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COMMUNICATION

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Legumes (Angiosperms: Fabaceae) of Bagalkot District, Karnataka, India

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Abstract: Fabaceae Lindl. or Leguminosae is one of the largest families of Angiosperms. Due to adaptability in various climatic conditions, members of the family Fabaceae are worldwide in their distribution. Globally, Fabaceae is represented by 770 genera and 19,500 taxa. Bagalkot is one of the largest districts of northern Karnataka and falls under the Deccan Peninsular region of India. The study area (Bagalkot District) is a rain shadow region and remains dry and hot throughout year. During floristic analysis of the District the authors recorded 157 species of legumes, which is communicated here in relation to habitat, life forms, distribution, classification and their importance.

Keywords: Deccan, Leguminosae, southern India, sub-family.

Kannada: ಫ್ಯಾಬಾಸೀ ಲಿಂಡ್ಲ್ ಅಥವಾ ಲೆಗುಮಿನೋಸೀ ಆಂಜಿಯೋಸ್ಪರ್ಮ್ಗಳಲ್ಲಿರುವ ಅತಿದೊಡ್ಡ ಸಸ್ಯ ಕುಟುಂಬಗಳಲ್ಲಿ ಒಂದು. ಫ್ಯಾಬಾಸೀ ಕುಟುಂಬದ ಸದಸ್ಯರು ವಿವಿಧ ರೀತಿಯ ಹವಾಮಾನಕ್ಕೆ ಹೊಂದಿಕೊಳ್ಳುವ ಸಾಮರ್ಥ್ಯದಿಂದಾಗಿ, ವಿಶ್ವಾದ್ಯಂತ ಹರಡಿಕೊಂಡಿವೆ. ಜಾಗತಿಕವಾಗಿ, ಫ್ಯಾಬೇಸಿಯನ್ನು 770 ತಳಿಗಳು ಮತ್ತು 19,500 ಗುಂಪುಗಳು ಪ್ರತಿನಿಧಿಸುತ್ತವೆ. ಬಾಗಲಕೋಟೆ ಉತ್ತರ ಕರ್ನಾಟಕದ ಅತಿದೊಡ್ಡ ಜಿಲ್ಲೆಗಳಲ್ಲಿ ಒಂದಾಗಿದೆ ಮತ್ತು ಇದು ಭಾರತದ ಡೆಕ್ಕನ್ ಪೆನಿನ್ಸುಲರ್ ಪ್ರದೇಶದ ಅಡಿಯಲ್ಲಿ ಬರುತ್ತದೆ. ಅಧ್ಯಯನ ಪ್ರದೇಶ (ಬಾಗಲಕೋಟೆ) ಮಳೆ ನೆರಳು ಪ್ರದೇಶವಾಗಿದ್ದು ವರ್ಷಪೂರ್ತಿ ಶುಷ್ಕ ಮತ್ತು ಉಷ್ಣ ವಾತಾವರಣ ಹೊಂದಿರುತ್ತದೆ. ಜಿಲ್ಲೆಯ ಸಸ್ಯಗಳ ಅಧ್ಯಯನ ಹಾಗೂ ವಿಶ್ಲೇಷಣೆಯ ಸಮಯದಲ್ಲಿ ಲೇಖಕರು ಇಲ್ಲಿ ನಮೂದಿಸಿದ 157 ಜಾತಿಯ ಲೆಗುಮ್ಸ್ಗಳ ಆವಾಸಸ್ಥಾನ, ಜೀವ ವಿಧಗಳು, ಹಂಚಿಕೆ, ವರ್ಗೀಕರಣ ಮತ್ತು ಅವುಗಳ ಪ್ರಾಮುಖ್ಯತೆಯನ್ನು ಇಲ್ಲಿ ದಾಖಲಿಸಿದ್ದಾರೆ.

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Author contribution: JVD—Field exploration, collection, herbarium preparation, identification, herbarium consultation and photography. RP—Field exploration, collection, laboratory studies, literature survey and local communication. SSK—Filed exploration, collection, data analysis and nomenclatural updates. VDJ—Laboratory analysis, literature survey, ethnobotanical data. SRY—Field exploration, collection, identification, laboratory analysis and photography.

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INTRODUCTION

Legumes are the third largest group of Angiosperms in terms of species number after Orchidaceae and Asteraceae and the second economically most important family after Poaceae (FAO 2016). Globally Fabaceae consists of 770 genera and over 19,500 species (LPWG 2017) in India, Fabaceae are represented by 147 genera, 805 species, 33 sub-species, 155 varieties and 14 forms (Sanjappa 1991, 1995; Dave 2004; Chaudhary & Khan 2005; Ansari 2008; Jabbar et al. 2010; Chavan et al. 2013; Gaikwad et al. 2014). Legumes are important food crops providing highly nutritious sources of protein and micronutrients. These micronutrients greatly benefit health and livelihoods, particularly in developing countries. They have been domesticated alongside grasses in different areas of the world since the beginning of agriculture and have played a key role in early agricultural development (Gepts et al. 2005; Hancock 2012; Yahara et al. 2013). Wild bean plants are also uniquely important as fodder and green manure in both temperate and tropical regions, and are used for their wood, tannins, oils and resins, in the manufacture of varnishes, paints, dyes and medicines and in the horticultural trading (LPWG 2017). Apart from socio-economic importance, legumes are equally beneficial for ecosystems and recycling by nitrogen fixation, improve soil porosity and structure, recycling of nutrients, decrease soil pH, reduction of soil compaction and in rotation with cereals they provide a source of slow-release nitrogen to sustainable cropping system (USDA 1998; Popelka et al. 2004). Many legumes play an important ecological role as they are major components of dry deciduous forests, ground cover and many are cultivated as major crops of the region and some have ornamental potential. In brief, legumes play a major role in socio-economic development of the region. Therefore, the present study focuses on the preparation of the database of legumes of Bagalkot District. While surveying this area it is observed that the flora of this district is dominated by the family Fabaceae. The probable reason of this high diversity may be adaptability to various habitats.

MATERIALS AND METHODS

Study area

Bagalkot is a district of northern Karnataka State separated from Vijayapura in 1997. The whole region falls under the Deccan Plateau and most of it comes under a rain shadow area. Due to low rainfall and hot & dry climatic conditions, the region is dominated by dry deciduous forests, scrub jungles, and vast seasonal grasslands. The district lies at 16.316^{0}N, 76.000^{0}E and 533m altitude and having a total area of 6,552km^2 (Dalavi et al. 2019). The district is divided into six sub-district regions, namely: Badami, Bagalkot, Bilgi, Hungund, Jamkhandi and Mudhol (Fig. 1). Rabakavi-Banahatti Guledgudda and Ilkal are newly divided taluk places. Major habitats of the districts are large rocky hills, gravelly slopes, sandy plains, perennial & seasonal lakes, marshy & saline areas, ditches, rivers, and black soil plains. Average rainfall recorded in the last decade ranges 337–819 mm and the average temperature reported ranges 17–42^{0}C. June to September is the monsoon season and February to May is the actual summer season. Due to hot arid conditions the area is blessed with spiny and thorny forests interrupted with grasslands.

