



RESEARCH ARTICLE

Alysicarpus hamosus var. *trifoliolatus* (Fabaceae) a new variety from Deccan plateau of India.

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ABSTRACT

A new variety, *Alysicarpus hamosus* var. *trifoliolatus*, has been identified and described from the Dr. Babasaheb Ambedkar Marathwada University Campus, Chhatrapati Sambhajnagar, and other localities in Maharashtra. This variety belongs to the genus *Alysicarpus* in the family Fabaceae and is distinct from the closely related *Alysicarpus hamosus*. Morphologically, *Alysicarpus hamosus* var. *trifoliolatus* is similar to *Alysicarpus hamosus* but can be distinguished by several key characteristics: it features trifoliate leaflets, unique leaflet shapes and sizes, distinct petal colour and morphology, and specific pod structures. Additionally, the variety has non-mottled seeds and a distinctive seed surface pattern. The new variety is described and illustrated, providing detailed morphological comparisons with *Alysicarpus hamosus* and enhancing the understanding of its taxonomic placement within the genus. This description contributes to the botanical knowledge of the region and aids in the identification and classification of the species.

Keywords- *Alysicarpus hamosus* var. *trifoliolatus*, new variety, Marathwada region, Maharashtra State, India.

INTRODUCTION

The genus *Alysicarpus* Desv. (Leguminosae: Papilionoideae) comprises 34 species distributed in the tropical and sub-tropical parts of the Old World (The Plant List 2024). In India, the genus is represented by 26 taxa, especially in the dry zones of the states of Maharashtra, Andhra Pradesh, Gujarat, Karnataka, Kerala and Tamil Nadu (Pokle 1999, 2002). Pramanik & Thothathri (1982), Almeida & Almeida (1988), Pokle (1999) Chavan (2013) described eight species and five varieties of *Alysicarpus* from the Indian peninsula. In addition, recently Gholami and Pande (2016) described two species viz, *A. poklianus* and *Alysicarpus gautalensis*, Dalvi et.al (2019) (2021) described one species and two varieties *Alysicarpus bhuibavadensis*, *Alysicarpus tetragonolobus* var. *micranthus* and *Alysicarpus tetragonolobus* var. *falcatus*. During the course of the investigation since last five years the authors have collected several variants particularly belonging *Alysicarpus hamosus* Edgew. The critical morphological observation reveals that the variant deserves higher taxonomic status. Present paper deals with the variant which deserves varietal status and is described, illustrated, note on phenology, ecology and a comparison with the allied species and SEM of spermoderm pattern of seed is provided.

MATERIALS AND METHODS

In the taxonomic survey, specimens collected from the fields. The records of localities were collected from Herbarium specimens from BAMU Herbarium and BSI Pune Herbarium and new localities were sought. On the basis of the nature of their variation in habit, shape, size and structure of leaf, structure of calyx, structure, size of pod and surface surface pattern of seed examined. The stereoscopic measurements were taken with the help of Pico meter in Millimeter (mm) dimensions. The calculations of Standard Deviation, Coefficient of Variation, Mean, and Range were done by standard method (Gupta 1969). For SEM studies, the seeds were dried and fixed to specimen stubs with an adhesive and placed on revolving discs of Joel fine coat ion sputter (JFC 1600 fine coater). Seeds were uniformly coated with gold. Specimens' stubs were then fixed to the specimen holder of Scanning Electron Microscope (Joel JSM 6360A) maintained at accelerating potential voltage of 15 KV, and photomicrographs of Seeds hylum, entire seed, and sub hylar region were taken at different magnification in Unit of the Scanning Electron Microscope in Dept of Physics, University of Pune, Pune.

Author collected original type specimen and protologue of *Alysicarpus hamosus* Edgw. and provided proper taxonomic

treatment. The critical investigation and morphological analysis results showed that the specimens raised taxonomic status as *Alysicarpus hamosus* var. *trifoliolatus*. The type specimen designated and protologue is described and comparative morphology are provided in (Table no. 1).

