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Ethnobotanical Assessment of Medicinal Climbers of Amroha District of Western Uttar Pradesh

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KEYWORDS

Climbing plants, Ethnobotany, Medicinal plants, Traditional knowledge

ABSTRACT

The present study emphasise on the climbers having medicinal values and the native of the western Uttar Pradesh region. The Ethnobotanical data has collected by interview of 100 informants which included local plant collectors, elderly villagers, and traditional healers. There are 21 families and 46 species of medicinal climbers are identified. The Cucurbitaceae, Convolvulaceae, and Fabaceae groups are the well-represented. The most often utilised plant parts were the leaves, which were followed by the roots and stems. The majority of the known medicinal climbers were used to treat urogenital issues, diabetes, lung conditions, gastrointestinal issues, skin conditions, and jaundice. In order to statistically assess the ethnobotanical data, the study also employed the utilisation value (UV), relative frequency of citation (RFC), and informant consensus factor (ICF).Ethnobotanical indices such asUV,RFC, and ICF can be analyzed quantitatively to assess the cultural significance of plants, rank species for further study or conservation priority, and provide information about local ecological knowledge and traditional resource management practices. This approach recognizes the importance of traditional knowledge while fostering a sense of community responsibility over conservation efforts. Additional formulations and research on each species can help steer the creation of innovative medications that have great promise for the future.

The medicinal climbers with high RFC and UV values were *Clitoria ternatea*L., *Convolvulus microphyllus*L., *Tinospora cordifolia* (Thunb.) Miers, *Asparagus racemosus*Willd, *Cucurbita maxima* Duchesne. Informant consensus about uses of medicinal climbers was high for several disease categories such as Skin diseases, Digestive problems, Respiratory illness, Diabetes and Gynaecological disorders. The findings highlight the rich diversity of medicinal climbers in western Uttar Pradesh and the associated traditional knowledge.

INTRODUCTION:

Herbal medicines are culturally acceptable, more compatible with the human body, and have less negative effects and also cost effective having such significant properties theses medicines are become more popular as primary health care (Musa *et al*, 2023). For many people throughout the globe, particularly in less developed nations, medicinal plants are an integral part of their health care system (WHO, 2013). The Rigveda, Atharveda, Charak Samhita, and Sushruta Samhita are examples of classical Indian texts. India has become the foremost important for the plants having medicinal values approximately 90% of the plants

and herbs having the medicinal value are collected from the forest of India (Gangola, *et., al 2017*). Traditional medicine has long made use of climbing plants, which are also called lianas or vines. Woody vines, orlianas, are significant but little-studied plant types that are found in most woods worldwide, especially in the tropics (Muthumperumal *et al,* 2009). These plants have evolved specialized adaptive strategies to climb and access sunlight in forest canopies. In addition to directly competing with trees, lianas also have a differential effect on different tree species, which alters how trees compete with one another and promotes forest regeneration and competition. They also have a significant role in ecosystem-level processes including carbon sequestration and transpiration throughout the entire forest. Their relative abundance is expected to rise throughout the tropics as the rate of disturbance of tropical forests increases, and lianas will become increasingly significant to many aspects of forest dynamics (Schnitzer *et al,* 2002). Previous ethnobotanical studies in Uttar Pradesh have mainly focused on the medicinal flora in general (Singh *et al,* 2018; Verma *et al,* 2007), while this study is exclusively dedicated to medicinal climbers. Many significant modern medications have been made possible by the documentation of traditional knowledge, particularly with regard to the therapeutic applications of plants. Plants are the sole source of health and medicine in the interior regions of the western Himalaya (Uniyal *et al,* 2006). Accordingly, the purpose of the above ethnobotanical research was to assess the medicinal climbers used by indigenous peoples in western Uttar Pradesh, India. The specific goals were to: (i) record the variety of medicinal climbers that are used in the study area; (ii) collect data on the parts, medicinal uses, and preparation methods of these medicinal climbers; (iii) use quantitative ethnobotanical indices to assess the relative importance and consensus of medicinal climbers; and (iv) determine the conservation status and possible threats to these priceless medicinal plants. The documented data were quantitatively analyzed for the first time in this area. The information was obtained through open-ended, semi-structured questionnaires. The benefits, importance and coverage of ethnomedicine were expressed through several quantitative indices including Informant Consensus Factor (ICF), Use Value (UV), and Relative Frequency of Citation (RFC).

MATERIALS AND METHODS:

Study Area

In the northern region of India, in Western Uttar Pradesh, the study was carried out. Its geographical area is 2470 Sq. Km. Extending from Latitute 28° 54’ North to 39° 6’ North and Longitude 78° 28’ East to 78° 39’ East (Singh *et al,* 2018). The maximum & minimum height from sea level are 240ft. In the north of the district lies District Bijnor, District Sambhal is in the south, District Moradabad is in the east and in the west are situated districts Hapur, Ghaziabad & Buland Shahar. Ganga river separates it from district Hapur, Ghaziabad & Buland Shahar (National informatic centre).

With the Ganges flowing directly through it, the Himalayas to the north, the Chota Nagpur plateau, and the Vindhya hills to the south, Uttar Pradesh is located in the center of the Indo-Gangetic plain. Uttar Pradesh's climate ranges from semi-arid in Bundelkhand and the Agra zone to extreme in the western UP and moderate in the eastern UP. Because of its subtropical climate, Western Uttar Pradesh frequently has hot, dry summers and cold winters (Chand *et al,* 2015). The average annual rainfall in Uttar Pradesh varies from 170 cm in hilly regions to 84 cm in Western up (NRI Department, Gov.of U.P, 2020). Changes in temperature, rainfall patterns, and extreme weather events can alter the life cycles of medicinal plants in India, affecting their growth, distribution, and quality. This can also affect the availability and efficacy of medicinal herbs because different plants produce different active chemical compounds. In other words, a changing climate can result in a decline in the therapeutic potential of many medicinal plants in the region.(Fig-1)