Data collection

A preliminary list of the species belonging to Fabaceae from Bagalkot District was prepared from all the available floras, revisions and checklists (Gamble 1935; Cooke 1958; Britto 1983; Singh 1988; Sharma & Balakrishnan 1993; Prasad & Singh 2002; Prajapati 2010; Kambhar & Katrahalli 2016; Dalavi et al. 2019). Herbarium studies were carried out by visiting some important herbaria namely BSI, CAL, MH, NGCPR and SUK, which was followed by extensive and intensive field tours throughout the district covering various habitats from June 2014 to January 2020. More than 90 tours were carried out and the data on habitat, distribution, phenology and local uses were recorded. Three to four herbarium specimens were prepared for each collected species by following standard procedures (Rao & Sharma 1990). Identifications were confirmed by using floras, revisions and all the available taxonomic literature (Gamble 1935; Cooke 1958; Matthew 1981; Sharma et al. 1984; Sharma & Balakrishnan 1993; Prasad & Singh 2002; Kanbhar & Katrahalli 2016). Problematic and notable species were identified by direct comparison with identified specimens deposited in BSI, SUK, CAL and digital herbaria such as Herbarium JCB (accessed from January 2014–December 2019), Kew Herbarium Catalogue (accessed from January 2017–March 2020) and JSTOR Global Plants (accessed from February 2017–December 2019). The nomenclature of plant species collected was updated using POWO (Plants of the world online Kew-science accessed from January 2015–December 2019) and Tropicos (tropicos.org accessed

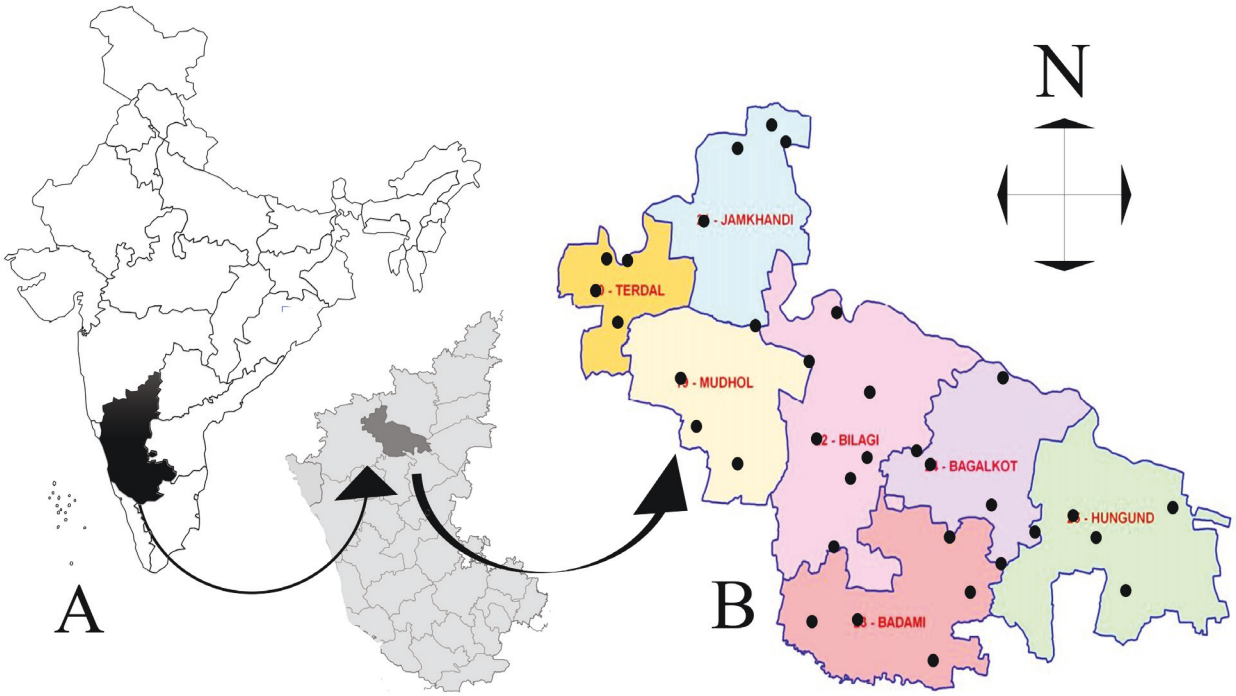

Figure 1. A—Position of Bagalkot District | B—Detailed map of study area.

from January 2017–January 2020). All leguminous taxa are grouped here according to the latest classification of Fabaceae (LPWG 2017) (Table 1). Charts and maps are provided for subfamily-wise classification and study area, respectively. Colour plates for important taxa are also provided for easy identification of species. Ethnobotanical information was collected by direct interaction with local people, ayurvedic practitioners and farmers.

RESULTS

Enumeration

A total of 157 taxa of Fabaceae have been reported from the Bagalkot District of Karnataka which measures about 15% of the total flora. All the legumes of the district belong to four subfamilies of Fabaceae, viz., Cercidoideae, Detarioideae, Caesalpinioideae and Papilionoideae; of which Papilionoideae or Faboideae is the largest subfamily with 45 genera and 106 species followed by Caesalpinioideae with 22 genera & 45 species, Cercidoideae with three genera & four species and Deratioideae with two genera & two species, respectively (Fig. 2). *Crotalaria* L. and *Indigofera* L. are the largest genera with 12 species each, followed by *Rhynchosia* Lour. with 10 taxa and *Alysicarpus* Desv. & *Senna* L. with nine species each. Fabaceae of the district consists of 48 tree species, eight shrubs, eight sub-shrubs, 74 herbs, and 18 climbers & creepers.

Endemism

Some plants are habitat specific and are endemic to peninsular India, viz., *Alysicarpus gamblei* Schindl., *Crotalaria paniculata* Willd., *C. pusilla* Roxb. ex Wight & Arn., *C. vestita* Baker found to be growing on rocky and sandy areas and are endemic to southern peninsular India (Dalavi et al. 2019). *Alysicarpus gamblei* Schindl. is only known from six localities of Karnataka and Maharashtra of which Bagalkot District has the highest population (Dalavi et al. 2019). *Vigna indica* Dixit et al. is also a dominant species of open areas and grasslands endemic to peninsular India. *Mimosa prainiana* Gamble a woody tree endemic to peninsular India which is also important member of dry forests of Bagalkot District.

Ethnobotany and economics

Many wild legumes are used as a source of medicine and food by local people. Pods of *Vachellia nilotica* (L.) P.J.H.Hurter & Mabb. are used to make tooth powder by drying and crushing the seeds; gum exuded from the stem is highly valued and used to cure many diseases and is edible, generally given to pregnant ladies in the form of small pieces mixed with dry fruits; tender branches are used as fodder for goats, timber is used in building and construction. Fresh flowers of *Sesbania grandiflora*

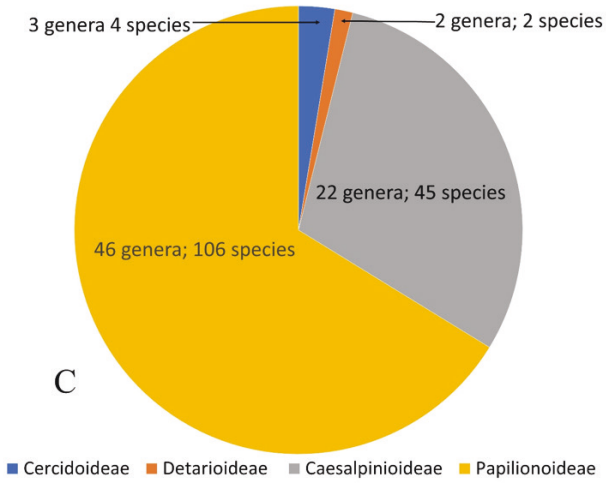

Figure 2. Subfamily wise distribution of legumes of Bagalkot District (as per LPWG 2017).

(L.) Poir are popularly eaten as a wild vegetable. Pericarp of *Vachellia farnesiana* (L.) Wight. & Arn. are dried and chewed to cure coughs. Young pods of *Vigna indica* are eaten raw as well as after cooking. Leaf powder of *Dichrostachys cinerea* (L.) Wight & Arn. is taken in water for common fever. Leaves, roots and seeds of *Senna tora* (L.) Roxb. and *S. occidentalis* (L.) Link are used to cure skin problems like itching and inflammations. Powdered seeds of *Senna sophera* (L.) Roxb. are used against ringworms. Leaf juice of *Guilandina bonduc* L. is taken to cure piles.

Economically important pulses *viz*., *Arachis hypogea* L., *Cajanus cajan* (L.) Huth, *Cyamopsis tetragonoloba* (L.) Taub., *Glycine max* (L.) Merr., *Lablab purpureus* (L.) Sweet, *Phaseolus vulgaris* L., *Pisum sativum* L., *Tamarindus indica* L., *Trigonella foenum-graecum* L., *Vigna aconitifolia* (Jacq.) Marechal, *Vigna mungo* (L.) Hepper, *Vigna radiata* (L.) Wilezek and *Vigna unguiculata* (L.) Walp. are cultivated on a large scale as vegetables. All crop legumes play an important role in the agro-economic development of the region. Avinash & Patil (2018) analysed that among the northern districts of Karnataka, Bagalkot is second largest producer of pulses and leguminous crops.

