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# Diversity of Ethnomedicinal Plants in Boridand Forest of District Korea, Chhattisgarh, India

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## Abstract

**Present study deals with an extensive ecological assessment of natural forest areas under several *in-situ* conservation plots which have resulted from high rate of grazing and biotic pressure. Over-exploitation of forest and unwanted incidental fire cases decreased the diversity of several ethno-medicinally and economically valuable plants species from the Boridand forest region in Korea district, Chhattisgarh. The total number of plants reported in all three study sites, 41 plants species belonging to 26 families and 37 plant genera were identified. A field survey was conducted at three different study sites in Boridand forest, district Korea, Chhattisgarh as Plot A, Plot B and Plot C, during months March 2013 to February 2014 to identify the diversity of ethnomedicinal plants.**

## Keywords

**Diversity, Conservation, Ethnomedicinal, Boridand Forest, Chhattisgarh**

## 1. Introduction

Boridand forest is a beautiful hill station in the district Korea. There is also one of world lable mini Railway Junction (BRND) of South Eastern Central Railway (SECR). It is border line of Madhya Pradesh and Chhattisgarh State. Korea district lies between 23˚02'42" to 23˚44'46" north latitude and between 81˚46'42" to 82˚33'43" east longitude. Its height from sea level is 700 meters. Total area of the district is 5978 sq. km. The climate is ideal with a beautiful monsoon, a mild summer and bearable winter and average rainfall is 1410.9 mm. Korea's average temperature is maximum 32˚C and minimum 17˚C. Total forest area is 350,420 hectares (59.3%). The total tribal population is 44.4%. The district is bounded on the north by Shidhi district of Madhya Pradesh on the

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south Bilaspur district on the east by its parent district Surguja and on the west by Shahdol district of Madhya Pradesh [1] [2].

Korea district is one of the north-west district of Chhattisgarh State. The district came into existence on 25th May 1998 in Madhya Pradesh State. Its parent district was Surguja. After the formation of new state of Chhattisgarh on 1st November 2000, the district fell under the Chhattisgarh State [3]-[5].

It is one of the hilly places of Korea district and hilly railway Junction. The forest vegetation of Boridand region is dominated by sal (*Shorea robusta* A. w. Roth.). The Boridand forest is scattered in Mahanadi forest range in Korea district. Korea district is divided into five blocks: Manendragarh, Bharatpur, Baikunthpur, Sonhat and Khadgawan [6]-[8]. The area of hilly places is thickly populated by various tribal communities like, *Baiga*, *Agaria*, *Panika*, *Gonds*, *Orao*, *Kol*, *Korku* etc. The density of Baiga and Korkua population is higher than others.

The most live in remote areas of deep forests [9]. The collection of medicinal plants, plant parts and thus uses from the forests are the main source of their livelihood. Due to close contact and association with forest, they have fairly good traditional knowledge of different valuable information of surrounding floras [10]-[12].

They mostly depend on plants or food, fuel, house building, equipments, tools, basketry etc., on one hand, various ethnomedicinal plants or remedies for the alleviation of various ailments on the other hands [13] [14].

## 2. Material and Methods

The present work was carried out in different Plot A, Plot B, and Plot C, of Boridand forest block Manendragarh district Korea, Chhattisgarh on ethnomedicinal drugs in the health care systems of tribes [15].

During the ethno botanical survey (March 2013-February 2014) several local tribals and medicine man have been interviewed for recording the Traditional uses of ethnomedicinal plants species from the surrounding forests. Data was collected in field work proforma (Kumar, 2007) and (Masih, 2013) and (Panigarhi *et al.*, 1989). An attempt was also undertaken in three *in-situ* plot having an area of on hectors each for ecological assessments [16] [17]. With the help of strip transect method data has been collected and density, frequency, abundance cover relative density relative frequency and relative abundance and cover IVI ( Important Value Index ) diversity contributory diversity percentage etc. were calculated [18]-[20] (**Figure 1(a)** and **Figure 1(b)**).

The Traditional information of 41 plants species are tabulated, Botanical name, parts of used and mode of uses [21]-[23].

