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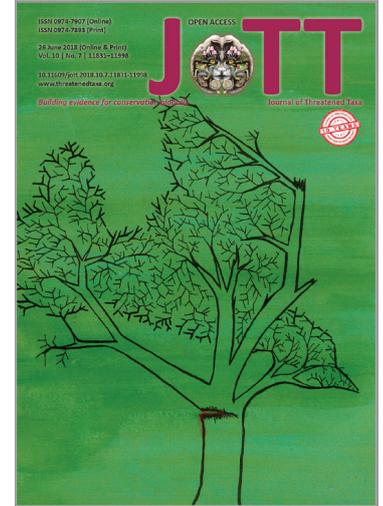
POLYTRIAS INDICA (POACEAE: ANDROPOGONEAE):

THE NAME, SPECIES IDENTITY AND ITS DISTRIBUTION IN INDIA

Vatsavaya S. Raju & V. Sampath Kumar

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POLYTRIAS INDICA (POACEAE: ANDROPOGONEAE): THE NAME, SPECIES IDENTITY AND ITS DISTRIBUTION IN INDIA

Vatsavaya S. Raju¹ & V. Sampath Kumar²

¹Department of Botany, Kakatiya University, NH-563, Vidyanarayapuri, Hanamkonda, Warangal, Telangana 506009, India

²Central National Herbarium, Botanical Survey of India, Botanic Garden (P.O.), Howrah, West Bengal 711103, India

¹rajuvatsavaya@gmail.com (corresponding author), ²vskumar10@rediffmail.com

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Abstract: *Polytrias indica* (Houtt.) Veldkamp is native to Java (Indonesia) but found outside its native range as a lawn grass or an escape. In India, it was first collected from Khasia (now Khasi) in Meghalaya and later reported as a garden escape in Indian Botanic Garden, Shibpur, West Bengal. Merrill created the confusion when he made the combination *Ischaemum indicum* (1938) for a taxon which is not an *Ischaemum*. The so-called *Polytrias indica* in certain Indian herbaria (e.g., PBL, BSID) is, indeed, *Ischaemum ciliare* Retz. (1791) to which name *Ischaemum indicum* has been misapplied in Indian grasses literature, and the IUCN assessment of *Polytrias indica* made in 2013 is not an exception.

Keywords: Identity, India, *Ischaemum indicum*, IUCN assessment, Java grass, nativity, *Phleum indicum*, *Polytrias indica*.

Polytrias

Polytrias Hack. is a genus of the family Poaceae, described with single species *P. praemorsa* (Nees) Hack. It is a prostrate grass from Java, bearing shiny, reddish-brown hairy racemes with each rachis joint (node) bearing two sessile and one pedicellate spikelets, and the flowering glume ending with an awn (Hackel 1887,

1896). Based on morphological characters, Clayton & Renvoise (1986) included *Polytrias* Hack. in the subtribe Saccharinae along with genera such as *Eriochrysis* P. Beauv., *Eulalia* Kunth, *Imperata* Cirillo, *Microstegium* Nees and *Pogonatherum* P. Beauv. of Andropogoneae, an ecologically and economically important tribe of C₄ species, which include the important crops of the world such as maize, sorghum and sugarcane. The genus *Polytrias* shows closer affinity with *Eulalia* and *Microstegium* of the Saccharinae on one hand and *Sorghastrum* of Sorghinae on the other, as per the multilocus phylogeny and phylogenomics (Welker et al. 2016).

The *Polytrias* Hack. (1887) resembles the genus *Pogonatherum* P. Beauv. (1812) in its terminal solitary racemes and articulate axis, but differs in the ternate spikelets. It is allied to *Eulalia* Kunth (1829) from which it differs strikingly in its solitary racemes and the spikelets in triads but both differing from *Ischaemum* L. (1753) in their slender joints of the rachis, lower glumes not

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winged, never tuberculate or rugose. In certain herbaria (e.g., Taiwan), *Polytrias* was often misidentified as *Eulalia leschenaultiana* (Lin et al. 2013). In Flora of British India, Hooker (1896) treated this taxon as doubtful and listed it in the excluded species of *Andropogon*. Further, he (p.210) mentioned *A. diversiflorus* Steud. (in Zoll., Syst. Verz. 58. 1854) as *Polytrias praemorsa* Hack., a Javanese plant that was not hitherto found in British India. But, later, Veldkamp (1991) brought to light that one of the collections made by J.D. Hooker & T. Thomson from Khasia in 1850, under the name *Pogonatherum crinitum*, in reality, is *Polytrias indica*.