Recently the Reinstatement and lectotypification of *Alysicarpus procumbens* done by Tiwari (2020) based on specimen drawn through the type specimen of *Alysicarpus hamosus* housed at K (K000858937) and Icones Roxburghinae no. 395. After the critical examination of type specimens and protologue of *Alysicarpus hamosus* clearly described and mentioned the leaves are unifoliolate and ovate to obovate, erect in habit. At the time of fields visit *Alysicarpus hamosus* shows qualitative as well quantitative variation. The variation is noted here which is observed in the field in various localities. In general, there are three types of habit observed, erect, procumbent and prostrate. Erect or rarely procumbent in habit it bears unifoliolate leaves with pods are longer than broad and pods turns black after mature. In addition to this in erect habit it is also observed that leaves are rounded obovate to orbicular, rarely branched and pods articles broader than long, shows straw color after mature. In Prostrate habit it is strictly shows trifoliolate leaves, rounded, obovate to orbicular, pod joints broader than long and after the mature its turns to straw color.

TAXONOMIC TREATMENT

Alysicarpus hamosus var. *trifoliolatus* Chavan, Taur and A. S. Dhabe, var. nov. (Figs. 1, 2) Type: INDIA, Maharashtra, Chhatrapati Sambhajinagar District, Dr. Babasaheb Ambedkar Marathwada University N19°54'5.86", E75°18'38.78". 30/08/2023, S.Y. Chavan, 005 (holotype CAL!; isotypes BSI!, MH!, BAMU!).

A. hamosus. Edgew.

1a. Prostrate, leaves trifoliolate*A. hamosus* var. *trifoliolatus*

1b. Erect; leaves unifoliolate 2

2a. Erect; leaves small ovate-obovate; pod cylindrical, pod articles longer than broad*A. hamosus poklianus*

2b. Erect; leaves large, rounded-obovate; pod swollen, pod articles broader than long*A. hamosus*

Alysicarpus hamosus var. *trifoliolatus* Chavan S.Y., Taur R.R. and A.S.Dhabe var. nov.

Annual, prostrate, branched herbs, 30-50 cm long, branches slender, pubescent with long, spreading trichomes. Leaves

trifoliolate, petiolate, stipulate, petioles ca 0.6-1.2 mm long, stiffly hairy, petiolules very short, densely pubescent, stipules, scarious, obliquely deltoid, tapering, acute tailed, ca 0.5-0.7 × 1.8-2.2 mm long, striate stipels two, lateral deltoid, subacute, ca 1.2 × 0.6-0.8 mm, pubescent, striate. Leaflets round or broadly ovate or obovate or orbicular, ca 1.5-2.5 × 1.6-3 cm, broader than length, leaf apices obtuse, leaf base rounded, leaf upper surface pilose, lower surface pubescent.

Flower in 4-8 pairs on 2-8 cm long axillary racemes, axis pubescent, pedicels ca 2-3 mm long, pubescent. Primary bract broadly ovate, acuminate, ca 2.2 × 0.8-1 mm, striate, secondary bracts two, lateral, ovate, acute, ciliate, striate, ca 1.6-1.8 × 0.4-0.6 mm long. Calyx ca 2.8-3.4 × 0.6-0.8 mm long, shorter than first joint of the pod, 3 inner teeth linear, acute, ciliate, calyx tube 1-2 mm long, calyx tube parallelly veined and sepal lobes reticulately veined. Corolla deep pink in to purple, standard faint, ca 2.8-3.2 × 1.5-2 mm, broadly round, cordate at base, emarginated at apex, limb up to ca 2 mm long, narrow, wings obovate- elongate, narrow towards the base, slightly curved, apex, round, ca 4 × 0.8 mm, keel boat shaped, ca 3 × 0.8-1 mm. Stamens 9+1, with 5 long and 5 short filaments. Ovary ca 1-2 mm long, pubescent, style ca 2-3 mm long, bent, stigma, capitate. Pods broad, 1-1.8 cm long, hairy with hook hairs, 3-5 articles with arise line between the articles, articles reticulate and longitudinally striate, densely pubescent with straight hooked trichomes, apex mucronate. (Fig.no.1,2).