Some floristic diversity work in this area has been done by workers like Maheswari *et al.* (1964) Oommacha (1989), Hemadri (1989), Chopra (1956), Masih (2013), Verma (1995), Busia, (2005), Khan, *et al* (2008), Kala (2005, 2007) where as Miller (1990), Jain ( 1991), Jain *et al.* (1994) and Ahirwar (2014, 2011, 2010) highlighted the Traditional Knowledge of plants use by the ethnic peoples [24]-[26] (**Table 1**).

## 3. Results and Discussion

In the ethno botanical and ecological assessment study a total of 41 plants species belonging to 26 families and 37 plant genera and total number herbacious plants ten and shrubs plants eight and Trees nineteen and climbers only four number of plants have been identified from the *in-situ* plots. The IVI and diversity of each useful plant species are projected. The plant species like *Abrus precatorius*, *Achyranthes aspera*, *Adhatoda vesica*, *Aegle marmelos*, *Andrographis paniculata* and *Argemone mexicana*, *Dalbergia sisso*, *Butea monosperma* etc. were the dominant ethnomedicinal plant species from the *in-situ* plots. The average IVI value, diversity and number of plants presented [27]-[29].

Highest value of contributory diversity percentage was observed in *Butea monosperma* (Lamk). (28.35), *Abrus precatoris* L. (26.58), *Delbergia sisso* Roxb. (26.14), *Desmodium gangeticum* (L.) DC. (24.64), *Mucuna puriens* L. DC. (20.61), *Pongimia pinnata* (L.) Pierre (18.76), *Asparagus recemos* Willd. (17.78), *Chlorophytm arundinacuem* Baker. (14.38), *Bauhinia vahlii* (Wt. & Arn.) Benth. (14.26) and *Ficus recemosa* Linn. (13.66) in Plot A, B and C respectively. Other species which represent less than 10% value need more protection and conservation for strengthening natural forest resource for future need and requirements of ethnomedicinal plants [30] [31] (**Table 2**) and (**Figure 2**).

## 4. Conclusions

The result of the present study indicated that the rich ethnomedicinal knowledge of the community should be

