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43/2 Varadarajulu Nagar, 5th Street West, Ganapathy, Coimbatore, Tamil Nadu 641006, India
Registered Office: 3A2 Varadarajulu Nagar, FCI Road, Ganapathy, Coimbatore, Tamil Nadu 641006, India
Ph: +91 9385339863 | www.threatenedtaxa.org
Email: sanjay@threatenedtaxa.org

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Cover: Rose-breasted Grosbeak *Pheucticus ludovicianus*, pen & ink with colour pencil. © Lucille Betti-Nash.



Legumes (Angiosperm: Fabaceae) of Birbhum District, West Bengal, India

Shamim Alam¹ & Adani Lokho²

¹Department of Botany, Suri Vidyasagar College, Suri, Birbhum, West Bengal 731101, India.

^{1,2}Department of Botany, Siksha Bhavan, Visva Bharati (A Central University), Santiniketan, Birbhum, West Bengal 731235, India.

¹shamim3004@gmail.com, ²lokhoabba@gmail.com (corresponding author)

Abstract: The present paper deals with a comprehensive enumeration of leguminous taxa found in Birbhum District of West Bengal, India. We recorded 140 species, one subspecies, and two varieties, representing 82 genera from 24 tribes under four subfamilies, viz., Cercidoideae (6 species in 2 genera belonging to 1 tribe), Detarioideae (3 species in 3 genera belonging to 3 tribes), Caesalpinioideae (43 species in 24 genera belonging to 5 tribes), and Papilionoideae (91 taxa including 88 species, 1 subspecies and 2 varieties in 53 genera belonging to 15 tribes). Herbs (59 taxa) were the largest group, followed by trees (39), climbers (23), and shrubs (22). *Crotalaria* and *Indigofera* (7 species each) emerged as the dominant genera, followed by *Senna* (6) and *Bauhinia* and *Senegalia* with five species each. In this district, the legumes are represented under 24 tribes, of which the Phaseoleae is the largest comprising 24 taxa, followed by Desmodieae (16) and Cassieae (12). Regarding endemics, *Indigofera prostrata* exclusive to West Bengal is recorded from Birbhum District, while *Grona brachystachya*, *Hardwickia binata*, *Pterocarpus marsupium*, and *P. santalinus* are endemic to India.

Keywords: Checklist, conservation, endemic species, ethnobotany, Ethnomedicine, habit, exotic species, indigenous taxa, Leguminosae, life form analysis, LPWG classification, taxon status, tribe.

Bengali: সারমর্ম: বর্তমান গবেষণাপত্রটি ভারতের পশ্চিমবঙ্গের বীরভূম জেলায় পাওয়া লেগুম উদ্ভিদের একটি বিস্তৃত বিবরণের সাথে সম্পর্কিত। আমরা 140টি প্রজাতি, একটি উপ-প্রজাতি এবং দুটি জাত রেকর্ড করেছি, যা চারটি উপ-পরিবারের অধীনে 24টি উপজাতি থেকে 82টি প্রজাতির প্রতিনিধিত্ব করে, যেমন, Cercidoideae (1টি গোত্রের অন্তর্গত 2টি বংশের মধ্যে 6টি প্রজাতি), Detarioideae (3টি দ্বাইবের মধ্যে 3টি প্রজাতি), Caesalpinioideae (5টি উপজাতির অন্তর্গত 24টি বংশের মধ্যে 43টি প্রজাতি), এবং Papilionoideae (91টি ট্যাক্সা সহ 88টি প্রজাতি, 1টি উপ-প্রজাতি এবং 15টি উপজাতির অন্তর্গত 53টি বংশের মধ্যে 2টি প্রজাতি)। ভূণ (59 ট্যাক্সা) ছিল বৃহত্তম দল, তারপরে বৃক্ষ (39), লতা (23), এবং শ্রুণ (22)। ক্রোটালিয়া এবং ইন্ডিগোফেরা (প্রতিটি 7 প্রজাতি) প্রভাবশালী বংশ হিসাবে আবির্ভূত হয়েছে, তারপরে সেনা (6) এবং বডিহিনিয়া এবং সেনেগালিয়া প্রতিটি পাঁচটি প্রজাতির সাথে আবির্ভূত হয়েছে। এই জেলায়, 24টি উপজাতির অধীনে লেগুমগুলিকে প্রতিনিধিত্ব করা হয়, যার মধ্যে 24টি ট্যাক্সা নিয়ে গঠিত Phaseoleae বৃহত্তম, তারপরে Desmodieae (16) এবং Cassieae (12)। আঞ্চলিক সংক্রান্ত, বীরভূম জেলা থেকে এক দিকে যেমন পশ্চিমবঙ্গের জন্য একচেটিয়া স্থানীয় প্রজাতি *ইন্ডিগোফেরা প্রোস্ট্রাটা* রেকর্ড করা হয়েছে, অন্যদিকে তেমনি আছে *গোনা ব্র্যাকিস্ট্যাচ্যা*, *হার্ডউইকিয়া বিনাটা*, *টেরোকার্পাস মার্সুপিয়াম* এবং *পি. সান্টালিনাস* এর মত ভারতীয় স্থানীয় প্রজাতি।

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Author details: SHAMIM ALAM, teacher fellow in the Department of Botany, Visva Bharati, Santiniketan. Adani Lokho, assistant professor, Angiosperm Taxonomy Laboratory, Department of Botany, Siksha Bhavana, Visva Bharati, Santiniketan.

Author contributions: SA—field survey, documentation and drafting of the manuscript. AL—supervised the work, preparation of the manuscript and communication.

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INTRODUCTION

Fabaceae Lindl. (nom. alt. for Leguminosae Juss.) is the third-largest Angiosperm family, with about 770 genera and over 19,500 species (Lewis et al. 2005; LPWG 2013). The family encompasses a remarkable array of life forms, from diminutive herbs to towering trees (Sanjappa 2001). The defining characteristic of the Fabaceae is the presence of pods, which distinguishes them from other plant families. The LPWG (2017) recognized six distinct subfamilies under the family Fabaceae, viz., Caesalpinioideae DC. (148 genera & ca. 4,400 species), Cercidoideae LPWG [Azani et al.] (12 genera & ca. 335 species), Detarioideae Burmeist. (84 genera & ca. 760 species), Dialioideae LPWG [Azani et al.] (17 genera & ca. 85 species), Duparquetioideae LPWG [Azani et al.] (1 genus & 1 species), and Papilionoideae DC. (503 genera & ca. 14,000 species). In India, Baker (1876–1878) first documented 132 genera and 833 species with 109 varieties from British India. Subsequently, a substantial number of legume taxa were recorded from India, accounting for 174 genera and 1,110 species (Sanjappa 2020). Prain (1903) reported 90 genera & 320 species from undivided Bengal Province. In West Bengal, the family is represented by 96 genera, 309 species, one subspecies, and 14 varieties (Paul et al. 2015). In Birbhum District, Sarkar (2017) reported 58 legume species in his floristic study.

Legumes are known for multiple functions including providing food grain and feed, facilitating soil nutrient management and contributing to climate mitigation (Baddeley et al. 2013). Herbaceous and tree legumes help in restoring soil fertility, preventing land degradation and improving sustainable crop and livestock productivity (Kassie 2011). The legumes include economically important species which are used as grains, and for pasture and agroforestry purposes (Graham & Vance 2003). The grain and forage legumes account for 27% of the world's primary crop production, and grain legumes contribute 33% of the dietary nitrogen (N) needs for humans (Vance et al. 2000). The most important legume species are Pea *Pisum sativum* L., Chickpea *Cicer arietinum* L., Cowpea *Vigna unguiculata* (L.) Walp., Broad Bean *Vicia faba* L., Pigeon Pea *Cajanus cajan* (L.) Huth, and Lentils *Lens culinaris* Medik.; 37% of processed vegetable oil is derived from Soya Bean *Glycine max* (L.) Merr. and Peanuts *Arachis hypogea* L. worldwide (Graham & Vance 2003). The forage legume Alfalfa (*Medicago sativa* L.) plays vital role in maintaining the health of animals (Wattiaux & Howard 2001) for dairy and meat production (Russelle 2001). The woody

tree legumes which are commonly used in agroforestry purposes usually belong to the genera, *Acacia* Mill., *Anadenanthera* Speg., *Calliandra* Benth., *Dalbergia* L.f., *Erythrina* L., *Gliricidia* Kunth, *Melanoxylum* Schott, *Parkia* R.Br., *Prosopis* L., *Pterocarpus* Jacq., and *Samanea* (Benth.) Merr. (Sprent & Parsons 2000). The other species which are interplanted with other crops in the field are *Sesbania* spp., *Glyricidia* spp., *Tephrosia* spp., *Crotalaria* spp., *Leucaena* spp., and *Cajanus* spp., for enhancing the fertility of the soil through nitrogen fixation by the root nodules (Sanchez 1999; Graham & Vance 2003). Ecologically, legumes display versatility similar to grasses, coexisting in a wide range of ecosystems. Some legume species serve as bottom-up control elements within their ecosystems, while others act as keystone species, exemplifying their ecological significance (Sanjappa 2001).