Note- *A. hamosus* var. *trifoliolatus* is collected from Dr BAMU University campus since last 15 years. Uniformly occurrence of trifoliolate leaves indicate that is ancestral character.

Diagnosis- Prostrate, leaves trifoliolate, large, rounded, ovate-obovate, pod broad, hairy with hook hairs, 3-5 seeded, seed nonmottled, seed surface pattern is multireticulate.(Fig.no.2)

Phonology- Flowering: August to September; fruiting: September to October

Etymology-The specific epithet 'trifoliolatus' derive from leaf phyllotaxy.

Distribution- Infrequent.

Flowering & fruiting- August to November.

Exsiccata- Specimens deposited BAMU Herbarium: ASD 648B Aurangabad, SYC 005 BAMU Campus, Aurangabad, SYC 017 Chalisgaon Ghat, SYC 184 Chandrapur, ASD 645A Akklakunwa, ASD 655 Halul, ASD 948A Aurangabad, SYC 041 Mahurgad,

Nanded, SYC 042 Nanded, SYC 154 Zarighat, Nashik, SYC 183 Chandrapur, SYC 186 BAMU Campus, Aurangabad, ASD 645 Akkalkunwa, ASD 648 Akkalkunwa, ASD 680 Abu road, Mount Abu, ASD 682 Himmat nagar, ASD 913 Bodhadi Nanded, SYC 175 Pune University Campus, Pune, SYC 145 Chandrapur, SYC 093 BAMU Campus, Aurangabad, SYC 107 BAMU Campus Aurangabad, SYC 154 Zarighat, Nashik, SYC 183 Chandrapur, SYC 186 BAMU Campus, Aurangabad.

Specimens Examined BSI Pune: S Y Kamble 169445 Ravidoh, Mr. Asan 93742 Daman Grandi, R. S Raghvan 115191 Mundra Gujrat, R.S.Raghwan 115063 Samrasar, R. S Raghvan 114704 Adesar valley, R.D. Pataskar 110397 Gora Narbada Broach District, R.D.Pataskar 112217A Gora Broach District, B.M Wadhava 60609A Bhavandgarh, M.Y. Ansari 94087 Khanvel, M.Y.Ansari 93687 Daman Ground, M.Y.Ansari 121930 Umberkoi, M.Y. Ansari 93742 Daman ground, M.Y. Ansari 93910 Sayli, M.Y. Ansari 94987 Khanvel, S. Karthikeyan 149297A Drug Tank Yawatmal District, John Cherian 63517 BSI Pune Compound, M.Y. Ansari 101661 Thopatwadi Khanapur Taluka, R.S. Rao 66116 Foot of Shambhu Reserve forest Khed taluka, S. Moorthy 112717 Devdongra Nashik, John Cherian 112633 Harsul Nashik District, R.D. Pataskar 101236 Barshingi Hills, P.L.Narsimhan 167586 Boripada Harsul Range Nashik, R.D. Pataskar 117416 Kali Karad Wadi, Miss. Ahuja K.K. 92109 Medshi Marghada Village Buldhana, Miss. Ahuja K.K 92301 Haripura Saputara, Miss. Ahuja K.K 92403 Kodsapani Forest near Palasner, Miss. Ahuja K.K 91889 achalpur ghat, B. Wadava 44719 Maliyabad Raichur, N.P.Singh 141522 Koppal Kushtogi road 38km Karnataka, N.P.Singh 141720 Raichur Hyderabad road 19th km Karnataka, P.S.Tool 39428 Nadiad, K.C.Kanodia 75144 Deriwadi Dongri Rajasthan, K.C.Kanodia 75253 Anandsagar forest Banswara Rajasthan, S.Moorthy 123981 GSI Camp Pular Parshi, K.C.Kanodia 67284 Dingapur Range forest office, G. G. Tatake 46465 Abu Hanuman Temple Rajasthan, S.K. Jain 45175 Mount Abu, R.S.Raghwan 46461 Mt Abu, S.B. Bhagwat 23728 Ghungasa, S.B. Bhagwat 23772 Bhurkwa, G.S.Puri 26560 Manpur Ghat, A.S.Rao 83874 Bherughat Madhya Pradesh, G.S.Puri 44020 Surat, B.M., Wadhwa 60608 Bhavandgarh.



