

Assessment of some climber species in Narmada basin forest area of Mohgoun block, Mandla district, Madhya Pradesh (India)

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ABSTRACT

The present study on the climber plants for conservation assessment of rare, endangered and threatened plants (RET) was conducted during 2013-17. A total of 4 villages viz. Gadhi, Chandwara, Kupariya and Padariya of tehsil Ghughri, block Mohgoun in Narmada basin forest area of Mandla district (M.P.) were surveyed. The collection and identification of climbing plant species from the study site were selected from higher dense forest area of Mohgoun block. A total number of 38 climber species comprising 33 genera of 16 families were identified. Out of these, 23 climber species like *Asparagus recemosus*, *Caesalpinia bonduc* etc. found to be endangered species and *Dioscorea hispida*, *Citrullus colocynthis*, *Clitoria ternatea*, *Gloriosa superba*, *Gymnema sylvestre* etc. are rare climber species. Since countless species have already gone extinct through natural processes. In the recent years an increasing attention has been paid on the conservation of rare and threatened species especially on medicinal plants through *ex-situ* and *in-situ* practices. There is an urgent need for developing pragmatic conservation strategies for endemic climber plant species in the Mandla district of Madhya Pradesh, which may lead to their effective protection.

KEYWORDS: - Rare, endangered, threatened Climber plants, conservation, Mandla district.

INTRODUCTION

Climber are the plants that germinate on the floor and grow for part of their life by winding ground, anchoring or adhering to other plants (Jongkind and Hawthorne, 2005) to attain great stature (Swaine, 2005). They rely on other plants for mechanical support. Due to their weak stem, they attach themselves to any neighboring object by means of some special organs of attachment. They show great diversity in their climbing mechanism depending on which they are classified as root climbers, hook climbers, tendril climbers, leaf or stem climbers or twinners (Agarwal, 2013). The IUCN Red list Categories have since then undergone a series of revisions to enhance their applicability to organisms other than mammals and to reflect the development of the new conservation science, population dynamics and conservation biology in the last two decades. The current version of the IUCN Red list criteria is the December 1994 IUCN ratified version. This version has far more objective criteria for assessment. The categories can be divided into 5 divisions viz. Extinct (Extinct and Extinct in the wild), Threatened (Critically Endangered, Endangered and Vulnerable), Non-threatened (Lower Risk near threatened, conservation dependent and least concern), Data Deficient and Not Evaluated. India has a rich tradition of conservation of nature. The species survival commission of the IUCN published information online about approximately 41,500 endangered species worldwide as the red list of Threatened species. It is reported that traditional healers use 2500 plant species and 100 species of plants serves as regular sources of medicine (Raut. *et.al.* 2013; Sainkhediya and Ray 2014).

There are several wild species which harbour rich biodiversity in plant and play an important role in the conservation of biodiversity. Conservation status of various taxa in different Indian parts is studied by several workers (Biswas, 1991; Kala, 2000; Badola and Pal, 2002; Anthwal *et.al.*, 2006; Choudhari, 2007; Kumari and Tewari, 2009). A number of workers have drawn attention towards the threatened medicinal plants of India from time to time (Jain and Shastry, 1980; Rao and Rajasekharan 2002; Bhakt and Pandit 2003; Badola and Pal 2003). However, large number of researchers and organizations were worked in the field of RET Climbers plants in India (Singh, 1990; Ghosh and Mukherjee, 2006; Narayan *et. al.*, 2008; Seliya and Patel, 2009; Usha, 2010; Bandopadhyya and Mukherjee, 2010; Jangid and Sharma, 2011; Patel *et. al.*, 2013; Sarvalingam and Rajendran, 2016;). In the recent years an increasing attention has been paid on the conservation of rare and threatened species especially on medicinal plants through *ex-situ* and *in-situ* practices.

