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Diversity of the Family Leguminosae in Koch Bihar District, West Bengal

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ABSTRACT

Introduction: Legume - a fascinating group of flowering plants belongs to the family Leguminosae or Fabaceae is deserve special attention as they play vital role both in human welfare as well as in ecological aspect. The district of Koch Bihar of West Bengal state has no account about the diversity of leguminous plants and their utilization by the ethnic and local peoples which initiates to undertake the present work.

Methods: Extensive field surveys in different parts of Koch Bihar in different seasons of five consecutive years were conducted to record the legumes of the district and their uses following the standard methods. Voucher specimens were processed and identified by using relevant literature and matching with herbarium specimens.

Result and Discussion: It is evident from the present study that the legumes of Koch Bihar district are represented by 81 species under 36 genera with *Desmodium* as dominant genus having 9 species. Maximum number of species have been recorded in the subfamily Faboideae (47 species) followed by Caesalpinioideae (18 species) and Mimosoideae (16 species). Among the 81 species of legumes there are 29 species of herbs, 28 species of trees, 16 species of shrubs and 8 species of climbers. It is interesting to note that a good number of legumes are exotic in origin and American elements are more dominant among the alien species. During the field study utilization of legume by the major ethnic communities (viz. Kheria, Oraon, Rabha, Rajbanshi, and Santal) and the local inhabitants of the district have also been recorded. It reveals that 31 species under 24 genera which is about 38% of the legume flora of the district are used in various purposes and several species have more than one kind of use.

Conclusions: Destruction of the habitat and the anthropogenic interferences are identified as the basic causes for the loss of diversity of legumes of the district. Similarly, acculturation is the reason for extinction of traditional knowledge regarding herbal therapy.

Key Words: Mimosoideae, Caesalpinioideae, Faboideae, Ethnic community, Traditional knowledge

INTRODUCTION

The family Leguminosae (Fabaceae) commonly known as legume or bean family is the third largest family among the flowering plants which is represented by 19,500 species under 770 genera¹ and is cosmopolitan in distribution. Human society is benefited by this group of plants as they are not only the source of pulses, fodder, oil seeds, medicines, timber etc but they also increase soil fertility by fixing atmospheric Nitrogen. This family is traditionally divided into three sub-families namely Mimosoideae, Caesalpinioideae and Faboideae (=Papilionoideae). Hutchinson² had recognized these three sub-families as independent families-Mimosaceae, Caesalpinaceae and Fabaceae. This view was followed by Cronquist³, Dahlgren⁴ and others. But the present

trend is to consider the above stated three sub-families under broadly circumscribed Leguminosae or Fabaceae. Morphological characters as well as rbcL sequence data support this view⁵. Takhtajan⁶, Thorne⁷ and APGIV⁸ also recognized the similar treatment. Recently the Legume Phylogeny Working Group⁹ based on plastid *matK* gene sequences subdivided Leguminosae into six subfamilies namely Caesalpinioideae (recircumscribed), Cercidoideae, Detarioideae, Dialioideae, Duparquetioideae and Papilionoideae.

Koch Bihar- a district of North eastern part of the state of West Bengal is floristically rich. Though a number of stray publications are existing regarding the flora of the Koch Bihar like Aditya and Ghosh¹⁰, Bandyopadhyay¹¹, Bandyopadhyay and Mukherjee^{12,13,14}, Banerjee¹⁵ but none of them

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reflect the diversity of leguminous plants of the district. The present work is therefore, undertaken to record the species diversity of the legumes of Koch Bihar district of West Bengal. Not only that an endeavor has also been made to record the local uses of such leguminous plants by the local ethnic and rural peoples of the district which will be helpful to preserve the indigenous knowledge of the ethnic communities of the district.

The district of Koch Bihar is situated under Jalpaiguri division of the state of West Bengal in between 26° 32' 46" to 25° 57' 57" N latitude and 89° 52' 00" to 88° 45' 02" E longitude and covering an area of 3,386 sq Km. The district is surrounded by Alipurduar district of West Bengal in northern and most part of Western side. The Southern boundary of the district is very much indented and is formed by the Rangpur district of Bangladesh. The eastern boundary is formed by the Goalpara district of Assam. The entire district is intersected by six river systems, namely Tista system, Jaldhaka system, Torsha system, Kalzani system, Raidak system and Gadadhar system. The soil of Koch Bihar district is alluvial type of rather recent origin and is mainly sandy loam type. The climate of the district is characterized by high humid atmosphere and abundant rain with the temperature being seldom excessive. The district receives an average rainfall of 320.1cm. Rajbanshi is the major ethnic community which constitute about 40% population of the district. The other ethnic groups are Kheria, Oraon, Rabha and Santal. Most of them are village dwellers and depend on plant and plant products to maintain their life and livelihood.

