



Received on 01 August 2022; received in revised form, 08 December 2022; accepted, 15 December 2022; published 31 December 2022

CUSCUTA REFLEXA ROXB.: A PHARMACOLOGICALLY MERITORIOUS HOLOPARASITIC PLANT

Aman Guleria^{*}, Upasana Thakur, Arti Devi, Amardeep Ankalgi, Vinay Pandit and Mahendra Ashawat

Department of Pharmaceutical Analysis and Quality Assurance, Laureate Institute of Pharmacy, Kathog - 177101, Himachal Pradesh, India.

Keywords:

Cuscuta reflexa Roxb,
Phytochemicals, *In-vitro* studies,
Pharmacological activities,
Traditional use

Correspondence to Author: Aman Guleria

Department of Pharmaceutical
Analysis and Quality Assurance,
Laureate Institute of Pharmacy,
Kathog - 177101, Himachal Pradesh,
India.

E-mail: aman.guleria098.ag@gamil.com

ABSTRACT: Natural sources like minerals, plants, and animals were used for various diseases by the human civilization from their very initials and were called traditional medicines. The traditional system of medicine is the backbone of a new class of drugs: phytomedicine or phytopharmaceuticals. These drugs are economically very important shortly in the pharmaceutical industry. The *Cuscuta reflexa* as phytomedicine brings us many medicinal importance in many diseases. Phytomedicines are employed to the population by analyzing its safety and efficacy. The *Cuscuta reflexa* Roxb. plant products are known for its diverse traditional uses in many diseases. *C. reflexa* has many medicinal properties for effective management such as antioxidant, anti-ulcer, antispasmodic, effective in jaundice and many more. Here, we use to review for the Phytochemical investigation and pharmacological effects of the *Cuscuta reflexa* Roxb. This review will try to enlighten the very specific and predictable use of this plant following the ailment in the body as a remedy.

INTRODUCTION: About 365 plants are reported to be useful as medication in ancient times. According to WHO, about 70% to 95% of the majority of developing countries still depend on traditional medicine as their remedy for various ailments. People use plants for their various therapeutical properties against inflammation, allergies, oxidation, microbial infection, diabetes, ageing, and more. The plant as a whole is not considered a standard medicine (like in the Ayurvedic system of medicine) for getting a nearby pharmacological effect for a particular disease; we must have to become aware of the phytoconstituents present in the plants.

By considering this, a new category of the drug came into existence called phytopharmaceutical. The phytopharmaceuticals is a balanced approach that trust everything but underlines the revalidation of the specification of the plant material or product. It is defined as a purified and standardized fraction with a defined minimum four bio-active or phytochemical compounds in the extract of a medicinal plant or its part for internal or external use by human beings or animals for diagnosis, treatment, mitigation or prevention of disease or disorder but the parenteral route of administration is discouraged by the scientists.

Phytomedicine brings new lead drug discoveries, and phytopharmaceuticals assure the people of its safe and productive use of plant-based medicinal products. Plant sources act as a new lead compound provider due to the various chemical entities present in them¹. The plants produce Secondary metabolites, of which a total of 15000 have been isolated, which is less than 10% of the total

QUICK RESPONSE CODE 	DOI: 10.13040/IJPSR.0975-8232.IJP.9(12).186-94
	The article can be accessed online on: www.ijpjournal.com
DOI link: http://dx.doi.org/10.13040/IJPSR.0975-8232.IJP.9(12).186-94	

secondary metabolites produced by plants. These secondary metabolites act as plant's defence mechanism against various microorganisms, insects, herbivores and also effective for animals against various diseases or disorders.

Cuscuta reflexa Roxb: It is a plant used to live on other plants by climbing and curling around them like wine and sucking the necessary nutrients from the host plant *via* attaching a special organ called haustoria to the host. It is a parasitic plant. It is categorized as an Angiospermic plant. It belongs to the morning glory family *Convolvulaceae* having genus *Cuscuta* and species *reflexa*. *Cuscuta* comprises 100- 170 species that comes under the class Eudicots. *Cuscuta* is found in the temperate and mainly in tropical regions of the world, with huge species diversity in tropical and subtropical regions². It is known to parasitize the majority of angiosperms.

Some traditional classifications placed *Cuscuta* in its own family, *Cuscutaceae*, but always allied with *Convolvulaceae*. With the advancement in the field of science, it is found in the molecular phylogenetic study that *Cuscuta* species have APG (Angiosperm Phylogeny Group) classifications which resemble the genus *Ipomoea* L. Data from nuclear, mitochondrial, and plastid genomes were used to show that *Cuscuta* was nested within *Convolvulaceae*. Still, despite extensive analysis, its exact position in the family could not be determined. Subsequent molecular phylogenetic work has provided a robust framework for the species within the genus. In English, it is known as Dodder. It is also known as Amarbel (Immortal twine), Akashwell (Sky winner), Swarnlata, Akakhilata. Other names include Hell weed, Devils gut, Begger weed, Scald weed, Dodder of thyme, Greater dodder Lesser dodder³.

TABLE 1: BOTANICAL CLASSIFICATION⁴

Taxonomical classification	
Kingdom	Plantae
Subkingdom	Tracheobionta
Super division	Spermatophyta
Division	Angiosperms
Class	Eudicots
Subclass	Asterids
Order	Solanales
Family	Convolvulaceae
Genus	<i>Cuscuta</i>
Species	<i>reflexa</i> Roxb.

TABLE 2: VERNACULAR NAMES

Vernacular names	
English	Dodder Plant
Hindi	Amarabela
Sanskrit	Akasavalli, Amaravalli, Khavalli
Punjabi	Zarbut
Urdu	Akashbel
Bengali	Akashbel

Morphological Characteristics:

Stem: It contains all the major plant parts. The stem is highly branched and vegetative during favourable conditions. It is a weak, twiner, pale-green, that develop haustoria at the point of contact with the host plant.

