around 20 genera and 500 species; now, it comprises only 1 genus, *Portulaca*, with roughly 115 species. These plants are recognized by their fleshy, often rosette-clustered leaves and showy flowers with five petals. They are rich in vitamins A and C, omega-3 fatty acids, fiber, and minerals. However, some species may contain anti-nutrients like lectins and tannins (Xu and Deng 2017).

***Portulaca oleracea* L.**

Botanical name: *Portulaca oleracea*

Family: Portulacaceae

Local name: Chiu, Ghol

Vernacular name:

- **Assamese**: Hah thegia
- **Bengali**: Nunia Sag
- **English**: Indian parselane
- **Gujarati**: Ghol
- **Hindi**: Lunia
- **Malayalam**: Cheriyagolicheera
- **Kannada**: Doodagooni Soopu
- **Sanskrit**: Brihalloni
- **Tamil**: Karpakantakkirai

Season: All season

Parts used: Leaves

Ganesh Chandrakant Nikalje, Apurva Chonde, Sudhakar Srivastava & Penna Suprasanna

Characteristics:

1. Growth Habit: *P. oleracea* is a low-growing, succulent annual plant. It has a prostrate or spreading growth habit, with stems that radiate from a central point or grow along the ground (Purslane, 1995; Chowdhary *et al.*, 2013).

2. Leaves: The leaves of *P. oleracea* are fleshy, smooth, and alternate in arrangement. They are spoon-shaped or obovate and vary in size, ranging from small to medium-sized. The leaves are typically shiny and may have a reddish or green color, depending on the cultivar and environmental conditions (Purslane, 1995; Chowdhary *et al.*, 2013) (Fig. **41.1**).

Fig. (41.1). Vegetative twig of *P. oleracea* (PC: Apurva Shankar Chonde).

3. Stems: The stems of *P. oleracea* are thick, smooth, and reddish or greenish in color. They are succulent and often form a dense mat-like structure close to the ground (Purslane, 1995; Chowdhary *et al.*, 2013).

4. Flowers: *P. oleracea* produces small, showy flowers that bloom at the tips of the stems. The flowers have five petals and come in a range of colors, including yellow, orange, pink, and white. Each flower is typically about 1 centimeter in diameter (Purslane, 1995; Chowdhary *et al.*, 2013).

5. Reproductive Structures: After flowering, *P. oleracea* develops small, capsule-like fruits that contain numerous tiny black seeds. The fruits are located at the base of the flower petals and eventually split open to release the seeds.

Distribution:

Europe- Greece, Italy, Spain, Portugal, United Kingdom, France, Germany, and Eastern European countries. Asia- India, China, Japan, Korea, and various Southeast Asian countries, Americas- United States, Mexico, Canada, Brazil, Argentina, Chile, and Colombia, Africa- Egypt, Morocco, South Africa, Kenya, Nigeria, and Tanzania, Australia and Oceania- New Zealand, Fiji, Papua New Guinea, and parts of Polynesia.

Propagation: Seeds and stem cuttings.

Chemical constituents:

Omega-3 fatty Acids- alpha-linolenic acid (ALA), Flavonoids- quercetin, kaempferol, and rutin, phenolic compounds- coumarins, caffeic acid, and ferulic acid, Betalains, Vitamins- vitamin C, vitamin A, vitamin E, Minerals- magnesium, calcium, potassium, iron, and polysaccharides.

Recipe:

Ingredients: Younger leaves, finely chopped onion, 5-6 garlic cloves, salt, green chilies, curry leaves, Asafoetida, mustard seeds, turmeric, gram dal, *etc.*

Method: Peel the stems of the leaves, wash the purslane leaves, and chop them finely. Heat oil in a pan and fry asafoetida, mustard seeds, curry leaves, crushed garlic cloves, and finely chopped onion. When the onion turns slightly yellow, add the chopped vegetables, chili, turmeric powder, soaked dal, and salt to taste. Lightly beat water, cover, and cook over low flame.

Uses:

1. Culinary: *P. oleracea* is consumed as a leafy vegetable in various cuisines around the world. The tender leaves and stems are used in salads, stir-fries, soups, and stews. It has a slightly tangy and lemony flavor that adds a refreshing taste to dishes (Rahimi *et al.*, 2019).

2. Nutritional Value: *P. oleracea* is highly nutritious and is rich in essential nutrients. It is a good source of vitamins A, C, and E, as well as minerals such as magnesium, calcium, potassium, and iron. It also contains omega-3 fatty acids, which are beneficial for heart health (Malek *et al.*, 2004; Zhou *et al.*, 2015).

3. Medicinal: *P. oleracea* has been used in traditional medicine for various health conditions. It is expected to have several medicinal properties, including:

CHAPTER 19

Wild Vegetables of the Family Rubiaceae

INTRODUCTION

The Rubiaceae family, or coffee family, includes over 13000 species in about 630 genera, mainly found in the tropics. They are recognizable by their simple, opposite leaves with stipules at the base and symmetrical flowers. Economically important members include coffee and madder, with additional medicinal uses and ornamental species. While offering a range of vitamins and beneficial compounds, some members may contain antinutrients (Xu and Chang 2017).

Meyna laxiflora Robyns

Botanical name: *Meyna laxiflora*

Family: Rubiaceae

Local name: Alu, aliv

Vernacular name:

- **Common name:** Muyna
- **Hindi:** Muyna, Pundrika
- **Manipuri:** Heibi
- **Marathi:** Huloo, Alu
- **Tamil:** Manakkarai
- **Telugu:** Visikilamu, Chegagadda
- **Kannada:** Chegugadde, Achura mullu, Mullakare, Gobergally
- **Oriya:** Gurbeli
- **Konkani:** Helu
- **Sanskrit:** Madan, Pindituka
- **Mizo:** Mawntawrawkawk

Season: June to September

Parts used: Fruits, leaves.

