Diversity of Medicinal and Tuber Bearing Plants in Bastar Plateau of Chhattisgarh, India

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Based on extensive explorations and observations the diversity and performance studies of medicinally important and some rarely occurring tuber bearing plants were studied. Out of major forest and village areas of Bastar division explored, the forest and some protected areas *viz.* Abujhmarh, Kanger ghati, Bijapur forest, Bailadila hills, Binta forest, Bhejji forests, Mardoom forests, Dantewada forest, Bhopalpatnam forest, Sukma forest and Keskal-Kanker were observed with maximum diversity of medicinal plants and tubers. Among medicinal species, the maximum diversity of *Chlorophytum* sp. was observed in eastern and southern regions of Abujhmarh, some pockets of Machkot range, river valley of Bhopalpatnam, Barsur and Kotumsar cave forests of Bastar. Similarly, the *Gloriosa superba* L. was noted with maximum diversity in forests surrounding to Sukma, eastern Abujhmarh, Cheetapadar and Tiriya forests. However, the occurrence of some other important medicinal species, *viz., Dioscorea* sp., *Amorphophallus* sp., *Colocasia* sp. Jangli angoor/ Datte lata (*Ampelocissus arnottina* Pleach) and Dokar bela/ Duthila kanda (*Vitex* sp. wild) was recorded in all the forest areas of Bastar with maximum recorded diversity in the forests of Abujhmarh hills, Machkot, Gupteswar river forest, Binta forests, Sukma, Kanger Ghatti, Bhopalpatnam, Barsur and Dantewara. Ramdatoun (*Smilax macrophylla*) was recorded with moderate in occurrence but maximum occurrence in forests of Abujhmar, Machkot, Tiriya, Kotumsar and Barsur.

Considering the density and diversity of various medicinal species like *Gloriosa superba*, *Chlorophytum borivillianum*, *C. laxum*, *Aristolochia indica* L., *Dioscorea hispida* L., *D. rotundata* L., *Smilax macrophylla* L., *Andrographis paniculata*, *Rauvolfia serpentina* are endangered and recorded with only location specific diversity in Bastar. *Piper longum* L. noted to be endangered except in river valleys of Abujhmar, Tiriya and Gupteswar surroundings where it was observed upto considerable extent. Similarly, *Rauvolfia serpentina* was noted to some extent only in forests of Gupteswar surroundings, Chitapadar of Machkot and eastern Abujhmarh. Based on above findings both the *in situ* and *ex situ* conservation of endangered species was suggested.

Key Words: Diversity, Medicinal species, Bastar plateau, Chhattisgarh, Abujhmarh hills, Barsur

Introduction

The state of Chhattisgarh has an area of 13.51 mh divided into 18 districts and three agro-climatic zones. Out of which 5.96 mh (44% approx) is covered under dense forests especially in areas like Bastar plateau and Northern hills (62 and 47 per cent, respectively) of total area under forest. These forests includes Bastar, Dantewada of Bastar plateau, Koriya, Surguja, Jashpur of Northern hills. Korba, Achanakmar of Chhattisgarh plains possesses dense and virgin forests growing medicinal and medicinal tuber plant species under natural habitats.

Since, time immemorial plants and plant parts like roots, tubers, barks etc. are being used for various needs related to health and illnesses. Further, various medicinal system, *viz.*, *Ayurveda*, *Siddha*, modern medicines mainly use roots and tubers, corms and rhizomes, bulbs etc. Similarly, the traditional tribal medicine systems like areas of Bastar mainly use aerial and underground parts like roots, tubers, leaf, bark, apical meristem, flowers and fruits etc. for general treatment and especially roots for specific treatments. Similarly, worlds traditional medicine systems use root as a main component, therefore in modern system like *Ayurvedic*, *Siddha*, *Unani* etc. herbal roots and whole extract play a significant role in medicine industries. Presently, out of 1200 medicinal plant species recognized with stable and potent components for treatments, 680 are root medicinal species of which 180 are minor edible and wild tubers. *Dioscorea species*, *viz.*, *D. floribunda* and *D. maxicana* originated from Mexico are being exploited for contraceptive medicines. Since, both the wild as well as cultivated spices are being used for contraceptive medicines as major source of Diosgenin, their availability is endangered. It is observed that the birth rate of Bastar tribals living in dense forests is automatically controlled without using any means of birth control since *Dioscorea* tubers are included in their daily diet. The other important medicinal plants of key importance with special reference to the Chhattisgarh state are Kalihari (*Gloriosa superba)*, Sarpagandha (*Rauvolfia serpentina*), Satawar *(Asparagus recemosus)*, Safed mushli (*Chlorophytum* sp.), Bidari kand (*Puraria tuberosa*), Keu kand (*Costus speciosus*), Teekhur

(*Curcuma angustifolia*), Kali haldi (*Curcuma caesia*), Ama haldi (*Curcuma amada* Roxb.), Jangali piyaj [*Urginea indica* (Roxb.) Kunth.], Jangali suran (*Amorphophallus sp.*), Jangli arvi [*Colocasia esculenta* (Linn.) Schott.], Chitrak (*Plumbago ovata*,), Peepra and peepri mool (*Piper longum*), Kali mushli (*Curculigo orchioides*), Jangli lahsun, Bramhi, Kimanch (*Mucuna purieta*), Aak [*Calotropis gigantean* (Linn) R. Br.], Dhatura (*Datura innoxa*), Anant mool (*Hemidesmus indicus*), Iser mool (*Aristolochia indica*), Gorakhmundi (*Sphaeranthus indicus* L.), Kalmegh (*Andrographis paniculata*), Bada ghokhru, Mokoi, Bhilwa (*Semecarpus anacardium*), Dokar bela [*Ampelocissus latifolia* (Vahl.) Pleach], Giloe (*Tinospora cordifolia*), Biskhapra (*Aconitum heterophyllum* Wall. ex. Royle), Mahabala (*Sida acuta*), Motha, Jangli bhatta, Van Jeera, Goolar, Ghui, Drona puspi, Lajwanti, Ram datoun, Marod phalli (*Holicterus isora*), Nagbala (*Sida veronicifova*) and many other medicinal species were observed under natural forests habitat.

Bastar is considered to be a 'Hot-Spot' for most of the tropical and sub tropical medicinal and tuber bearing plants which are rarely available in other areas of the state as well as other states, especially Abhujhmarh hills, Kanger ghati, Binta and Mardoom forests, Bailadila forest, Barsur forest, Bhairamgarh, Pamed, Dantewara, Bhopalpattanam, Machkot forest, Darbha forest, Sukma, Kondagoan, Keskal forests are the places of maximum diversity of medicinal plants and tuber species. The status diversity of some elite and important species are given below based on information gathered from intensive explorations and observations carried out to these areas.

Keeping these facts in view the study on biodiversity of some important medicinal plants in tribal area of Bastar (Chhattisgarh) is conducted with the following objectives:

i. To study the diversity and status of medicinal and tuber plants species in Bastar
ii. To identify the location specific diversity/hot spots of important medicinal plants in Bastar
iii. To assess the endangered species among medicinal and medicinal tuber crops in Bastar.

Methodology

The above study was conducted on the basis of extensive and planned frequent explorations to the selective large areas throughout the growing seasons. However, the specific explorations of the target species of maximum diversity was also conducted during their germination to early growth period as well as at the time of flowering and maturity to assess their actual growth and yield performance under natural habitat. The periodic explorations were made to individual areas during the period from 1989 to 2002 to collect and register the elite germplasm of various tuber and medicinal species to conserve and assess their field performance under better agro-climatic managements. As an out come of this study about 150 accessions of medicinal and 90 accessions of medicinal tuber species have been already submitted in national gene banks. A total of 90 accessions were submitted at CTCRI, Srikariyam, Thiruvanathapuram, Kerala. A part of these is also being maintained and evaluated at College of Agriculture and Research Station, Jagdalpur. The first phase of study mainly concentrated on tuber species, after the ad-hoc projects 'Network Project on Tribal area crops and Collection, conservation and evaluation of locally available Tuber Crops for different topo-sequences of Chhattisgarh' the medicinal and medicinally important tuber species were also studied.

For this study, the whole area was divided into different target locations and further into segments considering their importance and availability of species as per survey for target species. Accordingly the explorations were planned to explore the status (Fig. 1) and availability of species (Fig. 2). Thus the final location and segments for explorations were identified in Table 1.

Results and Discussion

On the basis of extensive explorations, the observed diversity and status of medicinal plants is presented segment wise as follows:

1. *Abujhmarh Hills of Bastar*

The Abujhmarh hill is situated in south western and joins the boundaries of Maharashtra and Andhra Pradesh states. Abujhmar hill, hillocks of Bastar and parts of Dantewara is most protected and prohibited parts because the specific

Table 1. Locations and segments for exploration of medicinal plants in Bastar Plateau of Chhattisgarh

S.No.	Name of location studied	Number of segments
1	Abujhmarh Hills	07
2	Antagarh-Pakhanjore-Bhanupratappur	04
3	Kanger Ghati-Teerathgarh-Kotumsar	04
4	Dantewara and Bailadila Hilly areas	05
5	Barsur Bijapur and Bhopalpatnam areas	05
6	Machkot-Gupteswar-Tiriya	03
7	Chitrakot-Mardoom-Binta areas	04
8	Jagdalpur-Kondagoan forest areas	04
9	Pharasgoan-Keshkal-Kanker	03
10	Sukma-Konta areas	03