The main organs of the stems are vascular bundles (xylem and phloem), and meristem. The main secondary metabolites are also present, like, terpenoids, carbohydrates, fats, *etc.*

Haustoria: It is a special organ developed as a result of the evolution of plants. It has two main stages based on its maturity in the host plant body. Further developed into haustoria hairs. These are hair-like projection that ultimately enters into the host body.

Flowers: The flowers are very distinct in shape and also small as compared to the other genus of *Cuscuta* species.

It has 5 petals and four lobes, Bracteate, ebracteolate, hermaphrodite, actinomorphic, pentamerous, small and pale-green. Further.

Gynoecium: Style very much reduced, disc red coloured, 2 carpels, syncarpous, superior, bilocular.

Carpels: Medially placed, 2 or more ovules in each locule, axile placentation stigma bifid and hairy, a nectareous disc is present below the ovary.

Androecium: 5 stamens, epipetalous, filaments of different sizes dorsifixed, alternipetalous.

Corolla: 5 petals, united, campanulate, valvate, with 5 coronary outgrowths at the base corolla.

Calyx: 5 sepals, fused, valvate.

Seed: These are small with hard coats which helps them survive many harsh seasons and climates. The seeds are viable for a very long period of time.

FIG. 1: *C. REFLEXA* STEM (A) AND FLOWER (B)

Initiation of Vegetative Parts of the *Cuscuta* Plant:

Initiation and Development of Sepals: Initiation starts with one lateral, adaxial sepal, either to the sides of the median plane. It is followed immediately by the second lateral, adaxial sepal. All the sepals are initiated abaxially. The two sepals grows faster than the remaining three sepals. Finally, calyx aestivation is quincuncial and at a length of about 3-4 mm the calyx is pressed open by the elongating corolla-filament tubes.

Initiation and Development of Petals: Petals are pentagonal and at the angles, five petal primordia are initiated more or less simultaneously and separate from each other development of the anthers then the gynoecium is closing and at last the petals begin to grow faster and bend over these organs. The five petals are connected by bridges of the developing filaments of the stamens and a long corolla filament tube is formed.

Initiation and Development of Stamen: The stamens grow along with the petals.

Initiation and Development of the Gynoecium: The gynoecium grows simultaneously with the stamens⁵.

Geographical Distribution: *Cuscuta reflexa* Roxb. occurs throughout India. This species is common over the northern region of the country, Bengal plains, Western ghats, Satara region, Himachal Pradesh, Uttar Pradesh, and Uttarakhand. It is also found in the plain of Afghanistan, Malaysia, Nepal and Thailand⁶. The *Cuscuta reflexa* mainly parasitizes all the angiospermic plants. The highly frequent host plants are given in the table below. The hosts include ephemeral, annual, biennial, and perennial life span; herb, shrub, climber, liana, and tree habits; and agricultural, horticultural, medicinal, weeds, forest, and economically important plants^{7, 8, 9, 10, 11}.

TABLE 3: FAVOURABLE AND HIGHLY FREQUENT HOSTS OF THE CUSCUTA PLANT

Host plants/botanical names	Vernacular name
<i>Justicia adhatoda</i> (Acanthaceae)	Vasaka
<i>Lannea coromandelica</i> (Anacardiaceae)	Jiga
<i>Mangifera indica</i> (Anacardiaceae)	Aam
<i>Calotropis gigantea</i> (Apocynaceae)	Safed aak
<i>Cascabela thevetia</i> (Apocynaceae)	Karabi
<i>Tabernaemontana divaricata</i> (Apocynaceae)	Tagor
<i>Alstonia scholaris</i> (Apocynaceae)	Chhativan, satawana
<i>Acacia nilotica</i> (Fabaceae)	Babool
<i>Datura metel</i> (Solanaceae)	Dhatura
<i>Bambusa tulda</i> (Poaceae)	Bans
<i>Oryza sativa</i> (Poaceae)	Paddy/Dhaan
<i>Aegle marmelos</i> (Rutaceae)	Bel
<i>Lantana camara</i> (Verbenaceae)	Raimuniya
<i>Annona squamosa</i> (Annonaceae)	sitaphal
<i>Catharanthus roseus</i> (Apocynaceae)	shisham
<i>Duranta plumieri</i> (Verbenaceae)	lal dudhi
<i>Ficus glomerata</i> (Moraceae)	udumbra, gular, rumbal

<i>Jatropha curcas</i> (Ephorbiaceae)	darvanti, jamal ghot
<i>Linum usitatissimum</i> (Linaceae)	Alsi, atashi
<i>Medicago sativa</i> (Fabaceae)	lahsun ghas, ashvabala
<i>Nerium oleander</i> (Apocynaceae)	Kaner or Ashvaghna, Karavira
<i>Phyllanthus niruri</i> (Euphorbiaceae)	Bhui aonla, Jaramla
<i>Punica granatum</i> (Mytraceae)	Pomegranate, anar
<i>Ricinus Communis</i> (Euphorbiaceae)	arandi
<i>Solanum tuberosum</i> (Solanaceae)	potato, aloo
<i>Vitex negundo</i> (Verbenaceae)	indrani, sambhalu
<i>Acacia catechu</i> (Mimosaceae)	Khair(katha)
<i>Pyrus communis</i> (Rosaceae)	Naspati
<i>Cajanus cajan</i> (Fabaceae)	Arhar
<i>Lawsonia inermis</i> (Apiacea)	Mehendi
<i>Azadirachta indica</i> (Meliaceae)	neem
<i>Carissa spinarum</i> (Apocynaceae)	Karonda
<i>Ziziphus mauritiana</i> (Rhamnaceae)	Ber / plum
<i>Hibiscus rosa sinensis</i> (Malvaceae)	rudrapushpa, babuitulsi
<i>Impatiens species</i> (Balsaminaceae)	dronapushpi, chhota halkusa