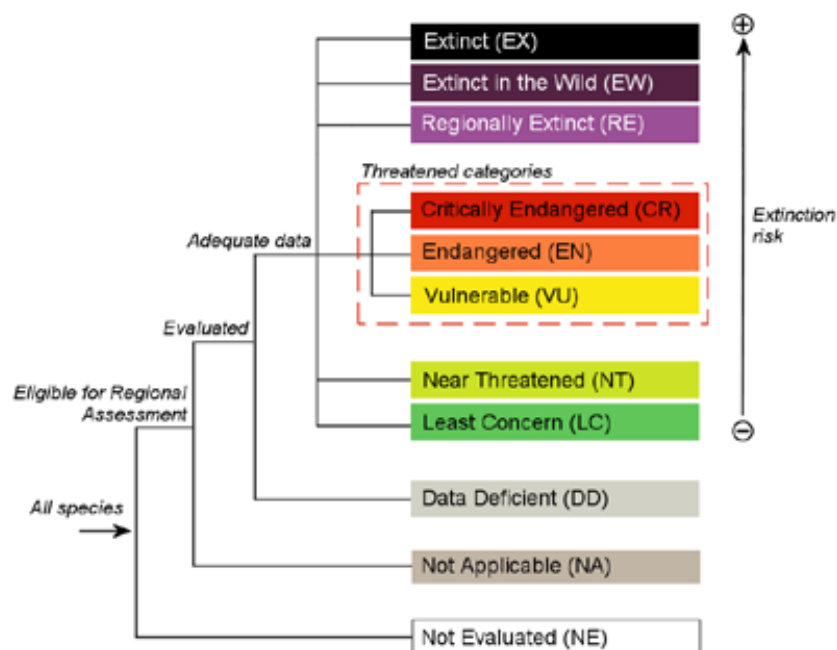


Fig. 1 Structure of the categories used at the regional level

Madhya Pradesh is the largest state of India and having large number of rare and endemic plant species. Madhya Pradesh is rich in plant wealth and BSI has documented about 2500 species of angiosperms in the flora of this state in India (Chaubey *et.al.* 2015). In Madhya Pradesh, the rare endangered and threatened plants are relatively well documented (Sharma, 2005; Sainkhediya and Ray, 2014; Bharti, 2015; Pandey, 2016).

STUDY SITE

Mandla district is located in the east central part of the Madhya Pradesh and is in eastern side of the Jabalpur district. The district forms a part of Satpura hills which separate the cotton growing of the south from the wheat growing extension of the Malwa plateau on the north and is the water shed of five district river systems. It lies between the latitude 22.2° and 23.2° north and longitude 80.78° and 81.50° east, the tropic of cancer line thus pass through the north of the district. The total area of the district is 13269 sq. km. Its extreme length is about 133 km. from north to south and extreme breadth 182 km. from east to west. Mandla district is rich in natural resources due to its vast ecological diversity and rivers like Narmada, Banjar, Bali, Thawar, Chakore, Budner flow through this region. During present study a total of 4 villages viz. Gadhi, Chandwara, Kupariya and Padariya of tehsil Ghughri, block Mohgoun in Narmada basin forest area of Mandla district (M.P.), India were surveyed (Fig. 2). Once upon a time this region was known for its teak forest abundance with mixed luxuriant flora. Now forest is totally disturbed and fragile. Mandla region boast of good species richness. There is an urgent need to conserve the RET plants which have been only reported from Mandla region but not found in other district of M.P. and surrounding states. Enormous data gathered during plant exploration will be helpful for planning conservation of RET plants and sustainable management of phyto-resources.