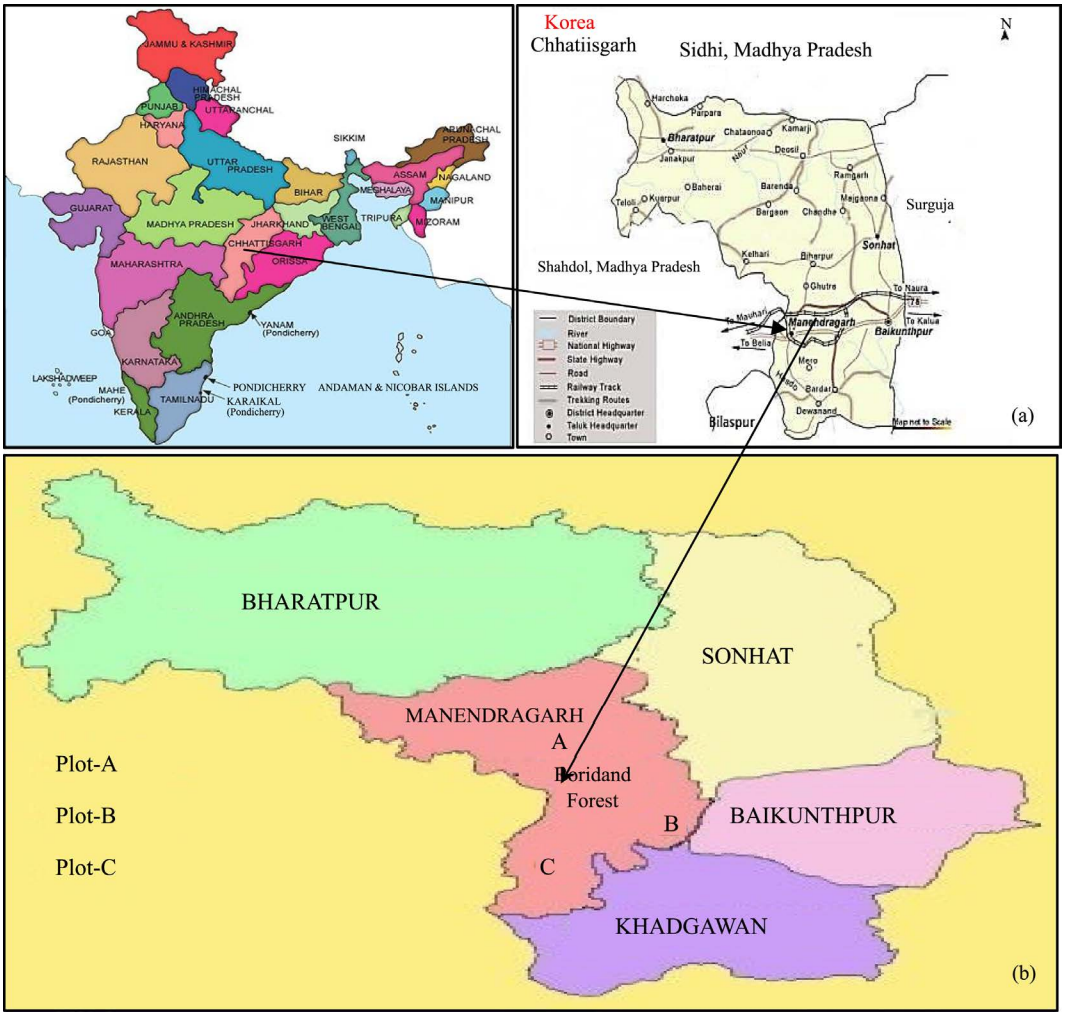


**Figure 1.** (a) Location map of India in Chhattisgarh State; (b) Representing the study sites of Korea district in Boridand forest.

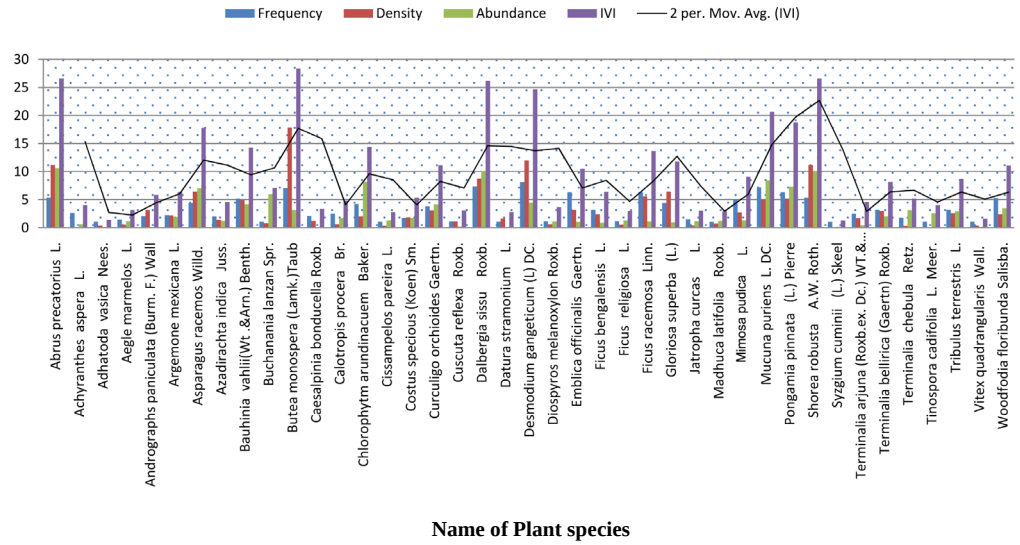


**Figure 2.** Shows IVI of ethnomedicinal plants in Boridand forest district Korea Chhattisgarh, India.

**Table 1.** Shows ethno botanical observation of 41 plants species of different study sites of Boridand forest, Korea district, Chhattisgarh, India.