Characteristics (Rymbai *et al.*, 2022):

1. Habitat: *M. laxiflora* is commonly found in tropical and subtropical forests, displaying a particular affinity for open areas or edges. This adaptable plant species demonstrates tolerance to a diverse range of soil types and light conditions.

2. Habit: Exhibiting the characteristics of a small tree or large shrub, *M. laxiflora* typically attains a height ranging from 3 to 6 meters. Notably, it is armed with straight, paired spines measuring 1.5-2 cm in length.

3. Leaves: The leaves of *M. laxiflora* are arranged either oppositely or in whorls of three. They take on an elliptic-oblong to ovate-lanceolate shape, measuring 3.5-15 x 1.2-10 cm. Both surfaces of the leaves are glossy and devoid of hair. The base of the leaf is either round or acute, while the apex is acuminate. Prominent midribs and fine lateral veins contribute to the leaf's overall appearance. Stipules, which are triangular and interpetiolar, are also present.

4. Flowers: The flowers of *M. laxiflora* are small and greenish-white, arranged in cymes on leafless nodes. Both the calyx and corolla exhibit 4-5 lobes each. The corolla is short and tubular, with stamens inserted at the mouth. The ovary is superior and 2-celled.

5. Fruits: The fruits of *M. laxiflora* are nearly globose fleshy drupes. When ripe, they appear smooth and take on a yellow hue, measuring about 1-2 cm in diameter. Each fruit contains 4-5 pyrenes, with each pyrene housing a single seed (Fig. **42.1**).

Fig. (42.1). Fruits of *M. laxiflora* (PC: Apurva Shankar Chonde).

Distribution:

Widespread in India, Nepal, Myanmar, and northern Thailand.

Propagation: Seed

Chemical constituents:

Carbohydrates, starch, proteins, tannins, saponins and alkaloids, flavonoids, steroids, proteins and amino acids (Janarthanan *et al.*, 2018).

Recipe:

Ingredients: Fruits, finely chopped onion, 5-6 garlic cloves, salt, green chilies, and curry leaves, Asafoetida, grated coconut, mustard seeds, turmeric, *etc.*

Method: Chop the fruits. Heat oil in the pan and fry asafoetida, mustard seed, curry leaves, crushed garlic cloves, and finely chopped onion. When the onion turns slightly yellow, add the chopped vegetables, chili, turmeric powder, and salt to taste; lightly beat water and cover, and cook over low flame. Once the vegetables are cooked, add wet coconut on top.

CHAPTER 20

Wild Vegetables of the Family Sapindaceae

INTRODUCTION

The Sapindaceae family, or soapberry family, includes over 1900 species across 144 genera, primarily in tropical and subtropical regions. These plants, ranging from trees to vines, are identified by their compound leaves and typically unsymmetrical flowers. The family includes both sweet fruits like lychee and rambutan and sources of maple syrup. Some species have medicinal uses, but soapberries contain saponins, which can be irritating. While offering vitamins and minerals in some fruits, some members may also contain anti-nutrients (Buerki *et al.*, 2021).

Cardiospermum halicacabum L.

Botanical name: *Cardiospermum halicacabum*

Family: Sapindaceae

Local name: Kapalphodi

Vernacular name:

- **Assamese:** Kapaal phuta lata
- **Hindi:** Kanphuta, Kapalphodi
- **Kannada:** Agniballi, Bekkina budde gida, Bekkina toddina balli, Chitaki hambu, Erumballi, Jotishmati, Kanakaaya, Minchuballi, Kangunge, Kangonge, Buddakaakarateege
- **Konkani:** Kanphuti, Kapala phodi
- **Malayalam:** Jyotishmati, Karuttakunni, Paluruvam, Uzhinja
- **Manipuri:** Poklaobi
- **Nepali:** Jyotishmati, Kapaal phodi, Kesh lahara
- **Odia:** Jyotishmati, Phutu phutuka
- **Sanskrit:** Karnasphota, Sphutavalkali

- **Tamil**: Korravan, Mutakkorran
- **Telugu**: Buddakakara, Jyotishmati

Season: Flowering and Fruiting: June-November.

Parts used: Fruits, leaves and seeds

Characteristics:

1. Vine-like plant: *C. halicacabum* is a climbing or trailing plant that grows as a vine. It can reach lengths of several meters, with the stem twisting around nearby support structures (Fig. **43.1**).

Fig. (43.1). Vine of *C. halicacabum* (PC: Sumaiya Siddiqui).

2. Leaves: The leaves are compound, meaning they are composed of multiple leaflets. Each leaf typically consists of three leaflets, arranged in an alternate pattern along the stem. The leaflets are ovate or lanceolate in shape, with serrated margins (Duke *et al.*, 1985; Senthilkumar *et al.*, 2013).

3. Flowers: The flowers are small and white or pale yellow in color. They are arranged in loose clusters or racemes. Each flower has five petals and a prominent

central column (Duke *et al.*, 1985; Senthilkumar *et al.*, 2013).

4. Fruits: The characteristic feature of *C. halicacabum* is its unique fruit, which is a small, inflated capsule resembling a balloon. The fruit is initially green but turns brown as it matures. When mature, the fruit dries up and splits open, revealing three black seeds with a white, heart-shaped mark on one side. This heart-shaped mark gives the plant its common name, "cardio" meaning heart, and "spermum" referring to the seeds (Senthilkumar *et al.*, 2013).

Distribution:

India: Assam, Bihar, Gujarat, Jammu & Kashmir, Maharashtra, Manipur, Kerala, Odisha, Punjab, Rajasthan, Tamil Nadu; South America.

