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Lectotypifcation of two names in *Urochloa* P. Beauv (Poaceae: Paniceae)

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Abstract

In the present research work, lectotypes have been designated for the names *Urochloa deflexa* and *U. lata*. The typification of one name, *U. deflexa,* has been revisited as the earlier indicated type is not in accordance with ICN guidelines. The selection of lectotypes is discussed and images of designated lectotypes have been provided.

Keywords

Brachiaria; nomenclature; Panicoideae; Poaceae; typification; *Urochloa*

Introduction

Urochloa P. Beauv. (1) is the largest genus of the subtribe Melinidinae of the tribe Paniceae (Poaceae: Panicoideae). It comprises approximately 100 species and is known to occur in subtropical and tropical regions inhabiting diverse habitats (2, 3). The distinguishing feature of the genus is the presence of a panicle inflorescence having one-sided spike-like raceme branches arranged on a central axis, spikelet abaxial or adaxial, the lower glume short and encircles the spikelet at the base, the upper glume and lower lemma as long as the spikelet and upper lemma crustaceous, acute to obtuse, at times mucronate or apiculate at the apex (3-5).

Previously, the taxonomic delimitation of the genus *Urochloa* (sensu stricto) was quite controversial with the genus *Brachiaria* Stapf (7), Bor (4) and Clayton and Renvoize (3) treated Brachiaria distinctly from Urochloa , mainly due to the adaxial orientation of spikelets . However, later many taxonomists including , Webster (8), Ashalatha and Nair (9), Morrone and Zuloaga (10, 11) and Veldkamp (5), did not consider this character reliable enough to treat both genera distinctly and therefore transferred most of the species of *Brachiaria* into *Urochloa*. Molecular phylogenetic analysis also supports and validates the transfer of *Brachiaria* species to *Urochloa* (12, 13).

In India, the first taxonomic account of the genus *Urochloa s.l.* was provided by Sir J. D. Hooker (14) under *Panicum* sect. *Brachiaria* Trin. (15) and recorded a total of 12 species. Later, Bor (4) provided a detailed taxonomic account and treated both *Urochloa* and *Brachiaria* as independent genera, recognizing 5 species in the former and 15 in the later. Subsequently, Bassappa (16) undertook a taxonomic revision of the genus *Brachiaria* from India and described 4 new species, viz., *B. chennaveeraiana* Basappa & Muniy., *B. hybrida* Basappa & Muniy., *B. munae* Basappa and *B. stapfiana*

Basappa & Muniy. (17,18). However, later Ashalatha and Nair (9) transferred most of the taxa to *Urochloa* (9). In the last few decades, checklists for the genus *Urochloa* (*s.l.*) from India have been prepared (19-21). At present, the genus *Urochloa s.l.* comprises ca 34 taxa from India (21).

While working on tribe Paniceae (Poaceae) from the Western Himalaya, the first author performed a nomenclatural survey of all the accepted names, of Indian *Urochloa* and encountered 2 names viz., *U. deflexa* (22) and *U. lata* (23) that have nomenclatural issues as there is no clarity regarding their type specimens. The name *U. deflexa* was attempted to be typified earlier, but not effectively due to infringement of Art, 7.11 and 9. 23 of the ICN (24) while the name *U. lata* has not been lectotypified before. Therefore, to promote nomenclatural stability and the precise application of these names, we have designated lectotypes following the ICN (24).

Materials and Methods

Throughout the current study, we have meticulously examined the protologues of the names and other pertinent literature to verify the typification of the aforementioned names, even if it was unintentional. Information on authors and collectors, as well as type materials , is derived from TL-2 (25). An extensive search of virtual herbaria, viz., B, BM, BR, C, FI, G, K, LE, LG, M, MO, P and S (26) was conducted to locate the type specimens. In the light of morphological characteristics provided in the protologue, the type specimens concerned were carefully and critically examined and the most suitable specimens have been selected as the lectotypes as per ICN guidelines.

Results and Discussion

Urochloa deflexa (Schumach.) H. Scholz. (1990: 443)

≡*Panicum deflexum* Schumach. (1827: 83)

≡*Brachiaria deflexa* (Schumach.) C.E. Hubb. ex Robyns. (1932: 181)

Lectotypus (hic designatus)

GHANA, the Southern part of the country, *Thonning 390* [C (barcode C10004257, digital image!)]; isolectotypes [C (barcode C10004258 and C10004259) (digital images!)]

