International Journal of Science and Research (IJSR)
ISSN (Online): 2319-7064
Index Copernicus Value (2015): 78.96 | Impact Factor (2015): 6.391

Rare and Threatened Flowering Plants of Harda District, Madhya Pradesh, India

Ray S[1], Sainkhediya J[2], Chouhan D S[3]

[1, 2]Department of Botany, PMB Gujarati Science College, Indore, MP, India

[3]Government PG College, Barwani, MP, India

Abstract: ***Present study deals with 91 rare and threatened flowering plants of Harda district of which 14 are critically endangered, 29 endangered, 30 vulnerable and 18 are found in rare category. These plants have medicinal and economic values which require conservation in priority basis. Mentioning few of them are Acampe praemorsa(Roxb.) Blatt &Mc., Alangium salvifolium(Lf.) Wang., Ceropegia bulbosaRoxb., Firmiania colorata(Roxb.)RBr., Geodorum densiflorum(Lam.)Sch., Habenaria marginata Colebr., Nervila concolor (Blume)Schltr., Oroxylum indicum(L)Kurz., Oryza rufipogon Griff., Stereospermum chelonoides (Lf.)Dc.***

Keywords: Threatened, Harda, Malwa, Native flora

1. Introduction

The flora of India is one of the richest in the world comprising of 17,527 plant species of angiosperm representing 7% of total plant specimen in world (Karthikeyan, 2009). Over 60,000 species have been assessed for conservation status according to internationally accepted criteria, of which 33,798 are classified globally threatened with extinction (Walter and Gillett, 1998). Rare and threatened plants are those encountered only in traces at specific sites in their natural habitats for the past 50 years (Leucas and Synge, 1978). Harda district is located in south western part of Madya Pradesh and lying between parallel of latitude 21^0 54'-$22^0$36' N and between longitudes of $76^0$46' – 77^0 30' E .It is bounded by Satpura ranges and extension of Malwa plateau in the south. Narmada river is flowing in the north along its tributaries. Major tributaries of Narmada river draining the district are Ganjal, Anjal, Sukani, Machak, Syani, Dendra and Midkul river. Total area of the district is 2644.32 sq km and comprises of 3 tehsils namely Khirkiya,Harda and Timarni. Forest covers 1,028 sq km which is 30.87 percent of total area.(ISFR,2011). Satpura ,Narmada valley form great variation in vegetation resulting rich species diversity. According to Champion and Seth (1968),the forest of Harda district is divided into Tropical moist deciduous ,dry deciduous and scrub forest. Harda district is one of the unexplored district of MadhyaPradesh.(Kumar,2012; Kumar et al,2014; Khanna et al,2001;Mudgal et al 1997;Sinha and shukla,2007;Sikarwar,2014;Tiwari and Khanna,2014; Verma et al,1993;Verma et al,2013;Wagh and Jain,2013).

2. Materials and Methods

Plant survey was made in different season during 2012 to 2017 covering all habitats from various ecological niches of the study area. In this context 22 field sites were selected and visited for plant survey. Plant collection was carried out by standard method (Jain and Rao 1977). Various flora, monographs, review, journals and available literature were consulted for plant identification. (Ansari,2008;Verma et. al. 1993; Mudgal et al,1997;Naik 1998;Bhandari 1977, Gamble, 1915;Singh et al,2001;Singh and Karthikeyan,2000). Field observation and field data were noted down in field diary. Some plant specimens have been identified from BSI, Central Circle Allahabad. Plants were deposited at the herbarium of PMB Gujarati Science College, Indore.

3. Result and Discussion

Phytodiversity of Harda district is facing different degree of threats due to heavy biotic pressure, habitat loss, megaprojects, overexploitation, trade value, overgrazing and intensive invasion of exotic species. Present study reports 91 rare and threatened flowering plant species which are distributed in 46 families and 86 genera (Table-1). Rare taxa are the effect of environmental damage because they occur in small population or at scattered very susceptible to localized habitats. Some other reasons may be reproductive mechanism and in viability of seeds. Through allelopathic effects, invasive species alter the population structure and natural dynamics of indigenous flora.