Due to its immense importance to human beings in various fields as stated above, the present study is an attempt to update the legume database and to shed light on the diversity and distribution of Fabaceae in Birbhum District, West Bengal.

MATERIALS AND METHODS

Study Area

Birbhum District (Figure 1) is located in the northernmost part of the Burdwan division in the state of West Bengal, India and covers an extensive area of 4,545 km² which lies between 23.3230–24.3500 °N and 87.0525–88.0140 °E. It is bordered by Santal Parganas of Jharkhand both on the north and west, Murshidabad and Purba Bardhaman districts on the east, whilst Paschim Bardhaman and Purba Bardhaman districts are on the south. The predominant soil type of the district is lateritic, characterized by its richness in iron and aluminum. The climate of Birbhum is monsoon marked by an oppressive hot and humid summer, well-distributed rainy season with a short winter. The forest cover area is about 159.26 km² with Sal forest as the major type.

Methods

Extensive field surveys were undertaken between April 2017 and March 2021 in the entire Birbhum District, West Bengal. The legume specimens were collected from the field along with their GPS location. The habit, habitat, and flower color was noted along with digital photographs (Nikon P900 camera). The plant specimens were identified with the help of relevant

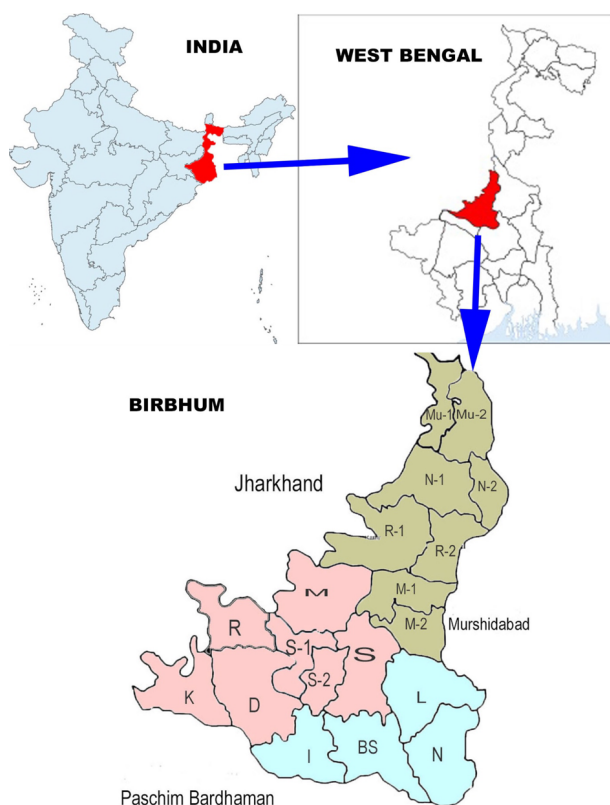


Figure 1. Study area (Birbhum District).

literature (Prain 1903; Bennet 1979; Guha 1984; Sanyal 1994; Debnath et al. 2013; Mitra & Mukherjee 2013; Ghosh & Mallick 2014; Paul et al. 2015; Santhosha & Kar 2017) and processed plant materials following standard procedures (Fosberg & Sachet 1965; Jain & Rao 1977; Bridson & Forman 1998). All processed and identified specimens were deposited in the Visva-Bharati Herbarium (VBH), Department of Botany, Visva-Bharati University, Santiniketan, West Bengal to serve as a reliable repository for future references.

The ethnobotanical information was collected through personal interview during the study period with the forest dwellers belonging to the Santal community. The detailed data was obtained from a total of 128 key informants which comprised common people, the local healers and cultivators of legumes from the district covering the forest area, agricultural fields and home gardens for comprehensive data for different uses in their daily life.

RESULTS AND OBSERVATION

The present study on legumes of Birbhum District, West Bengal was recorded with a total number of

143 taxa (Table 1; Figure 2; Images 1–9), comprising 140 species, 01 subspecies, and 02 varieties under 82 genera and 24 tribes within the four subfamilies, viz., Cercidoideae (Image 1a–f), Detarioideae (Image 1g–i), Caesalpinioideae (Images 1j–4d) and Papilionoideae (Images 4e–9o). The subfamily Papilionoideae exhibited the highest diversity with 91 taxa (88 species, 01 subspecies & 02 varieties) under 53 genera in 15 tribes, followed by Caesalpinioideae with 43 species under 24 genera and five tribes, Cercidoideae with six species under two genera and one tribe, and Detarioideae with three species under three genera and three tribes, respectively, as shown in Figure 2. The four major life forms—herbs, shrubs, trees, and climbers—were observed with the herbaceous growth forms exhibited the highest number (59 taxa), followed by trees (39 taxa), climbers (23 taxa), and shrubs (22 taxa), as depicted in figure percentage given in Figure 5. The tribe Phaseoleae recorded as the largest tribe with 24 taxa (22 species, 01 subspecies, & 01 variety), trailed by Desmodieae with 16 taxa (15 species & 01 variety), Cassieae (12 species), Dalbergieae and Acacieae (11 species each) as illustrated in Figure 3. The genus *Crotalaria* and *Indigofera* emerged as the most dominant (7 species each), followed by *Senna* (6 species), *Bauhinia* and *Senegalia* (5 species each) as shown in Figure 4.

DISCUSSION

The present investigation documented a total of 143 taxa (Images 1–9) belonging to the family Fabaceae from Birbhum District, which represents a significant 36% of the total 394 legume taxa (including cultivated species) reported by Paul et al. (2015) from West Bengal. This study recorded an additional 50 taxa (marked by ‘#’ in the table 1) including 32 wild and 18 cultivated / planted taxa to the existing legume database that have not been documented in Birbhum by Paul et al. (2015) and Sarkar (2017). One taxon, *Cassia roxburghii* (Image 2n), was recorded as a new addition to the flora of West Bengal by the authors (Alam & Lokho 2019) during this study.

The present study also indicates that 41% of the Legume taxa recorded (143 taxa) are herbaceous species which is in congruent with the past studies as reported by others (Sarkar 2017) that a very high percentage of herbaceous legumes dominantly occupy the different local ecosystems. The present analysis depicts the subfamily Papilionoideae with the highest number of taxa (91 taxa), the tribe Phaseoleae with maximum taxa (24 taxa), and two genera—*Crotalaria* and *Indigofera*

Table 1. Checklist of legumes of Birbhum District as per latest classification LPWG (2017) with their Habit, Habitat, Ethnobotanical Uses, Taxon status and Exsiccata.

	Name of taxon	Habit	Habitat & localities (Block number)	Ethnobotanical uses	Taxon status (as per POWO 2023)	Exsiccata
	Sub-family: CERCIDOIDEAE (1 tribe; 2 genera & 6 species)					
	I) Tribe: Bauhinieae : Genera:02; Species:06					
1	<i>#Bauhinia acuminata</i> L.	Shrub	Planted and escaped in wild (1,2,15)	-	Exotic	S. Alam 501
2	<i>#Bauhinia purpurea</i> L.	Tree	Deciduous forests and planted (Entire district)	-	Indigenous	S. Alam 1001
3	<i>Bauhinia tomentosa</i> L.	Shrub	Planted and Escaped (1,2,15)	-	Exotic	S. Alam 801
4	<i>Bauhinia variegata</i> L.	Tree	Planted as Avenue tree (1, 18)	-	Indigenous	S. Alam 301
5	<i>#Bauhinia blakeana</i> Dunn	Tree	Planted as Avenue tree (1)	-	Hybrid	S. Alam 1101
6.	<i>Phanera vahlii</i> (Wight & Arn) Benth.	Climber	Dry deciduous forests (11,18)	The peelings of the stem bark are used as ropes.	Indigenous	S. Alam 401
	Sub-family: DETARIOIDEAE (3 tribes; 3 genera & 3 species)					
	II) Tribe: Amherstieae : Genus:01; Species:01					
7	<i>Tamarindus indica</i> L.	Tree	Degraded forests and planted (Entire district)	i) The fruit pulp is used to enhance the taste of curries & chutneys. ii) Mature fruit pulp water is used to heal heat-shock during summer season.	Exotic	S. Alam 402
	III) Tribe: Detarieae : Genus:01; Species:01					
8	<i>#Hardwickia binata</i> Roxb.	Tree	Dry deciduous forests and Planted (1,11)	-	Indigenous & Endemic*	S. Alam 928
	IV) Tribe: Saraceae : Genus:01; Species:01					
9	<i>Saraca asoca</i> (Roxb.) de Wilde	Tree	Planted (1)	-	Indigenous	S. Alam 1201
	Sub-family: CAESALPINIOIDEAE : 5 tribes; 24 genera & 43 species)					
	V) Tribe: Acacieae : Genera:03; Species:11					
10	<i>Acacia auriculiformis</i> A. Cunn. ex Benth.	Tree	Planted and escaped forest (Entire district)	i) The wood is used for making doors, windows, almirah, bed and other furniture. ii) Fruit is used as an alternative soap for cleansing the body.	Exotic	S. Alam 802
11	<i>#Acacia holosericea</i> A.Cunn. ex G.Don	Shrub	Planted and escaped forest (1,2,14,15)	-	Exotic	S. Alam 1102
12	<i>Senegalia catechu</i> (L.f.) P. J. H. Hurter & Mabb.	Tree	Planted roadsides (1,15)	-	Indigenous	S. Alam 607
13	<i>#Senegalia intsia</i> (L.) Maslin, Seigler & Ebinger	Climber	Degraded forests and wastelands (1)	-	Indigenous	S. Alam 1008
14	<i>#Senegalia megaladena</i> (Desv.) Maslin, Seigler & Ebinger	Climber	Dry deciduous forests (15)	-	Indigenous	S. Alam 811
15	<i>#Senegalia polyacantha</i> (Willd.) Seigler & Ebinger	Tree	Dry deciduous forests (11,14,15,18,19)	-	Indigenous	S. Alam 712
16	<i>#Senegalia torta</i> (Roxb.) Maslin, Seigler & Ebinger	Scandent shrub	Dry deciduous forests (18)	-	Indigenous	S. Alam 903
17	<i>#Vachellia farnesiana</i> (L.) Wight & Arn.	Shrub	Degraded forests and Roadsides (1,11,13)	-	Exotic	S. Alam 1103
18	<i>#Vachellia leucophloea</i> (Roxb.) Maslin, Seigler & Ebinger	Tree	Dry deciduous forests and Roadsides (2,14,15,)	-	Indigenous	S. Alam 812
19	<i>Vachellia nilotica</i> (L.) P. J. H. Hurter & Mabb.	Tree	Dry deciduous forests and Roadsides (Entire district)	i) The wood is used for making handles of various agricultural tools. ii) The young twigs are used as tooth brush.	Indigenous	S. Alam 813
20	<i>#Vachellia tomentosa</i> (Rottler) Maslin, Seigler & Ebinger	Tree	Planted and Roadsides (1,2,15)	-	Indigenous	S. Alam 613
	VI) Tribe: Caesalpinieae : Genera:07; Species:07					
21	<i>Caesalpinia pulcherrima</i> (L.) Sw.	Shrub	Planted and Escaped Forest (Entire district)	-	Exotic	S. Alam 904