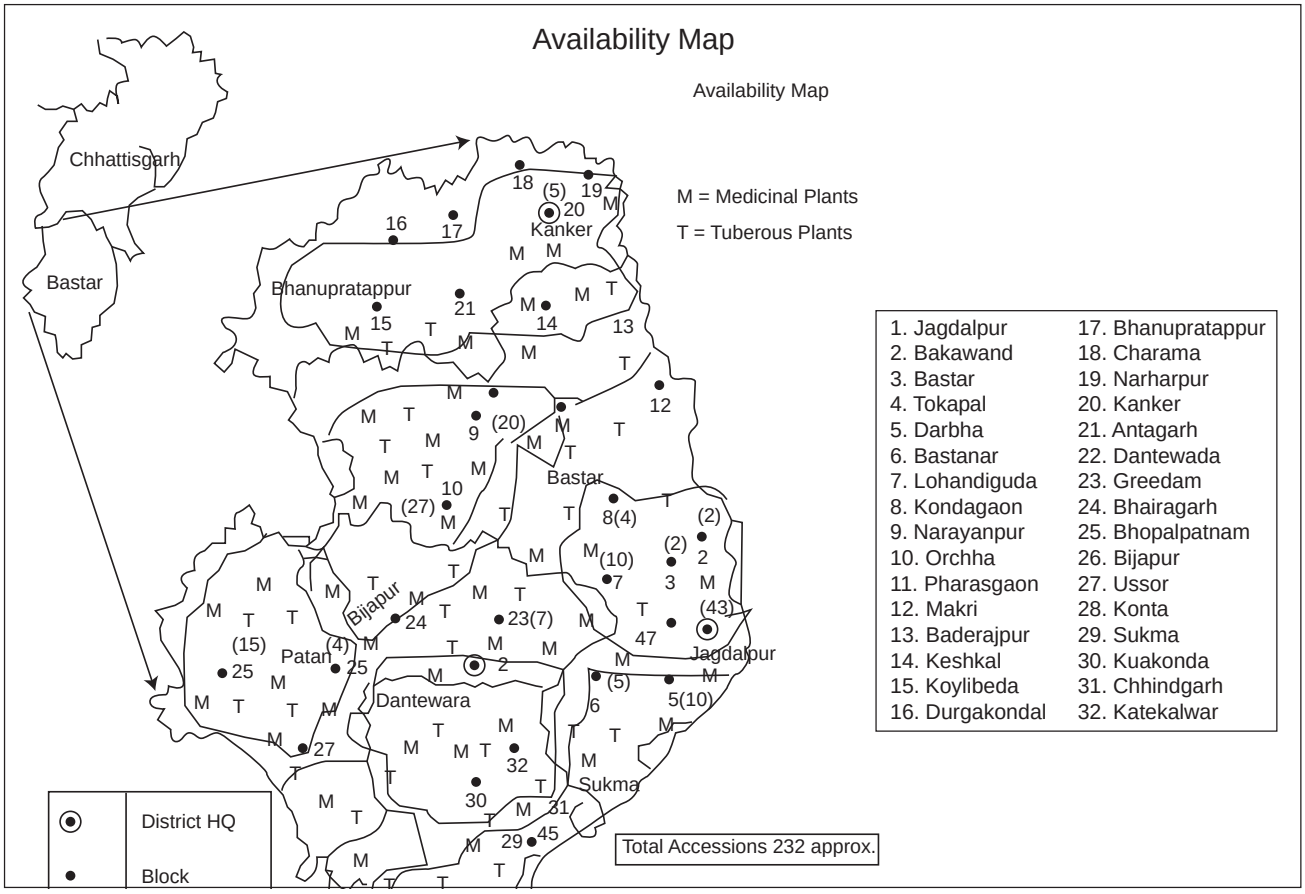


Fig. 1: Exploration map of medicinal plants at Bastar, Chhattisgarh

tribal race Abujhmaria, are native of this region but under full prohibition, since their main food source are roots, tubers, minor forest produces and hunting wild animals thus forest based economy prevails. Due to protection act operated in this area most of the rarely available endangered species of medicinal plants and tubers are available in abundance or up to the protectable scale. Tribal of this region are solely dependent on these species for various health illness and nourishments. Surveying or entering into this region by researchers/scientists or socialist etc requires the special permission by the district collector however, traders are strictly prohibited. Based on several intensive surveys/ explorations from 1989 to 2002, the general biodiversity of medicinal and tuber species is given in Table 2. It is evident from data that the medicinal floras are considerably or abundantly available in the region (Fig. 3) are *Chlorophytum* sp., *viz.*, *C. tubersum, C. arundinaceum, C. laxasum, C. borivillianum, Gloriosa superba, Disoscorea alata, D. bulbifera,* , *D. dumetorum, D. pentaphylla, D. trifoliata, D. esculenta, D. hispida, Curcuma angustifolia, Curcuma* sp. (Kalihaldi, ama haldi, jangli haldi), Ram dautoun (*Smilax macrophylla*), *Costus speciosus*, Jangli piyaj, Jangli lahsun, Jangli mirchi (wild chilli), Jangli suran (*Amorphophallus* sp.), Jangli arvi (*Colocasia* sp.), Chitrak (*Plumbago* sp.), Jatamansi (*Nardostachys grandiflora* DC), Bhui neem, Dholka kand, Anantmool, Bachh (*Acorus calmus* L.), jangli arand and Indrayan (*Citrullus colocinthis* Schrad) are also observed under Lanka and Kachhapal areas of Abujhmarh. Wild chillies resembling to Shimla mirch (sweet pepper) having wrinkled and uneven shape with light yellow colour and extreme pungency, small clove size and black round chilli all having excessive pungency is also observed in this area. Most of the important medicinal species have been observed in this location may be conserved through *in situ* conservation or making gene sanctuaries in these pockets.

2. Anthagarh-Pakhanjore-Bhanupratapur

The areas of Anthgarh include Anthgarh forest, Koilibeda, Pakhnjore and surroundings, Bande forest and adjoining forest areas of Bhanupratappur (Table 3). It has a typical

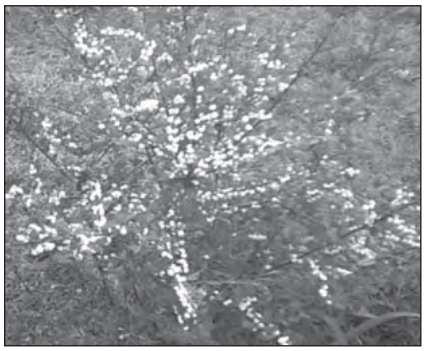
Selected plants from Cheetapadar collections

Dioscorea sinensis

Wild chili

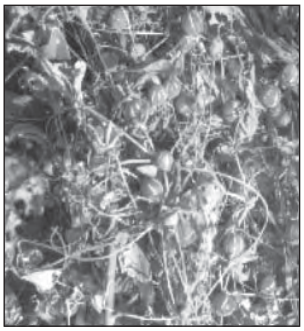
***Dioscorea* collections**

***Grewia tiliaefolia* Vahl.**

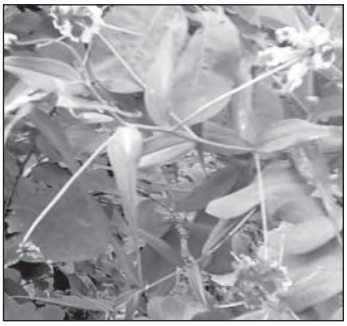


Fish Eye Plant (local name)

Hardjod



Brunopsis lacinasa



Gloriosa superba

Alpinia galanga

Dioscorea ovata

Tinospora cordifolia

Piper species

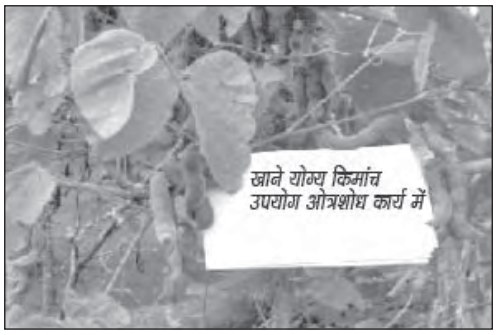
Fig. 2: Species diversity collected from Bastar plateau of Chhattisgarh

Martynia annua

Deekamali

***Cathrumthus* of Kondagaon**

***Dioscorea* of Kawalnar**



***Mucuna prurita* of Sukma**

***Clitoria ternatea* L. shrub**

Fig. 2 (Contd.): Species diversity collected from bastar Plateau of Chhattisgarh

flora comprising Sal trees, Dhawra, Arjun, Teak, Bamboo etc. Also the topography of this northern region is more plains than the hills. Hence, the location is rich in only medicinal weeds like Kalmegh, Gorakhmundi, Gumma, Bhaskatiya, Satyanasi, Indrayan (*Citrullus colocinthis* Schrad), Dudhi, Nagbel, Dokarbela, *Mucuna purita* and some tubers like *Dioscorea* sp., Jangli haldi, Jangli bhindi, *Costus speciosus*, wild *Amorphophallus*, Jangli *Colocassia* etc. Thus, this area can be considered as *in situ* diversity centre for *Colocasia*, *Zingiber* sp. and medicinal weeds. However the *Chlorophytum* sp. is rare in this area only *C. tuberosum* is found in some pockets. The typical species of *Dioscorea* like Sikka kanda (*D. rotundata*), Dori kand (*D. syanensis*), Surenda (*D. pentaphylla*) and Baichandi (*D. hispida*) are well represented in the area.

3. *Kanger Ghati-Teerathgarh-Kotumsar*

The areas of Kanger Ghati include Teerathgarh forest, Kotumsar, Kailasgupha, Darbha forest, Koling, Majhipal and adjoining forest areas (Table 3). It has a typical flora comprising Sal trees, Tendu, Dhawra, Arjun, Teak, Bija, bamboos and various ferns etc. Hence the zone is rich in medicinal climber medicinal tubers like *Dioscorea* species, Nagbel, Dokarbela (Dotho), wild grape or Datte lata (*Ampelocissus arnottina* Pleach) and also Brahmi, Mandukparni etc.The other medicinal species abundantly occurred are Jangali haldi, Jangali adark Jangli bhindi, Keu kand, Teekhur (*Curcuma angustifolia*), Indrayan (*Citrullus colocinthis* Schrad), Wild suran, Wild *Colocassia*, Bada Gunj (*Abrus precadiorius*) and Kimanch (*Mucuna purita*) etc. Thus this area can be considered as diversity for *Dioscorea*, *Amorphophallus*, *Colocassia*, *Curcuma* sp., *Zingiber* sp. hence, *in situ* conservation center may be adapted for their survival in this segment. However, the *Chlorophytum* sp. is rare in this area only *C. tuberosum* is abundantly occurred. The typical species of *Dioscorea* like Sikka kand (*D. rotundata*), Dori kand (*D. sinensis*), Surenda (*D. pentaphylla*), Targariya kand (*D. ovata*) and Baichandi (*D. hispida*) are observed in abundance. Wild *Dioscorea* germplasm, wild *Colocasia*, *Amorphophallus* (Gaint), bada gunj and mandukparni are important species in this area hence, may be conserved in this location.

