



Taxonomic Studies on the Genus *Vigna* Savi (Fabaceae: Phaseoleae) in Telangana, India

Vaghmare Jalander ^a and Jetty Swamy ^{b*}

^a Department of Botany, Telangana University, Dichpally, Nizamabad–503322, Telangana, India.

^b Botanical Survey of India, AJC Bose Indian Botanic Garden, Shibpur, Howrah–711103, West Bengal, India.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

The genus *Vigna* Savi is one of the economically and environmentally important genus of the family Fabaceae (Phaseoleae). It is distributed in tropical and subtropical regions of the world. In India, the genus is represented by 34 taxa, of which 16 taxa are endemic to the country. The present paper deals with the taxonomy of the genus *Vigna* based on live material and preserved specimens. According to the present studies, the genus contains 13 species in Telangana state of which three species namely *V. indica*, *V. subramaniana* and *V. trinervia* are reported here as additions to the flora of the state. Detailed morphology, taxonomic key to the species, field and germination photographs of all species are provided to facilitate easy identification.

Keywords: *Endemic; germination studies; Leguminosae; new records; Telangana; Vigna.*

*Corresponding author: E-mail: swamy.2706@gmail.com;

1. INTRODUCTION

The pantropical genus *Vigna* Savi (Fabaceae: Phaseoleae) comprises about 106 species [1] and distributed among seven (7) subgenera viz., *Ceratotropis*, *Haydonia*, *Lasiosporon*, *Macrorhyncha*, *Plectotropis*, *Sigmoidotropis* and *Vigna* [2]. Babu *et al.* (1985) [3] revised Tribe Phaseoleae for India in which 23 species *Vigna* were reported and described. Sanjappa [4] reported 24 species of *Vigna* in his Legumes of India. Currently in India, the genus is represented by 34 taxa, of these 16 taxa are endemic to India [5, 6, 7]. Wild relatives are very important reservoir of genes for the development of new hybrid and commercial varieties [8]. "India is the one of the twelve mega centres of biodiversity and Vavilov's centre of cultivated crop plants. About 400 wild crop relatives including cereals, millets, legumes, oilseeds, fibres, vegetables, tubers, fruits, spices, condiments and medicinal & aromatic plants have been documented from India from different phytogeographical regions of the country" [9]. "India is the secondary centre of species diversity for subgenus *Ceratotropis* and are also known as Asian *Vigna*" [2].

2. MATERIALS AND METHODS

The present study on the genus *Vigna* in Telangana state is based on fresh collections during the years 2019–2022 and comprehensive investigation of specimens housed in BSID, MH, HY, KUH, Department of Botany, Telangana University (TUH) etc. During the explorations, the authors collected *Vigna* specimens from various parts of the state. Stipules, colour of flower, pods, seeds, seedlings (Fig. 1) and first leaf (Fig. 2) has been recorded, which are very important characters to distinguish the species. To know the first leaf and seedlings of the species, germination studies were carried out during the period 2021–22 at Department of Botany, Telangana University. All the collected specimens were studied critically and identified with the help of relevant taxonomic literature [2, 10, 11] into thirteen (13) species namely *Vigna aconitifolia* (Jacq.) Marechal, *V. dalzelliana* (Kuntze) Verdc., *V. hainiana* Babu, Gopin. & S. K. Sharma, *V. indica* T.M. Dixit, K. V. Bhat & S.R. Yadav, *V. mungo* (L.) Hepper, *V. radiata* (L.) R. Wilczek, *V. stipulacea* (Lam.) Kuntze, *V. sublobata* (Roxb.) Babu & S.K. Sharma, *V. subramaniana* (Babu ex Raizada) M. Sharma, *V. trilobata* (L.) Verdc., *V. trinervia* (B. Heyne ex Wight & Arn.) Tateishi & Maxted, *V. umbellata* (Thumb.) Ohwi & Ohashi, *V. unguiculata* (L.) Walp. From the 13 species, so far three species

namely *V. indica*, *V. subramaniana* and *V. trinervia* have not been reported from Telangana [10,11], hence these three species are reported here as additions to the flora of Telangana state. Detailed description, taxonomic key to the species, notes, and field and germination photographs of all species are provided to facilitate easy identification. Detailed description, taxonomic key to the species, notes, and field and germination photographs of all species are provided to facilitate easy identification.

2.1 Taxonomic Treatment

Vigna Savi, Nuovo Giorn. Lett. Ser. 3, 8: 113. 1824; Benth. & Hook. f., Gen. Pl. 1: 539.1865; Baker in Hook. f., Fl. Brit. India 2: 204.1876 *pro parte*; Gamble, Fl. Madras 1: 364.1918 (Repr. ed. 1: 257.1957).

Habit: Decumbent herbs (*V. aconitifolia*), trailing herbs (*V. dalzelliana*, *V. indica*, *V. stipulacea*, *V. sublobata* and *V. trilobata*), twining herbs (*V. hainiana*, *V. subramaniana*, *V. trinervia* and *V. umbellata*), cultivated erect herbs (*V. mungo* and *V. radiata*), cultivated erect or scandent or straggling or twining herbs (*V. unguiculata*) and grows up to 2 meters high. **Stem:** Herbaceous in all the species; densely covered with hairs (*V. aconitifolia*, *V. hainiana*, *V. radiata*, *V. sublobata*, *V. subramaniana*, *V. trilobata*, and *V. trinervia*) or sparsely covered with hairs (*V. dalzelliana*, *V. indica*, *V. mungo*, *V. stipulacea* and *V. umbellata*) or glabrous (*V. unguiculata*). **Leaves:** Leaves compound, 3–foliolate; leaflets deeply lobed (*V. aconitifolia* and *V. indica*) or entire (*V. dalzelliana*, *V. radiata*, *V. sublobata* and *V. unguiculata*) or entire or shortly lobed (*V. hainiana*, *V. mungo*, *V. stipulacea*, *V. subramaniana*, *V. trilobata*, *V. trinervia* and *V. umbellata*) (Fig. 3). **Stipules:** Stipules 2, sub-medifixed, ovate, ciliate along margin (*V. indica*, *V. radiata*, *V. sublobata* and *V. subramaniana*) or ovate, orbicular–ovate, entire along margin (*V. stipulacea* and *V. trilobata*), elliptic or elliptic–ovate, ciliate along margin (*V. aconitifolia*, *V. hainiana*, *V. mungo*, *V. trinervia* and *V. umbellata*) or entire along margin (*V. unguiculata*) with nerves and hairs on dorsal surface or glabrous (Fig. 4).

Inflorescence: Axillary racemes with 4–7 flowered (*V. aconitifolia* and *V. hainiana*), 4–8 flowered (*V. mungo*), 4–10 flowered (*V. indica*), 5–10 flowered (*V. radiata*), 4–6 flowered (*V. stipulacea* and *V. subramaniana*), 10–13 flowered (*V. sublobata*), 2–6 flowered (*V.*

trilobata), 4–14 flowered (*V. trinervia*), 10–15 flowered (*V. umbellata*) and 8–10 flowered (*V. unguiculata*). **Flowers:** Flowers bracteate, (bracts 2, primary and secondary, ovate to oblong) bracteolate (bracteoles 2, ovate to oblong), bright yellow (*V. aconitifolia* and *V.*

stipulacea), yellow (*V. hainiana* and *V. indica*), pale yellow (*V. mungo* and *V. subramaniana*), greenish yellow (*V. radiata*, *V. sublobata* and *V. trinervea*), golden yellow (*V. trilobata* and *V. umbellata*), yellow or bluish white or pale white or pink (*V. unguiculata*) (Fig. 5).

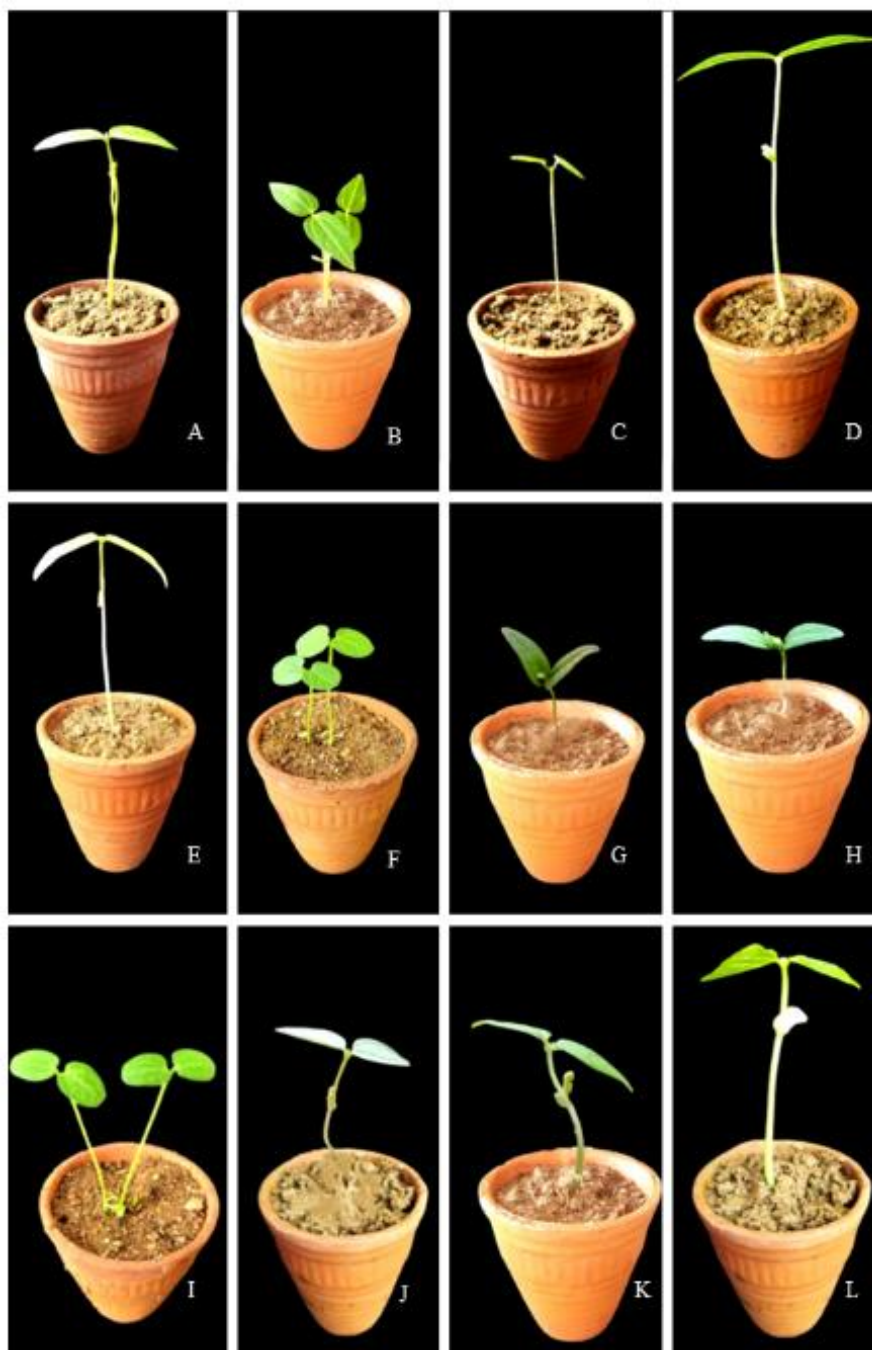


Fig. 1. Seedlings of *Vigna* species: A. *Vigna aconitifolia* (Jacq.) Marechal; B. *Vigna hainiana* Babu, Gopin. & S. K. Sharma; C. *Vigna indica* T.M. Dixit, K. V. Bhat & S.R. Yadav; D. *Vigna mungo* (L.) Hepper; E. *Vigna radiata* (L.) R. Wilczek; F. *Vigna stipulacea* (Lam.) Kuntze; G. *Vigna sublobata* (Roxb.) Babu & S. K. Sharma; H. *Vigna subramaniana* (Babu ex Raizada) M. Sharma; I. *Vigna trilobata* (L.) Verdc.; J. *Vigna trinervia* (B. Heyne ex Wight & Arn.) Tateishi & Macted; K. *Vigna umbellata* (Thumb.) Ohwi & Ohashi; L. *Vigna unguiculata* (L.) Walp.