A taxon is critically Endangered when facing high risk of extinction in the wild in immediate future. 14 species are observed in the study area under Critically Endangered category. *Acampe praemorsa , Acorus calamus , Cheiolocostus speciosus, Didymocarpus pygmaeus and Geodorum densiflorum* are facing high risk of extinction. A taxon is endangered when it is not Critically Endangered but it is facing a very high risk of extinction in the wild in the near future. 29 plant species are recorded under this category. *Asparagus racemosus, Centella asiatica, Crinum latifolium, Gloriosa , Habenaria marginata, Sarcostemma acidum, Zingiber roseum are become endangered in the area.* A taxon is Vulnerable when it is not Critically Endangered or not Endangered but it is facing a very high risk of extinction in the wild in the near future . 21 plant species are found under vulnerable category. *These plants are now common in the area but declining at alarming rate due harvesting for their medicinal value,overexploitation and trade value. Important plants of these category are Baliospermum montanum, Curculigo orchiodes,Drimia indica, Enecostema axillare, Hemidesmus indicus, Chlorophytum tuberosum, Trichosanthes palmata, Tylophora rotundifolia, Uraria picta.*

Some invasive plants like *Lantana aculeata, Gliricidia sepium,Senna uniflora,Stachytarpheta jamaicencis,Eichornia crassipes,Pistia stratiotes* are dominating over indigenous plants and native flora become threatened.

Table 1: Rare and Threatened plants of Harda district,MP

S.No	***Botanical name***	*Ver.name*	Locality	*Status*	*Reason*	*Cons.Str.*
1	*Acampe praemorsa* (Roxb.) Bla. & Mcm. **Orchidaceae**	Waierdo	Khirkiya	CR	LH,C	***ESC, PTC***
2	*Acacia penata*(L)Willd. Leguminosae	Raoni	Alanpur	R	L	**Ins**
3	*Acorus calamus* L. Araceae	Bach	Khirkiya	CR	T	ISC
4	*Amorphophalus konkanesis* Hett.S.R. Yadav &K.S.Patil Araceae	Jangli suran	Bargadi	CR	Hm	TC
5	*Alangium savlifolum* (L.f)Wangerin Cornaceae	Ankola	Rahatgaon	VU	Hm	ISC
6	*Andrographis paniculata(Bru.f.)Wal.ex.Nes.* Acanthaceae	Apmarg	Khirkiya	VU.	Hm	ISC
7	*Aristolochia bracteolata Lam.* Aristolochiaceae	Kidamar/Esamul	Guthanian	VU.	L/OV	ESC, BG
8	*Asparagus racemosus Willd.* Asparagaceae	Satawari	Sirali	EN.	T	ISC
9	*Baliospermum montanum (Willd.) Muell.* Euphorbiaceae	Jamalghotai	Makdai	EN.	L	ISC
10	*Boerhaviia repens*.L. Nyctaginaceae	Punarnava	Sontalai	VU.	Hm	CUL
11	*Boswellia serrata* Roxb. Burseraceae	Salai	Sirali	CR	OV	ISC
12	*Butea superba* Roxb. Leguminosae	Palasbel	Rahatgaon	R	L	ISC
13	*Cadaba fruticosa* (L)Druce Capparaceae		Alanpur	R	L / C	ISC
14	*Carallocarpus coronopus* Cucurbitaceae	Mirchikand	Makdai	EN	Hm/L	ISC
15	*Careya arborea*Roxb .Lecythidaceae	Kumbhi	Sirali	VU	L	RT
16	*Cassytha filiformis* Lauraceae		Sontalai	VU	LH	ISC
17	*Catanaregam spinosa*(Thin.)Tir.	Gelphel	Temgawoan	VU	D,L	ISC
18	*Centella asiatica* (L.) Urban Apiaceae	Brahami	Jamunya	EN	Hm	CU
19	*Ceropegia bulbosa Roxb.* Apocynaceae	kapari kand	Timarni	CR	Hm/ OV	TC
20	*Chlorophytum arundinaceum* Baker. Asparagaceae	Musali	Charwa	VU	T	ISC
21	*Citrullus colocynthis* (L.) Schard. Cucurbitaceae	Indrayan	Nayapura	VU.	I/OV	CU
22	*Rotheca serrata* (L.) Moon Lamiaceae	Bhrangi	Chipaner	VU.	C / OV	ISC
23	*Cordia macleodii*(Griff.)Hook.F.Thom. Boraginaceae	Daiwas	Dhekna	R	D	RT
24	*Cheiolocostus speciosus* (J.koening.) J.E.Sm. Costaceae	Kavkand	Makdai	CR	Hm	ISC
25	*Commelina coroliana*Walter Commelinaceae		Gogiya	R	C	ISC
26	*Crateva religiosaForst.* L. Capparaceae	Barna	Tamagaoni	R	C	ISC
27	*Crinum latifolium* L. Amaryllidaceae	Jaglikanda	Pokharni	EN.	Hm	ISC
28	*Curculigo orchioides* Gaertn. Hypoxidaceae	Kalimusali	Sontalai	VU.	T	CU
29	*Curcuma angustifolia* Roxb Zingiberaceae	Thikur	Khardana	EN.	T	ISC
30	*Curcuma decipiens*Dalzel Zingiberaceae		Rahatgaon	EN	Hm	TC
31	*Cullen corylifolium*(L)Medik Leguminosae	Babhachi	Handiya	VU	Hm	CU
32	*Cyperus dives*Delile Cyperaceae		Remlawadi	R	C	ISC
33	*Digitaria abludens*(Roem & Schult)VUeldKamp Poaceae		Ramlawadi	R	T	ISC
34	*Drimia indica*(Roxb.) Jessop Asparagaceae	Janglikando	Gtaniya	VU	Hm	CU
35	*Diplocyclos palmatus*(L)Jeffrey Cucurbitaceae	Ban kakadi	Handiya	EN	Hm	ISC