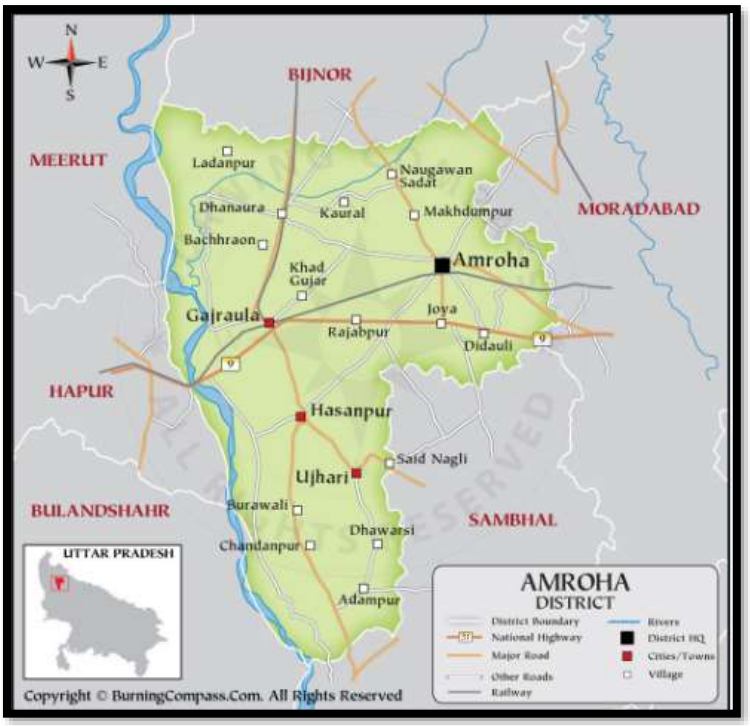

Fig 1-Courcy: BurningCampass.Com

Ethnobotanical Data Collection

From January 2022 to December 2023, comprehensive field surveys were carried out to gather ethnobotanical data. Semi-structured questionnaires were used for interviews with a total of 250 informants, which included local plant collectors, elderly villagers, and traditional healers. The purposive and snowball sampling techniques were used to choose the informants (Kennedy *et al,* 2021). Investigating the viewpoints, experiences, and significance of a particular group or phenomenon is a common task for qualitative educational research. Purposive sampling and snowball sampling are two popular sampling strategies used in qualitative educational research to achieve this. Purposive sampling is a non-probability sampling technique that entails choosing participants according to predetermined standards or goals that complement your study's goals. As a kind of purposive sampling, snowball sampling entails locating and enlisting individuals via recommendations from previous or current participants. Snowball sampling enables you to establish rapport and trust with your participants while reaching hidden or difficult-to-reach communities. For qualitative educational research, purposive and snowball sampling are both helpful methods since they enable us to choose participants who can offer rich and pertinent data for our study questions (Campbell *et al,* 2020). Thissample strategy was quite helpful for our study since we spoke with local healers, or Vaidyas, who are well-versed in the medicinal herbs of their communities.

The purpose of the questionnaire was to collect data about the medicinal climbers that the informants were using, including as their local names, therapeutic applications, plant parts that were utilised, preparation and administration methods, and so on. Hindi, the native tongue, was used for the interviews, which were thereafter translated into English. The Department of Botany, IFTM University, gathered, identified, and stored voucher specimens of the reported medicinal climbers. The authentication of the medicinal herbs is done by the IFTM Flora and the identification is also done by the online sources as google lense, PlantNet etc. Here, in the present study, the quantitative indices used are UV, RFC, and ICF.

Data Analysis

Using quantitative approaches, the ethnobotanical assessment of medicinal climbers in western Uttar Pradesh examined the species' relative value and concordance within the data collected. Usefulness value (UV), informant consensus factor (ICF), and relative frequency of citation (RFC) were the three indicators that were utilised. To see out how much consensus there was among the informants about the usage of particular climbers for treating different diseases, we employed the ICF. Based on the amount of uses indicated by informants. Finally, we utilised the RFC to see how often each species came up in the interviews, which gives us a good idea of how important it is culturally. By applying such quantitative criteria, the research aimed to provide a comprehensive understanding of the climbers' cultural relevance and therapeutic usefulness, which would aid its preservation and potential adoption into modern healthcare systems. The use of ethnomedicinal herbs by local healers was recorded using semi-structured, open-ended questionnaires. The potential medicinal benefits, vitality, and variety of ethnomedicine were communicated through a range of quantitative indicators, including the Informant Consensus Factor (ICF), Use Value (UV),and Relative Frequency of Citation (RFC).

Relative Frequency of Citation (RFC)

To ascertain any medicinal climber's significance locally, the relative frequency of citation (RFC) was computed (Tardio *et al,* 2008). To calculate RFC, this method was utilised:

With N being the general number of informants with FC being the number of informants that indicated utilising a specific species, the relative frequency coefficient (RFC) is calculated as FC/N.

Use Value (UV)

In order to rank those medicinal climbers in order of importance, we calculated their utilisation value (UV) utilising the amount of indicated applications from informants (Philips *et al,* 1993) UV was calculated by dividing the overall amount of species usage reported by informants (Ui) with the entire number of informants (N), where N is the number of informants which participated in the research.

Informant Consensus Factor (ICF)

In order to find out what amount of consensus there was among respondents about the application of medicinal climbers for addressing specific types of illnesses, the informant consensus factor (ICF) was used. You can find ICF by dividing the sum on all species utilised for treating a specific type of illness divided by the sum of every report or that type of utilisation (Nur - Nt) and then subtracting one from the total number of reports (Nur - 1). On a scale from 0 to 1, If this value is high, it means that the informants were more likely to support the use of specific climbers for treating a specific type of illness. This provides more evidence that the informants are in agreement regarding the medicinal usage of specific climbers for specific health issues, which is encouraging because it shows that these plants may be effective. The study's overarching goal, as measured by the ICF, was to determine which medicinal climbers were most significant to the region, as well as their pharmacological research potential and potential for incorporation into contemporary healthcare systems (Mekonnen *et al,* 2022)

RESULTS AND DISCUSSION:

Diversity of Medicinal Climbers

The ethnobotanical investigation uncovered forty-six species of medicinal climbers, that include twenty-one families. Cucurbitaceae (12 species), Convolvulaceae (9 species), and Fabaceae (4 species) were the groups most represented.(fig-2) There are numerous species in a community, but due to factors like population size, utilization, and favorable climate, one or a small number of species dominate the community.The list of medicinal climbers, including their scientific names, family names, local names, and medicinal purposes, is shown in Table 1.

Table 1. Medicinal climbers documented in western Uttar Pradesh, India.