Acacia auriculiformis A.Cunn. ex Benth., *A. mangium* Willd., *Adenanthera pavonina* L., *Albizia lebbek* (L.) Benth., *Dalbergia sisoo* Roxb. ex DC., *D. latifolia* Roxb., *Delonix regia* (Bojer ex Hook.) Raf., *D. elata* (L.) Gamble, *Cassia fistula* L., *C. javanica* L., *Senna siamea* (Lam.) H.S.Irwin & Barneby, *Clitorea ternatea* L., *Parkia biglandulosa* Wight & Arn., *Pithecellobium dulce* (Roxb.) Benth., *Pongamia pinnata* (L.) Pierre, *Prosopis cineraria* (L.) Druce, *Samanea saman* (Jacq.) Merr. are extensively planted as garden and avenue plants throughout the district.

Wood of *Albizia lebbek* (L.) Benth., *Dalbergia latifolia* Roxb., *D. sisso* Roxb. ex DC., *Tamarindus indica* L., *Senegalia chundra* (Roxb. ex Rottler) Maslin, *Vachellia nilotica* (L.) P.J.H.Hurter & Mabb. is used in the construction of houses and farming equipment.

Guilandina bonduc L., *Sesbania aculeata* (Schreb.) Pers. & *S. sesban* (L.) Merr. are used as bio-fencing plants along farm yards.

Ecology

Apart from the economic potential, some legumes are dominant weeds of the region like *Aeschynomene aspera* L., *A. indica* Burm.f., *Neptunia triquetra* Benth., etc., which grow along water bodies and spread throughout. *N. triquetra* if it enters into a pond ecosystem grows aggressively and forms a dense mat on the water surface and affects other biota. *Alysicarpus bupleurifolius* (L.) DC., *A. tetragonolobus* Edgew., *Cullen corylifolium* (L.) Medik, *Desmodium scorpiurus* (Sw.) Desv. ex DC., *Prosopis juliflora* (Sw.) DC., *Senna occidentalis* (L.) Link, *S. tora* (L.) Roxb., *S. uniflora* (Mill.) H.S.Irwin & Barneby and *Rothia indica* (L.) Druce grow in cultivated fields and have adverse effects on crop productivity. *Gliricidia sepium* (Jacq.) Steud. is one of the invasive tree species rapidly encroaching the forest areas of the region and have negative effects on native flora and the natural ecosystem.

Legumes play some important ecological roles. They are the factories of nitrogen fixation being equipped with root nodules. The study area is an arid zone hence it lacks dense forests. The resulting soil erosion is due to minimum leaf litter which fails to keeps soil moisture constant, however, some legumes, *viz*., *Crotalaria hebecarpa* (DC.) Rudd., *C. orixensis* Rottler ex Willd., *Indigofera linnaei* Ali, *I. linifolia* (L.f.) Retz., *Tephrosia strigosa* (Dalzell) Santapau & Maheshw., *Eleiotis rottleri* Wight & Arn., *E. sororia* (L.) DC., and *Rhynchosia capitata* (B.Heyne ex Roth) DC. form a dense mat on soil surfaces and maintain the moisture.

CONCLUSION

Due to adaptability to the various ecological and geographical conditions Fabaceae are the most dominant family of flora of Bagalkot District. Legumes like *Acacia* Mill., *Albizia* Durazz., *Bauhinia* Plum ex L., *Cassia* L., *Mimosa* L., *Mundulea* (DC) Benth., *Phanera* Lour., *Senegalia* Raf., *Vachellia* Wight & Arn. are the

Table. 1. Checklist of legumes of Bagalkot District as per latest classification LPWG (2017).

	Name of taxon	Habit	Phenology	Habitat & Localities	Exsiccata
Sub-family: **CERCIDOIDEAE** (3 genera 4 species)					
1	*Bauhinia tomentosa* L.*	Tree	Nov–May	Dry deciduous forest (Bd, Bi, G, J, M)	JVD-247 JVD-1204
2	*Phanera purpurea* (L.) Benth.	Tree	Nov–Mar	Deciduous forests/ planted (Bd, Bg, G, H, I)	JVD-1389
3	*Phanera variegata* (L.) Benth.	Tree	Oct–May	Planted as avenue tree (Bg, J, M, N)	JVD-1390
4	*Piliostigma racemosum* (Lam.) Benth.	Tree	Mar–Sept	Deciduous and scrub forest (Bd, Bi, G, H, I, J, M)	JVD-22
Sub-family: **DETARIOIDEAE** (2 genera, 2 species)					
5	*Hardwickia binata* Roxb.	Tree	Aug–Jan	Deciduous forests/ planted (Bd, Bg, Bi, G, J, M)	JVD-1391
6	*Tamarindus indica* L. *	Tree	Apr–Sept	In forest/ planted (Throughout year)	JVD-261
Sub-family: **CAESALPINIOIDEAE** (22 genera, 45 species)					
7	*Acacia auriculiformis* Benth.*	Tree	Jan–Aug	Planted and escaped in wild (Bd, Bg, Bi, J, N, R)	JVD-1392
8	*Acacia mangium* Willd. *	Tree	Jun–Aug	Planted and escaped in wild (Bg, J, N)	JVD-1393
9	*Adenanthera pavonina* L.	Tree	Dec–Apr	Planted (Bd, Bg, J, N, R, T)	JVD-1394
10	*Albizia amara* (Roxb.) Boiv.	Tree	Apr–Aug	Deciduous and scrub forest (Throughout district) (Bd, Bg, Bi, H, J, M)	JVD-172 JVD-1285
11	*Albizia lebbeck* (L.) Benth.	Tree	Apr–Aug	Dry deciduous forests and along roadsides. (Throughout district) (Bd, Bg, Bi, H, I, J, M, R)	JVD-241
12	*Cassia fistula* L.	Tree	Feb–Apr	Along roadsides (Throughout district)	JVD-302
13	*Cassia javanica* L. *	Tree	Mar–Jul	Planted (Bg, H, J, N, R, T)	JVD-1396
14	*Caesalpinia pulcherrima* (L.) Sw. *	Tree	Throughout year	Dry deciduous forests and along roadsides (Throughout district)	JVD-249
15	*Chamaecrista absus* (L.) H.S. Irwin & Barneby	Herb	Aug–Feb	Open forests and wastelands (Throughout district)	JVD-303 JVD-847
16	*Chamaecrista mimosoides* (L.) Greene *	Herb	Jul–Nov	Gravelly slopes (Bd, Bg, Bi, G, J, M, N, T)	JVD-1397
17	*Chamaecrista pumila* (Lam.) K. Larsen.	Herb	Jul–Dec	Open forests and wastelands (Bd, G, J, T)	JVD-304 JVD-928
18	*Delonix regia* (Hook.) Raf. *	Tree	Jan–June	Planted and also escaped (Throughout district)	JVD-1398
19	*Delonix elata* (L.) Gamble *	Tree	Sept–Dec	Dry deciduous forests (Throughout district)	JVD-1399
20	*Dichrostachys cinerea* Wight et Arn.	Tree	Jun–Aug	Dry deciduous forests (Throughout district)	JVD-19 JVD-908 JVD-1291
21	*Guilandina bonduc* L.	Shrubs	Jun–Feb	Cultivated, found along roadsides and open places (Bd, Bi, G, J, M, R)	JVD-250
22	*Lysiloma latisiliquum* (L.) Benth. *	Tree	Throughout year	Planted along roadside and as fodder plant (Throughout district)	JVD-1383
23	*Mimosa hamata* Willd.	Shrub	Jul–Oct	Deciduous forests (Throughout district)	JVD-311 JVD-930 JVD-911 JVD-1209 JVD-1224
24	*Mimosa prainiana* Gamble	Shrubs	Jul–Oct	Deciduous forest (Throughout district)	(Singh 1988 Op. cit.)
25	*Mimosa pudica* L. *	Herb	Jul–Mar	Dry forests and wastelands (Throughout district)	JVD-173
26	*Neptunia triquetra* Benth.	Herb	Nov–May	Stagnant water bodies (H)	(Singh 1988 Op. cit.)
27	*Libidibia coriaria* (Jacq.) Schltdl. *	Shrubs	Throughout year	Open areas (Throughout district) (Bd, Bg, T)	JVD-1385
28	*Parkia biglandulosa* Wight & Arn.	Tree	Nov–May	Planted (Bg, J, M, N)	JVD-1386
29	*Parkinsonia aculeata* L. *	Tree	Mar–Oct	Planted (Bg, J, M, N)	JVD-1387
30	*Peltophorum pterocarpum* Aucp. Non K.Heyne. (DC.) K.Heyne *	Tree	Jul–Jan	Planted and escaped in forest (Ba, J, L, M, N, T)	JVD-171 JVD-1296