Propagation: Seed

Chemical constituents:

Flavones, aglycones, triterpenoids, glycosides, carbohydrates, fatty acids, and volatile esters (Rao *et al.*, 2006). β-sitosterol, stigmasterol, flavones alkaloids, steroids, terpenoids, saponins, sugars, essential oil, resin, and tannin (Shree *et al.*, 2019).

Recipe:

Ingredients: Leaves, garlic, onion, gram flour, oil, chili powder, and salt.

Method: Wash and chop the leaves, then heat oil in a pan and fry them. Add crushed garlic cloves, followed by chopped vegetables, red chilies, and salt. Allow them to steam well. When the vegetables are halfway cooked, gradually sprinkle the dal flour and stir the vegetables continuously. Stirring evenly will help loosen the vegetables. Cook the vegetables on low flame.

Uses:

1. Skin conditions: The leaves and extracts of *C. halicacabum* are used in traditional medicine to alleviate skin conditions such as eczema, itching, and rashes. The plant possesses anti-inflammatory and antipruritic properties that may help soothe and relieve skin irritation (Sadique *et al.*, 1987).

2. Joint pain and inflammation: It is also used for its potential analgesic and anti-inflammatory properties. It is believed to help reduce joint pain, swelling, and inflammation associated with conditions like arthritis and rheumatism. The leaf of this plant mixed with castor oil is administered internally to treat rheumatism and

CHAPTER 21

Wild Vegetables of the Family Smilacaceae

INTRODUCTION

The Smilacaceae family, or greenbrier family, includes around 320 species in the two main genera, *Smilax* and *Heterosmilax*. Mostly found in tropical and temperate regions, these climbing vines are recognized by their prickly stems and tendrils near the leaves. Though not widely used in cooking, some Smilax species have historical medicinal uses, notably sarsaparilla root (Conran 1998).

Smilax zeylanica L.

Botanical name: *Smilax zeylanica*

Family: Smilacaceae

Local name: Ghotvel

Vernacular name:

- **Assamese:** Kumarika
- **Bengali:** Hosti-karna lota
- **Malayalam:** Arikanni, Kareelanchi
- **Mishing:** Yorit

Season: Flower, Fruit: April-February

Parts used: Tuber, stem, root, and leaves

Characteristics (Kamble and Lobo, 2022):

1. Habit: *S. zeylanica* is a woody climber or vine that can grow up to several meters in length. It typically has a twining or trailing growth habit, using tendrils to attach itself to other plants or structures for support (Fig. **44.1**).

2. Leaves: The leaves of *S. zeylanica* are simple, alternate, and have a heart-shaped or ovate shape. They are usually dark green and glossy, with prominent veins. The leaf margins may be smooth or slightly toothed (Fig. **44.1**).

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Fig. (44.1). Whole plants of *S. zeylanica* (PC: Madhura).

3. Stem: The stem of *S. zeylanica* is green and often has thorns or prickles along its length. It can be quite flexible and capable of winding around other plants or objects.

4. Flowers: *S. zeylanica* produces small, inconspicuous flowers that are typically greenish-yellow in color. The flowers are unisexual, meaning separate male and female flowers are borne on the same plant. They are arranged in clusters or umbels.

5. Fruits: After flowering, *S. zeylanica* develops small berries that turn from green to black when ripe. Each berry usually contains one or a few seeds.

Distribution:

India; Jawa; Malaya; Myanmar; Nepal; Solomon Is.; Sri Lanka

Propagation: Seeds.

Chemical constituents:

Steroidal saponins- smilasaponin, smilagenin, sarsasapogenin, and diosgenin, flavonoids- quercetin, kaempferol, and isorhamnetin, stilbenes- resveratrol, tannins, alkaloids, smilamine, smilacine, and smilacacidine (Madhavan *et al.*, 2010; Murali *et al.*, 2011; Rajesh *et al.*, 2014).

Recipe:

Ingredients: Younger stem, finely chopped onion, 5-6 garlic cloves, salt, green chilies, curry leaves, Asafoetida, mustard seeds, turmeric, gram dal, *etc.*

Method: Wash the curry leaves and chop them finely. Heat oil in a pan and fry asafoetida, mustard seeds, curry leaves, crushed garlic cloves, and finely chopped onions. Once the onions turn slightly yellow, add the chopped vegetables, chili, turmeric powder, soaked dal, and salt to taste. Lightly beat some water, cover the pan, and cook over low heat.

Uses:

1. Ayurvedic Medicine: In traditional Ayurvedic medicine, *S. zeylanica* has been used for its purported medicinal properties. It has shown diuretic, anti-inflammatory, and blood-purifying effects. It is sometimes used to support kidney health and as a remedy for skin disorders (Kumar *et al.*, 2005).

2. Culinary Uses: The tender shoots and young leaves of *S. zeylanica* are consumed as a vegetable in some cuisines. They are often cooked and used in stir-fries, soups, or curries. The plant has a slightly bitter and tangy taste (Kumar *et al.*, 2005).

3. Antioxidant and Anti-inflammatory Activity: *S. zeylanica* contains flavonoids and other compounds that have antioxidant and anti-inflammatory properties. These properties may contribute to its traditional use in promoting overall well-being (Sarvalingam *et al.*, 2016).

4. Traditional Remedies: In traditional practices, *S. zeylanica* has been used to alleviate conditions such as rheumatism, arthritis, and urinary tract infections (Jiang *et al.*, 2003; Jeyaprakash *et al.*, 2011; Shyma *et al.*, 2012; Breitbach *et al.*, 2013).

