

Taxonomic notes on *Acrachne borii*, *Acrachne sundararajii*, *Brachystelma telanganense* and *Striga scottiana*

Ravi Kiran Arigela¹, Althaf Ahamed Kabeer K², Sadasiviah B³✉

To Cite:

Arigela RK, Kabeer AAK, Sadasiviah B. Taxonomic notes on *Acrachne borii*, *Acrachne sundararajii*, *Brachystelma telanganense* and *Striga scottiana*. *Species*, 2021, 22(70), 330-337

Author Affiliation:

¹Botanical Survey of India (BSI), Deccan Regional Centre (DRC), Rooms 228–238, Kendriya Sadan, Sultan Bazar, Koti, Hyderabad-500095, Telangana, India. Orcid id: <http://orcid.org/0000-0001-5804-3423>

²Botanical Survey of India, Central Botanical Laboratory, P.O. Botanic Garden, Howrah-711 103, West Bengal, India. Orcid id: <https://orcid.org/0000-0002-7547-1363>

³Department of Botany, Dr. B.R.R Government College, Jadcherla, 509301, Telangana, India. Orcid id: <https://orcid.org/0000-0002-8968-7931>.

✉ Author for correspondence:

Department of Botany, Dr. B.R.R Government College, Jadcherla, 509301, Telangana, India.

Email: chumsada@gmail.com

Peer-Review History

Received: 28 June 2021

Reviewed & Revised: 31/June/2021 to 27/September /2021

Accepted: 29 September 2021

Published: September 2021

Peer-Review Model

External peer-review was done through double-blind method.



© The Author(s) 2021. Open Access. This article is licensed under a [Creative Commons Attribution License 4.0 \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/), which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license, and indicate if changes were made. To view a copy of this license, visit <http://creativecommons.org/licenses/by/4.0/>.

ABSTRACT

The erroneous identity of *Acrachne borii* J. Swamy & Rasingam (Swamy *et al.*, 2019), *Acrachne sundararajii* P. Umam., Muthuk. & P. Daniel (Umamaheswari *et al.*, 1997) and *Striga scottiana* (Jeeva *et al.*, 2012) are rectified and synonymised under *Acrachne racemosa* (B. Heyne ex Roth) Ohwi, *Acrachne henrardiana* (Bor) S.M. Phillips and *Striga gesnerioides* (Willd.) Vatke respectively. Apart, priority of the name *Brachystelma bilobatum* Sadas. & K. Prasad over the *Brachystelma telanganense* (Rasingam & Swamy, 2020) was discussed.

Key words: Ecotype, Hormones, New species, Priority and Synonym.

1. INTRODUCTION

Darwin has observed the evolution by natural selection as a very slow mechanism of change within populations and it plays a major role in generating phenotypic and genetic diversity (Safran & Nosil, 2012). According to Ramsey and Schemske (1998) approximately 70% of the angiosperms show the polyploidy. Morphological variations and species composition of many plant communities are based on changes in growth rates, carbon allocation patterns, nutrient cycling and competitive interactions (Ryan, 1991; Grime *et al.*, 2008). Venu & Sanjappa (2021) scrutinized many recent publications, observed the dishonesty in describing the new species and suggested to have inhouse deliberations. Ecotypic differentiation among plant populations is a widespread phenomenon (Gianoli *et al.*, 2004). Bradshaw and Hardwick (1989) stated constant stressful environment creates several ecotypes among the plant populations. Recently described new taxa *Acrachne borii* and *Striga scottiana* are purely based insignificant features and they are highly conspecific with existing species. Characterization and novelty described merely based on quantitative characters, they should be reduced as synonyms of other appropriate species (Venu & Sanjappa, 2021).

2. TAXONOMIC TREATMENT

Acrachne henrardiana (Bor) S.M. Phillips, Kew Bull. 37(1): 158. 1982.

Dactyloctenium henrardianum Bor, Blumea, Suppl. 3: 44. 1946.