S. No.	Botanical Name	Local Name	Family	Flowering Period	Ethnomedicinal Uses	References [21-66]
1	*Abrus precatorius*	Ratti	Fabacaceae	Winters	It is traditionally used to treat tetanus and to prevent rabies. The leaves of the herb are used to cure fever, cough, and cold, the roots are used to treat jaundice and haemoglobin uric bile. Paste of roots is used to cure abdominal pains, tumours, and also for abortion. Root is chewed as a snake bite remedy.	Garaniya N. and Bapodra A. (2014) Nadkarni K.M. (1994)
2	*Antigonon leptopus*	Coral Vine	Polygnaceae	Spring to Autumn	Tea prepared from the aerial parts of *Antigonon leptopus* is used as a remedy for cold and pain relief in many countries. Paste made from fresh leaves is applied externally in skin problems.	Mulabagal V. Lindo R, DeWitt D and Nair M (2011) Agrawal P. (2014)
3	*Asparagus racemosus*	Satawar	Liliaceae	December-January	*A. racemosus* is a well-known Ayurvedic rasayana which prevent ageing, increase longevity, impart immunity, improve mental function, vigour and addvitality to the body and it is also used in nervous disorders, dyspepsia, tumours, inflammation, neuropathy, hepatopathy. *Asparagus racemosus* is mainly known for its phytoestrogenic properties. Asparagus root possesses aphrodisiac, demulcent, general tonic, diuretic, anti-inflammatory, antiseptic, anti-oxidant and antispasmodic properties.	Alok S. Jain S. Verma A. Kumar M. Mahor A. Sabharwal M. (2013) and Sharma A. and Sharma V. (2013)
4	*Basella alba*	Malabar Spinach	Basellaceae	July to frost	Basella alba is reported to improve testosterone levels in males, thus boosting libido. Decoction of the leaves is recommended as a safe laxative in pregnant women and children. Externally, the mucilaginous leaf is crushed and applied in urticaria, burns and scalds.	Edouard Akono Nantia, Carine Travert, Faustin-Pascal T. Manfo, Serge Carreau, Thomas K. Monsees, and Paul Fewou Moundipa. (2011)
5	*Basella rubra*	Climbing Spinach	Basellaceae	July to frost	The plant has been explored for its medicinal properties in ancient Indian and Chinese traditional medicine practices to treat constipation and also as a diuretic and an anti-inflammatory material	Murakami, Hirano, & Yoshikawa, (2001)
6	*Bignonia corymbosa*	Pink Trumpet Vine	Bignoniaceae	Dec to March	The various ailments treated included cancer, snake bite, skin disorders, alopecia, impotency, respiratory tract illnesses, gastrointestinal disorders, cholera, spleen enlargement, rheumatoid arthritis, edema, gynaecological disorders, epilepsy, cold, fever, hepatic disorders, leucorrhoea, pain, urinary tract infections, malaria, sexually transmitted diseases, diabetes, and erectile dysfunction.	Rahamatullah M. Samarrai W. Jahan R. Sharmin N. (2010)
7	*Bougainvillia glabra*	Paper Flower	Nyctaginaceae	November-May	B. glabra is used in traditional medicine to treat respiratory diseases such as cold, flu, cough, bronchitis, and asthma, as well as for gastrointestinal problems such as diarrhoea and dysentery. Properties with antimicrobial activity are also attributed to it due to the presence of active compounds such as flavonoids, tannins, alkaloids, phenols, betacyanins, terpenoids, glycosides, and essential oils.	Schlaepfer and García, 2017; Rodríguez-Herrera et al. (2023) and Edwin et al., 2007; Zahidul et al. (2016)

8	*Caesalpinia bonduc*	Fever Nut	Caesalpinaceae	August-December	Caesalpiniaceae known as bonduc nut or fever nut, has been used in India for many years to treat fever, inflammation, diabetes, cardiovascular disorder, cancer and also for birth control. In recent years, the seeds of this plant are consumed to regulate the menstrual disorders in PCOS.	Kandasamy V. and Balasundaram U. (2021)
9	*Campsis grandiflora*	Chinese Trumpet Vine	Bignoniaceae	Summers	The flowers of Campsis grandiflora have long been used as herbal remedies in traditional Chinese medicine as an agent of activating blood circulation and removing blood stasis for treatment of diseases caused by blood stagnation.	Xiang-Yu Cui, Jin-Hwa Kim , Xin Zhao , Bao-Qiong Chen , Bum-Chun Lee , Hyeong-Bae Pyo , Yeo-Pyo Yun , Yong-He Zhang (2006)
10	*Capparis zeylanica*	Celon Caper	Capparidaceae	February-April	In Northern India, the leaves are widely used as counter-irritant, febrifuge and as a cataplasm in swellings, boils and piles. Traditionally it is also used as antidote to snake bite, to cure swelling of testicle, small pox, boils, cholera, colic, hemiplegia, neuralgia, sores, pneumonic and pleurisy.	Sini K., Sinha B. and Rajasekaran A. (2011)
11	*Cissus quadragularis*	Hadjod	Vitaceae	September-December	Cissus quadrangularis is used for diabetes, obesity, high cholesterol, bone fractures, allergies, cancer, stomach upset, painful menstrual periods, asthma, malaria, wound healing, peptic ulcer disease, weak bones, weak bones (osteoporosis) and as body building supplements as an alternative to anabolic steroids.	Sundaran J. Begum R. Vasanthi M. Kamalapathy M. Bupesh G and Sahoo U.(2020)
12	*Citrullus fistulosus*	Tinda	Cucurbitaceae	March-September	*Citrullus fistulosus* may be a useful source of resistance to whiteflies for the improvement of watermelons. Tinda is immature fruits are used in rayata or vegetable curries. The seeds of tinda are roasted and consumed in the same way as watermelon or egusi seeds. In India tinda is used as fodder and in medicine. The entire immature fruit is used as a cooked vegetable. In India the fruits are also pickled and candied.	Gautam S., Singh P., Shivhare Y. (2011)
13	*Citrullus vulgaris*	Tarbooz	Cucurbitaceae	Seeds planted in mid Feb-March	*Citrullus colocynthis* was reported in multiple ethnopharmacological studies from different part of the world as a traditional remedy for a variety of diseases including gastrointestinal, musculoskeletal, neurological, cardiovascular, and respiratory disorders also, diabetes mellitus is known as the most popular traditional indication of *C. colocynthis*.	Heydari M., Shams M. (2019)
14	*Clerodendrum splendens*	Flaming Glorybower	Verbenaceae	December-January	The leaves of Clerodendrum splendens are used to treat shingles, spleen in children, asthma, rheumatism, ulcers and malaria. Clerodendrum splendens plant is used in Ghana to treat vaginal thrush, bruises, wounds and various skin infections.	Nnanga E.N., Pouka C.K., Boumsong, S. Dibong, M.E. Didier Mpondo (2016) and Irvine (1961)
15	*Clitoria ternatea*	Aparajita	Fabaceae	Summer-Fall	*Clitoria ternatea* L. (CT) (Family: Fabaceae) commonly known as 'Butterfly pea', a traditional Ayurvedic medicine, has been used for centuries as a memory enhancer, nootropic, antistress, anxiolytic, antidepressant, anticonvulsant, tranquilizing and sedative agent.	Mukherjee P.K., Venkatesan Kumar, N Satheesh Kumar, Heinrich M. (2008)