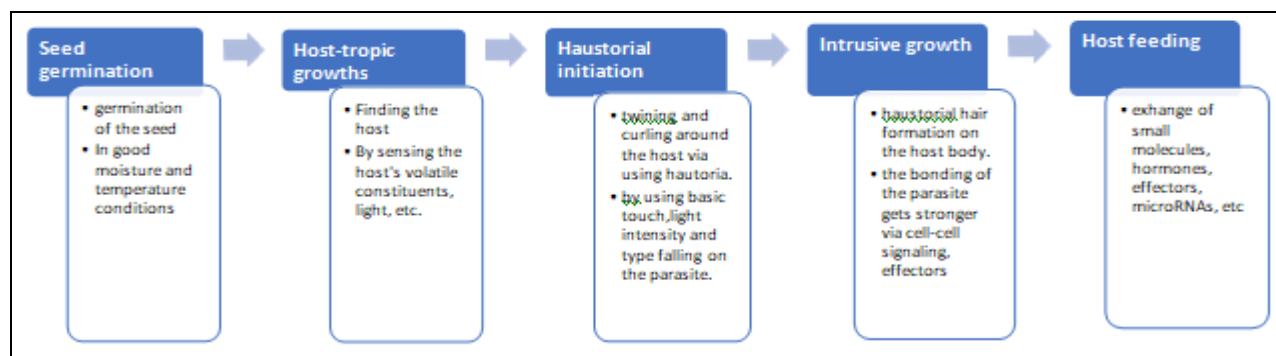


FIG. 2: LIFE CYCLE OF *CUSCUTA* PLANT¹²:

Scientific Research:

TABLE 4: IN-VITRO STUDIES RECORDED IN *CUSCUTA REFLEXA* PRESENT ON THE DIFFERENT HOSTS

Host plant	Total flavonoid contents (Mg QE/g Extract)*	Total phenolic content (Mg GAL/g Extract)**	DPPH scavenging activity (IC ₅₀ µ/ml)***
<i>D. longan</i>	44.49±1.07c	54.09±3.26b	478.99±4.71c
<i>S. asper</i>	76.88±2.18a	70.25±1.41a	231.38±2.81a
<i>Z. dongnaiensis</i> ¹³	49.86±0.91b	57.63±1.97b	289.63±3.88b
<i>A. indica</i>	82.91a a ± 0.71 80% methanolic)	66.30 b a ± 2.1(80% methanolic)	65.11a b ± 2.01(80% methanolic)
<i>Z. jojoba</i>	85.11a a ± 0.93	71.11a a ± 3.52	79.57a a ± 1.11
<i>M. alba</i>	72.03a b ± 0.69	61.01c a ± 2.18	44.29a d ± 1.02
<i>A. arabica</i>	73.28a b ± 1.29	51.29d a ± 2.01	51.03a c ± 1.02
<i>A. nilotica</i>	73.29a b ± 1.42	47.02e a ± 2.13	47.08a ± 1.52
<i>E. jambulana</i> ¹⁴	53.11a e ± 1.02	69.1 a ± 1.99	63.82a b ± 2.11
<i>Coccinia grandis</i>	114.4±0.7a	90.8±2.9a	168.7±1.0a
<i>Ficus racemosa</i>	79.0±1.8b	86.6±0.5b	201.6±0.5b
<i>Samanea saman</i> ¹⁵	67.5±2.6c	84.4±1.4b	279.7±6.0c

Values are mean (n = 3) ± SD (standard deviation). *Values are expressed as quercetin equivalents in mg/g extract. **Values are expressed as gallic acid equivalent in mg/g extract. *** Values are expressed as DPPH scavenged by cuscuta sample extract in IC₅₀ µ/ml.

Based on the characteristic, each type of *Cuscuta* sp. has a different phytochemical identity. Diverse types of phytocomponents have been isolated from the *Cuscuta reflexa* plant based on the host and

plant nutrition¹⁶. Most of the phytochemicals are listed below, reported so far in the plant *Cuscuta reflexa*. They were mainly alkaloid, flavonoids, phenols, glycosides, terpenoids, etc¹⁷. The various

chemical constituents are present in various extracts obtained from the plant and so the plant exhibits various pharmacological activities like antioxidant, antibacterial, antidiabetic, anticarcinogenic, antispasmodic, effective in jaundice, etc^{18,19}.

TABLE 5: PHYTOCONSTITUENTS REPORTED IN CUSCUTA REFLEXA ROXB.