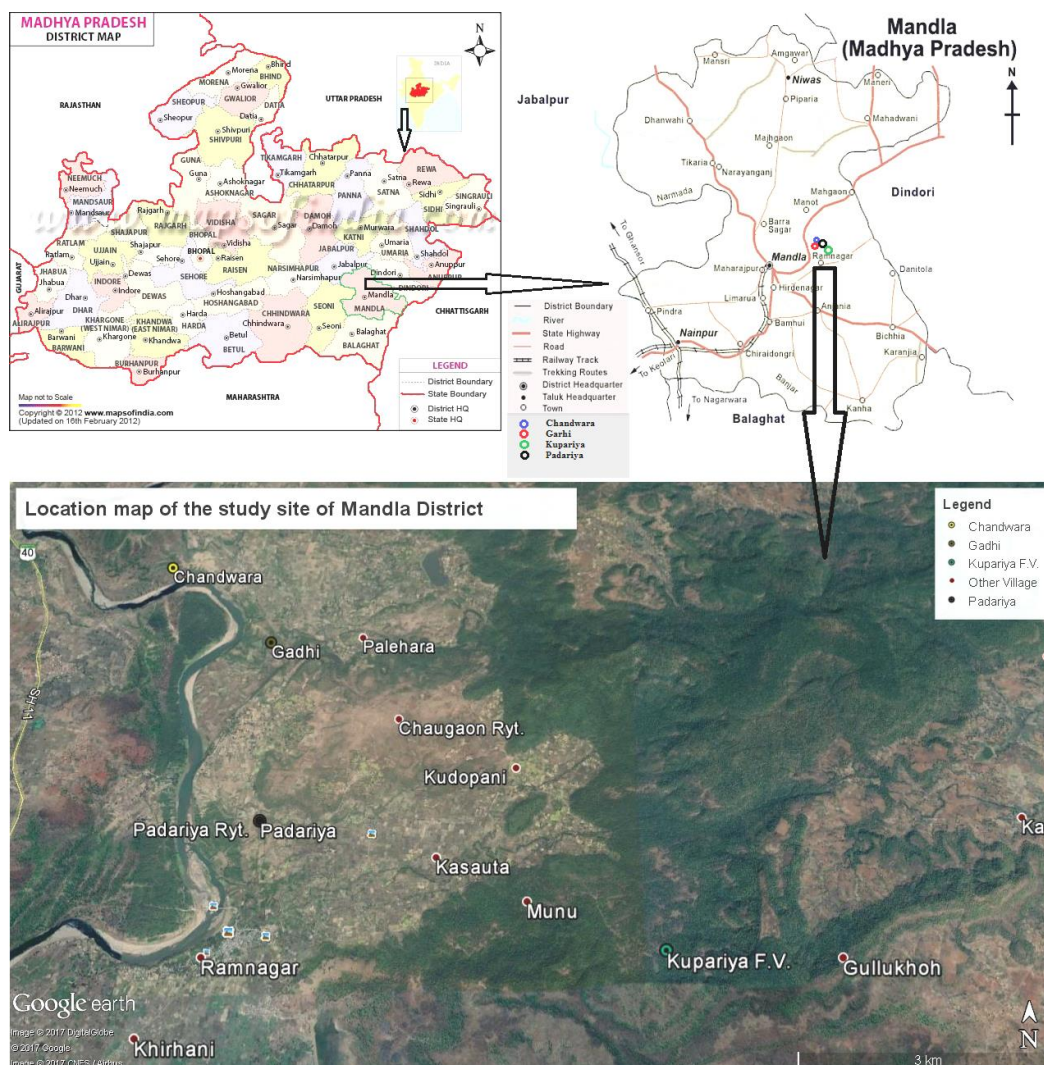


Fig. 2 Location Map of the study site in Mandla District, Madhya Pradesh (India)

MATERIAL AND METHOD

During the course of the proposed investigation well established and standard ethno-botanical methodology (Jain and Rao, 1976; Jain, 1989, 1995; Martin, 1995; Kasana *et.al.*, 2009) has been adopted and followed for the purpose. Plant specimens collected from the field carried out by standard method (Jain and Rao 1977) with their local names were identified with the help of flora of Madhya Pradesh (Verma *et. al.* 1993), native local flora of Jabalpur district (Oommachan and Shrivastava 1996) and available literature. The threatened Status of the plants was confirmed with IUCN Red list and also the help of using available Red data books and publications such as (Nair and Daniel, 1986; Nayer and Shastry, 1987, 1988, 1990; Scott *et. al.*, 1997). The identified plants were further conformed from local taxonomists and herbarium flora. The plants are arranged alphabetically by genus (Botanical name), local name, family, habit, plant part used and concerned diseases are also enlisted.

RESULT AND DISCUSSION

In the present study, 38 climber plant species have been documented as rare endangered threatened plants (RET). These 38 plant species belong to 16 families are enumerated in alphabetical order with their local names, red data book category and present status in study area (Table-1). Plants arranged in the table refer to the classification of threatened plants as given by IUCN. The category include: Extinct (EX); Extinct in wild (EW) and threatened. Threatened which are divide in to critically endangered (CR); endangered (EN); vulnerable (VU); near threatened (NT) and least concern (LC) (Fig. 1). Based on these categories, assessment of plant species have been carried out. The possible threat reason in selected site has also been included in the present study (Fig. 3).

During the investigation of RET climber plants we have recorded 20 species (52.63%) viz. *Abrus precatorius*, *Asparagus recemosus*, *Bryonopsis laciniosa*, *Caesalpinia bonduc*, *Cissus quadrangularis*, *Citrullus colocynthis*, *Cucumis callosus*, *Clitoria ternatea*, *Dioscorea bulbifera*, *Dioscorea hispida*, *Dioscorea oppositifolia*, *Dioscorea pentaphylla*, *Diplocyclos palmatus*, *Gloriosa superba*, *Gymnema sylvestre*, *Mucuna pruriens*, *Pueraria tuberosa*, *Smilax zeylanica*, *Tinospora cordifolia* and *Tylophora indica* are Trade; while *Asparagus recemosus*, *Bryonopsis laciniosa*, *Caesalpinia bonduc*, *Cissus quadrangularis*, *Citrullus colocynthis*, *Clitoria ternatea*, *Coccinia grandis*, *Cucumis callosus*, *Dioscorea bulbifera*, *Dioscorea hispida*, *Dioscorea oppositifolia*, *Dioscorea pentaphylla*, *Diplocyclos palmatus*, *Gloriosa superba*, *Gymnema sylvestre*, *Mucuna pruriens*, *Pueraria tuberosa*, *Smilax zeylanica*, *Tinospora cordifolia* and *Tylophora indica* are Trade for parts; 5 species (13.15%) such as *Argyreia speciosa*, *Coccinia grandis*, *Jasminum grandiflorum*, *Momordica charantia* and *Momordica dioca* are cultivated; 8 species (21.05%) such as *Abrus precatorius*, *Argyreia speciosa*, *Basella rubra*, *Cissus quadrangularis*, *Clitoria ternatea*, *Jasminum grandiflorum*, *Momordica dioca* and *Quisqualis indica* are also found ornamental; 4 species (10.52%) *Momordica charantia*, *Dioscorea bulbifera*, *Dioscorea hispida* and *Coccinia grandis* are harvested for food; all of the above species (100 %) are harvested for medicine in regional level. Twenty Seven species (71.05%) *Abrus precatorius*, *Argyreia speciosa*, *Ampelocissus latifolia* Roxb. *Aristolochia indica*, *Basella rubra*, *Caesalpinia bonduc*, *Cissus quadrangularis*, *Citrullus colocynthis*, *Cucumis callosus*, *Clitoria ternatea*, *Dioscorea bulbifera*, *Dioscorea hispida*, *Dioscorea oppositifolia*, *Dioscorea pentaphylla*, *Diplocyclos palmatus*, *Evolvulus nummularius*, *Gymnema sylvestre*, *Ipomoea hederifolia*, *Ipomoea pes-tigridis*, *Jasminum grandiflorum*, *Momordica dioca*, *Pergularia daemia*, *Quisqualis indica*, *Smilax zeylanica*, *Tinospora cordifolia*, *Tylophora indica* and *Vallisneria spiralis* are of loss of habitat and 25 species (65.78%) such as *Aristolochia indica*, *Ampelocissus latifolia*, *Asparagus recemosus*, *Bryonopsis laciniosa*, *Caesalpinia bonduc*, *Cissus quadrangularis*, *Citrullus colocynthis*, *Clitoria ternatea*, *Cucumis callosus*, *Dioscorea bulbifera*, *Dioscorea hispida*, *Dioscorea oppositifolia*, *Dioscorea pentaphylla*, *Diplocyclos palmatus*, *Gloriosa superba*, *Gymnema sylvestre*, *Ipomoea pes-tigridis*, *Mucuna pruriens*, *Pergularia daemia*, *Pistia stratiotes*, *Pueraria tuberosa*, *Smilax zeylanica*, *Tinospora cordifolia*, *Tylophora indica* and *Vallisneria spiralis* are found over exploited and every species comes under rare category because human interference and deforestation (Fig. 3).