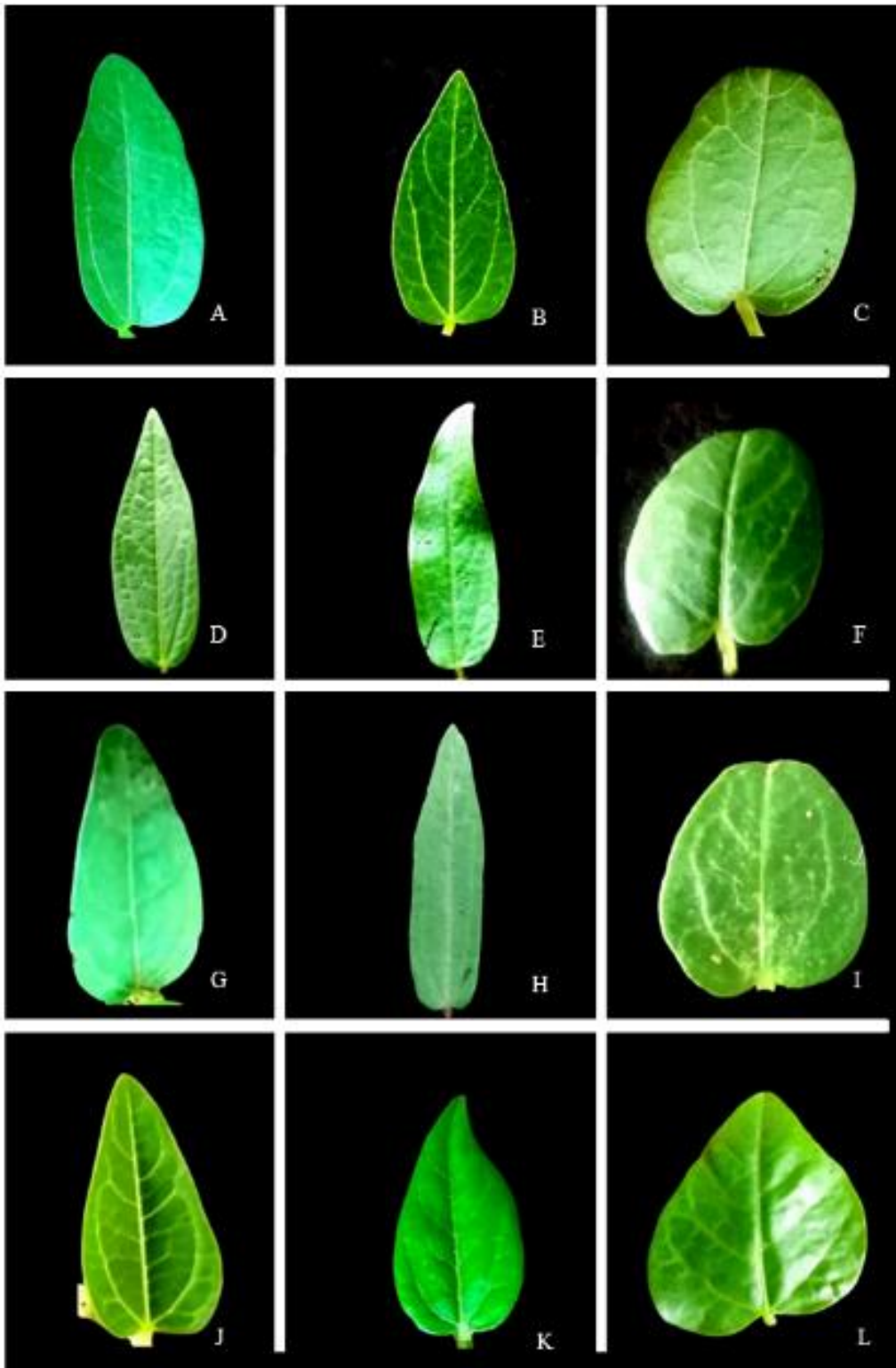


Fig. 2. First leaf of *Vigna* species. A. *Vigna aconitifolia* (Jacq.) Marechal; B. *Vigna hainiana* Babu, Gopin. & S. K. Sharma; C. *Vigna indica* T.M. Dixit, K. V. Bhat & S.R. Yadav; D. *Vigna mungo* (L.) Hepper; E. *Vigna radiata* (L.) R. Wilczek; F. *Vigna stipulacea* (Lam.) Kuntze; G. *Vigna sublobata* (Roxb.) Babu & S. K. Sharma; H. *Vigna subramaniana* (Babu ex Raizada) M. Sharma; I. *Vigna trilobata* (L.) Verdc.; J. *Vigna trinervia* (B. Heyne ex Wight & Arn.) Tateishi & Maxted; K. *Vigna umbellata* (Thumb.) Ohwi & Ohashi; L. *Vigna unguiculata* (L.) Walp.

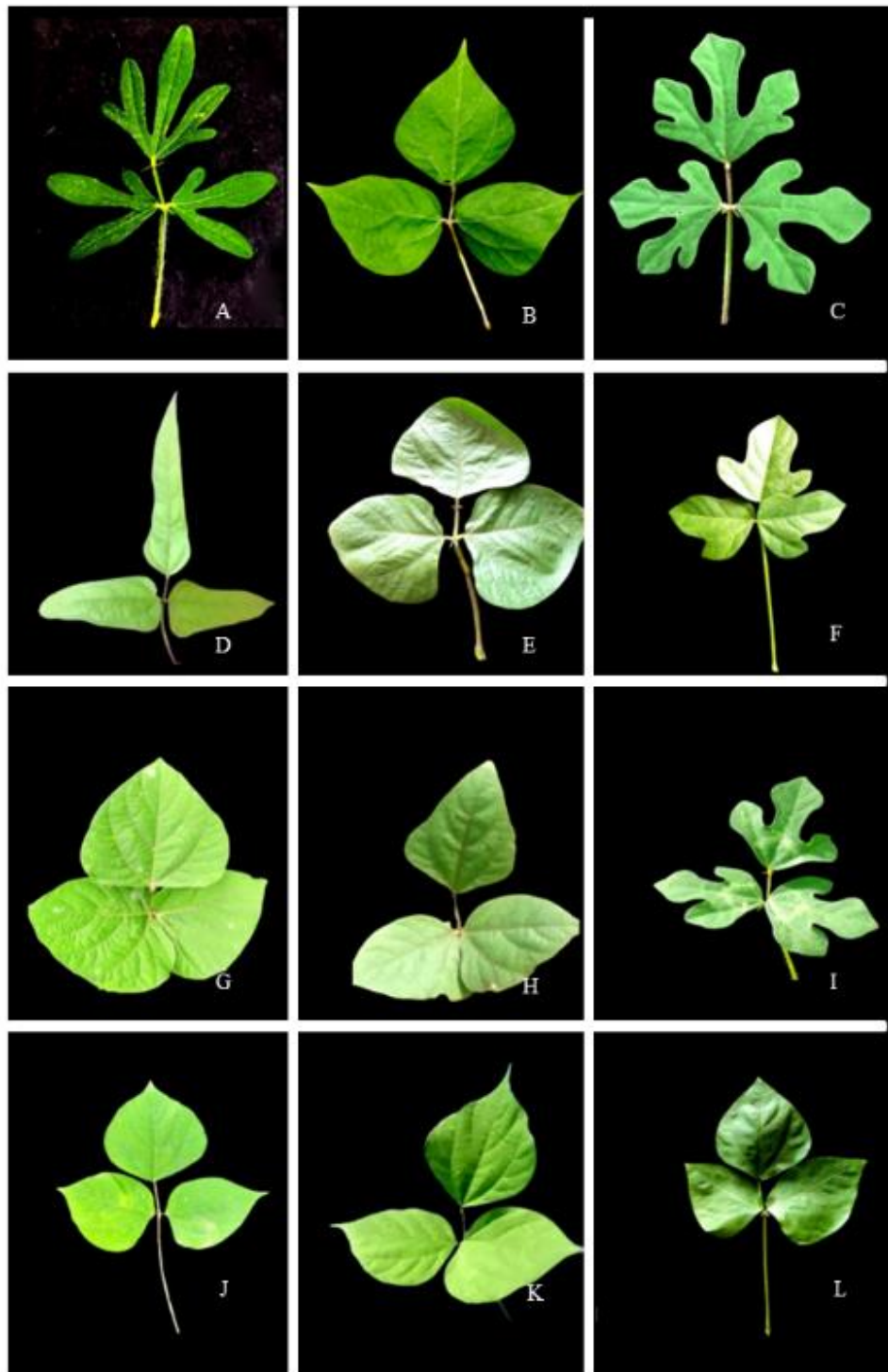


Fig. 3. Leaves of *Vigna* species: A. *Vigna aconitifolia* (Jacq.) Marechal; B. *Vigna hainiana* Babu, Gopin. & S. K. Sharma; C. *Vigna indica* T.M. Dixit, K. V. Bhat & S.R. Yadav; D. *Vigna mungo* (L.) Hepper; E. *Vigna radiata* (L.) R. Wilczek; F. *Vigna stipulacea* (Lam.) Kuntze; G. *Vigna sublobata* (Roxb.) Babu & S. K. Sharma; H. *Vigna subramaniana* (Babu ex Raizada) M. Sharma; I. *Vigna trilobata* (L.) Verdc.; J. *Vigna trinervia* (B. Heyne ex Wight & Arn.) Tateishi & Maxted; K. *Vigna umbellata* (Thumb.) Ohwi & Ohashi; L. *Vigna unguiculata* (L.) Walp.



Fig. 4. Stipules of *Vigna* species: A. *Vigna aconitifolia* (Jacq.) Marechal; B. *Vigna hainiana* Babu, Gopin. & S. K. Sharma; C. *Vigna indica* T.M. Dixit, K. V. Bhat & S.R. Yadav; D. *Vigna mungo* (L.) Hepper; E. *Vigna radiata* (L.) R. Wilczek; F. *Vigna stipulacea* (Lam.) Kuntze; G. *Vigna sublobata* (Roxb.) Babu & S. K. Sharma; H. *Vigna subramaniiana* (Babu ex Raizada) M. Sharma; I. *Vigna trilobata* (L.) Verdc.; J. *Vigna trinervia* (B. Heyne ex Wight & Arn.) Tateishi & Macted; K. *Vigna umbellata* (Thumb.) Ohwi & Ohashi; L. *Vigna unguiculata* (L.) Walp.

Calyx: Sepals united, 4 lobed, green in color, hairy or pubescent or glabrous. **Corolla:** Petals 5, free; standard petal bright yellow or yellow or pale yellow or greenish yellow or golden yellow or bluish white or pale white or pink, glabrous, entire along margins. Wing petals 2, base divided, acute. Keel petals incurved to the left, jointed at tip. **Androecium:** Stamens 9+1, didelphous, 9 stamens forming staminal tube with short filaments, and one stamen free with long filament, anthers dithecal, yellow in color. **Gynoecium:** Ovary flattened, 2.5–3 mm long (*V. aconitifolia*, *V. hainiana* and *V. indica*) or 3.5–4.5 mm long (*V. stipulacea*, *V. subramaniana*, *V. trilobata*, and *V. umbellata*) or 5–6 mm long (*V. mungo*, *V. radiata* and *V. sublobata*) or 5.5–7 mm long (*V. trinervea*) or 10–12 mm long (*V. unguiculata*). Style and stigma 3.2–4.5 mm long (*V. aconitifolia* and *V. hainiana*) or 4.5–7.5 (*V. stipulacea*, *V. trilobata* and *V. umbellata*) or 7.5–8 mm long (*V. indica*), 11–14 mm long (*V. mungo*, *V. radiata*, *V. subramaniana* and *V. sublobata*) or 15–17 mm long (*V. trinervea* and *V. unguiculata*), stigma curved, hairy on lower side. **Pod shape:** Linear, cylindrical (*V. aconitifolia*, *V. hainiana*, *V. indica*, *V. mungo*, *V. radiata*, *V. stipulacea*, *V. sublobata*, *V. subramaniana*, *V. trilobata*, *V. trinervea* and *V. umbellata*) or subterete, subcompressed (*V. unguiculata*).