16	*Coccinia grandis*	Ivy guard	Cucurbitaceae	July-September	Plant preparations from C. grandis are indigenously used for various skin diseases, bronchitis, anorexia, cough, asthma, catarrh, and epilepsy. Moreover, in Unani systems of medicine it has been used for ringworm, psoriasis, small pox and scabies.	Sakharkar P. and Chauhan B.(2017)
17	*Convolvulus microphyllus*	Shankhpushpi	Convolvulaceae	November	In Ayurveda, this herb is classically described as a memory and intellect booster. Moreover, it is employed in a variety of formulations used for the treatment of nervous disorders, such as insanity, epilepsy, hysteria, insomnia, and psycho-neurosis	Balkrishna A. Thakur P. and Varshney A.(2020)
18	*Cucumis melo*	Kharbooza	Cucurbitaceae	Summers	*C. melo* acts as purgative. It is used in dysuria, regulate the kidney functions, reduced blood pressure, dyspepsia, flatulence, leprosy, fever, jaundice, diabetes, obesity, cough, bronchitis, ascites, anaemia, constipation, other abdominal disorders, amentia and menorrhagia. The fruit is used as cooling agent, cleansing agent or moisturizer for the skin. It acts as demulcent and stomachic. The seeds have antitussive, febrifuge and vermifuge properties. Fruit pulp is employed as a lotion for chronic and acute eczema.	Hafiz Muhammad Asif, Naveed Akhtar, Sabira Sultana, Saif Ur Rehman, Muhammad Akram and Jalil Ur Rehman (2014)
19	*Cucumis sativus*	Khira	Cucurbitaceae	July-August	C. sativus pharmacological action includes antioxidant, anti-diabetic, UV protectant, hepatoprotective, gastroprotective, anti-helminthic, wound healing, antimicrobial, and anticancer.	Khan A., Mishra A., Syed Misbahul Hasan , Afreen Usmani , Mohd Ubaid , Naimuddin Khan , Mohd Saidurrahman (2022)
20	*Cucurbita maxima*	Sita phal	Cucurbitaceae	July-August	The fruit has flavor; diuretic, tonic; allays thirst; cures “kapha”; indigestible; increases “vata”; causes biliousness and loss of appetite (Ayurveda). The seeds are used as a taenicide. The oil is prescribed as a nervine tonic. The pulp of the fruit is often used as poultice. The seeds are an old popular remedy for tapeworm Malta, generally considered as very effective and safe. The fruit is considered as sedative, emollient, and refrigerant. The pulp is applied to burns and scalds, inflammations, abscesses, and boils; it is also prescribed in migraine and neuralgia. The seeds are used as anthelmintics, more especially as taenicides.	Sarvesh Dhar Dubey (2014)
21	*Cuscata reflexa*	Amarbel	Covolvulaceae	Throughout the year	*C. reflexa* possess antiviral, anticonvulsant activities, bradycardia, ant steroidogenic, antispasmodic and hemodynamic activities.Rural people of India used juice of *C. reflexa* for the treatment of jaundice, its warm paste is used to treat rheumatism and paste of whole plant is used for the treatment of headache. Seeds of *Cuscuta reflexa* have carminative and anthelmintic properties and used to treat bilious disorder.	Pooja Saini, Rekha Mithaland Ekta Menghani (2015)
22	*Dioscorea bulbifera*	Air yam	Dioscoreaceae	February-March	*Dioscorea bulbifera* preparation has been used for memory enhancement, anti-aging, constipation and fever, and has also been used as an infusion to apply to cuts and sores due to its high composition of the tannin that is used to hasten healing of wounds in a flamed membrane.	Hilda Ikiriza,Patrick Engeu Ogwang,Emanuel L. PeterOkella, HedmonCasim, Umba ToloMuwonge, AbubakerAli Abdalla Mai Abdalla (2019)

