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from Tamil Nadu, India

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A new species of *Justicia* L. (Acanthaceae) from Tamil Nadu, India

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ABSTRACT

Justicia tamilnadensis P.Raja & Soosairaj, sp. nov., a new species from Tamil Nadu, India is described and illustrated here. It is closely allied to *J. salsoloides* T.Anderson. *Justicia tamilnadensis* P.Raja & Soosairaj, sp. nov. is a prostrate herb with a slender, purplish-green, glabrous and angled stem; elliptic-oblong, glabrous, subsessile leaves; corolla pubescent on throat within and subterete capsules with a white tomentum whereas *J. salsoloides* is a small undershrub with rigid, white, tomentose and terete stem; spatulate, or oblong-lanceolate, subglabrous, sessile leaves; corolla glabrous within and compressed capsules with a brown tomentum. The identification key of *Justicia* L. from Tamil Nadu, the conservation status (Critically Endangered), and distribution map of *J. tamilnadensis* P.Raja & Soosairaj, sp. nov. are also provided.

KEY WORDS

Acanthaceae,
India,
new species.

RÉSUMÉ

Une espèce nouvelle de Justicia L. (Acanthaceae) du Tamil Nadu, Inde.

Justicia tamilnadensis P.Raja & Soosairaj, sp. nov, une espèce nouvelle du Tamil Nadu, Inde, est décrite et illustrée ici. Elle est étroitement apparentée à *J. salsoloides* T.Anderson. *Justicia tamilnadensis* P.Raja & Soosairaj, sp. nov. est une plante herbacée prostrée avec une tige mince, vert pourpre, glabre et anguleuse; des feuilles elliptiques-oblongues, glabres, subsessiles; une corolle pubescente à l'intérieur de la gorge et des capsules subcylindriques avec un tomentum blanc alors que *J. salsoloides* est un petit sous-arbrisseau à tige rigide, blanche, tomenteuse et térébrante; feuilles spatulées ou oblongues-lancéolées, subglabres, sessiles; corolle glabre à l'intérieur et capsules comprimées avec un tomentum brun. La clé d'identification de *Justicia* L. du Tamil Nadu, le statut de conservation (En danger critique d'extinction) et la carte de répartition de *J. tamilnadensis* P.Raja & Soosairaj, sp. nov. sont également fournis.

MOTS CLÉS

Acanthaceae,
Inde,
espèce nouvelle.

INTRODUCTION

Acanthaceae is one of the largest angiosperm families encompassing approximately 4900 species under 191 genera, widespread in the tropical and subtropical regions (Kiel *et al.* 2018; Alcantara *et al.* 2020; Manzitto-Tripp *et al.* 2022). *Justicia* L. is the most complex and largest pantropical genus of subtribe Justiciinae (Scotland & Vollesen 2000) and comprises of 1000 species (Manzitto-Tripp *et al.* 2022). In India, 51 species and five varieties of *Justicia* have been reported (Karthikeyan *et al.* 2009). Among them, a few species are endemic with narrow distributions. In South India, Gamble (1921) reported 21 species and two varieties from Madras Presidency. In addition, *Justicia sivasanii* Sunil, K.M.P.Kumar & Naveen and *Justicia gambleana* K.M.P.Kumar, Robi & Hareesh have been described from the southern Western Ghats of India in recent years (Sunil *et al.* 2015). Recently, Narasimhan & Irwin (2021) reported 16 species from Tamil Nadu including cultivated and ornamental species.

During recent botanical exploration in Pudukkottai district of Tamil Nadu, India, the authors collected an interesting plant of *Justicia* with very unusual morphological characters. After comprehensive observation of living plants, herbarium specimens, and relevant literature (Anderson 1867; Clarke 1885; Gamble 1921; Rani & Matthew 1983; Nayar *et al.* 2014; Britto 2019), it is concluded that it does not match any of the known species of *Justicia* and is reported as new species. It is described and illustrated here. The identification key and the distribution map are also provided.