MATERIALS AND METHODS

The present work is based on screening of herbarium specimens deposited at Central National Herbarium, Howrah and extensive survey conducted in different areas of Koch Bihar district in different seasons of five consecutive years. Plant specimens were collected from the field and preserved following the guidelines of Lawrence¹⁶ and Jain & Rao¹⁷. Local uses of the plants and vernacular names (if any) were procured from the ethnic medicine men and elderly knowledgeable persons of the villages through interview. The information was collected following Jain^{18, 19, 20} and Pal & Jain²¹ with some minor changes wherever required. Correct identity and updated nomenclature of the collected plant specimens were established with the help of published literature and also comparing with the authentic herbarium specimens of Central National Herbarium (CAL).

RESULTS

Species diversity in the three sub-families of Leguminosae viz Faboideae (=Papilionoideae), Caesalpinioideae and Mimosoideae are presented in table 1, 2 and 3 respectively. Updated nomenclature of each species along with vernacular name (if any), habit, flowering and fruiting periods and their distributional status have been provided in these tables. Uses of plants by the ethnic communities and rural peoples have also been provided in the column ethno botanical uses. The following abbreviations are used in the table:

rt.-root, tw.-twig, lf.-leaf, fl.-flower, fr.-fruit, sd.-seed, wd.-wood, pl.-plant, st. bk. - stem bark

Table 1: Species diversity in the sub-family Faboideae (Papilionoideae)

Name of the species (1)	Habit (2)	Flowering & fruiting period(3)	Status (4)	Specimen examined (5)	Ethnobotanical uses (6)
<i>Abrus precatorius</i> Linn. (<i>Kunch</i> -Beng.; <i>Kawet</i> -Sant.).	Twiner	Aug.-June.	Less Common	Patlakhawa forest, SB - 3794.	Leucorrhoea (rt.), sore throat (lf.), colic (lf.), rheumatic pain (lf. & fr.)
<i>Aeschynomene aspera</i> Linn. (<i>Shola</i> - Beng.).	Shrub,	Aug. - Dec.	Common	Folimari, SB - 3748	
<i>Aeschynomene indica</i> Linn.	Under shrub,	July -Oct.	Common	Setai, SB -3012.	
<i>Alysicarpus monilifer</i> (Linn.) DC.	Herb	Sept.-Mar.	Less common	Pundibari, SB - 3537	
<i>Alysicarpus vaginalis</i> (Linn.) DC.,	Herb	Sept.-March.	Less common	Dewanhat, SB - 3759.	
<i>Butea monosperma</i> (Lam.) Taub. (<i>Palash</i> - Beng./Sant.)	Tree	Mar. - May.	Less common	Atiamochar forest, SB - 3372.	Abdominal pain due to worm(lf.),menorrhagia(lf, fl bud);,edible(fl. bud),dye(fl.)

Table 1: (Continued)

Name of the species (1)	Habit (2)	Flowering & fruiting period(3)	Status (4)	Specimen examined (5)	Ethnobotanical uses (6)
<i>Cajanus cajan</i> (Linn.) Millsp. (Arahar – Beng.).	Shrub	Nov.– Mar.	Commonly cultivated	Sonapur, SB – 3547	Jaundice (lf.), septic wounds of cattle (lf.);edible(sd.)
<i>Cajanus scarabaeoides</i> (Linn.) du Petit Thouars	Climber	Sept.– Feb.	Less common	Atiamochar, SB – 3407.	
<i>Clitoria ternatea</i> Linn. (Aparajita – Beng.).	Twiner	More or less throughout the year.	Cultivated in gardens, often found as an escape	Balarampur, SB – 3628.	
<i>Crotalaria albida</i> Heyne ex Roth.	Herb or under-shrub	Aug. – Apr.	Less common	Atiamochar forest, SB –3820.	
<i>Crotalaria bialata</i> Schrank.	Herb or under-Shrub	Aug. – Dec.	Less common	Patlakhawa, SB –3808.	
<i>Crotalaria micans</i> Link.	Shrub or under-shrub	Sept. –Jan.	Less common	Megipur, SB – 3053.	Shade plant of tea nursery
<i>Crotalaria pallida</i> Ait.	Under shrub	Jul– Jan.	Common	Jamalda, SB – 2914.	
<i>Crotalaria prostrata</i> Rottler	Herb	Sept.–Dec.	Less common	Saulmari, SB – 3777.	
<i>Crotalaria spectabilis</i> Roth	Under -shrub	Nov. – Mar.	Commonly planted	Kochbihar, SB –3510.	
<i>Dalbergia sissoo</i> Roxb. ex DC. (Sissoo – Beng.).	Tree	Mar. – Nov.	Common	Atiamochar, SB-3371; Kochbihar, SB – 3905	Fodder (young tw); agricultural tools & household articles(wd)
1	2	3	4	5	6
<i>Desmodium gangeticum</i> (Linn.) DC.(Salpani-Beng.)	Under-shrub	Jul. – Feb.	Common	Baneswar, SB – 3521.	Catarrhal fever (lf.), swollen glands (lf.).
<i>Desmodium gyroides</i> (Roxb. ex Link.) DC.	Shrub	Sept. – Feb.	Common	Atiamochar forest, SB – 3402.	
<i>Desmodium heterocarpon</i> (Linn.) DC.	Under-shrub	Oct. – Feb.	Common	Kochbihar, SB – 3848.	
<i>Desmodium heterophyllum</i> (Willd.) DC.	Herb	Sept. –Feb.	Rare	Atiamochar forest, SB – 3131.	
<i>Desmodium laxiflorum</i> DC.	Under-shrub	Aug. – Jan.	Common	Kochbihar, SB – 3457.	
<i>Desmodium motorium</i> (Houtt.) Merr.	Under-shrub	Aug. – Jan.	Less common	Atiamochar, SB – 3840.	
<i>Desmodium pulchellum</i> (Linn.) Benth.	Shrub	Sept. – Feb.	Less common	Patlakhawa forest, SB – 3551.	

