

RARE ETHNO MEDICINAL HEMI PARASITIC PLANTS: CONSERVATION AND SUSTAINABLE USE IN SOUTH WEST BENGAL, INDIA

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ABSTRACT

Scurrula atropurpurea, *Macrosolen cochichinensis*, *Dendrophthoe falcata*, *Viscum articulatum*, *Loranthus longiflorus* and *Viscum album* are highly medicinal hemi parasites found in the forests of South West Bengal. Local people mainly tribal communities use these plants in various purposes of their lively hood. During extensive survey, it was found that these plants were at the point of extinction from the forests of south West Bengal. The frequency of these plant species reduced approximately 5% in 3 years (2016- 2018). During field work it was found that due to extensive use, various anthropogenic activities and change of micro climate, these plants were at the point of extinction from the forests of south West Bengal. To avoid bio diversity extinction some measures were taken, like, cultivation of these hemi parasitic medicinal plants, provision of training and extension services to farmers engaged in cultivation of medicinal plants, establishment of herbal gardens in forest areas and creation of seed bank. Sustainable utilization of this important renewable natural re-source was discussed. In addition to using their curative and therapeutic value, tribal people use these hemi parasitic plants in rituals, cultural activities and in religious functions which are another way to use and conserve this valuable biodiversity.

KEYWORDS : Biodiversity, Sustainable utilization, Hemi parasitic plant, Conservation.

INTRODUCTION:

Plants are the founder of earth's life. But unfortunately many of the valuable plants are extinct and some are at the point of extinction. The changes in civilization and the increasing pace of development in the last three centuries have left its footprint on our natural resources mainly on plant. Plants are valuable, not only because of its economic importance but also medicinal and socio cultural usefulness. Although some plants have effectively adapted to sustainable populations, the continual loss of high quality habitats all across the world has led to disturbing decline in the number of several important plants. Plant provide various kind of drugs and medicines and our dependence on medicinal plants has no way been minimized by the use of modern system of synthetic drugs whose use are not without side effect.

Ancient medicine was not solely based on empiricism and this is evident from the fact that some medicinal plants which were used in ancient times still have their place in modern therapy (Das and Mondal, 2012). In India, there are more than 7000 species, which have been identified as medicinal plants. The indigenous system of medicine practiced in India is based mainly on the use of plants. Charaka Samhita (1000 BC-100 AD) has recorded the 2000 vegetable remedies (Das et al, 2012). It was believed that all the plants in this world have its individual medicinal properties.

Hemi parasite is a group of plants which are parasitic under natural conditions and contains the power of photosynthesis to some degree. Hemi parasites may just obtain water and mineral nutrients from the host plant (Runyon et al, 2009). Many obtain at least part of their organic nutrients from the host. Haustorial connections of the hemi parasites allow the uptake of sap and nutrients from the host, which are the raw material for photosynthesis. Hemi parasites have the ability to gain carbon autotrophically, it has been suggested that nutrients such as nitrogen and potassium gained from hosts may be more beneficial to hemi parasites than carbon. The tribal peoples of south West Bengal use some of the hemi parasites in medicinal purpose. The plants are often used in various rituals and their house hold purpose. It was found that due to extensive use, various anthropogenic activities and change of micro climate, these plants are at the point of extinction from the forests of south West Bengal. To avoid bio diversity extinction some measures should be taken immediately. The aim of the study to create documentation of the loss of bio diversity and take proper steps to resist the loss.

lateritic soils and dry deciduous forest. In Midnapore district, our survey are conducted in some natural forest areas like Kushboni forest (22°49'N, 86°97'E to 22°51'N, 86°94'E), Salboni forest (22°61'N, 87°21'E to 22°64'N, 87°25'E), Dhamkurar jungle (22°73'N, 87°45'E to 22°76'N, 87°49'E), Hoomgarh forest (22°82'N, 87°23'E to 22°83'N, 87°25'E), Bulanpur forest (22°73'N, 87°10'E to 22°74'N, 87°11'E). In Purulia District we covered Ajothya hills (23°13'N, 86°06'E to 23°27'N, 86°19'E), Panchakot hills (23°59'N, 86°75'E to 23°64'N, 86°77'E), and in Bankura district, we visited Sarenga jungle (22°76'N, 87°01'E to 22°77'N, 87°03'E), Jalar jungle (23°03'N, 87°06'E to 23°08'N, 87°07'E). Except these locations our field survey are carried out in various human localities.