MATERIAL AND METHODS

During the assessment of flora of Pudukkottai district of Tamil Nadu, India in October, 2022, plant material was collected and processed following the standard procedure for botanical specimens. Morphological characters were studied and microscopic dissections of material were made and detailed illustrations were prepared. The plant specimens were also matched with herbarium specimens of *Justicia* deposited at various Indian herbaria (MH, CAL, RHT) and compared to digital images of herbarium specimens deposited at Kew Herbarium (K).

TAXONOMIC TREATMENT

Family ACANTHACEAE Juss.
Genus *Justicia* L.

Justicia tamilnadensis P.Raja & Soosairaj, sp. nov.
(Figs 1, 2; Table 1).

Justicia tamilnadensis P.Raja & Soosairaj, sp. nov. is morphologically closely allied to *Justicia salsoloides* T.Anderson. It differs by its herbaceous, slender, purplish-green, glabrous, and angled stem, elliptic-oblong, lanceolate, glabrous, sub-sessile leaves, corolla pubescent on throat within and sub-terete capsules.

TYPUS. — **India.** Tamil Nadu, Pudukkottai district, Poosathurai, (10°20'58"N, 78°47'22"E), c. 82 m, 11.X.2021, P. Raja & S. Soosairaj 4760 (holo-, RHT!; iso-, MH!).

DISTRIBUTION, HABITAT AND ECOLOGY. — *Justicia tamilnadensis* sp. nov. is presently known only from the type locality where less than 20 individuals have been observed in open places in Vellar river bed at elevations of 70-85 m and associated with *Fimbristylis falcata* (Vahl) Kunth, *Platostoma menthoides* (L.) A.J.Paton, *Evolvulus alsinoides* (L.) L., *Dyschoriste madurensis* (Burm.f.) Kuntze, *Eragrostis viscosa* (Retz.) Trin., *Euphorbia corrigioloides* Boiss., *Leucas diffusa* Benth., *Curculigo orchioides* Gaertn., *Cyanotis cristata* (L.) D.Don, *Vachellia leucophloea* (Roxb.) Maslin, Siegl. & Ebinger and *Melanocenthris monoica* (Rottler) C.E.C.Fisch.

PHENOLOGY. — Flowering and fruiting were observed from July to December.

ETYMOLOGY. — The specific epithet *tamilnadensis* refers to one of the south Indian states Tamil Nadu from where the specimens were collected.

CONSERVATION STATUS. — *Justicia tamilnadensis* sp. nov. was observed at only one location which is fragmented by transportation. The total population of this species is enumerated to be less than 20 individuals, and based on the field observation, the conservation status of the species has been evaluated accordingly. We have been surveying the entire Pudukkottai district and the surrounding regions since 2012. And from the entire study in the past decade, it was noted that the proposed species is found only in that specific location (Fig. 3). The geographic range for the Area of Occupancy (AOO) is c. 0.5 km² and the distribution is limited to the type locality (IUCN 2022). Urbanization, transportation and expansion of the highly invasive *Prosopis juliflora* (Sw.) DC. threatens the population of this species. Hence, this species is classified in criterion B (AOO) under B2a and B2b and criterion D (number of mature individuals is less than 20) as well to meet the criteria for the Critically Endangered B2ab (ii,iii,v); D.

ADDITIONAL SPECIMEN EXAMINED. — **India.** Tamil Nadu, Pudukkottai district, Poosathurai, (10°20'58"N, 78°47'22"E), c. 80 m, 09.X.2022, P. Raja 4766 (RHT!).