23	*Dolichos lablab*	Sem bean	Fabaceae	November-December	The plant was used as decoction in alcoholic intoxication, for the treatment of cholera, diarrhoea, globefish poisoning, gonorrhoea, leucorrhoea and nausea. Seeds were used to stimulate stomach, as antidote forpoisoning, for menopause and spasms, and for the treatment of cholera, diarrhoea, colic, rheumatism andsunstroke. The juice from the fruit pods was used as astringent, digestive, stomachic, to expel worms and for thetreatment of inflamed ears and throats. The flowers were used to treat inflammation of uterus and to increase menstrual flow. The plant was also used as anti-inflammatory, aphrodisiac, antispasmodic, antidiabetic, febrifuge and for flatulent, bilious, stomachic and phlegmatic disorders.	Prof Dr Ali Esmail Al-Snafi (2017)
24	*Ficus pumila*	Climbing fig	Moraceae	Rarely bloom in January-April	Ficus pumila L. also exhibits many therapeutic activities, including antioxidant, anti-inflammatory, antibacterial, anti-cancer, blood sugar lowering, gastrointestinal protection, hepatorenal protection, and cardiovascular protection.	Jia-Ying Zhao, Fang-Jun Lin, Wan-Lai Zhou and Ren-You Gan (2021)
25	*Ichnocarpus frutescens*	Black creeper	Apocynaceae	August-December	The whole part of *Ichnocarpus* was (root, flowers and leaves) reported to use for various medical illness such as, demulcent, syphilis, loss of sensation and hemiplegia, headaches fevers, wounds between fingers tonic, diaphoretic, diuretic, dyspepsia and skin troubles. It is mainly administered with milk for diabetes mellitus, excretion of the stone in the bladder and purification of blood.	Kumarappan, C; Srinivasan, R.; Jeevathayaparan, S.;Rajinikanth, R.; Naveen Kumar, H.S.; Senthilrajan, S.; Subhash, C.M. (2015)
26	*Ipomea alba*	Moon vine	Convolvulaceae	Jan-Feb	Ipomoea alba being highly rich in nutrients is widely used as raw or cooked vegetables in different regions of biosphere as it helps to heal certain unreliable happenings such as snake bites, filariasis, constipation, boils and wounds, also it overcomes obesity, used as antioxidant etc.	Rauniyar.N and Srivastava.D (2020)
27	*Ipomea aquatica*	Water Morning Glory	Convolvulaceae	May-July	In Ayurveda (the traditional medicine) it is reported that oral administration of *I. aquatica* leaves leads to cure ailments such as jaundice, nervous disability. The plant is used in the treatment of liver diseases, constipations, diabetes, abscesses, mental illness in Tanzania and intestinal problems in Somalia, nose bleed and high blood pressure, anthelmintic, central nervous system depression (CNS) depressant, antiepileptic, hypolipidemic effects antimicrobial and anti-inflammatory.	Malakpur C, Choudhary P.P.N. (2015)
28	*Ipomea palmata*	Railway creeper	Convolvulaceae	Occasionally throughout the months	The traditional uses of *Ipomoea palmata* arehaving Anti-microbial, and Anti-oxidant activities, Anti-inflammatory activity, Mosquitoes Larvicidal activity.*Ipomoea palmata* leaves is an effective antimicrobial andantioxidant agent that can be used for folk medicine andwill be a good source to treat and control many diseases.	Kishore. S, Anitha.K, Shireesha Nettem, Prathima K, Ravikumar.A (2014)

29	*Ipomea quamoclit*	Cypress vine	Convolvulaceae	August-December	*Ipomoea quamoclit* L is a less studied medicinal plant which is used as folk medicine around the world for illness. The plant is considered cooling and purgative; used in chest pain, pounded leaves are used as remedy for bleeding piles and carbuncles.	Jaseela N.M, Balasubramanian T, Suresha B.S , Anaswara M.R , Sushma Y.C (2022)
30	*Ipomea nil*	Japanese Morning Glory	Convolvulaceae	Summer to Fall	Seeds are useful in anti-inflammatory, carminative, depurative, purgative, vermifuge, inflammations, constipation, dyspepsia bronchitis, fever, skin diseases, scabies and splenopathy.	Londhe DK, Neel RS and Bhuktar AS (2017)
31	*Lagenaria sineraria*	Lauki	Cucurbitaceae	July-August	The fruits are edible and traditionally used in the treatment of jaundice, diabetes, ulcer, piles, colitis, insanity, hypertension, congestive cardiac failure, and skin diseases. It is used as a emetic, purgative, cooling, sedative, antibilious, and pectoral. Its pulp, boiled in oil is used to treat Rheumatism.	Rakesh P. Prajapati, Manisha Kalariya, Sachin K. Parmar, and Navin R. Sheth (2010)
32	*Lathyrus odoratus*	Sweet Pea	Convolvulaceae	Spring to Fall	Despite its known toxicity, *Lathryus* has been cultivated for animal and human consumption. The development of low-toxin subspecies has renewed interest in the legume as a source of animal feed protein.	M. C. Vaz Patto and D. Rubiales(2014)
33	*Luffa acutangula*	Tori	Cucurbitaceae	Throughout the year	The plant has been used in jaundice, diabetes, haemorrhoids, dysentery, headache, ringworm infection, and leprosy. Crude extract of plant and its isolated compounds possess broad pharmacological activities such as antidiabetic, hepatoprotective, antiulcer, anticancer, immunomodulatory, antihyperlipidemic, antioxidant, antimicrobial, CNS depressant, analgesic, and anti-inflammatory.	Shendge P.N. and Belemkar S. (2018)
34	*Luffa cylindrica*	Ghiya Tori	Cucurbitaceae	During Summers	Plant is bitter tonic, emetic, diuretic and purgative and useful in asthma, skin diseases and splenic enlargement. It is used internally for rheumatism, backache, internal haemorrhage, chest pains as well as haemorrhoids.	Sangh Partap, Amit Kumar, Neeraj Kant Sharma, K. K. Jha (2012)
35	*Merremia hederacea*		Convolvulaceae	December-January	*Merremia hederacea* can be used to treat colds, febrile disease, sunstroke, oliguria, tonsil inflammation, laryngitis as well as leucorrhoea. The seeds can be used to treat fevers, colds, sore throats, haematuria, conjunctivitis and boils. Leaves of M. hederacea can be used in the treatments of chapped hands and feet.	Charles A, Joseph M and Alex Ramani V (2012)
36	*Momordica charantia*	Karela	Cucurbitaceae	June-July	Leaf decoction is used in T2DM patients; fruits and leaves are used for the treatment of jaundice and other liver diseases and to cure ulcers and burns. Moreover, Momordica preparations are given for the treatment of gonorrhoea, measles, chicken pox, scabies and malaria.	Bortolotti M.,Mercatelli D. and Polito L. (2019)
37	*Mucuna pruriens*	Valvet Bean	Fabaceae	August-December	Mucuna pruriens (Fabaceae) is an established herbal drug used for the management of male infertility, nervous disorders, and also as an aphrodisiac. M. pruriens, even to treat such things as Parkinson's disease. M. pruriens has been shown to have anti-parkinson and neuroprotective effects, which may be related to its anti-oxidant activity.	Lampariello L.R. Alessio Cortelazzo, Roberto Guerranti, Claudia Sticozzi, and Giuseppe Valacchi. (2012)
38	*Mukia maderaspatana*	Madras Pea Pumpkin	Cucurbitaceae	July-October	The phytoconstituents in *Mukia maderaspatana* has high potential curingtendency for disorders such as asthma, histamine, bronchitis,	Kumar V. S., Ahmed, N., Alphonso J. K., Chandrasekar S.,

