



Council of Scientific and Industrial Research-National Institute of Science Communication and Policy Research (CSIR-NIScPR)

अयूर-वाटिका

AYUR-VATIKA

Bringing Herbal Healthcare to your Doorstep



India has a rich tradition of herbal remedies, practiced through Ayurveda and other disciplines. While herbal healthcare backed by the deep-rooted ancient science of Ayurveda had been widely practiced and accepted in India, there are several challenges that hinder its practice today. Firstly, there is the dwindling status of knowledge amongst the new generation about the different herbs and their medicinal properties. Secondly, there is the related hurdle of an adequate mechanism by which awareness can be created amongst the masses in a systematic manner. However, the biggest obstacle is easy accessibility to these herbs, especially in an urban environment. The CSIR-NIScPR 'Ayur Vatika' brings this herbal healthcare to home for the entire family. Sustainable health care through interventions like 'Ayur Vatika' aims to create awareness about medicinal plants amongst the society, especially the young students, researchers, etc.

Students being acquainted with the different medicinal plants housed in CSIR-NIScPR's Ayur-Vatika, on the occasion of Open-Day at CSIR's 81st Foundation Day celebrations 27th September, 2022.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Caryophyllales
Family	: Amaranthaceae
Genus	: <i>Achyranthes</i>
Species	: <i>aspera</i>

***Achyranthes aspera*, चिरचरी/ अपमर्ग**

Prickly chaff flower, (2n=42)

1. Plant taxonomy:

- *Achyranthes aspera* L. (Latjeera) is an erect or procumbent, annual, or perennial herb of about 1- 2 meters in height, often with a woody base.
- Stems are angular, ribbed, simple, or branched from the base, often with tinged purple color, branches terete or quadrangular, striate, pubescent.
- Leaves are thick, 3.8-6.3 × 22.5-4.5 cm, ovate-elliptic or obovate-rounded, finely and softly pubescent on both sides, and entire, petiolate, petiole 6-20 mm long.
- Flowers are greenish white, numerous in axillary or terminal spikes up to 75 cm long.
- Seeds are subcylindrical, truncate at the apex, rounded at the base, and reddish brown in color.

2. Ethnomedicinal uses:

- Traditionally, the plant is used against asthma and cough. It is pungent, anti-phlegmatic, anti-periodic, anti-diuretic, anti-purgative, and laxative, useful in edema, dropsy, piles, boils and eruptions of the skin, etc.
- The crushed plant is boiled in water and is used in curing pneumonia; the ash of the plant is applied externally for ulcers and warts.
- The flowering spikes or seeds, ground and made into a paste with water, are used as external applications for bites of poisonous snakes and reptiles; also helpful against night blindness and cutaneous diseases.
- Inhaling the fume of *Achyranthes aspera* mixed with *Smilax ovalifolia* roots is suggested to improve appetite and to cure various types of gastric disorders. It is useful in treating hemorrhoids. Leaves and seeds are emetic, digestive, hydrophobic, and carminative; they resolve swelling and expel phlegm.
- Leaves when crushed and rubbed on aching back cure strained back. A fresh piece of root is used as a toothbrush.
- Paste of the roots in water is used for treating ophthalmia and opacities of the cornea. Paste of fresh leaves is used for allaying pain from bites of wasps. Infusion of the root is a mild astringent in bowel complaints.

Reference: Srivastav S, Singh P, Mishra G, Jha KK, Khosa RL. *Achyranthes Aspera*-An important medicinal plant: A review. J Nat Prod Plant Resour. 2011; 1(1):1-4.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Asterales
Family	: Asteraceae
Genus	: <i>Ageratum</i>
Species	: <i>conyzoides</i>

***Ageratum conyzoides*, जंगली पुदीना**

Billygoat weed (2n=40)*

1. Plant taxonomy:

- *Ageratum conyzoides* L. is an annual herb.
- This herb has stems and leaves covered by smooth white trichomes, alongside it also harbours leaves with a short petiole.
- The leaf blade has an egg-like circular shape and is 7.5 cm in length that is sharpened up to its terminal.
- The flowers consist of 8 to 15 receptacles in either purple or white color, whereas the fruits are black and small.
- This herb is easily found in rice fields, yards, jungles, roadsides, and riversides, places having surplus sun exposure.

2. Ethnomedicinal uses:

- Used for treating burns, wounds, arthritis, headache, and dyspnea; has anti-microbial properties.
- Has analgesic, anti-pyretic, anti-inflammatory, anti-nociceptive, anti-oxidant, anti-cancer, anti-ulcerogenic, anti-diabetic, anti-cataleptic, hepatoprotective and anti-convulsant properties.
- Its other properties are: radio protective, anti-coccidial, antidote, anti-protozoal, hematopoietic, allopathic bronchodilator, uterine relaxant, anti-helminthic, insecticide anti-*Ehrlichia*, wound healing, gastroprotective, and anti-HIV/AIDS.
- *Ageratum conyzoides* L. contains phytochemical substances such as terpenoids, sterols, flavonoids, chromenes, pyrrolizidine alkaloids, coumarins, pyrrolons, and lignans.
- Analgesic activity has been reported for this herb by using alcoholic extract of a whole part of the plant.
- The ethanolic extract of *Ageratum* can reduce inflammation significantly, which is induced by carrageenan and histamine activities.
- This herb contains anti-microbial components which are useful against oxidase enzyme present in pathogenic bacteria that cause systemic infection leading to deadly effects in animals and humans.

References: Kotta, J. C., Lestari, A. B., Candrasari, D. S., & Hariono, M. (2020). Medicinal effect, in silico bioactivity prediction, and pharmaceutical formulation of *Ageratum conyzoides* L.: a review. *Scientifica*, 2020, 1-12.

*PROTA 2016



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Asparagales
Family	: Xanthorrhoeaceae
Genus	: Aloe
Species	: barbadensis

***Aloe barbadensis*, एलोवेरा**

Aloe vera, (2n=14)

1. Plant taxonomy:

- Aloe is an evergreen perennial succulent, stem-less or short stemmed plant.
- It grows up to a height of 60-100 cm.
- The plant's leaves are characterized by their thick and fleshy texture, with variations in color ranging from green to gray-green, and serrated margins with small white teeth.
- The shape of the leaves are rosette, large amount of pulp is present in the parenchyma of leaves, and the width of the base is 10 cm.
- The flowers of this plant are large, measuring about 90 cm in size, with a yellow tubular corolla that spans up to 2-3 cm, and their color varies from white to yellow, orange, and near-red.
- Fruits of Aloe are triangular capsules.
- The dry capsules of this plant contain seeds, which are characterized by their wings.
- Roots form an arbuscular type of mycorrhiza.

2. Ethnomedicinal uses:

- Aloe vera contains 75 potentially active constituents including vitamins, enzymes, minerals, sugars, lignin, saponins, salicylic acids, and amino acids.
- The latex of Aloe vera contains anthraquinones that act as a potent laxative, increasing intestinal water content, stimulating mucus secretion, and promoting intestinal peristalsis.
- Application of Aloe vera gel gloves has been shown to improve skin integrity, reduce appearance of fine wrinkles, and decrease erythema. It also exhibits anti-acne properties.
- Aloe vera gel has been reported to have a protective effect against radiation-induced damage to the skin.
- Aloe vera gel not only increases the collagen content of wounds but also alters collagen composition to contain more type III collagen and promotes collagen cross-linking.

Reference: Surjushe, A., Vasani, R., & Saple, D. G. (2008). Aloe vera: a short review. Indian journal of dermatology, 53(4), 163.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Zingiberales
Family	: Zingiberaceae
Genus	: <i>Alpinia</i>
Species	: <i>zerumbet</i>

***Alpinia zerumbet*, नरकचुर**

Shell ginger or Pink porcelain lily, (2n=52)*

1. Plant taxonomy:

- *A. zerumbet* is a perennial herb with rhizomes that have a typical ginger smell when cut.
- The plant has two-ranked thin leaves, approximately 25-35 cm long, and can also be used as an indoor plant with a smaller height.
- The flowers of the plant are pink and resemble seashells, hence the common names shell ginger, shell flower, pink porcelain lily, variegated ginger, and butterfly ginger.
- The fruit is ball-shaped with yellow stripes, changing to red at maturity.
- The flower forms a funnel-shape or shell-like structure with a milky white perianth and a fragrant pink apex.
- The fruit is a spindle-shaped capsule with longitudinal striations, including three locules that each contain >10 seeds. These polyhedral seeds are covered by white membranous coats, having a typically aromatic odor and slightly pungent flavor.

2. Ethnomedicinal uses:

- The antioxidant property of *A. zerumbet* is mainly due to polyphenols, with the methanol extract of *A. zerumbet* leaves exhibiting the strongest anti-oxidant activity.
- *A. zerumbet* flowers have been reported to possess anti-bacterial activity.
- In *A. zerumbet*, the flower and rhizome have stronger allelopathic activity against microbes than the leaf.
- Dihydro-5, 6-dehydrokawain (DDK) and its synthesized derivative, dimethyl phosphorothionate, isolated from the leaves of *A. zerumbet* at 100 µg/mL, showed the strongest anti-fungal activity among the allelochemicals tested.

References: Bhadra, S., & Bandyopadhyay, M. (2016). New chromosome number counts and karyotype analyses in three important genera of Zingiberaceae. *The Nucleus*, 59(1), 35-40.

Xuan, T., Quan, N., Quan, N., Rayee, R., Khanh, T., Tran, H., & Trung, N. (2019). Allelopathic plants: 26. *Alpinia zerumbet* (Pers.) BL Burt & RM Sm. (Zingiberaceae). *Allelopathy J*, 48, 1-13.)



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Mangoliophyta
Class	: Magnoliopsida
Order	: Caryophyllales
Family	: Amaranthaceae
Genus	: <i>Amaranthus</i>
Species	: <i>spinosus</i> L.

***Amaranthus spinosus*, कटीली चौलाई**

Spiny Amaranth, (2n=34)

1. Plant taxonomy:

- *A. spinosus* Linn is an erect, monoecious perennial plant that can grow up to 1 meter in height.
- The stem of the plant is terete or obtusely angular, green, or reddish-brown, glabrous or slightly pubescent, and branched.
- The leaves are alternate, simple, without stipules, and have a petiole that is approximately as long as the leaf blade (16-17). The blade shape is ovate-lanceolate to rhomboid, acute and often slightly decurrent at the base, obtuse, rounded, or slightly retuse, and often short-mucronate at the apex.
- The inflorescence of the plant is terminal and axillary, spike-like, erect, slender, and elongated, with remote axillary spikes at the base, lower clusters, pistillate, and upper staminate. The bracteoles are longer than or if the tepal, scarious, ovate, and weakly spiny-tipped. Staminate flowers have 3 oblong-ovate, obtuse, or acute, or shortly spiny-tipped tepals, while pistillate flowers have 5 white-membranous, acute, or shortly spiny-tailed tepals measuring 1-1.5 mm long.
- The fruit of the plant is ovoid-shaped, mostly dehiscent, compressed, ellipsoidal, acute or obtuse, with a short-inflated neck below the style base, circumscissile a little below the middle, or indehiscent.
- The seed of the plant is about 1mm in diameter, shiny, compressed, and black or brownish-black in color.

2. Ethnomedicinal uses:

- The juice of *A. spinosus* is used to prevent swelling around the stomach, while the leaves are boiled and consumed for 2–3 days to cure jaundice. The plant is used for its anti-inflammatory, anti-malarial, anti-oxidant activity, anti-bacterial, anti-microbial, anti-diuretic, anti-viral, and hepatic disorder properties.
- *A. spinosus* is used to treat internal bleeding, diarrhea, and excessive menstruation.
- The plant is known for its febrifuge, anti-pyretic, laxative, and diuretic properties. Besides its culinary value and usage as an appetizer, it is a popular medicinal plant used to treat digestive problems, bronchitis, nausea, flatulence, anorexia, blood diseases, burning sensation, leucorrhoea, leprosy, and piles, hallucination, healing of wounds, and rheumatism. It is known for its biliousness, galactagogue, haematinic, and stomachic effects.

Reference: Hatware, K., Annapurna, A., & Sravani, K. (2014). Evaluation of in vitro antioxidant activity & effect of aqueous extract of *Annona squamosa* leaves on indomethacin induced peptic ulcer in rats. *Int J Res Pharm Chem*, 4(3), 636-642.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Mangoliophyta
Class	: Magnoliopsida
Order	: Lamiales
Family	: Acanthaceae
Genus	: <i>Andrographis</i>
Species	: <i>paniculata</i>

***Andrographis paniculata*, कालमेघ**

Creat, (2n=50)

1. Plant taxonomy:

- *A. paniculata* is an erect and branched annual flowering herb that can grow up to a height of 30-110 cm.
- Its stem is dark green, quadrangular with longitudinal furrows and wings at angles of the young parts, and slightly enlarged at the nodes, measuring 2-6 mm in diameter and 30–110 cm in length.
- The leaves are lanceolate, opposite, decussate, glabrous, dark green, pinnately veined throughout the entire margin and have a very short petiole that measures 2–12 cm in length and 1–3 cm in width.
- The flowers, which appear between December and April, are small and consist of a narrow tube, five linear perianth calyx, and a 6 mm long white corolla with rose-purple spots on the petals.
- The fruits are small, odorless, linear-oblong, 2-celled capsules, 1–2 cm long, 2–5 mm wide, acute at both ends, and compressed.

2. Ethnomedicinal uses:

- Therapeutically active extracts can be prepared or metabolites can be isolated from different parts of *A. paniculata*, including aerial parts, leaves, roots, whole plants, or callus.
- *A. paniculata* contains various therapeutically active secondary metabolites such as lactones, diterpenes, flavonoids, quinic acid, xanthenes, iridoids, and other compounds.
- Andrographolide, neoandrographolide, and isoandrographolide are the most abundant bioactive compounds that can be isolated from any part of *A. paniculata*, including aerial parts, leaves, whole plants, and even roots.
- *A. paniculata* has been traditionally used to treat several infectious diseases caused by bacteria, and its aqueous extract has shown significant anti-bacterial activity.
- Methanolic extracts of *A. paniculata* have been shown to have anti-viral effects.
- *A. paniculata* crude extracts have been used in folk medicines for centuries to treat fungal infections.
- *A. paniculata* and its bioactive compounds have been extensively tested and found to exhibit anti-parasitic activity against various parasites such as *Ascaris lumbricoides*, *Plasmodium falciparum*, *P. berghei*, *Trypanosoma cruzi*, among others.

Reference: Hossain, S et al (2021). *Andrographis paniculata* (burm. F.) wall. Ex nees: an updated review of phytochemistry, antimicrobial pharmacology, and clinical safety and efficacy. Life, 11(4), 348.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Ranunculales
Family	: Papaveraceae
Genus	: Argemone
Species	: mexicana

Argemone mexicana, सत्यानाशी

Mexican prickly poppy, (2n=28)

1. Plant taxonomy:

- *A. mexicana* is an annual herb that grows erect up to 100 to 150 cm with a slightly branched tap root.
- Its stem is branched and extremely prickly, and has an oblong shape when viewed in cross-section. When cut, it exudes a yellow juice.
- The leaves of *A. mexicana* are alternate, without leaf stalks (petioles), and serrate, with spiny margins. They are typically blotched with green and white veins, and stand out against the bluish-green upper leaf surface.
- The flowers of *A. mexicana* are complete, meaning they contain both functional male and female reproductive structures, including stamens, carpels, and ovaries. They are typically terminal, or located at the tips of the branches, and are solitary and scentless. The petals are bright yellow or rarely, pale lemon yellow, and are typically 2.5-5 cm in diameter. The stamens number between 30-50 and have yellow filaments. The pistil is 4-6 carpellate.
- The fruit is an oblong or egg-shaped (ovoid) capsule that is prickly.

2. Ethnomedicinal uses:

- *A. mexicana* possesses medicinal properties in every part, small or large, for treating various health conditions.
- The stem of *A. mexicana* is used for treating a variety of health conditions, including leprosy, malaria, jaundice, rheumatism, pain, inflammation, skin diseases, fever, piles, warts, dysentery, tumors, and worm infestations.
- The latex of *A. mexicana* is used for treating boils, scorpion stings, dermatitis, disinfecting wounds, dropsy, jaundice, skin diseases, leprosy, blisters, indolent ulcers, conjunctivitis, inflammations, burning sensation, malarial fever, and rheumatic pain.
- The leaves are used for treating diabetes, fever, ulcers, maintaining blood circulation and cholesterol levels, anti-venom, anti-inflammatory effects, stomach aches, muscular pain, cough, and wounds.
- The root is used for treating chronic skin diseases, leprosy, inflammations, antihelmintic, anti-bacterial, cytotoxicity, wound healing, anti-oxidant, anti-fungal agent, expectorant, antidote to snake poison and hepato-biliary problems.

Reference: Pathak R, Goel A, and Tripathi SC. Medicinal property and ethnopharmacological activities of Argemone mexicana: an overview. Annals of the Romanian Society for Cell Biology. 2021 Mar 22:1615-41.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Liliopsida
Order	: Asparagales
Family	: Asparagaceae
Genus	: <i>Asparagus</i>
Species	: <i>racemosus</i>

Asparagus racemosus, सतावरी

Shatavari, (2n=20)

1. Plant taxonomy:

- *A. racemosus* is a woody climber that can grow up to 1-2 meters in height. Its stem is often spinescent, terete, and green, while the rootstock has fascicled tuberous roots.
- The leaves of *Asparagus* are like pine needles, small, and uniform. The flowers are white and have small spikes, cladodes from the axils of scale leaves in clusters of 2-6.
- *A. racemosus* has racemes that are 2.5-5 cm long, slender, axillary, solitary or clustered. The flowers are bisexual, 5-6 mm across, with triangular bracts and a pedicel of approximately 1 mm long. The perianth-lobes are six in number, white, oblong, acute, and measure about 3 x 0.5 mm.
- The stamens are six in number and adnate to the perianth lobes, with subulate filaments. The ovary is 2-3 mm long, globose to slightly 3-gonous, 3-celled, with two ovules per cell, and three recurved stigmas.
- Berries are 4-6 mm in diameter, globose, and purple when ripe. The seeds are 2-5 in number, globose, and measure approximately 2 mm across.

2. Ethnomedicinal uses:

- The root extract of *A. racemosus* is used in Ayurveda to increase milk secretion during lactation. A combination of *A. racemosus* with other herbal substances in the form of Ricalax tablets has been shown to increase milk production in females with deficient milk secretion.
- *Asparagus* can heal duodenal ulcers without inhibiting acid secretion, possibly due to its cytoprotective action like that of prostaglandin or binding of bile salts.
- The methanolic extract of *A. racemosus* roots exhibits significant anti-bacterial efficacy against several strains of bacteria including *Escherichia coli*, *Shigella dysenteriae*, *Vibrio cholerae*, *Salmonella typhi*, and *Staphylococcus aureus*.
- An aqueous solution of the crude alcoholic extract of *A. racemosus* roots was found to inhibit the growth of *Entamoeba histolytica*, a protozoan parasite.
- The ethanolic extract of *A. racemosus* has been evaluated for its inhibitory potential against lithiasis (stone formation).
- *A. racemosus* is used in the Indian traditional medicine system for improving the general state of health and treating stress-related immune disorders. In Ayurveda, *A. racemosus* is known as the queen of herbs due to its strong rejuvenating, nurturing, and stabilizing effects.