DESCRIPTION

Prostrate herb, 200-300 mm long; rootstock woody with fleshy roots. Stem prostrate, angled, slender, glabrous, bearded at nodes. Leaves sub-sessile, 9-35 × 3-6 mm, sub-coriaceous, elliptic to oblong, opposite, cuneate at base, margins entire on young leaves and occasionally margins undulate on mature leaves, obtusely acute at apex, mid nerve prominent, lateral nerves 3-4, obscure. Inflorescence sub-terminal and terminal spikes, 15-50 mm long, loosely arranged, peduncle 4-10 mm long. Bracts linear-lanceolate, 5-9 × 2-3 mm, base truncate, margin entire, apex acute, ciliate at base. Bracteoles 2, lanceolate, 10-12 × 1.5-2 mm, 3-nerved, nerves obscure, base truncate, margin entire, ciliate at base, acute at apex. Flowers 1 cm long; calyx lobes 5, equal in length, 5 × 1 mm, narrow, linear, cuneate at base, acute at apex, pubescent; corolla 1 cm long, pubescent without; corolla tube 5 mm long, pubescent in throat; bilabiate, upper two-lobed, lobes connate except tip, lower broadly 3-lobed, mid lobe broader than lateral



FIG. 1. — *Justicia tamilnadensis* P.Raja & Soosairaj, sp. nov.: **A**, habit; **B**, bract dorsal and ventral views; **C**, bracteoles; **D**, calyx; **E**, sepals dorsal and ventral views; **F**, corolla front view; **G, H**, corolla split open inner and outer views; **I**, stamens; **J**, pistil; **K**, l.s. of ovary; **L**, t.s. of ovary; **M**, capsule; **N**, seed; **A–J**, drawn from type *P. Raja & S. Soosairaj 4760*. Scale bars: **A**, 14.3 mm; **B**, 2 mm; **C, F, G, H, M, N**, 2.5 mm; **D, E, I, J**, 1.25 mm; **K**, 1 mm; **L**, 0.67 mm.



FIG. 2. — *Justicia tamilnadensis* P.Raja & Soosairaj, sp. nov.: **A**, habit; **B**, inflorescence; **C**, flower; **D**, calyx; **E**, bract; **F**, bracteole; **G**, corolla upper lobes with stamens; **H**, corolla lower lobes; **I**, stamen; **J**, pistil; **K**, capsule. Scale bars: A, B, 10 mm; C–M, 5 mm.