The following species categorised as possibly extinct in future such as *Argyreia speciosa*, *Ampelocissus latifolia*, *Gymnema sylvestre* and *Pueraria tuberosa* could be located in Mandla district as well as the species of *Tylophora indica*, *Asparagus recemosus*, *Citrullus colocynthis*, *Dioscorea hispida* and *Gloriosa superba* could also be located in the selected site. In addition to climbing threatened species out of Thirty eight, 23 climber plant species were threatened in Mandla district due to various categories such as over exploitation, loss of habitat, harvested for medicine, harvested for food, trade and trade for their parts etc.

In Mandla, the families with respect to endemic species have been recorded Dioscoreaceae in province in Padariya. Among these 12 families, except (Oxalidaceae, Cucurbitaceae, Menispermaceae and Convolvulaceae), all the others are among the top ten families in the study region, though their ranks are slightly altered. Most of the endemic species of (*Ampelocissus latifolia*, *Dioscorea bulbifera*, *Dioscorea hispida*, *Dioscorea oppositifolia*, *Dioscorea pentaphylla*, *Gloriosa superba*, *Gymnema sylvestre*, and *Mucuna pruriens*) are confirmed to the Gadhi, Chandwara, Kupariya and Padariya region (Fig. 4).

During the present study has RET climbers plant identified there hotspots of endemic centers in the local level of Mandla district, viz., Gadhi, Chandwara, Kupariya and Padariya. From Gadhi region it is reported that there are (5) Extinct in wild, rare (6) and also threatened 12 species [vulnerable (2), critical endangered (4) and endangered (7)] limited to this region. Chandwara region of Mandla district it is reported that there are (4) Extinct in wild, rare (3) and threatened 15 species [vulnerable (4), critical endangered (7) and endangered (5)] restricted to this place. One of the most hot spots place in this region is Chandwara and Kupariya. Both province Chandwara and kupariya is having high value threatened plants. Kupariya province reported also that (4) Extinct in wild, rare (4) and also threatened 15 species [vulnerable (6), critical endangered (2) and endangered (8)]. Padariya province of Mandla district it is reported that there are (3) Extinct in wild, rare (2) and threatened [vulnerable (3), critical endangered (3) and endangered (11)] limited to this point (Fig. 5).

Medicinal plants are being overexploited from the wild for trade. Populations have shrunk to the extent that any harvest even for subsistence living could result in the extinct. It is therefore suggested that cultivation be taken up to meet the demands of the trade industry or local needs for subsistence. Cultivation is a must for the texon to survive in the wild. Any delay would only mean that a much depleted wild gene pool would be available to utilise for cultivation programmes.