Reference: Alok, S., Jain, S. K., Verma, A., Kumar, M., Mahor, A., & Sabharwal, M. (2013). Plant profile, phytochemistry and pharmacology of *Asparagus racemosus* (Shatavari): A review. *Asian Pacific journal of tropical disease*, 3(3), 242-251.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Sapindales
Family	: Meliaceae
Genus	: <i>Azadirachta</i>
Species	: <i>indica</i>

***Azadirachta indica*, नीम**

Neem Plant, (2n=28)

1. Plant taxonomy:

- The tree is fast-growing and can reach a height of 20-23 meters with a straight trunk that has a diameter of 4-5 feet. The bark is grayish-brown and vertically striated, and it exudes red and sticky sap.
- Leaves imparipinnate, alternate, estipulate; rachis 14-30 cm long, slender, swollen at base, glabrous, leaflets 7-15, opposite or subopposite, estipellate; petiolule 3-5 mm long, slender, glabrous; lamina 4.5-7.5 x 1.5-2.5 cm, lanceolate or falcate, base oblique, apex acuminate, margin serrate, glabrous, coriaceous; lateral nerves 10-18 pairs, pinnate, slender, prominent, intercostale reticulate and faint.
- Flowers bisexual, 8 mm across, white, in axillary panicles; bracteoles scaly; pedicel 5 mm; sepals 5, connate at base, ovate, margin ciliate; petals 5, free, white, oblong-obovate, pubescent, spreading, imbricate; staminal tube 4 mm long, glabrous, apically 10 lobed; lobes truncate; anthers 10, slightly exserted, apiculate, opposite to lobes, sessile; ovary superior, globose, 3-celled; ovules 2 per cell; style slender, elongate; stigma terete, 3-lobed.
- The fruit is a drupe, oblong-ovoid, greenish-yellow, measuring 1.5 x 0.5 cm, with one seed surrounded by sweet pulp.

2. Ethnomedicinal uses:

- The most important active constituent found in neem (*Azadirachta indica*) is azadirachtin, and other active constituents include nimbolin, nimbin, nimbidin, nimbidol, sodium nimbin, gedunin, salannin, and quercetin.
- Neem plant parts exhibit an anti-microbial role by inhibiting the growth of microbes and potentially breaking down cell walls. Azadirachtin, a complex tetranor triterpenoid limonoid present in neem seeds, is the key constituent responsible for both antifeedant and toxic effects in insects.
- Neem plays the role of free radical scavenger, due to its rich source of anti-oxidants.
- The ingredients present in neem exhibit an active role in the management of cancer by regulating cell signaling pathways.
- Neem also plays role as an anti-inflammatory agent by regulating pro-inflammatory enzyme activities.

Reference: Alzohairy, M. A. (2016). Therapeutics role of *Azadirachta indica* (Neem) and their active constituents in diseases prevention and treatment. Evidence-Based Complementary and Alternative Medicine, 2016.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Lamiales
Family	: Plantaginaceae
Genus	: <i>Bacopa</i>
Species	: <i>monnieri</i>

***Bacopa monnieri*, ब्राह्मी**

Water Hyssop or Brahmi, (2n=64))

1. Plant taxonomy:

- *Bacopa monnieri* (L.) Pennell is a small, succulent, prostrate creeping annual herb found throughout India in wetlands and damp places. The stem is thin, green or purplish-green, about 1-2 mm thick, 10-30 cm long, soft; nodes and internodes are prominent and glabrous, and the taste is slightly bitter.
- Leaves are simple, opposite decussate, green, sessile, 0.6-2.5 cm long, 3-8 mm broad, obovate-oblong; and taste slightly bitter.
- Flowers are small, axillary, and solitary, pedicels 6-30 mm long, bracteoles shorter than pedicels.
- Fruits are capsules upto 5 mm long, ovoid, and glabrous.
- Root is thin, wiry, small, branched and creamish-yellow in color.

2. Ethnomedicinal uses:

- The active compounds in *Bacopa*, known as bacosides, are currently being evaluated for their effects on the brain and human health.
- *B. monnieri* may be useful in promoting liver function following toxin damage.
- *B. monnieri* has been shown to increase the utilization of nitric oxide in the body and appears to encourage vascular muscle function. These are two benefits that positively influence normal blood pressure.
- *B. monnieri* provides protection against oxidative damage, which is a type of cellular damage caused by free radicals. The herb has also been shown to enhance anti-oxidant activity in other organs, such as the kidneys.
- *B. monnieri* works to improve cognitive function in people of all ages. It improves the way the mind works for better memory and clearer thinking. This herb also helps to improve mood, and people who take the dried herb or extract report feeling an instant lift in their mood and a new way in which their brain functions.

Reference: Tanveer, A., Khan, M., & Shah, F. (2010). In Vitro micropropagation of Brahmi-Bacopa monnieri (L.) Pennell-A step for conservation. Nano Biotechnica Universale, 1(2), 139-150.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Lamiales
Family	: Acanthaceae
Genus	: <i>Barleria</i>
Species	: <i>lupulina</i>

***Barleria lupulina*, पियाबांस**

Hop-headed Barleria, (2n=40)

1. Plant taxonomy:

- This plant is a shrub with dark green leaves, red-brown branches, and flowers that bloom in upright spikes.
- It is an erect shrub with smooth, hairless stems and leaves that are narrowly obovate and spine-tipped. The leaves are 3.5-9 cm long and 0.8-1.2 cm wide.
- The flowers of this shrub occur in a terminal spike with overlapping bracts that are broadly ovate and 15 mm long. The bracts are green with a purple upper half.
- Each flower of this shrub consists of a 3 cm long corolla tube that opens into 1 cm long petals. The stamen filaments are longer at 2 cm, while the shorter stamens are fertile. The style is smooth and 3 cm long.

2. Ethnomedicinal uses:

- The plant has various folk medicinal uses, including being used as a tonic and for the treatment of dermatitis, sexual disorders, cough, fever, body aches, eczema, itches, and scabies.
- The plant contains several iridoid glucosides that may have therapeutic importance. Pharmacological studies have shown that the plant has anti-microbial, anti-oxidant, anti-viral, immunomodulatory, and anti-diabetic, wound healing, anti-inflammatory, anti-amoebic, anti-ulcer, and neuropharmacological properties.
- The presence of bioactive principles combined with the traditional uses and reported pharmacological properties of the plant suggest that it can be considered an important source for lead compounds and new drugs.
- Leaf juice from the plant is given to stop bleeding, while leaf paste is used to alleviate pain and to treat acne.
- The flowers, leaves, stems, roots, and seed extracts of plants belonging to this genus are rich in bioactive compounds and have exhibited significant medicinal potential for the treatment of various ailments and infections..

Reference: Journal of Medicinal Plants Studies 2018; 6(6): 231-234



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Lamiales
Family	: Lamiaceae
Genus	: <i>Ocimum</i>
Species	: <i>basilicum</i>

Ocimum basilicum, बबुई तुलसी

Basil or Sweet Basil, (2n=72)

1. Plant taxonomy:

- *Ocimum basilicum* is a small, erect, and herbaceous perennial plant.
- Stem is erect, quadrangular, and profusely branched.
- The leaves are ovate-lanceolate, acuminate, toothed or entire, glabrous on both surfaces, arranged in decussate manner and light green in color.
- The terminal peduncle is unbranched and height of the plant range from 52.34-74.34 cm.
- The inflorescence bears 6 to 10 small flowers arranged in whorls at the nodes, with a purplish-white color. Both the calyx and corolla are bell-shaped and lobed. There are two pairs of stamens, and the style is forked.
- The fruit consists of four nutlets enclosed within mature calyx which are ellipsoid and black in color.

2. Ethnomedicinal uses:

- It is used mostly to treat anxiety, colds, fevers, migraines, diabetes, menstrual cramps, sinusitis, cardiovascular diseases, nerve pain, insect bites, and headaches. Additionally, it exhibits anti-convulsant, anti-hyperlipidemic, anti-inflammatory, anti-oxidant, anti-platelet, anti-thrombotic, anti-microbial, insecticidal, immunomodulatory, and cytotoxic effects.
- *Ocimum basilicum* contains several active anti-oxidant compounds, and the oil obtained from this plant also exhibits anti-oxidant properties.
- *Ocimum basilicum* is a rich source of flavor compounds and volatile oils containing a variety of compounds that possess anti-microbial activity.
- The hydro-distillation of the aqueous leaf extract of *Ocimum basilicum* exhibits strong anti-convulsant activity mainly due to the presence of eugenol.
- The solvent extraction of methanolic extract from the aerial parts exhibits potent anti-inflammatory activity.

References: Kumar, N., Sharma, K. R., Sood, M., & Chandel, S. (2019). Morphological characterization of Bhabri Tulsi (*Ocimum basilicum* L.). *IJCS*, 7(6), 2295-2298.

Purushothaman B, PrasannaSrinivasan R, Suganthi P, Ranganathan B, Gimbin J, Shanmugam K. A comprehensive review on *Ocimum basilicum*. *J. Nat. Remedies*. 2018; 18(3):71-85.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Apiales
Family	: Araliaceae
Genus	: <i>Polyscias</i>
Species	: <i>fruticosa</i>

Polyscias fruticosa, मिंग अरैलिआ

Black aralia or Ming aralia, (2n=22, 24)

1. Plant taxonomy:

- *Polyscias fruticosa* is an erect, evergreen shrub that can grow up to a height of 11/2 – 21/2 meters. The stems of this plant are hollow in the internodes and solid at the nodes.
- The leaves of *Polyscias fruticosa* are spiny, bi-serrate, compound, mostly lanceolate acuminate, sharply, and irregularly spinulose toothed, often lobed, and approximately 5-10 cm in length. The terminal segments are usually larger than the others and more often lobed.
- *Polyscias fruticosa* produces umbellate inflorescences with epigynous flowers. The flowers have five petals and a broad base that alternates with the petals.
- The fruits are compressed, ovoid and about 4 cm in length.
- The seeds of *Polyscias fruticosa* are also compressed.

2. Ethnomedicinal uses:

- *Polyscias fruticosa* is believed to have various health benefits such as enhancing the body's immune system, improving male fertility, preventing fatigue, nourishing the body, increasing appetite, promoting better sleep, increasing work capacity, aiding in weight gain, and acting as an antidote.
- Leaves have been used to help with the treatment of neurodegenerative diseases such as Parkinson's and Alzheimer's diseases. This is because they can improve symptoms such as tremors, loss of balance, insomnia, memory impairment, nervous tension, and nervous breakdown.
- Pharmacological studies have shown that *P. fruticosa* has various effects on the body such as anti-depressant, anti-stress, memory-improvement, anti-oxidant, hypoglycemic, hepatoprotective, hypolipidemic, anti-fungal, and anti-bacterial effects.
- *P. fruticosa* is reported to contain various beneficial compounds such as saponins, alkaloids, glycosides, polyphenols, flavonoids, tannins, vitamins (C, B1, B2, and B6), and amino acids.

Reference: Ly HT, Nguyen TT, Le VM, Lam BT, Mai TT, Dang TP. Therapeutic Potential of *Polyscias fruticosa* (L.) Harms Leaf Extract for Parkinson's disease Treatment by *Drosophila melanogaster* Model. *Oxidative Medicine and Cellular Longevity*. 2022 May 19; 2



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Gentianales
Family	: Apocynaceae
Genus	: <i>Calotropis</i>
Species	: <i>gigantea</i>

Calotropis gigantea, मदार / आक

Madar or Aak, (2n=22)

1. Plant taxonomy:

- Shrub or a small tree up to 2.5 m (max.6 m) height.
- Root is simple, branched, woody at base and covered with a fissured; corky bark; branches somewhat succulent and densely white tomentose; early glabrescent. All parts of the plant exude white latex when cut or broken.
- Leaves are opposite-decussate, simple, sub sessile, exstipulate; blade-oblong ovate to broadly ovate, 5-30X2.5-15.5 cm, apex abruptly and shortly acuminate to apiculate, base cordate, margins entire, succulent, white tomentose when young, later glabrescent and glucose.
- The plant produces an inflorescence that is dense, multi-flowered, umbellate, pedicled cymes, which arise from the nodes and appear either axillary or terminal.
- Flowers are bracteate, complete, bisexual, actinomorphic, pentamerous, hypogynous, pedicellate; pedicel 1-3 cm long; sepals 5, polysepalous, 5 lobed, shortly united at the base, glabrescent, quincuncial aestivation; petals five, gamopetalous, five lobed, twisted aestivation. Stamens five, gynandrous, anther dithecal, coherent. Bicarpellary, apocarpous, styles are united at their apex, peltate stigma with five lateral stigmatic surfaces.
- Fruit is simple, fleshy, inflated, and subglobose to obliquely ovoid follicles up to 10 cm or more in diameter donate to the stigma forming a gynostegium.

2. Ethnomedicinal uses:

- Flavonoids, triterpenoids, alkaloids, steroids, glycosides, saponins, terpenes, enzymes, alcohol, resin, fatty acids and esters of calotropeols, volatile long-chain fatty acids, glycosides and proteases have been isolated from the various parts of the plant *Calotropis gigantea*.
- *C. gigantea* is used to treat asthma, colds, coughs, diarrhea, fever, indigestion, leprosy, leukoderma, and rheumatism in Ayurveda.
- The whole plant extract increases wound contraction and decreases re-epithelialization time.
- It also is used to treat toothache, elephantiasis and vomiting.

Reference: Kumar PS, Suresh E, Kalavathy S. Review on a potential herb *Calotropis gigantea* (L.) R. Br. Scholars Academic Journal of Pharmacy. 2013; 2(2):135-43.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Rosales
Family	: Cannabinaceae
Genus	: <i>Cannabis</i>
Species	: <i>sativa</i>

***Cannabis sativa*, भांग**

Indian hemp, (2n=20)

1. Plant taxonomy:

- Indian hemp (*Cannabis sativa* L.) is an annual herb belonging to the family Cannabinaceae. It has erected stems that grow from 3 to 10 feet or more in height, are very slightly branched, and have grayish-green hairs.
- The leaves are palmate, with five to seven leaflets, numerous, on long thin petioles with acute stipules at the base, linear-lanceolate, tapering at both ends and the margins sharply serrate.
- The leaves of the plant are used as a drug to reduce excitement, irritation, and pain as well as to induce deep sleep.
- The flowers are unisexual, the male in axillary and terminal panicles, apetalous, with five yellowish petals and five poricidal stamens; the female flowers germinate in the axils and terminally with one single-ovulate ovary.
- The fruit is small, smooth, light brownish-gray in color, and filled by the seed.

2. Ethnomedicinal uses:

- The chemical constituents of *Cannabis* belong to almost all the chemical classes including hydrocarbons, sugars, terpenes, steroids, flavonoids, nitrogenous compounds, and amino acids.
- Hemp is primarily used in medicine for easing pain and providing a soothing influence in nervous disorders.
- *Cannabis* leaves alone have the potential to cure more than 25 diseases.
- It is effective in treating gout, neuralgia, rheumatism, insanity, insomnia, and other similar disorders. Its action is mainly on the higher nerve centers.
- The medicinal properties of *Cannabis* include being an intoxicant, analgesic, narcotic, stomachic, anti-spasmodic, anodyne and sedative.
- Fresh *Cannabis* leaves can be used to treat hemorrhoids, the fruit can be applied externally to treat skin diseases, a decoction of the seeds can be used to treat migraine and cancer, and unripe fruit can be used to induce sleep.

Reference: Kuddus, M., Ginawi, I. A., & Al-Hazimi, A. (2013). *Cannabis sativa*: An ancient wild edible plant of India. Emirates Journal of Food and Agriculture, 736-745.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Brassicales
Family	: Capparaceae
Genus	: Capparis
Species	: spinosa

Capparis spinosa, हैसा

Caper bush, (2n=24, 38)

1. Plant taxonomy:

- The shrub can grow up to 2 meters tall, and its branches are usually prostrate. The twigs are terete, unarmed, and initially covered with a short, floccose, grayish indumentum that eventually disappears.
- Leaves alternate, simple, glaucous; petiole 0.7-1.3 cm long; the blade is subfleshy when fresh and herbaceous when dried, ovate-elliptical to suborbicular, 1.5-7.5 cm × 2.5-5.5 cm, base truncate to rounded, apex rounded to obtuse, veins in 5-7 pairs.
- Flowers solitary, axillary, showy and fragrant; pedicel 4.5-7.5 cm long, glabrescent; buds conical when young, later bulging, ultimately 2-2.5 cm in diameter; calyx strongly zygomorphic, glabrescent, with sepals in 2 pairs, the posterior sepal deeply saccate, 2.5-4 cm × 1.7-2.5 cm, the other sepals subovate, 2-2.5 cm × 0.7-2.5 cm; petals 4, in 2 pairs, white, turning red-purplish, upper pair rhombic, 3-5.5 cm × 2-4 cm, with a thick fleshy base, lower pair 3-3.5 cm × 1.5-3.3 cm; stamens 100-190, 4.5-6 cm long, white to reddish; pistil on a 6-7 cm long gynophore which is hairy near the base.
- Fruit is a berry with a thin, leathery to corky pericarp, ellipsoidal, 2.5-5 cm × 1.3-1.5 cm, olive-green with distinct ribs.
- Seeds numerous, subglobose, 4 mm in diameter and embedded in yellow fruit pulp.

2. Ethnomedicinal uses:

- *C. spinosa* is used for the treatment of various human ailments including gastrointestinal problems, hypertension, strangury, inflammation, emmenagogue, anemia, liver dysfunction, rheumatism, dropsy, anti-spasmodic, anti-diabetic, analgesic, ant-helminthic, anti-haemorrhoidal, aperient, deobstruent, depurative and diuretic.
- In the traditional system, dried fruits of *C. spinosa* are orally ingested with a glass of water to treat hypertension and diabetic problems.
- Traditional medicines have utilized decoctions made from the root bark of *C. spinosa* for the treatment of dropsy, anemia, and rheumatism.
- *C. spinosa* is ingested internally to treat gastrointestinal infections, diarrhea, and dysentery, and has been found to be helpful in removing kidney stones.
- The buds of *C. spinosa* are a rich source of aldose-reductase inhibitors, compounds that are effective in preventing the formation of cataracts.

Reference: Sher, H., & Alyemeni, M. N. (2010). Ethnobotanical and pharmaceutical evaluation of *Capparis spinosa* L, validity of local folk and Unani system of medicine. J. Med. Plants Res, 4(17), 1751-1756.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Gentiales
Family	: Apocynaceae
Genus	: Catharanthus
Species	: roseus

***Catharanthus roseus*, सदाबहार**

Madagascar periwinkle, (2n=16)

1. Plant taxonomy:

- The plant is an erect, branched, deciduous herb that becomes woody at the base, and the branching originates from the base.
- The leaves are short stalked leathery, petioles generally orbate, rarely oblong elliptic having oblong tips, leaf blade ranges from 2 to 4 inches. The younger leaves are particularly very soft and light green in color. Veins are prominent over the lower surface of the leaves.
- There are three variants in *Catharanthus roseus*- rose purple flowered, white flowered, and white flowered with rose purple spots in the center.
- Stem and leaves contain white latex.
- The seeds are black in color and oblong in shape.
- The way of propagation is through stem cutting or seeds.