4. *Machkot-Gupteswar-Tiriya*

The areas of Machkot range includes Kurandi forest, Cheetapaddar, Nangur, Gupteswar forest, Tiriya forest,

Table 2. Observed diversity and availability of medicinal plants in Abujhmarh-Hills, Chitrakot-Mardoom-Binta and Jagdalpur-Kondagoan forest areas of Bastar (Chhattisgarh)

S.No.	Vernacular name	Local name	Botanical name	Observed Diversity													
				Abujhmarh Hills							Jagdalpur-Kondagaon				Pharasgaon-Keskal-Kanker		
				1	2	3	4	5	6	7	1	2	3	4	1	2	3
1.	Ama haldi	Aami hardi	*Carcuma amada* Roxb.	–	+	+	++	++	++	+++	++	++	++	++	++	++	–
2.	Amaltas	Amaltas	*Cassia fistula* L.	–	+	+	–	–	+	+	+	++	++	++	++	++	+
3.	Aonla	Ounra	*Emblica officinalis*	–	+	++	++	+++	+	+++	+	++	+	++	++	+	+
4.	Anantamul	Sugandhi Jari	*Hemidesmus indicus*	++	++	++	++	++	++	+++	++	++	++	++	++	++	++
5.	Apamarg	Chirchira	*Achyranthus aspera*	++	++	++	++	++	+++	+++	+++	++	++	++	++	++	++
6.	Bach	Ghorbacchh	*Acorus calamus* L.	+	+	+	+	+	+	+	++	+	+	+	+	+	+
7.	Bada ritha	Ritha	*Sapindus aurifolius*	–	–	+	–	+	–	–	–	+	+	+	+	+	+
8.	Badi duddhi	Dudhiya	*Euphorbia hirta* L.	+++	+++	++	+++	+++	+++	+++	+++	++	++	+++	++	++	++
9.	Baghnakkha	Latkana	*Martynia annua*	++	++	+++	++	++	+++	+++	+++	++	++	++	++	++	++
10.	Baheda	Bahera	*Terminalia bellirica*	+	+	+	++	++	++	+++	–	+	+	+	+	+	–
11.	Bechandi	Kuliha kanda	*Dioscorea hispida*	+	+++	+++	+++	+++	+++	+++	+	+++	+	+	+++	+	+
12.	Bakayan	Bakien	*Malla azadaracht* L.	+	+	++	++	++	+	+	+	+	+	+	+	+	+
13.	Biskhapra Wall. ex. Royle	Bishkhapri	*Aconitum heterophyllum*	+++++	+++	+++	+++	+++	+++	++	++	++	+	+	++	+	
14.	Baramasi	Kandle Lata	*Ixora puriflora*	+++	+++	+++	++	++	+++	+++	+++	++	++	++	++	++	++
15.	Bariyara	Jharoo Lata	*Sida acuta*	++	+++	++	++	+++	++	+++	+++	++	++	++	++	++	++
16.	Bauchi	Bochi	*Psoralea corylifolia* L.	+	+	+	++	+	++	++	++	+	+	+	+	+	+
17.	Bel	Bel	*Aegle marmelos*	–	+	++	+	++	+	++	++	+	+	+	+	+	+
18.	Bhilwa	Bhirwan	*Semecarpus anacardium*	–	+	++	+++	++	+	++	+	++	+	+	++	+	+
19.	Bidari kand	Koua kand	*Puraria tuberosa*	++	++	++	++	++	+	+++	–	–	+	–	–	+	–
20.	Bilai kand	Bilaikand	*Ipomoea degitata*	++	+	++	+	++	++	+++	++	++	++	++	++	++	+
21.	Bramhi	Booti	*Bacopa monnieri*	–	+	++	+	++	+	++	+	+	+	–	+	+	+
22.	Chironji	Char-chironji	*Buchanania lanzan*	–	++	++	+++	+++	++	++	+	+	+	+	+	+	++
23.	Chitrak	Chitralata	*Plumbago ovata*	–	++	+	++	+++	++	+	+	+	+	–	+	+	+
24.	Dokarbela	Duthilakand (Vahl.) Pleach	*Ampelocissus latifolia*	+	++	+++	+++	++	+++	+++	+	++	+	++	++	+	+
25.	Giloe	Parhin	*Tinospora cordifolia*	+	++	++	+++	+++	+++	++	+	+	+	+	++	++	+
26.	Gorakhmundi	Mundi dara	*Sphaeranthus indicusi*	++	++	++	++	++	++	+++	+	++	+	+	++	+	++
27.	Gur sukri	Gur sakhari	*Grewia tiliaefolia* Vahl.	++	+++	+++	+++	+++	++	+++	+	++	+	++	+	++	+
28.	Hajardana	Bhui Aonla	*Phyllanthus niruri*	++	++	++	++	+++	++	+++	+++	++	++	+++	++	++	++
29.	Harad	Harra	*Terminalia chebula*	+	++	+++	+++	+++	+++	+++	+	++	++	++	++	++	+
30.	Hur hur	Hulhulia	*Cleome gynandra* L.	+	++	+	+	++	+	++	–	–	–	–	–	–	–
31.	Isser mool	Eswar mool	*Aristolochia indica*	–	–	+	++	–	+	+++	+	++	+	+	++	+	+
32.	Indrayan	Peeta Kachari Schrad	*Citrullus colocinthis*	+	++	+	+++	+	+++	+++	+	–	–	–		+	–
33.	Jangli angur	Datte lata Pleach.	*Ampelocissus arnottina*	+	++	++	+++	++	+	++	–	+	–	–	–	+	–
34.	Jangali arvi	Dhabbe kochai	*Colocasia indica* L.	++	+++	+++	+++	+++	+++	+++	+	+	+	++	+	+	++
35.	Jangali adrak	Baila Adrak	*Alpinia calcarata*	+	+	++	+++	++	++	+++	–	–	–	–	–	–	+
36.	Jangli bhindi		*Abelmoschus* sp.	+	++	++	+++	+++	+++	++	+	++	+	+	++	+	+
37.	Jangli bhatta	Jangli bagan	*Solanum melongena* var. *incanum* L.	+	++	++	+	++	+	++	+	–	–	–	–	+	–
38.	Jangli dhania	Padri Dera	–	+	+	+	++	+	+	+	+	–	+	+	–	+	+
39.	Jangli haldi	Hardi	*Curcuma aromatica* Salisb	+	+	++	+++	++	+++	+++	+	+	–	+	+	–	+
40.	Jangli pyaj	Gondla	*Urginea indica* (Roxb.) Kunth														
41.	Jangli suran	Barhakanda	*Amorphophallus* sp.	+	++	+++	+++	+++	+++	+++	+	++	+	+	++	+	+
42.	Kachnar	Kachnar	*Bauhinia purpuria*	–	+	–	–	–	–	+	+	+	+	+	+	+	+
43.	Kala dhatura	Dhatoor	*Datura innoxa*	+	+	++	++	++	++	++	–	–	–	+	–	–	–
44.	Kali haldi	Kaliyakand	*Curcuma caesia*	–	+	+	++	+	++	+	–	–	–	–	–	–	–
45.	Kali mushli	Musri lata	*Datura innoxa*	++	++	++	+++	+++	+++	+++	+	++	++	+	++	++	++
46.	Kalihari phool	Ghorandi	*Gloriosa superba*	+	+	+	++	+++	++	++	+	+	+	+	+	+	+
47.	Kalmegh	Bhuineem	*Andrographis paniculata*	+	+	++	+++	+++	+++	+++	++	+	–	++	+	–	+
48.	Karanj	Karanji	*Pongamia pinnata*	–	+	+	++	++	+	++	++	++	+	++	++	+	+
49.	Karukand	Peeta kanda	*Dioscorea dumetorum*	++	+++	+++	+++	+++	+++	+++	++	+++	+	++	+++	+	+
50.	Kekar	Keekar	*Garuga pinnata*	–	–	++	+++	++	–	++	–	+	+	+	+	+	+

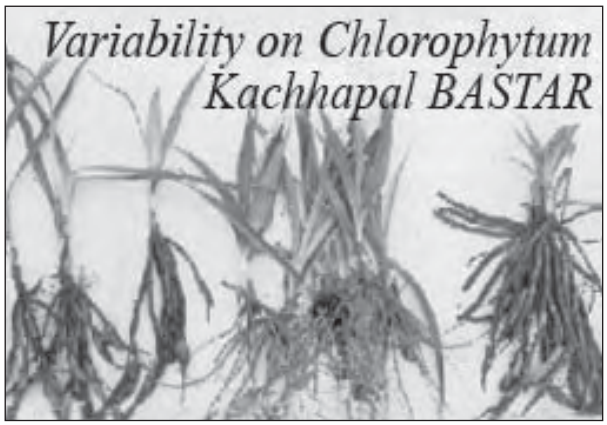
Contd.

Table 2. Contd.

