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Indian Weeds Having Medicinal Properties: A Review

Navneet Kumar Verma[*1]; Vikash Chandra[2]; Ruchi Mishra[3]
[1]Associate Professor, Buddha Institute of Pharmacy, GIDA, Gorakhpur, UP, India-273209
[2]Faculty of Pharmacy, Uttar Pradesh University of Medical Sciences Saifai Etawah UP.206130
[3]Assistant Professor, B.P.S. Educational Institution of Pharmacy, Etah, U.P, India

ABSTRACT
Growing demand for Indian weeds has resulted in a new approach in the field of plant materials transported inside and across countries in recent years. Because of their powerful pharmacological effects, low toxicity, and commercial feasibility, the therapeutic characteristics of these plants have been studied in light of modern scientific discoveries. Many people use medicinal weeds or seek medical advice regarding their use. Weed seeds are dispersed through a variety of methods, including wind and water transmission and ingestion of weeds and their fruit by native or introduced animals. Native birds are an excellent example of an efficient "vector" for dissemination. Weed invasion endangers wetland biodiversity, resulting in a loss of both species and habitat diversity. Aquatic weeds have the ability to clog streams and jeopardise irrigation channels. They have the ability to spread quickly and produce dense mats above or below the water. This reduces the amount of light entering the wetland and, in some situations, causes the mortality of aquatic animals such as fish. Weeds have numerous pharmacological qualities that will benefit mankind, and the general public will be able to expand their understanding of weeds and use them as a home medicine as a result of this review.

Keywords: *Weed, Pharmacological activity, Medicinal property.*

***Corresponding Author**
Navneet Kumar Verma
Associate Professor, Buddha Institute of Pharmacy, GIDA, Gorakhpur, UP, India-273209

INTRODUCTION

Natural products have long been employed for their restorative powers and are the primary source of medicinal medications. According to WHO, 80% of the world's population is expected to use herbal medicine in their health care[1]. India has around 45,000 plant species. Although there are approximately 3000 officially recognised plants with therapeutic potential, conventional practitioners employ over 6000 plant species. India is the world's largest producer of medicinal herbs and is appropriately recognised as the world's botanical garden[2, 3]. In pastoral India, the traditional system of medicine, such as Ayurveda, is used by 70% of the population. Plants are said to contain a variety of phytochemicals that are responsible for a variety of biological activities such as antioxidant, lipoprotective, antibacterial, anticancer, and anti-HIV properties[4]. Plant extracts or active chemicals derived from plants are predicted to make up roughly one-quarter of approved medications [5]. Weeds, in general, are plants that grow in places where we do not want any other plant to grow or where we do not want any plant to grow. Weeds typically struggle and compete with other plants and crops for space, light, water, soil moisture, mineral and other nutrients in cropland and forests, resulting in low quality and low-value grain output. Weeds are more adept than crops due to variables such as increased transpiration rate, stomata conductance, photosynthesis, and leaf temperature deficiency, among others, which leads to crop-weed competition and thus crop productivity drops. Weeds are thus defined as unwanted and unattractive plants that have a negative impact on human wellbeing by interfering with the use of lands and water resources. Unwanted vegetation grows in aquatic systems, forests, non-cropped areas such as industrial sites, roadsides, railway lines, waterways, and so on. As a result, under this situation, all undesirable plants become weeds. The term weed refers to any plant that grows aggressively or is invasive outside of its natural habitat. Weeds are sometimes applied derogatorily to species beyond the plant kingdom, species that can survive in harsh circumstances and reproduce swiftly; and in this sense, it has been attributed to humans. Weeds are regarded a significant aspect in land and water resource management, but their effectiveness is highest in agriculture. There is no trustworthy research on the global damage caused by weeds. It is known, however, that weed losses outnumber those caused by agricultural pests such as insects, worms, illnesses, rodents, and so on. Weeds also impede human productivity by generating physical discomforts such as allergies and poisoning [6]. Weeds have such adaptations that allow them to grow in disturbed settings such as dunes, shifting soils, alluvial flood plains, river banks/deltas, and regularly burned areas. They grow and multiply swiftly and have seeds that last for many years in the soil. Many weeds grow beyond their normal geographic boundaries as a result of human migrations and commerce [7].

CANNABIS SATIVA

Cannabis sativa is a Cannabaceae (hemp) plant that grows tall with narrowing leaves. Cannabis sativa strains originate primarily in equatorial nations such as Colombia, Mexico, Thailand, and South East Asia. Cannabis is referred to as dried flower tips of female cannabis plants that thrive in warmer conditions.