Pod surface: Covered with small white hairs (*V. aconitifolia*, *V. hainiana* and *V. stipulacea*) or densely covered with white hairs (*V. mungo*, *V. radiata* and *V. trinervea*) or densely pubescent (*V. subramaniana*) or finely pubescent (*V. indica*) or ferruginously hairy (*V. sublobata*) or glabrous or minutely hairy (*V. trilobata*) or covered with minute hairs (*V. umbellata*) or glabrous or puberulent (*V. unguiculata*). **Pod length:** 1.5–2.5 cm long (*V. aconitifolia* and *V. indica*) or 2.5–4.5 cm long (*V. hainiana*, *V. trilobata* and *V. umbellata*) or 4–5 cm long (*V. mungo* and *V. stipulacea*) or 5–6.5 cm long (*V. radiata*, *V. sublobata*, *V. subramaniana* and *V. trinervea*) or

18–20 cm long (*V. unguiculata*). **Pod color at maturity:** Buff or pale brown (*V. aconitifolia*, *V. hainiana* and *V. trilobata*) or black (*V. hainiana*, *V. sublobata*, *V. stipulacea* and *V. subramaniana*) or dark brown or black (*V. mungo*) or dark brown to blackish (*V. sublobata* and *V. trinervea*) or grayish black when mature (*V. umbellata*) or pale yellow when mature (*V. unguiculata*) (Fig. 6). **Number of seeds per pod:** 4–6 (*V. aconitifolia* and *V. indica*) or 5–6 (*V. aconitifolia*) or 9–10 (*V. hainiana*) or 6–12 (*V. mungo*) or 10–13 (*V. umbellata*) or 10–14 (*V. stipulacea*, *V. subramaniana* and *V. trinervea*) or 10–15 (*V. sublobata*), or 10–16 (*V. radiata*) or 12–18 (*V. unguiculata*). **Seed shape:** Elliptic (*V. aconitifolia*, *V. stipulacea* and *V. umbellata*) or oblong (*V. hainiana*) or rectangular (*V. indica*, *V. radiata*, *V. sublobata*, *V. subramaniana* and *V. trinervea*) or rounded (*V. mungo*, *V. trilobata* and *V. unguiculata*) **Seed surface:** Smooth (*V. aconitifolia*, *V. radiata*, *V. umbellata* and *V. unguiculata*) or rough (*V. hainiana*, *V. indica*, *V. mungo*, *V. stipulacea*, *V. sublobata*, *V. subramaniana*, *V. trilobata* and *V. trinervea*) (Fig. 7). **Seed length:** 2.2–2.5 (*V. hainiana*, *V. subramaniana* and *V. umbellata*) or 3.5–4 mm (*V. mungo*, *V. radiata* and *V. trinervea*) or 3–3.2 (*V. aconitifolia*, *V. indica*, *V. stipulacea*, *V. sublobata* and *V. trilobata*) or 10 mm (*V. unguiculata*). **Seed color:** Pale brown (*V. aconitifolia*) or blackish gray or brown (*V. hainiana*) or brown–maroon (*V. indica*) or black (*V. mungo*) or green (*V. radiata*) or brown with small black mottled (*V. stipulacea*) or dark brown to black (*V. sublobata*) or brownish–black (*V. subramaniana*) or orange brown (*V. trilobata*) or blackish brown (*V. trinervea* and *V. umbellata*) or pale yellow (*V. unguiculata*). **Aril development:** Not developed (*V. aconitifolia*, *V. hainiana*, *V. indica*, *V. radiata*, *V. sublobata*, *V. trinervea* and *V. umbellata*) or well developed (*V. mungo*, *V. stipulacea* and *V. trilobata*) or obscure (*V. subramaniana*) or slightly developed (*V. unguiculata*).

Key to the Species of *Vigna*

1. Stipules ovate.....2
 - Stipules elliptic or elliptic ovate.....7
2. Leaflets lobed.....3
 - Leaflets not lobed.....5
3. Seeds rough with reticulate surface, aril absent.....4. ***V. indica***
 - Seeds smooth, aril present.....4
4. Mature pod covered with brown hairs, seeds black.....7. ***V. stipulacea***
 - Mature pod glabrous, seeds orange yellow.....10. ***V. trilobata***

5. Flowers pale yellow (rarely greenish yellow), pods 1–3 per inflorescence with white or yellowish white hairs.....**9. V. subramaniana**
 Flowers greenish yellow, pods 4–8 per inflorescence with ferruginous hairs at maturity.....6
6. Plants erect, cultivated, seeds green or yellowish brown, shiny with smooth surface.....**6. V. radiata**
 Plants trailing or twining, seeds brownish black.....**8. V. sublobata**
7. Seeds with smooth surface.....8
 Seeds with rough surface.....11
8. Flowers bluish or pinkish purple, pod 23–26 cm long.....**13. V. unguiculata**
 Flowers yellow.....9
9. Plants trailing, leaflets deeply lobed.....**1. V. aconitifolia**
 Plants trailing or twining, leaflets not deeply lobed.....10
10. Style beak flat.....**2. V. dalzelliana**
 Style beak linear.....**12. V. umbellata**
11. Plants erect, cultivated, pods 4–6 seeded **5. V. mungo**
 Plants twinners, wild, pods with more than 6 seeds.....12
12. Leaflet velvety, flowers small, pods covered with conspicuous white hairs at maturity.....**3. V. hainiana**
 Leaflets not as above, flowers large, pods covered with brown hairs at maturity.....**11. V. trinervea**

2.2 Enumeration

1. Vigna aconitifolia (Jacq.) Marechal in Bull. Jard. Bot. Nat. Belg. 39: 160. 1969; Sanjappa, Legumes India 271.1992; Yadav et al., Genus *Vigna* in India 9.2014; Sanjappa in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicot. 438. 2020; Pullaiah, Fl. Telangana 1:314.2015; Reddy & Reddy, Fl. Telangana 219.2016. *Phaseolus aconitifolius* Jacq., Observ. Bot. 3: 2. t. 52. 1768; Baker in Hook. f. Fl. Brit. Ind. 2: 202. 1876; Gamble, Fl. Madras. 1: 363. 1918. (Repr. ed. 1: 256. 1957. *Dolichos dissectus* Lam., Encycl. 2: 300. 1786. (Fig. 8).

Decumbent herbs, up to 2 m long. Stem densely covered with 2–2.5 mm long hairs. Leaves 3–foliolate; terminal leaflets 3–3.8 × 3–3.5 cm, acute to rounded at base, deeply 5–lobed, acute to obtuse at apex; lateral leaflets 2.8–3.2 × 2–2.5 cm, deeply 4–lobed, acute to obtuse at apex, sparsely hairy; petioles 4–5.5 cm long, densely covered with hairs. Stipules 2, subulate, medifixed, 6–8 × 1.5–2 mm long, 6–7 nerved, rounded at base, ciliate along margin, acute at apex, hairy on dorsal surface. Flowers bright yellow, 4–7 in axillary, slender racemes, 5.5–6.5 × 4.5–5.5 mm in diameter; peduncle 8–10 cm long; bracts 2, oblong, acute to acuminate at apex, hairy on upper surface and on margins; bracteoles 2, ovate–oblong, acuminate at apex, hairy on upper surface and on margins. Sepals united, ovate, 1.75 × 3.5–4 mm. Petals bright

yellow; standard 6.5–7.5 mm long, glabrous, entire along margin; wings 2.5 × 3.5–4 mm, base divided, acute; keels incurved to the left, 1.5 × 6 mm, jointed at tip. Stamens 9+1, 9 stamens forming tube to 4.5–5 mm long; filaments 1.5–1.75 mm long; one stamen with filament 6 mm long. Ovary 2.5–3 mm long, flattened; style and stigma 3.2 mm long, stigma curved, hairy on lower side. Pods linear, cylindrical, glabrescent, 1.8–2.5 × 0.3–0.35 cm, buff or pale brown when mature. Seeds elliptic, 5–6 per pod, smooth, pale brown, 3–3.2 × 2 mm, aril not developed.

Flowering and fruiting: September–November.

Habitat: Found along road side, field bunds and fringe areas of tanks, lakes and river beds.

Distribution: TELANGANA: Mahabubnagar, Medak, Nalgonda, Nizamabad and Warangal Districts; INDIA: Maharashtra, Odisha, Rajasthan and Eastern India [2, 5].

Specimens examined: Mahabubnagar District: Rampur, 16.12.2008, B. Sadasivaiah & K. Prasad 032639 (SKU); Medak District: Pocharam Wildlife Sanctuary, along Bhimeswara Stream, J. Swamy 00521 (HY); Nalgonda District: Banalakunta thanda, 11.08.2011, A. Baleeshwar Reddy BRNS–PG. 05165 (BSID); Peddavura, 10.09.2012, A. Baleeshwar Reddy 01284 (BSID); Nizamabad District: Gandhari, B. Ravi Prasad &

C. Prabhakar Raju 7229 (SVU); Kammarpally, 0318 (TUH); Telangana University campus, 31.10.2022, V. Jalander 0850 (TUH); Ramadugu Dichpally, 15.10.2022, V. Jalander 00821 (TUH). Project, Ramadugu, 07.11.2020, V. Jalander



Fig. 5. Flowers of *Vigna* species: A. *Vigna aconitifolia* (Jacq.) Marechal; B. *Vigna hainiana* Babu, Gopin. & S. K. Sharma; C. *Vigna indica* T.M. Dixit, K. V. Bhat & S.R. Yadav; D. *Vigna mungo* (L.) Hepper; E. *Vigna radiata* (L.) R. Wilczek; F. *Vigna stipulacea* (Lam.) Kuntze; G. *Vigna sublobata* (Roxb.) Babu & S. K. Sharma; H. *Vigna subramaniana* (Babu ex Raizada) M. Sharma; I. *Vigna trilobata* (L.) Verdc.; J. *Vigna trinervia* (B. Heyne ex Wight & Arn.) Tateishi & Maxted; K. *Vigna umbellata* (Thumb.) Ohwi & Ohashi; L. *Vigna unguiculata* (L.) Walp.

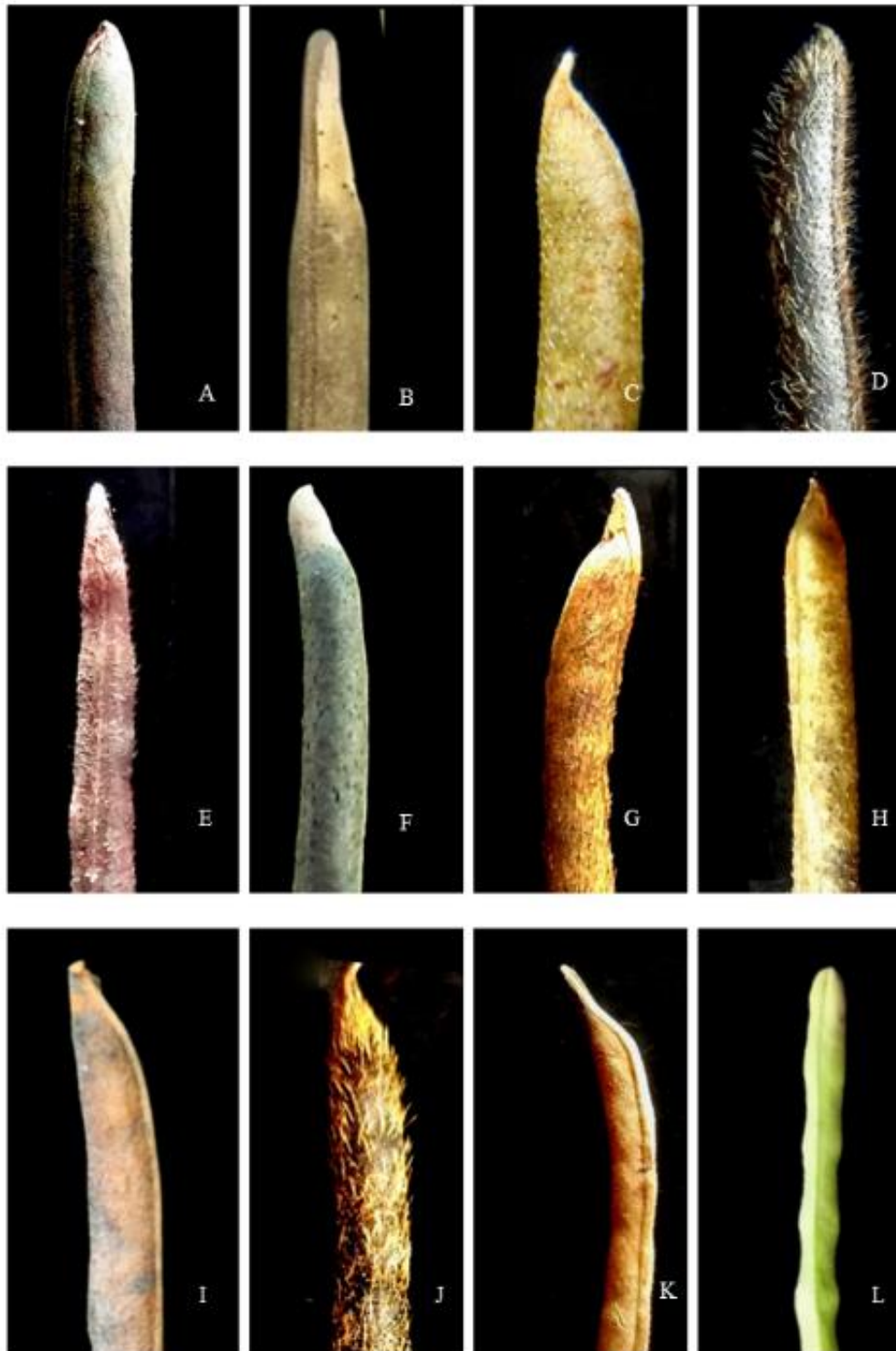


Fig. 6. Pods of *Vigna* species: A. *Vigna aconitifolia* (Jacq.) Marechal; B. *Vigna hainiana* Babu, Gopin. & S. K. Sharma; C. *Vigna indica* T.M. Dixit, K. V. Bhat & S.R. Yadav; D. *Vigna mungo* (L.) Hepper; E. *Vigna radiata* (L.) R. Wilczek; F. *Vigna stipulacea* (Lam.) Kuntze; G. *Vigna sublobata* (Roxb.) Babu & S. K. Sharma; H. *Vigna subramaniana* (Babu ex Raizada) M. Sharma; I. *Vigna trilobata* (L.) Verdc.; J. *Vigna trinervia* (B. Heyne ex Wight & Arn.) Tateishi & Maxted; K. *Vigna umbellata* (Thumb.) Ohwi & Ohashi; L. *Vigna unguiculata* (L.) Walp.