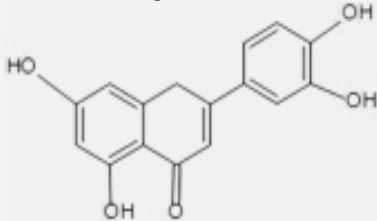
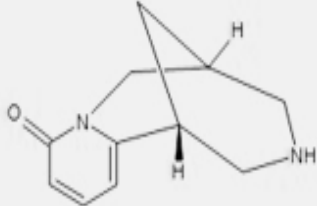
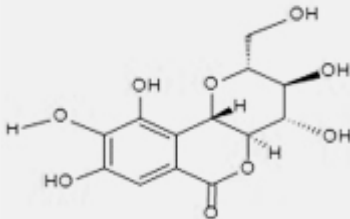
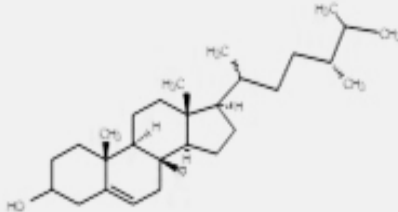
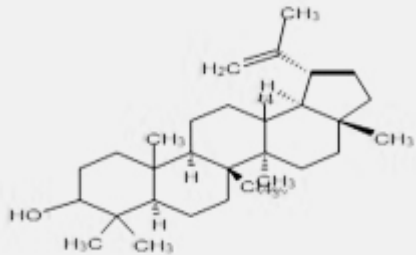
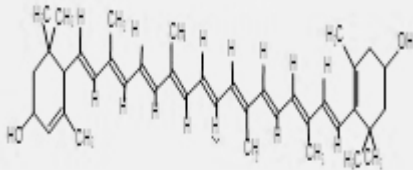
Phytochemicals	Chemical Constituents	Structure
Flavonoids	Quercetin ²⁰ , Hyperoside, Kaempferol, Myricetin, Quercetin 3-O-neohesperidoside ²¹ , Leuteolin, Quercetin-3-O-glucoside, 3,5,7,3'-pentahydroxy flavanone (taxifolin Reflexin ²² , 5-hydroxy-7-methoxy-6-(2,3-epoxy-3-methylbutyl)-flavanone Kaempferol-3-O-glucoside ²³ , Myricetin-3-O-alpha-rhamnoside Apigenin-7-b-rutinoside ²⁴ 3'-methoxy-3',4',5,7-tetrahydroxy flavone, 3'-methoxy-4',5,7-trihydroxy flavone-3-glucoside ²⁵ , Myricetin-3-glucoside, 6,7,8-Trimethoxy 2H-1-benzopyran-2-one, 4,4',6-Trihydroxyauran, Chlorogenic acid ²⁶ , Azaleatin, Melanettin 3,4',5,7-Tetrahydroxy flavanone, Taxifolin 7-O-beta-D-glucopyranoside ²⁷ ,	Quercetin 
Alkaloids	Methylcytisine ²⁶ , Laceric acid Lupanine ²⁸ , Sparteine, Cuscutamine Cytisine ²⁹	Cytisine 
Glycosides	Cuscutin ²⁰ Cuscutoside-B, Arbutin, p-Coumaric acid Coumaric acid 4,5-dicaffeoylquinic acid 3,4-Di-O-caffeoylquinic acid 4-oxo-7-oxo-kaurene-6 alpha-O-beta-D-glucoside ²⁶ , Cuscutoside-A ³⁰ , Caffiec acid ³¹ , 21-Hydroxy odoroside H Odoroside Cuscutin H ³² ,	Cuscutin 
Steroids and sterols	Stigmast-5-en-3-O-beta-D-glucopyranoside b Stigmast-5-en-3-yl-acetate ²³ , Campesterol Sesamin ²⁶ Gitoxigenin ³² Stigmasterol ³³	Campesterol 
Terpenoids and sesquiterpenes	Lupeol ²³ , Oleanolic acetate Alpha - Amyrin Beta - Amyrin Alpha Amyrin Acetate Beta Amyrin Acetate Hydroxyoleanane Maragenin ²⁶ , Aromandendrin ²⁷ , Ursolic acid ³² ,	Lupeol 
Carotenoids	Carotene ²¹ Lutein Lycopene ²⁴ , Violaxanthin Rubixanthin ²⁶	Lutein 

TABLE 6: TRADITIONAL USE OF CUSCUTA REFLEXA PLANT

Plant Part	Type of dosage form	Tradition use
Used whole plant	Paste	Treatment of swollen testicles, gout and joint pain, causes abortion, anti-rheumatic, analgesic ³⁰⁻⁴⁰ ,
	Maceration	Infection treatment ⁴¹
	Infusion	Anti-poisonous ⁴²
	Juice	Antiseptic, useful in itching skin and jaundice ^{43,44}
	Pills	Anti-tuberculosis ⁴⁶
	Powder decoction	Anti-fertility agent, astringent, diaphoretic ⁴⁵
stem	Decoction	Useful in skin disease, jaundice, cough, bronchitis, fever, sex stimulation, anti-diarrheal, anti-inflammatory, anti-ulcer, anti-dandruff, fracture joining ^{44, 46-52}
	Paste	Hepatoprotective, anti-diarrheal, useful in constipation, stomach disorders, urinary tract infections, jaundice, epilepsy, cholera, asthma ^{49, 53}
	Juice	Anti-hair fall, anti-rheumatic, useful in skin diseases ^{49,54}
Seeds	Crushed	Blood purifier, purgative, good for brain, fever, anthrax in cattle ^{56,57}
	Decoction	Cause abortion ⁴⁹ Carminative, anthelmintic, sedative, diuretic, liver disorders useful in ulcer ^{58, 59, 60}
Leaves	Poultice	Pain reliever
	Extract	Anti-hypertensive, anti-diarrheal, useful in jaundice ⁶¹⁻⁶³
Fruits	juice	Effective in scabies, eczem, Antipyretic, cough reliever ⁶⁴

Pharmacological Activities of *Cuscuta reflexa*:

When taken internally treats the retention of urine while being applied externally for skin itches. It is also used to cure cough and diabetes, eczema abortifacient, cholinergic action, anti-steroidogenic activity, hepatoprotective activity, diuretic activity, anticonvulsant activity.

Hepatoprotective Activity: A Hydro- alcoholic extract of *C. reflexa* has hepato- protector activity in albino rats against paracetamol-induced hepatic damage and acts as a hepatoprotective agent². The methanolic extracts of *C. reflexa* is evaluated for hepatoprotective activity on carbon tetrachloride-induced hepatotoxicity in liver histoarchitecture and alteration in certain biological parameters was observed⁶⁵.

Antitumor Activity: The Chloroform and ethanol extracts have antitumor activity reported against Ehrlich ascites carcinoma tumour in mice at doses of 200 & 400 mg/kg body weight orally^{66, 67}.