Fig.No. 1. Study area in West Bengal map (Red spotted area).

STUDY AREA:

The natural forest parts of south West Bengal is characterized by

MATERIAL AND METHODS:

Field explorations are carried out during the years 2016-2018. The survey based on ethno botanical field trips at the tribal forest areas of south West Bengal, mainly in habited by the Santals and Mundas. The first field trip of the study area was devoted to acquaintance with the local chiefs, priests, Vaidyas, herbal doctors, headman's and elderly people of both men and women. The methodology was adopted as described by S.K. Jain (1999), Chadwick and Marsh (1994). Structured questionnaires, interviews and participatory observations were used to illicit information from the resource persons using standard methods (Martin, 1995). Few works on tribal knowledge system about the use of medicinal plants in this area has been done (Pal & Raychaudhury, 1982; Chaudhury and Pal, 1975; Pal, 1981; Ghosh A 2008).

Information of folk-medicinal use of plants was obtained through oral interviews enduring local plant name, parts used, method of preparation, mode of administration and frequency status for each species. Plant specimens are snapped and collected from the study area authenticated and kept in the institution. The traditional ethno medicinal information of rare hemiparasitic plant species, which are at the point of extinction from the natural forests of south West Bengal, is listed (Table No. 1). To avoid bio diversity extinction some measures were taken, like, cultivation of these hemiparasitic medicinal plants, provision of training and extension services to farmers engaged in cultivation of medicinal plants, establishment of herbal gardens in forest areas and creation of seed bank. Sustainable utilization of this important renewable natural resource was discussed.

RESULT AND DISCUSSION:

The hemiparasitic plants are used by the local peoples as their household remedies and various purposes. The data has been verified from the ethnic people of different tribal areas. Statistically, information for treating a particular ailment from different informants certainly reflects the accuracy and authenticity of the folk drugs employed. In our investigation we found the tribal people of south West Bengal mainly the Santals use these plants in different ways which is devoid of Ayurvedic and Unani medicinal system these are as follows.

Medicinal values of hemiparasitic plants:

The tribal peoples of south West Bengal use some hemiparasites to cure their health problems.

***Scurrula atropurpurea* (Fig.No.-2):** *Scurrula atropurpurea* is traditionally used as a reducing agent in tumor treatment. *Scurrula atropurpurea* has often been used to nourish blood. It is also used to cure bleeding from the lungs or intestines caused by typhoid or dysentery, disturbance in blood circulation, internal and external haemorrhage and nosebleed.

***Macrosolen cochichinensis* (Fig.No.-3):** The leaf paste is taken mainly as a remedy for jaundice. The crushed bark of this plant is used in diarrhoea and leucorrhoea.

***Dendrophthoe falcata* (Fig.No.-4):** *Dendrophthoe falcata* has potential for treating hypertension. Their ethno medicinal applications include the treatment of chronic diseases and immunological disorders. It is also useful in treating pulmonary tuberculosis, asthma, menstrual disorders, swelling wounds, ulcers, renal and vesical calculi and vitiated conditions of kapha and pitta.

***Viscum articulatum* (Fig.No.-5):** Sun dried plant parts are used in rheumatic arthritis, urinary tract infection, low back pain dysentery and uterine bleeding. It also used to treat weakness.

***Loranthus longiflorus* (Fig.No.-6):** The leaves of *Loranthus parasiticus* is used for treating headache. The paste of this plant applied on the affected parts of the body to get relief from pain.

***Viscum album* (Fig.No.-7):** *Viscum album* is mainly used as cardiac, diuretic, stimulant and vasodilator. It has beneficial effects on the circulatory and cardiovascular system as it lowers the heart rate and blood pressure. It can ease anxiety and promote sleep. An external application is used in treatment of leg ulcers and varicose veins. It also stimulates digestion and is helpful in promoting digestive processes. According to traditional healers berries are poisonous. Large doses could have dangerous effects on heart action. So it needs to take proper dose for consumption.

Use of hemi parasitic plants by tribal people in house hold purpose:

Ethnic peoples of south West Bengal use these medicinally valuable hemiparasitic plants in their house hold purposes also.

Scurrula atropurpurea: The young leaves are used as vegetables. These are taken as food after roasting.