Uptill now no papers have been published with RET climbing plants of Mandla district, Madhya Pradesh. So far no records on the climbing plants about the rare, endangered and threatened plant (RET), this is evidently the first record of the RET climbing plants in the selected site of Mandla district. However some of the climbing plant species mentioned in this paper were also reported in some earlier work in international, national and regional level for different state of India. Firstly according to IUCN red data book viz. *Abrus precatorius* Linn. (Vulnerable), *Argyreia speciosa* Sweet. (Invulnerable), *Asparagus recemosus* willd. (Vulnerable), *Ampelocissus latifolia* Roxb. (Invulnerable), *Dioscorea bulbifera* Linn. (Endangered), *Gloriosa superba* Linn. (Endangered), *Gymnema sylvestre* (Retz.) R.Br. Ex. Sch. (Endangered), *Mucuna pruriens* (Linn.) DC. (Endangered) and *Tinospora cordifolia* (Willd.) Miers. (Endangered); secondly according to BSI viz. *Gloriosa superba* Linn. (Endangered), *Gymnema sylvestre* (Retz.) R.Br. Ex. Sch. (Vulnerable) and *Tylophora indica* (Burm.f.) Merriell. (Vulnerable); in addition to also some workers in India had reported various plants such as *Tinospora cordifolia* (Willd.) Miers. (Rare- Das et. al. 2013, Critical Endangered- Dwivedi et. al. 2008, Vulnerable- Sainkhediya and Ray 2014), *Gloriosa superba* Linn. (Critical Endangered- Prakash 2011, Extinct in Wild- Bharti 2015, Endangered- Dwivedi et al. 2008, Near Threatened- Gritto et. al. 2012, Endangered- Ray and Sainkhediya 2014), *Gymnema sylvestre* (Retz.) R.Br. Ex. Sch. (Vulnerable- Prakash 2011, Endangered- Ray and Sainkhediya 2014; Tewari et. al. 2014), *Argyreia speciosa* Sweet. (Extinct in Wild- Bharti 2015), *Ampelocissus latifolia* Roxb. (Least Concern- Sainkhediya and Ray 2014, Critical Endangered- Bharti 2015), *Dioscorea bulbifera* Linn. (Critical Endangered- Bharti 2015), *Abrus precatorius* Linn. (Endangered- Dwivedi et. al. 2008, Least Concern- Sainkhediya and Ray 2014, Rare- Sharma et.al. 2011), *Cissus quadrangularis* Linn. (Critical Endangered- Dwivedi et. al. 2008), *Momordica dioca* Roxb. ex Wild. (Vulnerable- Dwivedi et. al. 2008), *Mucuna pruriens* (Linn.) DC. (Vulnerable- Dwivedi et. al. 2008, Near Threatened- Sainkhediya and Ray 2014), *Smilax zeylanica* Linn. (Vulnerable- Gritto et. al. 2012), *Asparagus recemosus* willd. (Rare- Sharma et.al. 2011, Vulnerable- Ray and Sainkhediya 2014; Sainkhediya and Ray 2014, Near Threatened- Tewari et. al. 2014), *Citrullus colocynthis* (Linn.) Schard. (Vulnerable- Ray and Sainkhediya 2014), *Diplocyclos palmatus* (L.) Jeffrey (Near Threatened- Ray and Sainkhediya 2014), *Clitoria ternatea* Linn. (Least Concern- Sainkhediya and Ray 2014, Vulnerable- Tewari et. al. 2014), *Cocculus hirsutus* (Linn.) Diels. (Near Threatened- Sainkhediya and Ray 2014), *Cuscuta reflexa* Roxb. (Least Concern- Sainkhediya and Ray 2014), *Pueraria tuberosa* (Roxb. ex Willd.)DC. (Least Concern- Sainkhediya and Ray 2014) but about the threatened climbing plants reported in this paper are quite different from earlier reports.

Table-1. List of Threatened Climber plants species of Mandla district.

Name of plant		Family	Present Status in Study Site				Threat reasons in study site
Botanical Name	Local Name		Site 1	Site 2	Site 3	Site 4	
			Padariya	Kupariya	Gadhi	Chandwara	
<i>Abrus precatorius</i> Linn.	Ratti, Gumchi	Fabaceae	CR	EN	R	CR	L, Tr, Hm, I, D, O.
<i>Argyreia speciosa</i> Sweet.	Vidhara	Convolvulaceae	EW	EW	EW	EW	Cu, Hm, I, D, O. L.
<i>Aristolochia indica</i> Linn.	Ishwarmool	Aristolochiaceae	R	EN	EW	VU	Hm, OV, I, D, L.
<i>Ampelocissus latifolia</i> Roxb.	Pannibel, Jangli Angoor	Vitaceae	EN	EN	EN	EN	L, I, Hm, OV, D
<i>Asparagus recemosus</i> willd.	Satawar	Liliaceae	EW	EN	CR	R	Tr, Hm, OV, Tp, I, D.
<i>Basella rubra</i> L.	Poi sag	Basellaceae	CO	LC	CO	CO	Hm, I, D, O, L.
<i>Bryonopsis laciniosa</i> (Linn.) Nand.	Shivlingi	Cucurbitaceae	EN	VU	R	EN	OV, Tr, Tp, Hm, I, D.
<i>Caesalpinia bonduc</i> Linn. (Roxb.)	Gataran	Caesalpinaceae	CR	R	R	NT	OV, Hm, I, D, Tp, Tr, I, L.