S.No.	Vernacular name	Local name	Botanical name	Observed Diversity													
				Abujhmarh Hills							Jagdalpur-Kondagaon				Pharasgaon-Keskal-Kanker		
				1	2	3	4	5	6	7	1	2	3	4	1	2	3
51.	Keu kand	Keu	*Castus speciosus*	+	++	+++	++	+++	+++	+++	+	+	+	++	+	+	+
52.	Kimach	Kounch	*Mucuna prurita* Hook.	++	++	+++	+++	++	+++	+++	+	++	++	+	++	++	++
53.	Kulloo tree	Gurloo	*Sterculia urens*	–	+	++	++	++	–	++	–	+	–	+	+	–	–
54.	Kusum	Kosum	*Schleichera oleosa*	–	–	+	+	+	–	+	+	+	+	+	+	+	+
55.	Lajwanti	Lajni Lata	*Mimosa pudica*	++	+++	+++	++	++	++	+++	++	+++	+++	++	+++	+++	++
56.	Lal gunj	Gunj beej	*Abrus precadiorius*	+	+	++	++	++	+++	++	–	+	–	+	+	–	+
57.	Lemon grass	Chay lata	*Cimbopogon citrates*	+	+	++	+	+	++	++	++	+	+	+	+	+	+
58.	Lal Indrayan	Peeta kachri	*Trichosanthes tricuspidata* Lour fl Coch.	–	+	++	++	++	+	++	–	–	–	+	–	+	–
59.	Madar	Phundhar	*Calotropis gigantia*	++	++	+++	+++	++	+++	+++	+++	+++	++	++	+++	++	++
60.	Mahul	Mouha	*Madhuca longifolia* var. *latifolia* (Roxb) Cher	+	++	+++	+++	+++	+++	+++	+++	+++	++	++	+++	++	++
61.	Marodphalli	Maror phali	*Holicterus isora*	+	+	++	+	+	++	++	–	–	–	–	–	–	–
62.	Munga	Munga	*Moringa oleifera* Lam.	+	++	++	++	+++	++	+++	+++	++	++	++	++	++	++
63.	Nagbala	Palcha	*Sida veronicifova*	++	++	++	++	++	+++	+++	+	++	+	++	++	+	+
64.	Nagbel	Cheri singghi	*Cryptolapis buchananii* R. Rs.	++	++	+++	+++	++	+++	+++	–	++	++	++	++	++	+
65.	Neem	Neem	*Azadirachta indica*	+	+	+	++	+	+	++	++	++	+	+	++	+	++
66.	Nirgundi	Surteli	*Vitex negundo*	+	+	++	++	++	+++	++	+++	–	+	+	+		
67.	Palas	Choola	*Butea monosperma*	+	++	+++	+++	+++	++	+++	+	++	++	++	++	++	++
68.	Peet papra	Peet pakra	*Fumaria parviflora*	+	++	+++	++	+++	+++	+++	+	+	+	++	+	+	+
69.	Pipramool	Peepri jari	*Piper longum*	+	+	+	+	++	++	+	+	+	–	–	+	–	+
70.	Ramdaton	Potar	*Smilax macrophylla*	+	++	+++	+++	++	+++	++	+	+	+	+	+	+	+
71.	Ramphal	Ramphal	*Annona reticulata*	–	–	+	–	–	+	+	+	+	+	+	+	+	–
72.	Rasna jari	Rasna Booti	*Sapindus mukorossi*	–	+	+	+++	++	+	–	–	–	–	–	–	–	–
73.	Ratanjot	Ranijara	*Jatropa cordifolia*	++	+	++	++	+	++	++	++	+	++	+++	+	++	++
74.	Rosagrass	Pamarosa	*Cymbopogon martini*	+	++	++	++	++	++	++	+	+	+	+	+	+	+
75.	Sadabahar	Sadasuhagin	*Cathranthus roseus*	+	++	+	+	+	++	++	+	+	++	++	+	++	++
76.	Safed mushli	Mutri lata	*Chlorophytum arundinaceum*	+	++	++	+++	++	+++	+++	+	+	–	–	+	–	–
77.	Safed mushli	Mutri lata	*Chlorophytum laxum*	+	++	++	+++	+++	+++	+++	–	+	–	–	+	–	–
78.	Safed mushli	Mutri lata	*Chlorophytum tuberosum*	+	++	+++	+++	+++	+++	+++	+	++	+	+	++	+	+
79.	Safed mushli	Mutri lata	*Chlorophytum borivillianum*	–	–	+	+	+	++*	++*	–	++	–	–	++	–	–
80.	Sarifa	Seetaphal	*Annona squamosa* L.	+	++	++	++	++	+	+++	+++	++	++	++	++	++	++
81.	Sarpagandha	Kukdichhendi	*Rauvolfia serpentina* L.	–	+	+	++	+	–	+	–	–	–	+	–	–	–
82.	Satawar	Satawari	*Asparagus racemosus*	+	++	++	+++	+++	+++	+++	+	+	+	++	+	+	+
83.	Semal	Semal kand	*Bombax ceiba* L.	+	+	++	++	++	+	++	+	+	++	++	+	++	+
84.	Shivlinggi	Khutla (Linn)	*Brynopsis lacinosa*	+	++	++	+++	++	+++	+++	+++	++	++	++	++	++	++
85.	Surenda	Suarkand	*Dioscorea pantaphylla*	+	++	+++	+++	+++	+++	+++	+	+++	+	++	+++	+	+
86.	Targariyakand	Dorikanda	*Dioscorea sinensis* L.	+	+++	+++	+++	+++	+++	+++	+	+++	+	+	+++	+	+
87.	Teekhur	Teekhur	*Curcuma angustifolia*	+	+++	+++	+++	+++	+++	+++	++	+++	++	++	+++	++	++
88.	Tendu	Tendu	*Diospyros Montana* Roxb.	+	++	+++	+++	+++	++	+++	++	++	++	++	++	++	+
89.	Vaibidang	Bidang Burm. f.	*Embelia ribes*	+	++	+	++	++	+	+	+	–	–	–	–	–	–
90.	Van Tulsi	Moura lata	*Ocimum gratissimum*	+++	++	+++	++	++	+++	+++	+++	++	+++	+++	++	+++	++
91.	Wild fig	Tando	*Ficus benjamina*	+	++	+++	+++	+++	++	++	+	+	++	+	+	+	+
92.	Wood apple	Ghuee	*Feronia limonia*	–	+	++	+++	++	–	++	–	–	–	–	–	–	–

+ = Available in rare extent; ++ = Available in considerable extent; +++ = Available in abundant and - = Not available

- Abujhmarh hills: 1. Benoor forest, Narayanpur, Taroki and surrounding forests of Narayanpur, Brihibeda, Ranibeda and surrounding forests, 2. Sonpur, Sahnarghati, Kundla and intirior forests of medicinal importance, 3. Garpa, Paralkot, Gumnar and on way and interior forests from kundla to Garpa, 4. Kundla to Kuthul, Kacchapal and on way forest areas, 5. Akkabeda, Marka and on way forest and villages to Narayanpur, 6. Garhbengal, Dharaghati forest and Chotedongar forest areas, 7. Orchha forests, Aderghati adjoining river valley, forest areas and Dodamarka forests.
- Jagdalpur-Kondagoan: 1. Jagdalpur, Asna, Bastar and surrounding forests, 2. Bhanpuri, Baniyagoan and interior forests of medicinal importance, 3. Kondagoan and on way interior forests from Baniyagoan, 4. Makri, Riverbanks and on way forest areas from Kondagoan.
- Pharasgoan-Keshkal-Kanker: 1. Pharasgoan and on way forest to Keshkal, 2. Keshkal and sourrounding forest villages and 3. Kanker and surrounding forests, river banks.

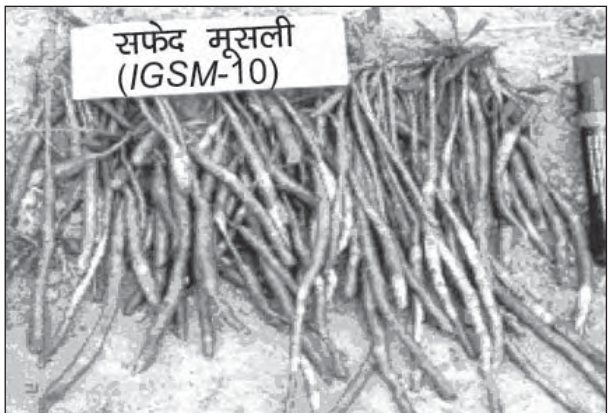


Chlorophytum **species abundantly observed at Abujhmarh**

Chlorophytum **tuberisation observed highest at Abujhmarh**

Chlorophytum **of East Abujhmarh**

Chlorophytum **of Dharaghati, Abujhmarh**

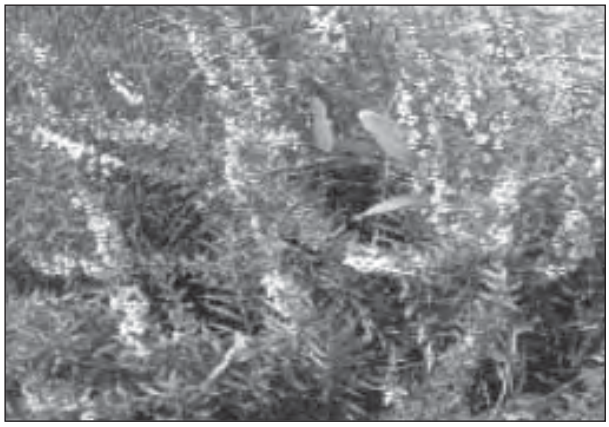


Selected accession of ***Chlorophytum*** **from Abujhmarh**

Selected plants from Abujhmarh collections

Fig. 3 : Medicinal floras abundantly available in the region

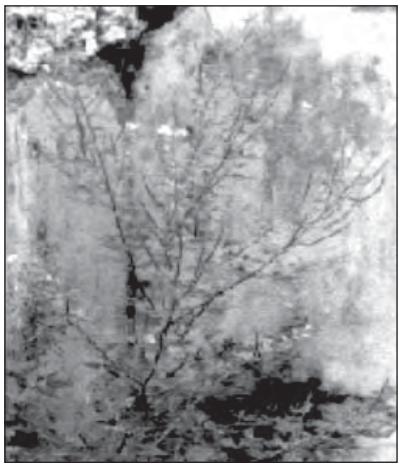
***Dioscorea* tubers of Abujhmarh collection**