36	*Desmodium oojeinense*(Roxb.)H.Ohashi Leguminosae	Tinsa	Charwa	R	D	RT
37	*Didymocarpus pygmaeus*C.B.Clarke Gesneriaceae		Timmarni	CR	C,P	ISC
38	*Eclipta prostrata*(L)L. Asteraceae		Chipawar	VU	Hm	CU
39	*Erythrina suberosa* Roxb. Leguminosae	Pangar	Sirali	EN	L	ISC
40	*Enecostema axillare*(Poir ex Lam)A Raynal Gesneriaceae	Nai	Handiya	VU	Hm	CU
41	*Eriolaena candolei*(Willd.)VUerd. Malvaceae		Makdai	R	D	RT
42	*Flemingia nana* Roxb. Leguminosae	I	Magardha	EN	C	ISC
43	*Firmiania colorata*(Roxb.)R.Br Malvaceae		Kodaro	EN	D,L	RT
44	*Ficus cupulata*Haines Moraceae		Timarni	R	D	ESC,BG
45	*Geodorum densiflorum* (Lam.) Schl. Orchidaceae	Kukarkand/ Salammishri	Khardana	CR	T	ISC ,PTC
46	*Gloriosa superba* L. Colchicaceae	Kalihari	Sirali	EN	T/ OVU	ISC
47	*Gymnema sylveestre*(Retz..)R.Br.Ex.Sch. Apocynaceae	Gudbel	Khirkiya	EN	Hm	ISC
48	*Gardenia tubifera*Wall ex Roxb. Rubiaceae		Siralia	VU	D	RT
49	*Habenaria digitata* Lindle. Orchidaceae	Vaanpyazi	Rahatgaon	CR	L	ESC PTC
50	*Habenaria ferciferaLindle* Orchidaceae	Devsundo	Sontalai	CR	Hm	ESC
51	*Habenaria marginata* Colebr. Orchidaceae	Bandoo	Sontalai	EN	Hm	ESC
52	*Haldina cordifolia*(Roxb.)Ridsdale Rubiaceae	Haldu	Makdai	R	L	ISC
53	*Hardwickia binata* Roxb. *Leguminosae*	Anjan	Nayapura	EN.	CLB	ISC
54	*Helicteres isora* L. Malvaceae	Marodfali	Handiya	VU.	T	ISC
55	*Hemarthia compressa*(L.f)R.Br Poaceae		Khidkiya	VU	L	ISC
56	*Hemidesmus indicus* (L.) R.Br. Apocynaceae	Anantmul	Rahatgaon	EN.	OV	ISC
57	*Hymenodiction orixense*(Roxb.)Mabb Rubiaceae		Makdai	R	D	RT
58	*Ipomoea hederifolia*L. Convolvulaceae		Handiya	VU	Hm	CU
59	*Kydia calycina* Roxb. Malvaceae	Barang	Khirkiya	VU.	L	ISC
60	*Leea macrophylla* Roxb. ex. Hornem. Leeaceae	Hatikan	Magardha	CR	I	ISC, CUL
61	*Lippia javanica*(Burm.f.)SprENg. Verbenaceae		Khirkiya	R	C	ISC
62	*Ledebouria revoluta(*L.f)Jessop Asparagaceae		Jamniya	R	Hm	CU
63	*Millettia extensa* (BENth) Baker Leguminosae	Agyo/Antamala	Charwa	VU.	Hm/I	ISC
64	*Nervilea concolor*(Blume)Schltr. *Orchidaceae*		Sontalai	CR	L,C	ISC
65	*Nothosaera brachiata*(L.)Wight Amaranthaceae	Kamlad	Magardha	R	L	ISC
66	*Oroxylum indicum* (L.) Venten Bignoniaceae	Arlu	Rahatgaon	CR	Hm	ISC
67	*Oryza rufipogon* Griff Poaceae	JangliChawal	Ratatalai	CR	L	ISC-Tc/CAP
68	*Plumbago zeylanica* L. Plumbaginaceae	Chitrak	Sontalai	EN	Hm	ISC CUL
69	*Pterocarpus marsupium* Roxb. Leguminosae	Bijasal	Sirali	EN	OV	ISC
70	*Pueraria tuberosa* (Rox.ex.Wil.)DC Leguminosae	Bidari Kand	Dhekna	EN	OV	ISC
71	*Rhynchostylis retusa* (L.) Blume Orchidaceae	Kophuli	Sontalai	CR	C	ESC,TC
72	*Samecarpus anacardium* L. Anacardiaceae	Bhelwa	Magardha	EN	C	ISC
73	*Sarcostemma acidum* (L.) R.Br. Apocynaceae	Somlata	Makdai	EN	T	ISC
74	*Schleichera oleosa* L.	Kusum	Handiya	VU	OV	ISC