2. Ethnomedicinal uses:

- Vincristine formally known as leurocristine, sometimes abbreviated "VCR," is an alkaloid extracted from *Catharanthus roseus* (Madagascar periwinkle). It is normally used in cancer chemotherapy.
- Vinblastin is a very important alkaloid extracted from the leaf part of *C. roseus*. Vinblastin inhibits the cell cycle of cancer cells.
- The periwinkle tea prepared from leaf decoction of *C. roseus* is used for curing diabetes.
- Traditionally, *C. roseus* has been used on a large scale to treat diabetes and high blood pressure. *C. roseus* has some diuretic action, meaning that it may promote the loss of urine from the body.

Reference: Shuchi Kaushik, Rajesh Singh Tomar, Monika Gupta, Raghvendra Kumar Mishra- An overview of *Catharanthus roseus* and medicinal properties of their metabolites against important diseases. European Academic Research - Vol. V, Issue 2 / May 2017



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Asterales
Family	: Asteraceae
Genus	: <i>Matricaria</i>
Species	: <i>chamomilla</i>

***Matricaria chamomilla*, बबुना**

Chamomile, (2n=18)

1. Plant taxonomy:

- True chamomile is an annual plant with thin spindle-shaped roots; only penetrating flatly into the soil.
- The branched stem is erect, heavily ramified, and grows to a height of 10–80 cm.
- The long and narrow leaves are bi to tripinnate.
- The flower heads are placed separately, they have a diameter of 10–30 mm, and they are pedunculate and heterogamous.
- The golden yellow tubular florets with 5 teeth are 1.5–2.5 mm long, ending always in a glandulous tube. The 11–27 white flowers are 6–11 mm long, 3.5 mm wide, and arranged concentrically. The receptacle is 6-8 mm wide, flat in the beginning and conical, cone shaped and hollow which is a very important distinctive characteristic of *Matricaria*.
- The fruit is a yellowish-brown achene.

2. Ethnomedicinal uses:

- Sesquiterpenes, flavonoids, coumarins, and polyacetylenes are the most significant constituents of chamomile drug.
- The production of essential oil in chamomile mainly occurs in the flowers and flower heads.
- Chamomile has been widely used in traditional medicine to treat various diseases, including infections, neuropsychiatric, respiratory, gastrointestinal, and liver disorders.
- Chamomile is known for its sedative, anti-spasmodic, anti-septic, and anti-emetic properties.

Reference: Singh O, Khanam Z, and Misra N, Srivastava MK. Chamomile (*Matricaria chamomilla* L.): an overview. Pharmacognosy reviews. 2011 Jan; 5(9):82.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida,
Order	: Vitales
Family	: Vitaceae
Genus	: <i>Cissus</i>
Species	: <i>quadrangularis</i>

***Cissus quadrangularis*, हडजोड़**

Veldt grape

(2n=24, 28 for diploids and 2n=45 for a specimen from India)

1. Plant taxonomy:

- *Cissus quadrangularis* L. is a succulent plant of the family Vitaceae usually found in tropical and subtropical xeric wood.
- The plant is a climber with a stout stem that is fleshy, quadrangular, and contracted at the node. It has dichotomously branching tendrils, and its stem is 4-angular, winged, and contracted at the nodes.
- The plant's leaves are early caducous, alternate distichous, and of the simple type, with ovate-suborbicular to reniform leaf shapes and serrate leaf margins.
- The flowers of the plant are whitish and arranged in a cymose inflorescence.
- The plant's fruit is globose and turns red when it is ripe.
- Mature stem cuttings are an efficient way to reproduce the plant.

2. Ethnomedicinal uses:

- *Cissus quadrangularis* is a versatile herb used for treating various conditions such as diabetes, obesity, high cholesterol, bone fractures, allergies, cancer, stomach upset, painful menstrual periods, asthma, malaria, wound healing, peptic ulcer disease, weak bones (osteoporosis); it also finds usage as a bodybuilding supplement.
- The herb is specifically used for the treatment of osteoarthritis, rheumatoid arthritis, and osteoporosis.
- The roots and stems of *Cissus quadrangularis* are used for the treatment of bone fractures.
- The stem paste of the herb boiled in limewater is given to people with asthma.
- The powdered form of the herb is administered for the treatment of hemorrhoids and certain bowel infections.
- The stem juice of the herb is used for the treatment of scurvy, debilitating menstrual disorders, otorrhoea, and epistaxis.
- *Cissus quadrangularis* is also used as a feed for cattle to stimulate milk flow.
- The strong, fleshy, quadrangular stem of the herb is traditionally used for treating acid reflux, gastritis, eye disorders, piles, and anemia.

Reference: Sundaran, J., Vasanthi, M., Kamalopathy, M., Bupesh, G., & Sahoo, U. (2020). A short review on pharmacological activity of *Cissus quadrangularis*. Bioinformation, 16(8), 579.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Alismatales
Family	: Araceae
Genus	: <i>Colocasia</i>
Species	: <i>esculenta</i>

Colocasia esculenta, अरबी

Taro or Arbi, (2n=26, 28, 38, 42)*

1. Plant taxonomy:

- *Colocasia esculenta* Linn. is a tall herb that can be tuberous or have a stout short caudex.
- The plant's leaves are simple, with stout petiole, and have a peltate lamina that is ovate-cordate or sagittate-cordate in shape. The spadix is shorter than the petiole and much shorter than the spathe, with an appendix that is much shorter than the inflorescence.
- The petiole of the plant is erect and can grow up to 1.2 m long, with a triangular sinus that is cut one-third half way to the petiole. The surface above the petiole is dull and not polished, while the surface beneath it is paler or colored, but rarely glaucous.
- The peduncle of the plant is shorter than the petiole, and the spathe is pale yellow and 15-35 cm long. The tube is greenish and oblong, while the lamina is narrowly lanceolate, acuminate, convolute, never widely open, and curved slightly backwards in flower.
- The female inflorescence of the plant is short, while the male inflorescence is long and cylindrical, usually with interposed neuters between the two. The appendix is erect, elongate-conical, or fusiform, subulate or abbreviate. The plant's male flowers have 3-6 androus, while the female flowers have 3-4 gynous. The ovary is ovoid or oblong, one-locular, and has several or many biseriate ovules. The style is short in the beginning but later disappears, and the stigma is depressed-capitate, very shortly 3-5 sulcate.



Colocasia esculenta (Arbi)

- The plant's berries are obconic or oblong, with many seeds that are oblong and sulcate. The albumen is copious, while the embryo is axile.
- The stem of the plant grows above ground or is slightly swollen at the base of the leaf-sheaths, and it arises from a hard tapering rhizome or, in cultivated forms, a tuberous rhizome. Suckers and stolons are sometimes present.
- The spadix of the plant is much shorter than the spathe, rather than slender. The female inflorescence is as long as the sterile male inflorescence, and the appendix is much shorter than the inflorescence. The style is very short, and the stigma is discoid.
- Berries obconic or oblong, many seeded. Seeds oblong, sulcate. Albumen copious; embryo axile.
- Stem above ground or slightly swollen at the base of the leaf-sheaths, arising from a hard tapering rhizome or in cultivated forms a tuberous rhizome suckers and stolons sometimes present.
- Spadix is much shorter than the spathe rather than slender. Female inflorescence as long as the sterile male inflorescence. Appendix much shorter than the inflorescence, style very short; stigma discoid.

2. Ethnomedicinal uses:

- The leaves of the plant contain calcium oxalate, fibers, minerals such as calcium and phosphorus, as well as starch, and vitamins A, B, C, and more. Phytochemically, they also contain flavonoids, apigenin, luteolin, and anthocyanins.
- The juice from the petiole can be used to stop arterial hemorrhage and is considered styptic.
- The plant is sometimes used to treat earaches and otorrhoea, and is also used as a stimulant and rubefacient, as well as to treat internal hemorrhages.
- The juice from the leaves is a stimulant, expectorant, astringent, appetizer, and is used to relieve earaches.
- The juice expressed from the leaf stalks mixed with salt can be used as an absorbent to treat inflamed glands and buboes.
- Cooked vegetables made from the plant contain mucilage and can be used as an effective nervine tonic.
- A decoction of the peel is used as a folk medicine to treat diarrhea.
- The plant can increase body weight and prevent excessive sputum secretion in asthmatic individuals.
- The juice from the corm is used to treat cases of alopecia.
- Internally, the plant acts as a laxative, demulcent, anodyne, and galactagogue, and is used to treat piles and congestion of the portal system. It is also used as an antidote to the stings of wasps and other insects. The corm is used by people of the Munda tribe as a remedy for body aches.

Reference: Prajapati R, Kalariya M, Umbarkar R, Parmar S, Sheth N. *Colocasia esculenta*: A potent indigenous plant. International Journal of Nutrition, Pharmacology, Neurological Diseases. 2011 J

*PubMed.gov



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Liliopsida
Order	: Commelinales
Family	: Commelinaceae
Genus	: <i>Commelina</i>
Species	: <i>benghalensis</i>

Commelina benghalensis, कनकउआ

Benghal dayflower or Dew flower, (2n=22)

1. Plant taxonomy:

- *Commelina benghalensis* is an herb that can be either annual or perennial.
- The leaves of this herb are ovate to lanceolate, with parallel venation, entire margins, and are 2.5-7.5 cm long and 1.5-4 cm wide. The leaves are also pubescent on both sides.
- The leaf sheath of this herb is covered in red and sometimes white hairs at the apex, which is a primary identification factor for this species.
- The stems of this herb can be erect, crawling along the ground and rooting at the nodes, or climbing if supported. The stems are 10-30 cm in height and 20-90 cm in length, and are covered in a fine pubescence. They are also dichotomously branched.
- *Commelina* produces flowers in spathes that are often found in clusters. The flowers are funnel-shaped, fused by two sides, 10-20 mm long and 10-15 mm wide, and are on peduncles 1-3.5 mm in length. The aerial flowers are staminate, perfect, and chasmogamous with 3 petals 3-4 mm long. The upper two petals are blue to lilac in color, while the lower petal is lighter in color or white and much less prominent.
- The seeds of this herb are rectangular, 1.6-3 mm in length and 1.3-1.8 mm wide. They are brown to black in color and have a netted appearance.

2. Ethnomedicinal uses:

- It is used for the treatment of headache, constipation, leprosy, fever, snake bite and jaundice.
- It is also used in the treatment of mouth thrush, insanity, epilepsy, and psychosis.
- *Commelina benghalensis* contains phytoconstituents like alkaloids, flavonoids, coumarins, triterpenoids, steroids, resins, carbohydrates, phenols, tannins, amino acids, quinones, oils and fats, saponins and salicylic acid.
- The ethanol extract of *Commelina* root contains resins, balsams, flavonoids, and tannin, which are responsible for its analgesic and anti-inflammatory activities.
- The aqueous and alcoholic root extract of *Commelina benghalensis* have been found to have significant wound-healing activities, while the methanol extract of dried leaf has been shown to have anti-asthmatic activities by inhibiting 15-lipoxygenase enzymes.
- Ethanolic leaf extract shows potential inhibitory activities against *Streptococcus lactis* (Gram +ve) and *Enterobacter aerogenes* (Gram -ve) bacteria.

Reference: Kansagara, P. A., & Pandya, D. J. (2019). A complete review on medicinally active herbal weed: *Commelina benghalensis* L. (Comelinaceae). *Journal of Pharmaceutical Sciences and Research*, 11(4), 1165-1171.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Saxifragales
Family	: Crassulaceae
Genus	: Crassula
Species	: ovata

***Crassula ovata*, जेड पौधा**

Jade plant, (2n=42)

1. Plant taxonomy:

- The jade plant is a tall evergreen plant, up to 1-3 m, with thick branches and smooth, rounded, fleshy leaves growing in opposite sides along the branches which are short, stubby, and well-proportioned.
- The leaves are egg-shaped to elliptic having rich jade green color, 30 - 90 mm long and 18- 40 mm wide, often with a red margin and a somewhat pointed end. They are arranged in opposite pairs, with one pair positioned at right angles to the next, and clustered towards the ends of the branches.
- New stem growth of jade plants has the same color and texture as the leaves, but becomes brown and woody with age.
- They may produce small white or pink star-like flowers in early spring under the right conditions. The flowers later develop into small capsules, each of which holds many tiny seeds.

2. Ethnomedicinal uses:

- Traditionally many communities have developed a habit of using the fluid extracted from the leaves to treat warts which are small circumscribed tumors of the outer layer of the skin. Warts are flat or elevated from the surrounding skin and are firm. They are caused by forms of the contagious human papillomavirus (HPV); warts vary in size and may be accompanied by pain, particularly if they occur on the feet (plantar warts).

Reference: Muiruri MD, Mwangi W. Phytochemical, and antimicrobial activity of (*Crassula ovata*) Jade plant on different strains of bacteria. European Journal of Medicinal Plants. 2016; 11(1):1-2.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida,
Order	: Malpighiales
Family	: Euphorbiaceae
Genus	: <i>Croton</i>
Species	: <i>bonplandianum</i>

***Croton bonplandianum*, बन तुलसी**

Ban tulsī, (2n=20)

1. Plant taxonomy:

- Members of the Genus *Croton* are either deciduous shrubs or small trees, and they may have various types of hair or scales on their surface. The typical height of the plant is around 30-40 cm and the stipules are small.
- The leaves of *Croton* are arranged alternately on the stem, and they have two glands located at their base.
- *Croton* flowers may be monoecious, dioecious, or a combination of both.
- The inflorescence of *Croton* is racemose, typically found at the tip of the stem.
- *Croton* flowers have five parts; male flowers have small disk glands with 5-30 stamens, female flowers have a three chambered ovary and may have vestigial petals.
- Fruit of *Croton* is a capsule.
- *Croton* seeds are small and may or may not have a caruncle, which is a white, spongy, bilobed outgrowth located near the narrow end of the seed.

2. Ethnomedicinal uses:

- *Croton bonplandianum* (Baill) used traditionally for curing different types of health related problems: gastrointestinal disorders (cholera, boils, bowel complaints, diarrhea, dysentery, acute constipation, abdominal dropsy, internal abscesses), respiratory diseases (cold and cough, lungs infection, bronchitis, asthma), hepatic problems (jaundice, liver complaints).
- Additionally, the plants functions as an analgesic (reduces pain, sprains, headache) and is utilized in the treatment of scurvy, malaria, chicken pox, eye diseases, skin diseases, rheumatism, epilepsy and many other diseases.
- The leaf, fruit, and fresh latex extracts of *C. bonplandianum*, exhibit anti-bacterial properties.
- The seed oil of this plant, known as croton oil, or its major active component 12-O-tetradecanoylphorbol-13-acetate (TPA), is a potent irritant and inflammatory agent that has been widely used to promote tumors.
- TPA has been shown to inhibit the growth, stimulate apoptosis, or enhance differentiation in human tumor cell lines derived from patients with melanoma, prostate, breast, colon, or lung cancer.
- The methanolic leaf extract of *C. bonplandianum* is effective against mosquito larvae.

Reference: Ghosh, Tanmay, et al. "A review on traditional and pharmacological uses of *Croton bonplandianum* with special reference to the phytochemical aspect." *European Journal of Medicinal Plants*



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Liliopsida
Order	: Poales
Family	: Poaceae
Genus	: <i>Cymbopogon</i>
Species	: <i>citratus</i>

***Cymbopogon citratus*, नींबू घास**

Lemon grass, (2n=20)

1. Plant taxonomy:

- This tropical grass grows in dense clumps that can grow to 6 ft (1.8 m) in height and about 4 ft (1.2 m) in width, with a short rhizome.
- The strap-like leaves are 1.3 to 2.5 cm wide, about 0.9 m long and have gracefully drooping tips.
- The evergreen leaves of lemon grass are a bright bluish-green color and emit a citrus scent when they are crushed.
- Lemon grass plants typically do not produce flowers, and if they do, it is rare for them to form flowering panicles.
- The inflorescence of lemon grass is nodding, and it measures between 30 to 60 cm long. The partial inflorescence is made up of paired racemes of spikelets that are subtended by a spathe.

2. Ethnomedicinal uses:

- Fresh leaves were active on *Setaria digitata* (anti-filarial activity).
- Lemon grass oil is active against dermatophytes such as *Trichophyton mentagrophytes*, *T. rubrum*, *Epidermophyton floccosum* and *Microsporum gypseum* and is among the most active agents against human dermatophytes.
- *Cymbopogon citratus* stalk decoction reduced the fecal output in a dose-dependent manner.
- The essential oil of *Cymbopogon citratus* possesses a significant anti-nociceptive activity.
- The essential oil extracted from fresh leaves of the plant has acaricidal and larvicidal properties.
- When used as a vaporizer, lemon grass oil can be an effective remedy for bacterial infections, flu, and colds. It contains stimulating agents, tonics, aromas, diuretics, anti-spasmodics, and other beneficial compounds. It can also be helpful for people with urinary problems.
- In hot weather, lemon grass oil is an excellent choice for cooling down the body temperature and refreshing the mind and spirit.
- In addition to the above, lemon grass oil is used to improve digestion, alleviate nausea and menstrual problems, and alleviate conditions such as headaches, muscle cramps, spasms, and rheumatism.

Reference: Shah, G., Shri, R., Panchal, V., Sharma, N., Singh, B., & Mann, A. S. (2011). Scientific basis for the therapeutic use of *Cymbopogon citratus*, stapf (Lemon grass). *Journal of advanced pharmaceutical technology & research*, 2(1), 3.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Liliopsida
Order	: Cyperales
Family	: Poaceae
Genus	: Cynodon
Species	: dactylon

***Cynodon dactylon*, दूब घास**

Durva grass or Bermuda grass, (2n=36)

1. Plant taxonomy:

- *Cynodon dactylon* (L.) is a perennial grass that grows prostrate along the ground.
- The root of *C. dactylon* is cylindrical and fibrous, up to 1 mm thick, and has cream-colored hair-like roots arising from the main roots.
- The leaves of the plant are distributed alternately along the runners, and the leaf blades are unhaired. However, the ligule is found with a conspicuous fringe of white hairs.
- The leaf blades are lanceolate, green to dull green in color, and finely parallel-ribbed on both surfaces, without a midrib.
- The inflorescence of the plant is supported on a culm and consists of a single whorl of 3-7 racemes. Spikelets are closely appressed to the rachis.
- The glumes are one-nerved, the lemma is silky pubescent on the keel, and the palea is glabrous.
- The caryopses of the plant are sub-elliptical, compressed, and brownish in color.