Petrol plant (local name) of West Abujhmarh

Various medicinal plant species of Abujhmarh

Rasna booti, East Abujhmarh



***Cleome gynandra* East Abujhmarh**

***Solanum melongena* East Abujhmarh**

***Solanum nigrum* East Abujhmarh**

Fig. 3 (Contd.): Medicinal floras abundantly available in the region

Table 3. Observed diversity and availability of medicinal plants in Kanger ghati, Machkot-Tiriya, Chitrakot-Mardoom and adjoining forest areas of Bastar (Chhattisgarh)

S. No.	Vernacular name	Local name	Botanical name	Observed Diversity														
				Kanger Ghati-Teerathgarh Kotumsar				Machkot-Gupteswar Tiriya			Chitrakot Mardroom Binta				Antagarh Pakhanjore Bhanuprtappur			
				1	2	3	4	1	2	3	1	2	3	4	1	2	3	4
1.	Ama haldi	Aami hardi	*Carcuma amada* Roxb.	-	+	+	++	++	++	+++	+	+	++	++	+	-	+	-
2.	Amaltas	Amaltas	*Cassia fistula* L.	-	+	+	-	-	+	+	+	+	+	+	+	++	+	+
3.	Ambla	Ounra	*Emblica officinalis* L.	-	+	++	++	+++	+	+++	+	+	++	+	+	+	+	+
4.	Anantamul	Sugandhi jari	*Hemidesmus indicus* L.	+++	++	++	++	++	++	+++	1	2	3	4	++	++	++	+
5.	Apamarg	Chirchira	*Achyranthus aspera* L.	++	++	++	++	++	+++	+++	+	++	+++	+++	++	++	++	+
6.	Bach	Ghorbacchh	*Acorus calamus* L.	+	+	+	+	+	+	+	++	+	+	+	–	+	+	
7.	Bada ritha	Ritha	*Sapindus aurifolius*	–	–	+	–	+	–	–	–	+	+	++	+	–	+	
8.	Badi duddhi	Dudhiya	*Euphorbia hitra* L.	+++	+++	++	+++	+++	+++	+++	+	++	+	–	++	++	++	
9.	Baghnakkha	Latkana	*Martynia annua* L.	++	++	+++	++	++	+++	+++	+++	+++	++	+++	+++	++	++	
10.	Baheda	Bahera	*Terminalia bellirica*	+	+	+	++	++	++	+++	+++	++	++	+++	+	–	+	
11.	Baichandi	Bechandi	*Dioscorea hispidaI* L.	+	+++	+++	+++	+++	+++	+++	+	++	+++	++	++	++	+	
12.	Bakayan	Bakien	*Malla azadaracht* L.	+	+	++	++	++	+	+	+	+	++	+++	+	+	+	
13.	Banarandi	Rani jara	*Jatropha curcas* L.	+	++	+++	+++	++	+	++	+	+	+	++	++	++	+		
14.	Baramasi	Kandle lata	*Ikora puriflora*	+++	+++	+++	++	++	+++	+++	+	+	++	+++	++	++	++	
15.	Bariyara	Jharoo lata	*Sidacuta*	++	+++	++	++	+++	++	+++	+	++	+++	++	++	++	++	
16.	Bauchi	Bochi	*Psoralea ncordifolia*	+	+	+	++	+	++	++	+++	++	++	++	+	+	+	
17.	Bel	Bel	*Aegle marmelos* L.	–	+	++	+	++	+	++	+	++	++	++	+	+	+	
18.	Bhilwa	Bhirwan	*Semecarpus anacardium* L.	–	+	++	+++	++	+	++	+	+	++	+	+	+	+	
19.	Bidari kand	Koua kand	*Puraria tuberosa*	++	++	++	++	++	+	+++	+++	++	++	++	–	–	–	
20.	Bilai kand	Biliekanda	*Ipomoea degitata*	++	+	++	+	++	++	+++	–	–	+	+	+	–	+	
21.	Biskhapra	Bishkhapri Wall. ex. Royle	*Aconitum heterophyllum*	++	+++	+++	+	++	+	+++	+++	+++	+++	+++	++	+	++	+
22.	Bramhi	Booti	*Bacopa monnieri* L.	–	+	++	+	++	+	++	++	+	+	+	–	+	+	
23.	Chironji	Char-chironji	*Buchanania lanzan*	–	++	++	+++	+++	++	++	+	++	++	+++	+	+	+	
24.	Chitrak	Chitralata	*Plumbago ovata*,	–	++	+	++	+++	++	+	–	–	–	+	–	–	+	
25.	Dokarbela	Duthilakand (Vahl.) Pleach	*Ampelocissus latifolia*	+	++	+++	+++	++	+++	+++	+++	+++	+++	++	++	+	+	
26.	Giloe	Parhin	*Tinospora cordifolia*	++	++	–	–	–	–	++	+++	+	++	++	–	–	+	+
27.	Gorakhmundi	Mundi dara	*Sphaeranthus indicusi*	++	++	++	++	++	++	+++	++	+	+	++	++	+	+	
28.	Gur sukri	Gursakhari	*Grewia tiliaefolia* Vahl.	++	+	++	+	++	+++	+++	++	++	++	+	++	+	–	–
29.	Hajardana	Bhui aonla	*Phyllanthus niruri*	++	++	++	++	+++	++	+++	+	+	+	+	++	++	++	
30.	Harad	Harra	*Terminalia chebula* (Retz.)	+	++	+++	+++	+++	+++	+++	–	+	+	++	+	+	++	
31.	Hur hur	Hulhulia	*Cleome gynandra* L.	+	++	+	+	++	+	++	+++	+++	+++	++	+	+	+	
32.	Isser mool	Eswar mool	*Aristolochia indica*	–	–	+	++	–	+	+++	+	+	++	++	+	+	–	
33.	Indrayan	Peeta kachari	*Citrullus colocinthis* Schrad	–	++	++	–	+	–	+++	–	–	++	+	–	–	–	–
34.	Jangali arvi	Dhabbe kochai	*Curcuma aromatica*	++	+++	+++	+++	+++	+++	+++	–	–	+	++	++	+++	+	
35.	Jangali adrak	Baila adrak	*Zingiber roseum*	+	+	++	+++	++	++	+++	+	–	+	++	–	++	+	
36.	Jangli bhindi	Bheri	*Abelmoschus* sp.	+	++	++	+++	+++	+++	++	++	++	++	++	+	++	+	
37.	Jangli dhania	Parli lata		+	+	+	++	+	+	+	+++	++	+++	+++	–	–	+	
38.	Jangli haldi	Hardi	*Curcuma aromatica* Salisb	+	+	++	+++	++	+++	+++	++	++	++	++	+	+	–	
39.	Jangli pyaj	Gondla (Roxb.) Kunth	*Urginea indica*	+	++	+	+	+	+	++	++	++	++	+++	+	+	+	+
40.	Jangli suran	Barhakanda	*Amorphophallus* sp.	+	++	+++	+++	+++	+++	+++	+	++	++	++	+	+	+	
41.	Kachnar	Kachnar	*Bauhinia purpuria* L.	–	+	–	–	–	–	+	–	–	+	+	+	+	+	
42.	Kala dhatura	Dhatoor	*Datura innoxa*	+	+	++	++	++	++	++	++	++	+++	+++	+	–	–	
43.	Kali haidi	Kaliyakand	*Curcuma caesia*	-	+	+	++	+	++	+	+	+	++	++	–	–	–	
44.	Kali mushli	Musri lata	*Datura innoxa*	++	++	++	+++	+++	+++	+++	–	–	+	–	+	++	+	
45.	Kalihari	Ghorandilata	*Gloriosa superba*	+	+	+	++	+++	++	++	+	+	++	++	–	–	+	
46.	Kalmegh	Bhuineem	*Andrographis paniculata*	+	+	++	+++	+++	+++	+++	–	+	+	+	+	–	+	
47.	Karanj	Karanji	*Pongamia pinnata* L.	–	+	+	++	++	+	++	–	+	+	++	++	++	+	
48.	Karukand	Peeta kanda	*Dioscorea dumetorum* L.	++	+++	+++	+++	+++	+++	+++	+	++	+++	++	++	++	+	
49.	Kekar	Keekar	*Garuga pinnata* (Roxb.)	–	–	++	+++	++	–	++	++	++	+	+	+	+	+	
50.	Keu kand	Keu	*Castus speciosus*	+	++	+++	++	+++	+++	+++	+	+	+	++	+	+	+	
51.	Kimach	Kounch	*Mucuna prurita* Hook.	++	++	+++	+++	++	+++	+++	+++	++	++	++	++	++	++	
52.	Kulloo tree	Gurloo	*Sterculia urens* (Roxb.)	–	+	++	++	++	–	++	–	+	+	++	–	+	+	
53.	Kusum	Kosum	*Schleichera oleosa* (Lour)	–	–	+	+	+	–	+	–	+	++	+	+	+	+	
54.	Lajwanti	Lajni lata	*Mimosa pudica* L.	++	+++	+++	++	++	++	+++	+	++	+++	+++	++	++	++	

Contd.

Table 3. Contd.