					chronic obstructivelung disorder, high fever, flu and also in the treatment of Rheumatoid arthritis, hypertension. It also reported that its fruits are used in treatment of piles, polyuria, dysuria, tuberculosis. Fruit has been prepared aslehium and consumed for treatment of naso-bronchial disorders, and alsoreduces pain during urination. Risks of osteoporosis in senior citizens is reduced by the plant extract, toothache is cured by chewing the roots.	& Boopathy, U. (2022).
39	*Passiflora foetida*	Jhumka Lata	Passifloraceae	September-May	*Passiflora foetida*, commonly known as stinking passion flower has been used as traditional medicine in treating diseases such as throat infection, giddiness, liver disorder, diarrhoea, tumour, nervous disorder, anxiety; sleep disorders, skin infections, hysteria and asthma. In addition, *P.foetida* has been reported to have potential antioxidant, anti-inflammatory, antiepileptic, antihyperglycemics, cardio protective, anti-diarrheal, and anticancer properties.	Shubashini K. Sripathi and R. Dhanya Sruthi (2023)
40	*Pentatropis capensis*	Amerbel	Asclapiadeceae	July-December	*Pentatropis capensis* is such an analgesic and anti-inflammatory drug which is popular among folklore remedies for various injuries and inflammatory problems.	Saikat Chowdhury, K. Nishteswar, and Mukesh Kumar Nariya. (2014)
41	*Pergularia daemia*	Trellis-vine	Asclapiadeceae	All year	Traditionally the plant *P. daemia* was used as anthelmintic, laxative, antipyretic and expectorant, and was also used to treat infantile diarrhoea and malarial intermittent fevers and possesses stomachic, laxative and diuretic properties, useful in cough, biliousness and sore eyes. This plant has been reported to have anti-fertility, antidiabetic, wound healing, antibacterial, anti-inflammatory and hepatoprotective activity. The plant extract is useful in uterine and menstrual disorder and in facilitating parturition.	Vyas Bhavin, Vyas Ruchi and Santani DD. (2011)
42	*Piper longum*	Pippali	Piperaceae	October-January	It is most commonly used to treat chronic bronchitis, asthma, constipation, gonorrhoea, paralysis of the tongue, diarrhoea, cholera, chronic malaria, viral hepatitis, respiratory infections, stomach-ache, bronchitis, diseases of the spleen, cough, and tumours.	Suresh Kumar, Jitpal Kamboj, Suman, Sunil Sharma. (2011)
43	*Quisqualis indica*	Rangoon Creeper	Combretaceae	Summers	*Quisqualis indica* is used as ascariasis, ringworm disease, infant, malnutrition. Seeds decoction in oil is applied topically in skin diseases. Seeds are the source of fatty oil which is purgative in action. Fruits and seeds of Q. indica possess anthelmintic properties.	Charulata Pandit Mahajan, A N. Aher. (2017)
44	*Tinospora cordifolia*	Giloy	Menispermaceae	May-June	*Tinospora cordifolia* has an importance in traditional ayurvedic medicine used for ages in the treatment of fever, jaundice, chronic diarrhoea, cancer, dysentery, bone fracture, pain, asthma, skin disease, poisonous insect, snake bite, eye disorders.	Soham Saha and Shyamasree Ghosh. (2012)

45	*Tribulus terrestris*	Gokhru	Zygophyllaceae	January-April	In Chinese Pharmacopoeia, the fruits of *Trichosanthes cucumerina* have been used for tonifying the kidneys and as a diuretic and cough expectorant that improves eyesight and for the treatment of skin pruritus, headache and vertigo, and mammary duct blockage. In India, the fruits have been used in the treatment of infertility, impotence, erectile dysfunction and low libido in Ayurveda. In addition, the roots and fruits are considered to have cardiotonic properties	Wenyi Zhu, Yijie Du, Hong Meng, Yinmao Dong, and Li Li. (2017)
46	*Trichosanthes cucumerina*	Snake Guard	Cucurbitaceae	July-September	In ancient medicine *T. cucumerina* was used for treating headache, alopecia, fever, abdominal tumours, bilious, boils, acute colic diarrhoea, haematuria, and skin allergy.	Ruvini Liyanage, Harshani Nadeeshani, Chathuni Jayathilake, Rizliya Visvanathan, and Swarna Wimalasiri. (2016)


a. *Curcumis melo*


b.*Coccinia grandis*


c.*Ipomea hederacea*


d. *Ipomea quamaclit*


e. *Merremia hederacea*


f. *Clitorea ternatea*


g. *Basella alba*

Fig-2 Few illustrations of Medicinal climbers:

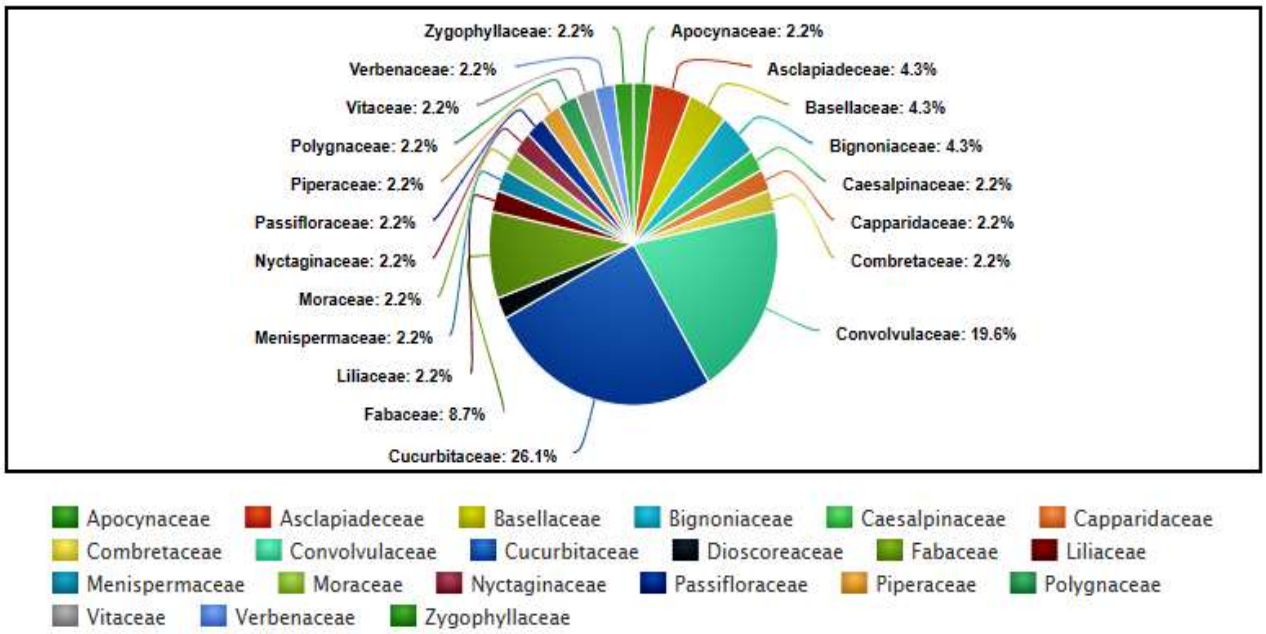

Fig.3. ***Pie-chart depicting the Climber family and their percentage distribution***