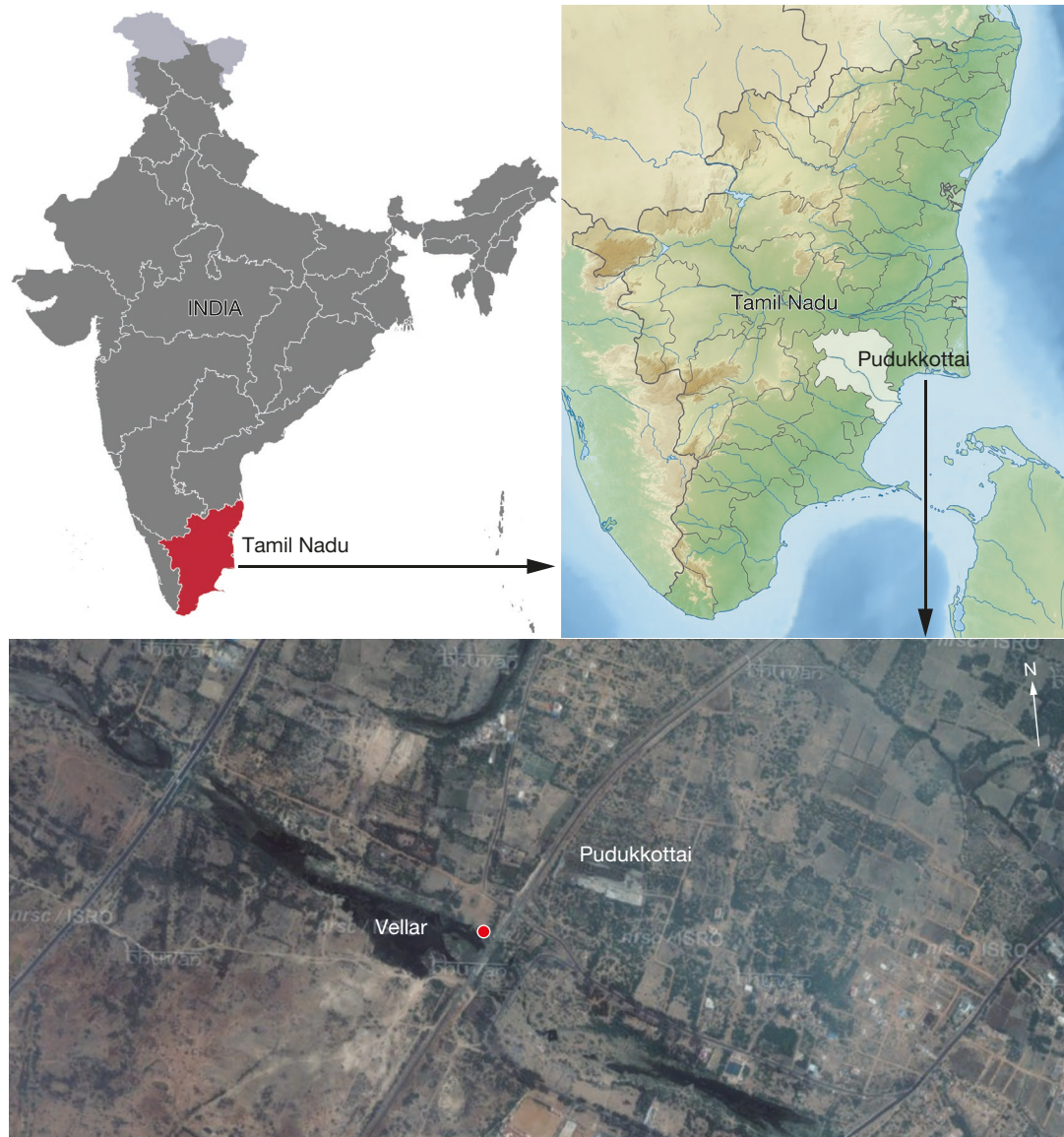


FIG. 3. — Distribution map of *Justicia tamilnadensis* P.Raja & Soosairaj, sp. nov. **A, B**, adapted from Wikipedia; **B**, adapted from Nzeemin version of the map; **C**, generated using Bhuvan: ISRO/NRSC 2021.

lobes, 4×3 mm, purplish inside, lateral lobes 4×2 mm, white inside. Stamens 2, exserted; filaments 5 mm long, glabrous; anthers 2-celled, pubescent on upper anther cell, 3 mm long with 1 mm appendage on lower anther cell. Pistil 8 mm long, ovary 2×1.5 mm, ovules 4, style slender, 6 mm long, pubescent on basal half, stigma simple. Capsule $12-15 \times 5$ mm, sub-terete, white tomentose without, shortly mucronate at apex. Seeds 3-4, echinate.

TAXONOMIC COMMENTS

Justicia tamilnadensis sp. nov. and *J. salsoloides* are restricted in distribution (Carnatic regions of Indian Peninsula). In the field, the habit of *J. tamilnadensis* closely resembles to that of *Lepidagathis cristata* Willd. and it could be mistaken in the absence of inflorescences. The

rootstock of *J. tamilnadensis* resembles that of the *Justicia trinervia* Vahl. There are about 5-7 fleshy roots per plant. Each root is about 100-160 mm long and 2-3 mm wide and deeply rooted to the barren or gravel soil up to 200 mm in depth. The tuberous root system enables the persistent stem to tolerate the dry season.