S. No.	Vernacular name	Local name	Botanical name	Observed Diversity: Kanger Ghati-Teerathgarh Kotumsar				Machkot-Gupteswar Tiriya			Chitrakot Mardroom Binta				Antagarh Pakhanjore Bhanuprtappur			
				1	2	3	4	1	2	3	1	2	3	4	1	2	3	4
55.	Lal gunj	Gunj beej	*Abrus precadiorius*	+	+	++	++	++	+++	++	++	++	+++	++	–	–	+	
56.	Lal Indrayan	Peeta kachri Lour fl Coch	*Trichosanthes tricuspidata*	+	++	–	+	–	–	++	++	+	++	++	–	–	+	–
57.	Lemon grass	Chay lata	*Cimbopogon citrates*	+	+	++	+	+	++	++	++	+	++	++	++	+	+	
58.	Madar	Phundhar	*Calotropis gigantia*	++	++	+++	+++	++	+++	+++	++	+	+	+	++	++	++	
59.	Mahul	Mouha	*Madhuka longifolia*	+	++	+++	+++	+++	+++	+++	+	+	+	+	++	++	++	
60.	Marodphalli	Maror phali	*Holicterus isora*	+	+	++	+	+	++	++	+++	++	+++	+++	–	–	–	
61.	Munga	Munga	*Moringa oleifera* Lam.	+	++	++	++	+++	++	+++	–	–	+	+	+	++	++	
62.	Nagbala	Palcha	*Sida veronicifova*	++	++	++	++	++	+++	+++	–	+	+	+	+	++	+	
63.	Nagbel	Cheri singhi	*Cryptolapis buchananii* R. Rs.	++	++	+++	+++	++	+++	+++	++	++	++	++	+	++	++	
64.	Neem	Leem	*Azadirachta indica*	+	+	+	++	+	+	++	++	++	++	++	++	++	+	
65.	Nirgundi	Surteli	*Vitex negundo*	+	+	++	++	++	+++	++	++	++	+++	++	+	+	+	
66.	Palas	Choola	*Butea monosperma* (Lamk)	+	++	+++	+++	+++	++	+++	+	+	+	+	+	++	++	
67.	Peet papra	Peet pakra	*Fumaria parviflora*	+	++	+++	++	+++	+++	+++	+	–	–	–	++	+	+	
68.	Pipramool	Peepri jari	*Piper longum*	+	+	+	+	++	++	+	+	+	++	+	+	+	+	
69.	Ramdaton	Potar	*Smilax macrophylla*	+	++	+++	+++	++	+++	++	–	+	++	++	++	+	++	
70.	Ramphal	Ramphal	*Annona reticulata* L.	–	–	+	–	–	+	+	++	++	+	+	–	+	–	
71.	Rasna jari	Rasna booti	*Sapindus mukorossi*	–	+	+	+++	++	+	–	+	+	+++	+++	–	–	+	
72.	Ratanjot	Ranijara-	*Jatropha curcas* L.	++	+	++	++	+	++	++	+	+	++	+	++	+	++	
73.	Rosagrass	Pamarosa	*Cymbopogon martini*	+	++	++	++	++	++	++	–	–	–	–	+	+	+	
74.	Sadabahar	Sadasuhagin	*Cathranthus roseous*	+	++	+	+	+	++	++	+	+	+	++	+	+	+	
75.	Safed mushli	Mutri lata	*Chlorophytum arundinaceum*	+	++	++	+++	++	+++	+++	+	+	++	+++	+	–	–	
76.	Safed mushli	Mutri lata	*Chlorophytum laxum*	+	++	++	+++	+++	+++	+++	–	–	+	–	–	–	–	
77.	Safed mushli	Mutri lata	*Chlorophytum tuberosum*	+	++	+++	+++	+++	+++	+++	–	–	+	–	+	+	+	
78.	Safed mushli	Mutri lata	*Chlorophytum borivillianum*	–	–	+	+	+	++*	++*	+	+	+	+	–	–	–	
79.	Sarifa	Seetaphal	*Annona squamosa* L.	+	++	++	++	++	+	+++	–	+	++	++	++	++	++	
80.	Sarpagandha	Kukdichhendi	*Rauvolfia serpentina* L.	–	+	+	++	+	–	+	–	–	–	–	–	+	–	
81.	Satawar	Satawari	*Asparagus racemosus*	+	++	++	+++	+++	+++	+++	++	++	++	+++	+	+	+	
82.	Semal	Semal Kand	*Bombax ceiba* L.	+	+	++	++	++	+	++	+	+	++	++	+	+	+	
83.	Shivlinggi	Khutla	*Brynopsis lacinosa* (Linn)	+	++	++	+++	++	+++	+++					++	++	++	
84.	Surenda	Suarkand	*Dioscorea pantaphylla*	+	++	+++	+++	+++	+++	+++	+	++	+++	++	++	++	+	
85.	Targariya kand	Dorikanda	*Dioscorea sinensis* L.	+	+++	+++	+++	+++	+++	+++	+	++	+++	++	++	++	+	
86.	Teekhur	Teekhur	*Curcuma angustifolia*	+	+++	+++	+++	+++	+++	+++	+	–	+	–	++	++	++	
87.	Tendu	Tendu	*Diospyros Montana Roxb.*	+	++	+++	+++	+++	++	+++	–	+	+	+	++	+	+	
89.	Vaibidang	Bidang	*Embelia ribes* Burm. f.	+	++	+	++	++	+	+	++	+++	+++	+++	+	–	–	
90.	Van tulsi	Moura lata	*Ocimum gratissimum*	+++	++	+++	++	++	+++	+++	–	–	+	+	++	++	++	
91.	Wild fig	Tando	*Ficus benjamina*	++	+	+++	+	++	++	++	+++	+	+++	+	+	+	+	
92.	Wood apple	Ghuee	*Feronia limonia*	+	+	–	–								–	–	+	

+ = Available in rare extent; ++ = Available in considerable extent; +++ = Available in abundant, and – = Not available

- Kanger Ghati-Teerathgarh-Kotamsar: 1. Neganar, Teerathgarh forest, Niyanar and forests surrounding to villages, 2. Kotumsar Cave, Kailash Cave, Majhipal forest, Molipadr and surroundings, 3. Darbha ghati, Koling forest areas and river valley and 4. Darbha and on way forests upto Bastanar
- Chitrakot-Mardoom-Binta: 1. Karanji, Potanar, Chitrdhara and surrounding forests, 2. Lohandiguda, Chitrakot and interior forests of medicinal importance, 3. Mardoom, Binta and on way interior forests from Mardoom to Binta and 4. Binta and on way forest areas from Binta to Barsur.
- Machkot-Gupteswar-Tiriya: 1. Machkot, Cheetapadar, Kurandi, 2. Gumiyapal, Tiriya and on way forests of medicinal importance and 3. Gupteswar river valley and forest areas of Bastar and part of adjoining Orissa.
- Antagarh-Pakhanjore-Bande: 1. Antagarh and Koilibera, 2. Pakhanjore and surrounding forest and villages, 3. Bande and surroundings and 4. Bhanupratapur and surroundings.

Niyanar and river valley adjoining to this pocket having only Sal, Tendu, Palas and some other trees (Table 3). The important diversity noted on this area are wild *Amorphophallus*, Peepra mool (*Piper longum* L.), *Chlorophytum tuberosum*, *Chlorophytum arundinaceum*, *Dioscorea* sp., Lal Gunj (*Abrous precatorius*) etc. However, occurrence of *Rauvolfia serpentina*, *Plumbago zylenica*, *Jatropha curcas*, wild *Colocasia* and other herbs of shed loving nature are also noted. The *Rauvolfia* and wild suran have sturdy and excellent plant type in this region. *Piper longum* L., Sarpgandha, wild suran, kalihari was abundantly observed in Gupteswar and river valleys of this place hence, they may be conserved under *in situ* in these pockets.

5. *Dantewara and Bailadila Hills*

This area includes the forests and villages of Dantewara, Bailadila hillocks, Balood, Kawalnar forest (Table 4). The Flora of this zone is rich in most of medicinal herbs especially tubers. The typical tuber species are *Costus speciosus*, *Dioscorea esculenta*, *D. alata*, Jata Mansi (*Nardostichus grandiflora* DC), Wild & edible Kimanch (*Mucuna purita* L.), Kali Haldi (*Curcuma caesia* Roxb.), black fruited Benjamin fig (*Ficus benjamina* L), Peepra mool (*Piper longum* L.), Giloy (*Tinospora cordifolia* L.), Teekhur (*Curcuma angustifolia* Roxb.), Safed musli (*Chlorophytum arundinaceum* L.), Aonla, Baila adrak (*Alpinia galanga*), Patal Kumhra, Kalmegh (*Andrographis paniculata* L.) are the species available in abundance. Beside these some herbal plants like Ananta mool (*Hemidesmus indicus*), Gorakhmundi (*Spillanthus indicus*), Bhui Aonla (*Phyllanthus niruri*) and Badi duddhi (*Euphorbia hirta*) are also observed in abundance. Hence, efforts should be concentrated for their *in situ* conservation in this area.

6. *Barsur-Bijapur-Bhopalpatnam*

This region includes the most typical forests like Barsur hillocks, Tular cave and surrounding forests areas, Pamed Sanctuary, Bhopalpatnam Forest and river banks of Indrawati River, Mahanadi river, Tarlaguda, Bhadra Kali *etc.* having dense forest dominating by Sal, Tendu, Beeja, Sihari plant, Bamboo plants *etc.* are the flora of this location. The medicinal species abundantly observed (Table 4) in this area (Fig. 4) are Kalihari (*Gloriosa superba* L.), various *Dioscorea* sp., *viz.*, Dori kanda, Targariya, Kuliha kanda, Sikka Kanda, Wild suran, Safed mushli (*C. laxum, C. arundinaceum*), Bhilwa trees (*Semecarpus anacardium* L.), Ram datoun (*Smilax macrophylla*), Ratanjot, Dokar bella, wood apple, *Asparagus sp.*, Mainhar, Teekhur, Jangli adrak, Jangli haldi, Kali mushli, white gunj, *Rasna jari* (Local name),

***Chlorophytum* selection of Tular cave forest**

***Chlorophytum* selected from Bhopalpatnam**

***Chlorophytum* selected plants from Barsur collections**

Fig. 4: Medicinal plants abundantly observed in Barsur-Bijapur-Bhopalpatnam region

Table 4. Observed diversity and availability of medicinal plants in Dantewara-Bailadila-Barsur-Bhopalpatnam forests of Bastar (Chhattisgarh)