	Name of taxon	Habit	Phenology	Habitat & Localities	Exsiccata
31	*Pithecellobium dulce* (Roxb.) Benth. *	Tree	Throughout year	Dry deciduous forests and along roadsides (Throughout district)	JVD-314
32	*Prosopis cineraria* (L.) Druce.	Tree	Sept–Apr	Wastelands, dry deciduous forests and along roadsides (Throughout district)	JVD-316
33	*Prosopis juliflora* (Sw.) DC. *	Tree	Sept–Apr	Dry deciduous forests and along roadsides (Throughout district)	JVD-317 JVD-1268
34	*Samanea saman* (Jacq.) Merr. *	Tree	Apr–Aug	Planted (Bd, Bg, Bi, J, N)	JVD-1395
35	*Senegalia chundra* (Roxb. ex Rottler) Maslin	Tree	Aug–Jan	Dry deciduous forests (Throughout district)	JVD-94
36	*Senegalia rugata* (Lam.) Britton & Rose	Tree	Aug–Jan	Dry deciduous forests (Throughout district)	JVD-232
37	*Senegalia polyacantha* (Willd.) Seigler & Ebinger	Tree	Aug–Apr	Dry deciduous forests and along roadsides (Throughout district)	JVD-237
38	*Senna alexandrina* Mill.	Sub-shrubs	Nov–Jun	Open areas and wastelands (H, I)	JVD-1388
39	*Senna auriculata* (L.) Roxb.	Tree	Jul–Feb	Deciduous forests and open areas (Throughout district)	JVD-159
40	*Senna italica* Mill. subsp. *micrantha* (Brenan) Lock	Tree	Jul–Feb	Deciduous forests and open forests (Bd, Bi, G, H, I)	JVD-264 JVD-874 JVD-875
41	*Senna sophera* (L.) Roxb. *	Sub-shrubs	Oct–Feb	Open areas and wastelands (Throughout district)	JVD-1400
42	*Senna occidentalis* (L.) Link *	Herb	Jul–Feb	Open forests and wastelands (Throughout district)	JVD-68
43	*Senna siamea* (Lam.) H.S.Irwin & Barneby *	Tree	Apr–Feb	Open forests and wastelands (Throughout district)	JVD-266
44	*Senna surattensis* (Burm.f.) H.S. Irwin & Barneby	Tree	Sept–Apr	Cultivated (Bd, J)	JVD-1401
45	*Senna tora* (L.) Roxb. *	Herbs	Jul–Apr	Open areas and wastelands (Throughout district)	JVD-267
46	*Senna uniflora* (Mill.) H.S.Irwin & Barneby *	Herbs	Sept–May	Open areas and wastelands (Throughout district)	JVD-1402
47	*Vachellia eburnea* (L.f.) P.J.H.Hurter & Mabb.	Tree	Aug–Feb	Dry deciduous forests and along roadsides (Throughout district)	JVD-1403
48	*Vachellia farnesiana* (L.) Wight & Arn. *	Small tree	Aug–Feb	Dry deciduous forests (Throughout districts)	JVD-233
49	*Vachellia horrida* (L.) Kyal. & Boatwr.	Small tree	Jul–Jan	Dry deciduous forests (Throughout district)	JVD-204
50	*Vachellia leucophloea* (Roxb.) Maslin	Tree	Aug–Feb	Dry deciduous forests and along road sides (Throughout district)	JVD-236
51	*Vachellia nilotica* (L.) P.J.H. Hurter & Mabb.	Tree	Aug–Mar	Dry deciduous forests and planted along roadsides (Throughout district)	JVD-08
PAPILIONOIDEAE (46 genera, 106 species)					
52	*Abrus precatorius* L.	Climber	Sept–Jun	Dry deciduous forests (Bd, Bi, Bg, G, J, M)	JVD-07 JVD-1211
53	*Alysicarpus bupleurifolius* (L.) DC.	Herb	Aug–Nov	Grasslands and Open areas (Bd, Bg, G, I, J, M, R)	JVD-242
54	*Alysicarpus gamblei* Schindl.	Herb	Aug–Nov	Rocky hills and sandy plains (Bd)	JVD-835
55	*Alysicarpus hamosus* Edgew.	Herb	Sept–Nov	Gravelly plains and Grasslands (Throughout district)	JVD-138, JVD-831
56	*Alysicaprus longifolius* (Rottl. ex Spreng.) Wight & Arn.	Herb	Sept–Mar	Open areas and weed of cultivated fields (L, M)	JVD-1404
57	*Alysicarpus monilifer* (L.) DC.	Herb	Aug–Dec	Gravelly plains and Grasslands (Throughout district)	JVD-244 JVD-914 JVD-1230
58	*Alysicarpus ovalifolius* (Schum.) Leonard	Herb	Sept–Dec	Along cultivated fields and wastelands (Bd, Bg, Bi, G, I, J)	JVD-1405
59	*Alysicarpus scariosus* (Spreng.) Thwaites	Herb	Aug–Dec	Seasonal grasslands and wastelands (Bd, L)	JVD-871 JVD-876
60	*Alysicarpus tetragonolobus* Edgew.	Herb	Jul–Dec	Grasslands and Open areas (Bd, Bg, Bi, G, M)	JVD-245
61	*Alysicarpus vaginalis* (L.) DC.	Herb	Sept–Dec	Gravelly plains and Grasslands (Throughout district)	JVD-246
62	*Arachis hypogaea* L. *	Herb	Nov–Mar	Cultivated farms (Throughout district)	JVD-1380

