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STUDIES ON EXPLORATION AND CONSERVATION OF SOME ENDANGERED MEDICINAL PLANTS GROWING IN GHAZIPUR ,U.P.

N.K. MISHRA[a1]
Department of Botany, A.B.R. P.G.College, Anpara, Sonebhadra, U.P., India
E-mail : neelkanth_2007@ rediffmail.com

ABSTRACT

Present paper deals with a detailed study of habit and habitat, frequency of occurrence, ecological conditions, floral characters and ethnomedicinal properties of six endangered but medicinally important angiospermic plant species *viz. Abrus precatorius* Linn. (Leguminosae), *Adhatoda vasica* Nees (Acanthaceae), *Rauwolfia serpentina* Benth. (Apocynaceae), *Strebles asper* Lour. (Urticaceae), *Tribulus terrestris* Linn. (Zygophyllaceae) and *Withania somnifera* Dunal (Solanaceae) collected from Ghazipur (U.P.). The reported plant species have been declared threatened by the Indian Subcontinent Plant Specialist Group. During the course of study efforts have been made to establish these extincting plants successfully in various environmental circumstances.

KEYWORDS: Ethnomedicinal, endangered, Ghazipur

The Indian Subcontinent Plant Specialist Group of SSC (Anonymous,1998), resolved that the most urgent action in the conservation of the Indian flora, is to conduct status surveys to identify the species which need protection by conservation. This Group identified ten plant species of medicinal importance for their detailed study and protection. All the plants mentioned in this list were found in Ghazipur district of eastern Uttar Pradesh. From this list six plants grow naturally in Ghazipur (U.P.) and have been considered as the samples for this study which are *Abrus precatorius* Linn. (Leguminosae), *Adhatoda vasica* Nees (Acanthaceae), *Rauwolfia serpentina* Benth. (Apocynaceae), *Strebles asper* Lour. (Urticaceae), *Tribulus terrestris* Linn. (Zygophyllaceae) *and Withania somnifera* Dunal. (Solanaceae).

Ghazipur is a district of Uttar Pradesh surrounded by Varanasi, Ballia, Azamgarh, Mau districts of U.P. and Buxar district of Bihar. It is situate in the eastern part of Indian subcontinent and has a subtropical climate. The district receives a major precipitation which comes in the form of rain fall in average of about 102 cms. per anum. The environment of this district is almost pollution free but the discharges from two main industries viz. Govt. Opium and Alkaloid Works, Govt of India, Ghazipur and Lord's Distillery, Nandganj, Ghazipur play a signifacant role in polluting the water, air and soil of the district. The soil of this district is mostly alluvial. Soil samples of different places of the district are of very close texture but those of riparian belt have a relatively coarse soil texture. Due to the favourable climatic and edaphic conditions a significant biodiversity is met in the district.

The rich floral distribution of this district attracted Singh et al., (1996) and Khan and Ali, (2003) for the taxonomic and ethnomedicinal studies of weed flora and medicinal plants of this region. Dastur, (1964); Donellan, (1995) and Johari & Johari, (2002) have made relevant studies on endangered medicinal plants and have contributed to important Ayurvedic and Ethno-medicines of India. The effect of climate, soil conditions, topography and infrastructure on the economics of conservation has been studied by Pearce and Moran (1994) and on the role of taxonomy in the conservation of medicinal .

MATERIALS AND METHODS

This piece of work is survey based. The surveys were made for the exploration of plants mentioned in the list of The Indian Subcontinent Plant Specialist Group of SSC (Anonymous, 1998) from the district and to study their habit and habitat, favourable ecological conditions, common names and ethnomedicinal usage prevalent among the people. Beside these the taxonomy and floral characters of these plants were studied following Duthie (1960) for their identification. Some preliminary tests of the soil samples collected from the places where the plants were found were done in the laboratory.

For the sake of illustration and presentation these plants were categorised as endangered and Extinct in wild (EW en) and Critically endangered (CR en) following

[1]**Corresponding author**

Anonymous (1994). In the present work the extinct in wild (EW en) plant species were explored and chosen as samples for study.