S. No.	Vernacular name	Local name	Botanical name	Dantewara-Bailadila forests					Barsur-Bijapur Bhopalpatnam					Sukma-Konta Forests		
				1	2	3	4	5	1	2	3	4	5	1	2	3
01	Ama haldi	Aami hardi	*Curcuma amada* Roxb.	+	+	+	–	+	++	++	++	++	+	–	++	+
02	Amaltas		*Cassia fistula* L.	++	++	+++	++	+++	++	++	+++	++	+++	++	++	++
03	Ambla	Ounra	*Emblica officinalis* L.	++	++	++	+	++	++	++	++	++	++	+	+	++
04	Anantamul	Sugandhi jari	*Hemidesmus indicus* L.	++	++	++	+	++	+++	++	+++	++	++	++	++	++
05	Apamarg	Chirchira	*Achyranthus aspera* L.	+++	++	++	++	+++	+++	++	+++	++	+++	++	++	++
06	Bach	Ghorbacchh	*Acorus calamus* L.	+	+	+	–	+	++	++	+	++	+	+	+	–
07	Bada ritha	Ritha	*Sapindus aurifolius* (Vahl.)	+	+	+	+	+	++	+	+	+	+	+	+	+
08	Badi duddhi	Dudhiya	*Euphorbia hitra* L.	++	+++	++	++	++	+++	+++	++	++	++	++	++	++
09	Baghnakkha	Latkana	*Martynia annua* L.	++	+++	++	++	+++	+++	+++	+++	+++	+++	++	+++	++
10	Baheda	Bahera	*Terminalia bellirica* (Roxb.)	+	++	++	+	++	++	++	++	++	++	+	++	+
11	Baichandi	Kuliha kanda	*Dioscorea hispidaI* L.	++	+++	++	++	+++	+++	+++	+++	+++	+++	++	+++	+++
12	Bakayan	Bakien	*Malla azadaracht* L.	+	+	+	+	+	++	++	+	++	+	+	+	+
13	Banarandi	Rani jara	*Jatropha curcas* L.	++	++	++	++	++	++	++	++	++	++	++	++	++
14	Baramasi	Kandle lata	*Ikora puriflora*	+++	+++	+++	++	++	+++	++	+++	++	++	++	++	++
15	Bariyara	Jharoo lata	*Sida acuta*	++	+++	+++	+++	+++	+++	+++	+++	++	+++	+++	+++	++
16	Bauchi	Bochi	*Psoralea cordifolia*	++	++	+	+	++	++	++	++	+++	++	–	+	+
17	Bel	Bel	*Aegle marmelos* L.	+	++	+	+	++	++	++	++	+	++	++	++	++
18	Bhilwa	Bhirwan	*Semecarpus anacardium* L.	++	++	+++	++	++	++	+++	++	++	++	+	++	+
19	Bidari kand	Koua kand	*Puraria tuberosa*	++	++	+++	++	++	+++	+++	++	++	++	+	++	+
20	Bilai kand	Bilaikand	*Ipomoea degitata*	++	+++	+++	+	++	+++	+++	+++	++	++	+	+	+
21	Biskhapra	Bishkhapri Wall. ex. Royle	*Aconitum heterophyllum*	+++	+++	+++	+++	++	+++	+++	+++	++	+++	+	+	+++
22	Bramhi	Booti	*Bacopa monnieri* L.	+	++	+	–	++	+++	++	++	++	++	–	+	–
23	Chironji	Char-chironji	*Buchanania lanzan*	++	++	++	++	++	++	++	++	++	++	+	++	+
24	Chitrak	Chitralata	*Plumbago ovata,*	+	+	+	+	++	++	++	++	+	++	+	++	++
25	Dokarbela	Duthilakand (Vahl.) Pleach	*Ampelocissus latifolia*	+++	+++	+++	++	+++	+++	+++	+++	+++	+++	++	+++	++
26	Giloe	Parhin	*Tinospora cordifolia*	+	++	+	++	+	++	++	++	++	+++	+	+++	+
27	Gorakhmundi	Mundi dara	*Sphaeranthus indicusi*	++	++	++	++	++	++	+++	++	+++	++	++	++	++
28	Gur sukri	Gursakhari	*Grewia tiliaefolia* Vahl.	++	++	++	+	+	+++	+++	++	+	+++	++	+	+
29	Hajardana	Bhui aonla	*Phyllanthus niruri*	++	++	++	++	++	+++	++	+++	++	++	++	++	++
30	Harad	Harra (Retz.)	*Terminalia chebula*	++	+++	++	++	+++	+++	++	+++	++	+++	++	++	+
31	Hur hur	Hulhulia	*Cleome gynandra* L.	+	++	+	+	++	+	+++	++	++	++	–	+	+
32	Isser mool	Eswar mool	*Aristolochia indica*	+	+	+	+	+	++	++	+	–	+	+	+	+
33	Indrayan	Peeta kachari	*Citrullus colocinthis* Schrad	–	++	++	+	+++	++	++	+++	++	+++	–	+	–
34	Jangali Arvi	Dhabbe kochai	*Curcuma aromatica*	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	++	+++	+
35	Jangali adrak	Baila adrak	*Zingiber roseum*	++	+++	+++	++	++	+++	+++	++	++	++	++	++	+
36	Jangli bhindi		*Abelmoschus* sp.	+++	+++	++	++	++	++	+++	++	++	++	++	++	++
37	Jangli dhania	Nepali dhaniya		+	+	+	–	–	–	–	–	+	–	–	–	–
38	Jangli haldi	Hardi	*Curcuma aromatica* Salisb.	+	++	+++	++	++	+++	+++	+++	++	++	++	+++	++
39	Jangli pyaj	Gondla	*Urginea indica* (Roxb.) Kunth.													
40	Jangli suran	Barhakanda	*Amorphophallus* sp.	++	+++	+++	++	+++	+++	+++	+++	++	+++	++	+++	++
41	Kachnar	Kachnar	*Bauhinia purpuria* L.	++	++	++	++	++	++	++	++	++	++	+	++	+
42	Kala dhatura	Dhatoor	*Datura innoxa*	++	+++	++	++	++	++	++	++	+	++	+	++	+
43	Kali haidi	Kaliyakand	*Curcuma caesia*	–	+	–	–	+	+	+	+	–	+	–	+	+
44	Kali mushli	Musri lata	*Datura innoxa*	++	++	++	+++	+++	+++	+++	+++	++	+++	++	+++	+
45	Kalihari	Ghorandi phool	*Gloriosa superba*	++	++	++	+	+	++	++	++	+	+	++	+++	–
46	Kalmegh	Bhuineem	*Andrographis paniculata*	++	+++	++	++	+++	+++	+++	++	++	+++	++	+++	++
47	Karanj	Karanji	*Pongamia pinnata* L.	+	+	+	+	++	++	++	++	++	++	+	++	+
48	Karukand	Peeta kanda	*Dioscorea dumetorum* L.	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++
49	Kekar	Keekar	*Garuga pinnata* (Roxb.)	++	++	++	++	++	++	++	++	++	++	+	++	+
50	Keu kand	Keu	*Castus speciosus*	++	+++	++	++	++	+++	++	+++	++	++	++	++	++
51	Kimach	Kounch	*Mucuna prurita* Hook.	++	+++	++	++	+++	+++	+++	+++	++	+++	++	+++	++
52	Kulloo tree	Gurloo	*Sterculia urens* (Roxb.)	+	+	+	+	+	++	++	++	++	+	+	+	+
53	Kusum	Kosum	*Schleichera oleosa* (Lour)	+	+	+	+	+	++	+	+	+	+	+	+	+
54	Lajwanti	Lajni lata	*Mimosa pudica* L.	++	++	++	++	++	++	+++	++	++	++	++	++	++
55	Lal gunj	Gunj beej	*Abrus precadiorius*	+	++	++	++	++	++	++	++	++	++	++	++	+
56	Lal indrayan	Peeta kachri Lour fl Coch.	*Trichosanthes tricuspidata*	+	++	+++	–	+	+++	+++	+++	+	+++	–	+	+

Contd.

Table 4. Contd.