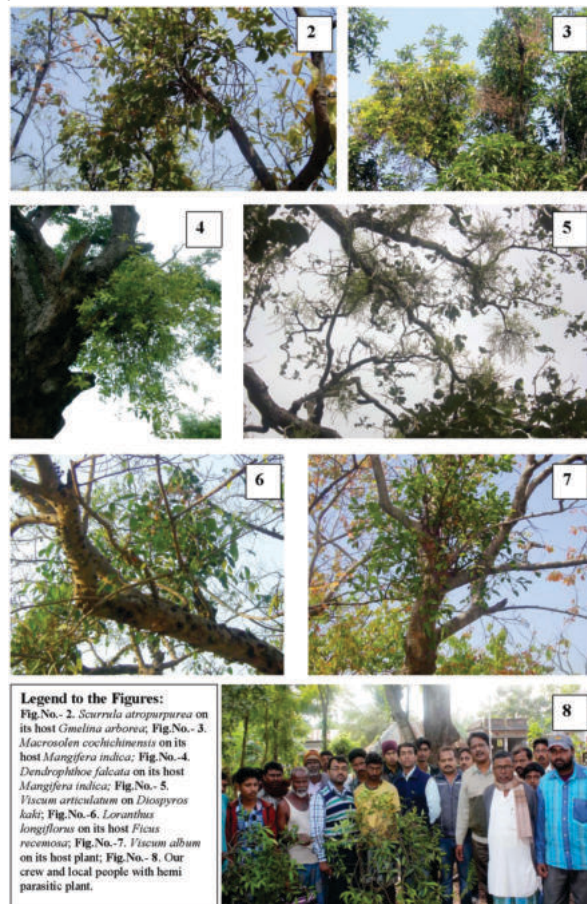
Macrosolen cochichinensis: It is thought that *Macrosolen cochichinensis* is a sign of ruinous power so the tribal peoples keep distance from the plant.

Dendrophthoe falcata: Various parts (flower, leaf and twig) of this plant are used in various tribal rituals.

Viscum articulatum: The ethnic people use *Viscum articulatum* as a protection against witchcraft. It was thought that if it was hung around the neck it repelled witchcraft.

Loranthus longiflorus: The tribal peoples use the leaf paste of this plant to enhance body skin tone.

Viscum album: The ripe fruit of *Viscum album* is edible. But berries are considered to be poisonous in over dose. So often it is used as poison.



Legend to the Figures:
 Fig.No.- 2. *Scurrula atropurpurea* on its host *Gmelina arborea*; Fig.No.- 3. *Macrosolen cochichinensis* on its host *Mangifera indica*; Fig.No.- 4. *Dendrophthoe falcata* on its host *Mangifera indica*; Fig.No.- 5. *Viscum articulatum* on *Diospyros kalis*; Fig.No.- 6. *Loranthus longiflorus* on its host *Ficus racemosa*; Fig.No.- 7. *Viscum album* on its host plant; Fig.No.- 8. Our crew and local people with hemiparasitic plant.

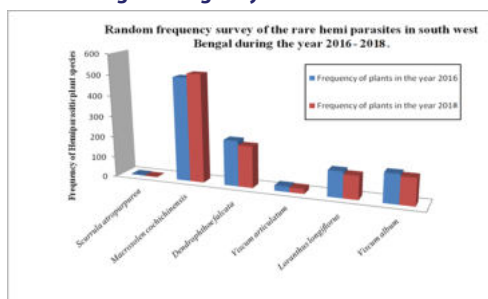
The villages of the region are rich with ethno medicinal knowledge.

They obtain a variety of plant products from wild plants to fulfill their own needs as they are economically weaker sections of the society. The importance of recording indigenous knowledge base related technology as described here become essential in view of rapid socio economic and cultural changes and for high technique low cost solution. Religious and cultural faith, poor economy and lack of modern medicinal facilities in villages of the study area seem to be cause of utilization of these plants. While conducting the survey the inhabitant revealed that most of the people were dependent on plants and they also preferred it, although the preparing methods are known only to local faith healers. Therefore, imperative that herbal medicines of the aborigines which are still in vogue should be documented, conserve and sustainably used.

Table: 1. Random frequency survey of the rare hemi parasites in south west Bengal during the year 2016- 2018.