	Name of taxon	Habit	Habitat & localities (Block number)	Ethnobotanical uses	Taxon status (as per POWO 2023)	Exsiccata
22	<i>Delonix regia</i> (Bojer ex Hook.) Raf.	Tree	Planted and Escaped (Entire district)	-	Exotic	S. Alam 403
23	<i>Guilandina bonduc</i> L.	Shrub	Along roadsides and open places (1,2,11,14,15,16)	Seeds are boiled and taken for treating gastro-intestinal problems.	Exotic	S. Alam 608
24	<i>#Mezoneuron cucullatum</i> (Roxb.) Wight & Arn.	Climber	Dry deciduous forests and Open areas (9,11,15)	-	Indigenous	S. Alam 111
25	<i>Moullava digyna</i> (Rottler) Gagnon & G.P.Lewis	Shrub	Dry deciduous forests (2)	-	Indigenous	S. Alam 905
26	<i>#Parkinsonia aculeata</i> L.	Tree	Roadsides and open places (3,17)	-	Exotic	S. Alam 1104
27	<i>Peltophorum pterocarpum</i> (DC.) Backer ex K. Heyne	Tree	Planted and Escaped Forest (Entire district)	-	Exotic	S. Alam 609
VII) Tribe: Cassieae : Genera:03; Species:12						
28	<i>Cassia fistula</i> L.	Tree	Roadsides (Entire district)	The crushed bark juice is taken orally to treat hiccups.	Indigenous	S. Alam 515
29	<i>#Cassia javanica</i> L. subsp. <i>nodosa</i> (Buch. Ham. ex Roxb.) K. Larsen & S. S. Larsen	Tree	Planted along roadsides (1)	-	Exotic	S. Alam 425
30	<i>#Cassia roxburghii</i> DC.	Tree	Along roadsides and open places (1,17,19)	-	Indigenous	S. Alam 715
31	<i>#Chamaecrista absus</i> (L.) H. S. Irwin & Barneby	Herb	Deciduous forests (15)	-	Indigenous	S. Alam 924
32	<i>#Chamaecrista mimosoides</i> (L.) Greene	Herb	Degraded forests (2,14)	-	Indigenous	S. Alam 1019
33	<i>Chamaecrista pumila</i> (Lam.) V. Singh	Herb	Forest edges (15)	-	Indigenous	S. Alam 1015
34	<i>Senna alata</i> (L.) Roxb.	Shrub	Wastelands and Roadsides (Entire district)	The leaves are soaked in water, crushed into a paste and applied on the affected part (body) for treating ringworm & body rashes.	Exotic	S. Alam 713
35	<i>Senna occidentalis</i> (L.) Link	Herb	Open areas and Roadsides (Entire district)	Roots are crushed into paste and taken along with few drops of mustard oil to cure black discharge during menstrual cycle.	Exotic	S. Alam 614
36	<i>#Senna polyphylla</i> (Jacq.) H. S. Irwin & Barneby	Shrub	Planted as ornamental plant (1)	It is planted in the garden and used as avenue plant.	Exotic	S. Alam 302
37	<i>Senna siamea</i> (Lam.) H. S. Irwin & Barneby	Tree	Degraded forests and Roadsides (Entire district)	-	Exotic	S. Alam 516
38	<i>Senna sophora</i> (L.) Roxb.	Herb	Open areas and Roadsides (Entire district)	-	Exotic	S. Alam 814
39	<i>Senna tora</i> (L.) Roxb.	Herb	Open areas and Wastelands (Entire district)	Leaf decoction is taken to cure cold and cough.	Exotic	S. Alam 714
VIII) Tribe: Ingeae : Genera:04; Species:05						
40	<i>Albizia lebbeck</i> (L.) Benth.	Tree	Dry deciduous forests and Roadsides (Entire district)	i) Leaf infusion in ghee is used to treat cold & cough. ii) Wood is used for making furniture & house building materials.	Indigenous	S. Alam 426
41	<i>#Albizia procera</i> (Roxb.) Benth.	Tree	Scrub forests and Roadsides (1,17,19)	-	Indigenous	S. Alam 615
42	<i>#Calliandra haematocephala</i> Hassk.	Shrub	Planted as Avenue plants (1)	-	Exotic	S. Alam 1104
43	<i>Pithecellobium dulce</i> (Roxb.) Benth.	Tree	Dry deciduous forests and Roadsides (Entire district)	-	Exotic	S. Alam 303
44	<i>Samanea saman</i> (Jacq.) Merr.	Tree	Planted and Roadsides (Entire district)	Wood is used for making house-building materials	Exotic	S. Alam 427
IX) Tribe: Mimoseae : Genera:07; Species:08						
45	<i>#Adenanthera pavonina</i> L.	Tree	Planted (1,2,4,18)	Seeds are crushed into power and used for curing wounds.	Indigenous	S. Alam 715
46	<i>#Dichrostachys cinerea</i> (L.) Wight & Arn.	Tree	Planted as Sacred Avenue tree (1,17,18)	-	Indigenous	S. Alam 716
47	<i>#Leucaena leucocephala</i> (Lam.) de Wit	Tree	Planted & Roadsides (Entire district)	-	Exotic	S. Alam 717