S. No.	Vernacular Name	Local Name	Botanical Name	Dantewara-Bailadila forests					Barsur-Bijapur Bhopalpatnam					Sukma-Konta Forests		
				1	2	3	4	5	1	2	3	4	5	1	2	3
57	Lemon grass	Chay lata	*Cimbopogon citrates*	+	+	+	+	+	+	+	++	+	+	+	+	+
58	Madar	Phundhar	*Calotropis gigantia*	+++	+++	+++	++	+++	+++	+++	+++	++	+++	+++	+++	++
59	Mahul	Mouha	*Madhuka longifolia* var. *latifolia*	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	++	++	++
60	Marodphalli	Maror phali	*Holicterus isora*	–	–	+	–	+	+++	++	++	++	+	+	+	+
61	Munga	Munga	*Moringa oleifera* Lam.	++	++	++	++	++	++	++	++	++	++	++	++	++
62	Nagbala	Paalcha	*Sida veronicifova*	++	++	++	++	++	++	++	++	++	++	++	++	++
63	Nagbel	Cheri singghi R. Rs.	*Cryptolapis buchananii*	++	+++	+++	+++	++	+++	+++	+++	++	++	++	+++	++
64	Neem	Neem A. Juss.	*Azadirachta indica*	++	++	++	++	++	++	+	++	+	++	++	++	++
65	Nirgundi	Surteli	*Vitex negundo*	+	++	++	+	++	++	++	+++	++	++	+	++	++
66	Palas	Choola	*Butea monosperma* Lamk.	++	+++	+++	++	+++	+++	+++	+++	+++	+++	++	+++	++
67	Peet papra	Peet pakra	*Fumaria parviflora* Lamk.	++	+++	+++	++	++	++	+++	+++	++	++	++	++	+
68	Pipramool	Peepri jari	*Piper longum*	–	+	–	–	+	++	++	++	+	+	+	+	–
69	Ramdaton	Potar	*Smilax macrophylla*	++	++	++	++	++	+++	+++	+++	++	++	++	+++	+
70	Ramphal	Ramphal	*Annona reticulata* L.	–	–	–	–	–	+	–	–	–	–	–	–	–
71	Rasna jari	Rasna booti	*Sapindus mukorossi*	–	–	–	–	+	+	+	+	–	+	–	+	–
72	Ratanjot	Ranijara-	*Jatropha curcas* L.	++	++	++	+	++	++	+++	++	++	++	+	++	+
73	Rosagrass	Pamarosa	*Cymbopogon martini*	+	+	+	+	+	+	++	+	+	+	+	+	+
74	Sadabahar	Sadasuhagin	*Cathranthus roseus*	+	++	++	++	+	+	++	+	+	+	+	+	+
75	Safed mushli	Mutri lata	*Chlorophytum arundinaceum*	+	+	+	+	+	+	+	+	+	+	+	+	+
76	Safed mushli	Mutri lata	*Chlorophytum laxum*	+	+	+	+	+	++	+	+	+	+	+	+	+
77	Safed mushli	Mutri lata	*Chlorophytum tuberosum*	+	++	++	+	++	+++	++	+	++	++	+	++	+
78	Safed mushli	Mutri lata	*Chlorophytum borivillianum*	–	–	+	–	–	–	–	–	–	–	–	–	–
79	Sarifa	Seetaphal	*Annona squamosa* L.	+	+	+	+	+	++	++	++	+	+	+	+	+
80	Sarpagandha	Kukdichhendi	*Rauvolfia serpentina* L.	+	+	+	–	+	+	+	++	+	+	+	+	+
81	Satawar	Satawari/ Jogilatti	*Asparagus racemosus*	++	+++	+++	++	+++	+++	+++	++	++	+++	++	+++	++
82	Semal	Semal kand	*Bombax ceiba* L.	++	++	++	++	++	++	++	++	++	++	++	++	++
83	Shivlinggi	Khutla	*Brynopsis lacinosa (*Linn)	++	+++	++	+++	++	+++	+++	++	+++	++	++	+++	+
84	Surenda	Suarkand	*Dioscorea pantaphylla*	+++	+++	+++	+++	+++	+++	+++	+++	+++	+++	++	+++	++
85	Targariyakand	Dorikanda	*Dioscorea sinensis* L.	++	+++	+++	++	+++	+++	+++	+++	+++	+++	++	+++	++
86	Teekhur	Teekhur	*Curcuma angustifolia*	+++	+++	++	++	+++	+++	+++	+++	+++	+++	+++	+++	++
87	Tendu	Tendu	*Diospyros Montana* Roxb.	++	++	++	++	+++	+++	+++	+++	+++	+++	++	+++	++
88	Vaibidang	Bidang	*Embelia ribes* Burm. f.	+	+	+	+	+	+	+	+	–	+	+	+	+
89	Van tulsi	Moura lata	*Ocimum gratissimum*	+++	+++	+++	++	+++	+++	+++	+++	+++	+++	++	+++	++
90	Wild fig	Tando	*Ficus benjamina*	++	+	+++	+	++	++	++	+++	+	+++	+	+	+
91	Wood apple	Ghuee	*Feronia limonia*	–	+	++	+	++	++	++	++	–	–	–	+	–

+ = Available in rare extent; ++ = Available in considerable extent; +++ = Available in abundant and - = Not available

- Dantewara and surrounding forest: 1. Kalepal upto Geedam and forests surrounding to villages and interiors, 2. Dantewara and river valley of Dankni and Shankani and surroundings forests, 3. Kawalnar and on way forest surroundings, 4. Nakulnar, Kuakonda, Jeerampal, Katkalyan, 5. Bailadila, Bacheli-Kirandul.
- Barsur-Bijapur-Bhopalpatnam: 1. Barsur, Chindnar, Bodhghat river valley and surrounding forests, 2. Tular cave, Garma and interior forests of medicinal importance, 3. Bijapur, Pamed, Nimed, Bhairamgarh and on way forests of medicinal importance, 4. Sangampalli, Maded, Sankanpalli and some interior hilloks of medicinal importance, 5. Bhopalpatnam, Bhadrkali, Tarlaguda, River valley and interior forest areas.
- Sukma-Konta and onway forests: 1. Bastanar, Chindgarh, Pakela, Rokel and on way forests, 2. Sukma, Gadiras, Jeerampal and interior forests of medicinal importance, 3. Sasharam, Penta, Ischar, Konta

Marod phalli (*Holicterus isora*), Gullu tree (*Sterculia urens* (Roxb.)) etc. Beside these, various orchids, bramhi, ferns and mosses are also available in riverbanks and most forests of Bastanar surroundings. The species *C. borivillanum* was also observed in some pockets of this area viz. on way riverbanks towards Tular cave and intirior river banks and forests of Bodhghat project. A rarely occurring species, locally known as *Ramakanda* was also noticed in forest of this location. Marod phalli (*Holicterus isora*), *Dioscorea* species are elite germplasm of this location. Hence they may be conserved under *in situ* in this location.

7. *Sukma-Konta Region*

This region includes forest and forest villages of Sukma, Chhindgarh, Gadiras and forests on way to Konta have been intensively surveyed and observed for the diversity present. The typical features of this area are dry and hot climate forests rich with Tendu, Sal, Palas, Arjuna and Teak trees in abundance. Among medicinal flora *Puraria*

tuberosa (locally called *Patal Kumhra*), *Dioscorea* species, *Tinospora cordifolia*, *Chlorophytum* sp., Kimanch yellow and Red fruit type (*Macuna puriata* L.) and white and red gunj (*Abrous precatorius*), Kalmegh, *Asparagus* sp., Nagbel, Nagbala etc. are in abundance. It was also observed that most of the edible and wild legumes are in abundance in this location. Wild chilies of upside bearing resembling to shimla mirch, small yellow in colour but having extremely high pungency was also seen in this area. *Tinospora cordifolia*, *Puraria tuberosa*, *Gloriosa superba* and *Abrous precatorius* may be conserved under *in situ* considering suitability of climate for these .

8. *Jagdalpur-Kondagaon*

The surveyed areas of this region include Bakawand, Bhond, Bhanpuri, Baniyagaon, Masora, Benoor and some other small interior forest villages on way to Kondagoan. The medicinal species available are *Asparagus* sp., *Amorphophallus* sp., *Cucurliago orchiodes*, Dokarbela and Ramdatoun. The typical strain of Safed musli (*Chlorophytum borivillianum*) having leaves dark green colour on upper surface and pinkish blue on lower surface is observed in interior forests near Baniyagoan which is never seen in any place of Chhattisgarh. The taste of tuber is very sweet and sticky but thin and medium in length. This elite strain of safed mushli should be studied and conserved in its existing place. The typical strain of reddish brown *Mucuna prurita* is also recorded in this region. The other herb, shrub and tree medicinal plants are noted similar to other areas but in less to moderate in occurrence.

9. *Chitrakote-Mardoom-Binta*

This includes areas of Chitradhara, Karanji, Lohandiguda, Chitrakot forest and surroundings, Mardoom and surrounding forests, Binta and Bhejji forests etc. These areas are dominated by most of the climbers like *Disoscorea alala*, *D. bulbifera*, *D. syanensis*, *D. dumetorum*, *D. pentaphylla*, *D. trifoliata*, *D. esculenta*, *D. hispida*, Ram datoun, dokarbela, Nagbel and herbs and Shrubs, *viz.*, Bhui neem, Wild brinjal (*Solanum* sp.), Vaybidang, Peng beej, *Asparagus* sp., wild arvi (*Colocasia* sp.), Wild suran (*Amorphophallus companulatus* and *A. poinifolious* L.), Anantmool, Buchh, jangli arand, Semal Kand, Baghnakkha (*Martynia annua* L.) etc. are noted in abundance. Among location specific species peng beej, white and red gunj, *Asparagus* having extra white tubers, wild bel (*Aegle marmelos* Wild.), Bada Surenda and edible sweet arvi are also noted in this region. Wild bel, peng beej, baghnakkha, kalmegh, various *Dioscorea*, wild brinjal etc. are noted specific to this location and hence, can be conserved in this area.

10. *Pharasgaon-Keskal-Kanker*

This includes forest areas of Pharasgaon, on way forest to Keshkal, Keshkal forest and surrounding forest villages, Kanker forest areas and river banks etc. These areas are dominated by most of the climbers like *Dioscorea* sp., *Tinospora cordifolia*, Ram datoun, dokarbela, Nagbel and herbs and shrubs, *viz.*, *Asparagus* sp., *Jatropa curcas*, wild and cultivated arvi (*Colocasia* sp.), Wild suran (*Amorphophallus companulatus* L.), Semal Kand, Baghnakkha (*Martynia annua*), *Piper longum* etc. are noted in considerable extent, though this location couldn't be extensively surveyed except some areas. Lemon grass and Pamarosa are also noticed in abundance in this area.

Conclusion

Based on overall observation and findings some of the species like *Piper longam*, Rasna Jari, *Gloriosa superba*, *Tinospora cordifolia*, Gunj, Sarpagandha etc. are found to be location specific hence, they can be conserved under *in situ* in those areas to maintain their existence and quality. However, some rarely existing species should be conserved under both the *ex situ* as well as *in situ* condition to sustain their existence. The rarely occurring species are already discussed in text. Thus gene sanctuaries for various species, *viz.*, *Chlorophytum* sp., *Gloriosa superba*, Wild Capsicum, Wild onion, *Dioscorea* sp., *Plumbago*, Jatamasi, Jangli arand, *Colocasia*, *Curcuma* sp., Rasna booti, *Satawar (Asparagous recemosus)* can be made in Abujhmarh; Barsur forest and river valleys for *Chlorophytum*, *Dioscorea* sp., Kachari kand, *Colocasia*, *Amorphophallus*, Marodphalli locally known as *Ainthee*; Machkot forests for conservation of *Rauvolfia serpentina*, *Asparagus*, *Piper longum* etc.; Dantewara-Bailadila forest can be chosen for conservation of *Dioscorea*, Bilai kand, Bidari kand, Jangli Haldi, Ram datoun etc. and Sukma forest may be utilized for Giloy, Gunj, Kalihari, Kalmegh, *Dioscorea* etc.

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