Type: India, Tamil Nadu, Ramnad District, Pamban, 29.1.1945. D. Daniel & S.R. Raju, MH20089 (Holotype K000245131!)

Acrachne sundararajii P. Umam., Muthuk. & P. Daniel in Kew Bulletin, Vol. 52(4): 1007. 1997, *syn. nov.*

Type: India, Tamil Nadu, Kanyakumari District, Vivekanandhapuram, seacoast, fl., 21 Nov. 1995, Muthukumar 106403 (holotype CAL!; isotypes MHI, K).



Figure 1: A–B. *Acrachne henrardiana*; C–E. *Brachystelma bilobatum*

Notes: The goose grass genus *Acrachne* Wight & Arn. ex Lindl. & Chiov. is distributed in Asia, Africa and Australia with 3 accepted species (POWO, 2021). Diagnostic characters of the Indian taxa *A. henrardiana* was well described in Flora of Tamil Nadu-Grasses (Kabeer & Nair, 2009) based on a number of collections from Tamil Nadu. While making the new combinations in the genus *Acrachne*, Phillips (1982) has defined the differences between *A. henrardiana*, *A. perrieri* and *A. racemosa*. New species *A. sundararajii* from Tamil Nadu was described merely based on quantitative characters such as size variation of spikelets, its glumes & lemmas are exactly falling under *A. henrardiana* characters range. Internodal elongation and culms height of the grasses depends on the climatic factors and plant hormones. After critical studies upon the protologue, type specimens and live specimens of *A. henrardiana* and *A. sundararajii*, we have not found any significant differences between *A. henrardiana* and *A. sundararajii* hence it is synonymised under *A. henrardiana* (Figure 1).

Acrachne racemosa (B. Heyne ex Roth) Ohwi Bull. in Tokyo Sci. Mus. 18: 1. 1947.

Eleusine racemosa B. Heyne ex Roth in Roemer & Schultes, Syst. Veg. 2: 583. 1817.

Type: India orientalis, B. Heyne *s.n.* (B barcode B 10 0296803 [image!], Lectotype designated by Turner, 2021)

Acrachne borii J. Swamy & Rasingam in Nelumbo Vol 61 (1). 10. 2019, *syn. nov.*

Type: India, Andhra Pradesh, Seshachalam Biosphere Reserve, Kadapa District, Rayachoti Range, Korthimadugu Beat, 14.28707 N 78.915692 E, 521 m, 15 Sept. 2017, J. Swamy 008829 (holotype CAL!; isotypes BSID!).

Notes: Recently described species *A. borii* from Seshachalam Biosphere Reserve, Kadapa district of Andhra Pradesh is an ecotypic variant of *A. racemosa*. We studied the morphological variations in *A. racemosa* at Telangana and Andhra Pradesh states of India. This grass luxuriantly blooms from August to September and grow as understory vegetation. The habit of the plant ranges from 3 cm to 1 m and the number of florets 2 to 10 were recorded within the same population at the same habitat due to edaphic factors. Number of spikelets and diagnostic description of *A. borii* are exactly falling under the ranges of *A. racemosa* number of spikelets and diagnostic description. We provided the photographic evidence (Figure 2 & 3) to understand the morphological variations of *A. racemosa* and treated *A. borii* as a synonym of *A. racemosa*.

Brachystelma bilobatum Sadas. & K. Prasad in K. Prasad, & Venu, A Taxonomic Revision of the Genus *Brachystelma* R.Br. in India 83: 2020.

Type: INDIA, Telangana, Nagarkurnool District, Nagarajunasagar Tiger Reserve, Appapur, 18.07.2015, B. Sadasivah 2081 (holo SKU!, iso BSID!)

Brachystelma telanganense Rasingam & J. Swamy in Rheedea 30(3): 380. 2020, *syn. nov.*

Type: INDIA, Telangana, Botanical Survey of India, Deccan Regional Centre, Hyderabad (introduced from Mallayalodhi, Mahbubnagar district, Telangana state, India, N 16°18'19.411", E 78°43'23.72", 780 m, 20.04.2018), L. Rasingam & J. Swamy 8023, infl. (holo CAL!; iso BSID!).