	Name of taxon	Habit	Phenology	Habitat & Localities	Exsiccata
63	*Aeschynomene aspera* L.	Herb	Throughout year	Along water bodies (KS)	JVD-238
64	*Aeschynomene indica* L.	Herb	Throughout year	Along water bodies (Bd, Bg, J, R)	JVD-239
65	*Butea monosperma* (Lam.) Taubert	Tree	Dec–May	Dry deciduous forests and along roadsides (Bd, Bg, J, L, M)	JVD-248
66	*Cajanus cajan* (L.) Millspaugh	Shrub	Aug–Apr	Cultivated (Throughout district)	JVD-1381
67	*Cajanus scarabaeoides* (L.) Thouars.	Creeper	Jul–Dec	Grasslands, Wastelands and Open areas (B, J, L, M)	JVD-301 JVD-863
68	*Canavalia ensiformis* (L.) DC. *	Climber	Throughout year	Dry deciduous forests (Bd)	JVD-218
69	*Cicer arietinum* L. *	Herb	Oct–Mar	Cultivated as pulse (Throughout district)	JVD-1382
70	*Clitoria annua* J. Graham	Climber	Aug–Oct	Dry deciduous forests and along roadsides (Bd)	JVD-118
71	*Clitoria ternatea* L. *	Climber	Jun–Jan	Dry deciduous forests and along roadsides (Throughout district)	JVD-305
72	*Crotalaria bifara* L.f.	Twining herb	Sept–Jan	Open areas (Bd, L)	JVD-878
73	*Crotalaria hebecarpa* (DC.) Rudd. *	Herb	Jul–Jan	Grasslands and open areas (Throughout district)	JVD-306
74	*Crotalaria hirsuta* Willd.	Herb	Sept–Dec	Rare on gravelly slopes (Bd, C)	JVD-1417
75	*Crotalaria juncea* L.	Herb	Sept–May	Grasslands and open areas (Throughout district)	JVD-167
76	*Crotalaria medicaginea* Lam.	Herb	Oct–May	Grasslands and sandy plains (Bd)	JVD-1405
77	*Crotalaria orixensis* Willd.	Herb	Jun–Jan	Grasslands and open areas (Bd, Bg, J, L)	JVD-307 JVD-1294
78	*Crotalaria pallida* Aiton. Var. *pallida*	Herb	Sept–Apr	Grasslands and open areas (Throughout district)	JVD-308
79	*Crotalaria paniculata* Willd.	Herb	Nov–Apr	Rare on gravelly slopes (Bd)	JVD-1428
80	*Crotalaria pellita* Bertero ex DC.	Herb	Aug–Dec	Grasslands and open areas (Bd, L)	JVD-208 JVD-889 JVD-1283
81	*Crotalaria pusilla* DC.	Herb	Jul–Jan	Grasslands and open areas (Bd, G, H, I)	JVD-309
82	*Crotalaria retusa* L.	Shrub	Aug–Mar	Grasslands and open areas (Bd)	JVD-310
83	*Crotalaria vestita* Baker.	Herb	Jul–Dec	Open areas and seasonal grasslands (Bd)	JVD-240
84	*Cullen corylifolium* (L.) Medik.	Herb	Oct–April	Weed of cultivated fields (Throughout district)	JVD-1429
85	*Cyamopsis tetragonoloba* (L.) Taub.	Herb	Oct–May	Cultivated (Throughout district)	JVD-920
86	*Dalbergia lanceolaria* L.f.	Tree	Mar–May	Dry deciduous forests (Throughout district)	JVD-251
87	*Dalbergia latifolia* Roxb.	Tree	Feb–May	Dry deciduous forests (Throughout district)	JVD-252
88	*Dalbergia sissoo* Roxb.	Tree	Dec–May	Planted and escaped (Throughout district)	JVD-1430
89	*Deguelia scandens* Aubl. *	Climber	Nov–May	Dry deciduous forest (Bd)	JVD-1431
90	*Desmodium scorpiurus* (L.) DC. *	Herb	Jul–Dec	Grasslands, Wastelands and Open areas (Throughout district)	JVD-253
91	*Grona triflora* (L.) H.Ohashi & K.Ohashi	Herb	Sept–Jan	Grasslands, Wastelands and Open areas (Throughout district)	JVD-157
92	*Eleiotis rottleri* Wight & Arn.	Herb	Jun–Oct	Rare in gravelly plains and seasonal grasslands (Bd)	JVD-175
93	*Eleiotis sororia* (L.) DC.	Herb	Jul–Nov	Rare in gravelly plains and seasonal grasslands (Bd, G, H, I)	JVD-254 JVD-1289
94	*Erythrina suberosa* Roxb.	Tree	Nov–Apr	Deciduous forests (Bd, J, M)	JVD-255
95	*Flemingia strobilifera* R.Br.	Herb	Nov–Mar	Deciduous forests (Bd)	JVD-198
96	*Gliricidia sepium* (Jacq.) Walp. *	Tree	Dec–Apr	Open areas (Throughout district)	JVD-1406
97	*Glycine max* (L.) Merr. *	Herb	Oct–Apr	Cultivated (Throughout district)	JVD-1407
98	*Indigastrum parviflorum* (B.Heyne ex Wight & Arn.) Schrire	Sub-shrubs	Oct–Apr	Open areas and sandy plains (Bd, L)	JVD-1434
99	*Indigofera arnottii* (Kuntze) Peter G.Wilson	Herb	Aug–Feb	Open areas and scrubs (Bd, Bg, G, I, J, M)	JVD-1278 JVD-1278

	Name of taxon	Habit	Phenology	Habitat & Localities	Exsiccata
100	*Indigofera aspalathoides* Vahl ex DC.	Herb	Sept–Apr	Open areas and scrubs (Bd)	JVD-864
101	*Indigofera astragalina* DC.	Herb	Aug–Feb	Sandy plains (Throughout district)	JVD-1430
102	*Indigofera coerulea* Roxb.	Herb	Sept–Jan	Seasonal grasslands and wastelands (Bd, G, H)	JVD-860
103	*Indigofera cordifolia* Heyne ex Roth.	Herb	Aug–Oct	Grasslands, gravelly plains and wastelands (Throughout district)	JVD-256
104	*Indigofera colutea* (Burm.) Merr.	Herb	Jun–Dec	Grasslands, gravelly plains and wastelands (Bd)	JVD-210 JVD-1246
105	*Indigofera glandulosa* Wendl.	Herb	Aug–Feb	Open areas and weed of cultivated fields (Throughout district)	JVD-888
106	*Indigofera linifolia* (L.f.) Retz.	Herb	Jun–Dec	Grasslands, gravelly plains and wastelands (Throughout district)	JVD-161 JVD-851
107	*Indigofera linnaei* Ali.	Herb	Jun–Feb	Grasslands, gravelly plains and wastelands (Throughout district)	JVD-257
108	*Indigofera tinctoria* L.	Shrub	Oct–Jan	Open areas and scrubs (Bd)	JVD-1435
109	*Indigofera trifoliata* L.	Herb	Jul–Feb	Grasslands, gravelly plains and wastelands (Bd, Bg, L, J, M)	JVD-258
110	*Indigofera trita* L.f.	Herb	Jun–Jan	Grasslands, gravelly plains and wastelands (Throughout district)	JVD-259 JVD-861
111	*Lablab purpureus* (L.) Sweet.	Climber	Aug–Dec	Cultivated fields (Throughout district)	JVD-260
112	*Macroptilium lathyroides* (L.) Urb. *	Twining herb	Aug–Apr	Open areas and along railway track (L)	JVD-1436
113	*Macrotyloma uniflorum* (Lam.) Verdc.	Twining herb	Oct–Apr	Cultivated (L)	JVD-1437
114	*Mucuna pruriens* (L.) DC.	Climber	Aug–Jan	Dry deciduous forests and (Bd, L)	JVD-312
115	*Mundulea sericea* (Willd.) A.Chev.	Shrub	Mar–Sept	Dry deciduous forests (Bd, G, H, I, J)	JVD-21
116	*Neonotonia wightii* (Wight & Arn.) J.A.Lackey	Climber	Oct–May	Dry deciduous forests and along streams (Bd, J, R)	JVD-1295 JVD-905
117	*Phaseolus vulgaris* L.	Climber	Throughout year	Cultivated as vegetable crop (Throughout district)	JVD-1408
118	*Phyllodium pulchellum* (L.) Desv.	Sub-shrubs	Oct–Apr	Deciduous forest (Bd)	JVD-1247
119	*Pisum sativum* L. *	Climber	Oct–May	Cultivated (L, M)	JVD-1409
120	*Pongamia pinnata* (L.) Pierre	Tree	Mar–Sept	Dry deciduous forests and along roadsides (Throughout district)	JVD-315
121	*Pseudarthria viscida* (L.) Wight & Arn.	Herb	Jul–Jan	Dry scrub forests and grasslands (Bd, J, M)	JVD-318
122	*Pterocarpus marsupium* Roxb.	Tree	May–Oct	Dry deciduous forests (Bd, Bg, G, J, M)	JVD-319
123	*Pycnospora lutescens* (Poir.) Schindl.	Twining herb	Apr–Oct	Dry deciduous forests (Bd)	JVD-320
124	*Rhynchosia aurea* DC.	Creeping herb	Jul–Jan	Grasslands and open areas (Bd)	JVD-205
125	*Rhynchosia cana* (Willd.) DC.	Sub-shrubs	Dec–Apr	Open areas (Bd)	JVD-1297
126	*Rhynchosia capitata* (B.Heyne ex Roth) DC.	Creeping herbs	Sept–Jan	Sandy plains (Bd)	JVD-1298
127	*Rhynchosia hirta* (Andrews) Meikle & Verdc.	Climbing shrub	Jan–Jul	Dry deciduous forest (Bd, J)	JVD-1438
128	*Rhynchosia minima* DC.	Climber	Jul–Jan	Grasslands and open areas (Throughout district)	JVD-155 JVD-1202
129	*Rhynchosia minima* var. *laxiflora* (Camb.) Baker	Climber	Throughout year	Open areas and weed of cultivated fields (Throughout district)	JVD-1412
130	*Rhynchosia rothii* Benth. ex Aitch.	Climber	Oct–May	Dry deciduous forest (Bd, H)	JVD-1413
131	*Rhynchosia rufescens* (Willd.) DC.	Sub-shrubs	Jul–Feb	Open areas and gravelly slopes (Bd)	JVD-262
132	*Rhynchosia suaveolens* (L.f.) DC.	Shrubs	Nov–Mar	Gravelly slopes of deciduous forest (Bd, H)	JVD-1415
133	*Rhynchosia viscosa* DC.	Climber	Throughout year	Deciduous forests (Bd)	JVD-1416
134	*Rothia indica* (L.) Druce	Herb	Sept–Apr	Sandy plains (Throughout district)	JVD-828 JVD-1132 JVD-1286 JVD-913
135	*Sesbania aculeata* (Schreb.) Pers.	Sub-shrubs	Sept–Jan	Dry deciduous forests and along roadsides (L, M)	JVD-269
136	*Sesbania grandiflora* (L.) Poir. *	Tree	Sept–Feb	Cultivated as fodder and vegetable plant (Throughout district)	JVD-1370