2. Ethnomedicinal uses:

- Various phytochemical analysis explored that the plant contains flavonoids, alkaloids, glycosides, terpenoids, triterpenoids, steroids, saponins, tannins, resins, phytosterols, reducing sugars, carbohydrates, proteins, volatile oils and fixed oils.
- Decoction of the entire plant used as diuretic.
- Crushed leaves are used as a styptic in minor wounds to stop bleeding. Also used for inflammatory conditions.
- Decoction of the root used as diuretic in dropsy and syphilis.
- The roots are used as a substitute for sarsaparilla, infusion of root is used to stop bleeding in piles.
- Paste of plant applied to forehead for curing headaches.
- Mixed with clove (*Syzygium aromaticum*) and used as anti-helmintic.
- Folk remedy for cancer, epilepsy, cough, dysentery, warts, snakebites, bronchitis, anasarca, calculus, dropsy, hemorrhage, urogenital disorders, cough, sores, cancer, carbuncles, convulsions, cramps, cystitis, dysentery, hemorrhoids, leucoderma, hypertension, etc.
- The paste made from the plant mixed with honey is applied in cases of epistaxis (nose bleeding).
- The juice of the plant mixed with honey is orally administered 2-3 times a day for a few days to effectively treat menorrhagia, which is excessive bleeding during menstruation.

Reference: Khatun, P., & Das, S. K. (2020). Medicinal and Versatile Uses of an Amazing, Obtainable and Valuable Grass: *Cynodon dactylon*.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Euphorbiales
Family	: Euphorbiaceae
Genus	: <i>Euphorbia</i>
Species	: <i>neriifolia</i> Linn.

***Euphorbia neriifolia*, सेहूँडा**

Indian spurge tree, (2n=90)

1. Plant taxonomy:

- *E. neriifolia* is glabrous erect branched succulent, xerophytic tree, or shrub up to 20 ft. or 1.8–4.5 m high with jointed cylindrical or obscurely 5 angled branches.
- The fresh young leaves are simple, dark green in color having a leathery texture, leaf surface is glabrous with reticulate venation.
- The stem of the plant is cylindrical, succulent, and glabrous, with internodes measuring 4-10 cm in length and 2-6 cm in diameter.
- The branches have a pair of strong stipular spines on tubercles of the branchlet, which are confluent in 5 vertical spinal lines or ribs. The branches are obtusely 5 gonous in segment.
- Bunches of succulent thick leaves occur on the branchlets.
- The flowers are yellowish green in color, and the fruits occur during the months of December to May.
- The fruits look like capsules, with a style that is 3-fid and stigmas that are slightly dilated and minutely toothed.
- The seeds are flat and contain soft hairs.
- Latex is a milky-sap-like fluid found in cells or vessel.

2. Ethnomedicinal uses:

- Latex is acrid, laxative, pungent and good for tumors, abdominal troubles and leucoderma. It is used to remove cutaneous eruptions and warts.
- Leaves are brittle, heating, carminative, improve the appetite, good for treatment of tumors, pains, inflammations, abdominal swellings, and bronchial infections.
- The stem, which is roasted in ashes and expressed juice mixed with honey and borax is given in small doses to promote excitation of phlegm. Pulp of the stem mixed with fresh ginger is used to prevent hydrophobia.
- Root is used as symptomatic treatment of snake bite, scorpion sting and as an anti-spasmodic. Crushed root mixed with black-pepper is employed in treatment of scorpion-stings and snakebites both internally and externally.

Reference: Prashant Y. Mali, Shital S. Panchal/Asian Pacific Journal of Tropical Medicine 2017; 10(5): 430–438



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Euphorbiales
Family	: Euphorbiaceae
Genus	: <i>Euphorbia</i>
Species	: <i>tirucalli</i>

Euphorbia tirucalli, बर्की थोहर

Pencil cactus or Milkbush, (2n=10 or 20)

1. Plant taxonomy:

- *E. tirucalli* is a flowering shrub or small tree that can grow up to 4-12 m tall with straight twigs and a stem width of about 15-20 cm.
- The leaves are small, linear-oblong, spotted, and oblensolate, about 1.3-2.5 cm long and 2 cm wide. They are located only at the tips of young branchlets and quickly deciduous, with tips of young leafy branchlets slightly tomentose among rounded coffee hairs.
- Branches are longitudinal, evergreen, and juicy, about 7 mm wide and typically bent in a whorl.
- Fresh stems are green and cylindrical, with a diameter of 0.5-2.0 cm and ooze out milky exudates when broken. Dried stems are greenish-brown and surface longitudinally, finely striated.
- Flowers are very tiny, fair, bottle green and arranged in groups on terminal twigs, judicious and grouped at the tip of small branches. Cymes are 2-6, overcrowded at the apex of the branchlet.
- The fruit is a glabrescent capsule on top of a tomentose pedicel, up to 1 cm long, yellowish-red when ripe and drops off easily

2. Ethnomedicinal uses:

- The latex of *E. tirucalli* is vesicant and rubefacient, and is used for rheumatism, warts, cough, asthma, ear-ache, tooth-ache, and neuralgia.
- Latex is also used to heal skin ailments and bone fractures. In Malabar of India and Moluccas, the latex is used as an emetic and an anti-syphilitic.
- Little twigs of the plant can be roasted and chewed for a tender throat, and a decoction of branches is used in gastralgia and colic. Ash is useful as a caustic to release abscess.
- The bark is used in the treatment of fractures.
- Poultices prepared from the stem are useful in repairing broken bones.
- The roots are administered in colic and gastralgia, and a boiled root liquid acts as an emetic in cases of snake-bite and for infertility in women.

Reference: Mali PY, Panchal SS. *Euphorbia tirucalli* L.: Review on morphology, medicinal uses, phytochemistry and pharmacological activities. Asian Pacific Journal of Tropical Biomedicine. 2017 Jul 1; 7(7):603-13.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida,
Order	: Asterales
Family	: Asteraceae
Genus	: <i>Eclipta</i>
Species	: <i>prostrata</i>

***Eclipta prostrata*, भृंगराज**

False Daisy, (2n=22)

- *E. prostrata* is a medium-sized, branched, annual herb that bears white flowers.
- The stems of *E. prostrata* are reddish-purple, occasionally branching, round, and have scattered white hairs that are oppressed upward.
- The size of the leaves of *E. prostrata* is variable, usually 3-10 cm long and 5-15 mm wide. They are usually opposite, although some of the upper leaves may be alternate. The leaves are sessile against the stems or have short pedicels.
- Each leaf of *E. prostrata* is lanceolate, with scattered hairs that are oppressed. The margins have about 3-15 teeth on each side
- Inflorescence from the axils of the leaves, there are 1-3 flowerheads on short pedicels. Each flat-topped flower head is about 1/3 across, consisting of about 8-16 bracts and numerous ray florets that surround the numerous disk florets.
- Flower is bisexual, grouped in a terminal or axillary head about 7 mm in diameter and subtended by a ring of 8-10 green bracts. The spreading green bracts are triangular-shaped and form the base of the flowerhead. The ray florets are white and quite narrow and short, while the disk florets are cream or dull white with 4 small spreading lobes. Pale yellow or light brown anthers protrude slightly from the disk florets.
- Fruit is achenes of ray-florets 3-angled, of disc-florets 4-angled, strongly tuberculate, scattered hairs at apex; pappus absent.

2. Ethnomedicinal uses:

- *E. prostrata* has been traditionally used to treat various skin problems including wounds, prevent hair loss, and treat dermatitis.
- The combination of leaf juice and honey is used to treat catarrh in infants, while the juice of *E. prostrata* is taken orally or applied topically to promote hair growth.
- The whole plant is used to treat symptoms related to hepatitis, itching, hemoptysis, bleeding, hematuria, diarrhea, and diphtheria.
- The plant juice has been used to control, kill, and inhibit the growth of disease-carrying vectors such as mosquitoes.
- *E. prostrata* is also used to treat various symptoms such as acidity, alopecia, gingivitis, fever, body pain, asthma, bronchitis, burns, constipation, wounds, wrinkles, edema, and pimples, as well as other skin diseases. It contains a wide range of active phytoconstituents.

Reference: Timalisina, D., & Devkota, H. P. (2021). *Eclipta prostrata* (L.) L. (Asteraceae): ethnomedicinal uses, chemical constituents, and biological activities. *Biomolecules*, 11(11), 1738.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Caryophyllales
Family	: Didiereaceae
Genus	: <i>Portulacaria</i>
Species	: <i>afra</i>

Portulacaria afra

Elephant bush Plant, (2n=44)

1. Plant taxonomy:

- *P. afra* is a succulent herbaceous plant with thick fleshy leaves for water storage that grows annually.
- It can reach up to a height of 2 meters and has red stems with round, fleshy leaves, and pink flowers.
- It is commonly found in warm climates in eastern South Africa.

2. Ethnomedicinal uses:

- Traditionally *P. afra* was used to treat various skin disorders: sores, ringworm, boils, burns, rash, wounds, shingles, warts, abscesses, and acne.
- The identification of active phytochemicals from these natural sources, which can block COX-2 activity, may aid the production of anti-inflammatory pharmaceuticals.

Reference: Tabassum Tabassum et.al. Phytochemical Profiling, Antioxidant, Anti-Inflammatory, Thrombolytic, Hemolytic Activity in Vitro and In Silico Potential of *Portulacaria afra*. *Molecules*. 2022 Apr 7; 27(8):2377.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Zingiberales
Family	: Zingiberaceae
Genus	: <i>Elettaria</i>
Species	: <i>cardamomum</i>

***Elettaria cardamomum*, हरी इलायची**

Green or true cardamom, (2n=48)

1. Plant taxonomy:

- Cardamom is a perennial herb with underground rhizomes.
- The aerial pseudostem of cardamom is composed of leaf sheaths.
- Cardamom produces a long panicle inflorescence with racemose clusters that arise from the underground stem but grow above the soil.
- The flowers of cardamom are bisexual, fragrant, and the fruit is a trilocular capsule.
- Flower initiation in cardamom occurs between March and April. From flower initiation to full bloom, it takes nearly 30 days, and from bloom to maturity, it takes approximately 5 to 6 months.
- Honeybees are the primary pollinators of cardamom. They significantly increase fruit set when compared to flowers that are prevented from bee visits.
- Cardamom flowers remain open for around 16 to 18 hours. Stigma receptivity and pollen viability are the highest during the morning hours.

2. Ethnomedicinal uses:

- Powdered cardamom seeds are invariably mixed with ground ginger, cloves and caraway and used mainly for combating digestive ailments. It is used as a powerful pleasant aromatic stimulant, carminative, stomachic and diuretic.
- Use of cardamom checks nausea and vomiting. In the present-day stress prone population cardamom is used invariably as cardiac stimulant.
- Nasal application is prepared by using extracts of cardamom, neem and myrobalans along with animal fat and camphor.
- Cardamom seeds are chewed to prevent unpleasant smell in mouth, indigestion, nausea and vomiting due to sickness and to prevent pyrosis (excessive watering in mouth).
- Gargling with the infusion of cardamom and cinnamon is known to cure pharyngitis, sore throat, and hoarseness during the infective stage of flu.
- Powdered cardamom seeds boiled with tea-water impart a very pleasant aroma to the tea and it can be used as medicine for scanty urination, diarrhea, dysentery, palpitation of the heart, exhaustion due to overwork, depression etc.
- It is believed that eating cardamom capsule daily alongwith a tablespoon of honey improves eyesight, strengthens the nervous system, and thus improves health of the person.

Reference: Korikanthimath, V. S., Prasath, D., & Rao, G. (2000). Medicinal properties of cardamom *Elettaria cardamomum*. Journal of Medicinal and Aromatic Plant Sciences, 22, 683–685.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida,
Order	: Euphorbiales
Family	: Euphorbiaceae
Genus	: <i>Euphorbia</i>
Species	: <i>hirta</i>

***Euphorbia hirta*, दूधिया**

Dove Milk or Asthma weed, (2n=18)

1. Plant taxonomy:

- *E. hirta* is an annual hairy plant with a slender stem, many branches from the base to the top, and can spread up to 40 cm in height. The plant is reddish or purplish in color.
- Leaves are opposite, elliptic-oblong to oblong-lanceolate, acute or subacute, dark green above and pale beneath, 1- 2.5 cm long, blotched with purple in the middle, and toothed at the edge.
- The fruits are yellow, three-celled, hairy, keeled capsules, 1-2 mm in diameter, containing three brown, four-sided, angular, wrinkled seeds.

2. Ethnomedicinal uses:

- *E. hirta* is used in the treatment of gastrointestinal disorders (diarrhea, dysentery, intestinal parasitosis, etc.) bronchial and respiratory diseases (asthma, bronchitis, hay fever, etc.) and in conjunctivitis.
- The aqueous extract exhibits anxiolytic, analgesic, anti-pyretic, and anti-inflammatory activities.
- The stem sap is used in the treatment of eyelid styles and a leaf poultice is used on swelling and boils.
- Extracts of *E. hirta* have been found to show anti-cancer activity. The aqueous extract of the herb strongly reduces the release of prostaglandins I₂, E₂, and, D₂.
- The aqueous extract also inhibits aflatoxin contamination in rice, wheat, maize, and mustard crops.
- Methanolic extract of leaves have anti-fungal and anti-bacterial activities. The leaves pounded with turmeric and coconut oil are warmed and rubbed on itchy soles.
- The latex of *E. hirta* is applied on lower eyelids, like surma to cure eye sores.
- The root exudate exhibits nematicidal activity against juveniles of *meloidogyne incognita*.
- Decoction of dry herbs is used for skin diseases while decoction of fresh herbs is used as gargle for the treatment of thrush.
- Root decoction is also beneficial for nursing mothers deficient in milk. Roots are also used for snake bites.
- The polyphenolic extract of *E. hirta* has anti-amoebic and anti-spasmodic activity.
- Quercitrin, a flavonoid glycoside, isolated from the herb shows anti-diarrheal activity. It is reported to have a relaxation effect on respiration.

Reference: Kumar, S., Malhotra, R., & Kumar, D. (2010). *Euphorbia hirta*: Its chemistry, traditional and medicinal uses, and pharmacological activities. *Pharmacognosy reviews*, 4(7), 58.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida ,
Order	: Euphorbiales
Family	: Euphorbiaceae
Genus	: <i>Euphorbia</i>
Species	: <i>tithymaloides</i> L.

***Euphorbia tithymaloides*, बेयर, अगिया**

Devil's backbone, (2n=34 or 36)

1. Plant taxonomy:

- The plant has fleshy, tubular, zigzag stems that can grow between 0.4-3 meters tall and 4-6 cm wide.
- Leaves are ovate in shape, glabrous, and acuminate, with a length of about 1.4 to 3 inches.
- The plant's flowers are beak-shaped and arranged in a dichotomous congested cyme fashion, with colors that can range from bright white to pink.
- The plant's fruits are sulcata, deeply 3-lobed, and contain subglobose gray-brown seeds.
- The leaves of the plant may turn pink during flowering or chilly winter temperatures, but extended drought or winter cold spells may cause the leaves to completely drop off.

2. Ethnomedicinal uses:

- The plant is widely used in traditional medicine to treat asthma, persistent coughing, and mouth ulcers.
- The plant contains various antioxidant principles, such as 3-O-β-d-glucopyranoside-6''-(3-hydroxy-3-methyl glutarate), quercitrin, isoquercitrin, scopoletin, and other phytochemicals, including steroids, tannins, triterpenes, coumarins, and saponins. These have been shown to possess anti-diabetic, anti-viral, hemostatic, anti-microbial, anti-helminthic, and mitogenic activities.
- The plant's sap has traditionally been used to treat calluses, earache, insect stings, ringworm, skin cancer, toothache, umbilical hernias, and warts. However, there is no scientific proof that it is effective for these uses.

Reference: Poudel. R, Srivastava R, Tripathi A (2019). Pharmacognostical & Physicochemical Studies of *Euphorbia tithymaloides* (L.) Poit." IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS) 14.6: 17-24



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Rosales
Family	: Moraceae
Genus	: <i>Ficus</i>
Species	: <i>religiosa</i>

***Ficus religiosa*, पीपल**

Peepal or Sacred Fig, (2n= 26)

1. Plant taxonomy:

- This big and old tree is 30 meters tall.
- The tree's bark shatters and can be white or brown in color.
- The leaves of the tree are shiny, thin, and have 5-7 veins, while the fruits are small and about half an inch in diameter, similar in size to an eye pupil. The fruit is circular and compressed, green when raw and turns black on ripening.
- The tree fruits in summer and the fruits ripen during the rainy season.
- The leaves of the tree show a sigmoid growth pattern, with each leaf increasing in size within 9 days of its emergence from the spathe, as judged by the average mature leaf size.
- The Peepal tree's fruits are hidden within the figs. The figs ripen in May, and the ones that contain the flowers grow in pairs just below the leaves, resembling berries. The tree's bark is light gray and peels in patches, while its fruit is purple in color.

2. Ethnomedicinal uses:

- The stem bark of *F. religiosa* contains phytoconstituents such as asphenols, tannins, steroids, alkaloids and flavonoids, β -sitosteryl-D-glucoside, vitamin K, n-octacosanol, methyl oleanolate, lanosterol, stigmasterol, and lupen-3-one.
- Aqueous and ethanolic extracts of *F. religiosa* leaves showed anti-bacterial effect against *Staphylococcus aureus*, *Salmonella paratyphi*, *Shigella dysenteriae*, *S. typhimurium*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, *S. aureus*, *Escherichia coli*, and *S. typhi*.
- *F. religiosa* bark methanolic extract was 100% lethal for *Haemonchus contortus* worms.
- Anti-oxidative properties of the extract of *F. religiosa* fruit are also reported.
- Hydroalcoholic extract of *F. religiosa* leaves have wound-healing activity against excision wound, incision wound, and burn wound.
- The plant has been studied for its various pharmacological activities like anti-bacterial, anti-fungal, anti-convulsant, immunomodulatory, anti-oxidant, hypoglycemic, hypolipidemic, anti-helminthics, and wound healing.

Reference: Chandrasekar, S. B., Bhanumathy, M., Pawar, A. T., & Somasundaram, T. (2010). Phytopharmacology of *Ficus religiosa*. Pharmacognosy reviews, 4(8), 195.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Malvales
Family	: Malvaceae
Genus	: <i>Hibiscus</i>
Species	: <i>tiliaceus L.</i>

***Hibiscus tiliaceus*, समुद्री हिबिस्कस, बोला**

Sea or Beach hibiscus, (2n=80, 96)*

1. Plant taxonomy:

- Beach hibiscus is a tree that typically reaches a height of 3-10 meters, although it can reach up to 20 meters in rare cases, with a maximum stem diameter of 50 cm. The tree often has a short trunk with numerous crooked, sprawling, and intertwined branches that form an impenetrable thicket.
- The leaves are simple, heart shaped, rather large (8-20 cm long and 6–15 cm in width), often wavy, discolourous, bright green on the upper surface, and grayish-green and hairy below.
- The plant has a highly spreading, near-surface, lateral root system, often consisting of only a few main roots.
- The flowers are typical of the *Hibiscus* genus, showy, fragile, and short-lived, falling the same day that they open. They are borne terminally or axillary, few flower in cymes (3–6 flowers) or else solitary. Individual flowers are cup-shaped, with the corolla consisting of five radiating, obovate, lemon-yellow petals (4–6 cm long), dark maroon at the base.
- The fruits are a light brown, ovoid, dry capsule, about 2 cm long, splitting into 5 segments and 10 cells of seeds at maturity. Fruiting may occur throughout the year.
- There are about 5–7 kidney-shaped seeds per cell. The seeds are rich brown to brown-black in color, roughened, and hairy.