	Name of taxon	Habit	Habitat & localities (Block number)	Ethnobotanical uses	Taxon status (as per POWO 2023)	Exsiccata
48	<i>Mimosa pudica</i> L.	Herb	Open areas and Wastelands (Entire district)	Leaves are crushed and applied on the affected part to cure wounds.	Exotic	S. Alam 718
49	<i>Mimosa rubicaulis</i> subsp. <i>himalayana</i> (Gamble) H. Ohashi	Shrub	Dry deciduous forests and Roadsides (1,2,11,14,15,18)	-	Indigenous	S. Alam 814
50	<i>Neptunia oleracea</i> Lour.	Herb	Stagnant water bodies (1,2)	-	Indigenous	S. Alam 719
51	<i>Prosopis juliflora</i> (Sw.) DC.	Tree	Roadsides (1,2,3,4,11,19)	-	Exotic	S. Alam 1105
52	<i>Xylia xylocarpa</i> (Roxb.) W. Theob.	Tree	Dry deciduous forests (9,11)	-	Indigenous	S. Alam 304
Sub-family: PAPILIONOIDEAE : 15 tribes; 53 genera & 88 species; 1 subspecies; 2 varieties						
X) Tribe: Abreae : Genus:01; Species:01						
53	<i>Abrus precatorius</i> L.	Climber	Dry deciduous forests & Roadsides (1,3,14,15,17)	i) Roots paste is taken to cure arthritis. ii) Stem extract along with leaves of <i>Adhatoda vasica</i> & honey are taken to cure Jaundice.	Indigenous	S. Alam 925
XI) Tribe: Cicereae : Genus:01; Species:01						
54	<i>Cicer arietinum</i> L.	Herb	Cultivated farms (Entire district)	i) Seeds are cooked and eaten as pulses. ii) Tender leaves are cooked and eaten as leafy vegetables.	Exotic	S. Alam 1202
XII) Tribe: Crotalariaeae : Genus:01; Species:07						
55	<i>Crotalaria juncea</i> L.	Herb	Cultivated field as fiber crop (3,14,16)	Bast fiber of the stem is used for making ropes & cordages.	Indigenous	S. Alam 720
56	<i>Crotalaria pallida</i> Aiton	Herb	Wastelands and roadsides (Entire district)	Aqueous extracts of root with milk & honey taken in empty stomach early morning to cure indigestion & weakness.	Indigenous	S. Alam 616
57	<i>Crotalaria prostrata</i> Rottler ex Willd.	Herb	Dry deciduous forests (2,11,15)	-	Indigenous	S. Alam 926
58	<i>Crotalaria quinquefolia</i> L.	Herb	Wastelands and Cultivated fields (2,11)	-	Indigenous	S. Alam 927
59	<i>Crotalaria retusa</i> L.	Herb	Wastelands and Cultivated fields (19)	-	Indigenous	S. Alam 1203
60	<i>Crotalaria spectabilis</i> Roth	Herb	Open areas and Roadsides (Entire district)	-	Indigenous	S. Alam 1106
61	<i>Crotalaria verrucosa</i> L.	Herb	Open areas and Roadsides (5)	-	Indigenous	S. Alam 815
XIII) Tribe: Dalbergieae : Genera:07; Species:11						
62	<i>Aeschynomene americana</i> L.	Herb	Along roadsides (Entire district)	-	Exotic	S. Alam 1107
63	<i>Aeschynomene aspera</i> L.	Herb	Along water bodies (2,3,17)	-	Indigenous	S. Alam 721
64	<i>Aeschynomene indica</i> L.	Herb	Along water bodies (1,2,5)	-	Indigenous	S. Alam 816
65	<i>Arachis hypogaea</i> L.	Herb	Cultivated farms (1,2,13,14)	Seeds are roasted and eaten.	Exotic	S. Alam 201
66	<i>Brya ebenus</i> (L.) DC.	Shrub	Planted as ornamental plant (1,2)	It is planted in the garden and used as avenue plant.	Exotic	S. Alam 428
67	<i>Dalbergia lanceolaria</i> L.f.	Tree	Dry deciduous forests and Roadsides (1,2,6,11,13,14,15,16,17)	-	Indigenous	S. Alam 305
68	<i>Dalbergia sissoo</i> Roxb. ex DC.	Tree	Planted and Roadsides (Entire district)	i) The leaf crushed juice taken to treat chronic cough. ii) The hard & durable wood is extensively used for furniture and construction purposes.	Indigenous	S. Alam 306
69	<i>Pterocarpus marsupium</i> Roxb.	Tree	Dry deciduous forests and Roadsides (1,2,10,11)	Wood is used for making furniture, door and other wooden tools.	Indigenous & Endemic*	S. Alam 1016
70	<i>Pterocarpus santalinus</i> L.f.	Tree	Dry deciduous forests (11)	-	Indigenous & Endemic*	S. Alam 437
71	<i>Smithia sensitiva</i> Aiton.	Herb	Wet grasslands (11,14,18)	-	Indigenous	S. Alam 929
72	<i>Zornia gibbosa</i> Span.	Herb	Open areas and Grasslands (2,18)	-	Indigenous	S. Alam 930

	Name of taxon	Habit	Habitat & localities (Block number)	Ethnobotanical uses	Taxon status (as per POWO 2023)	Exsiccata
	XIV) Tribe: Desmodieae : Genera:10; Species:15; Variety:01					
73	<i>Alysicarpus bupleurifolius</i> (L.) DC.	Herb	Muddy Brick wall (15)	-	Indigenous	S. Alam 817
74	<i>Alysicarpus monilifer</i> (L.) DC.	Herb	Grasslands and Roadsides (Entire district)	-	Indigenous	S. Alam 931
75	<i>Alysicarpus vaginalis</i> (L.) DC. var. <i>nummulariifolius</i> (DC.) Miq.	Herb	Grasslands and Roadsides (2,11, 17)	-	Indigenous	S. Alam 932
76	<i>Alysicarpus vaginalis</i> (L.) DC. var. <i>vaginalis</i>	Herb	Grasslands and Roadsides (Entire district)	-	Indigenous	S. Alam 933
77	<i>Christia vespertilionis</i> (L. f.) Bakh. f.	Herb	Planted as ornamental plant (18)	The plant is planted in the garden for beatification.	Exotic	S. Alam 722
78	<i>Codariocalyx motorius</i> (Houtt.) H. Ohashi	Shrub	Dry deciduous forests (11)	-	Indigenous	S. Alam 1017
79	<i>#Desmodium scorpiurus</i> (Sw.) Desv.	Herb	Roadsides and open areas (2,19)	-	Exotic	S. Alam 1018
80	<i>Grona brachystachya</i> (Graham ex Benth.) H. Ohashi & K. Ohashi	Herb	Dry deciduous forests (2,11,15)	-	Indigenous & Endemic*	S. Alam 1019
81	<i>#Grona heterocarpos</i> (L.) H.Ohashi & K.Ohashi	Herb	Dry deciduous forests (2,11,13,15)	-	Indigenous	S. Alam 723
82	<i>#Grona heterophylla</i> (Willd.) H.Ohashi & K.Ohashi	Herb	Dry deciduous forests (2)	-	Indigenous	S. Alam 934
83	<i>Grona triflora</i> (L.) H.Ohashi & K.Ohashi	Herb	Grasslands, Wastelands and Open areas (Entire district)	-	Indigenous	S. Alam 724
84	<i>#Phyllodium pulchellum</i> (L.) Desv.	Shrub	Dry deciduous forests (2, 11,13,14,15,18)	-	Indigenous	S. Alam 935
85	<i>Pleurolobus gangeticus</i> (L.) J.St. Hil. ex H. Ohashi & K. Ohashi	Herb	Grasslands, wastelands and Roadsides (Entire district)	i) Roots are made into paste and rubbed on chest to reduce pain. ii) Stem bark is used for making ropes.	Indigenous	S. Alam 818
86	<i>#Polhillides velutina</i> (Willd.) H. Ohashi & K. Ohashi	Herb	Dry deciduous forests (2,11,15)	-	Indigenous	S. Alam 936
87	<i>Pseudarthria viscida</i> (L.) Wight & Arn.	Herb	Grasslands (2)	-	Indigenous	S. Alam 937
88	<i>Uraria lagopodioides</i> (L.) DC.	Herb	Dry deciduous forests (11,15)	-	Indigenous	S. Alam 819
	XV) Tribe: Diocleae : Genus:01; Species:01					
89	<i>#Canavalia gladiata</i> (Jacq.) DC.	Climber	Dry deciduous forests and Open areas (1,2,5,9,17,18,19)	Young fruits are cooked and eaten as vegetables.	Indigenous	S. Alam 820
	XVI) Tribe: Fabeae : Genera:02; Species:06					
90	<i>#Lathyrus aphaca</i> L.	Climber	Weed of cultivated Grass pea field (7,14)	-	Indigenous	S. Alam 1204
91	<i>Lathyrus oleraceus</i> Lam.	Climber	Cultivated farms (Entire district)	Seeds are cooked and eaten as pulses.	Exotic	S. Alam 1205
92	<i>Lathyrus sativus</i> L.	Climber	Cultivated farms (Entire district)	i) Seeds are cooked and eaten as pulses. ii) Leaves are cooked and eaten as leafy vegetables. iii) Twigs with leaves are used as fodder for livestock.	Exotic	S. Alam 1206
93	<i>Vicia hirsuta</i> (L.) Gray	Climber	Cultivated Lentil field (Entire district)	-	Indigenous	S. Alam 1207
94	<i>Vicia lens</i> (L.) Coss. & Germ.	Herb	Cultivated farms (Entire district)	Seeds are cooked and eaten as pulses.	Exotic	S. Alam 1208
95	<i>#Vicia sativa</i> L.	Herb	Cultivated fields (Gram & Lentil) (Entire district)	-	Indigenous	S. Alam 1209
	XVII) Tribe: Genisteae : Genus:01; Species:01					
96	<i>Lupinus angustifolius</i> L.	Herb	Planted (1)	The plant is planted in the garden for beautification.	Exotic	S. Alam 1210
	XVIII) Tribe: Indigoferae : Genus:01; Species:07					
97	<i>Indigofera cassioides</i> Rottler ex DC.	Shrub	Dry deciduous forests (11)	-	Indigenous	S. Alam 1233
98	<i>#Indigofera glabra</i> L.	Herb	Dry deciduous forests (2)	-	Indigenous	S. Alam 938