Table 1: (Continued)

Name of the species (1)	Habit (2)	Flowering & fruiting period(3)	Status (4)	Specimen examined (5)	Ethnobotanical uses (6)
<i>Desmodium triflorum</i> (Linn.) DC.(Kurali -Rj.).	Herb	Aug – Feb.	very common	Atiamochar, SB-3196; Gossanimari, SB – 3329.	Dental carries (tw.),boil & septic wounds(pl.)
<i>Desmodium triquetrum</i> (Linn.) DC.	Under-shrub	Aug.– Jan.	Less common	Atiamochar forest, SB – 3824.	
<i>Desmodium triquetrum</i> (Linn.) DC. ssp. <i>pseudotriquetrum</i> (DC.) Prain	Under-shrub	Sept. – Feb..	Less comon	Atiamochar forest, SB – 3841.	
<i>Erythrina stricta</i> Roxb.	Tree	Mar. – Jun.	Common	Atiamochar, SB –3386	Menorrhagia and metorrhagia (st.bk.)
<i>Erythrina variegata</i> Linn.	Tree	Mar. – Jul.	Less common	Tufanganj, SB – 3572.	
<i>Flemingia macrophylla</i> (Willd.) Kuntze ex Merr.	Shrub	Nov. – Mar.	Less common	Patlakhawa forest, SB – 3389.	
<i>Flemingia strobilifera</i> (Linn.) Ait. And Ait. f.	Shrub	Dec. – Mar.	Less common	Patlakhawa forest, SB – 3558.	
<i>Indigofera linifolia</i> (Linn.f.) Retz.	Herb	Jul – Oct.	Less common	Haldibari, SB – 3652.	
<i>Indigofera zollingeriana</i> Miq.	Tree	Jul. –Nov.	Less common, planted	Saulmari, SB – 3775.	Shade plant of tree garden
<i>Lathyrus aphaca</i> Linn.	Herb	Dec. – Mar.	Less common	Kochbihar, SB – 3398.	
1	2	3	4	5	6
<i>Lathyrus sativus</i> Linn	Herb	Nov. – Feb.	Common, cultivated	Takuamari, SB – 3468.	
<i>Lens culinaris</i> Medik	Herb	Nov. – Mar.	Common, cultivated	.Ghughumari, SB – 3862	
<i>Medicago lupulina</i> Linn.	Herb	Jan. – Mar.	Common	Kochbihar,SB – 3898.	
<i>Melilotus alba</i> Medik.ex Desr.	Herb	Jan. – Apr.	Less common	Ghughumari, SB – 3858.	Edible (tw.)
<i>Melilotus indica</i> All.	Herb	Jan. – Mar.	Common	Atiamochar, SB –3886.	Edible (tw.)
<i>Mucuna pruriens</i> (Linn.) DC.(Alkushi-Beng.)	Climber	Oct.–May.	Less common	Nagurhat, SB –3617.	Aphrodisiac(sd.)
<i>Pueraria phaseoloides</i> (Roxb.) Benth. var. <i>subspicata</i> (Benth.) van der Maesen	Climber	Sept.–Dec.	Less Common	Atiamochar forest,SB– 3438;Nagurhat, Mukherjee, 4657.	
<i>Sesbania grandiflora</i> Pers.(Bokphul-Beng.)	Tree	Jun – Oct.	Less common	Gitaldaha, SB – 3728.	Dysmenorrhoea(fl.), epilepsy(lf.) ; edible(fl.)