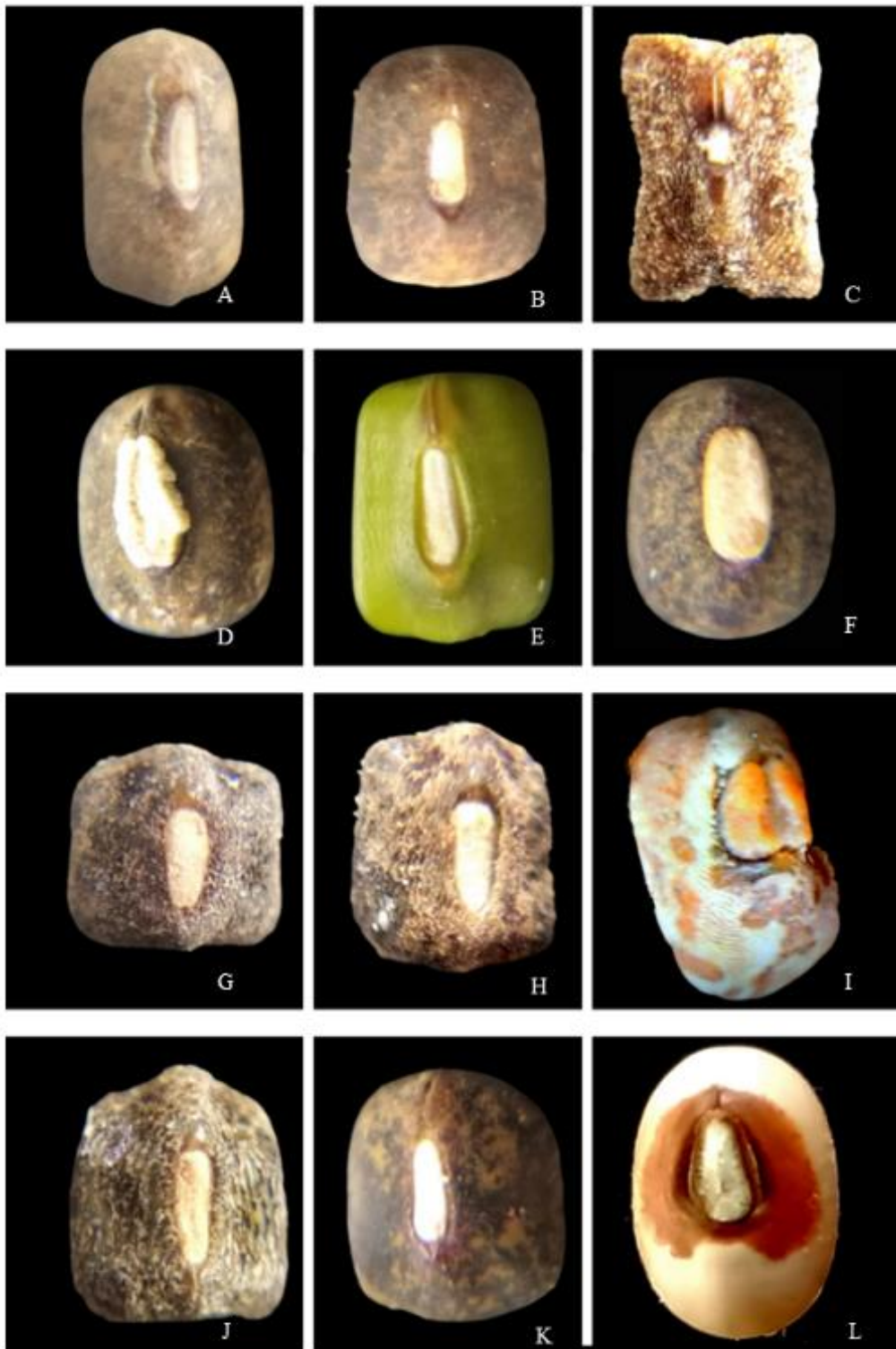


Fig. 7. Seeds of *Vigna* species: A. *Vigna aconitifolia* (Jacq.) Marechal; B. *Vigna hainiana* Babu, Gopin. & S. K. Sharma; C. *Vigna indica* T.M. Dixit, K. V. Bhat & S.R. Yadav; D. *Vigna mungo* (L.) Hepper; E. *Vigna radiata* (L.) R. Wilczek; F. *Vigna stipulacea* (Lam.) Kuntze; G. *Vigna sublobata* (Roxb.) Babu & S. K. Sharma; H. *Vigna subramaniana* (Babu ex Raizada) M. Sharma; I. *Vigna trilobata* (L.) Verdc.; J. *Vigna trinervia* (B. Heyne ex Wight & Arn.) Tateishi & Macted; K. *Vigna umbellata* (Thumb.) Ohwi & Ohashi; L. *Vigna unguiculata* (L.) Walp.



Fig. 8. *Vigna aconitifolia* (Jacq.) Marechal: A. Habitat; B. Habit; C. Stem; D-F. Stipules; G. Leaf; H. Inflorescence; I. Primary bract; J. Secondary bract; K-L. Bracteoles; M. Flower; N. Calyx; O. Corolla; P. Stamens; Q. Keel pocket; R. Pistil; S. Style beak; T-V. Pods; W-X. Seeds; Y. Seedling; Z. First leaves

2. *Vigna dalzelliana* (Kuntze) Verdc. in Kew Bull. 24: 558. 1970; Sanjappa, Legumes India 272.1992; Yadav et al., Genus *Vigna* in India 15.2014; Sanjappa in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicot. 438. 2020; Pullaiah, Fl. Telangana 1:314.2015; Reddy & Reddy, Fl. Telangana 219.2016. *Phaseolus dalzellianus* Kuntze, Rev. Gen. 1: 202. 1891. *P. puciflorus* Dalzell in Hook. J. Bot. 3: 209. 1851 nom. illeg.; Baker in Hook. f. F1. Brit. Ind. 2: 202. 1876. *P. dalzellii* T. Cooke, Fl. Bombay 1: 376. 1902 (Repr. ed. 1: 401. 1958); Gamble, Fl. Madras 1: 363. 1918 (Repr. ed. 1: 256. 1957). (Fig. 9).

Prostrate trailing or twining herbs, up to 1.5 m high. Stem sparsely covered with 0.5–1 mm long hairs. Leaves 3-foliolate; terminal leaflets 5.5–6.5 × 3–3.5 cm, ovate, acute to rounded at base, entire, acute or shortly acuminate at apex; lateral leaflets 5–5.5 × 2.5–3 cm, obliquely ovate, acute or shortly acuminate at apex, sparsely hairy; petioles 3–5 cm long, sparsely covered with hairs. Stipules 2, elliptic-ovate, medifixed, 4–4.2 × 1.2–1.3 mm, 8–10 nerved, rounded at base, ciliate along margin, acute at apex, hairy on dorsal surface. Flowers pale yellow, 5–6 in axillary, slender racemes, 11–12 mm in diameter; peduncle 6–12 cm long; bracts 2, oblong, acuminate at apex, hairy on upper surface; bracteoles 2, ovate-oblong. Sepals united, ovate, 1.3–1.5 × 3.6–4 mm. Petals yellow; standard 0.5–0.7 cm long, glabrous, entire along margin; wings 0.2–0.3 × .03–0.4 cm, base divided, acute; keels incurved to the left, 6–7 × 1.5–2 mm, jointed at tip. Stamens 9+1, 9 stamens forming tube to 5–6 mm long; filaments 2–2.3 mm long; one stamen with filament 6–7 mm long. Ovary 2.5–3 mm long, flattened; style and stigma 3.8–4.2 mm long, stigma curved, hairy on lower side. Pods linear, cylindrical, glabrescent, 4–4.2 × 0.3–0.35 cm, buff or black when mature. Seeds rectangular, 9–13 per pod, smooth, shiny, grey mottled, 2.8–3 × 1.8–2 mm, aril well developed.

Flowering and fruiting: September–December.

Habitat: Occasionally found as under growth in dry deciduous forests.

Distribution: TELANGANA: Khammam and Warangal districts [11]; INDIA: Bihar, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Rajasthan and Tamil Nadu [2,5].

Specimen examined: Khammam District: Khammam Hills, 26.01.2002, R. Rajan 0113801 (MH).

3. *Vigna hainiana* Babu, Gopin. & S. K. Sharma in Bull. Bot. Surv. India 27:15.1987; Yadav et al., Genus *Vigna* in India 19.2014; Sanjappa in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicot. 438. 2020; Jalander and Swamy in Indian Journal of Forestry 45(1): 24–26.2022. *Phaseolus wightianus* Graham in Wall., Numer. List. n. 5591. 1832, nom. nud. *P. subvolubilis* Buch.–Ham. in Wall., Numer. List. n. 5605. 1832, nom. nud. *P. wightii* Wight & Arn., Prodr. Fl. Ind. Orient. 1: 245. 1834, non *V. wightii* Benth. ex Baker, 1876. *P. mungo* L. var. *wightianus* Baker in Hook.f., Fl. Brit. India 2: 203. 1876. *P. calcaratus* sensu Haines, Bot. Bihar Orissa 3: 288. 1922, non Roxb., 1832. *P. sublobatus* sensu Duthie, Fl. Gangetic Plain 1: 226. 1903, non Roxb., 1832. (Fig. 10).

Twining herbs, up to 2 m high. Stem densely covered with 1–1.5 mm long hairs. Leaves 3-foliolate; terminal leaflets 5.5–6.5 × 3–3.5 cm, ovate-deltoid, acute to rounded at base, entire or shortly lobed along margin, acute or shortly acuminate at apex; lateral leaflets 5–5.5 × 2.5–3 cm, obliquely ovate-deltoid, acute or shortly acuminate at apex, sparsely hairy; petioles 3–5 cm long, densely covered with hairs. Stipules 2, elliptic-ovate, medifixed, 6–7 mm long, 8–10 nerved, rounded at base, ciliate along margin, acute at apex, hairy on dorsal surface. Flowers yellow, 4–7 in axillary, slender racemes, 8–10 mm in diameter; peduncle 6–12 cm long; bracts 2, oblong, acuminate at apex, hairy on upper surface; bracteoles 2, ovate-oblong. Sepals united, ovate, 1.3–1.5 × 3.5–4 mm. Petals yellow; standard 5–7 mm long, glabrous, entire along margin; wings 2.8–3 × 3.6–4 mm, base divided, acute; keels incurved to the left, 1.7–2 × 6–7 mm, jointed at tip. Stamens 9+1, 9 stamens forming tube to 5–6 mm long; filaments 2–2.3 mm long; one stamen with filament 6–7 mm long. Ovary 2.5–3 mm long, flattened; style and stigma 3.5–4 mm long, stigma curved, hairy on lower side. Pods linear, cylindrical, covered with small, white hairs, 3.5–4.5 × 0.3–0.35 cm, black when mature. Seeds oblong, 9–10 per pod, rough, blackish gray or brown, 2.5 × 1.8–2 mm, aril not developed.