	Name of taxon	Habit	Phenology	Habitat & Localities	Exsiccata
137	*Sesbania sesban* (L.) Merr.	Tree	Sept–Dec	Common along cultivated fields (Throughout district)	JVD-1371
138	*Smithia conferta* Sm. var. *conferta*	Herb	Oct–Dec	Wet grasslands (Bd)	JVD-1418
139	*Stylosanthes fruticosa* Mohlenbr	Herb	Throughout year	Open areas and wastelands (Throughout district)	JVD-268
140	*Stylosanthes hamata* (L.) Taub. *	Herb	Throughout year	Open areas and wastelands (Throughout district)	JVD-202
141	*Taverniera cuneifolia* (Roth) Arn.	Herb	Dec–Jul	Weed of cultivated fields (R, T)	JVD-1419
142	*Tephrosia hookeriana* Wight & Arn.	Sub-shrubs	Oct–May	Open grasslands (Bd)	Singh 1988 Op. cit.
143	*Tephrosia pumila* (Lam.) Pers.	Herb	Jul–Dec	Open areas and wastelands (Bd)	JVD-263
144	*Tephrosia purpurea* (L.) Pers.	Sub-shrubs	Jul–Dec	Open areas and wastelands (Throughout district)	JVD-098
145	*Tephrosia strigosa* (Dalzell) Santapau & Maheshw.	Herb	Jul–Dec	Open areas and wastelands (Bd, L, M)	JVD-1420
146	*Tephrosia subtriflora* Baker	Herb	Aug–Jan	Open areas and wastelands (Bd)	JVD-1425
147	*Tephrosia uniflora* Pers.	Herbs	Oct–Jun	Open areas and wastelands (Bd)	Singh 1981 Op. cit.
148	*Tephrosia villosa* (L.) Pers.	Sub-shrubs	Jul–Jan	Open areas and wastelands (Bd, G, H, I, J, M)	JVD-265 JVD-919 JVD-1213
149	*Teramnus labialis* (L.f.) Spreng.	Twining herb	Aug–Jan	Open areas and along cultivated fields (Bd, L)	JVD-1209
150	*Trigonella foenum-graecum* L.	Herb	Throughout year	Cultivated as vegetable crop (Throughout district)	JVD-1411
151	*Vigna indica* T.M.Dixit, K.V.Bhat & S.R.Yadav	Climber	Jul–Jan	Open areas and wastelands (Throughout district)	JVD-1145
152	*Vigna aconitifolia* (Jacq.) Marechal	Creeping herb	Aug–Jan	Cultivated and escaped in wild (Throughout district)	JVD-1421
153	*Vigna mungo* (L.) Hepper	Creeping herb	Aug–Jan	Cultivated (Throughout district)	JVD-1422
154	*Vigna trilobata* (L.) Verdcourt	Creeping herb	Jul–Jan	Open area sand wastelands (Throughout district)	JVD-270
155	*Vigna radiata* (L.) Wilezek	Creeping herb	Jul–Jan	Open areas and wastelands (Throughout district)	JVD-332
156	*Vigna unguiculata* (L.) Walp. *	Creeping herbs	Jul–Jan	Open areas and wastelands (Throughout district)	JVD-1423
157	*Zornia gibbosa* Span.	Herb	Jul–Jan	Open areas and grasslands (Throughout district)	JVD-334

Bd—Badami | Bg—Bagalkot | Bi—Bilgi | C—Cholachgudda | G—Guledgudda | H—Hungund | I—Ilkal | J—Jamkhandi | KS—Kudal Sangam | L—Lokapur | M—Mudhol | R—Rabkavi | T—Terdal. |(*) —non-native species (which are either introduced or invasive)

dominant components of dry deciduous forests of the district while species of *Alysicarpus* Desv., *Crotalaria* L., *Indigofera* L., *Rhynchosia* Lour., *Senna* Mill., *Tephrosia* Pers. are the dominant herbaceous legumes of the region. Kambhar & Katrahalli (2016) reported 126 species of legumes which is the dominant family from Gadag District (adjoining district of Bagalkot), while Seetharam et al. (2000) in flora of Gulbarga District (region of northeastern Karnataka) also reported Fabaceae as the most dominant family. Rain shadow area and arid climatic conditions are favourable for farming several leguminous crops. Apart from this many leguminous trees are a source of timber and economically important products and many others are used as medicinal and ornamental plants.

The present work will be helpful to the forest officials, policy makers, teachers, students and local people for study and sustainable utilizations of legumes of Bagalkot District.

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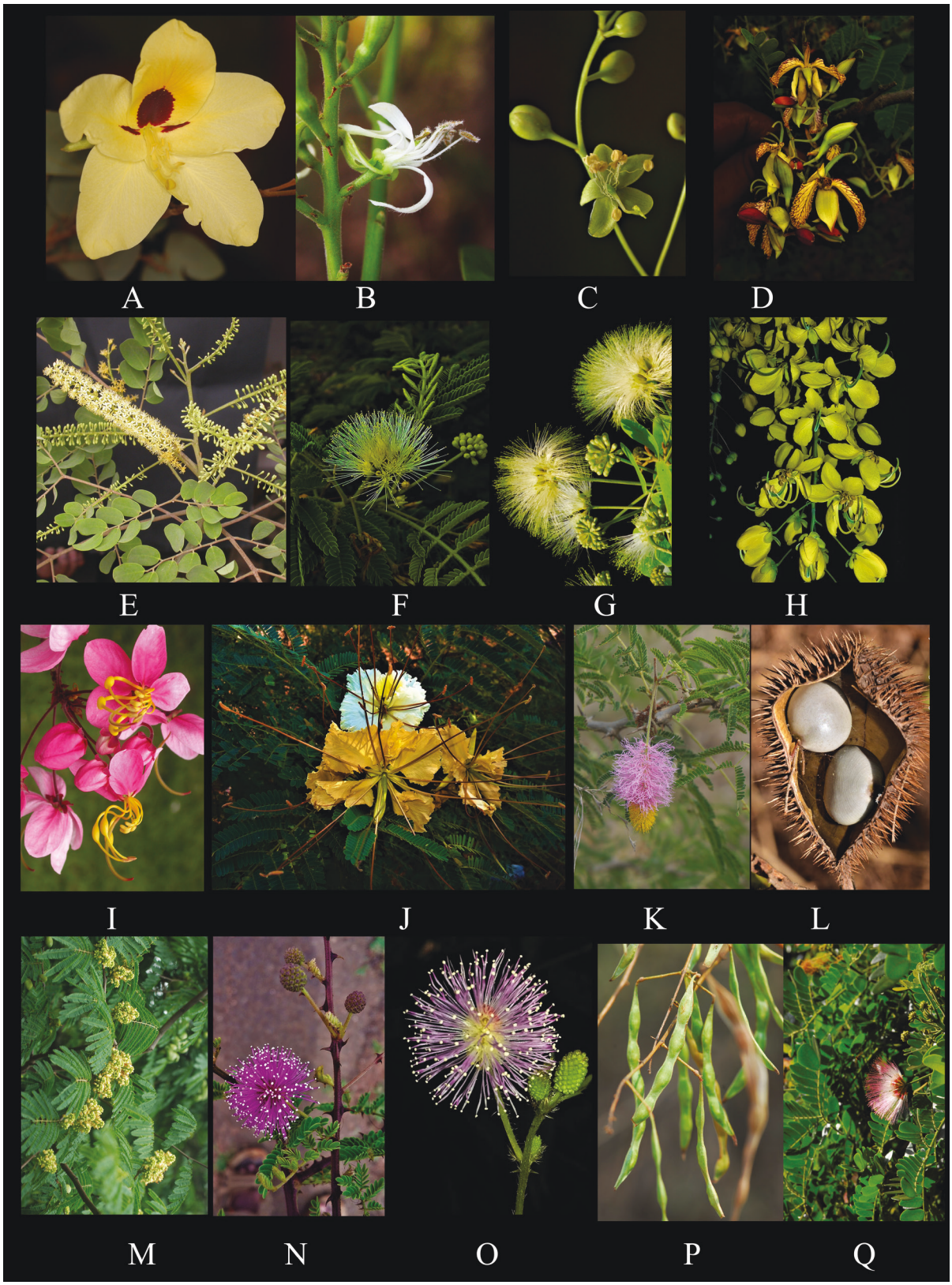