Nomenclature notes

To establish plantations in Danish Guinea (now South-Eastern Ghana), the Danish government sent various workers at different times to explore the flora of the area (27). Under this project, Peter Thonning, a German surgeon, was also sent during 1799-1800 and he returned with a vast collection of plants and botanical observations in the form of manuscripts. Thonning's main set of specimens was deposited in C and duplicates were given to his colleagues (27). Unfortunately, the main collection in C was destroyed by the British bombing of Copenhagen in 1807; however, later his collections in C were reconstructed by combining the duplicates given to friends and colleagues, particularly Vahl, Schumacher, Hornemann and Johannes Colsmann (28, 29). Schumacher (28) documented Thonning's collection from Danish Guinea in the form of *Beskrivelse af Guineiske Planter* [Description of Guinean Plants].

Schumacher (28) described a new species along with a brief diagnosis and description in the protologue; however, the associated gathering and precise type locality were not addressed (28). Later based on Thonning's manuscript (now lost), Heeper (29) and Junghans (30) stated that this new species was based on the gathering *Thonning 390* and also confirmed the presence of three specimens in C . After a thorough search, we found 4 potential type specimens, of which 3 were housed in C (C10004257, C10004258 and C10004259) and one in K (K000282165). Two of the 3 traced specimens at C belonged to *Hb. Hornemann* (C10004258 and C10004259) and the remaining one is from *Hb. Schumacher* (C10004257). Specimen C10004258 consists of a determinavit label by C. Mez "*Panicum ramosum* var. *deflexum*" (*nomen nudum*) and a label of Hb. Hornemann, "*Panic. 39 petiveri* trin*, magnum, gui. Th.*" indicates the collection number '390', type locality 'Guinea' and the collector 'Thonning'. The specimen C10004259 also consists of the same with an additional co-typus label and handwritten annotation of morphological characteristics: "*Panicula simplici, ramis distantibus patentissimus, pubescentibus, fol. Margin pubescntibus*". Specimen C10004257 consists of 2 additional labels except the detarminavit label by Mez, the first one is of Hb. Schumacher "*Hb. Schumacher, 390., Panicum deflexum*; *Panicum petiverii* Trin." and the second label consist of morphological features "*totum subtilissime pubescens exceptis valvulis corollinis; ramis deflexis paucifloris; floribus distantibus plerisque geminis; unius sessilis alteri pedunculus fere 2 vel linearum*". The name *Panicum petiveri* trin. (synonym of *Urochloa ramosa* (L.) T. Q. Nguyen) which has been annotated on all three specimen sheets, is a misidentification as the morphological characters correspond to *P. deflexum.* Besides, the specimen housed in K (K000282165) is incomplete and represented by only 4 spikelets which might be taken from C specimens. All the mentioned specimens show compatibility with the protologue and consist of notes by Schumacher's hand (except K000282165), therefore, these should be considered as original material and syntypes as well (Art. 9.4 and 9.6 of ICN, 2018) (24).

Recently, Vorontsova (31), further followed by Oula *et al*. (32), has indicated specimen C10004257 as the holotype and the remaining 3 specimens C10004258, C10004259 and K000282165 as the isotypes. Since all the traced specimens are syntypes, therefore, the use of the words "holotype" and "isotype" is a misapplication (Art. 9.6 of the ICN, 2018) (24). Furthermore, the type citation by Vorontsova is not effective, as it would not be considered an inadvertent lectotypification (as the work was published after 1 January 2001 and failed to mention the word "lectotype" and the phrase "designated here" or an equivalent) nor corrected as a lectotype (Art. 7.11, 9.10 and 9.23 of the ICN) (24). Therefore, after a careful and critical examination of all syntype specimens and in compliance with Arts. 7.11, 9.3, 9.10 and 9.23 of ICN (24), we have designated here the specimen with barcode C10004257 as

the lectotype and thus effectively lectoypified the name *Urochloa deflexa* (≡*Panicum deflexum*) as it is the best preserved, well-mounted and consisting of vegetative and reproductive parts (Fig. 1).

Urochloa lata (Schumach.) C.E. Hubb. (1934: 112)