Flowering and fruiting: September–November.

Habitat: Occasionally found as under growth in dry deciduous forests.

Distribution: TELANGANA: Nizamabad district [6]; INDIA: Andhra Pradesh, Assam, Bihar, Chhattisgarh, Himachal Pradesh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal [2,5].

Specimen examined: Nizamabad district: Sirikonda mandal, Kondapur Village, 22.08.2021, *V. Jalander & J. Swamy* 0394 (TUH, BSID).

4. *Vigna indica* T.M. Dixit, K.V. Bhat & S.R. Yadav, *Rheedea* 21: 1. 2011; Yadav et al., *Genus Vigna in India* 23.2014; Sanjappa in A.A. Mao & S.S. Dash, *Fl. Pl. India Annot. Checkl. Dicot.* 439. 2020. *Vigna trilobata* (L.) Verdc. var. *pusilla* Naik & Pokle in *J. Econ. Taxon. Bot.* 7: 670. 1986. (Fig. 11).

Perennial trailing herbs, up to 1.5 m high. Stem sparsely covered with 0.5–1.5 mm long hairs. Leaves 3–foliolate; terminal leaflets 1.8–2 × 1.2–1.5 cm, ovate–rhomboid, acute to rounded at base, 3–5 deep–shallowly lobed along margin or entire, acute at apex; lateral leaflets 1.3–1.6 × 1.2–1.3 cm, oblique, acute at apex; petioles 1.3–1.5 cm long, sparsely covered with hairs. Stipules 2, ovate–lanceolate, medifixed, 2.8–3.3 mm long, 4–7 nerved, rounded at base, ciliate along margin, acute at apex. Flowers yellow, 4–10 in axillary, slender racemes, 6–7 mm in diameter; peduncle 5–8 cm long; bracts 2, oblong, acuminate at apex, hairy on margin and upper surface; bracteoles 2, ovate–oblong. Sepals united, ovate, 1.1–1.3 × 3.5–3.7 mm. Petals yellow; standard 3–3.5 × 6–6.5 mm, glabrous, entire along margin; wings 1.8–2 × 3–3.2 mm, base divided, acute; keels incurved to the left, 1.5–2 × 6–7 mm, jointed at tip. Stamens 9+1, 9 stamens forming tube to 5–5.5 mm long; filaments 1.5–2 mm long; one stamen with filament 5.5 mm long. Ovary 2–2.5 mm long, flattened; style and stigma 7–8 mm long, stigma curved, hairy on lower side. Pods linear, cylindrical, finely pubescent, 1.5–2.5 × 0.2–0.4 cm, buff or pale brown when mature. Seeds rectangular, 4–6 per pod, rough, brown–maroon, 3.2 × 1.8–2 mm, aril not developed.

Flowering and fruiting: July–October.

Habitat: Occasionally found in slopes of hills and road side areas.

Distribution: TELANGANA: Kamareddy district (present report); INDIA: Gujarat, Madhya Pradesh, Maharashtra and Rajasthan [2,5].

Specimen examined: Kamareddy District: Tadwai (Mandal), 25.09.2022, *V. Jalander* 0792 (TUH).

Note: The species has not been reported from Telangana State, hence it has been reported here as an addition to the Flora of Telangana.

5. *Vigna mungo* (L.) Hepper in *Kew Bull.* 11: 128. 1956; Sanjappa, *Legumes India* 275.1992; Yadav et al., *Genus Vigna in India* 29.2014; Sanjappa in A.A. Mao & S.S. Dash, *Fl. Pl. India Annot. Checkl. Dicot.* 446. 2020; Pullaiah, *Fl. Telangana* 1:315.2015; Reddy & Reddy, *Fl. Telangana* 220. 2016. *Phaseolus mungo* L., *Mant.* 1: 101. 1767; Baker in *Hook.f., Fl. Brit. India* 2: 203. 1876; Gamble, *Fl. Madras* 1: 363.1918. *P. max* Roxb., *Fl. Ind.* 3: 295. 1832. *P. radiatus* Roxb. *Fl. Ind.* 3: 296. 1832, non L., 1753. *P. mungo* L. var. *radiatus* (L.) Baker in *Hook.f., Fl. Brit. India* 2: 203. 1876, non *P. radiatus* L., 1753. *P. roxburghii* Wight & Arn., *Prodr. Fl. Ind. Orient.* 1: 246. 1834. (Fig. 12).

An erect cultivated herb, 40–80 cm high. Stem sparsely covered with 0.5–1 mm long hairs. Leaves 3–foliolate; terminal leaflet 5.5–10 × 3.5–5.5 cm, rhomboidal, acute to rounded at base, entire or shortly lobed along margins, acute or shortly acuminate at apex; lateral leaflets 5–7 × 3.5–4 cm, obliquely ovate, acute or shortly acuminate at apex; petioles 8–12 cm long, densely covered with hairs. Stipules 2, elliptic–lanceolate, medifixed, 10–12 × 3–4 mm long, 8–10 nerved, rounded at base, ciliate along margin, acute at apex, hairy on dorsal surface. Flowers bright yellow, 4–8 in axillary, slender racemes, 18–20 mm in diameter; peduncle 4–10 cm long; bracts 2, oblong, acuminate at apex, hairy on upper surface; bracteoles 2, ovate–oblong. Sepals united, ovate, 2 × 5 mm. Petals yellow; standard 8–10 × 15–17 mm long, glabrous, entire along margin; wings 8 × 10 mm, base divided, acute; keels incurved to the left, 5 × 12 mm, jointed at tip. Stamens 9+1, 9 stamens forming tube to 11–13 mm long; filaments 5–6 mm long; one stamen with filament 17–18 mm long. Ovary 5–6 mm long, flattened; style and stigma 12 mm long, stigma curved, hairy on lower side. Pods linear, cylindrical, densely covered with white hairs, 4–5 × 0.5–0.6 cm, dark brown or black when mature. Seeds rounded 6–12 per pod, rough, black, 4 × 3 mm, aril well developed.

Flowering and fruiting: September–January.

Habitat: Cultivated for pulses and often escaped from cultivation and also very frequent along roadsides.

Distribution: TELANGANA: Hyderabad and Nizamabad districts; INDIA: Karnataka, Kerala, Madhya Pradesh, Maharashtra and Odisha [2,5].

Specimens examined: Hyderabad District: Sanathnagar, 24.08.2007, V. Sampath Kumar & K. Chandra Sekar 00397 (BSID); Nizamabad District: Dichpally Mandal, Bibipur Thanda, 21.08.2022, V. Jalander 0772 (TUH).



Fig. 9. *Vigna dalzelliana* (Kuntze) Verdc.: A. Habit; B. Flowering branch; C-D. Leaves; E. Inflorescence; F. Flower; G. Pods; H-J. Seeds

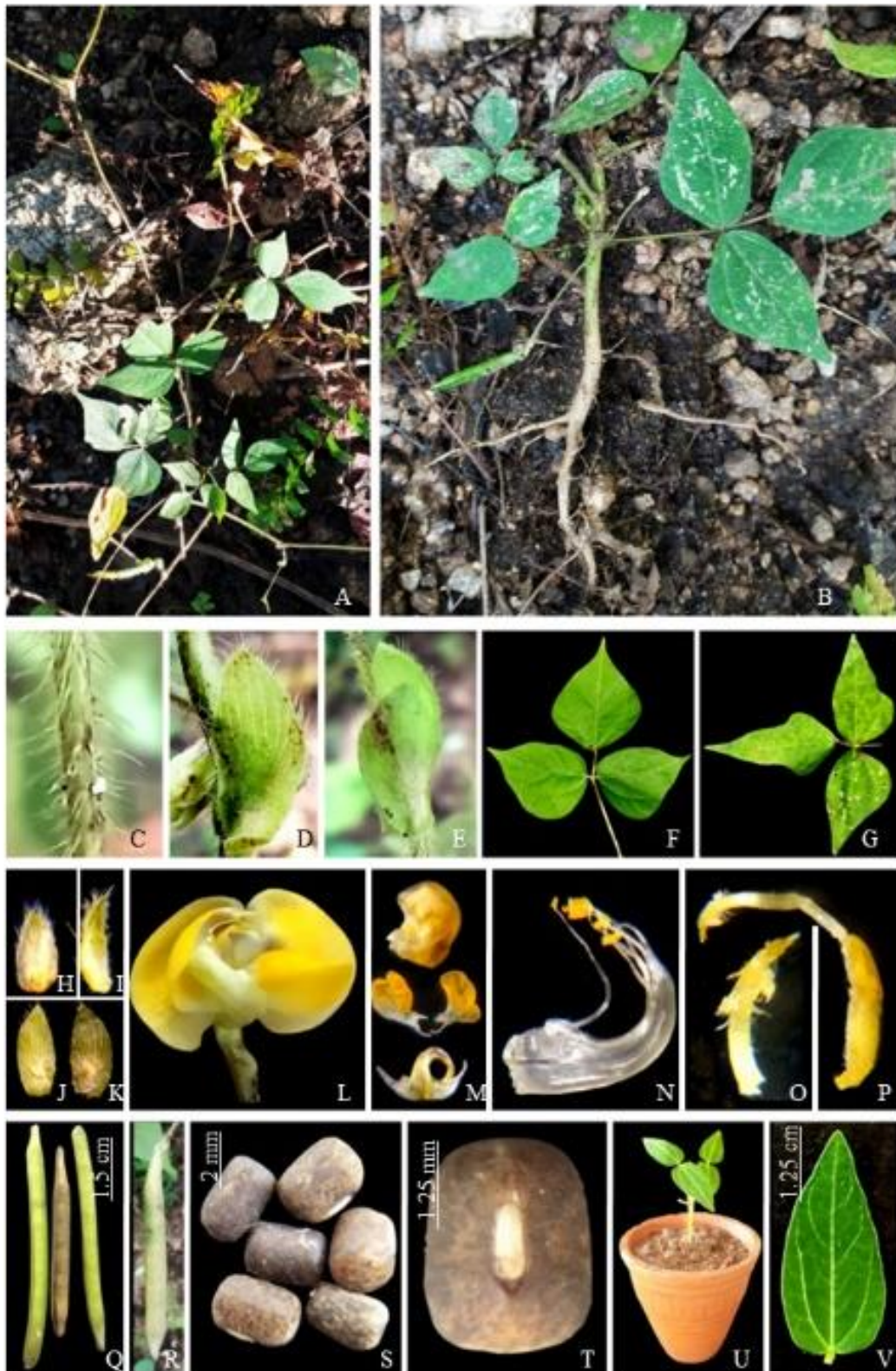


Fig. 10. *Vigna hainiana* Babu, Gopin. & S.K. Sharma: A. Habitat; B. Habit; C. Stem; D-E. Stipules; F-G. Leaves; H. Primary bract; I. Secondary bract; J-K. Bracteoles; L. Flower; M. Corolla; N. Stamens; O. Style beak; P. Pistil; Q-R. Pods; S-T. Seeds; U. Seedlings; V. First leaf



Fig. 11. *Vigna indica* Dixit, K.V. Bhat & S. R. Yadav: A. Habitat; B. Habit; C. Stem; D-E. Stipules; F. Leaf; G. Inflorescence; H. Primary bract; I. Secondary bract; J-K. Bracteoles; L. Flower; M. Calyx; N. Corolla; O. Stamens; P. Style beak; Q. Pistil; R-T. Pods; U-V. Seeds; W. Seedling; X. First leaves



Fig. 12. *Vigna mungo* (L.): A. Habitat; B. Habit; C. Stem; D. Stipules; E. Leaf; F. Inflorescence; G. Primary bract; H. Secondary bract; I-J. Bracteoles; K. Flower; L. Corolla; M. Keel pocket; N. Stamens; O. Pistil; P-Q. Pods; R-S. Seeds; T. Seedling; U. First leaf

6. *Vigna radiata* (L.) R. Wilczek, Fl. Congo Belge 6: 386. 1954; Verdc. in Kew Bull. 24: 558. 1970 (excl. vars. *sublobata* and *glabra*); Sanjappa, Legumes India 275.1992; Yadav et al., Genus *Vigna* in India 31.2014; Sanjappa in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicot. 446. 2020; Pullaiah, Fl. Telangana 1:315.2015; Reddy & Reddy, Fl. Telangana 220. 2016. *Phaseolus radiatus* L. Sp. Pl. 725. 1753; Gamble, Fl. Madras 1: 363.1918. *P. aureus* Roxb., Fl. Ind. 3: 297. 1832 (non Zuccagni, 1806). *Azuki radiata* (L.) Ohwi in Bull. Natl. Sci. Mus. Tokyo 33: 77.1953. (Fig. 13).