	Name of taxon	Habit	Habitat & localities (Block number)	Ethnobotanical uses	Taxon status (as per POWO 2023)	Exsiccata
99	<i>#Indigofera hirsuta</i> L.	Shrub	Roadsides and Wastelands (1,2)	-	Indigenous	S. Alam 939
100	<i>Indigofera linifolia</i> (L.f.) Retz.	Herb	Grasslands and Roadsides (Entire district)	-	Indigenous	S. Alam 821
101	<i>Indigofera linnaei</i> Ali.	Herb	Grasslands and Wastelands (Entire district)	-	Indigenous	S. Alam 940
102	<i>#Indigofera prostrata</i> Willd.	Herb	Grasslands and Wastelands (2)	-	Indigenous & Endemic**	S. Alam 941
103	<i>Indigofera tinctoria</i> L.	Shrub	Open areas and Roadsides (Entire district)	The roots are crushed and made into paste and the same is taken with black pepper and turmeric to treat rheumatism.	Indigenous	S. Alam 725
XIX) Tribe: Millettieae : Genera:05; Species:06						
104	<i>#Brachypterum scandens</i> (Roxb.) Miq.	Climber	Dry deciduous forests and Open areas (2,3)	-	Indigenous	S. Alam 726
105	<i>#Derris trifoliata</i> Lour.	Shrub	Dry deciduous forests (11)	-	Indigenous	S. Alam 251
106	<i>Millettia peguensis</i> Ali	Tree	Roadsides (1)	-	Exotic	S. Alam 202
107	<i>Pongamia pinnata</i> (L.) Pierre	Tree	Dry deciduous forests and Roadsides (Entire district)	Freshly cut bark boiled in hot water and the boiled barks are used to relief from toothache.	Indigenous	S. Alam 308
108	<i>Tephrosia purpurea</i> (L.) Pers.	Herb	Open areas and Wastelands (Entire district)	-	Indigenous	S. Alam 617
109	<i>Tephrosia villosa</i> (L.) Pers.	Herb	Open areas and Wastelands (1,2)	-	Indigenous	S. Alam 727
XX) Tribe: Phaseoleae : Genera:17; Species:22; Subspecies:01; Variety:01						
110	<i>Butea monosperma</i> (Lam.) Kuntze	Tree	Dry deciduous forests and Roadsides (Entire district)	i) The bark infusion is used to reduce fever. ii) The flower buds are crushed and mixed with black pepper and taken in empty stomach to treat menorrhagia.	Indigenous	S. Alam 203
111	<i>Cajanus cajan</i> (L.) Huth	Shrub	Cultivated farms (Entire district)	i) Seeds are cooked and eaten as pulses. ii) The leaves are crushed and make into soup mixed with sugarcane juice for treating Jaundice. iii) The plant is used as hedges in agricultural fields.	Indigenous	S. Alam 1020
112	<i>Cajanus crassus</i> (Prain ex King) Maesen	Climber	Dry deciduous forests (15)	-	Indigenous	S. Alam 1211
113	<i>Cajanus scarabaeoides</i> (L.) Thouars	Climber	Dry deciduous forests and Open areas (Entire district)	Decoction of the plant twig is used in veterinary to treat cattle diarrhoea.	Indigenous	S. Alam 942
114	<i>#Centrosema pubescens</i> Benth.	Climber	Open forests (1,2,18)	-	Exotic	S. Alam 1108
115	<i>#Clitoria ternatea</i> L. var. <i>pleniflora</i> Fantz	Climber	Along roadsides; often planted (1, 14, 17)	-	Exotic	S. Alam 618
116	<i>Clitoria ternatea</i> L. var. <i>ternatea</i>	Climber	Dry deciduous forests, Roadsides, Planted (Entire district)	Root decoction is used to treat leucorrhea.	Exotic	S. Alam 619
117	<i>Erythrina variegata</i> L.	Tree	Roadsides and Open areas (1,2,4,5,11,17)	i) Decoction of the bark mixed with black pepper is taken to treat dysentery. ii) The seed paste is used for massaging the affected part of the body for treating paralysis.	Indigenous	S. Alam 204
118	<i>Glycine max</i> (L.) Merr.	Herb	Cultivated farms (2)	Seeds are cooked or roasted and eaten.	Exotic	S. Alam 943
119	<i>Lablab purpureus</i> (L.) Sweet	Climber	Cultivated (Entire district)	Green fruits are cooked and eaten as vegetables.	Indigenous	S. Alam 1021
120	<i>#Macroptilium atropurpureum</i> (DC.) Urban	Climber	Open areas and Roadsides (1)	-	Exotic	S. Alam 1109
121	<i>Macrotyloma uniflorum</i> (Lam.) Verdc.	Herb	Cultivated farms (1, 2,3,4,5,6)	Seeds are cooked and eaten as pulses.	Indigenous	S. Alam 944

	Name of taxon	Habit	Habitat & localities (Block number)	Ethnobotanical uses	Taxon status (as per POWO 2023)	Exsiccata
122	<i>Mucuna pruriens</i> (L.) DC.	Climber	Dry deciduous forests and Roadsides (2,5,14,15,18)	i) Seed decoction is used to treat irregular menstruation. ii) Decoction of leaves is used to treat cattle diarrhoea.	Indigenous	S. Alam 1022
123	<i>Neustanthus phaseoloides</i> (Roxb.) Benth.	Climber	Dry deciduous forests (2,14,15)	-	Indigenous	S. Alam 822
124	<i>Pachyrhizus erosus</i> (L.) Urb.	Herb	Cultivated farms (3,5,6)	Fleshy tubers are eaten.	Exotic	S. Alam 945
125	<i>Phaseolus vulgaris</i> L.	Herb	Cultivated farms (1,2,9)	Green fruits are cooked and eaten as vegetables.	Exotic	S. Alam 112
126	<i>#Rhynchosia rufescens</i> DC.	Shrub	Dry deciduous forests (15)	-	Indigenous	S. Alam 1212
127	<i>#Spatholobus parviflorus</i> (Roxb. ex G. Don) Kuntze	Climber	Dry deciduous forests (2,11,14,15)	-	Indigenous	S. Alam 946
128	<i>Teramnus labialis</i> (L.f.) Spreng.	Climber	Open areas and Cultivated fields (1,2,3,4)	-	Indigenous	S. Alam 947
129	<i>Vigna mungo</i> (L.) Hepper	Herb	Cultivated farms (Entire district)	Seeds are cooked and eaten as pulses.	Indigenous	S. Alam 728
130	<i>Vigna radiata</i> (L.) R. Wilczek	Herb	Cultivated farms (Entire district)	Seeds are cooked and eaten as pulses.	Indigenous	S. Alam 517
131	<i>Vigna trilobata</i> (L.) Verdc.	Herb	Open areas and Wastelands (Entire district)	-	Indigenous	S. Alam 729
132	<i>Vigna unguiculata</i> (L.) Walp. subsp. <i>cylindrica</i> (L.) Eseltine, Hendricks	Herb	Cultivated farms (Entire district)	Green fruits are cooked and eaten as vegetables.	Exotic	S. Alam 730
133	<i>Vigna unguiculata</i> (L.) Walp. subsp. <i>unguiculata</i>	Climber	Cultivated farms (Entire district)	Green fruits are cooked and eaten as vegetables.	Exotic	S. Alam 731
XXI) Tribe: Psoraleae : Genus:01; Species:01						
134	<i>Cullen corylifolium</i> (L.) Medik.	Herb	Weed of cultivated field (19)	-	Indigenous	S. Alam 1110
XXII) Tribe: Robinieae : Genus:01; Species:01						
135	<i>Gliricidia sepium</i> (Jacq.) Kunth	Tree	Open areas and Roadsides (1,2,11,17,18)	-	Exotic	S. Alam 205
XXIII) Tribe: Trifolieae : Genera:03; Species:05						
136	<i>Medicago lupulina</i> L.	Herb	Weed of cultivated fields (14)	-	Indigenous	S. Alam 113
137	<i>Melilotus albus</i> Medik.	Herb	Weed of cultivated fields (1)	-	Exotic	S. Alam 1213
138	<i>Melilotus indicus</i> (L.) All.	Herb	Weed of cultivated fields (1,4)	-	Indigenous	S. Alam 1214
139	<i>Trigonella balansae</i> Boiss. & Reut.	Herb	Cultivated as leafy vegetable (1,7,8,9,10,11,12)	Leaves are cooked and eaten as leafy vegetables.	Exotic	S. Alam 1215
140	<i>Trigonella foenum-graecum</i> L.	Herb	Cultivated as leafy vegetable & spice (2,4,12,17)	i) Leaves are cooked and eaten as leafy vegetables. ii) Seeds are used as spices.	Exotic	S. Alam 1216
XXIV) Tribe: Sesbanieae : Genus:01; Species:03						
141	<i>Sesbania bispinosa</i> (Jacq.) W. Wight	Shrub	Cultivated farms and Roadsides (1,2,4,13,14,16)	i) The plant is grown in the agricultural fields to enhance soil fertility. ii) Leaves are used in fishery as food for grass carp & silver carp fish and as fodder for domestic grazing animals.	Indigenous	S. Alam 948
142	<i>Sesbania grandiflora</i> (L.) Poir.	Tree	Dry deciduous forests and Roadsides (2,14,16)	i) The whole flower is mixed with gram flour, fry or cooked in oil and eaten as vegetables. ii) Flower is also used to treat hypertension. ii) Leaf extracts mixed with honey & milk is taken to improve night vision.	Exotic	S. Alam 823
143	<i>Sesbania sesban</i> (L.) Merr. var. <i>bicolor</i> (Wight & Arn.) F. W. Andrews	Tree	Roadsides and Planted (2,11,13,14)	-	Indigenous	S. Alam 1111

*—endemic to India | **—endemic to West Bengal | #—taxa not reported from Birbhum by Paul et al. (2015) and Sarkar (2017).