| S. No. | Botanical name | Local name | Family | Ethno-botanical & ethnomedicinal uses | Hb | Study sites |
|---|---|---|---|---|---|---|
| **1.** | ***Abrus precatorius* L.** | Ghumchi | Fabaceae | Root powder is given for the treatment of whooping cough with slightly warm water, two teaspoonful a day for seven days. | Sh | Plot A, B & C |
| **2.** | ***Achyranthes aspera* L.** | Chirchita | Amaranthaceae | Decoction of plant root along with bark decoction of *Terminelia bellirica* (Gaestn.) Roxb. *Terminalia chebula.* Retz and *Ficus religiosa* L. mixed with on kg. Cow or goat milk and heated to prepare curd 100 to 200 gm. treat-ment of Asthama. *religiosa* L. mixed with on kg. Cow or goat milk and heated to prepare curd 100 to 200 gm. treatment of asthama. | H | Plot B & C |
| **3.** | ***Adhatoda vasica* Nees.** | Adusa | Acantha aceace | Leaf decoction is given fifteen days for the treatment of Asthma, one glass twice a day. | Sh | Plot B & C |
| **4.** | ***Aegle marmelos* L.** | Bel | Rutaceae | Baiga Tribe used its Kernal of fruit mixed with powder of black peper, is given for a month every evening for the treatment or Syphillis or Gonorrhea. Five to six tender leaf with powder of black peper chewed seven days at a time for the treatment of acidity of other stomach discover. | T | Plot A, B & C |
| **5.** | ***Andrographs paniculata* (Burm. F.) Wall** | Bhui limb/ Kalmegh | Acanthaceae | Baiga use its root to treat fever. A tea spoonful powder mixed with a glass of cow milk or slightly warm water is given seven days, twice a day after meal. | H | Plot A & C |
| **6.** | ***Argemone mexicana* L.** | Pila Dhatura | Paperveraceae | Latex of plants is suggested to apply one drop in eye lid for the treatment of conjunctivitis, once a day for three days. Root juice of plants, one tea spoon full mixed with equal proportion of cow butter, its given at once for the treatment of eczema and other skin problems. | H | Plot A, B & C |
| **7.** | ***Asparagus racemos* Willd.** | Sataveri | Liliaceae | Decoction of plant is used to treat Uraemia (blood in orine), two times a day, a full of glass till the effect observed. Root powder also used as vital effective. | H | Plot B & C |
| **8.** | ***Azadirachta indica* Juss.** | Neem | Meliaceae | Seed oil one tea spoon full or crushed seed mixed with glass of water is given 15 days every morning for the treatment of piles. Aqueous solution prepared with bank of plants is given seven days every morning empty stomach, to treat eczema. | T | Plot A, B & C |

**Continued**

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|---|---|---|---|---|---|---|
| **9.** | ***Bauhinia vahlii* (Wt. & Arn.) Benth.** | Mohlain | Caesalpiniaceae | Root paste mixed with a glass of water to prepare aqueous solution and one glass solution is given to treat syphilis or gonourhea for 15 days every morning. | Cl | Plot C |
| **10.** | ***Buchanania lanzan* Spr.** | Chaar | Anacardiaceae | Baiga use its bark and leaf to treat snake bite. Two are three tender leaf paste, mixed with a glass of water and also mixed 3 - 4 tea spoonful sugar to prepare aqueous solution. One glass solution is given 5 - 7 days at a time to treat Syphilis. | T | Plot A & C |
| **11.** | ***Butea monospera* (Lamk.) Taub** | Palas | Fabaceae | Juice of stem bark, two or three tea spoon full mixed with a glass a water thrice a day is given 3 - 4 days for the treatment of dysentery is summer season. | T | Plot A & B |
| **12.** | ***Caesalpinia bonducella* Roxb.** | Gataran | Caesalpiniaceae | Leaf Juice 2 - 3 tea spoon full mixed with equal part of *Tramarindus indica* L. bark ash, two times a day, is given for 15 days to treat asthma or other cough complaints. | Sh | Plot A & C |
| **13.** | ***Calotropis procera* Br.** | Aak | Asclepiadaceae | Ash of flower mixed with honey one teaspoonful twice a day taken to cure whooping cough and asthma. | Sh | Plot A, B & C |
| **14.** | ***Chlorophytm arundinacuem* Baker.** | Safedmusli | Liliaceace | Five gram paste of tuber is mixed with water is taken orally three timer a day for treatment of frequent nocturnal emission's. | H | Plot A, B & C |
| **15.** | ***Cissampelos pareira* L.** | Pathar/Paat Korea | Menisper maceace | Baiga use its root to treat fever. Root decoction used as mild tonic, diuretic and stomach. | H | Plot C & A |
| **16.** | ***Costus specious* (Koen) Sm.** | Keokand | Costaceace | Juice of rhizome is used to cure leprosy. The juice a tea spoon full, along with equal part of *Azadirachta indica* Juss. Bark powder is used two times a day for 15 days to treat jundice. | H | Plot B & A |
| **17.** | ***Curculigo orchioides* Gaertn.** | Kalimusli | Hypoxidace ae | Baiga use its tuber for a period of 15 days empty stomach for the treatment of impotency. | H | Plot C |
| **18.** | ***Cuscuta reflexa* Roxb.** | Amarbel | Cuscutaceae | Juice of this twinner acts as antiseptic on wounds. Decoction of plant is given for bath to cure skin disease. | Cl | Plot C |
| **19.** | ***Dalbergia sissu* Roxb.** | Shisham | Fabaceae | Paste of four to five tender leaf is prepared and mixed with a glass of water. Give for a day to treat syphilis or other veneral disease. | T | Plot B & C |
| **20.** | ***Datura stramonium* L.** | Dhatura | Solanaceae | Leaf decoction is used by Baiga to cure joint complaints. The slightly warm decoction administered throughout the complaint area till the effect absorbed. Dry leaf used for smoking to treat asthma. | Sh | Plot A & C |