Common names- Marijuana, hemp, gallow grass, bhang.
Biological name- *Cannabis sativa L.*

Description

A fully established cannabis plant can grow to be up to 20 feet tall. Once the flowering period of cannabis plants begins, it typically takes 10 to 16 weeks for the plants to develop. Cannabis sativa pure strains require six months for both growth and flowering. The female Cannabis plant's blooms are arranged in racemes and can yield up to 100 seeds. Male Cannabis plants, in general, shed their pollen and die many weeks before seed maturity. Although genetic variables determine whether a plant is male or female, environmental factors such as the diurnal light cycle influence sexual expression [8]. In their vegetative phase, cannabis plant requires more than 12–13 hours of light per day to stay vegetative. When darkness equals at least 12 hours per day then only the flowering occurs. Depending on the strain and environmental conditions, the flowering cycle of Cannabis plants lasts between 9 and 15weeks.

Figure.1; *Cannabis Sativa L.*

Common use

Cannabis has been utilised for a variety of therapeutic uses for many years. It has anti-microbial, anti-bacterial, anti-oxidant, analgesic[9], and anti-inflammatory properties.The open trial found that daily cannabis consumption reduces plasma HIV viral load[11]. It is useful in the treatment of epilepsy[12] and Parkinson's disease because it decreases discomfort and improves movement[13]. The majority of paediatric palliative patients treated with dronabinol demonstrated a promising impact in alleviating refractory spasticity[14]. Phytocannabinoids have been identified as the primary substance that helps sleep disorders and has anti-inflammatory actions [15]. Cannabis and other cannabinoids have a modest effect on PTSD (Posttraumatic Stress Disorder) [16]. The in-vivo test results give substantial evidence for cannabidiol (CBD)'s medicinal potential for Alzheimer's disease [17]. THC reduces pain intensity and unpleasant swallowing in the mouth or oesophagus (odynophagia)[18], is used to treat nausea and vomiting in advanced cancer patients[19], improves post-traumatic stress disorder (PTSD)[20, 21], and is also used to treat multiple sclerosis[22]. Cannabis is also useful in treating Crohn's disease[23], gastrointestinal disorders[23], pain and inflammation[23], anxiety[24, 25], driving ability[26], and sleep quality[27]. A controlled investigation also shown that cannabidiol is useful in treating psychosis[28], schizophrenia[28], and Alzheimer's disease[29]. Treating with dronabinol is effective in reducing the symptoms of OCD[30].

Scientific classification

Kingdom : Plantae
Order : Rosales
Family : Cannabaceae
Genus : *Cannabis*
Species : *C. sativa*

Side-effects

Cannabis smoking causes a variety of physical and psychiatric side effects in new users, including increased heart rate, blood pressure, psychomotor retardation, impairment of cognition and memory[31], euphoria and dizziness, as well as decreased pulmonary function, chronic obstructive airway disorder, and pulmonary infection[31]. Concerns about cannabis safety include an increased risk of memory impairment [32].Strokes are a possible side effect of cannabis use [33]. Despite the fact that the data supports the premise that adolescent cannabis use is related with worse cognition and mental health in adults, it does not demonstrate that cannabis use alone is sufficient to cause these deficits in humans[34].

However, there is still disagreement among published studies about an increased risk of cancer from cannabis smoking in the upper respiratory tract[31].

SOLANUM NIGRUM

It is an African plant used to treat a variety of disorders that cause newborn death, including feverish convulsions. It is a common plant that grows in various parts of Europe and the African continent, primarily in areas such as waste ground, old fields, ditches, wooded margins, and cultivated land. It is a well-known plant due to the hazardous presence of Solanine, a glycoalkaloid found in most portions of the plant, particularly unripened berries [35, 36].

Common names- Black nightshade, wonder berry, and makoi.
Biological name – *Solanum nigrum L.*

Description

Solanum nigrum is a common herb or short-lived perennial shrub found in a variety of woodland places as well as disturbed areas throughout the world's temperate and tropical habitats[37]. It is an annual herb that can grow up to 90 cm tall. Its leaves are dull black in colour, juicy, ovate or lanceolate in shape, and toothless to slightly toothed on the margins. Solanum nigrum flowers are small and white, with a short pedicellate and five widely spread petals. Fruits are typically tiny and turn black when fully mature [35, 36].It is well-known as a rich source of one of the most common plant poisons, as well as a reservoir of different phytochemicals with numerous pharmacological effects [35, 38]. Another strain of Solanum nigrum is found in India with berry es that turns red when ripe [39].