Blocks: 1—Bolpur-Sriniketan (BS) | 2—Ilambazar (I) | 3—Labpur (L) | 4—Nanor (N) | 5—Mayureswar-I (M-1) | 6—Mayureswar-II (M-2) | 7—Murari-I (Mu-1) | 8—Murari-II (Mu-2) | 9—Nalhati-I (N-1) | 10—Nalhati-II (N-2) | 11—Rampurhat-I (R-1) | 12—Rampurhat-II (R-2) | 13—Dubrajpur (D) | 14—Khayrasole (K) | 15—Md. Bazar (M) | 16—Rajnagar (R) | 17—Sainthia (S) | 18—Suri-I (S-1) | 19—Suri-II (S-2).

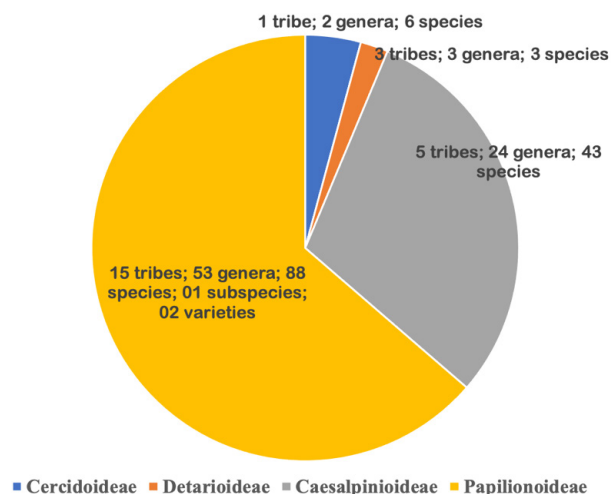


Figure 2. Subfamily wise distribution of legumes in Birbhum District (as per LPWG 2017).

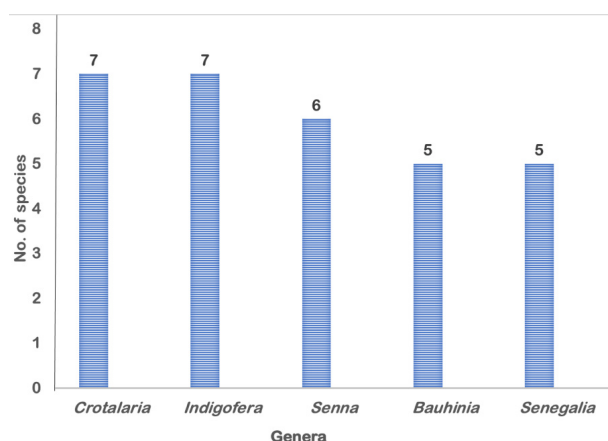


Figure 4. Top five dominant legume genera in Birbhum District.

(7 species each)—as the dominant genera from the district. The present observation is in conformity with the findings of Paul et al. (2015) where Papilionoideae, Phaseoleae, and *Crotalaria* emerged as the most dominant subfamily, tribe and genus, respectively, which suggest the family (Fabaceae) has high adaptability and abundance throughout the state. Out of 24 tribes and 82 genera recorded from the district, nine tribes and 57 genera are represented by only a single taxon.

The *Hardwickia binata* (monotypic genus, Image 1h), three other species—*Grona brachystachya* (Image 5p), *Pterocarpus marsupium* (Image 5e) and *P. santalinus* (Image 5f)—were found to be endemic to India (Irwin & Narasimhan 2011; Sanjappa 2020) while *Indigofera prostrata* (Image 7f) was identified as an exclusive endemic species to West Bengal (Karthigeyan

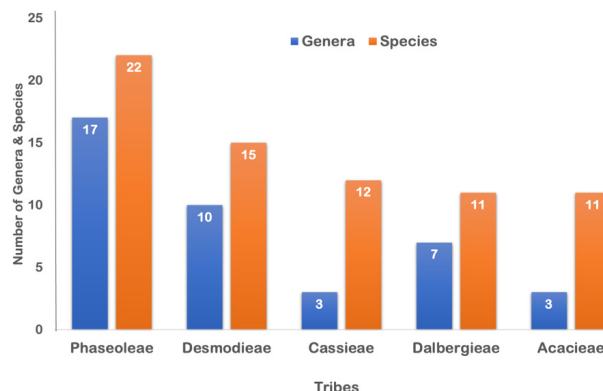


Figure 3. Top five dominant legume tribes showing number of genera and species in Birbhum District.

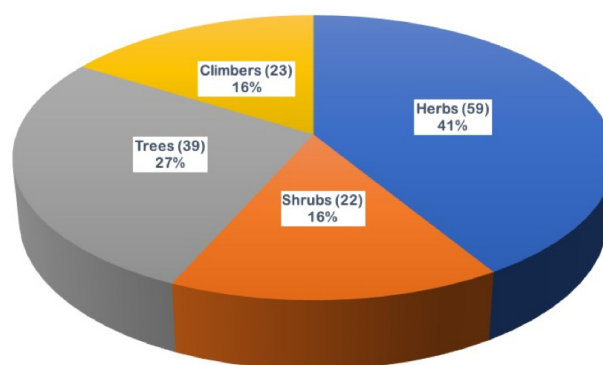


Figure 5. Percentage of various legume life forms in Birbhum District.

et al. 2022). As per the IUCN (2023) three species which are in different critical levels as 'Endangered' (*Pterocarpus santalinus*), 'Vulnerable' (*Saraca asoca*), and 'Near Threatened' (*Pterocarpus marsupium*) were documented from this district. This study recorded 32 wild legume species as new additions to the flora of Birbhum district which were not reported by Paul et al (2015) and Sarkar (2017) from the district Birbhum, viz.: *Aeschynomene americana*, *Albizia procera*, *Brachypterum scandens*, *Canavalia gladiata*, *Cassia roxburghii*, *Centrosema pubescens*, *Chamaecrista absus*, *C. mimosoides*, *Crotalaria quinquefolia*, *Dalbergia lanceolaria*, *Derris trifoliata*, *Desmodium scorpiurus*, *Grona heterocarpos*, *G. heterophylla*, *Indigofera glabra*, *I. hirsuta*, *I. prostrata*, *Lathyrus aphaca*, *Macroptilium atropurpureum*, *Mezoneuron cucullatum*, *Polhillides velutina*, *Rhynchosia rufescens*, *Senegalia intsia*, *S. megaladena*, *S. polyacantha*, *S. torta*, *Spatholobus parviflorus*, *Vachellia farnesiana*, *V. leucophloea*, *V. tomentosa*, *Vicia sativa*, and *Zornia gibbosa*. The study also recorded 18 cultivated / planted legume taxa which

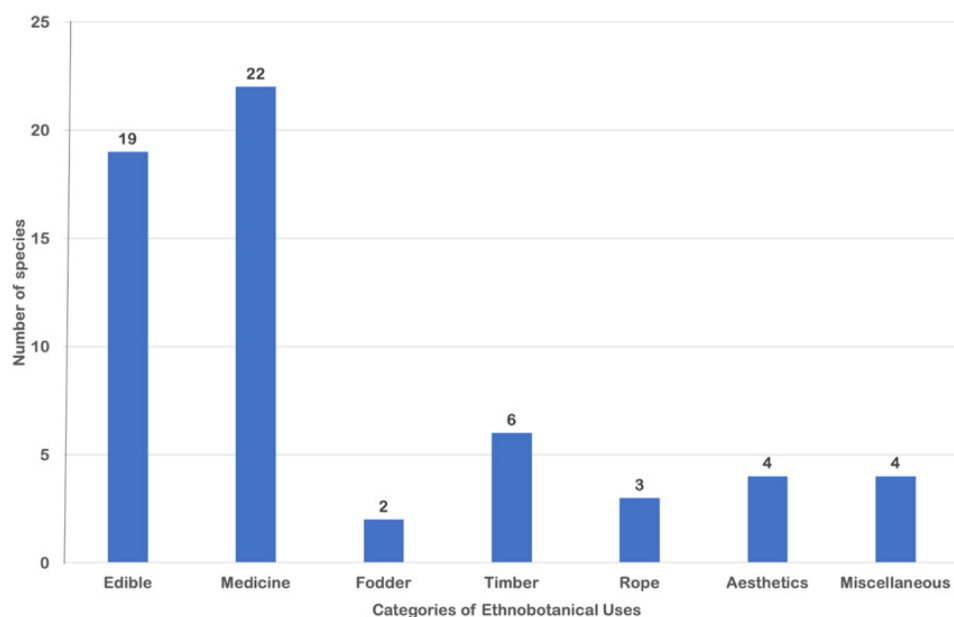


Figure 6. Different ethnobotanical usage groups.