Antioxidant Activity: The antioxidant capacity was measured using various assays like reducing power, DPPH scavenging activity, and percent inhibition of linoleic acid peroxidation. Various extracts from treating the plant with various solvents were analyzed for the quantity of phenols and flavonoids¹⁸. The Ethyl acetate and ethanol extract of the plant showed higher activity than other fractions, very close and identical in magnitude and comparable to the standard antioxidant agents⁶⁸.

Antibacterial Activity: An ethanolic extract of *Cuscuta reflexa* showed antimicrobial activity against *E. coli* and *S. sonnei*. Plants collected from different seasons showed antimicrobial activity against microorganisms like *Staphylococcus epidermidis*, *Staphylococcus aureus*, *E. coli*, *Micrococcus luteus*, *Pseudomonas aeruginosa*⁶⁹.

Antiepileptic and Anticonvulsive Activities: The significant reduction in the duration of convulsion in tonic seizure induced by pentylenetetrazol (30mg/kg Ip) in mice. The plant product reduces the convulsion induced by maximum electroshock against the tonic extension convulsion².

Hypoglycaemic Activity: A Methanolic extract showed significant inhibition against α -Glucosidase^{70, 71}.

Anti-HIV Activity: Water extracts of *C. reflexa* exhibited anti-HIV activity⁷².

Effect on Blood Pressure: Alcoholic extract of *Cuscuta reflexa* has positive inotropic and cardiogenic activities on the perfuse frog heart. A Series of experiments on dogs results in a fall in blood pressure.

Cholinergic Action: The effects of the extract of *C. reflexa* resembled with that of an acetylcholine when tested on isolated rabbit ileum and frog rectus abdominis and heart⁷³. Ethanolic extract causes a dose dependent decrease in arterial blood pressure

and heart rate in pentothal- anaesthetized rats. Four caffeoylquinic acid derivatives were isolated from the extract's active fractions and have an inhibitory effect on Angiotensin Converting Enzyme (ACE) activity. The presence of those metabolites may be responsible for the anti-hypertensive activity extract⁷⁴.

Relaxant and Spasmolytic Action: An Aqueous and alcoholic extracts showed relaxant and spasmolytic action on small intestine of guinea pig and rabbit²⁷.

Diuretic Activity: An Aqueous and alcoholic extracts of *C. reflexa* showed diuretic activity in Wistar rat².

Anti-diabetic Activity: The methanol and aqueous extracts showed a significant reduction in blood glucose levels during OGTT (oral glucose tolerance test) in diabetes rats. The treatment also improved body weights, decreased HbA1c and restored lipid profile. A Methanolic extract of *C. reflexa* has significant antidiabetic effects and improves metabolic alterations⁷⁵. Hair growth activity: Petroleum-ether and ethanolic extract of *C. reflexa* is given and observed in male swiss albino rats. *C. reflexa* extract is useful in the treatment of alopecia. This study showed us that it can promote follicular proliferation or prevent hair loss in cyclophosphamide-induced hair fall in *In-vivo* conditions⁷⁶.

Anti-inflammatory and Anti-carcinogenic Activity: In different phases of the pathogenesis of cancer, inflammatory reactions play a vital role in preventing cancer from spreading. In *in-vitro* and *vivo* tests, aqueous and alcoholic stem extracts of *C. reflexa* and its ethyl acetate fraction showed remarkable anti-inflammatory activity. *C. reflexa* significantly suppressed inflammation by reducing edema volume in the body up to 80 percent of rats^{77,78}.

Anti-fertility Effect: Methanolic extract returns the normal oestrus cycle and decreases the ovarian and uterus weight in adult female mice⁷⁹.

CONCLUSION: *Cuscuta reflexa* has enormous therapeutic potential from the early civilizations. The phytoconstituents such as flavonoids, alkaloids, glycosides, steroids, volatile oils and

resins are considered important bioactive ingredients of the plant. This plant is considered a meritorious plant is having a broad spectrum of pharmacological activities. Decoction, extracts, paste, powder, juice and infusions from various parts of the plant impart therapeutic nature against numerous ailments of human beings. Limitations of this study might include that; only a fewer animal studies are employed to detect its efficacy in their pharmacological activities. Hence, this review paves the way for people to explore more for its various other therapeutic uses concerning the type of host on which it is growing. These phytochemicals contain antimicrobial, anticancer, and antioxidant potentials and can be used as potential drugs to treat various diseases. *C. reflexa* survive as holoparasitic and depend on other host plants' nutrients, water, and carbohydrates. *Cuscuta* species lack roots or leaves but possess specific penetrating organs called haustoria, fully developed in 5–6 days after the first contact with the host body. The whole plant is purgative. The plant is employed in Ayurvedic medicine to treat difficulty in urinating, jaundice, muscle pain, and coughs. The juice of the plant, mixed with the juice of *Saccharum officinarum* or coconut water, is used to treat jaundice. *C. reflexa* is a parasitic weed plant that causes a huge loss to crop plants yearly. Still, *C. reflexa* is called a miracle medicinal plant because many chemical compounds have been isolated from this plant having medicinal properties.

ACKNOWLEDGEMENT: Nil

CONFLICTS OF INTEREST: Ni

REFERENCES:

- Nooreen Z, Rai VK and Yadav NP: Phytopharmaceuticals: A new class of drug in India. Ann. Phytomed; 7(1): 27-37.
- Akarsh S and Thippeswamy B: Phytochemical analysis for secondary metabolites and *in-vitro* antimicrobial activity of *cuscuta reflexa*. Plant Archives 2020; 20(1): 989-97.
- Nickrent DL: Parasitic angiosperms: how often and how many. Taxon 2020; 69(1): 5- 27.
- Vijikumar S, Ramanathan K and Devi BP: *Cuscuta reflexa* Roxb A wonderful miracle plant in ethnomedicine. Indian J Nat Sci Int Bimon 2011; 976: 997.
- Prenner G, Deutsch G and Harvey P: Floral development and morphology in *Cuscuta reflexa* Roxb. (Convolvulaceae). *Oberösterreichisches Landesmuseum* 2002.
- Verma N and Yadav RK: *Cuscuta reflexa*: a paracitic medicinal plant. Plant Arch 2018; 18: 1938-42.