Notes: *B. bilobatum* was published in July 2020 and it was collected in 2015 from the Nagarjunasagar Srisailam Tiger Reserve (NSTR) in Telangana which was part of the NSTR in Andhra Pradesh before its bifurcation. *B. telanganense* was published on 30.09.2020 and it was also collected in 2016 in the open grasslands of dry deciduous forests of Mallayalodhi, Amrabad Tiger Reserve, Telangana (the part of NSTR in the Telangana was renamed after the Andhra Pradesh state bifurcation into two states). The same plant of same locality was described two times by different authors and validly published with two different names in different dates. As per the ICN article 11 (Turland *et al.*, 2018), *B. telanganense* Rasingam & J. Swamy has no priority as it is published later than *B. bilobatum*, hence it is treated as synonym of *B. bilobatum* Sadas. & K. Prasad (Figure 1).

Striga gesnerioides (Willd.) Vatke, Oesterr. Bot. Z. 25: 11. 1875.

Buchnera gesnerioides Willd., Sp. Pl. 3(1): 338. 1800.

Type: India, Koenig *s.n.* (B-W11573-010!)

Striga scottiana Solomon Jeeva, Shynin Brintha and Rasingam in Journal of Basic and Applied Biology 6(3&4). 79. 2012, *syn. nov.*

Type: India, Tamilnadu, Kanyakumari District: Chunkankadai hills, 12 December 2010, S. Jeeva 2252 (Holotype BSID!; Isotype SCCN).