2. Ethnomedicinal uses:

- The plant was used as a traditional medicine by the people for the treatment of fever, coughs and dry throat, ear infections, chest congestion, diarrhea, dysentery, and typhoid.
- The extract of *H. tiliaceus* was reported to have various interesting pharmacological activities such as anti-oxidant, anti-inflammatory, anti-helminthic and anti-microbial.
- The slimy sap of the bark, branches and flower buds has been used as a mild laxative or as a lubricant during childbirth or labor pains when rubbed on the stomach.
- An aqueous extract of wood and fresh flowers is a registered treatment for skin diseases.
- Chemical constituents present in the ethanolic extracts of leaf and bark possess cytotoxic, anti-bacterial, analgesic and neuropharmacological activities.
- The phytochemical analysis of the leaf extract indicates the presence of tannins, whereas bark extract indicated the presence of alkaloids, reducing sugar and tannins.

Reference: Abdul-Awal, S. M., Nazmir, S., Nasrin, S., Nurunnabi, T. R., & Uddin, S. J. (2016). Evaluation of pharmacological activity of *Hibiscus tiliaceus*. Springerplus, 5(1), 1-6.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Lamiales
Family	: Lamiaceae
Genus	: <i>Ocimum</i>
Species	: <i>tenuiflorum</i>

Ocimum tenuiflorum or *Ocimum sanctum*, तुलसी

Holy basil, (2n=36)

1. Plant taxonomy:

- The natural habitat of Tulsi varies from sea level to an altitude of 2000 m.
- Tulsi is a branched, fragrant, and erect herb having hair all over. It attains a height of about 75-90 cm when mature.
- Its leaves are nearly round and up to 5 cm long with the margin being entirely toothed. These are aromatic because of the presence of a kind of scented oil in them. A variety with green leaves is called Shri Tulsi and one with reddish leaves is called Krishna Tulsi.
- Tulsi flowers are small, with a purple to reddish color, and are present in small compact clusters on cylindrical spikes. Each flower cluster has stalkless heart-shaped bracts at its base, and the sepal cup is not hairy within.
- Flowers are rarely longer than 5 mm, calyx tube bearded outside near base and flower tube is hairy.
- The fruits are small and the seeds yellow to reddish in color.



Ocimum tenuiflorum (Rama Tulsi)



Ocimum tenuiflorum (Shyama Tulsi)

2. Ethnomedicinal uses:

- This plant is well known for its medicinal and spiritual properties in Ayurveda which includes curing cough, asthma, diarrhea, fever, dysentery, arthritis, eye diseases, indigestion, gastric ailments, etc.
- Mixture of Tulsi leaves and black pepper seeds are used for the treatment of fever and malaria as a traditional medicine.
- The leaves of the Tulsi contain essential oils including carvacrol, ursolic acid, eugenol and the seeds contain fixed oils, including oinoleic acid, oleic acid, palmitic acid, and stearic acid.
- Different parts of *O. tenuiflorum* showed anti-fertility, anti-cancer, anti-diabetic, anti-fungal, hepatoprotective and cardioprotective actions.
- *O. sanctum* ameliorates H₂O₂ induced neuronal damage via its anti-oxidant defense mechanism and might be used to treat neuronal disorders mediated by oxidative stress.
- *O. sanctum* prevents diabetes and diabetic complications through its anti-oxidant activity by reducing the plasma level of thiobarbituric acid reactive substances (TBARS).

Reference: Parasuraman S, Balamurugan S, Christopher PV, Petchi RR, Yeng WY, Sujithra J, Vijaya C. Evaluation of antidiabetic and antihyperlipidemic effects of hydroalcoholic extract of leaves of *Ocimum tenuiflorum* (Lamiaceae) and prediction of biological activity of its phytoconstituents. *Pharmacognosy research*. 2015 Apr; 7(2):156.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Liliopsida
Order	: Zingiberales
Family	: Costaceae
Genus	: <i>Chamaecostus</i>
Species	: <i>cuspidatus</i>

Chamaecostus cuspidatus, केऊकंद

Insulin Plant or Spiral Flag, (2n=18)*

1. Plant taxonomy:

- It is a perennial, upright, spreading plant that can reach about two feet of height, with the tallest stems falling over and lying on the ground.
- The leaves are simple, alternate, entire, oblong, evergreen, and 4-8 inches in length with parallel venation.
- The large, smooth, dark green leaves of this tropical evergreen have light purple undersides and are spirally arranged around stems, forming attractive, arching clumps arising from underground rootstocks.
- Beautiful, 1.5-inch diameter, orange flowers are produced in the warm months, appearing on cone-like heads at the tips of branches.
- The fruits are inconspicuous, not showy, less than 0.5 inch in size, and green-colored.

2. Ethnomedicinal uses:

- *C. igneus* leaves are rich in protein, iron, and anti-oxidant components such as ascorbic acid, α-tocopherol, β-carotene, terpenoids, steroids, and flavonoids.
- Patients consuming either one fresh leaf or 1 teaspoon of shade-dried powder/day of *C. igneus* in conjunction with other modalities of treatment had effectively produced glycemic control in diabetics.
- Leaves and rhizomes showed good anti-oxidant activity of about 89.5%-90.0%.
- Methanolic extract of *C. igneus* showed maximum anti-bacterial activity against gram-positive *Bacillus cerus*, *Bacillus megaterium*, *Micrococcus leuteus*, *Staphylococcus aureus*, *Streptococcus lactis*, and gram-negative strains such as *Pseudomonas aeruginosa*, *Escherichia coli*, *Enterobacter aerogenes*, *Klebsiella pneumoniae*, and *Salmonella typhimurium*.
- All the extracts of bark had potent anti-cancer properties against HT 29 and A549 cells.

Reference: Hegde, P. K., Rao, H. A., & Rao, P. N. (2014). A review on Insulin plant (*Costus igneus* Nak). *Pharmacognosy reviews*, 8(15), 67.

*Hort. Bot. Utrecht 3568, originating from Bahia



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Lamiales
Family	: Oleaceae
Genus	: <i>Jasminum</i>
Species	: <i>sambac</i>

***Jasminum sambac*, मोतिया/ मोगरा**

Arabian or Tuscan jasmine, (2n=26)*

1. Plant taxonomy:

- It is an evergreen broad-leaf vine or shrub and its height reaches up to 1-3 m.
- The phyllotaxy of the leaves is opposite or in three whorls, ovate and darkgreen in color.
- In a greenhouse, flowers can bloom throughout the year and are present in the form of clusters ranging from 3 -12.
- These flowers have a strong aroma and open at night.
- Jasmine plants can easily grow in hot and humid environments during day time and it requires low temperature at night.
- This plant can grow as bushy shrubs in extreme sun, as well as a vine in shady areas with bigger and darker leaves.

2. Ethnomedicinal uses:

- This plant has various medicinal properties including anti-depressant, analgesic, sedative, anti-inflammatory, anti-septic, expectorant, and aphrodisiac.
- The roots of this plant can be used to cure wounds and snake bites.
- The flowers and leaves of this plant have decongestant and anti-pyretic properties.
- The flowers, roots, and leaves of this plant are utilized to treat various diseases such as conjunctivitis, diarrhea, abdominal pain, and dermatitis, as well as for pain relief, diarrhea, and fever.
- The flowers and leaves of *Jasminum sambac* are used in folk medicine to prevent and treat breast cancer, aiding in preventing breast cancer and stopping uterine bleeding.
- Jasmine essential oil has therapeutic properties such as being anti-depressant, anxiolytic, anti-septic, aphrodisiac, anti-spasmodic, cicatrisant (wound healing), expectorant, galactagogue, parturient, sedative, and tonic (uterine).

Reference: Mourya, N. M. N., Bhopte, D. B. D., & Sagar, R. S. R. (2017). A review on *Jasminum sambac*: A potential medicinal plant. International Journal of Indigenous Herbs and Drugs, 13-16.

* George, K., & Geethamma, S. (1992). Cytology and evolution of jasmines. Cytologia, 57(1), 27-32.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Saxifragales
Family	: Crassulaceae
Genus	: <i>Kalanchoe</i>
Species	: <i>pinnata</i>

***Kalanchoe pinnata*, पत्थरचट्टा**

Cathedrals bells or Miracle leaf, (2n=40)

1. Plant taxonomy:

- It is an herb that is smooth and hairless, with a height ranging from 0.3 to 1.2 meters.
- The stems are obtusely four-angled, and the older parts are light-colored, while the younger parts are reddish and speckled with white.
- The leaves are decussate, with the lower ones usually being simple or occasionally compound, measuring 8-12 cm in size, and the upper ones usually being 3-5 or sometimes 7-foliolate. They are long-pointed, and the petioles are united by a ridge around the stem. The leaflets are ovate or elliptic, with crenate or serrate edges. The leaves often produce buds at the extremities of the lateral nerves, which drop off and become new plants.
- The flowers are reddish-purple and pendant, forming large spreading panicles with opposite stout branches. The pedicle is slender, and the calyx is red and green at the base, striated, and pale green above, with triangular teeth. The corolla is swollen and octagonal at the base, reddish-purple, and constricted in the middle. The filaments are green at the base and pinkish below the anther, and the anther is hastate and black.
- The fruits are enclosed in the persistent papery calyx and corolla.
- The seeds are small, smooth, oblong-ellipsoid, scarcely striate, and smooth.

2. Ethnomedicinal uses:

- The plant contains alkaloids, flavonoids, phenolic compounds, tannins, macroelements such as magnesium, calcium, potassium, phosphorus, sodium, and microelements such as iron and zinc. It also contains vitamins like ascorbic acid, riboflavin, thiamine, and niacin.
- The hydroalcoholic extract of the plant has shown to reduce postprandial and streptozotocin-induced diabetes blood glucose levels, triglyceride levels, low-density lipoprotein levels, and increase high-density lipoprotein levels.
- The ethanolic extract of the plant has demonstrated activity against acute ulcers, while the aqueous extract did not prevent the formation of gastric mucosal lesions induced by indomethacin.
- The 60% methanolic extract of *Kalanchoe pinnata* leaf has been found to inhibit the growth of microorganisms. Additionally, the plant shows a relaxing effect on the contractility of human myometrium and reinforces against fenoterol-induced uterine contractility, including spontaneous and oxytocin-stimulated contractions.

Reference: QuaziMajaz, A., et al. "The miracle plant (*Kalanchoe pinnata*): a phytochemical and pharmacological review." Int J Res Ayurveda Pharm 2.5 (2011): 1478-82.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Lamiales
Family	: Verbenaceae
Genus	: <i>Lantana</i>
Species	: <i>camara</i>

***Lantana camara*, राईमुनिया**

Wild or Red sage, (2n=22)

1. Plant taxonomy:

- *L. camara* is a thorny shrub upright, half climbing or sometimes more or less hanging, reaching 2-3 m in height.
- The stems and branches are angular, bearing curved spines, and arranged along the edges.
- The leaves are simple, opposite, decussate carried by a petiole, 1.5-2 cm long. The blade is leathery, oval to broadly oval shaped, 5-8 cm long and 3-4 cm wide, truncated to subcordate at the base, acute or acuminate at the top. Rough and hispid on the upper surface, pubescent on the lower surface. The leaf margin is regularly toothed.
- The inflorescence is a hemispherical head, axillary or terminal, yellow, pink or orange colored, made up of many small tubular flowers.
- The fruits are small drupes fleshy, about 3 mm in diameter, varying in color from blue to black.

2. Ethnomedicinal uses:

- A tea made from the leaves and flowers of the plant was traditionally used as a remedy for fever, influenza, and stomach-ache.
- The plant was used to prepare remedies for various conditions including fevers, colds, rheumatism, asthma, and high blood pressure.
- An alkaloid fraction was isolated from the leaves, which was found to lower blood pressure, accelerate deep respiration, and cause shivering in dogs. It was suggested that this alkaloid fraction may be useful in reducing fevers, and in the treatment of asthma and hypertension.
- The use of *Lantana* extracts in folk medicine is believed to be effective in treating various conditions such as cancers, chicken pox, measles, asthma, ulcers, swellings, eczema, tumors, high blood pressure, bilious fevers, catarrhal infections, tetanus, rheumatism, malaria, and atony of abdominal viscera.

Reference: Ghisalberti EL. *Lantana camara* L. (verbenaceae). *Fitoterapia*. 2000 Sep 1; 71(5):467-86.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Lamiales
Family	: Lamiaceae
Genus	: <i>Lavandula</i>
Species	: <i>angustifolia</i>

***Lavandula angustifolia*, लैवेंडर**

Lavender, (2n=18)

1. Plant taxonomy:

- The Lavenders are evergreen, shrubby plants.
- They vary from one to three feet high and show a range of leaf and flower shapes.
- The leaves can be lobed or unlobed and are sometimes present only at the base of the stems.
- The flowers of the plant can be found in a range of colors from blue to violet, while the stem and leaves can range from deep bluish gray to green, and sometimes discolored brown.



Lavender

2. Ethnomedicinal uses:

- Lavender (*Lavandula angustifolia*), is a kind of medicinal herb that can be effectively used in the treatment of vaginal discharges.
- Lavender's essential oil is frequently used in traditional medicine and its impact on reducing the amount of *Candida albicans* fungus.
- Lavender's essential oil is commonly used in aromatherapy and massage.
- Its major clinical benefits are on the central nervous system.
- Used as a sedative, anxiolytic and mood modulator.
- Chemical constituents of lavender have potent anti-carcinogenic and analgesic properties; its anti-oxidant effects are less potent than those of other members of its botanical family such as rosemary and sage.
- Lavender has traditionally been used to treat symptoms ranging from restlessness to colic infants and children.

Reference: Chu CJ, Kemper KJ. Lavender (*Lavandula* spp.). Longwood Herbal Task Force. 2001 Jul; 32:1-32.



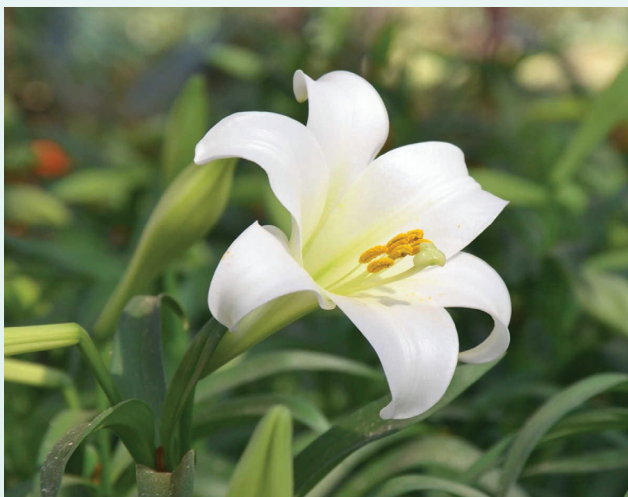
Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: tracheophyta
Class	: Magnoliopsida
Order	: Liliales
Family	: Liliaceae
Genus	: <i>Lilium</i>
Species	: <i>longiflorum</i>

Lilium longiflorum, लिली

Lily, (2n=24)

1. Plant taxonomy:

- Lilies are erect perennial plants with leafy stems, scaly bulbs, usually narrow leaves, and solitary or clustered flowers.
- The flowers consist of six petal-like segments, which may form the shape of a trumpet, with a more or less elongated tube.
- The sepals and petals are usually undifferentiated (tepals) and sometime variegated.
- Both perigonal and septal nectarines are present and the ovary can be inferior or superior.
- Lilies are usually raised from bulbs, but they can also be grown from seed.



Leaf arrangement and white color flower of lily

2. Ethnomedicinal uses:

- The genus *Lilium* contains a variety of chemical components, including steroidal saponins, sterols, polysaccharides, alkaloids and flavonoids, among which steroidal saponins, flavonoids and polysaccharides are the main active substances with anti-tumor, anti-inflammatory, antioxidant and other pharmacological activities.
- The bulb is anti-asthmatic, anti-tussive, expectorant, sedative and tonic (nutritive). It is used in the treatment of coughs, haemoptysis, insomnia and fidgetiness in the later stage of febrile disease.

Reference: Zhou J, An R, Huang X. Genus *Lilium*: A review on traditional uses, phytochemistry and pharmacology. Journal of Ethnopharmacology. 2021 Apr 24; 270:113852.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Malpighiales
Family	: Malpighiales
Genus	: <i>Malpighia</i>
Species	: <i>emarginata</i>

Malpighia emarginata

Acerola, Barbados cherry, (2n=20)

1. Plant taxonomy:

- The evergreen shrub typically grows between 2-3 meters in height but can occasionally reach up to 6 meters. It has spreading branches and small, dark green leaves.
- The young leaves of the shrub have white hairs that can cause skin irritation. However, the mature leaves are hairless and glossy in appearance.
- The plant produces small, 5-petaled flowers year-round in warmer climates. The flowers grow in clusters of three to five and are usually pale to deep pink in color.
- Following the flowers, the shrub produces cherry-like drupes that are known as Acerola cherries. These cherries ripen from green to a shiny, bright red color.
- The Acerola cherries contain yellow to orange, juicy pulp with several small seeds.
- The taste of the fruit ranges from tart to sweet tart.
- However, due to their short shelf life once removed from the tree, handling and storage of the fruits can be challenging.

2. Ethnomedicinal uses:

- Acerola cherries are one of the richest sources of ascorbic acid, known as vitamin C. This vitamin is known to strengthen the immune system and to build collagen cells. It also supports the respiratory system. Deficiencies can result in scurvy, a potentially fatal disease.
- Fruit is also rich in anti-oxidants. These compounds are known to help prevent cell damage from free radicals. The combination of vitamin C and other antioxidants might help to protect the body from degenerative diseases, inflammation, and infections.
- According to research, concentrated extract from the Acerola cherry has been shown to have skin whitening effects on UV-induced pigmentation, making it a significant ingredient in facial skincare products that aim to combat cellular aging.

References: pascoe.ca/herbal-index/acerola

Lim, T. K. (2012). Edible medicinal and non-medicinal plants (Vol. 1, pp. 656-687). Dordrecht, The Netherlands:: Springer.



Domain	: Eukaryota
Kingdom	: Plantae
Phylum	: Tracheophyta
Class	: Liliopsida
Order	: Zingiberales
Family	: Marantaceae
Genus	: <i>Maranta</i>
Species	: <i>arundinacea</i> L.