7. Haupt S, Oparka KJ, Sauer N and Neumann S: Macromolecular trafficking between *Nicotiana tabacum* and the holoparasite *Cuscuta reflexa*. Journal of Experimental Botany 2001; 52(354): 173-7.
8. Sarma H, Sarma CM and Bhattacharjya DK: Host specificity of *Cuscuta reflexa* Roxb. in the Manas biosphere reserve, Indo-Burma Hotspot. International Journal of Plant Production 2008; 2(2): 175-80.
9. Sarkar AK, Dey M and Mazumder M: Host Diversity of the Parasitic Genus *Cuscuta* in Northern Part of West Bengal, India. Bioscience Discovery 2017; 8(4): 738-46.
10. Kumari P, Tiwari SK and Choudhary AK: Host range, anatomy, biochemistry and impacts of *Cuscuta reflexa* Roxb.: A case study from the Betla National Park, Jharkhand, India.
11. Kim G and Westwood JH: Macromolecule exchange in *Cuscuta*-host plant interactions. Current Opinion in Plant Biology 2015; 26: 20-5.
12. Clarke CR, Timko MP, Yoder JI, Axtell MJ: Westwood JH: Molecular dialog between parasitic plants and their hosts. Annual review of Phytopathology 2019; 57(1).
13. Suttiarporn P and Tanruean K: GC-MS analysis, antioxidant and α -glucosidase inhibitory activities of the methanol extract of *Cuscuta reflexa* Roxb. grown on different hosts. KMUTNB Int J Appl Sci Technol Special 2017; 59-65.
14. Anjum F, Bukhari SA, Shahid M, Anwar S, Afzal M and Akhter N: Comparative evaluation of antioxidant potential of parasitic plant collected from different hosts. J Food Process Technol 2013; 4(5): 1-6.
15. Tanruean K, Kaewnarin K, Suwannarach N and Lumyong S: Comparative evaluation of phytochemicals and antidiabetic and antioxidant activities of *Cuscuta reflexa* grown on different hosts in northern Thailand. Natural Product Communications. 2017; 12(1): 1934578X1701200114.
16. Ahmad A, Tandon S, Xuan TD and Nooreen Z: A Review on Phytoconstituents and Biological activities of *Cuscuta* species. Biomedicine & Pharma 2017; 92: 772-95.
17. Noreen S, Noreen S, Ghumman SA, Batool F and Bukhari SN: The genus *Cuscuta* (Convolvaceae): An updated review on indigenous uses, phytochemistry, and pharmacology. Ira J of Basic Med Scie 2019; 22(11): 1225.
18. Savitha T: Review on Pharmacological and Therapeutic Potential of *Cuscuta* species. Medicon Medical Sciences 2021; 1: 18-31.
19. Gilani AU and Aftab K: Pharmacological actions of *Cuscuta reflexa*. IJP 1992; 30(4): 296-302.
20. Patel S, Sharma V, Chauhan NS and Dixit VK: An updated review on the parasitic herb of *Cuscuta reflexa* Roxb. Zhong xi yi jie he xue bao= Journal of Chinese Integrative Medicine 2012; 10(3): 249- 55.
21. Saini P, Mithal R and Menghani E: A parasitic medicinal plant *Cuscuta reflexa*: an overview. Int J Sci Eng Res 2015; 6(12): 951-9.
22. Tripathi VJ, Yadav SB, Upadhyay AK. A new flavanone, reflexin, from *Cuscuta reflexa* and its selective sensing of nitric oxide. Applied Biochemistry and Biotechnology 2005; 127(1): 63-7.
23. Hřibová P, Žemlička M, Bartl TO and Švajdlenka E: Newly identified phenolic compounds in parasitic plants *Cuscuta europaea* and *Cuscuta campestris*. Chemická Listy 2009; 103(3).
24. Dandapani M and Nagarajan S: Isorhamnetin 3-O-neohesperidoside from *Cuscuta reflexa*. Indian J Chem 1989; 28: 606-7.
25. Chatterjee D and Sahu RK: Chemical characterization of the flavonoid constituents of *Cuscuta reflexa*. Pharmaceutical and Biosciences Journal 2014; 13-6.
26. Vijikumar S, Ramanathan K and Devi BP: *Cuscuta reflexa* Roxb A wonderful miracle plant in ethnomedicine. Indian J Nat Sci Int Bimon 2011; 976: 997.
27. Mahmood N, Piacente S, Burke A, Khan AL and Pizza C: Constituents of *Cuscuta reflexa* are anti-HIV Agents. Antiviral chemistry and Chemotherapy 1997; 8(1): 70-4.
28. Thomas S, Shrikumar S, Velmurugan C and Kumar BA: Evaluation of anxiolytic effect of whole plant of "*Cuscuta reflexa*". World J Pharm Sci 2015; 4: 1245-53.
29. Bäumel P, Witte L, Czygan FC and Proksch P: Transfer of quinolizidine alkaloids from various host plants of the Fabaceae to parasitizing *Cuscuta* species. Biochemical Systematics and Ecology 1994; 22(7): 647-56.
30. Costea M, Tardif FJ: The biology of Canadian weeds. 133. *Cuscuta campestris* Yuncker, *C. gronovii* Willd. ex Schult., *C. umbrosa* Beyr. ex Hook., *C. epithimum* (L.) L. and *C. epilinum* Weihe. Canadian Journal of Plant Science 2006; 86(1): 293-316.
31. Löffler C, Sahm A, Wray V, Czygan FC and Proksch P: Soluble phenolic constituents from *Cuscuta reflexa* and *Cuscuta platyloba*. Biochemical Systematics and Ecology 1995; 23(2): 121-8.
32. Versiani MA: Studies in the chemical constituents of *Bombax ceiba* and *Cuscuta reflexa* (Doctoral dissertation, University of Karachi, Karachi).
33. Ramachandran NA and Thirupurasundari G: Coumarins and flavonoids from *Cuscuta reflexa* parasitic on *Bougainvillea spectabilis*. Fitoterap 1992; 63(4): 381-2.
34. Patel JN and Patel NK: Study of parasite hosts of the genus *Cuscuta* and its traditional uses in Planpur Taluka, Gujarat, India. Ethnobotanical Leaflets 2010; 2010(2): 3.
35. Basak S, Banerjee A and Manna CK: Role of some ethno medicines used by the Santal tribal people, of the district Bankura, WB, India, for abortifacient purposes. J Med Plants Stud 2016; 4: 125-9.
36. Singh RS and Shahi SK: Diversity of medicinal plants of Ratanpur region of Bilaspur district (Chhattisgarh). J Med Plants 2017; 5: 276-81.
37. Mohapatra SS, Sarma J, Roy RK, Panigrahi S and Ganguly S: Ethnomedicinal plants used in Balasore district of Odisha: a comprehensive report. Int J Curr Microbiol App Sci 2018; 7(1): 1959-63.
38. Rai Y and Kumar D: Survey on medicinal climbers in Meerut district, Uttar Pradesh, India. Imperial J Interdisciplinary Res 2016; 2: 603-10.
39. Nita RD and Haresh DL: Ethno-botanical survey of some medicinal plants in Jatasankar region of Girnar forest, Gujarat, India. Global Journal of Research on Medicinal Plants & Indigenous Medicine 2013; 2(12): 830.
40. Paudel N, Adhikari DC and Das BD: Some medicinal plants uses in ethnical group from Biratnagar, Eastern, Nepal. American Academic Scientific Research J for Engineering, Technology and Sciences 2018; 41(1): 233-9.
41. Rahmatullah M, Khatun Z, Hasan A, Parvin W, Moniruzzaman M, Khatun A, Mahal MJ, Bhuiyan SA, Mou SM and Jahan R: Survey and scientific evaluation of medicinal plants used by the Pahan and Teli tribal communities of Natore district, Bangladesh. African J of Traditional, Comp and Alternativ Med 2012; 9(3): 366-73.
42. Singh EA, Kamble SY, Bipinraj NK and Jagtap SD: Medicinal plants used by the Thakar tribes of Raigad district, Maharashtra for the treatment of snake-bite and scorpion-bite. Int J Phytother Res 2012; 2(2): 26-35.