Sl. No.	Name of Hemi parasite plants	Family	Hosts	Frequency of plants in the year		Percentage of Reduction of the plant species
				2016	2018	
1.	<i>Scurrula atropurpurea</i> (Blume) Danser	Loranthaceae	<i>Gmelina arborea</i>	3	1	67%
2.	<i>Macrosolen cochichinensis</i> (Lour.) Van Teigh	Loranthaceae	<i>Casuarina equisetifolia</i> , <i>Ficus religiosa</i> , <i>F. Indica</i> , <i>Mangifera indica</i> , <i>Shorea robusta</i> and <i>Annona squamosa</i>	500	520	- 4%
3.	<i>Dendrophthoe falcata</i> (Linn. f.) Etting.	Loranthaceae	<i>Mangifera indica</i> , <i>Psidium guajava</i> , <i>Punica granatum</i>	220	200	9%
4.	<i>Viscum articulatum</i> L.	Santalaceae	<i>Diospyros kaki</i>	26	23	12%
5.	<i>Loranthus longiflorus</i> Desr.	Loranthaceae	<i>Mangifera indica</i> , <i>Citrus limon</i> , <i>Ficus religiosa</i> , <i>F. racemosa</i>	125	112	10%
6.	<i>Viscum album</i> L.	Santalaceae	<i>Malus sikkimensis</i> , <i>Malus sylvestris</i> , <i>Annona squamosa</i>	140	130	7%

Fig.No. 9. Rannom frequency survey of the rare hemi parasites in south west Bengal during the year 2016- 2018.



In our field survey it is found that the endangered medicinal hemiparasitic plant species are decreasing in number. (Table No. 1) Our survey was conducted during the year 2016- 2018. The frequency of these plant species reduced approximately 5% in 3 years (2016- 2018). But an interesting fact is revealed in this investigation, that the frequency of *Macrosolen cochichinensis* is increasing day by day because of its wide range of host specificity (Fig.No. 9). But *Scurrula atropurpurea* is at the point of extinction from the forests of the south West Bengal. During field work it was found that due to extensive use of these plant species, various anthropogenic activities like destruction of natural forests and change of micro climate, these plants are at the point of extinction from the forests of south West Bengal. Due to modern forest management system young growing plants are cut for economic benefit and new plants are introduced, so the hemi parasites cannot establish in their hosts because of this short time period. More over these artificial forests are covered by mainly Eucalyptus and Shal trees which have allelopathic effect

so hemi parasites can't grow on it. These hemi parasites penetrate their haustoria through the ruptured portion of the bark so they need old trees which have less immunity power to resist penetrating the haustoria. Some of the host plants die due to over parasitism and the hemi parasites also die with them. To overcome these problems some measures are taken by our crew like, cultivation of host plant of these hemi parasitic medicinal plants and its infection, provision of medicinal plants, establishment of herbal gardens in forest areas and creation of seed bank. Sustainable utilization of this important renewable natural re-source was discussed.

CONCLUSION:

This type of field survey is extremely necessary to prepare a database of the valuable indigenous medicinal plants and their ethnic uses for mankind. Herbal medicines of the aborigines which are still in vogue should be documented, conserve and sustainably used. However, isolation of active principles, phyto chemical and pharmacological investigations is needed to sustain the claims of the ethnic healers. This may provide new sources of herbal drugs. The formulation of these effective phyto medicines should be encouraged for their sustainable uses. Hemi parasites are truly endangered in the forests of south West Bengal. To conserve these plants it needs to protect old susceptible host plants and take proper care on over parasitism of the hemi parasites.

ACKNOWLEDGEMENTS:

We like to thank Mr. Banchu Lohar, Mr. Dharamdas Murmu, Mr. Babulal Mandi, Mr. Kandalal Kisku, Mrs. Radhuni Soren, Mr. Tudulopal Mandi and Mr. Marshal Tudu for providing us the valuable information about the concern work.

We are highly indebted to UGC-DRS SAP, New Delhi for their financial support in the form of Project Fellows. We are also thankful to Professor Ranjan Chakraborti, Honourable Vice-Chancellor, Vidyasagar University for proving us adequate research facilities. We are also thankful to the Research Scholars from Plant Taxonomy, Biosystematics and Molecular Taxonomy Laboratory for supporting us in this research work.

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