CHAPTER 22

Wild Vegetables of the Family Solanaceae

INTRODUCTION

The Solanaceae family, or nightshade family, includes over 2,000 species across 100 genera, ranging from herbs and shrubs to towering trees found worldwide. They are recognized by their star-shaped flowers with five petals and sepals, and alternate leaves. This family offers a mix of toxic and edible plants, including deadly nightshade, potatoes, tomatoes, and eggplants. While some have medicinal uses, caution is advised due to varying toxicity. Nutritionally, they provide vitamins and antioxidants, but some also contain harmful anti-nutrients (Chidambaram *et al.*, 2022).

***Solanum nigrum* L.**

Botanical name: *Solanum nigrum*

Family: Solanaceae

Local name: Black Nightshade, Kamoni

Vernacular name:

- **Sanskrit:** Dhvansamaci
- **Bengali:** Gudakamai
- **English:** Garden night shade
- **Hindi:** Makoya, Kakamachi, Kali makoy
- **Kannada:** Ganikesopu
- **Malayalam:** Manatakkali
- **Marathi:** Kamoni
- **Punjabi:** Mako, Peelak, Mamoli
- **Urdu:** Mako

Season: December to March

Parts used: All parts

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Characteristics:

1. Habit: *S. nigrum* is an annual or perennial herbaceous plant. It can grow upright or have a sprawling or prostrate growth habit, depending on the conditions (Dilip *et al.*, 2012).

2. Leaves: The leaves of *S. nigrum* are alternate and simple. They are typically ovate to lanceolate in shape, with serrated or wavy margins. The leaves are green and can have a smooth or slightly hairy surface (Dilip *et al.*, 2012).

3. Flowers: *S. nigrum* produces small, star-shaped flowers that are usually white, although they can also be pale yellow or purple. The flowers are borne in clusters or umbels and have five petals (Dilip *et al.*, 2012).

4. Fruits: After flowering, *S. nigrum* develops small berries that turn from green to black when ripe. The berries are round or slightly elongated and contain numerous small seeds (Dilip *et al.*, 2012) (Fig. **45.1**).

Fig. (45.1). Fruits of *S. nigrum* (PC: Apurva Shankar Chonde).

5. Stem: The stem of *S. nigrum* is usually green and can be slightly hairy or have sparse prickles. It can reach heights of up to one meter, depending on the growing conditions (Dilip *et al.*, 2012).

Distribution:

Europe, Asia- India, China, Japan, Thailand, Malaysia, Indonesia, and the Philippines, Africa- Nigeria, South Africa, Ethiopia, Kenya, Tanzania, and Egypt, Americas- North America, including the United States and Canada, as well as in Central and South America, Australia and Oceania- Australia, New Zealand, Fiji, and Papua New Guinea.

Propagation: Seed

Chemical constituents:

α and β-solamagrine, apigenin, caffeic acid, catechin, epicatechin, flavonoids, gallic acid, Gentisic acid, Kaempferol, Luteolin, m-coumaric acid, naringenin, protocatechuic acid, rutin, solanine, solamargine, solasonine, solasodine, solanidine, solasodinsolanidine, steroidal saponins and glycoprotein (Hoang *et al.*, 2014)

Recipe:

Ingredients: Kamoni, mustard seeds, cumin seeds, green chilies, salt, red chili powder, turmeric powder, coriander powder, coriander, *etc.*

Method: Heat oil in a pan on the stove. Keep the flame low. Once the oil is hot, add mustard seeds, cumin seeds, and green chilies. Fry them for a few seconds. Now add Kamoni and fry for 2 minutes. After frying the Kamoni, add salt, red chili powder, turmeric powder, and coriander powder. Fry the spices for 1 minute. Cover the pan and cook the tomatoes on medium heat, stirring occasionally. Once the Kamoni is cooked, add sugar and cook for an additional 2 minutes. Turn off the gas. Transfer the Kamoni sabji to a bowl. Garnish it with fresh coriander.

Uses:

1. Traditional Medicine: In traditional medicine systems, various parts of *S. nigrum*, including the leaves, berries, and roots, have been used for their potential medicinal properties. It is believed to possess anti-inflammatory, analgesic, diuretic, and antioxidant properties. It has been used to treat conditions such as fever, digestive disorders, skin problems, respiratory ailments, and urinary tract infections (Leporatti *et al.*, 2009; Jain *et al.*, 2011; Wang *et al.*, 2013).

2. Culinary: In certain cultures, *S. nigrum* is used as a culinary ingredient. The young leaves, shoots, and fruits are cooked and consumed as a vegetable in dishes such as stir-fries, curries, and soups. However, it is important to note that some varieties of *S. nigrum* may contain toxic compounds, particularly in unripe fruits

CHAPTER 23

Wild Vegetables of the Family Typhaceae

INTRODUCTION

The Typhaceae family, or cattail family, includes around 51 species in one or two genera (*Typha* and *Sparganium*). These wetland plants are recognized by their tall, emergent forms with long, strap-like leaves and dense flower spikes. Despite limited variety, Typhaceae plants have various uses. Some cultures use cattails in food preparations, and their dense pollen has been used as tinder. Medicinally, they have been used for wound healing, though research is limited. Nutritionally, they offer some carbohydrates, but their primary value lies in their ecological role in wetlands (Kubitzki 1998).

Typha latifolia L.

Botanical name: *Typha latifolia*

Family: Typhaceae

Local name: Cattail

- **Common name:** Broadleaf Reedmace, Broadleaf cattail, Bulrush, Common bulrush, Common cattail, Cat-o'-nine-tails, Great reedmace, Cooper's reed
- **Kashmiri:** Zab, Peit

Season: June- July

Parts used: All parts

Characteristics (Pojar *et al.*, 1994):

1. Habitat: *T. latifolia* is commonly found in wetland habitats, such as marshes, swamps, and the edges of lakes, ponds, and streams. It thrives in areas with freshwater or brackish water.