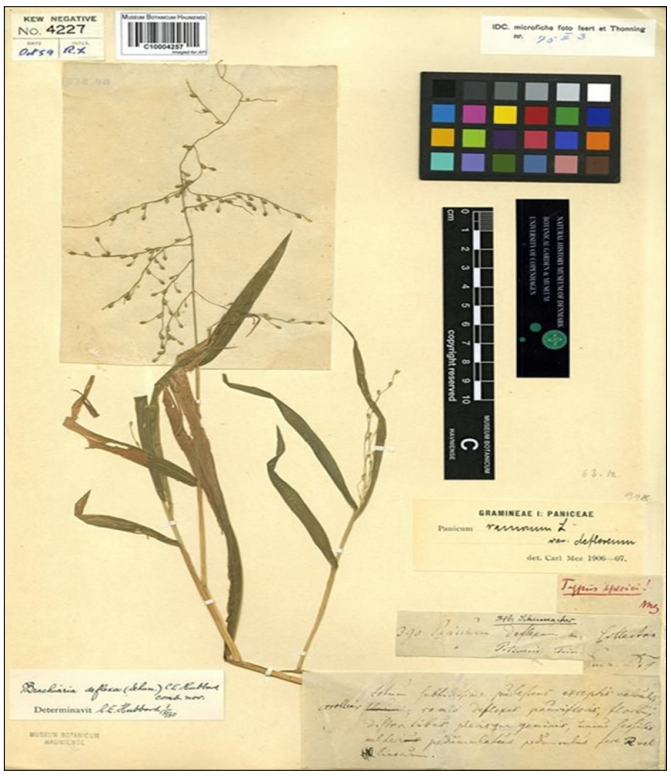

Fig. 1. Lectotype of the name *Urochloa deflexa* (Schumach.) H. Scholz. (Barcode C10004257) [© Natural History Museum of Denmark, University of Copenhagen. Reproduced with consent].

≡*Panicum latum* Schumach. (1827: 61)

≡*Brachiaria lata* (Schumach.) C.E. Hubb. (1938: Pt. 3363)

Lectotypus (hic designatus)

GHANA, the southern part of the country, *Thonning 353* [C (barcode C10004262—the left-hand specimen on the sheet, digital image!)]; isolectotypes [C (barcode C10004263 and C10004264) (digital images!)].

Nomenclature notes

Schumacher (28) described Panicum latum based on Peter Thonning's collection from Ghana as already discussed under U. deflexa. In the protologue, a brief diagnosis with a detailed morphological description was provided without any details of the associated gathering. Researchers (29, 30) confirmed that this species is based on gathering "*Thonning. 353,"* which they registered from Thonning's now lost manuscript; however, not all the specimens have been assigned collection number 353. After a thorough search of C and other European herbaria, we found three specimens of *Thonning 353* in C (C10004262, C10004263 and C10004264) and two in K (K000282167 and K000282168). The sheet C10004262 consists of two specimens, the specimen on the left carried an original identification label by Schumacher's hand with the annotation "*Hb. Hornemann*; *353. Panicum latum m. Panicum adenodes* Trin.*; Collectan Guin. D. Thon*," verified by Mez as *Panicum latum* and by Hubbard as *Urochloa lata* (cited *U. insculpta* in synonymy). The specimen on the right is a panicle branch, verified by Mez as *P. latum* and belongs to Schumacher herbarium. It contains the annotation "*Panicum adenodes* Trin*; Collectan Guin. D. Thon*". The specimen C10004263 is of Hb. Hornemann carrying the annotation "*Panicum adenodes Trin spicis conjugatis v. alternis racemosis muticis, vaginis foliis et rachi pilosi*" and on the verso*"con-typus; panicum latum: panicum exasperate*" by Mez. The specimen C10004264 is determined by Mez as "*Panicum latum*" and by Hepper as "*Brachiaria lata* (Schumach.) Hubbard; *Panicum latum*" with an annotation of "*type speci*" marked by Mez while on the verso, an original label of Schumacher's handnotes is pasted "*353. Panicum latum; adenodes Trin.: Guin D. Th.*". Furthermore, the specimens preserved in K, K000282167 and K000282168 are incomplete and represented only by spikelets taken from the type specimen deposited in C. The latter one (K000282168) has an illustration of the left-hand specimen of sheet C10004262. Since all the specimens belong to *Thonning 353* and consist of the original identification label by Schumacher's hand (except K specimens), they should therefore be treated as original material and syntypes as well (Art. 9.4 and 9.6 of ICN) (24). Considering the above discussion and for the correct application of the name, here we have selected the left-hand specimen mounted on the sheet with barcode C10004262 as the lectotype for the name *Panicum latum* in conformity with Art. 9.3 of ICN (24) as the specimen corresponds well to the protologue, has an original identification label by Schumacher and is verified by Hubbard as *Urochloa lata* (≡*Panicum latum*) (Fig. 2).

Acknowledgements

Fig. 2. Lectotype of the name *Urochloa lata* (Schumach.) C.E. Hubb. (Barcode C10004262—the left-hand specimen on the sheet) [© Natural History Museum of Denmark, University of Copenhagen. Reproduced with consent].

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Authors' contributions

SJ performed the necessary research and prepared the initial draft of the manuscript. DP, RY and SS edited and refined the manuscript. VKM reviewed the final draft of the manuscript and made some key additions. PA supervised the whole work and sent the manuscript for publication.

Compliance with ethical standards

Conflict of interest: The authors affirm that this research is conducted without any conflicts of interest.

Ethical issues: None.

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