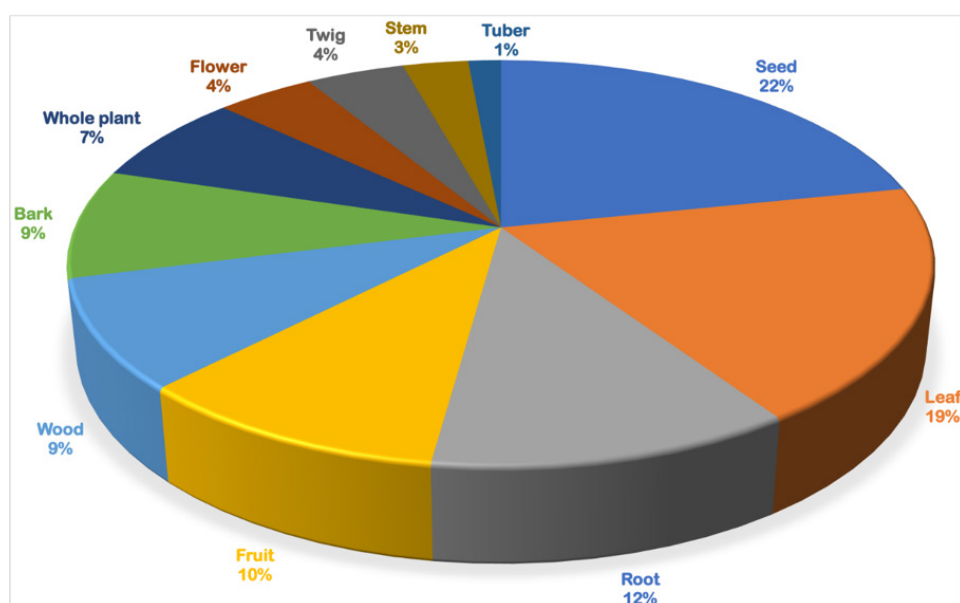


Figure 7. Different plant parts used for ethnobotany in Birbhum District.

were not reported earlier from the district, viz.: *Acacia holosericea*, *Adenanthera pavonina*, *Bauhinia acuminata*, *Bauhinia purpurea*, *B. blakeana*, *Brya ebenus*, *Calliandra haematocephala*, *Cassia javanica* ssp. *nodosa*, *Clitoria ternatea* var. *pleniflora*, *Crotalaria juncea*, *Dichrostachys cinerea*, *Hardwickia binata*, *Leucaena leucocephala*, *Parkinsonia aculeata*, *Phyllodium pulchellum*, *Prosopis juliflora*, *Pterocarpus santalinus*, and *Senna polyphylla*. In spite of the rich legume diversity, the Birbhum district hosts 49 exotic species (table 1) which represents over

one-third (34%) of the total legume species in the district which have become naturalized and affect the local phytodiversity. The exotic genus *Senna* (Image 3b–g) was found to be the most dominant one with six exotic species (*Senna alata*, *S. occidentalis*, *S. polyphylla*, *S. siamea*, *S. sophora*, and *S. tora*).

The different plant parts (seeds, stem, leaves, fruits, roots, wood, bark, whole plant, flowers, twig, tuber) of 50 legume taxa (34%) under 39 genera are used for various ethnobotanical uses (Table 1), of

which 19 taxa are edible, 22 taxa have medicinal uses, two taxa (*Lathyrus sativus* and *Sesbania bispinosa*) are used as fodder, six taxa (*Acacia auriculiformis*, *Albizia lebbeck*, *Albizia saman*, *Dalbergia sissoo*, *Pterocarpus marsupium*, and *Vachellia nilotica*) are used in timber production purposes, four taxa (*Brya ebenus*, *Christia vespertilionis*, *Lupinus angustifolius*, and *Senna polyphylla*) for aesthetics, three taxa (*Crotalaria juncea*, *Pleurolobus gangeticus*, and *Phanera vahlii*) are used in making ropes and cordage, and four taxa (*Acacia auriculiformis*, *Cajanus cajan*, *Sesbania bispinosa*, and *Vachellia nilotica*) for miscellaneous purposes as shown in Figure 6. Among the plant parts used, seeds (15) taxa emerged as the most frequently utilized component followed by leaves (13), roots (08), fruits (07), wood (06), bark (06), whole plant (05), flowers (03), twig (03), stem (02) and tuber (01) as depicted in Figure 7. About 44% of the ethnobotanical plants recorded are used as medicine for treating a range of 20 common ailments. The species which are used as medicines for various treatments, viz., *Senna tora*, *Albizia lebbeck*, *Dalbergia sissoo* for cold & cough; *Adenanthera pavonina*, *Mimosa pudica* for healing wounds; *Senna occidentalis*, *Mucuna pruriens* for menstrual problems; *Guilandina bonduc*, *Crotalaria pallida* for indigestion and stomach problems; *Abrus precatorius*, *Cajanus cajan* to treat jaundice; *Cajanus scarabaeoides* & *Mucuna pruriens* for cattle diarrhoea; *Butea monosperma* (fever), *Cassia fistula* (hiccups), *Clitoria ternatea* (leucorrhoea); *Erythrina variegata* for dysentery & paralysis; *Pleurolobus gangeticus* for chest pain; *Senna alata* for ringworm; *Sesbania grandiflora* for dizziness & night blindness; *Tamarindus indicus* (heat-shock); *Indigofera tinctoria* (rheumatism); *Butea monosperma* (menorrhagia); *Pongamia pinnata* for toothache; and *Abrus precatorius* for arthritis.

Fifteen species have been documented which are popularly used for food, viz., *Cajanus cajan*, *Cicer arietinum*, *Glycine max*, *Lathyrus oleraceus*, *L. sativus*, *Macrotyloma uniflorum*, *Vicia lens*, *Vigna mungo* and *V. radiata*, *Lablab purpureus*, *Pachyrhizus erosus*, *Phaseolus vulgaris*, *Vigna unguiculata*, *Trigonella balansae*, *T. foenum-graecum*. The only species *Arachis hypogaea* is used for oil seed. The study also documents four ornamental legume species cultivated for beautification in gardens, viz., *Brya ebenus*, *Christia vespertilionis*, *Lupinus angustifolius*, *Senna polyphylla*, and one legume fiber plant, *Crotalaria juncea* for making ropes and cordages.

Six species categorized as weeds in cultivated fields were identified such as *Lathyrus aphaca*, *Medicago lupulina*, *Melilotus albus*, *M. indicus*, *Vicia hirsuta*, and

V. sativa. Furthermore, species like *Crotalaria prostrata*, *Indigofera linifolia*, and *I. linnaei* were noted for their ability to retain moisture, forming a dense mat on the soil surface, which aids in water conservation.

CONCLUSION

It is revealed from the present investigation on the family Fabaceae that in the Birbhum District 143 taxa are recorded, which indicates 36% of the total legume taxa reported in West Bengal. Amongst the total taxa (143), 50 additional taxa (including 32 wild and 18 cultivated/ planted taxa) were documented that are not reported from the district by earlier workers (Paul et al. 2015; Sarkar 2017). Also, the taxon *Cassia roxburghii* has been reported for the first time as a new addition to the flora of West Bengal (Alam & Lokho 2019). Apart from legume rich diversity, the district is a habitat for a few Indian endemic species, viz., *Hardwickia binata*, *Grona brachystachya*, *Pterocarpus marsupium*, *P. santalinus* (Irwin & Narasimhan 2011; Sanjappa 2020), and one exclusive species *Indigofera prostrata* endemic to the West Bengal State (Karthigeyan et al. 2022). The presence of exotic legumes species (34%) in the district requires the importance of monitoring and managing non-native species to prevent potential ecological disruptions. Management strategies to control the weedy legumes are essential to safeguard agricultural productivity. There are a few species recorded which fall in a different category as per IUCN (2023) and require immediate attention for conservation, viz., *Pterocarpus santalinus* (Endangered), *P. marsupium* (Near Threatened). The local people (mostly tribals) use about 50 legume taxa for multiple ethnobotanical uses such as food, and folk medicine on a daily basis indicating the direct dependence on the natural resources for their livelihood. Therefore, the sustainable management of the resources found in the district is paramount for preservation and conservation of the rich diversity of the legume taxa. Further research is required in medicinal plants for scientific validation and potential biochemical constituents in various plants for drug discovery to treat various diseases. The comprehensive legume data will be beneficial to the local people, students, teachers, forest officials and policy makers to enable them to study, utilize and in the management of legumes in a sustainable manner.