Figure.2; *Solanum nigrum*

Common use

The glycoprotein derived from Solanum nigrum may have anti-cancer properties by inhibiting the NF-kappaB anti-apoptotic pathway, activating caspase cascades, and enhancing nitric oxide generation [40].Solanum nigrum roots are used to promote fertility in women in various parts of India, such as the Thar desert [41]. It is also prescribed for asthma and whooping cough [42]. Solnaum nigrum is commonly used in the treatment of ringworm, used for wart dressing, given to children to stop bedwetting, acute Streptococcus bacterial infection (erysipelas), blindness; conjunctivitis; glaucoma; trachoma; cataract, burns and dermal affections, stomachache; stomach ulcer, rabies; wound healing, cough, as a liver tonic [43].

Scientific classification

Kingdom : Plantae
Order : Solanales
Family : Solanaceae
Genus : *Solanum*
Species : *S. nigrum*

Side effects

Oral administration of black nightshade is dangerous because it contains a toxic chemical known as solanine, which can cause nausea, vomiting, and headache at low doses and severe poisoning at high doses, including irregular heartbeat, difficulty breathing, dizziness, drowsiness, twitching of the arms and legs, muscle cramps, diarrhoea, paralysis, coma, and death. Pregnant women should avoid using black nightshade since it may cause birth abnormalities. A decoction of the herb depresses the CNS and spinal cord reflexes [44]. Antiulcerogenic activities of *Solanum nigrum* studied against aspirin-induced gastric ulcers in rats. The powder of aerial parts of *Solanum nigrum* as well as its methanolic extract, decreased the ulcer index significantly. The activity may be due to inhibition of acid and pepsin secretions [44].

DATURA

Datura stramonium is a Solanaceae plant that grows in the wild. It is widely distributed and easily accessible in deserts of North America, South America, Europe, Asia, and Africa, with the Himalaya region from Kashmir to Sikkim being the most abundant. It is mostly composed of tropane alkaloids that are highly poisonous in nature, such as atropine, hyoscyamine, and scopolamine [45].

Common names- Thorn apple, Datura metel, angel's trumpets and moonflowers
Biological name - *D.stramonium L.*
Description

Datura stramonium is a coarse shrub of height about 3 to 4 feet. It is an annual plant with alternate leaves, 8 cm in length and 5 cm breadth, with a lobed margin. The roots of *Datura stramonium* are large, white in color, and have advance taproot system. The stem of *Datura stramonium* is greenish in color, hairless, and cylindrical in shape. Flowers are single and erect and arise through the branches [45].

Figure.3; *Datura stramonium*

Common uses

Datura is been reported for various medicinal properties such as it is effective for treatment of Asthma [46], Parkinson's disease, and motion sickness. It also has acaricidal, repellent and oviposition deterrent properties, anti-microbial properties[47], pesticide toxicity, and anti-inflammatory properties and it is also been reported that datura also shows anti-cancer activity [48].

Scientific classification

Kingdom : Planteae
Order : Solanales
Family : Solanaceae
Genus : *Datura*
Species : *stramonium*

Side-effects

Poisonous to human health, anticholinergic delirium, hyperthermia; tachycardia; bizarre, and possibly violent behavior; and severe mydriasis with resultant painful photophobia a pronounced amnesia. It has been found that seeds of datura lead to acute encephalopathy **[**49**]**.

GOLDEN ROD

Solidago is commonly known as goldenrods and belongs to aster family, Asteraceae. It consists of 100 to 120 species of flowering plants of an Asteraceae family. They are mostly found in North America, mainly in Mexico; and some species are found in South America and Eurasia [50].

Common names- Solidago, Aaron's Rod, Canadian Goldenrod, Early Goldenrod, European Goldenrod, Solidage, Solidage du Canada, *Solidago canadensis*, *Solidago longifolia*, *Solidago serotina*, and *Solidago virgaurea*.
Biological name- Solidago

Description

Solidago is a perennial plant with woody rhizomes. The stem is 5 cm tall and erect. The majority of Solidago species are unbranched, but certain Solidago species do have branching in the top section of the plant. Both the leaves and the stem range from hairless to pubescent. The leaf edges are complete, and some may have trinerved venation. The flower heads are normally radiating, with distinct ray and disc florets, though some are discoid on occasion.

Figure.4; Goldenrod

Common uses

Goldenrod is used to reduce pain and inflammation, also used as a diuretic to increase urine flow and to stop muscle spasms. It is used in case of gout, joint pain (rheumatism), arthritis, as well as eczema and other skin conditions. Goldenrod is also used in the treatment of tuberculosis infections, diabetes, asthma [51], enlargement of the liver, hemorrhoids, internal bleeding, hay fever, asthma, an enlarged prostate, urinary tract infections [52], and in low back pain [53].