***Maranta arundinacea*, तिखुर**

Arrowroot, (2n=48)

1. Plant taxonomy:

- Arrowroot is a thin terrestrial herb with perennial rhizomes.
- Rhizomes are modified, fusiform-shaped subterranean stems that grow vertically or horizontally under the soil, arrowroot rhizomes can be 5-25 cm in length, with a mean diameter of 12 cm.
- The arrowroot stem is erect and shows leaves of variable sizes at its top, they are usually a large size up to 12 cm wide.
- The leaves are composed of leaf blade, pulvinus, petiole, and sheath.
- Arrowroot represents only one type of root, in a fasciculated arrangement. After planting rhizomes, fibrous roots grow at the base of the sprouts.
- The species possesses a terminal inflorescence (synflorescence), composed of several partial inflorescences.
- The flowers are small and gamopetalous, with white coloration and there may be up to two racemes each with two to three flowers. They are bisexual, trimerous, with one stamen, an inferior ovary, one or three fertile locules, and a simple style that is generally recurved. Sepals are oblong, and the calyx and corolla are heterochlamydeous.
- Fruits are scarce, covered by oval capsules measuring about 8 mm, with a coloration varying from red to brown and arillate brown seeds with abundant endosperm.

2. Ethnomedicinal uses:

- The phytochemicals present in plants are biologically active compounds that occur naturally in a range of plant parts, including bark, leaves, flowers, roots, fruits, and seeds.
- Saponins are used in the treatment of hypercholesterolemia and hyperglycemia, and also aid in weight loss while tannins present anti-dysenteric and anti-diarrheal activities.
- Rhizomes of *M. arundinacea* are also used as a natural source of calcium and in the treatment of indigestion and urinary infections.
- Chemically active substances present in arrowroot plants produce beneficial physiological reactions in the body exhibited as an immunostimulatory activity, increasing the serum levels of immunoglobulin G (IgG), IgA, and IgM as well as anti-oxidant activity against hydrogen peroxide (H₂O₂) and nitric oxide (NO).

Reference: Brito, Vitor, et al. "Arrowroot (*Maranta Arundinacea* L.): Botany, Horticulture, and Uses." *Horticultural Reviews* 48 (2021): 233-274.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida,
Order	: Fabales
Family	: Fabaceae
Genus	: <i>Mimosa</i>
Species	: <i>pudica</i>

***Mimosa pudica*, लाजवंती**

Touch-me-not plant, (2n=52)

1. Plant taxonomy:

- Root is cylindrical, tapering repentant, with secondary and tertiary branches, varying in length up to 2 cm thick.
- Stem is cylindrical, up to 2.5 cm in diameter; sparsely prickly, covered with long, weak bristles longitudinally grooved, external surface light brown and internal surface is gray.
- Leaf digitately compound with one or two pairs of sessile, hairy pinnae, alternate, petiolate, stipulate, linear lanceolate; leaflets 10–20 pairs, 0.6–1.2 cm long, 0.3–0.4 cm broad, sessile, obliquely narrow or linear oblong; obliquely rounded at base, acute, nearly glabrous; yellowish green.
- Flower pink, in globose head, peduncles prickly; calyx very small; corolla pink, lobes 4, ovate oblong; stamens 4, much exerted; ovary sessile; ovules numerous.
- Fruit Lomentum, simple, dry, 1-1.6 cm long, 0.4-0.5 cm broad, with in dehiscent segments and persistent sutures having two to five seeds with yellowish spreading bristle at sutures, 0.3 cm long, glabrous, and straw colored.
- Seed compressed, oval-elliptic, brown to gray, 0–0.3 cm long, 2.5 mm broad, having a central ring on each surface.

2. Ethnomedicinal uses:

- *Mimosa pudica* is one of the folk medicinal plants commonly used as anti-fertility agent in some places of India. Air-dried roots of *M. pudica* were extracted using methanol.
- The leaves together with leaves from other medicinal plants are used in treating hemorrhoids and urinary infections. The juice is used in sinus, sores, piles, and fistula, paste is applied to glandular swellings, and hydrocele.
- Decoction is efficacious in gravel and other urinary complaints. Treats dysentery, fever, syphilis, leprosy, stomach worms, venereal diseases, insect bite, insomnia, nervousness, and piles.
- *M. pudica* whole plant extract possesses good anti-microbial activity.
- As Laajvanti; its leaves and roots are used for gravel and other kidney diseases, also for piles and fistula in the Sagar District, Madhya Pradesh, India. The roots are also used in an oral snakebite remedy.
- *M. pudica* leaf extract showed the presence of bioactive components such as terpenoids, flavonoids, glycosides, alkaloids, quinines, phenols, tannins, saponins, and coumarins.

Reference: Ahmad, et al.: *Mimosa pudica* L.: An Overview Pharmacognosy Reviews | July–December 2012 | Vol 6 | Issue 12)



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Brassicales
Family	: Salvadoraceae
Genus	: <i>Salvadora</i>
Species	: <i>persica</i>

***Salvadora persica*, मेस्वाक**

Miswak or Tooth-brush tree, (2n=24)

1. Plant taxonomy:

- *Salvadora persica* is a large, well-branched evergreen shrub or small tree having soft whitish yellow wood, bark is of old stems rugose, branches are numerous, drooping, glabrous, terete, finely striate, shining, and almost white.
- Leaves are somewhat fleshy, glaucous, 3.8–6.3 by 2–3.2 cm in size, elliptic lanceolate or ovate, obtuse, and often mucronate at the apex, the base is usually acute, less commonly rounded, main nerves are in 5–6 pairs, and the petioles 1.3–2.2 cm long and glabrous.
- The flowers are greenish yellow in color, in axillary and terminal compound lax panicles 5–12.5 cm long, numerous in the upper axils, pedicels 1.5–3 mm long, bracts beneath the pedicels, ovate and very caducous.
- Calyx is 1.25 mm long, glabrous, cleft half-way down, lobes rounded. Corolla is very thin, 3 mm long, deeply cleft, persistent, lobes are 2.5 mm long, oblong, obtuse, and much reflexed. Stamens are shorter than corolla, but exerted, owing to the corolla lobes being reflexed.
- Drupe is 3 mm in diameter, globose, smooth and becomes red when ripe.

2. Ethnomedicinal uses:

- Leaves are bitter in taste, corrective, deobstruent, astringent to the bowels, tonic to the liver, diuretic, analgesic, antihelmintic, useful in ozoena and other nose troubles, piles, scabies, leukoderma, lessening inflammation, and strengthening the teeth.
- Fruits possess deobstruent, carminative, diuretic, lithontriptic, and stomachic properties and are used against stomach ache and rheumatism.
- A paste of the roots is applied as a substitute for mustard plaster and their decoction is used against gonorrhea and vesical catarrh. A decoction of the bark is used as a tonic in amenorrhea.
- Stem bark is used as an ascarifuge and also in gastric troubles.
- Seeds have a bitter and sharp taste. They are used as purgative, diuretic and tonic seed oil is applied on the skin to treat rheumatism.

Reference: Khatak, M., Khatak, S., Siddiqui, A. A., Vasudeva, N., Aggarwal, A., & Aggarwal, P. (2010). *Salvadora persica*. Pharmacognosy reviews, 4(8), 209.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Tracheophyta
Class	: Magnoliopsida,
Order	: Sapindales
Family	: Rutaceae
Genus	: <i>Murraya</i>
Species	: <i>koenigii</i>

***Murraya koenigii*, कडीपत्ता**

Curry tree (2n=18)

1. Plant taxonomy:

- A small spreading shrub, about 2.5 meters high; the main stem, dark green to brownish, with numerous dots on it; its bark can be peeled off longitudinally, exposing the white wood underneath; the girth of the main stem is 16 cm.
- Leaves, exstipulate, bipinnately compound, 30 cm long, each bearing 24 leaflets, having reticulate venation; leaflets, lanceolate, 4.9 cm long, 1.8 cm broad, having 0.5 cm long petiole.
- Flowers, bisexual, white, funnel-shaped, sweetly scented, stalked, complete, ebracteate, regular, actinomorphic, pentamerous, hypogynous, the average diameter of a fully opened flower being 1.12 cm.
- Inflorescence, a terminal cyme, each bearing 60 to 90 flowers; calyx, 5-lobed, persistent, inferior, green; corolla, white, polypetalous, inferior, with 5 petals, lanceolate; length, 5 mm; androecium, polyandrous, inferior, with 10 stamens, dorsifixed, arranged into circles of five each; smaller stamens are upto 4 mm in length whereas the longer stamens reach a length of 5-6 mm; gynoecium is 5-6 mm long; stigma is bright and sticky; style is short; ovary is superior.
- Fruits, round to oblong, 1.4-1.6 cm long, 1-1.2 cm in diameter; fully ripe fruits, black with a very shining surface.



Murraya (Murraya koenigii) plant with fruits

2. Ethnomedicinal uses:

- The leaves, roots, and bark of this plant are rich sources of carbazole alkaloids, which produce potent biological activities and pharmacological effects. These include anti-oxidant, anti-diabetic, anti-inflammatory, anti-tumor, and neuroprotective activities.
- *M. koenigii* leaves are slightly bitter in taste, pungent in smell, and weakly acidic. They are used as anti-helminthics, analgesics, digestives, and appetizers in Indian cookery.
- The green leaves of *M. koenigii* are used in treating piles, inflammation, itching, fresh cuts, dysentery, bruises, and edema.
- The roots are purgative to some extent. They are stimulating and used for common body aches. The bark is helpful in treating snake bites.
- The essential oil extracted from *M. koenigii* leaves is reported to possess anti-oxidative, hepatoprotective, anti-microbial, anti-fungal, anti-inflammatory, and nephroprotective activities.
- *M. koenigii* has numerous disease remedial activities, for instance, different parts of the plant, such as the leaves, roots, and bark, can be prepared as tonics for inducing digestion and flatulence or as anti-emetics.
- The leaves and roots can be given as an anti-helminthic, analgesic, cure for piles, body heat reducer, and thirst quencher and are also helpful in reducing inflammation and itching. They are also useful in managing leucoderma and blood disorders.
- When eaten raw, the green leaves can offer a cure for dysentery, and when they are boiled in milk, the paste has good application prospects for curing poisonous bites and eruptions.

Reference: Balakrishnan, Rengasamy, et al. "Medicinal profile, phytochemistry, and pharmacological activities of *Murrayakoenigii* and its primary bioactive compounds." *Antioxidants* 9.2 (2020): 101.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Sapindales
Family	: Rutaceae
Genus	: <i>Murraya</i>
Species	: <i>paniculata</i>

***Murraya paniculata*, कामिनी**

Orange Jessamine, (2n= 18)

1. Plant taxonomy:

- These are aromatic shrubs or trees that can grow to a height of 3-10 m, with dense foliage. The branchlets are glandular punctate and can be puberulent to glabrate in texture.
- Leaves are odd pinnate 4-11 cm long; petioles and rachises are puberulent; leaflets alternate or rarely subopposite, obovate, obtuse or rounded to abruptly blunt acuminate and usually retuse apically, cuneate basally, the margins entire, revolute, dark green above, paler beneath, coriaceous, puberulent to glabrate, glandular punctate, the punctuations numerous over the entire blade, 11-43 mm long, 7-24 mm wide; petiolules are puberulent upto 2 mm long.
- Inflorescences are dense, puberulent, 2.5-4.5 cm long.
- Flowers 5-merous, fragrant, the pedicels are 3 mm long; sepals 5, triangular, puberulent, 1 mm long, connate for about half their length; petals 5, white, oblanceolate to spatulate, recurved, glandular punctate, pubescent or glabrous, tomentulose apically, 12-19 mm long, 5-6 mm wide; stamens 10, alternately shorter, the filaments subulate, 6-9 mm long; disc prominent, fleshy; ovary glandular punctate, glabrous, 2 mm high, the style deciduous, the stigma capitate, 1 mm in diameter.
- The fruit is a red to orange drupaceous berry that is ovoid in shape with an acuminate apex. It is glandular punctate and verrucose, and it is glabrous in texture. The fruit measures 1 cm in length and contains 1-2 seeds.

2. Ethnomedicinal uses:

- The plant has been reported to possess various pharmacological effects, such as anti-nociceptive, anti-oxidant, anti-diabetic, anti-microbial, and analgesic activities.
- Effective substances, such as alkaloids, phenols, terpenoids, and flavonoids, have been isolated from different parts of *M. paniculata*, including leaves, fruits, flowers, and root barks, to be used as a health remedy.
- Plant extracts of *M. paniculata* have been found to be a potential source of novel anti-microbial agents.
- In traditional medicine in many areas of Bangladesh, *M. paniculata* leaves extract has been orally administered for the relief of pain.
- The leaves extract of *M. paniculata* has the potential to provide a remarkable therapeutic effect on Diabetes Mellitus.

Reference: Sayar K, Paydar M, Pingguan-Murphy B. Pharmacological properties and chemical constituents of *Murraya paniculata* (L.) Jack. Medicinal and Aromatic Plants. 2014; 3(4):1-6.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Lamiales
Family	: Lamiaceae
Genus	: <i>Ocimum</i>
Species	: <i>killimandscharicum</i>

***Ocimum killimandscharicum*, कपूर तुलसी**

Camphor Tulsi, (2n=76)

1. Plant taxonomy:

- It is a perennial aromatic evergreen undershrub with pubescent branchlets having pale green leaves which are glandular, ovate or oblong in shape, base is acute, deeply serrated, pubescent on both surfaces, oppositely arranged and about 3-7 cm in length including petioles which are 4-12 mm long, 1-2.5 cm wide; indumentum of long white adpressed hairs or sometimes glabrous above; petiole 4-10 mm.
- Stems are brownish green, round-quadrangular, much branched, woody with epidermis sometimes peeling off in strips below, arising from a large woody rootstock, with white glandular hairs, becoming denser in the inflorescence-axis, with sparse sessile glands.
- The older stems tend to lose their hairs near their bases and the bark becomes shredded and conspicuous when the dry stems are broken.
- Inflorescence is vertical, flowers are purplish white in simple or much branched racemes; bracts usually deciduous, forming a small coma, ovate, entire, cuspidate; pedicel 3 mm, erect, and slightly curved.

2. Ethnomedicinal uses:

- The leaves of *O. kilimandscharicum* are acrid, thermogenic, aromatic, insecticidal, anti-viral, appetizing and deodorant and are useful in cough, bronchitis, foul ulcers and wounds, ophthalmopathy and vitiated conditions of 'vata'. The plant is reported to have various central nervous system (CNS) activities. The plant has shown neurotoxic, anti-neuralgic, CNS stimulant, tranquilizer, anti-Alzheimer's and sedative effects.
- The plant is characterized by the presence of essential oil with high amount of camphor.
- Leaves are used to protect foodstuffs from pests; to treat cold & cough, abdominal pains, measles and diarrhea and also insect repellents against mosquitoes.
- Crushed leaves are snuffed or vapors of boiling leaves are inhaled to treat congested chest, cough and cold.
- Whole plant used as grain protectant, mosquito repellent, analgesic and anti-pyretic; it is used in treating nasal congestion, colds, flu, insect bites, general aches and pains.

Reference: Singh, V., Krishan, P., & Shri, R. (2014). *Ocimum kilimandscharicum* Guerke: Phytochemical and pharmacological aspects; a review. Journal of Pharmacognosy and Phytochemistry, 3(2), 1-11.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Gentianales
Family	: Apocynaceae
Genus	: <i>Cascabela</i>
Species	: <i>thevetia</i>

***Cascabela thevetia* or *Thevetia peruviana*, कनेर**

Peeli Kaner or Yellow oleander, (2n=20)

1. Plant taxonomy:

- Shrub or small tree up to 8 m tall; branchlets glabrous, with gray bark and white latex.
- Leaves arranged spirally, simple and entire, almost sessile; stipules absent; blade linear-lanceolate, 6–15 cm × 0.5–1 cm, base decurrent into the short petiole, apex long-acuminate, leathery, lateral veins obscure.
- Inflorescence a terminal or seemingly axillary cyme, few-flowered; bracts small, linear.
- Flowers bisexual, regular, 5-merous, faintly fragrant; pedicel 1–2 cm long; sepals ovate, 1 cm long, acute, spreading; corolla tube trumpet-shaped, 35–45 cm long, corona lobes small, densely pubescent, alternating with the stamens, corolla lobes broadly oblong, 3 cm long, overlapping, yellow to peachy pink, rarely white; stamens inserted near apex of corolla tube, included, anthers almost sessile; ovary superior, consisting of 2 carpels fused in lower half, style long and slender, pistil head consisting of a 5-ridged basal part and a cone-shaped apex.
- Fruit a depressed-globose to turnip-shaped drupe 3–4 cm in diameter, yellowish green, ripening black, 2–4-seeded within the stony endocarp.
- Seeds obovoid, 2 cm × 1.5 cm, flattened.

2. Ethnomedicinal uses:

- *Thevetia* is a medicinal plant traditionally used to treat external wounds, infected areas, ring worms, tumors and other ailments.
- A decoction made from the bark or leaves of *Thevetia* is used to relieve constipation and induce vomiting. It is also believed to be an effective cure for intermittent fevers.
- The seeds of *Thevetia* can be used as a purgative, while the seed oil is applied topically in India to treat skin infections.
- In Senegal, a maceration of *Thevetia* leaves and bark is consumed to treat amenorrhea.

Reference: Schmelzer, G. H., & Gurib-Fakim, A. (2006). *Thevetia peruviana* (Pers.) K. Schum. [Internet] Record from PROTA4U. Schmelzer, GH and Gurib-Fakim, A. (Editors). PROTA (Plant Resources of Tropical Africa: Wageningen, Netherlands).



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Caryophyllales
Family	: Cactaceae
Genus	: <i>Opuntia</i>
Species	: <i>dillenii</i>

***Opuntia dillenii*, नागफनी**

Prickly pear or Nagphani, (2n=44)

1. Plant taxonomy:

- Plants of *O. dillenii* sprawl out or erectly grow and reach a height of about 50-200 cm.
- The cactus plants consist of flattened, elliptic, and obovate stem segments, known as cladodes, joints, or pads, and are notable for their numerous stout spines.
- The joints are dull green or bluish-green in color, 10-40 cm long, 5-15 cm broad, 1-2 cm thick, and irregularly trimmed with relatively few areoles. These pimple-shaped structures are some millimeters in height and in diameter and bear small scale-like leaves on young joints, later on 1-10 spines each.
- The spines of cactus plants are highly variable in color (ranging from yellow to brown) and length (1.5-6 cm), and may sometimes be absent.
- O. dillenii* plants produce 6-8 cm wide flowers that turn lemon yellow as they mature, although they may appear slightly reddish during the early stages of development.
- The pear-shaped fruits of the plant have purple skin, measure 4-7 cm in length, and are about 3 cm in diameter.

2. Ethnomedicinal uses:

- O. dillenii* is a plant that contains betalains, a natural pigment known for its pharmacological properties such as anti-oxidant, anti-cancer, anti-lipidemic and anti-microbial activity, making it a valuable source of these beneficial compounds.
- Consuming *O. dillenii* fruits is a significant source of fiber, ascorbic acid, Manganese, Chromium, and total phenolics, which contribute to its anti-oxidant properties and make it a powerful complement to a healthy diet.
- The fresh stems of *O. dillenii* can be used to extract a potent radical scavenging agent, making it an effective natural remedy with anti-oxidant properties.
- Various extracts of the *Opuntia* plant, including fruit extract, lyophilized cladodes, or phytosterols from fruit and stem extracts, have been shown to have analgesic and anti-inflammatory effects, providing natural relief from pain and inflammation.
- The lyophilized aqueous extract of *O. dillenii* fruits, traditionally used in Canarian medicine for gastrointestinal and bronchial troubles, has been evaluated for its analgesic and anti-inflammatory effects, confirming its potential as a natural remedy for these conditions.
- Polysaccharides isolated from *O. dillenii* have been shown to have antitumor effects, indicating that this plant may have potential as a natural treatment for certain types of cancer.