Well branched erect cultivated herb, up to 1 m high. Stem sparsely to densely covered with 0.5–0.6 mm long yellowish white hairs. Leaves 3–foliolate; terminal leaflets 6.5–8 × 6–7.5 cm, narrowly ovate–rhomboidal, acute to rounded at base, entire along margin, acute or rounded at apex; lateral leaflets 6.5–8 × 6–7.5 cm, obliquely ovate, acute at apex, sparsely hairy; petioles 8–10 cm long, densely covered with hairs. Stipules 2, ovate, medifixed, 11–16 × 7–8 mm, 12–15 nerved, rounded at base, ciliate along margin, acute at apex, hairy on dorsal surface. Flowers greenish yellow, 5–10 in axillary, slender racemes, 12–14 × 15–16 mm in diameter; peduncle 4–10 cm long; bracts 2, oblong, acuminate at apex, hairy on upper surface; bracteoles 2, ovate–oblong. Sepals united, ovate, 2–2.2 × 4.7–5 mm. Petals greenish yellow; standard 8–10 × 15–17 mm, glabrous, entire along margin; wings 4–5 × 8–10 mm, base divided, acute; keels incurved to the left, 3.7–4 × 10–13 mm, jointed at tip. Stamens 9+1, 9 stamens forming tube to 9–11 mm long; filaments 6–8 mm long; one stamen with filament 17–18 mm long. Ovary 5–6 mm long, flattened; style and stigma 11–13 mm long, stigma curved, hairy on lower side. Pods linear, cylindrical, densely covered hairs, 6–6.5 × 3.5–4 mm, dark brown to blackish when mature. Seeds rectangular, 10–16 per pod, smooth, green, 3.6–4 × 2.8–3 mm, aril not developed.

Flowering and fruiting: August–February.

Habitat: Cultivated for pulses and often escaped from cultivation and also very frequent along roadsides.

Distribution: TELANGANA: Karimnagar, Khammam, Medak and Nizamabad districts; Throughout India [2,5].

Specimen examined: Kamareddy District: Yerrapahad Village, Tadwai mandal, 14.08.2022, V. Jalander & J. Swamy 0768 (TUH); Karimnagar

District: Aklasapur, G.V.Subbarao 25645 (MH); Khammam District: Krishna Rala Sagar, 27.09.1994, R. Chandrasekaran, 102459 (MH); Medak District: Pocharam Wildlife Sanctuary, along road sides of Medak to Bodhan way, J. Swamy 00542 (HY); Nizamabad District: Dichpally Mandal, Ghanpur Village, 28.08.2022, V. Jalander 0778 (TUH).

7. *Vigna stipulacea* (Lam.) Kuntze, Revis. Gen. Pl. 1: 212. 1891; Yadav et al., Genus *Vigna* in India 37.2014; Jalander & Swamy in Bioinfolet 19(3): 301–303.2022. *Dolichos stipulaceus* Lam., Encycl. 2(1): 300. 1786. (Fig. 14).

Trailing and twining herbs, 1–1.5 m long. Stem herbaceous, 4–6–angled, sparsely covered with 1 mm long hairs. Leaves trifoliate, 6–15 cm long (with petiole); terminal leaflets narrowly ovate to rhomboidal, 1–3 lobed or entire, 2–4 × 1.5–3.5 cm; lateral leaflets obliquely ovate, 1–3 lobed or entire, 1.5–4 × 1.4–3.5 cm sparsely hairy; petioles 3–9 cm long, sparsely covered with hairs; stipules 2, large, ovate, medifixed, 10–18 × 5–13 mm, 12–14–nerved, deeply cordate at base, entire along margin, acute at apex, sparsely hairy on dorsal surface. Inflorescence axillary, 4–6 flowered; peduncle 12–28 cm long. Flowers bright yellow, 9–11 mm in diameter, bracts 2, boat shaped; bracteoles 2, ovate–oblong. Sepals united, ovate, 1.8–2 × 4.5–5 mm, hairy, tip acute. Petals yellow, standard bright yellow, 7–11 mm long, glabrous, entire along margin, obcordate at apex; wings 4.6–5 × 5.5–6 mm, base divided, acute; keels 2, incurved to the left, 1.8–2 × 7.5–8 mm, jointed at tip. Stamens 9+1, 9 stamens form a tube, 5–6 mm long; anther filaments 2–2.5 mm long; one stamen with filament 7–8 mm long. Ovary 4.5 mm long, flattened; style and stigma 5 mm long, stigma curved, hairy at lower side. Pods linear, cylindrical, covered with small white hairs, 4–5 × 0.3–0.35 cm, black when mature. Seeds elliptic, 10–14 per pod, rough, brown with small black mottled, 2.8–3 × 1.8–2 mm, aril developed.

Flowering and fruiting: September–November.

Habitat: Common along field bunds and in cultivated fields.

Distribution: TELANGANA: Nizamabad district [7]; INDIA: Andhra Pradesh, Chhattisgarh, Gujarat, Madhya Pradesh, Maharashtra, Odisha, Rajasthan and Tamil Nadu [2].

Specimen examined: Nizamabad District: Dichpally (Mandal), 19.09.2021, V. Jalander & J. Swamy 0403 (TUH, BSID).

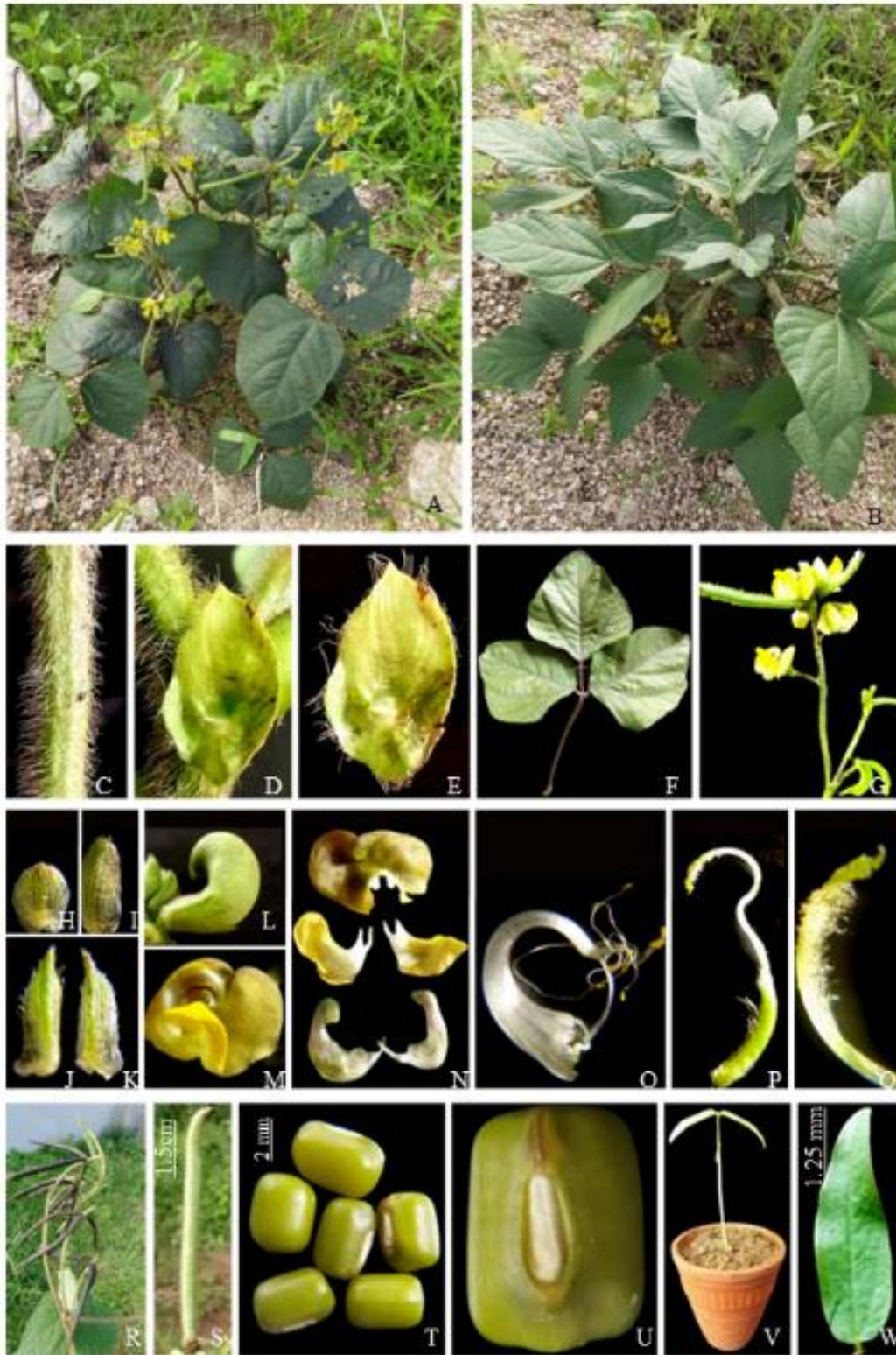


Fig. 13. *Vigna radiata* (L.) R. Wilczek: A. Habitat; B. Habit; C. Stem; D-E. Stipules; F. Leaf; G. Inflorescence; H. Primary bract; I. Secondary bract; J-K. Bracteoles; L. Bud; M. Flower; N. Corolla; O. Stamens; P. Pistil; Q. Style beak; R-S. Pods; T-U. Seeds; V. Seedling; W. First leaf



Fig. 14. *Vigna stipulacea* Kuntze: A. Habitat; B. Habit; C. Stem; D-E. Stipules; F. Leaf; G. Inflorescence; H. Primary bract; I. Secondary bract; J-K. Bracteoles; L. Flower; M. Calyx; N. Corolla; O. Stamens; P. Keel pocket; Q. Pistil; R. Style beak; S-T. Pods; U-V. Seeds; W. Seedlings; X. First leaf

8. *Vigna sublobata* (Roxb.) Babu & S.K. Sharma in Bull. Bot. Surv. India 27: 21. 1987; Sanjappa, Legumes India 276. 1992; Yadav et al., Genus *Vigna* in India 39.2014; Sanjappa in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicot. 440. 2020; Reddy & Reddy, Fl. Telangana 220. 2016. *Phaseolus sublobatus* Roxb., Fl. Ind. 3: 288. 1832; Gamble, Fl. Madras 2: 363. 1918 (Repr. ed. 1: 255. 1957). *V. brachycarpa* Kurz in J. Asiat. Soc. Bengal, Pt. 2, Natl. Hist. 43: 185. 1874. *P. setulosus* Dalzell, Hooker's J. Bot. Kew Gard. Misc. 2: 33. 1850. *P. mungo* L. var. *radiatus* (L.) Baker in Hook.f., Fl. Brit. India 2: 203. 1876, p.p. *P. sublobatus* Roxb. var. *setulosus* (Dalzell) Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66: 423. 1897. *P. sublobatus* Roxb. var. *grandiflora* Prain in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66: 423. 1897. *P. radiatus* L. var. *setulosus* (Dalzell) H. Hara, J. Jap. Bot. 30: 141. 1955. *V. radiata* (L.) R. Wilczek var. *setulosa* (Dalzell) Ohwi & H. Ohashi, Jap. J. Bot. 44: 31. 1969. *V. radiata* (L.) Wilczek var. *sublobata* (Roxb.) Verdc. in Kew. Bull. 24: 559, 1970; Pullaiah, Fl. Telangana 1:316.2015. (Fig. 15).