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2. Growth Habit: *T. latifolia* is a perennial herbaceous plant that grows in dense clumps or colonies. It typically reaches a height of 3 to 9 feet (1 to 3 meters). The plant forms large stands of tall, erect stems.

3. Leaves: The leaves of *T. latifolia* are long and narrow, resembling strap-like blades. They are flat, smooth, and have parallel veins. The leaves arise from the base of the plant and grow in a tufted arrangement.

4. Flowers: The flowers of *T. latifolia* are arranged in dense cylindrical spikes, known as "catkins." The female catkins are located at the top of the spike and are brownish or dark in color. The male catkins are located below the female catkins and are yellowish in color. The female flowers are small and densely packed, while the male flowers are elongated and feathery (Fig. **46.1**).

Fig. (46.1). Inflorescence of *T. latifolia* (PC: Apurva Shankar Chonde).

5. Inflorescence: The inflorescence of *T. latifolia* consists of separate male and female catkins. The female catkins are cylindrical and compact, while the male catkins are elongated and feathery.

6. Seeds: After pollination, the female flowers develop into small seeds enclosed in a fluffy, cotton-like material. These seeds are easily dispersed by wind or water.

Distribution:

North America- United States, Canada, and Mexico. Europe, Asia, China, Japan, India, Russia, Africa, and Australia.

Propagation: Seed, young shoots

Chemical constituents:

Phenolic Compounds- tannins, flavonoids, and phenolic acids, fatty acids- linoleic acid, palmitic acid, and oleic acid, proteins and amino acids, carbohydrates- starches and sugars, Minerals- potassium, calcium, magnesium, and trace elements such as iron and manganese.

Recipe:

Ingredients: Cattail hearts tender white bottom portions, white wine, vinegar, salt, bay leaf, lemon zest, oil, garlic, fresh thyme.

Method: Sauté the garlic in the oil, stirring occasionally, until it becomes aromatic and turns slightly tan in color. Be careful not to let the garlic burn. Add the shallot and continue cooking for 2 more minutes. Pour in the wine, cattail hearts, bay leaf, lemon, thyme, and salt. Cook the mixture covered for about 10 minutes, or until the cattails become tender. To prevent excessive evaporation and keep the pan moist, cover it with a piece of parchment paper. Finally, add the vinegar and taste the mixture for salt, adjusting as needed. Transfer the relish to a container with a tight-fitting lid and store it for future use. This relish can be kept for at least a month, if not longer.

Uses:

1. Food Source: The young shoots, tender stems, and rhizomes of *T. latifolia* can be consumed as a source of food. They are rich in starch and can be boiled, roasted, or ground into flour for making bread, porridge, or other food products (Pandey and Verma, 2018).

2. Medicinal Purposes: Various parts of *T. latifolia* have been used in traditional medicine. The plant has been employed for its diuretic, anti-inflammatory, and analgesic properties. It has been used to treat conditions such as urinary tract infections, dysuria, and kidney stones, and as a general detoxifying agent (Sesin *et al.*, 2021).

3. Craft and Construction Material: The leaves and stems of *T. latifolia* have been traditionally used for making handicrafts, such as baskets, mats, and hats. The

CHAPTER 24

Wild Vegetables of the Family Verbinaceae

INTRODUCTION

The Verbenaceae family, or Verbena family, includes over 1200 species in around 34 genera. Primarily tropical, these aromatic plants range from herbs and shrubs to trees. They feature opposite or whorled leaves and small flowers with four or five petals in spikes, clusters, or racemes. Popular for ornamental and historical medicinal uses, the family is best known for lemon verbena, which adds a citrusy touch to dishes (Atkins 2004).

Clerodendrum serratum (L.) Moon.

Botanical name: *Clerodendrum serratum*

Family: Verbenaceae

Local name: Bharangi

Vernacular name:

- **Hindi:** Bharangi
- **Sanskrit:** Bharangi
- **English:** Bharangi

Season: August to October

Parts used: Roots and Leaves

Characteristics:

1. Habit: *C. serratum* is a perennial shrub or vine that can grow up to 2-3 meters in height. It has a woody stem with branches.

2. Leaves: The leaves of *C. serratum* are opposite, simple, and elliptic to lanceolate in shape. They have serrated margins and are approximately 5-15 cm in length. The leaves are dark green and glossy in appearance.

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3. Flowers: The flowers of *C. serratum* are tubular and arranged in terminal clusters called cymes. They have a distinct blue or violet color with a white throat. The corolla tube is about 2 cm long and curved, while the four petals are spreading (Fig. **47.1**).

Fig. (47.1). Inflorescence of *C. serratum* (PC: Apurva Shankar Chonde).

4. Fruits: After flowering, *C. serratum* produces small, rounded fruits that are about 6-8 mm in diameter. The fruits are initially green and turn black when mature.

Distribution:

The plant is distributed over scrub forests throughout the tropical and sub-tropical parts up to 1500 m, particularly in Bengal, Odisha and peninsular India.

Propagation: Stem cuttings of semi-hardwood.

Chemical constituents:

Some of the major constituents present in the plant include D-mannitol, hispidulin, cleroflavone, apigenin, scutellarein, serratagenic acid, acteoside, verbascoside, oleanolic acid, clerodermic acid, γ-sitosterol, β-sitosterol, cholestanol, clerosterol, campesterol, and 24-ethyl cholesterol. Additionally, it

contains compounds like 7-β-coumaroyl-oxyugandoside and 7-βcinnamoy--oxyugandoside.