	Asteraceae					
75	*Chlorophytum tuberosum*(Roxb)Baker Asparagaceae	Musli	Gutaniya	VU	C/OV	ISC
76	*Soymida febrifuga* (Roxb.)A. Juss. Meliaceae	Rohani	Khirkiyan	EN	OV	ISC
77	*Smilax zeylanica*L. Smilacaceae		Handiya	EN	L	ISC
78	*Spilanthaes calva* DC Asteraceae	Akalkara	Rahatgaon	VU	I/OV	ISC
79	*Stereospermum chelonoides* (L.F.) DC Bignoniaceae	Padar	Charwa	EN	Hm	ISC
80	*Strychnos potatorum* L. Loganiaceae	Kaya	Lokhartalai	VU	Hm	CU
81	*Tinospora cordifolia(Willd)Miers* MENispermaceae	Gudbel	Handiya	VU.	Hm	ESC CUL
82	*Trichosanthes palmata* L. Cucurbitaceae	Kudaliyo	Siralii	VU.	Hm	CU
83	*Tripogon* lisboaeStapf. Poaceae		Chapaner	R	C	ISC
84	*Theriophonum dalzelli*Schott. Araceae		Sirali	EN	L	ISC
85	*Tragia plukentii*Radcl..-Sm Euphorbiaceae		Khirkiya	R	C	ISC
86	*Tylophora rotundifolia*Buch. –Ham ex Wight Apocynaceae	Bhuleya bel	Rahatgaon	VU	Hm	CUL
87	*Uraria picta* (Jacq.) Des.ex.DC Leguminosae	Pithawan	Chipamer	VU	C	ISC
88	*Viitex negundo* L. Lamiaceae	Nidgundi	Khirkiya	VU	T	CUL
89	*Viscum articulatum* Brum .f. Santalaceae	HaddiJod	Khardana	EN	D	ISC
90	*Zeuxine strateumatica* (L.) Schlechter Orchidaceae	Dhouli Jad	Nepanagar	EN	T	ISC
91	*Zingiber roseum* (Roxb.) Roscoe Zingiberaceae	Jangli Adrak	Sirali	EN	T	ISC