Table 1: (Continued)

Name of the species (1)	Habit (2)	Flowering & fruiting period(3)	Status (4)	Specimen examined (5)	Ethnobotanical uses (6)
<i>Sesbania sesban</i> (Linn.) Merr.	Shrub	Sept. – Dec.	Less common	Ghughumari, SB – 3444.	
<i>Tephrosia candida</i> DC.	Shrub	Nov. – Feb.	Less common	Garodahat, SB – 3829	
<i>Tephrosia purpurea</i> (Linn.) Pers. (Bounil – Beng.).	Herb	Apr. – Oct.	Common	Jamalda, SB – 2967.	Piles (tw.)
<i>Vicia hirsuta</i> (Linn.) S.F. Gray	Climber	Nov. – Apr.	Less common	Atiamochar, SB – 3347.	
<i>Vicia sativa</i> Linn.	Herb	Nov. – Mar.	Common	Ghughumari, SB – 3855; Kochbihar, Banerjee 15233.	
<i>Vicia tetrasperma</i> (Linn.) Schrebur	Herb	Nov. – Mar.	Less common	Rasikbil, SB – 3390; Atiamochar forest, Banerjee 15376	

Table 2: Species diversity in the sub-family Caesalpinioideae

Name of the species (1)	Habit (2)	Flowering & fruiting period(3)	Status (4)	Specimen examined (5)	Ethnobotanical uses (6)
<i>Bauhinia acuminata</i> Linn. (Kanchan – Beng.).	Shrub	Apr. – Sept.	Less common	Kochbihar, SB – 3306.	
<i>Bauhinia purpurea</i> Linn. (Raktokanchan – Beng.).	Tree	Sept. – Feb.	Less common	Dinhata, SB-3703.	Edible(fl.)
<i>Bauhinia variegata</i> Linn.	Tree	Mar. – Feb.	Less common	Tufanganj, SB – 3566.	
<i>Caesalpinia bonduc</i> (Linn.) Roxb. (Nata-Beng., Bagni-Sant.)	Scrambler	Aug. – Apr.	Common	Jamalda forest, SB – 2975.	Quick detachment of placenta(Rt.), Vertigo(sd.), burning sensation of body(sd.)
<i>Caesalpinia cucullata</i> Roxb.	Scrambler	Dec. – Mar.	Less common	Ucchalpukri forest, SB – 3495.	Sprain (Rt.)
<i>Caesalpinia pulcherrima</i> (Linn.) Sw.	Shrub	Almost the year	Less common	Dinhata, SB – 3711	
<i>Cassia fistula</i> Linn. (Sondali, Amaltash – Beng.).	Tree	Apr. – Jul.	Common	Mathabhanga, SB – 3097; Tufanganj, SB – 3567.	Swelling of neck of cattle (fr.); Edible (fl.&sd.)
<i>Cassia glauca</i> Lam.	Tree	Apr. – Jun.	Less common	Kochbihar, SB – 3334.	
<i>Delonix regia</i> (Boj.) Rafin	Tree	Apr. – Jun.	Common	Nagurhat, SB 3612; Kochbihar, SB – 3904.	

Table 2: (Continued)

Name of the species (1)	Habit (2)	Flowering & fruiting period (3)	Status (4)	Specimen examined (5)	Ethnobotanical uses (6)
<i>Peltophorum pterocarpum</i> (DC.) Baker ex. K. Hyne	Tree	Apr. -Nov.	Common	Kochbihar, SB - 3651.	
<i>Saraca asoca</i> (Roxb.) de Wilde	Tree	Mar. -Sept.	Less Common, Cult.	Kochbihar, SB - 3573.	Dyspepsia(st.bk.), promote conception(st.bk), prevent miscarriage(fl.bud)
<i>Senna alata</i> (Linn.) Roxb. (<i>Barachakar</i> - Khe.).	Shrub	Jul. - Nov.	Less Common	Atiamochar village, SB - 3126.	Itching(lf.)
1	2	3	4	5	6
<i>Senna auriculata</i> (Linn.) Roxb.	Shrub	May - Dec.	Rare	Dewanhat, SB - 3760.	
<i>Senna occidentalis</i> (Linn.) Link.	Under-shrub	Apr. - Sept; often almost the year.	Common	Jamalda, SB- 2928; Nababgunjbalasi, SB - 3281.	Fever(rt.), menorrhagia(rt.); keep off evil spirit(rt.)
<i>Senna siamea</i> (Lam.) Irwin and Braneby	Tree	Mar. - Nov.	Common	Kochbihar, SB - 3768.	
<i>Senna sophora</i> (Linn.) Roxb. (<i>Kalkasundar</i> - Beng.; <i>Chakunde</i> - Rj.).	Under-shrub	May -Nov.	Very Common	Jamalda, SB-2908; Mathabhanga, SB-3096.	Croup (lf.); edible(lf.)
<i>Senna tora</i> (Linn.) Roxb. (<i>Chakunda</i> -Beng.).	Herb	Jul - Dec.	Very Common	Gitaldaha, SB - 3732.	Edible (lf.& fl.)
<i>Tamarindus indica</i> Linn. (<i>Tentul</i> - Beng.; <i>Imlidaru</i> - Sant.).	Tree	Apr. - Feb.	Common	Takuamari, SB - 3608.	Dyspepsia (lf.) emetic (fr.); edible (lf & fr.)