Recipe:

Ingredients: Younger leaves, finely chopped onion, 5-6 garlic cloves, salt, green chilies, curry leaves, Asafoetida, grated coconut, mustard seeds, turmeric, Jaggery, gram dal, *etc.*

Method: First, peel the stalks of the leaves and wash a single Judy leaves. Chop the leaves finely. Heat oil in a pan and fry asafoetida, mustard seeds, curry leaves, crushed garlic cloves, and finely chopped onion. Once the onion turns slightly yellow, add the chopped vegetables, chili, turmeric powder, soaked dal, jaggery, and salt to taste. Lightly beat water and cover the pan. Cook the mixture over low heat until the vegetables are tender. Once cooked, garnish with freshly grated wet coconut.

Uses:

1. Respiratory Disorders: In traditional medicine, *C. serratum* is used for the treatment of respiratory disorders such as cough, asthma, and bronchitis. It is believed to have expectorant and bronchodilatory properties (Jagruti *et al.*, 2014).

2. Anti-inflammatory and Analgesic Activity: *C. serratum* has shown potential anti-inflammatory and analgesic effects in experimental studies. It is used to alleviate pain and inflammation associated with various conditions (Narayanan *et al.*, 1999).

3. Anti-diabetic Properties: The leaves and roots of *C. serratum* have been traditionally used to manage diabetes. It is believed to have hypoglycemic activity and may help regulate blood sugar levels (Chae *et al.*, 2006).

4. *C. serratum* is utilized in the treatment of serious diseases such as syphilis, typhoid, cancer, jaundice, hypertension, asthma, and inflammatory and infectious disorders (Jagruti *et al.*, 2014).

5. The isolated flavonoids, such as hispidulin and cleroflavone, demonstrate significant activities including antioxidant, antimicrobial, anti-asthmatic, anti-tumor, and CNS-binding properties (Shi *et al.*, 1993; Rajlakshmi *et al.*, 2003, Chae *et al.*, 2006; Vincent *et al.*, 2012).

6. The root of *C. serratum* holds a significant value as one of the key components of Brahata panchamool, a traditional formulation, and is in high demand (Chae *et al.*, 2006).

CHAPTER 25

Wild Vegetables of the Family Vitaceae

INTRODUCTION

The Vitaceae family, or grape family, includes over 750 species across 14 genera, primarily in tropical and warm temperate regions. These climbing plants are identified by swollen leaf nodes and tendrils. Tiny flowers clustered opposite the leaves yield the family's most famous product grapes. Enjoyed fresh, dried, or juiced, grapes are a global culinary staple. While some Vitaceae species have medicinal uses, caution is advised as some contain toxins. Nutritionally, grapes are rich in vitamins and antioxidants, while other family members have limited nutritional value (Wen 2007).

***Leea indica* (Burm.f.) Merr.**

Botanical name: *Leea indica*

Family: Vitaceae

Local name: Dinda

Vernacular name:

- **Common name:** Bandicoot Berry
- **Hindi:** Kukur jihwa
- **Manipuri:** Koknal
- **Marathi:** Karkani
- **Tamil:** Nalava, Ottannalam
- **Malayalam:** Nakku
- **Telugu:** Amkador
- **Kannada:** Andilu, Tannunuka, Gadapatri
- **Bengali:** Kurkur
- **Assamese:** Ahina
- **Sanskrit:** Chatri
- **Mizo:** Kawlkar

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Season: Flowering and fruiting: March-August

Parts used: Leaves, roots, stem bark, inflorescence, and flowers.

Characteristics (Balkrishna *et al.*, 2023):

1. Growth Habit: *L. indica* is a medium-sized shrub that can grow up to 2-3 meters in height. It has a spreading and bushy growth habit with multiple branches.

2. Leaves: The leaves of *L. indica* are compound, alternate, and large in size. Each leaf is composed of 5-7 leaflets arranged in a palmate pattern. The leaflets are ovate or lanceolate in shape, with serrated or toothed margins. The upper surface of the leaves is usually dark green, while the lower surface may have a lighter shade (Fig. **48.1**).

Fig. (48.1). Leaves of *L. indica* (PC: Apurva Shankar Chonde).

3. Flowers: *L. indica* produces small, inconspicuous flowers that are arranged in panicles or clusters at the ends of the branches. The flowers are typically greenish-white to pale yellow in color.

4. Fruits: The fruits of *L. indica* are small berries that turn from green to dark purple or black when ripe. The berries are round or slightly oval in shape and may contain several seeds.

5. Stem and Bark: The stems of *L. indica* are slender and woody, with a brownish or grayish bark. The bark may have a rough texture.

Distribution:

Southeast Asia- Thailand, Myanmar, Laos, Cambodia, Vietnam, Malaysia, Indonesia, and the Philippines, Indian Subcontinent- India, Nepal, Bangladesh, and Sri Lanka, China- Yunnan and Guangxi regions, *etc.*

Propagation: Seed, cuttings, air layering

Chemical constituents:

Alkaloids, flavonoids, gallic acid, glycosides, lupeol, mollic acid, arabinoside, mollic acid, xyloside, quercetin, saponins, steroids, terpenoids, ursolic acid, β-sitosterol (Kekuda *et al.*, 2018).

Recipe:

Ingredients: Younger leaves, finely chopped onion, 5-6 garlic cloves, salt, green chilies, curry leaves, Asafoetida, grated coconut, mustard seeds, turmeric, besan, *etc.*

Method: Wash the leaves and chop them finely. Heat oil in a pan and fry asafoetida, mustard seeds, curry leaves, crushed garlic cloves, and finely chopped onion. When the onion turns slightly yellow, add the chopped vegetables, chili, and turmeric powder. Also, add besan (gram flour) and salt to taste. Lightly beat water and cover the pan. Cook over low flame. Once the vegetables are cooked, add wet coconut on top.