Plant Parts Used and Modes of Preparation:

The most widely employed part of medicinal climbers was the foliage (41%) followed by roots (24%) and stems (18%), fruits (11) and entire plant (6%). The common modes of preparation included decoction (32%), juice (26%), powder (19%), paste (14%), infusion (6%), and raw consumption (3%).(Fig-3& 4)

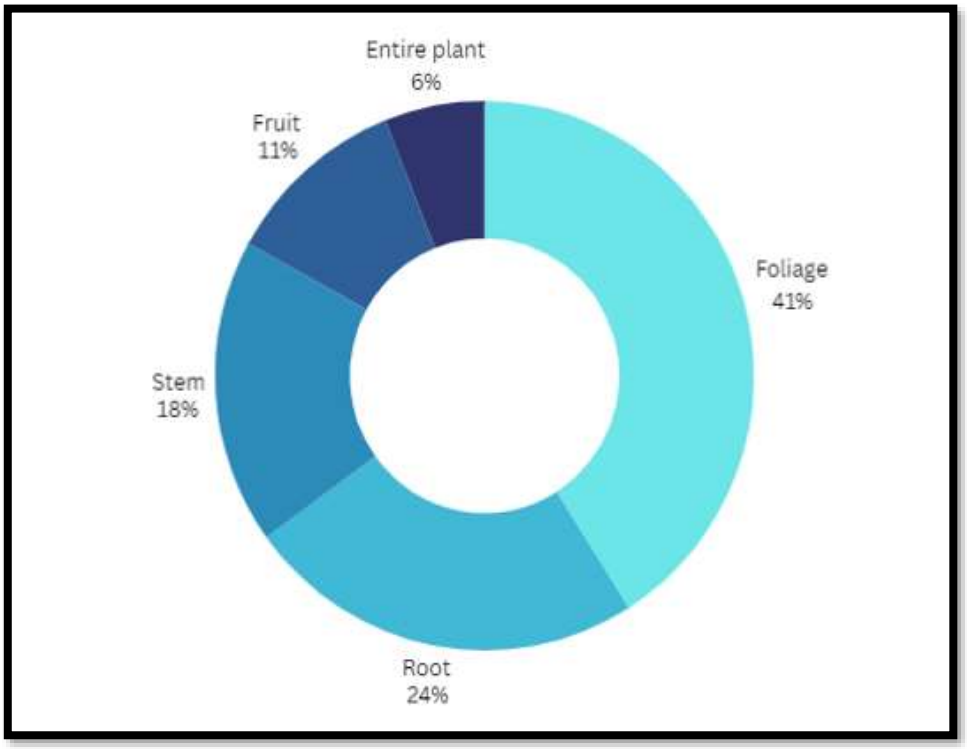

Fig.4. Percentage distribution of Plants Parts Used

Quantitative Ethnobotanical Analysis

The medicinal climbers with high relative frequency of citation (RFC) values were *Tinospora cordifolia* (0.78), *Clitoria ternatea* (0.64), *Cucurbita maxima* (0.54), *Asparagus racemosus* (0.48), and *Convolvulus microphyllus* (0.46). These species were frequently cited by the informants for their medicinal uses.

The medicinal climbers with high use value (UV) were *Tinospora cordifolia* (1.92), *Clitoria ternatea* (1.58), *Cucurbita maxima* (1.36), *Asparagus racemosus* (1.24), and *Convolvulus microphyllus* (1.12).(fig-2) These species had multiple medicinal uses reported by the informants. The informant consensus factor (ICF) values ranged from 0.68 to 0.50 for different disease categories. The disease categories with high ICF values were skin diseases (0.68), gynaecological disorders (0.61), digestive ailments (0.60), respiratory disorders (0.51) and Diabetes (0.50). These sources appear to become in accord regarding the usage of medicinal climbers as a treatment for various ailments. This study in western Uttar Pradesh, India, discovered that the locals use an extensive number of medicinal climbers. The large number of medicinal climbers listed in this study emphasises how important these plants are to the area's traditional medical practices. Numerous medicinal climbers are utilised by local tribes, according to similar investigations carried out in other regions of India (Sharma *et al*, 2012; Datta *et al*, 2014; Kabir *et al*, 2014). Cucurbitaceae, Convolvulaceae and Fabaceae, the three leading families of medicinal climbers in our study, have been shown to be significant sources of bioactive chemicals with potential therapeutic applications. Numerous species belonging to these groups are widely recognised for their therapeutic qualities and have been employed in traditional medical systems around the globe. Because they contain a variety of phytoconstituents, including tannins, glycosides, carbohydrates, resins, saponins, carotenoids, phytosterols, and—most importantly—triterpenoid cucurbitacins, plants of the Cucurbitaceae family have enormous medicinal value. Coccinia grandis (ivy gourd), Lagenaria siceraria (bottle gourd), Cucumis melo (musk melon), Cucumis sativus (cucumber), Cucurbita maxima (pumpkin), Momordica charantia (bitter gourd), and other food plants of the Cucurbitaceae family have been reported to have a number of medicinal uses (Pulok *et al*, 2022). Many phytochemicals, including flavonoids, alkaloids, carbohydrates, phenolic compounds, mucilage, unsaturated sterols or terpenes, resin, tannins, lactones, and proteins, are found in the Convolvulus genus (Salehi *et al*, 2020). Flavonoids, the most prevalent phytochemical in Fabaceae plants, are among the several phytochemicals found in these plants. Isoflavones, flavanones, flavanols, saponins, alkaloids, and tannins are examples of flavonoids. In addition, these plants have organic components, vitamins, and minerals. The extensive traditional knowledge of extracting therapeutic compounds from plant sources is indicated by the widespread use of decoction and juice as preparation methods. Many traditional medical systems use decoction as a frequent preparation technique because it makes it possible to extract medicinal chemicals from plant components that are soluble in water (Sorrenti *et al*, 2023).