A trailing or twining herb, up to 180 cm high. Stem densely covered with 2–2.5 mm long hairs. Leaves 3–foliolate; terminal leaflets 5–8 × 5–8 cm, rhomboidal, broadly ovate, acute to rounded at base, entire along margin, acute or rounded at apex; lateral leaflets 6–7.5 × 6.5–7 cm, obliquely ovate, acute or shortly acuminate at apex, sparsely hairy; petioles 5–6 cm long, densely covered with hairs. Stipules 2, ovate, medifixed, 10–12 × 5–6 mm long, 10–13 nerved, rounded at base, ciliate along margin, acute at apex, hairy on dorsal surface. Flowers greenish yellow, 10–13 in axillary, slender racemes, 17–18 mm in diameter; peduncle 10–15 cm long; bracts 2, oblong, acuminate at apex, hairy on upper surface; bracteoles 2, ovate–oblong. Sepals united, ovate, 1.8–2.2 × 6.8–7.2 mm. Petals greenish yellow; standard 6.2–6.5 × 10–12 mm, glabrous, entire along margin; wings 2.7–3 × 7.2–8 mm, base divided, acute; keels incurved to the left, 1.9–2.3 × 11–12 mm, jointed at tip. Stamens 9+1, 9 stamens forming tube to 11–13 mm long; filaments 2–2.5 mm long; one stamen with filament 15 mm long. Ovary 5.5–6 mm long, flattened; style and stigma 12–14 mm long, stigma curved, hairy on lower side. Pods linear, cylindrical, ferruginously hairy, 6–6.5 × 0.4–0.5 cm, dark brown to blackish when mature. Seeds rectangular, 10–15 per pod, rough, dark brown to black, 3–3.2 × 2.2–2.5 mm, aril not developed.

Flowering and fruiting: September–November.

Habitat: Occasionally found along field bunds and road sides.

Distribution: TELANGANA: Adilabad, Mahabubnagar and Medak districts; INDIA: Assam, Bihar, Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Tamilnadu and West Bengal [2,5].

Specimens examined: Adilabad District: Echoda Village and Mandal, 28.09.2022, *V. Jalander* 0798 (TUH); Pochhera Waterfalls, Pochhera, 01.10.2022, *V. Jalander* 0802 (TUH); Mahabubnagar District: Saleswaram, 19.09.2013, *L. Rasingam* & *M. Sankara Rao* 03472 (BSID); Umamaheswaram, 20.09.2013, *L. Rasingam* & *M. Sankara Rao* 03612 (BSID); Medak District: Pocharam Wildlife Sanctuary, Rajpet, *J. Swamy* 00135 (HY).

9. *Vigna subramaniana* (Babu ex Raizada) M. Sharma in Indian J. Forest. 3 (2): 133.1980; Yadav et al., Genus *Vigna* in India 41.2014; Sanjappa in A.A. Mao & S.S. Dash, Fl. Pl. India, Annot. Checkl. 1: 440.2020. *Phaseolus subramanianus* Babu ex Raizada, Suppl. Duthie's Fl. Upper Gangetic Plain 5: 56.1976. (Fig. 16).

Twining herbs, up to 1.5 m high. Stem densely covered with 2–2.5 mm long brown colored hairs. Leaves 3–foliolate; terminal leaflets 3–4.5 × 2.8–4.5 cm, narrowly ovate to rhomboidal, acute to rounded at base, entire or shortly lobed along margin, acute at apex; lateral leaflets 3–4.5 × 2.5–3.5 cm, obliquely ovate, acute at apex; petioles 2–5 cm long, densely covered with hairs. Stipules 2, broadly ovate or ovate–elliptic, medifixed, 7–8 × 3.5–4 mm, 11–13 nerved, rounded at base, ciliate along margin, acute at apex, hairy on dorsal surface. Flowers 4–6, in axillary or terminal, slender racemes, 12–14 mm in diameter; peduncle 3.5–8 cm long; bracts 2, rounded to acute at apex; primary bract, ovoid–orbicular; secondary bract oblong; bracteoles 2, oblong–lanceolate, acute at apex. Sepals united, ovate, 3–3.3 × 5.5–6.2 mm, 5–lobed; lobes acute at apex. Petals golden yellow or yellowish brown; standard 5–6 × 8–12 mm, glabrous, entire along margin, obcordate at tip; wings 5 × 8 mm, base divided, acute; keels incurved to the left, 2.5 × 9 mm, jointed at tip. Stamens 9+1, 9 stamens forming tube to 14–16 mm long; filaments 3–3.5 mm long; one stamen with filament 16–18 mm long. Ovary 4.5–5 mm long, linear, flattened; style and stigma 10–12 mm long; stigma curved, hairy on lower side. Pods linear, cylindrical, densely pubescent, 5–6.5 × 0.3–0.35 cm, black

when mature. Seeds rectangular, 10–14 per pod, rough, brownish–black, 2.2–2.5 × 1.8–2 mm, aril obscure.

Flowering and fruiting: September–December.

Habitat: Occasionally found in scrub jungles and along road sides.

Distribution: TELANGANA: Kamareddy district (present report); INDIA: Gujarat, Himachal

Pradesh, Kerala, Madhya Pradesh, Punjab, Tamil Nadu, Uttarakhand and Uttar Pradesh [2,5].

Specimen examined: Kamareddy District: Govt. Degree College campus, Kamareddy, 31.10.2021, V. Jalander 0434 (TUH).

Note: The species has not been reported from Telangana State, hence it has been reported here as an addition to the Flora of Telangana.



Fig. 15. *Vigna sublobata* (Roxb.) Babu & S.K. Sharma: A. Habitat; B. Habit; C. Stem; D-E. Stipules; F. Leaf; G-H. Inflorescences; I. Primary bract; J. Secondary bract; K-L. Bracteoles; M. Flower; N. Calyx; O. Corolla; P. Stamens; Q. Keel pocket; R. Pistil; S. Style beak; T-V. Pods; W-X. Seeds; Y. Seedling; Z. First leaves



Fig. 16. *Vigna subramaniana* (Babu ex Raizada) M. Sharma: A. Habitat; B. Habit; C. Stem; D-E. Stipules; F. Leaf; G. Inflorescence; H. Primary bract; I. Secondary bract; J-K. Bracteoles; L. Flower; M. Calyx; N. Corolla; O. Stamens; P. Pistil; Q. Style beak; R. Keel pocket; S-T. Pods; U-V. Seeds; W. Seedling; X-Y. First leaves

10. *Vigna trilobata* (L.) Verdc. var. **trilobata** in Taxon 17: 172. 1968; Sanjappa, Legumes India 271.1992; Yadav et al., Genus *Vigna* in India 43.2014; Sanjappa in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicot. 446. 2020; Pullaiah, Fl. Telangana 1:316.2015; Reddy & Reddy, Fl. Telangana 221. 2016. *Dolichos trilobatus* L., Mant. Pl. 1: 101. 1767. *Phaseolus trilobatus* (L.) Schreb., Nova. Act. Acad. Caes. Leopold. Carol. Germ. Nat. Curios 4: 132. 1770. *P. trilobus* auct. non *D. trilobus* L., 1753; Baker in Hook.f., Fl. Brit. India 2: 201. 1876; Gamble, Fl. Madras 1: 362. 1918. (Repr. ed. 1: 255–256. 1957). (Fig. 17).

Trailing or twining, straggling herbs, up to 1 m high. Stem densely covered with 1–1.5 mm long hairs. Leaves 3-foliolate; terminal leaflets 5.5–6.5 × 3–3.5 cm, narrowly ovate, acute to rounded at base, 3 lobed; lateral leaflets 5–5.5 × 2.5–3 cm, obliquely ovate–deltoid, 3 lobed; petioles 4–5 cm long, densely covered with hairs. Stipules 2, orbicular–ovate, medifixed, 4–4.5 × 2–2.5 mm long, 10–12 nerved, rounded at base, ciliate along margin, acute at apex, hairy on dorsal surface. Flowers golden yellow, 2–6 in axillary, slender racemes, 8–10 mm in diameter; peduncle 6–12 cm long; bracts 2, oblong, acuminate at apex, pubescent on upper surface; bracteoles 2, ovate–oblong. Sepals united, ovate, 1.2–1.5 × 5–5.5 mm. Petals golden yellow; standard 8–12 mm long, glabrous, entire along margin; wings 3.5 × 5 cm, base divided, acute; keels incurved to the left, 8–9 × 1.5–2 mm, jointed at tip. Stamens 9+1, 9 stamens forming tube to 6–7 mm long; filaments 2–2.5 mm long; one stamen with filament 8 mm long. Ovary 3.5–4 mm long, flattened; style and stigma 4.5 mm long, stigma curved, hairy on lower side. Pods linear, cylindrical, glabrous or minutely hairy, 2.5–3.3 × 0.1–0.2 cm, buff or pale brown when mature. Seeds rounded, 6–10 per pod, rough, orange brown, 3 × 2 mm, aril well developed.

Flowering and fruiting: September–February.

Habitat: Frequent in sandy soils and in dry deciduous forests.

Distribution: TELANGANA: Adilabad, Khammam, Mahabubnagar, Medak, Nizamabad and Warangal districts; INDIA: Andhra Pradesh, Kerala and Tamil Nadu [2,5].

Specimens examined: Adilabad District: Kawal Tiger Reserve, Ichoda Range, Srikonda Beat, 05.02.2014, *P.S. Annamma* 04804 (BSID); Sone, T. Pullaiah & P. Venkat Prasanna 4022 (MH);

Khammam District: Bhadradi–Kothagudem, Allapally Range, Mylaram Beat, 11.17.2021, *J. Swamy* 09346 (BSID); Khammam to Dhanaiyaigudem, 01.01.1997, *R. Rajan* 108087 (MH); Mahabubnagar District: Rampur, 16.12.2009, *B. Sadasivaiah & S.K. Basha* 32640 (SKU); Medak District: Manjeera Wildlife Sanctuary, Bapanigadda, *L. Rasingam & J. Swamy* 010209 (BSID); Manjeera Wildlife Sanctuary, Pottipally, *L. Rasingam & J. Swamy* 11279 (BSID); Nizamabad District: Kammarpally, *T. Pullaiah & B. Ravi Prasad Rao*, 6230 (SKU).

11. *Vigna trinervia* (B. Heyne ex Wight & Arn.) Tateishi & Maxted var. **trinervia** in Kew Bull. 57: 633.2002; Yadav et al., Genus *Vigna* in India 45.2014. *Phaseolus trinervius* B. Heyne ex Wight & Arn., Prodr. Fl. Ind. Orient. 1: 245.1834. (Fig. 18).

Twining herbs, up to 2 m high. Stem densely covered with 1–2 mm long brown colored hairs. Leaves 3-foliolate; terminal leaflets 4–6.5 × 3–5 cm, narrowly ovate to rhomboidal, acute to rounded at base, entire or shortly lobed along margin, acute at apex; lateral leaflets 3.5–5.5 × 3–3.5 cm, obliquely ovate, acute at apex; petioles 4–8 cm long, densely covered with hairs. Stipules 2, long elliptic–ovate, medifixed, 10–13 × 4.5–5.5 mm, 12–14 nerved, rounded at base, ciliate along margin, acute at apex, hairy on dorsal surface. Flowers greenish yellow or golden yellow, 4–14 in axillary or terminal, slender racemes, 10–12 mm in diameter; peduncle 4–12 cm long; bracts 2, oblong, acute at apex, hairy on upper surface; bracteoles 2, ovate–oblong. Sepals united, ovate, 2–2.5 × 4.5–5 mm. Petals greenish yellow or golden yellow; standard 6–6.2 × 8–10 mm long, glabrous, entire along margin; wings 4.5–5 × 5.2–6 mm, base divided, acute; keels incurved to the left, 2–2.5 × 7.5–8 mm, jointed at tip. Stamens 9+1, 9 stamens forming tube to 12–14 mm long; filaments 3–6 mm long; one stamen with filament 16–18 mm long. Ovary 5.5–7 mm long, flattened; style and stigma 13–15 mm long, stigma curved, hairy on lower side. Pods linear, cylindrical, densely covered with 1–2 mm, brown hairs, 4.5–6 × 0.4–0.55 cm, dark brown to blackish when mature. Seeds rectangular, 10–14 per pod, rough, blackish brown, 3–3.5 × 2–2.5 mm, aril not developed.

Flowering and fruiting: September–December.

Habitat: Rare along field bunds and road sides.

Distribution: TELANGANA: Nizamabad district (present report); INDIA: Odisha [2].