Spermoderm Pattern

The seeds are sub-compressed, large, $1.9-2.5 \times 1.6-2.1$ mm in dimension (Length & Width), the wing is absent, the seed shape rounded, orbiculate with smooth shiny surface structure and yellow brown, yellow red colors. The SEM revealed that the seed spermoderm pattern is faveolate. The anticlinal walls are slightly raised with undulate epidermal cells shape; the periclinal walls are flat. The hilum shape is circular with sub-central to sub-terminal position. (Fig.1,1,2,3).

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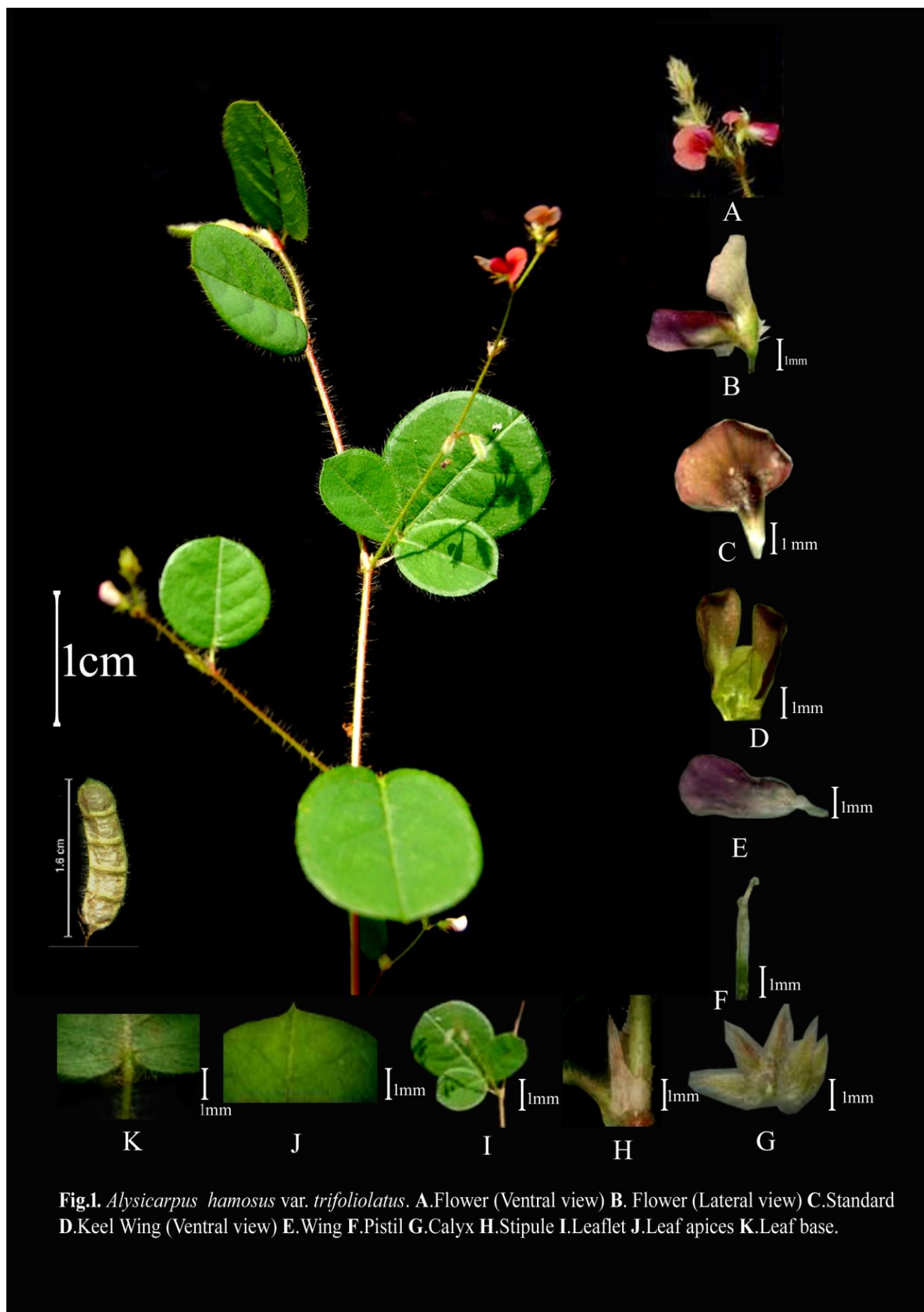
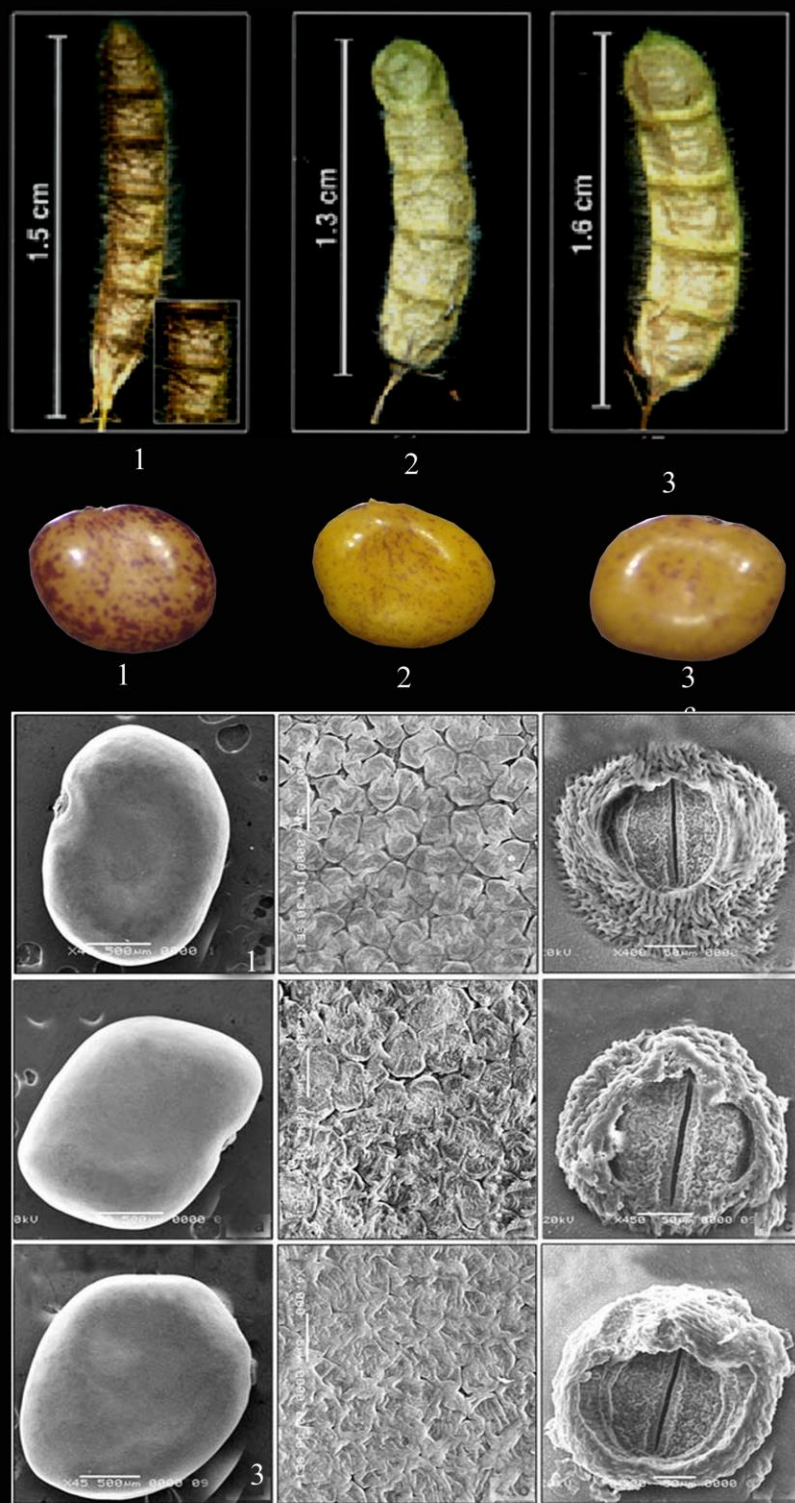