RESULTS

During the survey it was observed that all the plants mentioned in the list of the Indian Subcontinent Plant Specialist Group of SSC 1998 grow and flourish in the district. The plants explored during the survey are of two types on the basis of the Categories of Threatened Plants, IUCN, (Anonymous, 1994)

[1]. Plants which are known to survive only in cultivation and may be Extinct in wild (EW en) and

[2]. Plants which are Critically endangered (CR en).

Six plants from the list were found wildly growing in the Ghazipur district in a very low frequency of occurrence, facing serious threat of extinction and have been Endangered and Extinct in wild (EW en) due to habitat destruction caused by urbanization or by several other factors.

Table-1 depicts the information about plants mentioned in the list of Indian Subcontinent Plant Specialist Group of SSC (1998). Table- 2 has the general information and favourable climatic and edaphic conditions of Extinct in wild (EW en) plants. General information, Taxonomy and Floral characters, medicinal usage and causes of endangerment of these EW en plants are as follows:

1-*Abrus precatorius* Linn.

Abrus precatorius is a well known genera belonging to the family Leguminosae. This is known as Ghumchi or Ratti . This plant was found to grow in the basic (pH 8.0), nitrogen rich soil of alluvial nature.

General Taxonomy and Floral Characters

Stem branched, woody. Leaves 3-4 cms. long; leaflets paripinnate, in 10-20 opposite pairs, about 1.0 cms. long, ligulate oblong, membranous, with smooth dorsal side and silky ventral side. inflorescence; crowded raceme, many flowered. Calyx companulate, equal, teeth very short. Corolla much exerted; ovate, acute, adhering below the staminal tube. Wings narrow, keel curved, Stamens 9, united in a tube slit above, anthers uniform. Ovary subsessile, style short, incurved, stigma capitate, pods linear 8-12 seeded, seeds polished, subglobose, orange coloured with black hilum.

Medicinal Uses

The root of this plant is used as a substitute for liquorice, it is purgative, emetic and antispasmodic, In dental problems the root is used as “Dataun”. The leaves of this plant are used as expectorant, wound healer and analgesic. Seeds of this plant are powdered and mixed with honey and this paste is applied on head in biliousness.

Cause of Extinction

Habitat destruction.

Table 1 :Details of plants referred by ISPSG for their detailed study and protection

S. No.	Name of the plant	Family	Category	Habit
1.	*Abrus precatorius* Linn.	Leguminosae	EW en	Climbing shrub
2.	*Adhatoda vasica* Nees	Acanthaceae	EW en	Shrub
3.	*Centella asiatica* Linn.	Umbelliferae	CR en	Creeping herb
4.	*Costus speciosus* Smith	Zingiberaceae	CR en	Perennial Herb
5.	*Gloriosa superba* Linn.	Lilliaceae	CR en	Perennial Herb
6.	*Rauwolfia serpentina* Benth.	Apocynaceae	EW en	Small Shrub
7.	*Saraca asoca* Linn.	Caesalpinaceae	CR en	Tree
8.	*Strebles asper* Lour.	Urticaceae	EW en	Large Shrub
9.	*Tribulus terrestris* Linn.	Zygophyllaceae	EW en	Herb
10.	*Withania somnifera* Dunal	Solanaceae	EW en	Herb

Table- 2 : General information about favourable climatic and edaphic conditions of EW en plants

Sl. No.	Name of plant	Family	Local Name	Flowering Time	Nature of soil	pH
1.	*Abrus precatorius*	Legum inosae	Ghumchi	July-Sept	Alluvium with humus, Nitrogen	8.0
2.	*Adhatoda vasica*	Acanth aceae	Aroosh	Aug-Dec.	Hard, calcarius loam, deficient in Nitrate content	9.5
3.	*Rauwolfia serpentina*	Apocyn. aceae	Sarpgandha	Apr-Aug	Coarser alluvium rich in nitrogen and humus	6-8
4.	*Strebles asper*	Urticac eae	Sinhore	Jan-March	Hard, calcarius loam deficient in nitrogen	9.5
5.	*Tribulus terrestris*	Zygoph yllaceae	Gokhru	Mar-Apr	Hard, calcarius loam deficient in nitrogen	7-9
6.	*Withania somnifera*	Solan aceae	Asgandh	Jul-Oct	Alluvium with humus, rich in nitrogen	6-8