Table 2.

Category of ailment	Nt	Nur	FIC
Dermatological disorders as skin allergies, rashes, burns,wounds etc.	21	48	0.68
Infertility, spermatorrhea, impotence, abortion, dysmenorrhea, enlarged breasts, leucorrhea, uterine problems, and diminished sexual desire are all examples of sexual and associated disorders.	11	27	0.61
Disorders of the **digestive system** include piles, carminatives, flatulence, indigestion, colic, ulcers, constipation, diarrhea, and anthelmintics.	35	88	0.60
Respiratory conditions: pneumonia, bronchitis, and asthma	14	30	0.51
Diabetes	28	55	0.50

Informant Consensus Factor (ICF) by category of ailment within the present study.

Nt =number of species used
Nur =number of use citation
FIC = Informant consensus factor

The relative significance and agreement of the medicinal climbers among the interviewees were shown by the quantitative ethnobotanical study. Species including *Tinospora cordifolia, Clitorea ternatea*, and *Cucurbita maxima* had high RFC and UV values, indicating their great medicinal relevance and extensive usage in the research region. Numerous pharmacological properties, such as hepatoprotective, immunomodulatory, and anti-diabetic effects, have been documented for these species.
High ICF values for specific illness categories—diabetes, skin conditions, and respiratory problems. The high level of agreement may be explained by the fact that these illnesses are common in the research region and that medicinal climbers are successful in treating these ailments (Raghupathy *et al,* 2008).
Conventional climber knowledge and its use in medicine, nevertheless, are under attack from a number of directions. Rapid urbanization, deforestation, and changes in land use patterns have led to the loss of natural habitats of these plants. The encouragement of both in-situ and ex-situ conservation techniques, such as incorporating medicinal plants into home gardens and farmlands to guarantee their conservation and sustainable usage (Asigbaase *et al,* 2023). In addition, several medicinal climber species are seriously threatened by unsustainable harvesting methods such gathering entire plants and roots (Uniyal *et al,* 2002).
It is essential to create and put into practice efficient conservation techniques in order to preserve these priceless medicinal plants and guarantee their continued use. These strategies may include in-situ conservation through the establishment of medicinal plant reserves, ex-situ conservation through cultivation in botanical gardens and nurseries, and the promotion of sustainable harvesting practices (Kala *et al,* 2000). Use Value (UV), Relative Frequency of Citation (RFC), and Informant Consensus Factor (ICF) are important quantitative tools in ethnobotanical studies because they enable researchers to objectively evaluate the relative importance and degree of agreement within a community regarding the medicinal uses of various plant species, highlighting which plants are most frequently used and thought to be effective for particular ailments by the local population. **Setting research priorities**: Scientists can decide which plants to focus on for more studies into their possible medicinal qualities by finding those with high UV, RFC, and ICF values. **Comprehending cultural knowledge**: By identifying which species are most valued by the community, thesequantitative indexes offer insights into local knowledge and customs around medicinal plants.**Comparing across communities**: Researchers can determine possible region-specific medicinal knowledge and analyze the differences in plant use patterns by computing these values for various cultures**. Making conservation a top priority:** Harvesting may put more strain on species with high usage values. For conservation efforts, this knowledge may be essential. **Drug discovery**: A plant with a high use value may include useful therapeutic ingredients that warrant more pharmacological investigation.
Furthermore, there is a need for scientific validation of the traditional medicinal uses of these climbers through phytochemical and pharmacological studies. Such studies can help identify the active compounds responsible for the therapeutic effects and provide evidence-based support for their traditional uses (Fabricant *et al,* 2001) Newer pharmaceuticals and herbal remedies derived from medicinal climbers may also emerge from the approach.
The documentation and preservation of traditional knowledge associated with medicinal climbers are also essential. The traditional knowledge held by the local communities is often passed down orally from one generation to another, and it is vulnerable to loss with the changing socio-economic conditions (Singh *et al,* 2012). Efforts should be made to document

this knowledge systematically and create databases to ensure its preservation and future use (Kunwar *et al,* 2006).

CONCLUSION:

The current study draws attention to the wide variety of medicinal climbers that the indigenous people of Amroha region of Western Uttar Pradesh, India, use. There were 46 species identified in 21 families, the most common being Cucurbitaceae, Convolvulaceae and Fabaceae. The plant portion that was utilised the most was the leaf, and decoction and juice were the usual methods of preparation.

The relative significance and agreement of the medicinal climbers among the interviewees were shown by the quantitative ethnobotanical study. High RFC and UV values were found in species including *Tinospora cordifolia, Clitorea ternatea, and Cucurbita maxima*, showing their major therapeutic relevance. The high ICF values for certain illness categories point to a high degree of agreement among the informants and a clearly defined selection process. The conservation of abused medicinal plants requires a multifaceted strategy. This comprises regulated collecting through the implementation of laws and regulations, as well as sustainable harvesting. Don't take the entire population; instead, concentrate on established plants. Involve local people in keeping an eye on and implementing sustainable harvesting methods. the preservation of the environment through the establishment of reserves, the restoration of damaged regions, the encouragement of the cultivation of therapeutic plants, and the development of better features. Another method for growing therapeutic plants outside of their natural habitats is ex-situ conservation. It can aid in the threatened species' survival. educating the public, recording, and conserving indigenous knowledge regarding the usage and care of medicinal plants before certain communities go extinct.

Nonetheless, there are a number of challenges to the medicinal climbers in the research region, including habitat degradation and unsustainable harvesting methods. The sustained use and preservation of these priceless medicinal plants depend on conservation tactics, scientific confirmation, and documenting of traditional knowledge.

Future studies and initiatives to conserve can build around the findings of this research while also advancing our grasp of the ethnobotanical knowledge of medicinal climbers in western Uttar Pradesh. This study's documentation of traditional knowledge can direct pharmacological research in the future and aid in the creation of novel herbal remedies. To preserve the long-term availability of these medicinal climbers and to fully use their therapeutic potential for the improvement of human health, it is imperative that local people, researchers, and policymakers be involved in the conservation and sustainable management of these plants. We can guarantee that future generations will have access to the priceless therapeutic resources that nature offers by putting these strategies into practice.

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