Image 1. A—*Bauhinia tomentosa* L. | B—*Piliostigma racemosum* (Lam.) Benth.—C. *Hardwickia binata* Roxb.—| D—*Tamarindus indica* L. | E—*Adenanthera pavonina* L.f.—| F—*Albizia amara* (Roxb.) Boivin | G—*Albizia lebbeck* (L.) Benth. | H—*Cassia fistula* L. | I—*Cassia javanica* L. | J—*Delonix elata* (L.) Gamble | K—*Dichrostachys cinerea* (L.) Wight & Arn. | L—*Guilandina bonduc* L. | M—*Libidibia coriaria* (Jacq.) Schltdl. | N—*Mimosa hamata* Willd. | O—*Mimosa pudica* L. | P—*Parkinsonia aculeata* L. | Q—*Samanea saman* (Jacq.) Merr. © A–C—S.R. Yadav & D–Q—Jagdish Dalavi.

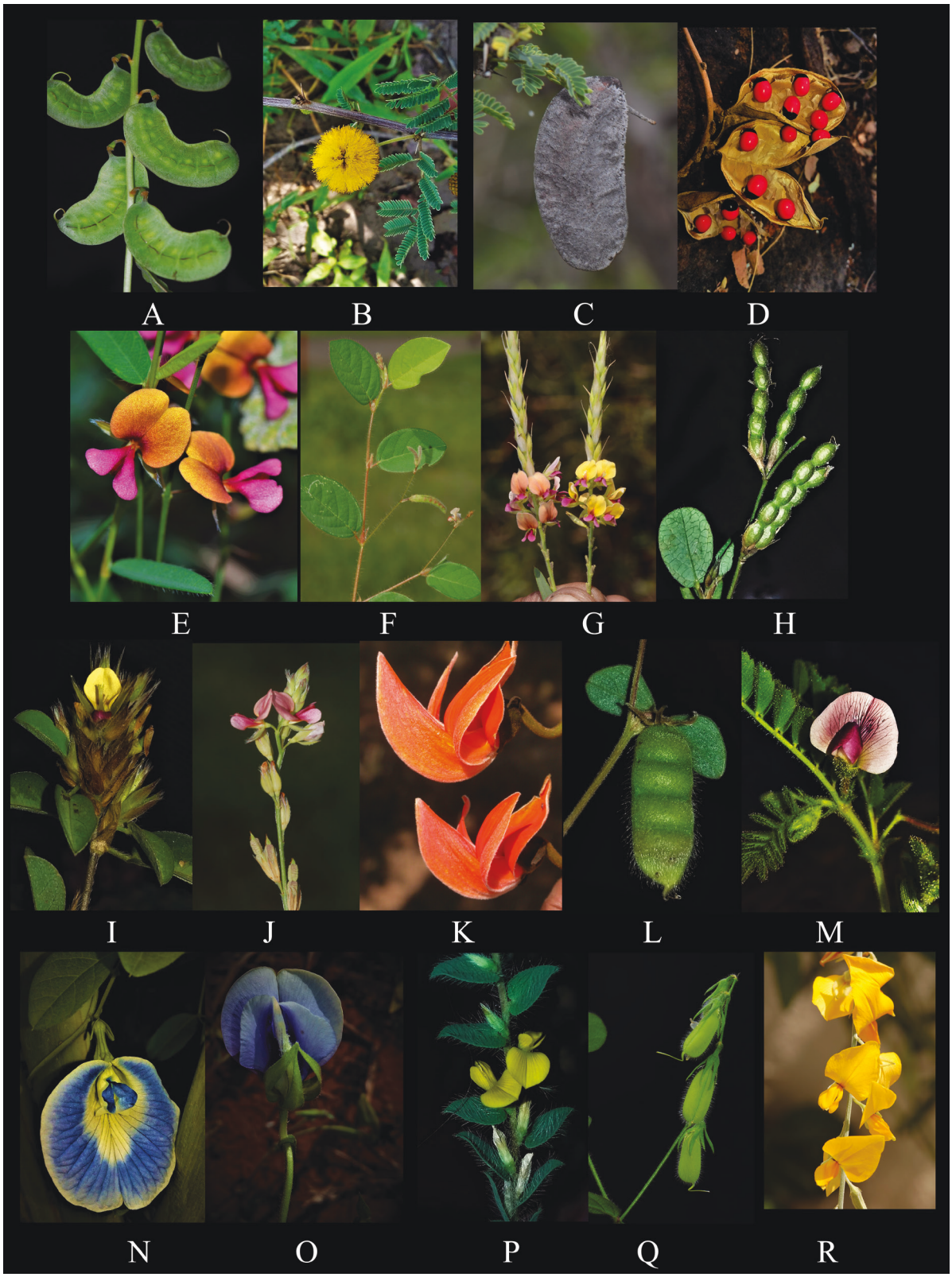

Image 2. A—*Senna italica* Mill. subsp. *micrantha* (Brenan) Lock | B—*Vachellia farnesiana* (L.) Wight & Arn. | C—*Vachellia horrida* (L.) Kyal. & Boatwr. | D—*Abrus precatorius* L. | E—*Alysicarpus gamblei* Schindl. | F—*Alysicarpus hamosus* Edgew. | G—*Alysicarpus longifolius* (Rottler ex Spreng.) Wight & Arn. | H—*Alysicarpus monilifer* (L.) DC. | I—*Alysicarpus scariosus* (Spreng.) Thwaites | J—*Alysicarpus tetragonolobus* Edgew. | K—*Butea monosperma* (Lam.) Kuntze | L—*Cajanus scarabaeoides* (L.) Thouars | M—*Cicer arietinum* L. | N—*Clitoria ternatea* L. | O—*Crotalaria bifara* L.f.| P—*Crotalaria hebecarpa* (DC.) Rudd. | Q—*Crotalaria hirsuta* Willd. | R—*Crotalaria juncea* L. © A–J, L–R—Jagdish Dalavi & K—S.R. Yadav.