Fig.1. *Alysicarpus hamosus* var. *trifoliolatus*. A.Flower (Ventral view) B. Flower (Lateral view) C.Standard D.Keel Wing (Ventral view) E.Wing F.Pistil G.Calyx H.Stipule I.Leaflet J.Leaf apices K.Leaf base.



Pod Morphology Fig 2 1 Alysicarpus poklianus, 2. Alysicarpus. hamosus
3. Alysicarpus hamosus var. trifoliolatus Seed Morphology (1,2,3) Seed Shape,
Spermoderm pattern, hylum structure and position (123)



Alysicarpus poklianus Gholami A, Pandey Ak



Table 1. Comparative morphology of Alysicarpus hamosus. Edgew taxa.

Sr. No.	Morphological parameters	<i>A. hamosus</i> . Edgew		
		<i>A. pokkianus</i>	<i>A. hamosus</i>	<i>A hamosus</i> var. <i>trifoliolatus</i>
1	Habit, leaf type	Erect, unifoliolate	Erect or rarely procumbent, unifoliolate	Prostrate, Diamorphic, trifoliolate
2	Leaf shape	Ovate-obovate	Rounded, obovate, orbicular, hairs on midrib	Round or broadly ovate or obovate or orbicular
3	Leaf margin	Ciliate, finely hairy along margin	Entire, hairy along margin	Ciliate
4	Leaf length/width	1.2-3.2 × 1-2.2 cm	1.3-3.5 × 1-3 cm	1.5-2.5 × 1.6-3 cm
5	Leaf apices	Mucronulate or obtuse	Obtuse or roundly mucronulate	Obtuse
6	Leaf base	Obtuse or subcordate	Subcordate	Rounded
7	Leaf upper surface	Scabrous	Sparsely hairy	Pilose
8	Leaf lower surface	Pubescent or pilosely hairy	Pilosely hairy	Pubescent
9	Stipule shape	Ovate-elliptic, tapering, acuminate	Lanceolate, tapering, acuminate, slightly curved	Ovate-elongate, tapering, very acuminate
10	Corolla	Pink	Pink	Orange
10	Pod	Pod linear 4-6 seeded 10-15 mm	Pod broad, hairy with hook hairs, 3-5 seeded. 12-17 mm,	Pod broad, hairy with hook hairs, 3-5 seeded. 10-18 mm long,
11	Seed articles, pattern	4-6, Mottled,	3-5, Non mottled,	3-5, Non mottled,
12	Spermoderm Pattern	Faveolate	Faveolate	Multireticulate