Uses:

1. Medicinal Purposes: In traditional medicine practices, different parts of *L. indica*, such as the leaves, roots, and bark, are used to treat various ailments. It is believed to have properties such as anti-inflammatory, analgesic, antipyretic, and antioxidant effects. It is used for conditions like fever, cough, cold, skin diseases, rheumatism, and digestive disorders (Burkill, 1966; Rahman *et al.*, 2013; Siew *et al.*, 2014; Singh *et al.*, 2019).

2. Culinary: In some regions, the leaves of *L. indica* are used as a culinary ingredient. They are added to dishes like soups, stews, and curries to enhance flavor and provide nutritional value (Rahman *et al.*, 2013).

CHAPTER 26

Wild Vegetables of the Family Zingiberaceae

INTRODUCTION

The Zingiberaceae family, or ginger family, includes over 1,300 species across 50 genera, primarily in tropical and subtropical regions. These aromatic perennial herbs are recognized by their underground rhizomes, which are often the most valuable part. Key features include the absence of latex and the presence of stipules at the base of leaves. Culinary stars like ginger and turmeric dominate, while cardamom and galangal add unique flavors. Medicinally, ginger aids digestion, and turmeric has anti-inflammatory properties. Nutritionally, the family offers vitamins, minerals, and bioactive compounds, though some members may contain anti-nutrients (Larsen *et al.*, 1998).

Curcuma neilgherrensis Wight

Botanical name: *Curcuma neilgherrensis*

Family: Zingiberaceae

Local name: Ranhalad

Vernacular name:

- **Common name:** Nilgiri Turmeric
- **Malayalam:** Koova, Kattumanjal, Vellakkuva
- **Marathi:** Ranhalad

Season: June to October

Parts used: All parts

Characteristics:

1. Plant Height: *C. neilgherrensis* is a relatively tall plant, with mature plants reaching heights of around 1 to 2 feet (30 to 60 centimeters). However, the exact height can vary depending on growing conditions (Shyam *et al.*, 2012).

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2. Rhizomes: *C. neilgherrensis* has thick, fleshy rhizomes that grow underground. The rhizomes are aromatic and contain the bioactive compounds responsible for their medicinal properties (Shyam *et al.*, 2012).

3. Leaves: The plant has long, lance-shaped leaves that arise directly from the ground. The leaves are green, glossy, and have prominent veins. They grow in an alternate arrangement along the stem (Shyam *et al.*, 2012).

4. Inflorescence: *C. neilgherrensis* produces an inflorescence that emerges from the base of the stem. The inflorescence consists of a central spike surrounded by colorful bracts. The bracts can be various shades of pink, purple, or white, and they form an attractive cluster (Shyam *et al.*, 2012).

5. Flowers: The individual flowers of *C. neilgherrensis* are small and tubular. They are typically white or pale yellow in color. The flowers are arranged in dense, cone-like structures on the central spike of the inflorescence (Shyam *et al.*, 2012) (Fig. **49.1**).

Fig. (49.1). Whole plant of *C. neilgherrensis* (PC: Apurva Shankar Chonde).

Distribution:

It is native to the Nilgiri Hills of Southern India. It is primarily found in the states of Tamil Nadu and Kerala.

Propagation: Rhizome

Chemical constituents:

Curcuminoids, essential oils, turmerones, flavonoids, quercetin and kaempferol, phenolic acids and their derivatives, and caffeic acid derivatives.

Recipe:

Ingredients: Young tender leaves, onion, garlic, gram masala, ground onion-coconut paste, oil, salt, masoor, black peas, *etc.*

Method: Heat oil in a pan and add the onions. Fry until they turn a golden-brown color. Add salt, masoor dal or black peas, and garam masala. Once the masoor dal or black peas are cooked, add the onion-coconut paste, water, and tender leaves. Cook the mixture until the leaves become tender.

Uses:

1. Culinary: The rhizomes of *C. neilgherrensis* are used as a culinary spice, similar to other turmeric varieties. It imparts a distinct flavor and vibrant yellow color to various dishes (Chaithra *et al.*, 2013).

2. Medicinal: *C. neilgherrensis* possesses medicinal properties and is used in traditional medicine systems. It is believed to have anti-inflammatory, antioxidant, and antimicrobial properties. It is used to alleviate digestive issues, promote wound healing, chronic hepatitis, anti-arthritis, antiseptic, and menstrual disorders, and support overall health (Gantait *et al.*, 2011).

3. Cosmetics and Skincare: The extract of *C. neilgherrensis* is used in cosmetics and skin care products due to its skin-brightening and anti-aging properties. It is used in creams, lotions, and face masks to improve skin tone and texture (Chaithra *et al.*, 2013).

4. Natural Dye: The vibrant yellow color of *C. neilgherrensis* makes it suitable as a natural dye. It is used to dye fabrics, yarns, and other materials (Chaithra *et al.*, 2013).

5. Ornamental Plant: *C. neilgherrensis* is also cultivated as an ornamental plant for its attractive foliage and flowers. It adds beauty to gardens and landscapes (Chaithra *et al.*, 2013).

CHAPTER 27

Wild Vegetables of the Family Zygophyllaceae

INTRODUCTION

The Zygophyllaceae family, or caltrop family, includes around 240 species in 22 genera, thriving primarily in dry and hot climates, including deserts and saline environments. These plants are characterized by shrubby or herbaceous forms with opposite or spirally arranged leaves, sometimes spiny or fleshy. Their flowers feature four or five separate petals and sepals, typically with eight to ten stamens. While some species have medicinal uses, culinary contributions are limited. Some members contain nutritional compounds such as steroidal saponins, flavonoids, alkaloids, terpenoids, etc. (Sheahan 2007).

Tribulus terrestris L.