Image 1. a—*Bauhinia acuminata* L. | b—*Bauhinia purpurea* L. | c—*Bauhinia tomentosa* L. | d—*Bauhinia variegata* L. | e—*Bauhinia blakeana* Dunn | f—*Phanera vahlii* (Wight & Arn.) Benth. | g—*Tamarindus indica* L. | h—*Hardwickia binata* Roxb. | i—*Saraca asoca* (Roxb.) de Wilde | j—*Acacia auriculiformis* A.Cunn. ex Benth. | k—*Acacia holosericea* A.Cunn. ex G. Don | l—*Senegalia catechu* (L.f.) P.J.H. Hurter & Mabb. | m—*Senegalia intsia* (L.) Maslin, Seigler & Ebinger | n—*Senegalia megaladena* (Desv.) Maslin, Seigler & Ebinger | o—*Senegalia polyacantha* (Willd.) Seigler & Ebinger | p—*Senegalia torta* (Roxb.) Maslin, Seigler & Ebinger. © Shamim Alam.



Image 2. a—*Vachellia farnesiana* (L.) Wight & Arn. | b—*Vachellia leucophloea* (Roxb.) Maslin, Seigler & Ebinger | c—*Vachellia nilotica* (L.) P.J.H.Hurter & Mabb. | d—*Vachellia tomentosa* (Rottler) Maslin, Seigler & Ebinger | e—*Caesalpinia pulcherrima* (L.) Sw. | f—*Delonix regia* (Bojer) Raf. | g—*Guilandina bonduc* L. | h—*Mezoneuron cucullatum* (Roxb.) Wight & Arn. | i—*Moullava digyna* (Rottler) Gagnon & G.P.Lewis | j—*Parkinsonia aculeata* L. | k—*Peltophorum pterocarpum* (DC.) Baker ex K.Heyne | l—*Cassia fistula* L. | m—*Cassia javanica* L. ssp. *nodosa* (Buch.-Ham. ex Roxb.) K.Larsen & S.S.Larsen | n—*Cassia roxburghii* DC. | o—*Chamaecrista absus* (L.) H.S.Irwin & Barneby | p—*Chamaecrista mimosoides* (L.) Greene. © Shamim Alam.



Image 3. a—*Chamaecrista pumila* (Lam.) K. Larsen | b—*Senna alata* (L.) Roxb. | c—*Senna occidentalis* (L.) Link | d—*Senna polyphylla* (Jacq.) H.S. Irwin & Barneby | e—*Senna siamea* (Lam.) H.S. Irwin & Barneby | f—*Senna sophora* (L.) Roxb. | g—*Senna tora* (L.) Roxb. | h—*Albizia lebbbeck* (L.) Benth. | i—*Albizia procera* (Roxb.) Benth. | j—*Calliandra haematocephala* Hassk. | k—*Pithecellobium dulce* (Roxb.) Benth. | l—*Samanea saman* (Jacq.) Merr. | m—*Adenanthera pavonina* L. | n—*Dichrostachys cinerea* (L.) Wight & Arn. | o—*Leucaena leucocephala* (Lam.) de Wit | p—*Mimosa pudica* L. © Shamim Alam.



Image 4. a—*Mimosa rubicaulis* subsp. *himalayana* (Gamble—H.Ohashi | b—*Neptunia oleracea* Lour. | c—*Prosopis juliflora* (Sw.) DC. | d—*Xylia xylocarpa* (Roxb.) Taub. | e—*Abrus precatorius* L. | f—*Cicer arietinum* L. | g—*Crotalaria juncea* L. | h—*Crotalaria pallida* Aiton | i—*Crotalaria prostrata* Rottl. | j—*Crotalaria quinquefolia* L. | k—*Crotalaria retusa* L. | l—*Crotalaria spectabilis* Roth | m—*Crotalaria verrucosa* L. | n—*Aeschynomene americana* L. | o—*Aeschynomene aspera* L. | p—*Aeschynomene indica* L. © Shamim Alam.



Image 5. a—*Arachis hypogaea* L. | b—*Brya ebenus* DC. | c—*Dalbergia lanceolaria* L.f. | d—*Dalbergia sissoo* Roxb. | e—*Pterocarpus marsupium* Roxb. | f—*Pterocarpus santalinus* L.f. | g—*Smithia sensitiva* Aiton, | h—*Zornia gibbosa* Span. | i—*Alysicarpus bupleurifolius* (L.) DC. | j—*Alysicarpus monilifer* (L.) DC. | k—*Alysicarpus vaginalis* (L.) DC. var. *nummulariifolia* (DC.) Miq. | l—*Alysicarpus vaginalis* (L.) DC. var. *vaginalis* | m—*Christia vespertilionis* (L.f.) Bakh.f. | n—*Codariocalyx motorius* (Houtt.) H. Ohashi | o—*Desmodium scorpiurus* (Sw.) Desv. | p—*Grona brachystachya* (Graham ex. Benth.) H. Ohashi & K. Ohashi. © Shamim Alam.



Image 6. a—*Grona heterocarpos* (L.) H. Ohashi & K. Ohashi | b—*Grona heterophylla* (Willd.) H. Ohashi & K. Ohashi | c—*Grona triflora* (L.) H. Ohashi & K. Ohashi | d—*Phyllodium pulchellum* (L.) Desv. | e—*Pleurolobus gangeticus* (L.) J.St.-Hil. | f—*Polhillides velutina* (Willd.) H. Ohashi & K. Ohashi | g—*Pseudarthria viscida* (L.) Wight & Arn. | h—*Uraria lagopodioides* (L.) Desv. | i—*Canavalia gladiata* (Jacq.) DC. | j—*Lathyrus aphaca* L. | k—*Lathyrus oleraceus* Lam. | l—*Lathyrus sativus* L. | m—*Vicia hirsuta* (L.) Gray | n—*Vicia lens* (L.) Coss. & Germ. | o—*Vicia sativa* L. | p—*Lupinus angustifolius* L. © Shamim Alam.



Image 7. a—*Indigofera cassioides* Rottler ex DC. | b—*Indigofera glabra* L. | c—*Indigofera hirsuta* L. | d—*Indigofera linifolia* (L.f.) Retz. | e—*Indigofera linnaei* Ali. | f—*Indigofera prostrata* Willd. | g—*Indigofera tinctoria* L. | h—*Brachypterum scandens* (Roxb.) Miq. | i—*Derris trifoliata* Lour. | j—*Millettia peguensis* Ali | k—*Pongamia pinnata* (L.) Pierre | l—*Tephrosia purpurea* (L.) Pers. | m—*Tephrosia villosa* (L.) Pers. | n—*Butea monosperma* (Lam.) Taub. | o—*Cajanus cajan* (L.) Huth | p—*Cajanus crassus* (Prain ex King) Maesen. © Shamim Alam.



Image 8. a—*Cajanus scarabaeoides* (L.) Thouars | b—*Centrosema pubescens* Benth.; c—*Clitoria ternatea* L. var. *pleniflora* Fantz. | d—*Clitoria ternatea* L. var. *ternatea* | e—*Erythrina variegata* L. | f—*Glycine max* (L.) Merr. | g—*Lablab purpureus* (L.) Sweet | h—*Macroptilium atropurpureum* (DC.) Urb. | i—*Macrotyloma uniflorum* (Lam.) Verdc. | j—*Mucuna pruriens* (L.) DC. | k—*Neustanthus phaseoloides* Benth. | l—*Pachyrhizus erosus* (L.) Urb. | m—*Phaseolus vulgaris* L. | n—*Rhynchosia rufescens* (Willd.) DC. | o—*Spatholobus parviflorus* (Roxb. ex DC.) Kuntze | p—*Teramnus labialis* (L.f.) Spreng. © Shamim Alam.



Image 9. a—*Vigna mungo* (L.) Hepper | b—*Vigna radiata* (L.) R. Wilczek | c—*Vigna trilobata* (L.) Verdc. | d—*Vigna unguiculata* (L.) Verdc. subsp. *cylindrica* (L.) Eseltine | e—*Vigna unguiculata* (L.) Verdc. subsp. *unguiculata* | f—*Cullen corylifolium* (L.) Medik. | g—*Gliricidia sepium* (Jacq.) Kunth ex Walp. | h—*Medicago lupulina* L. | i—*Melilotus albus* Medik. | j—*Melilotus indicus* (L.) All. | k—*Trigonella balansae* Boiss. & Reut. | l—*Trigonella foenum-graecum* L. | m—*Sesbania bispinosa* (Jacq.) W. Wight | n—*Sesbania grandiflora* (L.) Poir. | o—*Sesbania sesban* (L.) Merr. var. *bicolor* (Wight & Arn.) F.W. Andrews. © Shamim Alam.

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c/o Wildlife Information Liaison Development Society,
43/2 Varadarajulu Nagar, 5th Street West, Ganapathy, Coimbatore,
Tamil Nadu 641006, India
ravi@threatenedtaxa.org

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