Figure 2: A–C. *Acrachne racemosa* habit and inflorescence variations

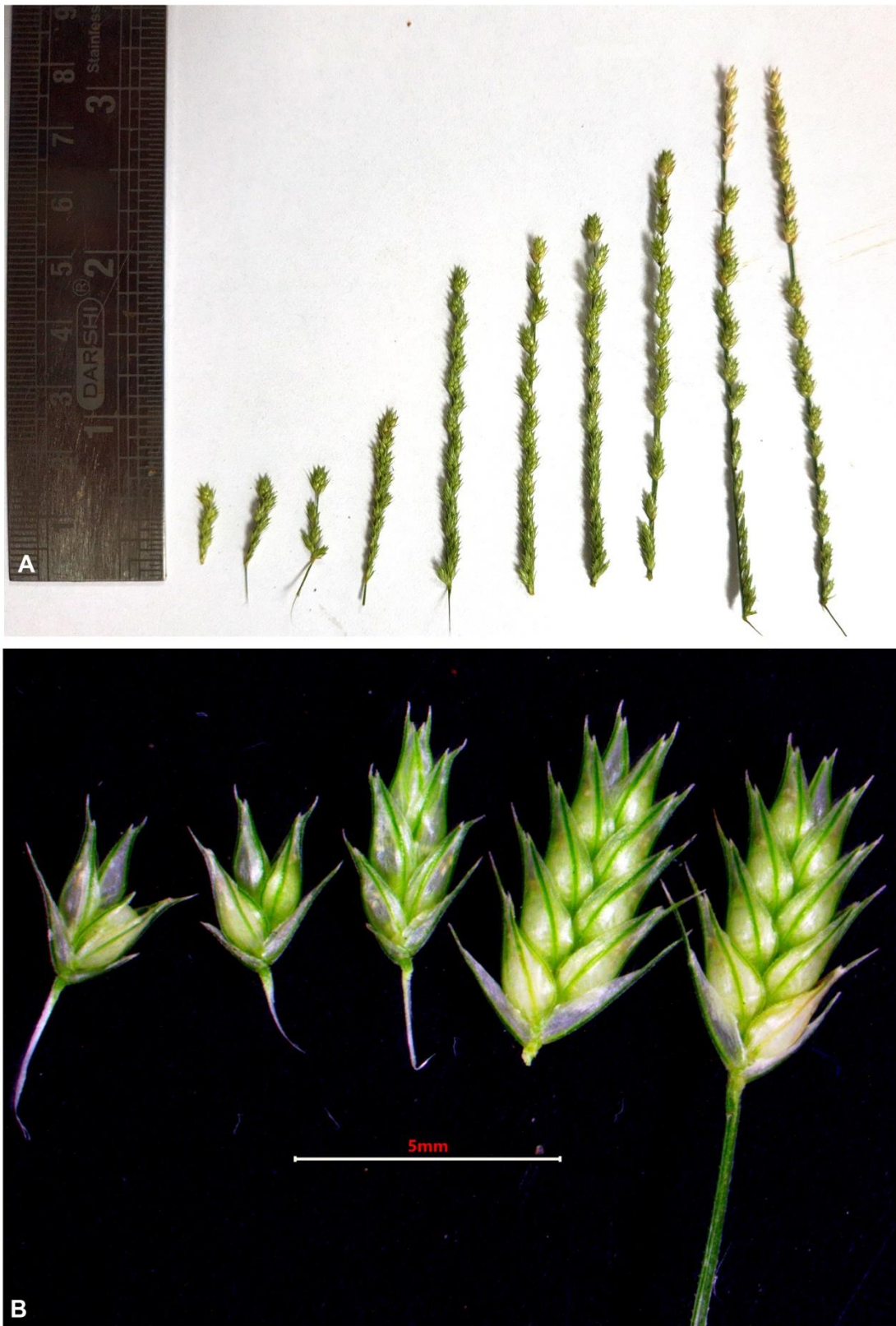


Figure 3: *Acrachne racemosa* – A. Racemes; B. Spikelets



Figure 4: A–F. Habit variations in *Striga gesnerioides*

Notes: Among all the witch weed species, *S. gesnerioides* has vast distribution range and it has developed host-specific strains that have distinct morphotypes. These strains will differ in succulence, length and number of branches, color and indumentum of stem, length of bracts comparative to calyx, length of calyx lobes comparative to tube and color of corolla, size and presence of indumentum on it (Mohamed *et al.*, 2001). We have studied the several specimens of *S. gesnerioides* from Andhra Pradesh, Karnataka, Kerala, Rajasthan, Tamil Nadu and Telangana and observed several variations within the same populations and populations at different geographical areas (Figure 4), such as stem solitary to branched, subterete to angular and flowers pinkish or

lilac or white. *S. gesnerioides* shows distinct morphological changes soon after coming into contact with the host root surface (Reiss & Bailey, 1998). While describing a new species which is allied to the existing species with large geographical distribution, it is inevitable to refer the specimens in different herbaria and the literature to understand the variations of a species influenced by climatic factors and host specific responses. We also studied the holotype specimen of *S. scottiana* and concluded it as ecotype of *S. gesnerioides*, hence it is treated as its synonym.

Acknowledgements:

First and second authors are thankful to the Director, Botanical Survey of India, Kolkata and Botanical Survey of India, Deccan Regional Centre, Hyderabad for facilities. All authors wish to acknowledge Dr. Robert Vogt, Herbarium Curator, Botanic Garden and Botanical Museum, Berlin for type information.

Funding:

This research received no external funding.

Ethical approval

The ethical guidelines for plants & plant materials are followed in the study for species collection & identification.

Conflicts of interest:

The authors declare no conflict of interest.

Data and materials availability

All data associated with this study are present in the paper.