Abbreviations: ISC: Insitu conservation,TC: Traditional conservation ,CUL:Cultivation,ESC:Exsitu conservation,PTC: Plant Tissue Culture,BG:Botanical Garden,Hm :Harvesting of medicine,Hf:Harvesting of food,C:Climatic,L:Loss of habitat,LH:Loss of Host plant,OV: CLB:Indiscriminate collection of leaves and young branches.RT: Reintroduction. T:Trade,RT:Reintroduction, LH: Loss of Host

4. Acknowledgement

We are very much thankful to Dr. M A Wadood Khan,Majalgaon and Dr. V. B. Diwanji,Dr C M Solanki (Retd. Professor of Botany, Indore) for identification of plants. We are also thankful to farmers and DFO, Harda forest division and other forest officials for giving permissions to plant survey in the area. Help and co-operation rendered by informants, guide, and local people of Harda district during plant survey is highly acknowledged. We are grateful to Prof. R B Patel, Principal P.M.B. Gujarati Science College, and Dr. J. S. Sikka, Head, Department of Botany, P.M.B. Gujarati Science College for providing research and library facilities. Financial support provided by UGC, CRO, Bhopal is highly appreciated and acknowledged.

References

[1] Ansari A(2008).*CrotalariaL. In India*Bishen Singh Mahendra Pal Singh,Dehradun
[2] Bhandari, M.M. (1977*). Flora of the Indian Desert*, Scientific publishers, Jodhpur, India.
[3] Champion, H.G. and Seth, S.K.(1968).*A revised survey of forest types of India*. Manger of publications, Delhi, India.
[4] Gamble, J.S. 1915. *Flora of the Presidency of Madras* .BSI Calcutta, India. 1-3.
[5] Jain, S.K. and Rao, R.R(.1977). *A handbook of field and herbarium method*,Today and Tomorrows Printers and publisher, New Delhi, India.
[6] Karthikeyan, S.(2009). Flowering plants of India in 19th and 21st Centuries – A comparision. *In: Krishnan, S. & Bhat, D.J. (Eds.), Plant and fungal biodiversity and bioprospecting.* Goa University, Goa. . 19–30.
[7] Leucas ,G and Synge,H,(1978).IUCNMorges,Switzerland,*IUCN Red Data Book*
[8] Naik V N.(1998).*The flora of Marathwada*,vol I and II,Amrit prakashan,Aurangabad.
[9] Sinha, B. K. and Shukla, B.K. (2007). Synoptic flora of Khargone district, M.P.- 1. *J. Eco. Taxon. Bot.* 487-535:31:2.
[10] Sikarwar R L S, (2014).Angiosperm diversity assessment of Chitrakoot the legendaryplace of Vindhyan range,J .Eco.Tax.Bot .38,3-4:563-618.
[11] Tiwari A and Khanna K K(.2014).Inventory of angiospermic taxa of Sidhi district,MP,J Eco.Tax,Bot. 38,3-4:395-440
[12] Verma, D. M., Balakrishnan, N. P. and Dixit, R. D. (1993). *Flora of Madhya Pradesh*.BSI, Calcutta, India. Vol 1.

[13] Verma K S,Kurmi L,Awasthi A and Khan S.(2013).Conservation status of the fabaceae taxa in eastern MP,*Phytotaxonomy*13:128-131
[14] Vinay KumarBharti(2015).An ethnobotanical study of medicinal plants in Shadol district of MadhyaPradesh,India.*International Journal of Science and Research*.vol 4(10):1501-1505
[15] Wagh V and Jain A.(2013).Floristic diversity of Jhabua district,MP,*Aca. J Plant Sciences* 6(4):146-167
[16] Walter,KS and Gillet H. J.(1998).The 1997 IUCN Red List of threatened plants.*IUCN,Gland,Switzerland and Cambridge,UK*