**Continued**

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|---|---|---|---|---|---|---|
| **21.** | ***Desmodium gangeticum* (L.) DC.** | Balraj | Fabaceace | Whole plant is pounded in little water to prepare paste and is given to apply on fore head to cure recurring headache. | H | Plot B & C |
| **22.** | ***Diospyros melanoxylon* Roxb.** | Tendu | Ebenaceae | Baiga use its dry bark to cure burns. Bark ash mixed with linum oil and applied externally on burn spot till the effect observed. | T | Plot B & C |
| **23.** | ***Emblica officinalis* Gaertn.** | Amala | Euphorbiaceae | Its fruits used in fever vomiting, indigestion habitual constipation, digestional troubles. | T | Plot B & C |
| **24.** | ***Ficus bengalensis* L.** | Bad | Moraceae | Tip of aerial roots are crushed and applied on lesions caused due to syphilis. Latex of plant drenches in sugar cake and used 21 days every morning as physical tonic. | T | Plot B & C |
| **25.** | ***Ficus religiosa* L.** | Pepal | Moraceae | Tenders leaves or bark heated with milk and given seven days at a time for the treatment of gonorrhea. Leaves mixed with rice is given to dumb child, so that his tongue will begin to tremble. | T | Plot A & C |
| **26.** | ***Ficus racemosa* Linn.** | Dumer | Moraceae | Latex is used piles diarrhea and dysentery. Fruits are used in urinary trouble and roots are used as anti-diabitic. | T | Plot A & C |
| **27.** | ***Gloriosa superba* (L.)** | Kalihari | Liliaceae | Root powder of about 20 gram mixed with oil of linum is given to animals to treat dysentery. | H | Plot B & C |
| **28.** | ***Jatropha curcas* L.** | Bhakranda | Euphorbiaceae | Baiga use its stem as tooth brush to cure toothache till the effect observed. | Sh | Plot A & B |
| **29.** | ***Madhuca latifolia* Roxb.** | Mahua | Sapotaceae | Paste of dry flowers are prepared and slightly warm paste is applied on aching muscle to relief pain. Seed oil is used to treat crack on heel. Baiga use its flower paste as ointment in scorpion sting to cure pain and liques prepared by flower used orally. | T | Plot A, B & C |
| **30.** | ***Mimosa pudica* L.** | Chunimui | Mimosaceae | Seed about 5 gram mixed with equal part of sugar is given daily for three days to treat veneral diseases. | Sh | Plot B & C |
| **31.** | ***Mucuna puriens* L. DC.** | Kemach | Fabaceae | Baiga use its roots decoction to cure joint disease. A glass decoction is given a day for 15 days to treat gout. | Cl | Plot B & C |
| **32.** | ***Pongamia pinnata* (L.) PPierre** | Karanj | Fabaceae | Seed oil used to apply externally throughout the affected area for the treatment of seasonal exzema. Baiga use its tender branch as tooth stick to treat toothache and gum troubles. | T | Plot A & C |
| **33.** | ***Shorea robusta* A.W. Roth.** | Sal/Sarai | Dipterocarpaceae | Fruits are used for dysentery and scorpion sting. | T | Plot A, B & C |