REFERENCES AND NOTES

- Bradshaw AD and Hardwick K. 1989. Evolution and stress-genotypic and phenotypic components. *Biological Journal of the Linnean Society* 37:137–155.
- Gianoli E, Inostroza P, Zúñiga-Feest A, Reyes Díaz M, Cavieres LA, Bravo LA and Corcuera LJ. 2004. Ecotypic Differentiation in Morphology and Cold Resistance in Populations of *Colobanthus quitensis* (Caryophyllaceae) from the Andes of Central Chile and the Maritime. *Arctic, Antarctic and Alpine Research* 36 (4): 484–489.
- Grime JP, Fridley JD, Askew AP, Thompson K, Hodgson JG and Bennett CR. 2008. Long-term resistance to simulated climate change in an infertile grassland. *Proceedings of the National Academy of Sciences of the United States of America* 105(29): 10028–10032.
- Jeeva S, Brintha TSS and Rasingam L. 2012. *Striga scottiana* (Scrophulariaceae) - a new species from southern Western Ghats of Tamilnadu, India. *Journal of Basic and Applied Biology* 6 (3&4): 79–82.
- Kabeer KAA and Nair VJ. 2009. *Flora of Tamil Nadu-Grasses*. Botanical Survey of India, Kolkata. 525pp.
- Mohamed KI, Musselman LJ and Riches CR. 2001. The Genus *Striga* (Scrophulariaceae) in Africa. *Annals of the Missouri Botanical Garden* 88(1): 60–103.
- Phillips SM. 1982. A Numerical Analysis of the Eragrostideae (Gramineae). *Kew Bulletin* 37(1):133–162.
- POWO. 2021. Plants of the World Online. Royal Botanic Gardens, Kew. <http://www.plantsoftheworldonline.org/> (Downloaded on 10 February 2021).
- Prasad K and Venu P. 2020. *A Taxonomic Revision of the Genus Brachystelma R.Br. in India*. Bishen Singh Mahendra Pal Singh, Dehra Dun, India, 116pp.
- Ramsey J and Schemske DW. 1998. Pathways, mechanisms and rates of polyploid formation in flowering plants. *Annual Review of Ecology, Evolution and Systematics* 29: 467–501.
- Rasingam L and Swamy J. 2020. *Brachystelma telanganense* (Apocynaceae: Asclepiadoideae- Ceropogonieae) – a new species from Telangana, India. *Rheedea* 30(3): 379–382. DOI: <https://dx.doi.org/10.22244/rheedea.2020.30.03.02>
- Reiss GC and Bailey JA. 1998. *Striga gesnerioides* Parasitising Cowpea: Development of Infection Structures and Mechanisms of Penetration. *Annals of Botany* 81: 431–440.
- Ryan KC. 1991. Vegetation and wildland fire - Implications of global climate change. *Environment International* 17(2–3): 169–178.
- Safran RJ and Nosil P. 2012. Speciation: The Origin of New Species. *Nature Education Knowledge* 3(10):17.
- Swamy J, Rasingam L. and Nagaraju S. 2019. *Acrachne borii* sp. nov. (Poaceae) a new species from Eastern Ghats of Andhra Pradesh, India, *Nelumbo* 61(1): 10–12. DOI: 10.20324/nelumbo/v61/2019/141863.

16. Turland NJ, Wiersema JH, Barrie FR, Greuter W, Hawksworth DL, Herendeen PS, Knapp S, Kusber W-H, Li D-Z, Marhold K, May TW, McNeill J, Monro AM, Prado J, Price MJ and Smith GF. 2018. *International Code of Nomenclature for algae, fungi, and plants (Shenzhen Code)*. Regnum Vegetabile 159. Koeltz Botanical Books, Glashütten, pp.
17. Turner, I.M. 2021. Heyne, Roth, Roemer and Schultes, and the plant names published in *Novae plantarum species praesertim Indiae orientali*. *TAXON* 70 (2): 365–428. <https://doi.org/10.1002/tax.12449>
18. Umamaheswari P, Muthukumar SA and Daniel P. (1997). *Acrachne sundararajii* – a new species from coastal Tamil Nadu, India. *Kew Bulletin*. 52 (4): 1007–1009.
19. Venu P and Sanjappa M. (2021). Taxonomic practices and Indian concerns. *Current Science* 12(7): 1151–1159.