Scientific classification

Kingdom : Planteae
Order : Asterales
Family : Asteraceae
Genus : *Solidago*
Species : *S. Canadensis and S. longifolia*

Side effects

There is not sufficient information available on net and journals which prove that whether goldenrod is safe to be taken for medical conditions. There are some special warnings and precautions given on the use of goldenrod in cases like high blood pressure, edema, pregnancy and breast feeding.

POISON IVY

Toxicodendron radicans, are well known as poison ivy or eastern poison ivy, it is found as poisonous flowering plant in Asian and North American, which is well recognized to cause an itching, irritation, allergic and painful rash in those people who touch it, and it is caused due to presence of urushiol, which is a clear liquid compound found in the plant's sap. Poison ivy is found throughout the North America, as well as the Canadian Maritime provinces, Quebec, Ontario, Manitoba, and on the rocky mountains of U.S, and also in the mountain region of Mexico [54].

Common name - *Rhus toxicodendron* and *Rhus radicans*.
Biological name - *Toxicodendron radicans*.

Description

There are abundant species of *Toxicodendron radicans*, which are found growing in any forms which have a woody stems ant the deciduous leaves are trifoliate and have three almond-shaped leaflets. The color of leaf ranges from light green to dark green, which turns bright red when it falls. The clusters of leaflets are alternate on the vine, and the plant has no thorns. Vines growing on the trunk of a tree become determinedly attached through abundant aerial rootlets. A clear liquid compound urushiol found in poison ivy is not a defensive measure but to a certain extent, it helps the plant to preserve or retain water. It is recurrently eaten by animals like deer and bears. It grows either vegetatively or sexually. It is dioecious,and the flowering occurs from the month of May to July. A drupe matures by August to November and becomes acquire grayish-white color and for some birds and other animals, these fruits are their favorite winter food [55, 56].

Figure.5; Poison ivy

Common uses

Poison ivy is commonly used to reduce pain and inflammation [57], also used in musculoskeletal injuries, chronic aches, pains, and arthritic conditions [58].

Scientific classification

Kingdom : Planteae
Order : Sapindales
Family : Anacardiaceae
Genus : *Toxicodendron*
Species : *radicans*

Side-effects

The most commonly occurring side-effects due to ingestion of poison ivy are allergic reactions, urushiol-induced contact dermatitis and poison ivy rash [59].

SUMAC

Sumac is among the 35 species of flowering plants in genus *Rhus* of family Anacardiaceae, and it is found in subtropical and temperate regions throughout the world, mainly in East Asia, Africa and North America [60].

Common names- *Rhus*
Biological name- *Rhus*

Description

Rhus are shrubs or small trees which can reach a height up to 1–10 m. The leaves of *Rhus* genus are spirally arranged, and while some species have trifoliate and simple leaves. The flowers are in dense panicles or spikes, and 5–30 cm in length. The flowers are very small in size, greenish to creamy white or red in color, with five petals. The fruit forms dense clusters of reddish drupes known as sumac bobs. The dried drupes of some species are ground to produce a tangy crimson spice. Sumac propagate both by seed which is spread by birds and other animals through droppings, and some by new shoots from rhizomes, forming large clonal colonies [60].

Common uses

Sumac is commonly used as dye and tanning agent, as a spice and beverage flavoring agent. It is also used as an anti-fungal, anti- microbial [41], anti-inflammatory agent [61] and also effective in the treatment of Leucorrhea [62]. It is also used as a remedy in case of chemotherapy induced nausea and vomiting in Breast cancer [63]. It is also effective in the treatment of diarrhea [64], also used as an anti-cancer agent [65] and in the treatment of diabetes [66].

Scientific classification

Kingdom : Plantae
Order : Sapindales
Family : Anacardiaceae
Genus : *Rhus*
Species : *coriaria*

Figure.6; SUMAC

Side-effects

Erythema, edema, burning, and rhus dermatitis are the most common side effects caused due to ingestion of sumac [67].

CONCLUSION

Weeds, as known, grow on cultivated ground and cause injury to the desired crops. As per the general concept, rice on a paddy-wheat field is a weed, and similarly wheat on a paddy field is a weed. So considering these weeds are noxious to the growth of the desired crop but they are not useless at all, rather they can be beneficial. The only thing matter is the knowledge about them and their proper utilization. After reviewing all these articles and researches, I came to conclude that weeds can also be beneficial plants for human use as they show enormous useful pharmacological activity.

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