Table 3: Species diversity in the sub-family Mimosoideae

Name of the species (1)	Habit (2)	Flowering & fruiting period (3)	Status (4)	Specimen examined (5)	Ethnobotanical uses (6)
<i>Acacia auriculiformis</i> A. Cunn. ex Benth.	Tree	Almost the year.	Common	Maruganj, SB - 3305.	
<i>Acacia catechu</i> (Linn. f.) Willd. f. (<i>Khair</i> - Beng.).	Tree	Aug. - Dec.	Common	Jamalda forest, SB - 2912.	Fodder(lf.); dye(gum); household article (wd.)
<i>Acacia farnesiana</i> (Linn.) Willd	Tree	Feb. to Jun.	Less Common	Patlakhawa, SB - 3559	
<i>Acacia nilotica</i> (Linn.) Delile, ssp. <i>cupressiformis</i> (J. L. Stewart) Ali and Faruqui (<i>Babla</i> - Beng.).	Tree	Aug. - Apr.	Common	Bamanhat, SB - 3752.	Adhesive(gum)
<i>Acacia pennata</i> (Linn.) Willd	Shrub or small tree	Jun. - Dec.	Less Common	Haldibari, SB - 3663.	
<i>Acacia sinuata</i> (Lour.) Merr.	Shrub	Apr.-Dec	Less Common	Patlakhawa forest, Banerjee-15299	
<i>Albizia chinensis</i> (Osb.) Merr. (<i>Tollisiris</i> - Beng.)	Tree	Apr. -Jan.	Less Common	Ucchalpukuri, SB - 3490.	

Table 3: (Continued)

Name of the species (1)	Habit (2)	Flowering & fruiting period(3)	Status (4)	Specimen examined (5)	Ethnobotanical uses (6)
1 <i>Albizia lebbek</i> (Linn.) Benth. (<i>Sirish</i> – Beng.,Sant.).	2 Tree	3 Apr. – Nov.	4 Common	5 Mathabhanga, SB – 3090; Dinhata, SB – 3336.	6 Impotency(sd.); household article(wd.)
<i>Albizia lucidior</i> (Steud.) Nielsen(<i>Patkasiris</i> – Beng.)	Tree	Apr. – Jan.	Common	Mathabhanga, SB – 3476.	
<i>Albizia odoratissima</i> (Linn. f.) Benth.	Tree	Apr. – Jan..	Less Common	Jamalda, SB – 3640	
<i>Albizia procera</i> (Roxb.) Benth. (<i>KoroiSiris</i> – Beng.)	Tree	Jun.- Jan.	Common	Mathbhanga, SB – 3680.	
<i>Leucaena latisiliqua</i> (Linn.) Gills (<i>Subhabul</i> – Beng.).	Shrub or small tree	May – Jan.	Common	Chilakhana, SB – 3638.	Fodder(tw.); fuel wood
<i>Mimosa pudica</i> Linn. (<i>Lajja-bati</i> – Beng.; <i>Lajnu</i> – Sant.).	Under-shrub	Jul. – Nov.	Very common	Jamalda forests, SB – 2971; Khagratoli, SB – 3038.	Parturifacient(rt.),blood dysentery(tender shoot) ,burn wounds(lf.),fever(rt), body-ache(pl.),snake bite (rt.)
<i>Mimosa rubicaulis</i> Lam.	Shrub	Jul. – Oct.	Common	Gossanimari, SB – 3331	
<i>Pithecellobium dulce</i> (Roxb.)Benth.(<i>Dhekanibabla</i> – Beng.; <i>Jilapiphal</i> – Rj.)	Tree	Mar. – Oct.	Less Common	Kochbihar, SB – 3576.	Edible(sd.)
<i>Samanea saman</i> (Jacq.) Merr.,	Tree	Apr. – Nov.	Common	Kochbihar, SB – 3581.	