Veldkamp's (1991) assignment of *Phleum indicum* Houtt. to *Polytrias* created (heterotypic) synonymy. To mention the relevant names discussed in this paper, we have: *Polytrias praemorsa* Hack. (1887), a combination without basionym, and that of 1889 by Hackel is a superfluous basionym (Veldkamp 1991). The isotype of *Andropogon diversiflorus* Steud. in Leiden/Lund (L0050026: Zollinger, H., #539, Java, Indonesia) was identified by J.Th. Hernard in 1921 as *Polytrias praemorsa* (Nees) Hack. *Andropogon diversiflorus* Steud. [in Zoll., Syst. Verz. 1: 58 (June) 1854, nomen] Syn. 1. 370 (July) 1854 is again a synonym which makes *Andropogon amaurus* Büse (Miq., Pl. Jungh. 3: 360. Aug. 1854) and its combination [*Polytrias amaurens* (Büse) Kuntze (1891)], superfluous. For further synonymy in this regard, one can refer to Veldkamp (1991).

The genus *Polytrias* Hack. was first reported from India from the Indian Botanic Garden, Shibpur, West Bengal, by Jain & Pal (1968) as *P. amaurens* (Büse) Kuntze. This grass was widely known as *Polytrias amaurens*, based on *Andropogon amaurus*, which is a superfluous name for *A. diversiflorus*, as mentioned above. *Polytrias amaurens* was first noticed as a weed in Sector 1 of the Botanic Garden but later it was found to spread all over by the year 1985 (Pal 1987). Karthikeyan et al. (1989) have placed this record/taxon under *Eulalia amaurens* (Büse) Ohwi for the checklist of monocots of India.

Conversely, *Polytrias indica* was reported from India as a garden escape, or on the path of naturalization. It is of interest to note that the specific epithet "*indica*" has nothing to do with the country India, as of nativity. It could be due to the historical reason. In Linnaean time, several European botanists treated the Southeast Asian region under a common name, India (or East India, Indiae Orientale, Indiae Orientalis). Moreover, on herbarium sheet, on the top-left side he inscribed the origin of the plant as Planta Ind. Orient., which could refer to either Java or Ceylon (Wijnands et al. 2017). Perhaps, it could be the reason why Houttuyn (1792) did not bother to

pay attention to the precise locality when he named '*Phleum indicum*'.

The residence time (Pyšek & Jarošík 2005; Suthari et al. 2016) of this weed is 167 years (1850-2017) in Khasia (Meghalaya; on the authority of Veldkamp 1991) and 49 years (1968-2017, Shibpur) in West Bengal, and 41 years (1959-2017) in Andaman & Nicobar Islands (after Jain & Pal 1968).

Ischaemum

Phleum indicum was described by Houttuyn (Nat. Hist. 2(13): 198, t.90. f.2) in 1782 of a collection from Java. Houttuyn's exotic herbaria were from the Cape of Good Hope (South Africa), Ceylon (Sri Lanka), Java (Indonesia), and Japan. Houttuyn did not go abroad to collect these plants (Wijnands et al. 2017). The type of *Phleum indicum* was deposited in Herb. Houttuyn present in Geneva Herbarium (G), under Pre-Linnaean collections. Later, this name became the basionym for two different entities – *Ischaemum indicum* (Houtt.) Merr. (J. Arnold Arbor. 19: 320. 1938) and *Polytrias indica* (Houtt.) Veldkamp (Blumea 36: 180. 1991). Since Merrill (1938) conceived *Phleum indicum* Houtt. to be an *Ischaemum* and made the combination under the genus, it suppressed the name *I. ciliare* Retz. (1791). Hackel (1889) considered *I. ciliare* Retz. to be polymorphic and recognized in it three varieties and four subvarieties. The name "*Ischaemum indicum* sensu Merr." (Bor 1960), however, continues to be used in all the Indian floras and the recent generic accounts of *Ischaemum* (Sur 2001: 419; Srivastava & Nair 2010:75) in India, despite the fact that Veldkamp (1991) clearly established that the holotype (specimen) of *Phleum indicum* is not an *Ischaemum* but a *Polytrias* by virtue of its solitary racemes and ternate flowers bearing one pedicellate and two sessile spikelets. Therefore, the name *I. ciliare* Retz. has to be used in lieu of the replacement name "*Ischaemum indicum* (Houtt.) Merr."