Reference: Shirazinia, R., Rahimi, V. B., Kehkhaie, A. R., Sahebkar, A., Rakhshandeh, H., & Askari, V. R. (2019). *Opuntia dillenii*: a forgotten plant with promising pharmacological properties. *Journal of pharmacopuncture*, 22(1), 16.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Lamiales
Family	: Lamiaceae
Genus	: <i>Mentha</i>
Species	: <i>piperita</i>

***Mentha piperita*, विलायती पुदीना**

(It is the natural hybrid ($2n=6x=72$) from *M. aquatica* L. (water mint, $2n=96$) and *M. spicata* L. (spearmint, $2n=48$))

Peppermint, ($2n=36$ to $2n=134$)

1. Plant taxonomy:

- The plant grows from 45 to 80 cm tall; stem is quadrangular, channeled, purplish, somewhat hairy and branching towards the top.
- The leaves are opposite, petiolate, ovate, sharply serrate, pointed, smoother on the upper than on the under surface, and of a dark green color, which is paler beneath, the presence of volatile essential oils in the leaves and other parts of the plant gives the plant a very appealing scent and fills the surrounding air with a pleasant aroma of mint.
- The leaf lamina (4–14 cm) possesses hair and glandular trichomes on both the surfaces. Usually the lower surface of leaves contain more glandular trichomes than the upper surface.
- The inflorescence is verticillate.
- The flowers are small, purple, and in terminal obtuse spikes, interrupted below, and cymosely arranged. Late in the season, the growth of the lateral lower branches often gives to the inflorescence the appearance of a corymb.
- The calyx is tubular, often purplish, furrowed, glabrous below, and five-toothed, the teeth being hirsute. The corolla is purplish, tubular, with its border divided into four segments, of which the uppermost is broadest, and notched at its summit. The four short stamens are concealed within the tube of the corolla; the style projects beyond it, and terminates in a bifid stigma.

2. Ethnomedicinal uses:

- To alleviate symptoms in the periumbilical area and intestines, mix 3 drops of *Mentha piperita* (peppermint oil) and 2 drops of *Carum carvi* (caraway oil) with 1 tsp of carrier oil, then apply to the affected area with friction.
- Peppermint oil derived from fresh leaves of the plant, contains cineol, limonene, menthofuran, menthol, and menthone.
- It also has a variety of therapeutic properties and is used in aromatherapy, bath preparations, mouthwashes, toothpastes, and topical preparations. Topical preparations of peppermint oil have been used to calm pruritus and relieve irritation and inflammation.
- Peppermint is promoted for relieving irritable bowel syndrome (IBS), other digestive problems, common cold, sinus infections, headaches, and other conditions. Peppermint oil is promoted for topical use (applied to the skin) for problems like headache, muscle aches, joint pain.

Reference: Fayed, M. A. (2019). *Mentha Piperita* L.-A promising dental care herb mainly against cariogenic bacteria. Universal Journal of Pharmaceutical Research, 4(3), 33-38.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Equisetopsida
Order	: Malpighiales
Family	: Phyllanthaceae
Genus	: <i>Phyllanthus</i>
Species	: <i>virgatus</i>

Phyllanthus virgatus, भुई आंवला

Knotgrass(2n=24)*

1. Plant taxonomy:

- *P. virgatus* is a type of herb that can grow erect or diffuse with a woody root stock.
- The leaves of *P. virgatus* are narrowly oblong, measuring 1.5-2.2 cm in length and 0.4-0.6 cm in width, with an acute base and an apiculate apex. The stipules are peltate-sub sagittate and acuminate.
- *P. virgatus* produces solitary flowers that grow at the axillary position. The male flowers are minute and subsessile, with 5 orbicular tepals, 3 stamens, and nearly free filaments. The female flowers grow on long, filiform pedicels, with 6 oblong and acute tepals, 3 spreading styles, and a saucer-shaped and wavy disc.
- The fruit of *P. virgatus* is a depressed-globose capsule that is 3-4 mm across and verrucose in texture.
- The seeds of *P. virgatus* are minutely tubercled.



Capsule fruit of *Phyllanthus*

2. Ethnomedicinal uses:

- The lignin virgatusin from *P. virgatus* also shows antibacterial activity, it inhibits growth of Gram-positive bacteria.
- Geraniin is the common compound found in *P. virgatus*, which shows antiviral property in the herb.
- The extract of this herb is fed to children suffering from malnutrition due to worm infestation.
- This herb is used as an antiseptic and anti-inflammatory agent by the Gond tribe of India.
- The plant extract shows high anti-oxidant properties.

Reference: Mao, X., Wu, L. F., Guo, H. L., Chen, W. J., Cui, Y. P., Qi, Q., ...& Zhang, L. Z. (2016). The genus *Phyllanthus*: an ethnopharmacological, phytochemical, and pharmacological review. Evidence-Based Complementary and Alternative Medicine, 2016.

*Choda, S.P. & Mehra, P.N. 1972.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Caryophyllales
Family	: Portulacaceae
Genus	: <i>Portulaca</i>
Species	: <i>oleracea</i>

***Portulaca oleracea*, कुलफा, लोनिया**

Common Purslane, (2n=18)

1. Plant taxonomy:

- It grows well in orchards, vineyards, crop fields, landscaped areas, gardens, roadsides, and other disturbed sites.
- Stems are cylindrical, up to 30 cm long, 2-3 mm in diameter, green or red, swollen at the nodes, smooth, glabrous apart from the leaf axils, and diffusely branched, and the internodes are 1.5–3.5 cm in length.
- Purslane leaves are alternate or subopposite, flat, fleshy, having variable shapes, obovate, 1–5 cm long, and 0.5–2 cm across, obtuse or slightly notched at the apex, tapering at base, sessile or indistinctly petiolate, glabrous, smooth, and waxy on the upper surface, with entire margin, small stipules, and cluster of hairs up to 1 mm long. Leaves are egg to spatula shaped, succulent, and stalkless or have very short stalks, about 5–30 mm long, and sometimes their edges are red-tinged. Leaves are green or green with a red margin.
- Cotyledons (seed leaves) are egg shaped to oblong, hairless, succulent, about 2–5 mm long, and sometimes tinged red.
- Flowering initiates during May to September. Flowers originate as single or clusters of two to five at the tips of stems. The flowers are minute or small, having orange, yellow, purple, or white pink color with five petals and typically open only on hot and sunny days from mid-morning to early afternoon.
- Fruit consists of almost round to egg-shaped capsules, usually about 4–8 mm long that open around the middle to release the seeds. Seeds are tiny, less than 1 mm in diameter, circular to egg shaped, flattened, and brown to black with a white point of attachment.
- Numerous seeds are produced.

2. Ethnomedicinal uses:

- Its medicinal value is evident from its use for treatment of burns, headache, and diseases related to the intestine, liver, stomach, cough, shortness of breath, and arthritis.
- Its use as a purgative, cardiac tonic, emollient, muscle relaxant, and anti-inflammatory and diuretic treatment makes it important in herbal medicine.
- Purslane has also been used in the treatment of osteoporosis and psoriasis.
- Purslane is a very good source of alpha-linolenic acid. Alpha-linolenic is an omega-3 fatty acid which plays an important role in human growth and development and in preventing diseases.

Reference: Uddin, M., Juraimi, A. S., Hossain, M. S., Nahar, M., Un, A., Ali, M., & Rahman, M. M. (2014). Purslane weed (*Portulaca oleracea*): a prospective plant source of nutrition, omega-3 fatty acid, and antioxidant attributes. The Scientific World Journal, 2014.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Malpighiales
Family	: Euphorbiaceae
Genus	: <i>Ricinus</i>
Species	: <i>communis</i>

***Ricinus communis*, अरंडी**

Castor oil plant, (2n=20)

1. Plant taxonomy:

- *Ricinus communis* L. (Castor oil plant) is an annual or perennial shrub belonging to the family Euphorbiaceae.
- Leaves have long petioles and palm-like lobed blades.
- Inflorescence consists of unisexual flowers which are arranged at the top of the axis in the form of panicles; male flowers lie towards the base and female flowers towards the apex; perianth leaves (sepals and petals) are inconspicuous and caducous.
- Fruit is three chambered, globose capsule with soft spines. When capsules mature, they split up into three cavities and the seeds are expelled out.
- Seeds are dorsoventrally flattened, ovoid, fleshy, and covered by grayish, silvery or light brown generally dotted seed coats.

2. Ethnomedicinal uses:

- *R. communis* exhibits various biological and pharmacological activities such as abortifacient effect, acid phosphatase inhibition, acid phosphatase stimulation, agglutinin activity, alkaline phosphatase inhibition, anti-conceptive activity, anti-diabetic activity, anti-fertility effects, anti-inflammatory activity, anti-microbial activity, anti-oxidant activity, free radical scavenging activity, hepatoprotective activity, Insecticidal activity, and repellent Properties.
- Root extract of *R. communis* a potent anti-diabetic.
- The subcutaneous application of ether extracts prepared from seeds of castor plant demonstrate anti-contraceptive effect.
- Castor oil applied topically can give immense relief from arthritis, back pain and general muscle aches and soreness.
- Leaves are used in the form of a poultice or fomentation on sores, boils and swellings.
- The kheer made from the plant's seeds (boiled in milk) is a well-known household remedy for the Sciatica-Lumbago Syndrome.
- Castor oil has the remarkable ability to increase our body's lymphocytes. Lymphocytes, or white blood cells, regulate wound healing.

Reference: A review of phytochemistry, ethnomedicinal uses, biological and pharmacological activities of Castor oil plant. Pak. J. Pharm. Sci., Vol.30, No.5, September 2017, pp.1815-1827.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Lamiales
Family	: Lamiaceae
Genus	: <i>Rosmarinus</i>
Species	: <i>officinalis</i>

***Rosmarinus officinalis*, गुलमैहदी**

Rosemary, (2n=18)

1. Plant taxonomy:

- Rosemary is an evergreen shrub up to 1.8 m tall, erect or procumbent.
- The leaves (10–41 × 1–3 mm) are non-petiolate, of variable size in the same branch; they are strongly recurved and are sharpened, with a linear or lanceolate shape. The upper surface is green and the underside is whitish due to the presence of numerous hairs: glandular (capitate and peltate) and non-glandular trichomes.
- Its flowers are small, arranged in short clusters, and they have a purple or white bilabiate corolla (8.5 – 13.5 mm).
- Fruit is a small, brown nutlet.

2. Ethnomedicinal uses:

- *Rosmarinus officinalis* is known in medicine for antimicrobial, anti-mutagenic, anti-diabetic, anti-depressive, and chemopreventive activities.
- The presence of carnosol and carnosic acid, as well as ursolic, oleanolic, and micromeric acids, are responsible for the inflammatory activity of *R. officinalis* extract.
- The anti-fungal activity of rosemary essential oil has been demonstrated against *Candida albicans*, *Candida dubliniensis*, *Candida parapsilosis*, and *Candida krusei*.
- The oil extracted from *R. officinalis* accelerates wound healing in both diabetic and non-diabetic animals.
- Administration of *R. officinalis* hydroalcoholic extract results in a decrease in the number, diameter, weight, and incidence of tumors, as well as an increase in the latency period.
- The leaves of *R. officinalis* have been shown to exhibit anti-inflammatory activity.

Reference: de Macedo LM, Santos ÉM, Militão L, Tundisi LL, Ataíde JA, Souto EB, Mazzola PG. Rosemary (*Rosmarinus officinalis* L., syn *Salvia rosmarinus* Spenn.) and its topical applications: a review. *Plants*. 2020 May; 9(5):651.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Santalales
Family	: Santalaceae
Genus	: <i>Santalum</i>
Species	: <i>album</i>

***Santalum album*, चंदन**

Indian Sandalwood, (2n=20)

1. Plant taxonomy:

- *Santalum album* is a small evergreen tree that can reach a height of 4 m in Australia, but can grow much larger in India, up to 20 m in height with a girth of up to 2.4 m and slender drooping branchlets.
- The bark of the tree is tight and can be dark brown, reddish, dark gray, or nearly black, smooth in young trees, but rough with deep vertical cracks in older trees, and red inside.
- Leaves thin, usually opposite, ovate or ovate elliptical, 3-8 x 3-5 cm, glabrous and shining green above, glaucous and slightly paler beneath; tip rounded or pointed; stalk grooved, 5-15 cm long; venation noticeably reticulate.
- Flowers purplish-brown, small, straw coloured, reddish, green or violet, about 4-6 mm long, up to 6 inches small terminal or axillary clusters, unscented in axillary or terminal, panicle cymes.
- Fruit a globose, fleshy drupe; red, purple to black when ripe, about 1 cm in diameter, with hard ribbed endocarp and crowned with a scar, almost stalk less, smooth, single seeded.



Sandalwood or Chandan

2. Ethnomedicinal uses:

- The plant is renowned for its unique and distinctive fragrance.
- In traditional medicinal systems like Ayurveda, Unani, and Siddha, the sandalwood plant is utilized to treat various ailments such as jaundice, dysentery, gastric irritability, and is used as a tonic for the liver, heart, fever, memory improvement, anti-poison, and as a blood purifier.
- Sandalwood is known to possess expectorant, diuretic, astringent, stimulant, coolant, and sedative properties.
- The plant is linked to various reported therapeutic and pharmacological properties such as antioxidant, anti-cancer, anti-inflammatory, anti-viral, anti-bacterial, anti-fungal, hepatoprotective, and cardio-protective properties.

Reference: Choudhary S, Chaudhary G. Sandalwood (*Santalum album*): ancient tree with significant medicinal benefits. International Journal of Ayurveda and Pharma Research. 2021 Jun 1:90-9.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Liliopsida
Order	: Asparagales
Family	: Asparagaceae
Genus	: <i>Dracaena</i>
Species	: <i>trifasciata</i>

***Dracaena trifasciata* or *Sansevieria trifasciata*, नाग पौधा**

Snake Plant or Mother-in-law's tongue or Goodluck Plant, (2n=40)

1. Plant taxonomy:

- The plant is either a spreading or clumping species that possesses a network of creeping underground stems.
- The plant has large, elongated, sword-shaped leaves that can reach lengths of 30-120 cm and widths of 2.5-9 cm. These leaves are arranged in small upright clusters.
- The plant's long-lived leaves are somewhat fleshy and have sharply-pointed tips.
- The leaves are irregularly striped, dark green and pale whitish-green in colour.
- The plant's whitish-coloured flowers are 25-30 mm long and have six narrow 'petals' that are partially fused at the base.
- The plant's rounded berries have a diameter of 7-9 mm and turn bright orange when they reach maturity.

Use:

Analgesic and anti-pyretic effects of *Sansevieria trifasciata* Leaves.

Reference: Anbu, J. S. J., Jayaraj, P., Varatharajan, R., Thomas, J., Jisha, J., & Muthappan, M. (2009). Analgesic and antipyretic effects of *Sansevieria trifasciata* leaves. African Journal of Traditional, Complementary, and Alternative Medicines, 6(4), 529.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Fabales
Family	: Fabaceae
Genus	: <i>Prosopis</i>
Species	: <i>cineraria</i>

***Prosopis cineraria*, जंड, खेजड़ी**

Shami tree or Jand or Khejri, (2n=28)

1. Plant taxonomy:

- The *Prosopis cineraria* tree can grow up to 6.5 meters in height, and has a cortex that is cinereous in color. It features scattered, straight, and somewhat macroscopic prickles that are conical in shape with broad bases, and are found internodally. Additionally, its taproot can extend more than 3 meters in length.
- Leaves 1-3-jugate, glabrous or puberulous; petiole and rachis 0.5-4 cm long, the pinnae 2-7 cm long; leaflets 7-14 jugate, ovate, straight to subfalcate, without nerves (or 2-4 nerves at base, the midrib excentric), mucronate, 4-15 mm long x 2-4.5 mm broad, greyish when dry; stipules foliaceous, and deciduous.
- Racemes are spiciform, 5-13 cm long, several together, subpaniculate; peduncle with amplexicaul bract (or 2 bracts united), this caducous and leaving an oblique scar, 1.5-2 mm long; bractlets ovate, sessile, 0.5-0.8 mm long, caducous; pedicels 0.5 mm-1.5 mm long when mature.
- Flowers are yellow, glabrous; calyx truncate, 0.8-1.2 mm long; corolla 3.5 mm long, glabrous, the petals rolled back in age; anthers 0.8-1 mm long; pistil glabrous.
- Fruit slender, elongate, 8-19 cm long (including the stipe 0.8-2 cm), subcylindrical-torulose, 4-7 mm in diameter, glabrous; pericarp thin, brittle; endocarp segments thin, longitudinal, little developed; seeds distant, longitudinal, ovate, 6 mm long, the tegument with open horse-shoe fissural line on faces, 10-15 in a pod, brown.

2. Ethnomedicinal uses:

- The stem bark has folkloric reputed to possess anti-inflammatory, anti-rheumatic, tonic, and vermifuge properties and is used in the treatment of anxiety, asthma, bronchitis, dyspepsia, fever, dysentery, leprosy, piles, wandering of the mind, and tremors. Furthermore, it is claimed to have abortifacient and laxative properties.
- The smoke of the burnt leaves is used to treat eye inflammation. Leaf paste is applied on boils and blisters, including mouth ulcers in livestock and leaf infusion on open sores on the skin.
- Flowers are used as an antidiabetic agent and to prevent abortion.
- The plant material is one of the herbal remedies for snake bite and scorpion sting.
- The wood ash may be used as a source of potash and the ashes are rubbed over the skin to remove hair.

Reference: Orwa C, A Mutua, Kindt R, Jamnadass R, S Anthony. 2009 Agroforestry Database: a tree reference and selection guide version 4.0 (<http://www.worldagroforestry.org/sites/treedbs/treedatabases.asp>)

Janbaz, K. H., Haider, S., Imran, I., Zia-Ul-Haq, M., De Martino, L., & De Feo, V. (2012). Pharmacological evaluation of *Prosopis cineraria* (L.) Druce in gastrointestinal, respiratory, and vascular disorders. Evidence-Based Complementary and Alternative Medicine, 2012).



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Solanales
Family	: Solanaceae
Genus	: <i>Solanum</i>
Species	: <i>nigrum</i> Linn.

Solanum nigrum, मकोई

Black Nightshade, (2n=24)

1. Plant taxonomy:

- The plants in this family are typically climbers or scrambling plants, often possessing hairy stems and leaves.
- The leaves of these plants are variable and can either be entire or dissected, without any stipules, and are usually arranged alternately.
- Morphological studies reveal that the roots of these plants have few branches and numerous small lateral roots. Externally, the root appears smooth and pale brown.
- The fruit of these plants has a thin, papery epicarp, a pulpy mesocarp, and axile placentation.
- The seeds of these plants are free in the pulp of the fruit. The fruits themselves are usually berry-like, with a diameter of around 6mm and are obtuse in shape.