<i>Cissus quadrangularis</i> Linn.	Haadjood	Vitaceae	CR	EW	EW	R	OV, I, L, D, Tr, Tp, Hm, O.
<i>Citrullus colocynthis</i> (Linn.) Schard.	Indrayan / Kahira	Cucurbitaceae	EN	NT	EW	CR	OV, I, L, D, Tr, Tp, Hm,
<i>Clitoria ternatea</i> Linn.	Aprajita	Fabaceae	EN	CR	R	CR	OV, I, L, D, Tr, Tp, Hm, O.
<i>Coccinia grandis</i> Linn.	Kundru	Cucurbitaceae	CO	CO	CO	CO	Hf, Hm, I, D, Cu, Tp.
<i>Cocculus hirsutus</i> (Linn.) Diels.	Jaljamni	Menispermaceae	CO	CO	CO	CO	Hm, I, D.
<i>Cucumis callosus</i> (Rott.) Cong.	Ban kachria	Cucurbitaceae	LC	NT	NT	NT	I, Hm, OV, Tp, Tr, I, D, L.
<i>Cuscuta reflexa</i> Roxb.	Amarbel	Convolvulaceae	CO	CO	CO	CO	Hm, I, D.
<i>Dioscorea bulbifera</i> Linn.	Ageetha	Dioscoreaceae	EN	R	R	CR	OV, I, L, D, Tr, Tp, Hm, Hf.
<i>Dioscorea hispida</i> Dennst.	Baichandi	Dioscoreaceae	LC	EW	EN	EW	Hf, OV, I, L, D, Tr, Tp, Hm,
<i>Dioscorea oppositifolia</i> L.	Bilaikand	Dioscoriaceae	EN	CR	EN	VU	D, Hm, Tr, Tp, I, OV, L.
<i>Dioscorea pentaphylla</i> L.	Sungarakanda	Dioscoriaceae	VU	VU	CR	EN	D, Hm, Tr, Tp, I, OV, L.
<i>Diplocyclos palmatus</i> (L.) Jeffry	Bilaiya	Cucurbitaceae	VU	EN	VU	CR	D, Hm, Tr, Tp, I, OV, L.
<i>Evolvulus nummularius</i> L.	Safed Shankpushpi	Convolvulaceae	CO	LC	LC	LC	Hm, I, D, L, C.
<i>Gloriosa superba</i> Linn.	Kalihari	Liliaceae	EN	EN	R	EW	D, I, Hm, OV, Tp, Tr,
<i>Gymnema sylvestre</i> (Retz.) R.Br. Ex. Sch.	Gudmar	Asclepiadaceae	EW	EW	EW	EW	Hm, D, OV, Tp, Tr, I, L.
<i>Ipomoea hederifolia</i> Linn.	Ganesh Vel	Convolvulaceae	LC	LC	LC	LC	Hm, I, D, L, C.
<i>Ipomoea pes-tigridis</i> Linn.	Panch patri	Convolvulaceae	VU	VU	EN	VU	D, Hm, I, L, OV.

<i>Jasminum grandiflorum</i> Linn.	Chameli	Oleaceae	LC	LC	LC	LC	Cu, O, I, D, L, Hm.
<i>Memordica charantia</i> Linn.	Karela	Cucurbitaceae	CO	CO	CO	CO	Hf, Hm, I, D, Cu.
<i>Momordica dioca</i> Roxb. <i>ex Wild</i>	Van-Kareli	Cucurbitaceae	LC	LC	LC	LC	Cu, O, I, D, L, Hm
<i>Mucuna pruriens</i> (Linn.) DC.	Kiwanch	Fabaceae	NT	VU	EN	CR	D, Hm, Tr, Tp, I, OV.
<i>Oxalis corniculata</i> Linn.	Khatti buti/ Teenpatia	Oxalidaceae	CO	CO	CO	CO	Hm, I, D.
<i>Pergularia daemia</i> (Forsk.) Chiov.	Utran, sadovani, Dhudheli	Asclepiadaceae	LC	LC	LC	LC	D, Hm, I, L, OV.
<i>Pistia stratiotes</i> Linn.	Jalkumbhi	Araceae	R	R	CR	EN	Hm, OV, I, D.
<i>Pueraria tuberosa</i> (Roxb. <i>ex Willd.</i>)DC.	Bidarikand, patal kumhda	Fabaceae	EN	VU	EN	EN	D, Hm, Tr, Tp, I, OV, L.
<i>Quisqualis indica</i> Linn.	Madhumalti	Combretaceae	LC	LC	LC	LC	O, I, D, Hm, L,
<i>Smilax zeylanica</i> Linn.	Ramdatun	Liliaceae	EN	EN	NT	R	D, Hm, Tr, Tp, I, OV, L.
<i>Tinospora cordifolia</i> (Willd.) Miers.	Giloy	Menispermaceae	EN	R	CR	LC	D, Hm, Tr, Tp, I, OV, L.
<i>Tylophora indica</i> (Burm.f.) Merriell.	Dambel	Asclepiadaceae	EX	EN	EN	CR	D, Hm, Tr, Tp, I, OV, L.
<i>Vallisneria spiralis</i> (L.) Kuntze	Phulkati	Apocynaceae	EN	VU	VU	VU	D, Hm, I, L, OV.