One can also know this fact from the Merrill's (1938: 320) own making. Realizing Houttuyn's name, Merrill made the observation that Houttuyn's material was from Java and his species was clearly indicated as new (he used '*mihi*' for the binomials coined by himself - cf. Wijnands et al. 2017: 158), following the short Latin diagnosis. To Merrill, Houttuyn's illustration is a reasonably good one for the grass currently known as *Ischaemum ciliare* Retz., which is common in Java, and more definitely Houttuyn's species seems to be the same as *Ischaemum ciliare* Retz. var. *genuinum* Hack. In fact, Merrill mentioned *I. ciliare* Retz. as a synonym under the combination. Above all, Veldkamp (1991:

180) actuality pleaded for the reinstatement *I. ciliare* Retz. for the *Ischaemum indicum* auct. non (Houtt.) Merr. though it was not taken into the cognizance by the subsequent workers on Indian grasses. When the 'www.theplantlist.org' mentions the name *Ischaemum indicum* (Houtt.) Merr. as a synonym of *Polytrias indica* (Houtt.) Veldkamp, many grass workers perhaps simply adopted that name. Efloraofindia (Google sites) is no exception in this regard.

Polytrias indica: its description, distribution and IUCN categorization

Polytrias indica (Houtt.) Veldkamp in Blumea 36: 180.1991.

Phleum indicum Houtt., Nat. Hist. 2(13): Aanwyz. Plaat. [1], 198. tab.90, fig.2. 1782. Lectotypus (designated by Veldkamp [Wijnands et al. 2017: 184]): Indonesia. Java: Anon. s.n. (G-PREL [G00096222]) image!.

Pollinia praemorsa Nees ex Steud., Syn. Pl. Glumac. 1: 409. 1854. *Polytrias praemorsa* (Nees ex Steud.) Hack. in H.G.A. Engler & K.A.E. Prantl, Nat. Pflanzenfam. 2(2): 24.1887. *Andropogon amaurus* Büse in F.A.W.Miquel, Pl. Jungh., prepr.: 20. 1854, nom. illeg. *Andropogon diversiflorus* Steud., Syn. Pl. Glumac. 1: 370.1854. *Polytrias diversiflora* (Steud.) Nash in Torreyia 5: 110. 1905. *Polytrias amauro* Kuntze, Revis. Gen. Pl. 2: 788.1891, nom. illeg. *Eulalia amauro* (Büse) Ohwi in Bull. Tokyo Sci. Mus. 18, 2. 1942; Baker & Brink, Fl. Java 3: 587. 1968.

Description: Culms terete, hollow, creeping (mat-forming), stoloniferous, perennial (hemicryptophyte) of 10–30 cm height; plant parts and culm nodes glabrous. *Leaf* sheaths shorter than internodes; ligule short, 0.5–1 mm long, ciliate; blades linear, flat, 22–50 × 2–4 mm, margins scabrous, apex acuminate. *Inflorescence* solitary raceme, 2–5 cm long; rachis fragile, internodes linear, 2–2.5 mm long, pedicels linear, flattened, shorter than spikelets. *Spikelets* hermaphroditic, 2 sessile and 1 pedicellate at each joint; pedicelled spikelets usually like sessile ones, often smaller, at times staminate; sessile spikelets falling with adjacent internode and pedicel. Upper floret fertile and the lower absent. *Lower glume* with inflexed margin, oblong, 3–3.5 mm long, dorsally flat, 4-veined, 2-keeled, surface pilose in the lower half, ciliate, apex truncate, awnless. *Upper glume* oblong, 3–3.5 mm long, chartaceous, 1–3-veined, mid-vein keeled, apex truncate, ciliate, awnless. *Upper lemma* ovate or oblong, 1 mm long, smooth, apex 2-toothed, ending with hairs, awned; awn from a sinus, 8–12 mm long; column twisted. *Upper palea* oblong, 1–1.2 mm long, hyaline. Anthers 3, 2–2.5 mm long, dark purple,

styles with purple stigmas. *Caryopsis* obovoid, glabrous, apex rounded (after Baker & Brink 1968; Chen & Phillips 2006; Lin et al. 2013; present study).