43. Singh S: Ethnobotanical study of some climbers of Parsa district forest of Nepal. *J Med Plants* 2016; 4: 6-10.
44. Ahirwar RK: Diversity of ethnomedicinal plants in Boridand forest of district Korea, Chhattisgarh, India. *American Journal of Plant Sciences* 2015; 6(02): 413.
45. Khattak NS, Nouroz F, Rahman IU and Noreen S: Ethno veterinary uses of medicinal plants of district Karak, Pakistan. *J of Ethnopharmacol* 2015; 171: 273-9.
46. Akter H, Akter H and Rahmatullah M: Synergistic antihyperglycemic activity of *Coccinia grandis* leaves and *Cuscuta reflexa* stems. *World J Pharm Sci* 2016; 5(12): 236-43.
47. Singh S and Sharma A: Studies on ethnomedicinal plant of Baghicha Jashpur Chattisgarh. *J Sci Lett* 2017; 2: 48-55.
48. Chowdhury M and Das AP: Folk medicines used by the Rabha tribe in Coochbehar district of West Bengal: a preliminary report. *Adv Ethnobot* 2007; 289-96.
49. Patel H and Patel N: "Sacred and medicinal plant diversity of patan sacres grove of Patan District (NG)". *Life Sci Leaf* 2017; 92: 50-60.
50. Seliya AR, Patel NK: Ethnomedicinal uses of climbers from Saraswati river region of Patan district, North Gujarat. *Ethnobotanical Leaflets* 2009; 2009(7): 5.
51. Kala CP: Ethnomedicinal botany of the Apatani in the Eastern Himalayan region of India. *JEE* 2005; 1(1): 1-8.
52. Khatun MM, Rahma M. Medicinal plants used by the village Pania under Baghmara District, Bangladesh. *Discovery* 2018; 54: 60-71.
53. Plants Profile for *Cuscuta coryli* (hazel dodder)". [Plants.usda.gov](http://plants.usda.gov) 2018.
54. *Cuscuta compacta*". Natural Resources Conservation Service PLANTS Database. USDA (2016).
55. Azam MN, Ahmed MN, Rahman MM and Rahmatullah M: Ethnomedicines used by the Oraon and Gor tribes of Sylhet district, Bangladesh. *Am-Eur J Sustain Agr* 2013; 7: 391-402.
56. Khalid M, Bilal M, Hassani D, Zaman S and Huang D: Characterization of ethno-medicinal plant resources of karamar valley Swabi, Pakistan. *Journal of Radiation Research and Applied Sciences* 2017; 10(2): 152-63.
57. Azam MN, Mannan MA and Ahmed MN: Medicinal plants used by the traditional medical practitioners of Barendra and Shamatat (Rajshahi & Khulna Division) region in Bangladesh for treatment of cardiovascular disorders. *Journal of Medicinal Plants* 2014; 2(2).
58. Subramanian SS and Nair AG: Chemical components of *Cuscuta reflexa* Roxb. *Indian J of Chem* 1963; 1(11): 501.
59. Kirtikar KR and Basum BD: *Indian medicinal plants*. Delhi: Periodical Experts Book Agency 1 (1984).
60. Verma N and Yadav RK: *Cuscuta reflexa*: a paracitic medicinal plant. *Plant Arch* 2018; 18: 1938-42.
61. Kumar S, Sharma SD and Kumar N: Ethnobotanical study of some common plants from district hamirpur of Himachal Pradesh (India). *International Journal of Advanced Research* 2015; 3(2): 492-6.
62. Begum HA, Hamayun M, Zaman K, Hussain A and Ruaf M: Phytochemical evaluation of ethnobotanically selected medicinal plants of mardan, pakistan. *J Adv Bot Zool* 2015; 3(1): 10-21.
63. Khan W, Khan SM and Ahmad H: Ethno-ecology, human health and plants of the Thandiani Sub Forest Division, Abbottabad, KP, Pakistan. In *Plant and Human Health*, Springer Cham 2018; 1: 547-567.
64. Patel S, Sharma V, Chauhan NS and Dixit VK: An updated review on the parasitic herb of *Cuscuta reflexa* Roxb. *Zhong xi yi jie he xue bao. Journal of Chinese Integrative Medicine* 2012; 10(3): 249-55.