Botanical name: *Tribulus terrestris*

Family: Zygophyllaceae

Local name: Gokharu

Vernacular name:

- **Sanskrit:** Gokshur
- **English:** Caltrops
- **Hindi:** Gokharu
- **Gujarathi:** Bethagokharu or Nanagokharu
- **Tamil:** Nerinjil
- **Urdu:** Khar-e-khusak khurd

Season: January to April

Parts used: All parts

Characteristics (Chhatre *et al.*, 2014):

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1. Growth Habit: *T. terrestris* is a low-growing, spreading herbaceous plant. It has a prostrate or decumbent growth habit, meaning it lies flat on the ground or spreads along the surface.

2. Leaves: The leaves of *T. terrestris* are small, opposite, and pinnately compound. Each leaflet is typically elliptical or lanceolate in shape and has a spiny margin. The leaves are arranged in pairs along the stems.

3. Stems: The stems of *T. terrestris* are slender, wiry, and covered with short, stiff hairs. They often branch near the base and can trail along the ground.

4. Flowers: *T. terrestris* produces solitary flowers that are small and typically yellow in color. The flowers have five petals and are radially symmetrical. They have a star-like appearance and are borne on short stalks arising from the leaf axils (Fig. **50.1**).

Fig. (50.1). Flowering twig of *T. terrestris* (PC: Trilok Barge).

5. Fruits: After flowering, *T. terrestris* develops distinctive spiny fruits known as burrs or nutlets. These fruits consist of several hard, woody segments with sharp spines. The spines are adapted for attachment and dispersal, as they can easily stick to clothing or animal fur.

Distribution:

Asia- India, Pakistan, Sri Lanka, Bangladesh, Nepal, Myanmar (Burma), Thailand, Malaysia, Indonesia, China, Japan, and the Middle East. Europe- Greece, Bulgaria, Romania, and Ukraine. Africa- Egypt, Sudan, Ethiopia, Kenya, Tanzania, Uganda, Nigeria, South Africa, and Madagascar. North America- United States, including Arizona, California, and Nevada, Australia, South America- Argentina, Brazil, and Chile.

Propagation: Seeds

Chemical constituents:

Steroidal saponins- protodioscin and dioscin, flavonoids- kaempferol, quercetin, apigenin, and rutin, alkaloids- harmine, harmaline, and harmane, terpenoids- saponins and triterpenes, phenolic compounds- gallic acid and ellagic acid, sterols- beta-sitosterol and stigma-sterol.

Recipe:

Ingredients: Tender leaves, soaked moogdal or turdal, finely chopped onion, cumin, mustard, Asafoetida, chili powder, salt, *etc*.

Recipe: Wash and chop the leaves. Heat oil in a pan and add cumin seeds, mustard seeds, and asafoetida. Fry the lentils (dal) and onions until golden brown. Then, add the chopped vegetables and stir well. Sprinkle chili powder and salt to taste. Next, add some water and cook the vegetables until tender.

Uses:

1. Enhancing Athletic Performance: *T. terrestris* is often used as a dietary supplement by athletes and fitness enthusiasts. It is believed to have potential benefits for increasing strength, stamina, and muscle mass. Some individuals use it to support athletic performance and improve exercise capacity (Kalamegam *et al.*, 2008).

2. Sexual Health and Libido: *T. terrestris* is widely known for its traditional use as an aphrodisiac. It has been used to enhance sexual desire, improve erectile function, and increase overall sexual performance in both men and women. It is a common ingredient in many herbal supplements targeted towards sexual health (Bitzer *et al.*, 2013).

CONCLUSION

Biodiversity is as important to the life on Earth as is the oxygen and water. This fact must be realized and spread to every corner of the society and to all the people. The present book explores the diversity of wild vegetables in India and presents a repertoire of resourceful information on "124 wild vegetables" belonging to 50 different families. The diversity of vegetables on our plate is diminishing with the 'same' vegetable being repeated on a regular basis. The book presents information lucidly on alternate potential vegetables that are available in nature. With a diverse group of vegetables on our plate, greater diversity in tastier food and enriched nutrition can be possible. Most importantly, the diversity brings in nutritional requirements more effectively as compared to the consumption of a few specific vegetables.

Nutritional deficiency, for example of minerals iron (Fe) and zinc (Zn) and vitamins like vitamin A, are common throughout the world. It is partly due to the inadequate quantity of food consumed and partly due to the consumption of very less variety of vegetables and, some specific common vegetables and fruits. The present book demonstrates the rich diversity of several vegetables, the "wild, edible plants" that can be easily adopted and consumed by the people. With the increase in modernization and globalization, there is a rapid disappearance of traditional things including local food and traditional delicacies. There are recipes known for the wild vegetables and this book has attempted to provide information on this culinary angle. The readers of the book shall become aware of the vast diversity of vegetables they can consume and can also gain benefit from known recipes. Obviously, there may be many more ways to consume such vegetables, such as soup, salad, or other delicacies.

Another important point to consider is the increasing ailments and mental and physical disorders in the present era of environmental pollution, contaminated food items, and unhealthy lifestyle. It is worth noting that wild vegetables also possess several medicinal properties and plenty of natural phytochemicals. It is a well-known fact that in earlier times, people used a number of plant-based traditional medicines throughout the world, and that knowledge is vastly respected even today. In fact, the knowledge of traditional medicine has paved the way for several drugs used in the present era. The presented data on wild vegetables also includes their usefulness in terms of medicinal value. The known uses of various wild vegetables for medicinal purposes are included in the book.

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In conclusion, the present book offers the readers a valuable resource on the wild vegetables' diversity of India along with their various uses. The book chapters include scientific to traditional information ranging from classification, chemical composition, and cooking instructions to medicinal applications.

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