2-*Adhatoda vasica* Nees

Adhatoda vasica belongs to the family Acanthaceae and is commonly known as Aroosh. Another name of this plant is *Justicia adhatoda* Linn**.** It is found to grow near the road-side and on the borders of ponds and bunds of fields.

General Taxonomy and Floral Characters

An ever-green gregarious shrub attaining a height of 1-3 meters Root system tap, well branched. Stem with yellowish bark, terete, glabrous; branches many, ascending. Leaves 7-12 cms. long, elliptic lanceolate, acuminate, tapering to the base, minutely hairy, with dark green dorsal and pale ventral sides. Inflorescence, short axillary peduncled spike, Bracts upto 1.0 cms. long, elliptic subacute and glabrous, bracteoles about 80 mm. long with ciliate margins.Flowers complete Calyx 50-75 mm.long , slightly pubescent, oblong lanceolate, acute, 3 nerved. Corolla white with purple strips, about 2.0 cms. long, hairy, bilabiate, upper lip curved, ovate oblong, notched, lower lip oblong, rounded. Androecium, filaments hairy at the base, lower anther cell is apiculate (not spurred). Ovary and lower portion of style hairy, capsule 1.0- 1.5 cms. long, clavate, pubescent. Seeds suborbicular.

Medicinal Uses

In ring worm and other skin problems, the leaf of this plant crushed with cow's urine and turmeric is applied on the affected area. The decoction of leaves are used in cough, chronic bronchitis, asthma and other respiratory disorders. It is antipyretic and anti tuberculosis.

Causes of Extinction

Over exploitation for production of Ayurvedic and Homoeopathic medicines.

3-*Rauwolfia serpentina* Benth

Rauwolfia serpentina belongs to the family Apocynaceae and is commonly known as Sarpgandha . In Ghazipur, about 30 years before the plants of *Rauwolfia serpentina* were growing in abundance in shade of dense vegetation.

General Taxonomy and Floral Characters

Small, erect, glabrous shrub with yellow tinged bark. Leaves 7-15 cms.long and 2.5-5.0 cms.wide, lanceolate, acute, tapering into petiole, arranged in a whorled phyllotaxy. Flowers white which turn pink when exposed to sunlight, arranged in terminal corymbose cyme, peduncles stout which turn red at maturity. Flowers bracteate, gamosepalous, Corolla tube like, anthers acute, free from stigma, stigma capitate, tip bifid, ovules two colateral in each carpel.

Medicinal Uses

People use the roots of this plant to reduce the raised blood pressure and hyper-tension and arial parts are used to raise blood pressure. The whole plant acts as stabilizer of blood pressure. Besides it the decoction is given to the patients suffering sleeplessness and hysteria.

Causes of Extinction

Habitat destruction.

4-*Strebles asper* Lour.

Strebles asper belongs to the family Urticaceae and is commonly known as Sinhore. In Ghazipur district this plant is found in a very low frequency. It prefers shaded places and hard, calcarius, basic (pH. 9.5) loam for its growth. There is no knowledge about the medicinal properties of this plant. Another name of this plant is *Trophis aspera* Retz.

General Taxonomy and Floral characters

A small usually gnarled evergreen tree attaining the height of about 10 meters but very frequently merely a shrub.Stem well branched with thick, soft and gray bark. Branchlets many, much interwoven. Leaves 3-6 cms.long, elliptic or rhomboid, acute, margins toothed near apex, rough on both surfaces with minute dots, stepules obliquely lanceolate. Flowers usually diocious, Male flowers in shortly stalked globose heads, perianth companulate, tepals 4 hairy outside, stamens 4 inflexed in bud, pistillode dialated at the top. Female flowers in solitary axillary inflorescence with 4 tepals. Ovary straight, retuse, style central with long arms. Seeds globose.