65. Versiani MA: Studies in the chemical constituents of *Bombax ceiba* and *Cuscuta reflexa* (Doctoral dissertation, University of Karachi, Karachi).
66. Nisa M, Akbar S, Tariq M and Hussain Z: Effect of *Cuscuta chinensis* water extract on 7, 12- dimethylbenz [a] anthracene- induced skin papillomas and carcinomas in mice. *Journal of Ethnopharmacology* 1986; 18(1): 21-31.
67. Mozghan FS, Seyed BJ and Bahareh H: The *Cuscuta kotschyana* effects on breast cancer cells line MCF7. *J of Medicinal Plants Research* 2011; 5(27): 6344- 51.
68. Selvi EK, Turumtay H, Demir A and Turumtay EA: Phytochemical profiling and evaluation of the hepatoprotective effect of *Cuscuta campestris* by high-performance liquid chromatography with diode array detection. *Analytical Letters* 2018; 51(10): 1464-78.
69. Riaz M, Bilal A, Ali MS, Fatima I, Faisal A, Sherkheli MA and Asghar A: Natural products from *Cuscuta reflexa* Roxb. with antiproliferation activities in HCT116 colorectal cell lines. *Natural Prod Res* 2017; 31(5): 583-7.
70. Perveen S, Bukhari IH, Kousar S and Rehman J: Antimicrobial, antioxidant and minerals evaluation of *Cuscuta europea* and *Cuscuta reflexa* collected from different hosts and exploring their role as functional attribute. *IRJPharma and Applied Scien* 2013; 3(5): 43-9.
71. Shikha S, Amrinder K and Anania A: Antimicrobial study of *Cuscuta reflexa* collected in different seasons. *International J of Pharma and Biosc* 2013; 4(3): 1393-7.
72. Borole SP, Oswal RJ, Antre RV, Kshirsagar SS and Bagul YR: Evaluation of anti-epileptic activity of *Cuscuta reflexa* Roxb. *Rese JPBCHEM Sciences* 2011; 2(1): 657-63.
73. Singh GS and Garg KN: Some pharmacological studies on *Cuscuta reflexa* plant (Akash Bel). *IJP* 1973; 5(2): 344.
74. Al-Sultany FH, Al-Hussaini IM and Al- Saadi AH: Studying hypoglycemic activity of *Cuscuta chinensis* Lam. on type 1 diabetes mellitus in white male rats. In *J of Physics Conf Series* 2019; 12946: 062020).
75. Kayath HP and Goel NK: Effects of *Cuscuta* stem extract on various animal tissues. In *J of Pharma* 1995; 27(4): 227.
76. Sakshy S, Hullatti KK, Prasanna SM, Kuppast IJ and Paras S: Comparative study of *Cuscuta reflexa* and *Cassytha filiformis* for diuretic activity. *Pharma Res* 2009; 1(5).
77. Mittal, Abhilasha & Sachan, Sandeep: Antidiabetic activity of *Cuscuta reflexa*. *International Journal of Pharma and Chemical Research* 2017; 3: 572- 576.
78. Ghayoumi A and Mashayekhi A: Scleroderma treatment in iranian traditional medicine: a case report. *Advanced Herbal Medicine* 2016; 2(3): 1-4.
79. Ferraz HO, Silva MG, Kato ET, Barros S and Bacchi EM: Antiulcer and antioxidant activities and acute toxicity of extracts of *Cuscuta racemosa* Mart. (Convolvulaceae). *Latin American Journal of Pharmacy* 2011; 30.

How to cite this article:

Guleria A, Thakur U, Devi A, Ankalgi A, Pandit V and Ashawat M: *Cuscuta reflexa* Roxb.: a pharmacologically meritorious holoparasitic plant. *Int J Pharmacognosy* 2022; 9(12): 186-94. doi link: [http://dx.doi.org/10.13040/IJPSR.0975-8232.IJP.9\(12\).186-94](http://dx.doi.org/10.13040/IJPSR.0975-8232.IJP.9(12).186-94).

This Journal licensed under a Creative Commons Attribution-Non-commercial-Share Alike 3.0 Unported License.

This article can be downloaded to **Android OS** based mobile. Scan QR Code using Code/Bar Scanner from your mobile. (Scanners are available on Google Playstore)