DISCUSSION

The forest vegetation of Koch Bihar district is Tropical moist deciduous type. Presently the district has a total forest cover of 45.31 sq. km and the forests are scattered in few pockets as protected forests. The common trees and shrubs of legumes in forest terrain includes *Acacia catechu*, *Albizia chinensis*, *Butea monosperma*, *Dalbergia sisoo*, *Desmodium pulchellum*, *Erythrina stricta*, *Flemingia macrophylla*, *Flemingia strobilifera* etc. A number of herbaceous species of legumes are also grown in the forest floor. Some of them are *Crotalaria albida*, *Crotalaria bialata*, *Desmodium motorium*, *Desmodium triquetrum*, *Mimosa pudica*, *Senna alata*, *Vicia hirsuta*, *Vicia tetrasperma* etc. The common climbers and twiners found in this forest are *Abrus precatorius*, *Caesalpinia bonduc*, *Caesalpinia cucullata*, *Cajanus scarabaeoides*, *Mucuna pruriens* and *Pueraria phaseoloides*.

Beside the forest terrain, a vast stretches of land in the villages and urbanized area as well as wastelands beside ag-

ricultural fields, roadsides, railway tracks, canal banks, harbor a number of leguminous species. Tree legumes are generally planted by the villagers for meeting their needs or planted in afforestation programme by the forest department beside roads and waste places. It has been seen those tree species are sometimes naturalized and running wild. Some of them are *Acacia auriculiformis*, *Acacia farnesiana*, *Acacia nilotica* subspecies *cupressiformis*, *Albizia lebbek*, *Albizia lucidior*, *Cassia fistula*, *Dalbergia sisoo*, *Delonix regia*, *Derris indica*, *Erythrina stricta*, *Erythrina variegata*, *Leucaena latisiliqua*, *Peltophorum pterocarpum*, *Pithecellobium dulce*, *Samanea saman*, *Senna siamea*, *Sesbania grandiflora*, *Tamarindus indica* and others. The common herbs and undershrubs of those areas are *Alysicarpus monilifer*, *Alysicarpus vaginalis*, *Crotalaria pallida*, *Desmodium gangeticum*, *Desmodium laxiflorum*, *Desmodium triflorum*, *Medicago lupulina*, *Mimosa pudica*, *Senna occidentalis*, *Senna sophera*, *Senna tora* and many others.

It has been noted during study that a good number of species are exotic in origin and they became naturalized in Koch Bihar flora. American elements are more dominant among the exotic species, some of them are *Acacia farnesiana*, *Caesalpinia pulcherrima*, *Clitoria ternatea*, *Delonix regia*, *Leucaena latisiliqua*, *Mimosa pudica*, *Pithecellobium dulce*, *Samanea saman*, *Senna alata*, *Senna occidentalis*, *Senna sophera*, *Senna tora* and others. Similarly *Lens culinaris*, *Lathyrus aphaca*, *Medicago lupulina*, *Melilotus alba*, *Vicia hirsuta*, *Vicia sativa* etc constitute the European elements of the flora. Legumes of African origin naturalized in this district include *Acacia nilotica*, *Lathyrus sativus*, *Sesbania sesban* and *Tamarindus indica*.

The present study reveals that the legumes of the district of Koch Bihar are represented by 81 species under 36 genera. The proportions of genera to species are 1: 2.25. The numerical representation of genus and species under three subfamilies is presented in Table 4 and Diagram 1. A comparison between Koch Bihar, West Bengal²² and India²³ regarding diversity of Legumes has been presented in Diagram 2. There are 28 species of trees, 16 species of shrubs, 29 species of herbs and 8 species of climbers recorded during study. The analysis of habits of the species in each sub-family is provided in Table 5 and Diagram 3. Among the legumes *Desmodium* shows maximum species diversity having 9 species followed by *Acacia*, *Crotalaria* and *Senna* with 6 species each. In contrary there are 16 genera having single species each.