Medicinal Uses

It is used in toothache in the form of Dataun beside it many other problems of teeth are cured by the use of decoction as a mouthwash.

Causes of Extinction

Habitat destruction.

5. *Tribulus terrestris* Linn

Tribulus terrestris is a well known species of family Zygophyllaceae. It is commonly known as Gokshur or Gokharu. Another name of this plant is *T. lanuginosa* Linn. It prefers hard, calcarius, basic (pH.8.0-9.0) sandy loam for its normal growth.

General Taxonomy and Floral characters

A prostrate annual herb clothed with silky hairs Stem branched. Leaves; stepulate, opposite, abruptly pinnate, leaflets usually unequal. Flowers solitary on pseudo- axillary peduncles, white; sepals 5, imbricate, petals 5, imbricate, spreading, disk annular ,10 lobed. Stamens 10, alternately longer and shorter, filaments filiform. Ovary sessile, 5-12 lobed and celled, style short, stigmas 5-12, ovules superposed, fruits 5 lobed, spinous. Seeds 2 or more in each cell.

Medicinal Uses

This plant is used in dysurea, nephritis, impotence, piles,cough, asthma and heart diseases. It is effective in low back pain.

Causes of Extinction

Habitat destruction and occurrence in very low frequency.

6- *Withania somnifera* Dunal

Withania somnifera is a member of family Solanaceae and is commonly known as Asgandh or Ashwagandha. It is also named as *Physalis flexuosa* Linn. This plant is found to grow in alluvial soil rich in humus and nitrogen with pH ranging between 6-8.

General Taxonomy and Floral characters

An erect branching herbaceous under shrub upto 2 meter high, branches terete, densely tomentose. Leaves petiolate 3-6 cms. long, ovate, subacute, with acute base. Flowers axillary, shortly pedicillate, complete; Calyx companulate, 5 or 6 toothed, fused, enlarged covering the fruit, Corolla companulate, lobes lanceolate, acute, hairy outside, Anthers adnate, oblong, Ovary two celled, style linear, stigma shortly bifid. Fruits globose berry, become yellow when ripe.

Medicinal Uses

Root of this plant is effective in painful swellings, fever and carbuncles. The whole plant is frequently used in leucorrhoea and low back pain in females and impotence in males.

Causes of Extinction

Over exploitation for preparation of medicines on large scale.

DISCUSSION

Ghazipur district is undoubtedly rich in plant diversity. All the plants suggested for detailed study and conservation, by the Indian Subcontinent Plant Specialist Group, 1998, grow and flourish in the district. These plant species can be categorized in two categories viz. Extinct in wild (EW en) and Critically endangered (CR en).

The Extinct in wild (EW en) plants are those which

were found growing uncultivated and were not facing the threat of extinction in the recent past because of the fact that their frequency was higher. However a drastic fall in their frequency was recorded during the study. This fall is only because of habitat destruction due to urbanization and over exploitation. These plants need their cultivation because it is hard for them to survive in wild habitat and they are facing over exploitation due to less production and higher demand. Other plants of the list prepared by Indian Subcontinent Plant Specialist Group, 1998, are found in the district growing conserved either in the form of ornamentals or as the collections in the gardens are considered as Critically Endangered (CR en). These plants need special awareness for their conservation and propagation considering the difficulties of their survival and higher demand.

However, this district suffers water and soil pollutants from two major industries namely, "Govt.Opium and Alkaloid Works, Govt. of India" and "Lord's Distillary, Nandganj" which situate in the district. The discharged effluents of these industries may also be one of the causes of habitat distruction resulting into extinction of these plants. The lower concentrations of these effluents may be supportive for the conservation of endangered experimental plants.

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