English vernacular: Java Grass.

Illustrations: Houtt., Nat. Hist. 11(13): 198, t. 90, f. 2. 1782; Panzer, Vollst. Pflanzensyst. 2: 259, t. 90, f. 2. 1785, as *Phleum indicum*. Lin et al., Taiwan J. Biodivers. 5(1): 79, f. 1. 2013, as *Polytrias indica*.

Distribution: (a) Global: Native to SE Asia, including China (Chen & Phillips 2006). It is found in tropical Australia, south-eastern China, Malaysia, Myanmar, New Guinea, the Philippines and Vietnam (Lin et al. 2013). The limited (three) specimens at Kew are from Borneo, Java and Thailand. It is an introduction elsewhere as a lawn grass. It is reported from grassy places on mountain slopes, grassy spaces, lawns, wastelands and roadsides. (b) India: It is known from Meghalaya (Veldkamp 1991) and West Bengal (Jain & Pal 1968) and not yet reported from Andhra Pradesh and Telangana (V.S. Raju, pers. obs.), Kerala (P.V. Sreekumar, pers. comm.), Tamil Nadu (Kabeer & Nair 2009), Maharashtra (P. Lakshminarasimhan, pers. comm.) or other parts of India. (c) Andaman Group of Islands: Pal (1987) reported its presence in Andaman Islands of a collection made in Nov. 1976 (Gupta 4096, CAL) which is yet to be traced; however, there are eight collections at PBL from Andaman & Nicobar Islands in the folders of *Polytrias indica* which were originally labelled by the collectors as *Ischaemum indicum*. We identify all these as of *Ischaemum ciliare* Retz.

Note: It is a good lawn and pasture grass of great value (Bor 1960; Baker & Brink 1968) and as well pollen donor to bees (Baker & Brink 1968; Pal 1981). It is a short-day plant and flowers in winter (Remo-castro & Tabbada 1977). Its pollen may cause allergy to humans (Dacanay & Artiaga 1969) when grown as a lawn grass. Therefore, it is to be classified as an environmental weed (present study).

Invasive Weed Status: *Polytrias indica* is reported to be invasive outside its native range as per PIER (http://www.hear.org/pier/species/polytrias_indica.htm) and HEAR (gcw/species/polytrias_amauro/). It was reported decades back as an escape in India (Jain & Pal 1968; Pal 1987). However, it is yet to be confirmed as an invasive species on the Indian mainland or the Andaman group of islands.

IUCN Red List Status: Kumar (2013) assessed *Polytrias indica* as Least Concern (LC). The assessment they made is of *Ischaemum indicum* sensu Merr. and it shall belong to *Ischaemum ciliare* Retz. It is a clear case of misapplication of name of the lawn grass *Polytrias indica* to yet another but marsh grass from Java which

entered into India earlier to 1791. The IUCN assessment of *Polytrias indica*, as of now, needs correction.

CONCLUSION

Polytrias indica (Houtt.) Veldkamp is the name of Java Lawn Grass misapplied to another grass from Java found very common in India or elsewhere which is to be rightly called *Ischaemum ciliare* Retz. Although Veldkamp (1991) clearly brought out the distinction of *Polytrias indica* of its ternate flowers, the confusion continues in Indian grass literature. It pertains to the subtribe Sacchrinae rather than Ischaeminae of Andropogoneae. The 2013 IUCN Red List assessment of *Ischaemum indicum* sensu Merr. (i.e., *I. ciliare* Retz.) was attributed to *Polytrias indica* as a result of misapplication of the name. Although *Polytrias indica* is stated to be invasive outside its native range, it is yet to be confirmed as such in India. Thus far, it is known from Meghalaya and West Bengal of India.

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