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KEY TO THE GENUS *JUSTICIA* L. FROM TAMIL NADU, INDIA

1. Calyx lobes 5 2
— Calyx lobes 4 14
2. Shrubs or undershrubs 3
— Erect or diffuse herbs 12
3. Anther cells minutely apiculate at base 4
— Anther cells with prominent white appendage at base 5
4. Inflorescence capitate *J. beddomei* (C.B. Clarke) Bennet
— Inflorescence spikes *J. adhatoda* L.
5. Capsule 2-2.5 cm long 6
— Capsule less than 2 cm long 7
6. Erect shrubs. Leaves 6-9 cm broad *J. santapau* Bennet
— Procumbent undershrub. Leaves 0.5-1.5 cm broad *J. nilgherrensis* (Nees) Wight ex C.B. Clarke
7. Leaves less than 3 cm long 8
— Leaves more than 5 cm long 9
8. Bracts elliptic, acute *J. salsoloides* T. Anderson
— Bracts orbicular or obcordate, short-apiculate *J. tranquebariensis* L.f.
9. Capsule pubescent 10
— Capsule glabrous *J. gendarussa* Burm.f.
10. Seeds spinulose or echinate when wetted 11
— Seeds softly round-tuberculate when wetted *J. wynaadensis* B. Heyne
11. Bracts white with green nerves; bracteoles similar *J. betonica* L.
— Bracts not as above; bracteoles different, often absent *J. glauca* Rottler
12. Leaves more than 5 cm broad *J. scandens* Vahl
— Leaves less than 1 cm broad 13
13. Bracts white with green nerves. Seeds tuberculate when wetted *J. trinervia* Vahl
— Bracts not as above. Seeds echinate when wetted *J. tamilnadensis* P. Raja & Soosairaj, sp. nov.
14. Spikes stout, cylindric 15
— Spikes slender, linear 18
15. Subshrubs or undershrubs; branchlets somewhat woody 16
— Herbaceous; branchlets slender 17
16. Bracts with bulbous based white hairs. Capsule pubescent *J. neesii* Ramamoorthy
— Bracts not as above. Capsule glabrous *J. latispica* (C.B. Clarke) Gamble
17. Spikes up to 3 cm long *J. procumbens* L.
— Spikes more than 5 cm long *J. simplex* D. Don
18. Calyx lobes obtuse at apex *J. quinqueangularis* J. Koenig ex Roxb.
— Calyx lobes acute at apex 19
19. Bracts and bracteoles ovate *J. diffusa* Willd.
— Bracts and bracteoles lanceolate 20
20. Seeds tuberculate *J. prostrata* (Roxb. ex C.B. Clarke) Gamble
— Seeds papillae 21
21. Leaves ovate-elliptic or linear-lanceolate, acute, glabrous *J. vahlii* Roth
— Leaves ovate or orbicular, obtuse, strigose above, villous beneath *J. nepalensis* V.A.W. Graham

TABLE 1. — Comparison of the morphological characters of *Justicia salsoloides* T.Anderson and *Justicia tamilnadensis* P.Raja & Soosairaj, sp. nov.

Characters	<i>Justicia salsoloides</i> T.Anderson	<i>Justicia tamilnadensis</i> P.Raja & Soosairaj, sp. nov.
Habit	Undershrub, > 300 mm tall, much branched	Prostrate herb, upto 300 mm tall, not much branched
Stem	Branchlets rigid, terete, white, densely tomentose throughout	Branchlets slender, angled, purplish green, glabrous, bearded at nodes
Leaves	Sessile, subglabrous	Subsessile, glabrous
Leaf shape	Spathulate or oblong-lanceolate	Elliptic-oblong, lanceolate
Leaf size	4-19 × 2-4 mm	9-35 × 3-6 mm
Bracts	3-6.5 mm long	5-10 mm long
Bracteoles	Smaller than bracts, often absent	Slightly longer than bracts, always present
Corolla	9 mm long, tube 2.2 mm long, completely glabrous within	10 mm long, tube 5 mm long, pubescent on throat within
Capsule	Compressed, brown tomentose	Subterete, white tomentose

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