Table 4: Conspectus of the family Leguminosae of Koch Bihar district

Sub-Families	No. of Genera	No. of Species
Mimosoideae	06	16
Caesalpinioideae	08	18
Faboideae	22	47
Total	36	81

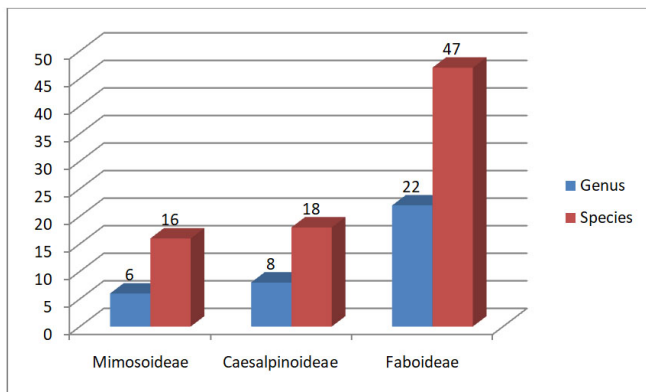


Diagram 1: Distribution of taxa in different sub-families of Leguminosae.

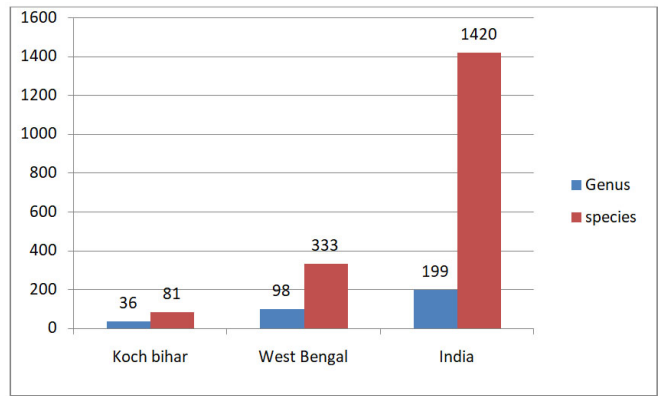


Diagram 2: Comparison between the Legumes of Koch Bihar, West Bengal and India regarding different taxa.

Table 5: Numerical analysis of the growth forms of Legumes of Koch Bihar district

Sub-Families	Tree	Shrub	Herb	Climber
Mimosoideae	12	03	01	-
Caesalpinioideae	09	04	03	02
Faboideae	07	09	25	06
Total	28	16	29	08

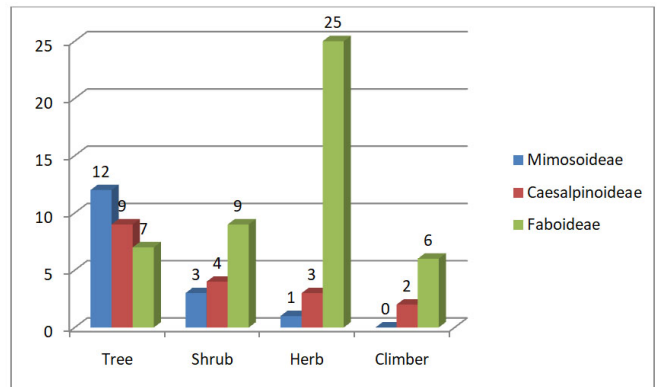


Diagram 3: Growth forms in different sub-families of Leguminosae.

During the present study uses of leguminous plants by the ethnic communities and rural peoples of the district has also been recorded. The results shows that 31 species of legumes under 24 genera are used for various purposes which are about 38% of the legume flora of the district and several species have more than one kind of uses. The collected information shows that plants and plant parts of 11 species are edible, 20 species have medicinal uses, 2 species are used as fodder, woods of 3 species are used in constructions and making household articles and 6 species have miscellaneous uses. A total of 69 uses have been recorded during the present study and it has been noted that leaves of the legumes are used in maximum occasion (18) followed by stem & twigs (14) and roots & seeds (09).

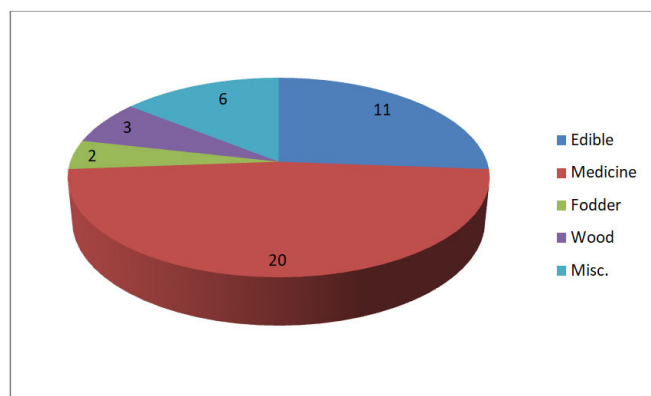


Diagram 4: Numerical analysis of different ethnobotanical uses.