EW – Extinct in wild, CR- Critically endangered, EN - Endangered, NT – Near threatened, VU- Vulnerable, LC- Least concern, CO- Common, EX – Extinct., L- Loss of habitat, Tr- Trade, C- Climate, Hm- Harvest for medicine, OV- Over exploitation, Hf- Harvested for food, Tp – Trade for parts, I – Human Interference, D – Deforestation. O – Ornamental. Cu – Cultivated plants.

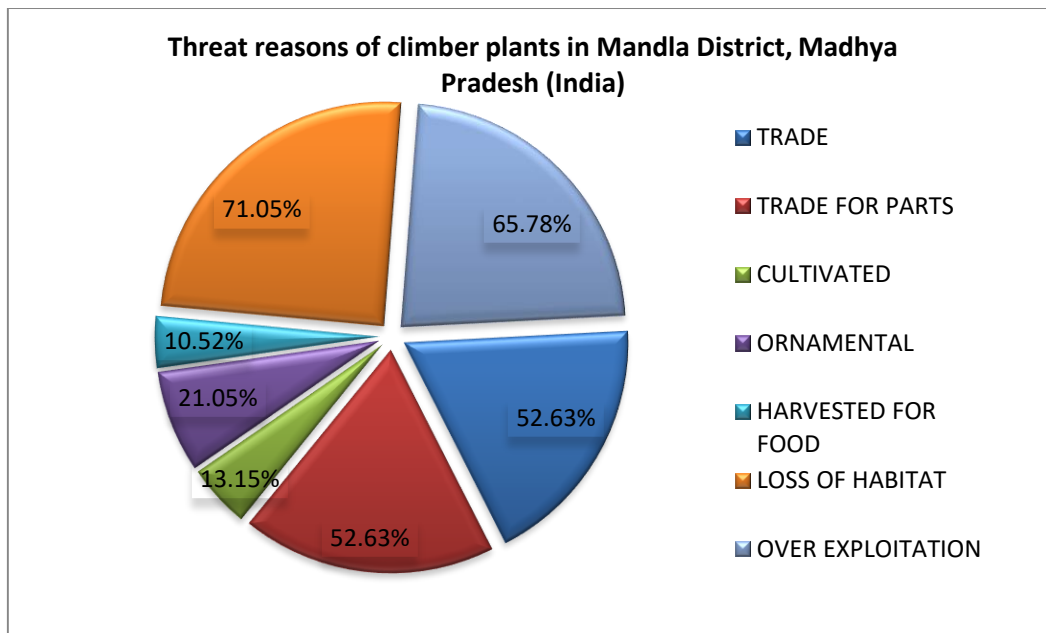


Fig.-3. Threat reasons of climber plants in Mandla district, Madhya Pradesh (India)