**Continued**

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|---|---|---|---|---|---|---|
| **34.** | ***Syzgium cuminii* (L.) Skeel** | Jamun | Myrtaceae | Seed are dried and powdered about 5 gram powder is dissolved in half a glass of water and after some time is given orally twice a day for 15 days to treat diabetes. | T | Plot A & B |
| **35.** | ***Terminalia arjuna* (Roxb.ex. Dc.) Wt. & Arn.** | Kahua/Arjun. | Combretaceae | Paste of unripe fruit is used as a stringent while ripe fruit paste is used as purgative. | T | Plot A & B |
| **36.** | ***Terminalia bellirica* (Gaertn) Roxb.** | Baheda | Combretaceae | Paste of two three tenders leaf prepared and is given thrice a day one day one day to cure vomiting and loosemotion. | T | Plot A & C |
| **37.** | ***Terminalia chebula* Retz.** | Harra | Combretaceae | Ripe fruits paste is used to treat frequent nocturnal emissions in man and unripe fruits powder fried with butter and taken twice a day to treat constipation. | T | Plot A & C |
| **38.** | ***Tinospora cadifoli* L. Meer.** | Gurich | Menispermaceae | Baiga use its stem to cure fever. Decoction is given half a glass twice a day for week. Bathing in the decoction of plant also suggested. The believes that Evils ran away when see the plant or decoction of the plant. | T | Plot B & C |
| **39.** | ***Tribulus terrestris* L.** | Gokhuru | Zygophyllaceae | Decoction of plant is given twice a day for 15 days or till relief for the treatment of spermatorrhea or urin complaints. Baiga use root paste to controle temperature. They apply paste on forehead. | Cl | Plot A & C |
| **40.** | ***Vitex quadrangularis* Wall.** | Hadjod | Vitaceace | Aqueous solution of plant is given, one glass a day till relief to treat bone fracture. Decoction of stem is given twice a day for 15 days to treat irregular menstruration. | Sh | Plot A & C |
| **41.** | ***Woodfodia floribunda* Salisba.** | Dhawai | Lytheraceae | Leaves ash well mixed with musterd oil and used for pain. | T | Plot A & C |

**Abbreviations:** Hb: Habit, H: Herbs, Sh: Shrubs, T: Trees, Cl: Climbers.

**Table 2.** Important value index, diversity of plants species in various plots at Boridand forest district Korea, Chhattisgarh, India.

| S. No. | Botanical name | Plot A | Plot B | Plot C | IVI, Diversity |
|---|---|---|---|---|---|
| **1.** | *Abrus precatorius* L. | 5.37 | 11.15 | 10.6 | 26.58-**II** |
| **2.** | *Achyranthes aspera* L. | 2.61 | 0.08 | 0.63 | 4.04 |
| **3.** | *Adhatoda vasica* Nees. | 1.04 | 0.37 | 0.01 | 1.42 |
| **4.** | *Aegle marmelos* L. | 1.45 | 0.52 | 1.16 | 3.13 |
| **5.** | *Andrographs paniculata* (Burm. F.) Wall | 2.07 | 3.14 | 0.06 | 5.81 |
| **6.** | *Argemone mexicana* L. | 2.27 | 2.19 | 1.88 | 6.34 |
| **7.** | *Asparagus racemos* Willd. | 4.37 | 6.41 | 7.0 | 17.78-**VII** |
| **8.** | *Azadirachta indica* Juss. | 2.0 | 1.4 | 1.18 | 4.58 |
| **9.** | *Bauhinia vahlii* (Wt. & Arn.) Benth. | 5.16 | 4.92 | 4.18 | 14.26-**IX** |
| **10.** | *Buchanania lanzan* Spr. | 1.05 | 0.79 | 5.96 | 7.08 |