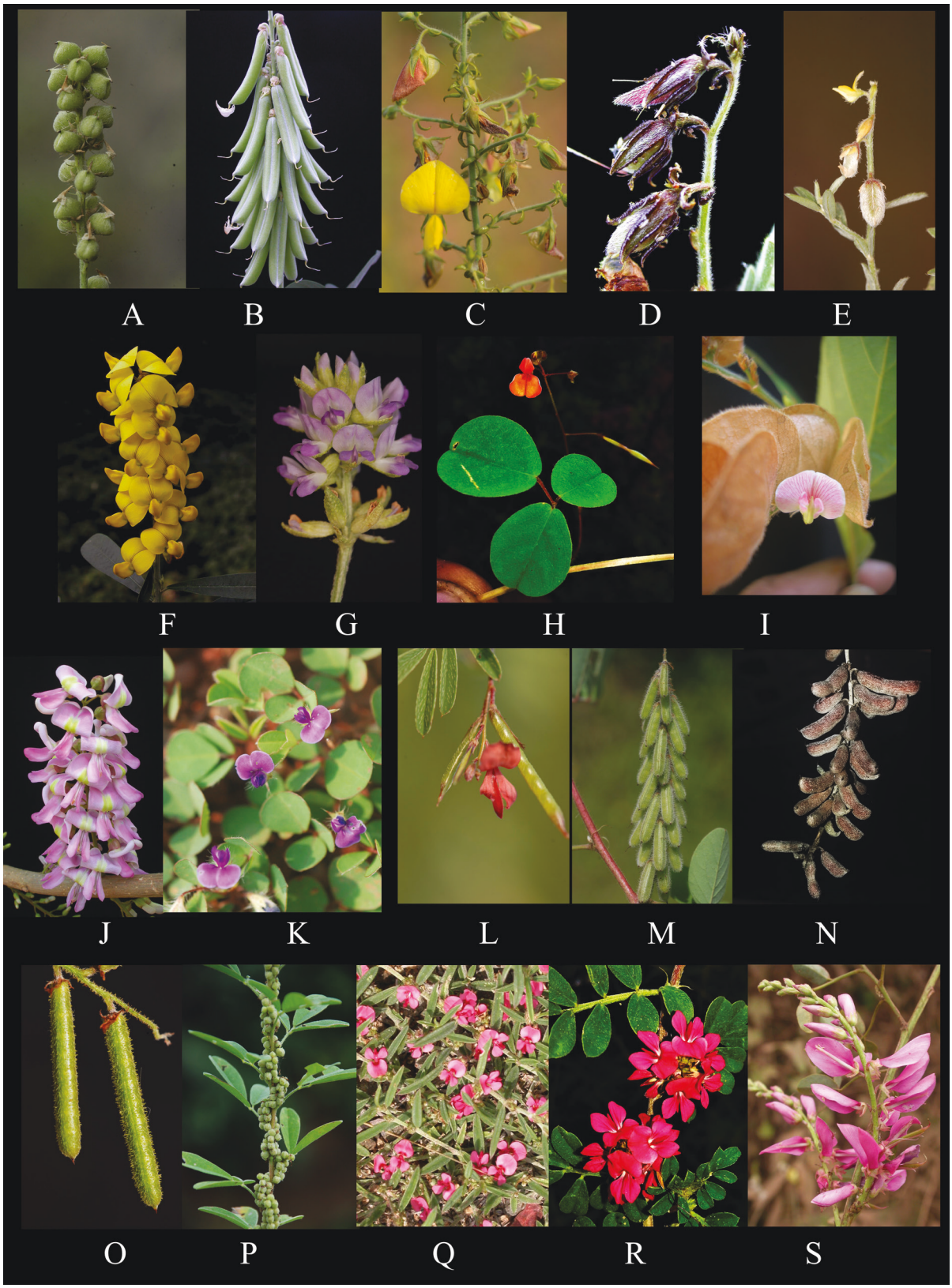

Image 3. A—*Crotalaria medicaginea* Lam. | B—*Crotalaria pallida* Aiton. | C—*Crotalaria paniculata* Willd. | D—*Crotalaria pellita* Bertero ex DC. | E—*Crotalaria pusilla* B.Heyne ex Roth | F—*Crotalaria retusa* L. | G—*Cullen corylifolium* (L.) Medik. | H—*Eleiotis rottleri* Wight & Arn. | I—*Flemingia strobilifera* (L.) W.T.Aiton | J—*Gliricidia sepium* (Jacq.) Steud. | K—*Grona triflora* (L.) H.Ohashi & K.Ohashi | L—*Indigofera arnottii* (Kuntze) Peter G.Wilson | M—*Indigofera astragalina* DC. | N—*Indigofera coerulea* Roxb.— | O—*Indigofera colutea* (Burm.f.) Merr. | P—*Indigofera glandulosa* J.C. Wendl. | Q—*Indigofera linifolia* (L.f.) Retz. | R—*Indigofera linnaei* Ali | S—*Indigofera tinctoria* L. © A–S—Jagdish Dalavi.

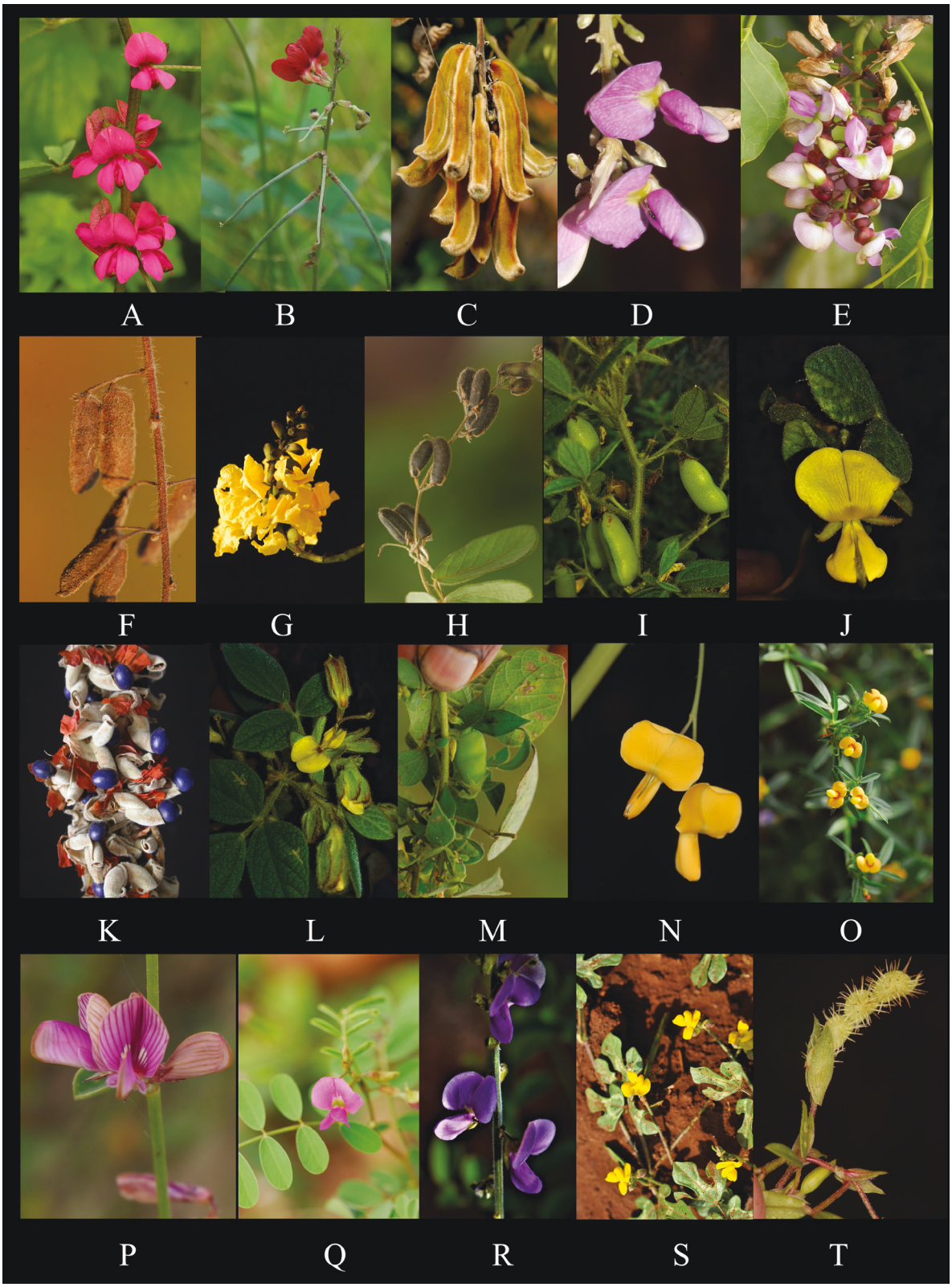

Image 4. A—*Indigofera trifoliata* L. | B—*Macroptilium lathyroides* (L.) Urb.—| C—*Mucuna pruriens* (L.) DC. | D—*Mundulea sericea* (Willd.) A.Chev. | E—*Pongamia pinnata* (L.) Pierre | F—*Pseudarthria viscida* (L.) Wight & Arn. | G—*Pterocarpus marsupium* Roxb.—| H—*Pycnospora lutescens* (Poir.) Schindl. | I—*Rhynchosia cana* (Willd.) DC. | J—*Rhynchosia capitata* (B.Heyne ex Roth) DC. | K—*Rhynchosia hirta* (Andrews) Meikle & Verdc. | L—*Rhynchosia rufescens* DC. | M—*Rhynchosia suaveolens* (L.f.) DC. | N—*Sesbania aculeata* (Schreb.) Pers. | O—*Stylosanthes fruticosa* (Retz.) Alston | P—*Taverniera cuneifolia* (Roth) Arn. | Q—*Tephrosia purpurea* (L.) Pers. | R—*Tephrosia villosa* (L.) Pers. | S—*Vigna indica* T.M. Dixit, K.V. Bhat & S.R. Yadav. | T—*Zornia gibbosa* Span. © A–H—S.R. Yadav & I–T—Jagdish Dalavi.

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