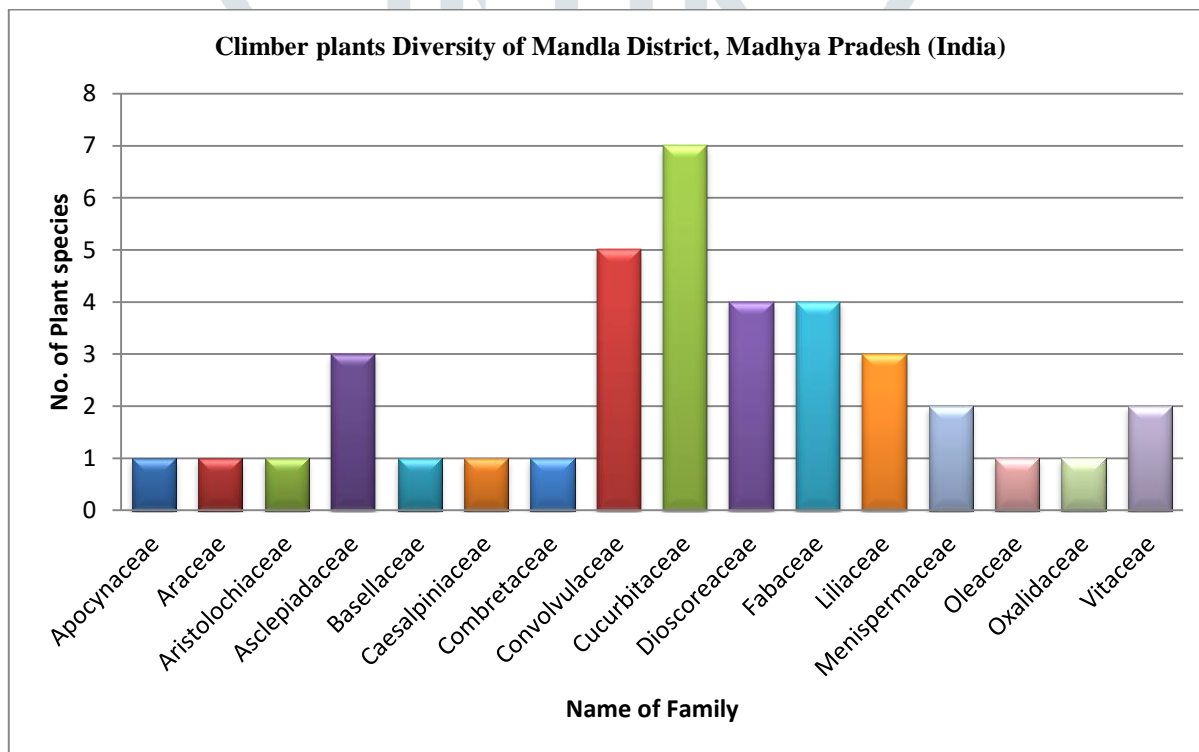


Fig.-4. Climber diversity of Mandla District, Madhya Pradesh (India).

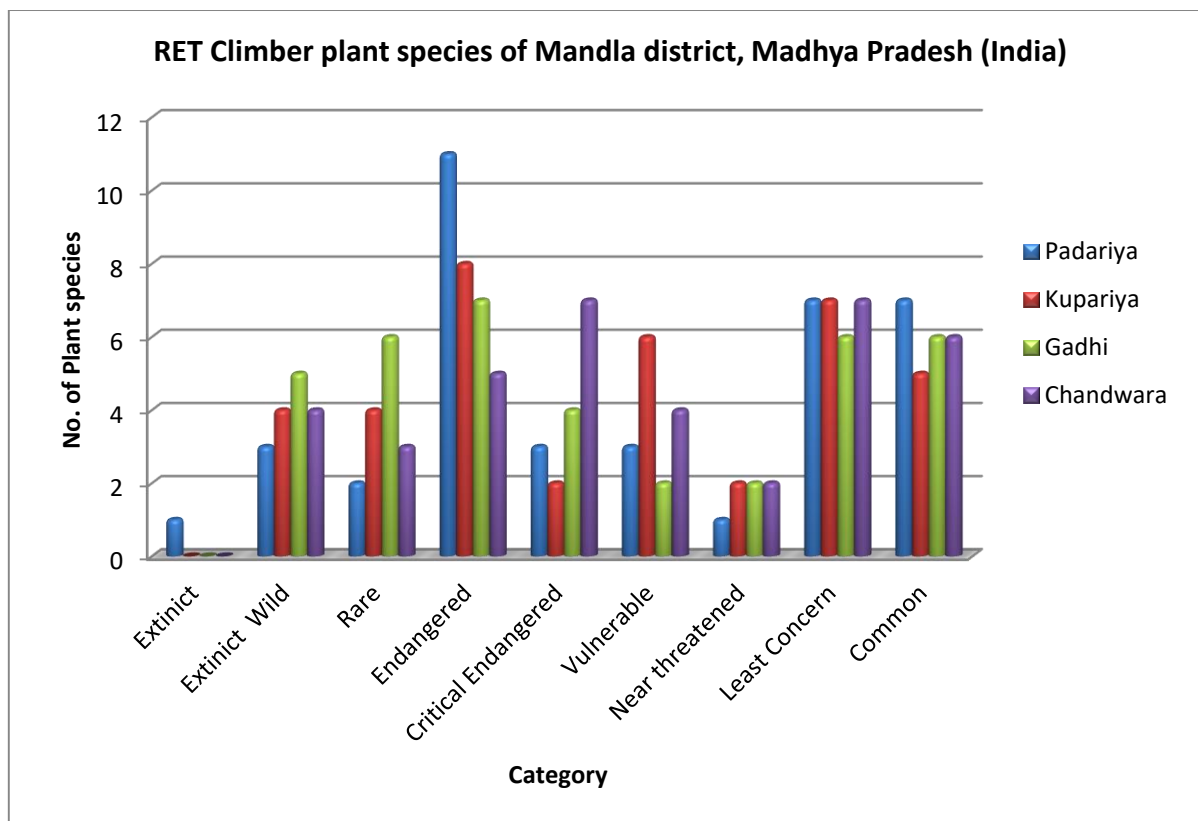


Fig.5. RET Climber species index chart in different site of Mandla District, Madhya Pradesh (India).

CONCLUSION

The present study evokes that RET climber plant species could give very important information about the niches and amplitudes of rare endemic, endangered and threatened plant species in a regional scale. Some of the Threatened factors such as over-exploitation of natural resources and other anthropogenic activities adversely affect the existing ecosystem and it may lead to the rarity of many species in future. Extinction of some important plants not only leads to loss of biodiversity but also results in eradicating knowledge regarding century's old traditional methods of curing disease from those extinct species. There is an urgent need for developing pragmatic conservation strategies for endemic climber plants in the Mandla district of Madhya Pradesh, which may lead to their effective protection.

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Fig. 6. Some Threatened climber plant species in Mandla district of Madhya Pradesh (India)