**Continued**

| | | | | | |
|---|---|---|---|---|---|
| **11.** | *Butea monospera* (Lamk.) Taub | 7.04 | 17.81 | 3.14 | 28.35-**I** |
| **12.** | *Caesalpinia bonducella* Roxb. | 2.11 | 1.19 | 0.07 | 3.37 |
| **13.** | *Calotropis procera* Br. | 2.5 | 0.61 | 1.7 | 4.81 |
| **14.** | *Chlorophytm arundinacuem* Baker. | 4.21 | 1.98 | 8.19 | 14.38-**VIII** |
| **15.** | *Cissampelos pareira* L. | 1.04 | 0.34 | 1.33 | 2.74 |
| **16.** | *Costus specious* (Koen) Sm. | 1.73 | 1.82 | 1.75 | 5.38 |
| **17.** | *Curculigo orchioides* Gaertn. | 3.83 | 3.08 | 4.16 | 11.11 |
| **18.** | *Cuscuta reflexa* Roxb. | 1.07 | 1.08 | 0.19 | 3.06 |
| **19.** | *Dalbergia sissu* Roxb. | 7.37 | 8.73 | 10.04 | 26.14-**III** |
| **20.** | *Datura stramonium* L. | 1.05 | 1.59 | 0.14 | 2.78 |
| **21.** | *Desmodium gangeticum* (L) DC. | 8.16 | 11.98 | 4.5 | 24.64-**IV** |
| **22.** | *Diospyros melanoxylon* Roxb. | 1.13 | 0.62 | 1.09 | 3.65 |
| **23.** | *Emblica officinalis* Gaertn. | 6.32 | 3.17 | 1.02 | 10.51 |
| **24.** | *Ficus bengalensis* L. | 3.16 | 2.38 | 0.85 | 6.39 |
| **25.** | *Ficus religiosa* L. | 1.16 | 0.55 | 1.29 | 3.00 |
| **26.** | *Ficus racemosa* Linn. | 6.31 | 5.55 | 1.08 | 13.66-**X** |
| **27.** | *Gloriosa superba* (L.) | 4.37 | 6.41 | 1.0 | 11.78 |
| **28.** | *Jatropha curcas* L. | 1.5 | 0.38 | 1.15 | 3.03 |
| **29.** | *Madhuca latifolia* Roxb. | 1.02 | 0.71 | 1.18 | 2.91 |
| **30.** | *Mimosa pudica* L. | 5.05 | 2.69 | 1.31 | 9.05 |
| **31.** | *Mucuna puriens* L. DC. | 7.18 | 5.02 | 8.41 | 20.61-**V** |
| **32.** | *Pongamia pinnata* (L.) Pierre | 6.31 | 5.16 | 7.29 | 18.76-**VI** |
| **33.** | *Shorea robusta* A.W. Roth. | 5.38 | 11.15 | 10.06 | 26.58 |
| **34.** | *Syzgium cuminii* (L.) Skeel | 1.02 | 0.09 | 0.16 | 1.27 |
| **35.** | *Terminalia arjuna* (Roxb.ex. Dc.) Wt. & Arn. | 2.5 | 1.69 | 0.43 | 4.62 |
| **36.** | *Terminalia bellirica* (Gaertn) Roxb. | 3.17 | 3.0 | 2.02 | 8.19 |
| **37.** | *Terminalia chebula* Retz. | 1.77 | 0.28 | 3.12 | 5.17 |
| **38.** | *Tinospora cadifolia* L. Meer. | 1.05 | 0.04 | 2.59 | 4.04 |
| **39.** | *Tribulus terrestris L.* | 3.16 | 2.58 | 2.92 | 8.66 |
| **40.** | *Vitex quadrangularis* Wall. | 1.04 | 0.37 | 0.17 | 1.58 |
| **41.** | *Woodfodia floribunda* Salisba. | 5.26 | 2.38 | 3.43 | 11.07 |

documented and preserved properly for better utilization of the plant resources. Particularly, there is a need of detail study of the ethnomedicinal plants used by the tribals community with possible investigation which may highlight the true value of these plant species so that they can be managed and conserved for the benefit of the local community as well as for the welfare of mankind.