Flower and fruits of *Solanum nigrum* Plant

2. Ethnomedicinal uses:

- The leaves of this plant are utilized for the treatment of rheumatoid and gouty joints, as well as for skin diseases. They are also used in the treatment of tuberculosis, nausea, and nervous disorders.
- The juice and decoction of the berries of this plant are known to have anti-oxidative, anti-inflammatory, and anti-pyretic effects. They are useful in treating coughs, diarrhea, inflammations, and skin diseases.
- The ethanol extract of dried fruits from the *Solanum nigrum* plant has been shown to have a remarkable hepatoprotective effect against CCl₄ induced oxidative damage on liver cells.
- The most significant property of the *Solanum nigrum* plant is its anti-cancer potential.

Reference: Sudha, Yerukali & Reddy, V & Basha, Shaik & Mallapu, Koshma & Hanumanthu, G & Swaroopa, P. (2017). A REVIEW ON SOLANUM NIGRUM. 6. 10.20959/wjpps 201712-10538.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Asterales
Family	: Asteraceae
Genus	: <i>Sphagneticola</i>
Species	: <i>calendulacea</i>

***Sphagneticola calendulacea*, पीला भंगरा**

Chinese Wedelia, (2n=50)

1. Plant taxonomy:

- Wedelia is a tender, spreading, and hairy herb that typically has branches that are less than 50 cm in length.
- The leaves of this plant are oblong to oblong-lanceolate and measure 2-4.5 cm in length. They are narrowed at both ends, with margins that are either entirely smooth or obscurely toothed. Additionally, both surfaces of the leaves are covered with sharp-pointed, appressed, straight, and stiff hairs.
- The heads of this plant are yellow, stalked, and about 1 cm in diameter. The involucre bracts are oblong-ovate in shape.
- The ray flowers of this plant are broad, spreading, and number 8-12, approximately equal in size to the bracts. The disk flowers, on the other hand, are short, narrow, and pointed, numbering about 20.
- The achenes of this plant are nearly cylindrical and covered in hair.

2. Ethnomedicinal uses:

- The herb contains wedelolactone and demethyl wedelolactone (Coumestans derivatives) possessing potent anti-hepatotoxic effect and is incorporated as a major ingredient in a number of developed potent anti-hepatotoxic phytopharmaceuticals formulations. It is useful in the treatment of osteoporosis of the knee and also possesses anti-inflammatory activity.
- Its leaves can be used in treatment of dermatological disorders, cough, headache, hair loss, lice, strengthening the nervous system, lack of blood, digestive system disorders. The leaves are used in dyeing gray hair and in promoting the growth of hair. They are considered tonic, alternative, and useful in coughs, cephalalgia, skin diseases, and alopecia.
- The juice of the leaves is much used as a snuff in cephalalgia.
- The seeds, flowers, and leaves of this plant are used in decoction, typically in the amount of half a teacupful twice daily, as a deobstruent. This decoction is also used in the treatment of uterine hemorrhage and menorrhagia.
- Wedelia leaves extract can be used with confidence for treating Rheumatic fever

Reference: Mehra, P. N., & Remanandan, P. (1974). Cytological investigations on the Indian compositae. II. Astereae, Heliantheae, Helenieae and Anthemideae. *Caryologia*, 27(3), 255-284.

Meena, A. K., Rao, M. M., Meena, R. P., & Panda, P. (2011). Pharmacological and phytochemical evidence for the plants of Wedelia Genus—A Review. *Asian Journal of Pharmaceutical Research*, 1(1), 7-12.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Mangoliophyta
Class	: Magnoliopsida
Order	: Ranunculales
Family	: Menispermaceae
Genus	: <i>Tinospora</i>
Species	: <i>cordifolia</i>

Tinospora cordifolia, गिलोय

Heart-leaved moonseed, (2n=26)

1. Plant taxonomy:

- *T. cordifolia* is a wide deciduous, glabrous, rapidly ascending shrub with several coiling branches extending approximately 3-4 feet in height and roughly 1 foot long.
- The stem is quite scrumptious, with long filiform fleshy aerial branch roots. The plant stem is grayish brown-black in color, bitter in texture, soft wooded, dry, cylindrical, and also in circumference from 5 mm to 25 mm.
- The leaves are simple, 5-10 cm long, alternating, exstipulate, long petiolate (2.5-7 cm), rounded chordate with multi-coated reticulated midrib. From the branches long tentacle-like aerial roots arise.
- The flowers of this plant are small, typically yellow or yellow-greenish in color. The male flowers are concentrated in adjunct and terminal racemes or racemose panicles, while the females are usually solitary.
- The fruit of this plant is a composite structure that is fleshy and red in color. It features extensive drupelets on a thick stalk with a border that is sub-terminal in form, and is colored scarlet.

2. Ethnomedicinal uses:

- *Tinospora cordifolia* extracts are extensively used in various herbal preparations for the treatment of different ailments for its anti-periodic, anti-spasmodic, anti-microbial, anti-osteoporotic, anti-inflammatory, anti-arthritic, anti-allergic, and anti-diabetic properties.
- The stem of *Tinospora cordifolia* is widely used in the therapy of diabetes by regulating the blood glucose in traditional folk medicine of India.
- Alkaloids, tannins, cardiac glycosides, flavonoids, saponins, and steroids as the major phytoconstituent of *Tinospora cordifolia* have been reported to play an anti-diabetic role.
- *Tinospora cordifolia* extracts have been reported to scavenge free radicals generated during aflatoxicosis.
- *Tinospora cordifolia* with *Zingiber officinale* has been used in rheumatoid arthritis treatment in traditional medicine.
- The methanol extracts of *Tinospora cordifolia* have been reported to have potential against microbial infections.
- The oral administration of *Tinospora cordifolia* stem methanol extracts has been shown to increase the antioxidant capacity of the body. This increase was accompanied by a reduction in erythrocyte membrane lipid peroxide and an increase in catalase activity.

Reference: Ancient Science of Life / Apr-Jun 2012 / Vol 31 / Issue 4 Saha and Ghosh: *Tinospora Cordifolia* and biomedical applications.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Apiales
Family	: Apiaceae
Genus	: <i>Trachyspermum</i>
Species	: <i>ammi</i>

***Trachyspermum ammi*, अजवायन**

Ajwain, (2n=18)

1. Plant taxonomy:

- Ajwain is an annual herb that is profusely branched and can grow up to 60-90 cm in height.
- Its leaves are pinnate and consist of a terminal leaflet and 7 pairs of lateral leaflets.
- The stem of the plant is striated.
- The inflorescence of Ajwain is a compound umbel, consisting of 16 umbellets, each containing up to 16 flowers. The flowers are of the actinomorphic type and are white in color. They can be either male or bisexual, and have a corolla consisting of 5 bilobed petals and 5 stamens that alternate with the petals. The ovary of the flower is inferior, and the stigma is knob-like.
- The fruit of Ajwain is ovoid and cordate in shape, and is known for its aromatic properties. It is a cremocarp with a persistent stylopodium and consists of two mericarps that are grayish-brown in color. Each mericarp is about 2 mm long and 1.7 mm wide, and has 5 ridges and 6 vittae. The mericarps are usually separate and have 5 primary ridges.



Ajwain

2. Ethnomedicinal uses:

- Ajwain seed contain fiber (11.9%), carbohydrates (38.6%), tannins, glycosides, moisture (8.9%), protein (15.4%), fat (18.1%), saponins, flavone and mineral matter (7.1%) containing calcium, phosphorous, iron and nicotinic acid.
- Ajwain fruits yield 2% to 4% brownish essential oil, with thymol as the major constituent (35% to 60%).

- The principal oil constituents of *T. ammi* are carvone (46%), limonene (38%), and dillapiole (9%).
- Ajwain with its characteristic aromatic smell and pungent taste is widely used as a spice in curries. Its seeds are used in small quantities for flavoring numerous foods, as preservatives, in medicine and for the manufacture of essential oil in perfumery.
- Ajwain is administered for curing stomach disorders, a paste of crushed fruits is applied externally for relieving colic pains; and a hot and dry fomentation of the fruits is applied on chest for asthma.

Reference: Bairwa, R., Sodha, R. S., & Rajawat, B. S. (2012). *Trachyspermum ammi*. *Pharmacognosy reviews*, 6(11), 56.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Mangoliophyta
Class	: Magnoliopsida
Order	: Asterales
Family	: Asteraceae
Genus	: <i>Tridax</i>
Species	: <i>procumbens</i>

Tridax procumbens, घमरा

Coatbuttons or Tridax daisy, (2n=36)

1. Plant taxonomy:

- *T. procumbens* can be found in tropical and subtropical areas around the world, and it grows in areas such as annual crops, roadsides, pastures, fallow land, and waste areas.
- It has herbaceous, semi-prostrate habit and can reach heights of 15-40 cm. The leaves are opposite, elongated, ovate with serrated margins, and are covered in stiff hairs on both the upper and lower surfaces.
- The inflorescence of *T. procumbens* is a capitulum containing white ligulate ray florets with three teeth and yellow, tubular, bisexual disc inner flowers with a corolla length of 6 mm.
- *T. procumbens* produces an abundant amount of pappus achenes, which are obovoid, setaceous, 2 mm long, and covered in stiff hairs. These achenes can be carried by the wind for long distances, making this species a potential invasive species if not properly controlled.

2. Ethnomedicinal uses:

- *T. procumbens* is utilized as a treatment for bacterial, fungal, and viral infections, as well as for conditions such as vaginitis, stomach pain, diarrhea, mucosal inflammations, and skin infections.
- The juice from *T. procumbens* leaves is applied topically to wounds to promote healing and stop bleeding.
- Tridax can be used to alleviate anemia symptoms in lactating pregnant women.
- The whole plant is used to treat protozoal infections.
- Aqueous extracts derived from *T. procumbens* have potent anti-plasmodial properties against chloroquine-resistant *P. falciparum* parasites.
- *T. procumbens* leaves can be dried and used with other herbs orally for various purposes, such as treating diabetes, acting as an insect repellent, and treating diarrhea. They are also used to treat hemorrhages, hair loss, jaundice, and inflammation.

Reference: Beck, S., Mathison, H., Todorov, T., Calder, E., & Kopp, O. R. (2018). A review of medicinal uses and pharmacological activities of *Tridax procumbens* (L.). *J Plant Stud*, 7(1).



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Gentianales
Family	: Apocynaceae
Genus	: Tylophora
Species	: indica

***Tylophora indica*, अंतमूल, दमबेल**

Antmool, (2n=64)

1. Plant taxonomy:

- The plant is a perennial herb with a twining or climbing laticiferous and suffruticose (woody) growth habit.
- The roots of the plant are fleshy and long, and bear knots with a light brown corky bark.
- The stem of the plant is long, hairy, and can climb up to a height of 1.5 meters with the help of tendrils.
- The leaves of the plant are arranged in an opposite decussate manner, with oblong, ovate to elliptical shapes and a length and diameter of 6-10.5 and 3.8-6.0 cm, respectively. The leaves have 12 mm long petioles.
- The plant produces minute flowers arranged in umbellate cymes (1-1.5 cm across) at the end of hairy peduncles of leaf axils. The flowers have a haired calyx and greenish-yellow to greenish-purple corolla, and blossom from September-January.
- The fruit of the plant is a fusiform follicle that is 5-8.5 cm long, divaricate, ovoid lanceolate, tapering at the apex, and glabrous.

2. Ethnomedicinal uses:

- Traditionally, the plant is being used for curing asthma, cough, inflammation, jaundice, snakebite, syphilitic rheumatism, gout, diarrhea, and dysentery. The plant has been traditionally used as emetic, diaphoretic, expectorant, purgative and stimulant.
- A rich phytochemical profile such as alkaloids, saponins, tannins, terpenoids, etc., is associated with *T. indica*. Major Phytochemicals are investigated in the aerial parts of the plant, mainly leaves.
- The plant is admired for the valuable bioactive phytoconstituents, particularly alkaloids. The alkaloids are known to lend the analgesic, antispasmodic, and bactericidal potential to the plants.
- Saponins are admired for the ability to fight against the microbes and boost the immune system of the body. Anti-cancer, anti-oxidant, anti-microbial, and anti-inflammatory properties of different plant parts could also be attributed to the action of saponins.
- An extract of the leaves of the plant, along with black pepper and garlic, is used for the treatment of asthma.
- A decoction made from the leaves of the plant is used as an antidote against snake poison.
- The plant is also used to kill intestinal worms.

Reference: Nazar, S., et al. "Alkaloid-rich plant Tylophora Indica; current trends in isolation strategies, chemical profiling and medicinal applications." Arabian Journal of Chemistry 13.8 (2020): 6348-6365.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Tracheophyta
Class	: Magnoliopsida
Order	: Solanales
Family	: Solanaceae
Genus	: <i>Withania</i>
Species	: <i>somnifera</i>

***Withania somnifera*, अश्वगंधा**

Winter cherry or Ashwagandha, (2n=48)

1. Plant taxonomy:

- *Withania* is a branching perennial undershrub with a strong, disagreeable odor similar to horse's urine, growing to a height of 30-150cm.
- *Withania somnifera* is a small shrub that grows to a height of 1-2m, covered in silver-gray, fine, branched hairs, and with almost the entire plant covered and surrounded by them.
- The stems of *Withania* are erect and brownish-dark in color, and the lower part of the stem may have fewer leaves or no leaves at all.
- The leaves are in an alternate manner (opposite on flowering shoots), simple, possessing margins are slightly waved, narrowed into the 5-20mm long petioles, normally broadly ovate or oblong, 29-80 mm long and 21-50mm broad. It is generally referred to as stellate-tomentose, grayish, under shrub of 30-150 cm height with long woody tuberous roots.
- Flowers are generally small, greenish, axillary, monoecious or bisexual and solitary or in few-flowered cymes.
- Ashwagandha fruit is usually a round hairless berry, 5-8 mm across, orange-red to red in ripped condition and is enveloped by the enlarged calyx.
- Seeds are normally many, discoid, reiform and yellow.

2. Ethnomedicinal uses:

- *Withania somnifera* has been traditionally used to increase energy, youthful vigor, endurance, strength, and vital fluids such as semen, blood, lymph, muscle fat, and cell production.
- It possesses medicinal properties for various human diseases including anti-cancer, anti-microbial, anti-convulsant, anti-oxidant, anti-neurodegenerative; and is an immune-modulatory agent.
- *Withania somnifera* also contains novel biochemical molecules with potent pharmacological activities such as withaferin, withanolides, and withanimades.
- The roots and leaves of *Withania somnifera* are the major sources of phytochemical compounds, unique in steroidal alkaloids and lactones.
- *Withania somnifera* has been found to have various potent pharmacological activities such as anti-microbial, anti-protease, and inhibitors of phospholipase and hyaluronidase activity of snake venom.
- *Withania somnifera* has a controlling effect on azoxymethane-induced colon cancer and immune dysfunction.

Reference: Gaurav, N., Kumar, A., Tyagi, M., Kumar, D., Chauhan, U. K., & Singh, A. P. (2015). Morphology of *Withania somnifera* (distribution, morphology, phytosociology of *Withania somnifera* L. Dunal). *Int J Current Sci Res*, 1(7), 164-173.

A Dar, P., R Singh, L., A Kamal, M., & A Dar, T. (2016). Unique medicinal properties of *Withania somnifera*: Phytochemical constituents and protein components. *Current pharmaceutical design*, 22(5), 535-540.



Domain	: Eukaryota
Kingdom	: Plantae
Sub-kingdom	: Tracheobionta
Division	: Magnoliophyta
Class	: Magnoliopsida
Order	: Apiales
Family	: Apiaceae
Genus	: Centella
Species	: asiatica

***Centella asiatica*, जल-ब्राह्मी/ गोटू कोला**

Gotu kola or Indian pennywort, (2n=18)*

1. Plant taxonomy:

- *C. asiatica* is a perennial herb that has many horizontal and creeping stems and is either hairless or slightly wooly. The stem of *C. asiatica* is thin, cylindrical, and fluted, and it is also stoloniferous.
- The stem of *C. asiatica* may be purple in color, and it can be either glabrous (hairless) or tomentum wooly, which means it has a dense covering of fine, matted hairs.
- The leaves are round, 2-9 cm in diameter, arranged in groups of 4-5 and carried by a long petiole (1-10 cm). Leaves are arranged in small clusters of 1-5. Blades are attached by long petioles 1-50 cm long. Leaflet is gutter and base sheathing, papery, glabrous to pubescent or wooly. Limbe wide, reformed to orbicular, base cordate and apex rounded, 1-7 cm long and 1.5-9.5 cm wide. Limbe loosely hairy or pubescent or wooly on the lower surface, especially the ribs. Upper surface glabrous. Leaf margin is created to denote. Venation is palmate.
- Fruit is an achene, circular to ellipsoid shaped, yellowish brown and slightly lobed.

2. Ethnomedicinal uses:

- It is widely used as a blood purifier as well as for treating high blood pressure, for memory enhancement and promoting longevity.
- In Ayurveda, *C. asiatica* is one of the main herbs for revitalizing the nerves and brain cells.
- Eastern healers relied on *C. asiatica* to treat emotional disorders, such as depression, that were thought to be rooted in physical problems.
- In the Western medicine, during the middle of the twentieth century, *C. asiatica* and its alcohol extracts reported to have shown positive results in the treatment of leprosy.
- The primary active constituents of *C. asiatica* are saponins (also called triterpenoids), which include asiaticosides, in which a trisaccharide moiety is linked to the aglycone Asiatic acid, madecassoside and madasiatic acid. These triterpene saponins and their sapogenins are mainly responsible for the wound healing and vascular effects by inhibiting the production of collagen at the wound site.
- Indian literature has described *C. asiatica* as possessing various CNS effects, including stimulatory-nervine tonic, rejuvenant, sedative, tranquilizer, and intelligence-promoting properties.
- *C. asiatica* is known to have the ability to revitalize the brain and nervous system, as well as to increase attention span and concentration, and combat aging.

Reference: Gohil, K. J., Patel, J. A., & Gajjar, A. K. (2010). Pharmacological review on *Centella asiatica*: a potential herbal cure-all. *Indian journal of pharmaceutical sciences*, 72(5), 546. Nagendra Prasad, P. & E. K. J. Ammal. 1985. *Chromosome count of *Centella asiatica* (Linn.) Urban. *Curr. Sci.* 54: 706-707.



Medicinal values of the different plants assembled at the in-house Ayur-Vatika being demonstrated on the occasion of Student-Scientist Connect programme organized at the campus on 4th November, 2022.



Participants of the National Workshop “Role of taxonomical identification and authentication of plants and crude drugs in traditional medicine and research” organized as a part of International Conference on “Communication and Dissemination of Indian Traditional Knowledge (CDTK)-2023”, visited the Ayur-Vatika on February 15, 2023.

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