CONCLUSION

The present study concludes that the Leguminosae or Fabaceae is the most dominant and diversified family which constitutes about 10% of the total Angiospermic flora of the district. But the rapid urbanization and increase in population causes serious damage to the habitats of these plants. Much damage to the forest vegetation is being done by the cattle grazing. Grazing animals on one hand browse the tree seedlings and on the other hand trampling the soil and seedlings. Therefore, soil become compact and become unsuitable for the growth of the plants. Anthropogenic interference like extraction of “catechu” gum from *Acacia catechu*, peeling of barks for preparation of medicines and careless and illegal cutting and lopping from the plants for the purpose of fodder and firewood are the causes of the loss of species diversity. Similarly, extensive collection of useful seeds, fruits, roots etc. from plants like –*Abrus precatorius*, *Derris indica*, *Butea monosperma*, *Mucuna pruriens* etc. effects the natural regeneration of population of the species. On the other hand the indigenous knowledge especially the uses of the herbal drugs are in threat due to modernization of the society and loss of interest among the young generation of ethnic and rural peoples about the traditional healing methods. It is, therefore, an urgent need to protect the plants to save the diversity of leguminous flora as well as the ethnic culture of the district.

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REFERENCES

1. The Legume Phylogeny Working Group. Legume phylogeny and classification in the 21st century: progress, prospects and lessons for other species rich clades. *Taxon* 2013; 62:217-48.
2. Hutchinson J. The Families of Flowering Plants. 3rd ed. London: Oxford University Press; 1973.
3. Cronquist A. Evolution and Classification of Flowering Plants. 2nd ed. New York: New York Botanic Garden; 1988.
4. Dahlgren G. The last Dahlgrenogram. Systems of classification of dicotyledons. In : Tan K. editor. The Davis and Hedge Festschrift. Edinburgh: Edinburgh University Press; 1989.p.249-60.
5. Doyle JA, Endress PK. Morphological phylogenetic analysis of basal angiosperms: comparison and combination with molecular data. *Int Jour Plant Sci* 2000; 165(6 suppl):S55-67.
6. Takhtajan A. Flowering Plants. 2nd ed. Springer; 2009
7. Thorne RF. (2003). An updated classification of the class Angiospermae www.rsabg.org/publication/angiosp.htm.
8. The Angiosperm Phylogeny Group. An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG IV. *Bot Jour Linn Soc* 2016; 181: 1–20.
9. The Legume Phylogeny Working Group. A new subfamily classification of the Leguminosae based on a taxonomically comprehensive phylogeny. *Taxon* 2017; 64:44-77.
10. Aditya NR Ghosh RB. Further contribution to the flora of Cooch Behar district, West Bengal. *Jour Econ Tax Bot* 1989; 13: 437-53.
11. Bandyopadhyay S. A Systematic Census on the Sedges of Koch Bihar district, West Bengal. *Ind Jour Appl Pure Biol* 2017; 32:181-188.
12. Bandyopadhyay S, Mukherjee SK. Diversity of Aquatic & Wetland vascular plants of Koch Bihar district, West Bengal. In: Pandey AK et al., editors. *Plant Taxonomy: Advances and Relevance*. New Delhi: CBS Publishers; 2005.p.223-44.
13. Bandyopadhyay S, Mukherjee SK. Diversity of climbing plants in Koch Bihar district of West Bengal, India 2010; *Pleione* 4: 82-9.
14. Bandyopadhyay S, Mukherjee SK. A Sketch of the Monocot Flora of Koch Bihar district, West Bengal *Jour Econ Tax Bot* 2017; 40:99-103.
15. Banerjee BC. Addition to the flora of Cooch Behar district, West Bengal. *Jour Econ Tax Bot* 1992; 16 :177-83
16. Lawrence GHM. *Taxonomy of vascular plants*. London: Macmillan Company; 1951.
17. Jain SK Rao RR. *A Handbook of Field & Herbarium Methods*. New Delhi: Today and Tomorrows' Printers and Publishers; 1977.
18. Jain SK. Medicinal Plant lore of tribal of Bastar. *Econ Bot* 1965; 19:236-50
19. Jain SK. editor. *Glimpses of Indian Ethnobotany*. New Delhi: Oxford and IBH Publishing Company; 1981.

20. Jain SK, A Manual of Ethnobotany, 2nd ed. Jodhpur: Scientific Publisher; 1995.
21. Pal DC, Jain SK. Tribal Medicine. Calcutta: Naya Prakash ; 1999.
22. Mitra S. Floristic diversity of West Bengal, India. Germany: Lambert Academic Publishing; 2016.
23. Karthikeyan S. 2000. A statistical analysis of flowering plants of India. In: Singh NP, Singh DK, Hajra PK, Sharma BD. editors. Flora of India Intro. Vol., Part II. Calcutta: Botanical survey of India; p. 201 – 17.