The present study represents of 41 ethnomedicinal plants species in Boridand forest area which belong to 26 families and 37 plant genera. There are 26 families under to herbs 24%, shrubs 20%, trees 46%, and climbers 10% identified and total 26 families in the highest diversity of family *Fabaceae*, *Moraceae* and *Liliaceae* were reported (**Figure 3** and **Figure 4**). We also represent some ethnomedicinal plants, vegetation of forest, Baiga

tribals huts and tribal healers photographs in Boridand forest district Korea, Chhattisgarh, India (**Figure 5-13**).

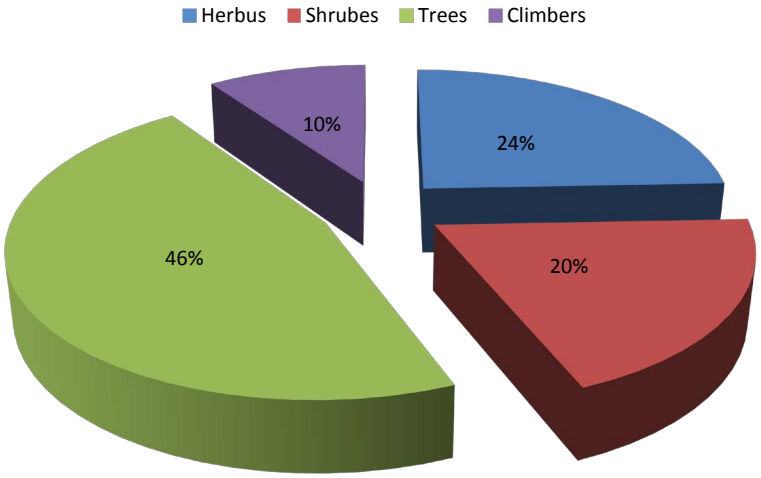


**Figure 3.** Distribution of ethnobotanical species in Boridand forest.

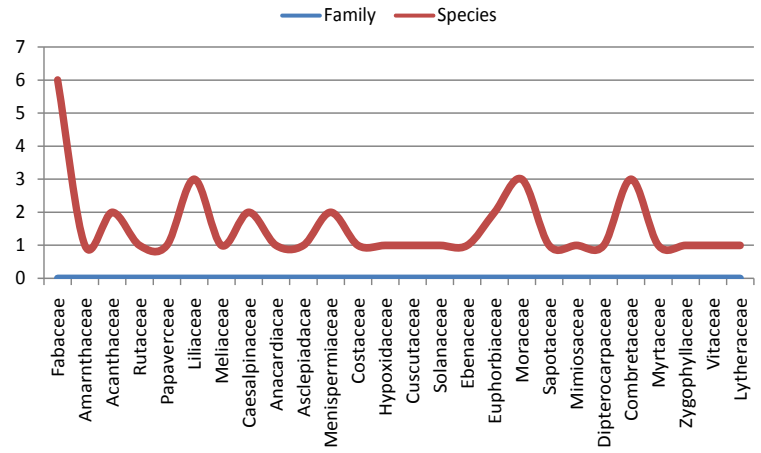


**Figure 4.** Showing comparative distribution of family and plant species in Boridand forest.

**Figure 5.** Vegetation of Boridand forest district Korea, Chhattisgarh, India.

**Figure 6.** Location of Baiga's tribes hut's.

**Figure 7.** Showing on ethnomedicinal plants of Baiga tribes and tribal healer.

**Figure 8.** *Abrus precatorius* L.

**Figure 9.** *Mucuna puriens* L. DC.

**Figure 10.** *Chlorophytm arundinacuem* Baker.

**Figure 11.** *Curculigo orchioides* Gaertn.

**Figure 12.** *Caesalpinia bonducella* Roxb.

**Figure 13.** *Achyranthes aspera* L.

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