Fig. 17. *Vigna trilobata* (L.) Verdc.: A. Habitat; B. Inflorescence with young pods; C. Stem; D-E. Stipules; F. Leaf; G. Inflorescence; H. Primary bract; I. Secondary bract; J-K. Bracteoles; L. Flower; M. Calyx; N. Corolla; O. Stamens; P. Pistil; Q. Style beak; R-S. Pods; T-U. Seeds; V. Seedlings; W. First leaf

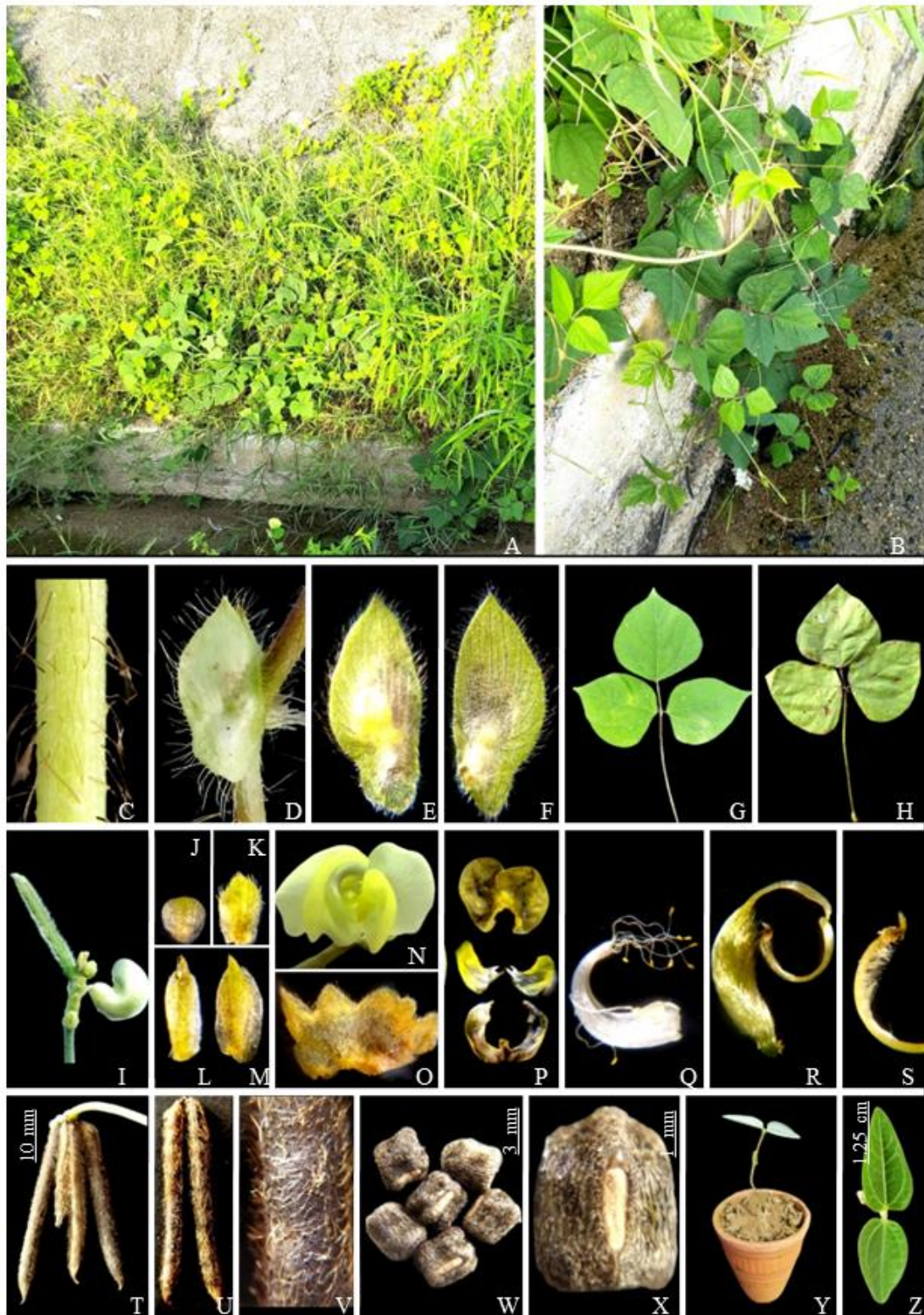


Fig. 18. *Vigna trinervia* (B. Heyne ex Wight & Arn.) Tateishi & Maxted var. *trinervia*: A. Habitat; B. Habit; C. Stem; D-F. Stipules; G-H. Leaves; I. Inflorescence; J. Primary bract; K. Secondary bract; L-M. Bracteoles; N. Flower; O. Calyx; P. Corolla; Q. Stamens; R. Pistil; S. Style beak; T-V. Pods; W-X. Seeds; Y. Seedling; Z. First leaves

Specimens examined: NH-44, Near CMC Hospital, Dichpally, 11.09.2022, *V. Jalander* 0787 (TUH); Yanampally, 16.10.2022, *V. Jalander* 0828 (TUH).

Note: The species has not been reported from Telangana State, hence it has been reported here as an addition to the Flora of Telangana.

12. *Vigna umbellata* (Thumb.) Ohwi & Ohashi in J. Jap. Bot. 44: 31. 1969; Yadav et al., Genus *Vigna* in India 49.2014; Sanjappa in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicot. 440. 2020; Swamy & Rasingam in Nelumbo 64 (1): 202. 2022. *Dolichos umbellatus* Thunb., Trans. Linn. Soc. 2: 339. 1794. *Phaseolus calcaratus* Roxb., Fl. Ind. 3: 289. 1832; Baker in Hook. f., Fl. Brit. Ind. 2: 203. 1876; Gamble, Fl. Madras 1:363. 1918. *P. pubescens* Blume, Cat. Gew. Buitenzorg: 93. 1823. *P. torosus* Roxb., Fl. Ind. 3: 298. 1832. *V. calcarata* (Roxb.) Kurz in J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 45: 247. 1877. *Azukia umbellata* (Thunb.) Ohwi, Fl. Jap.: 691. 1953. (Fig. 19).

Twining herbs, up to 1.5 m high. Stem sparsely covered with 0.5–0.7 mm long hairs. Leaves 3–foliolate; terminal leaflets 6.5–7 × 4.5–5 cm, narrowly ovate–rhomboid, acute to rounded at base, entire or shortly lobed along margin, acute or shortly acuminate at apex; lateral leaflets 3.5–4 × 5–5.5 cm, obliquely ovate, acute or shortly acuminate at apex, sparsely hairy; petioles 10–12 cm long. Stipules 2, elliptic–ovate, medifixed, 7–8 mm long, 12–14 nerved, rounded at base, ciliate along margin, acute at apex, hairy on dorsal surface. Flowers golden yellow, 10–15 in axillary, slender racemes, 9–10 mm in diameter; peduncle 8–14 cm long; bracts 2, oblong, acute to acuminate at apex, hairy on upper surface; bracteoles 2, ovate–oblong. Sepals united, ovate, 1.2–1.5 × 4–4.5 mm. Petals golden yellow; standard 5–6 × 8–9 mm long, glabrous, entire along margin; wings 2.5 × 6 mm, base divided, acute; keels incurved to the left, 2 × 8 mm, jointed at tip. Stamens 9+1, 9 stamens forming tube to 5–5.5 mm long; filaments 2–2.5 mm long; one stamen with filament 7–8 mm long. Ovary 4–4.5 mm long, flattened; style and stigma 4–5 mm long, stigma curved, hairy on lower side. Pods linear, cylindrical, covered with minute hair, 3.5–4 × 0.25–0.3 cm, grayish black when mature. Seeds elliptic, 10–13 per pod, smooth, blackish brown, 2.2–2.5 × 1.8–2.2 mm, aril not developed.

Flowering and fruiting: September–November.

Habitat: Occasionally found in dry deciduous forests and road sides.

Distribution: TELANGANA: Khammam and Nizamabad districts [12]; INDIA: Karnataka, Mizoram and Odisha [2,5].

Specimens examined:

Khammam District: Bhadradi–Kothagudem, Chatakonda Range, Gattumalla South Section & Beat, 15.11.2020, *J. Swamy* 10871 (BSID); Bhadradi–Kothagudem, Allapally Section & Range, Raipadu Beat, *J. Swamy* 09874 (BSID); Nizamabad District: Dichpally Mandal, Nadipally Thanda, 11.09.2022, *V. Jalander* 0788 (TUH).

13. *Vigna unguiculata* (L.) Walp., Repert. Bot. Syst. 1: 779. 1843; Sanjappa, Legumes India 271.1992; Yadav et al., Genus *Vigna* in India 53.2014; Sanjappa in A.A. Mao & S.S. Dash, Fl. Pl. India Annot. Checkl. Dicot. 446. 2020; Pullaiah, Fl. Telangana 1:316.2015; Reddy & Reddy, Fl. Telangana 221. 2016. *Dolichos unguiculatus* L., Sp. Pl. 725. 1753. *Glycine unguiculata* L., Sp. Pl. ed. 2, 2: 1023. 1763. *Voandzeia unguiculata* (L.) DC., Prodr. 2: 474. 1825. *Vigna catajang* Baker in Hook.f., Fl. Brit. India 2: 2025.1876; Gamble, Fl. Madras 1: 365.1918. (Fig. 20).

Erect or scandent or straggling or trailing or twining herbs, up to 1.8 m high. Stem glabrous or at times sparsely or densely covered with hairs. Leaves 3–foliolate; terminal leaflets 3.5–4.5 × 6.5–7 cm, ovate, acute to rounded at base, entire along margin, acute at apex; lateral leaflets 5–5.5 × 5.5–6 cm, obliquely ovate, acute or shortly acuminate at apex, sparsely hairy; petioles 3–5 cm long. Stipules 2, ovate–lanceolate, medifixed, 13–15 × 4.5–5 mm long, 8–10 nerved, rounded at base, entire along margin, acute to shortly acuminate at apex, pubescent on dorsal surface. Flowers bluish white or pale white or pink, 8–10 in axillary on slender racemes; peduncle 6–10 cm long; bracts 2, oblong, acute at apex; bracteoles 2, ovate–oblong. Sepals united, ovate, 7–8 × 9–10 mm, tuberculate. Petals bluish white or pale white or pink; standard 22–23 × 25–26 mm, glabrous, entire along margin; wings 12–13 × 16–18 mm, base divided, acute; keels incurved to the left, 10–11 × 12–13 mm, jointed at tip. Stamens 9+1, 9 stamens forming tube to 17–18 mm long; filaments 4–5 mm long; one stamen with filament 22 mm long. Ovary 10–12 mm long, flattened; style and stigma 17 mm long,

stigma curved, hairy on lower side. Pods subterete, sub-compressed and glabrous or puberulent, 18–20 × 0.9–1 cm, pale yellow when

mature. Seeds rounded, 12–18 per pod, smooth. Pale yellow, 10 × 5 mm, aril slightly developed.



Fig. 19. *Vigna umbellata* (Thumb.) Ohwi & Ohashi: A. Habitat; B. Habit; C. Stem; D-E. Stipules; F-G. Leaves; H. Inflorescence; I. Primary bract; J. Secondary bract; K-L. Bracteoles; M. Flower; N. Calyx; O. Corolla; P. Stamens; Q. Pistil; R. Keel pocket; S. Style beak; T-V. Pods; W-X. Seeds; Y. Seedling; Z. First leaves



Fig. 20. *Vigna unguiculata* (L.) Walp.: A. Habitat; B-C. Habit; D. Stem; E-F. Stipules; G. Leaf; H. Inflorescence; I. Primary bract; J. Secondary bract; K-L. Bracteoles; M. Flower; N. Calyx; O. Corolla; P. Stamens; Q. Pistil; R. Style beak; S. Pods; T-U. Seeds; V. Seedling; W. First leaf

Flowering and fruiting: September–March.

Habitat: Cultivated for pulses and often escaped from cultivation and frequently seen along road sides.

Distribution: TELANGANA: Nizamabad and Warangal districts; INDIA: Kerala, Maharashtra, Odisha, Tripura, Uttaranchal, and West Bengal [2, 5].

Specimens examined: Nizamabad District: Dichpally Mandal, Mullangi Village, 31.10.2022, V. Jalander 0852 (TUH); Warangal District: Rangapuram, 09.02.1983, P.V. Sreekumar & N. Rama Rao 76923 (MH).

3. CONCLUSION

India is a secondary centre of species diversity for subgenus *Ceratotropis* and is also known as Asian *Vigna*. Wild crop relatives are a very important reservoir of genes for the development of new hybrid and commercial varieties. Survey, correct identification and documentation of these wild crop relatives in any region has high biological and conservation value. First leaf of the plant is one of the important characteristics apart from stipule, leaves, flowers, beak structure of the style, pods and seeds for identification of the species complex in this genus. To distinguish the species from each other, a series of germination studies have been conducted and with the help of the first leaves, all the collected plant specimens have been identified into 13 species, of which three species are endemic. The present taxonomic survey also leads to discovery of three new distributional record for the state. The occurrence of endemics in the state is significant from the conservation perspective and adds conservation value to the plant diversity of the state.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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