

Rapid Communication

First record of *Paspalum guenoarum* Arechv. (1894) (Panicoideae: Poaceae), Ramirez-grass in Gauteng province of South AfricaAluoneswi C. Mashau¹, Frits P. van Oudtshoorn³ and Moleseng C. Moshobane^{1,2}¹South African National Biodiversity Institute (SANBI), Private Bag X101, Pretoria, 0184, South Africa²Department of Biology and Environmental Sciences, Sefako Makgatho Health Sciences University, Ga-Rankuwa, 0208, South Africa³Working on Grass, PostNet Suite 040, Private Bag X1049, Modimolle, 0510, South AfricaCorresponding author: Moleseng C. Moshobane (moshobanemc@gmail.com, mcmoshobane@sanbi.org.za)

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Abstract

Paspalum guenoarum Arechv. (Poaceae) (Ramirez-grass) is a perennial tussock, leafy grass up to 1.0 m tall, with short basal rhizomes. This species is native in subtropical and grasslands of South America, and it is highly palatable to animals with a good distribution of forage production throughout the year. In this study, we present the first record of *P. guenoarum* in the Gauteng province of South Africa. This new record increases the number of alien and invasive grasses introduced into South Africa.

Key words: alien grass, grass distribution, invasive alien species, NEM:BA, spikelet**Introduction**

Numerous species of the grass family (Poaceae) have been distributed to regions and countries outside of their native range due to their use and trade as forage crops, grain crops, and ornamental grasses. South Africa has relatively few alien invasive grass species and the introduction of alien grasses has declined in recent decades (Visser et al. 2017).

Paspalum (Linnaeus, 1759) is a large genus of approximately 330 species, mainly distributed in the Americas, tropics, and predominantly in the New World (Morrone et al. 2012). Of these species, only three are indigenous namely *P. scrobiculatum* L., *P. distichum* L., and *P. vaginatum* L. while others five have naturalised in southern Africa. The genus *Paspalum* belongs to the *Plicatula* group of grasses, the most important group of grasses in Brazil and South America due to its agronomic characteristics and being a significant food source for both wild and domesticated animals (Meirelles et al. 2013). *Paspalum* species are well represented in natural rangelands used for cattle production systems, but some species are also cultivated for forage, turf, and cereal.

The species *Paspalum guenoarum* (Arechavaleta, 1894) is a valuable wild forage grasses in native subtropical and grasslands of South America, especially temperate regions of southern Brazil, Argentina and Paraguay

(Steiner et al. 2017). It has been introduced as a forage crop in warm regions of the world (Ramirez 1954; Oram 1990). *Paspalum guenoarum* has a slow initial development, but is highly palatable to animals, tolerant to cold and drought, with a good distribution of forage production throughout the year (Pedreira et al. 1975). The common name of *P. guenoarum* is Ramirez-grass or wintergreen paspalum. Ramirez-grass is a perennial grass with basal rhizomes and can reach about a meter high (Clayton et al. 2015). It grows primarily in the seasonally dry tropical biome. In this study, we present the first record of *P. guenoarum* in Gauteng province, South Africa, accompanied by detailed descriptive data, thereby enhancing our understanding of its invasive dynamics.

Materials and methods

The first record of the *P. guenoarum* was collected from the University of Pretoria experimental farm, across the road to CSIR, Gauteng province, Pretoria, South Africa (specimen collector and collector no: Ellis 1824) on 10 January 1974. This specimen was named *Paspalum plicatulum* subsp. *guenoarum* (Arechav.) Roseng., published by B.R.Arrill. & Izag. in Gram. Urug.: 373 (1970) which is now a homotypic synonym. Another record was collected from Malkerns Research Station, Mbabane, Eswatini (formerly Swaziland) (Oakes 1705) on 22 April 1971. In 1974 Arechavaleta identified this specimen as *Paspalum* cf. *plicatulum* subsp. *guenoarum* (Arechav.) Roseng. The cf. is commonly placed between the genus name and the species name to describe a specimen that is hard to identify because of practical difficulties, such as poor preservation. However, taxonomists curating the Poaceae family changed those two specimens to *Paspalum* spp. (meaning they don't have species names at all). The recent record of the *Paspalum guenoarum* was found at the South African National Biodiversity Institute (SANBI), next to the Education Centre parking place, Gauteng province, Pretoria, South Africa. The species was identified by the first and second author (Dr A.C. Mashau and Mr F. van Oudtshoorn) using a light microscope (Kyowa Tokyo No: 810532 microscope). The morphological characteristic of the collected species was identified compared to other *Paspalum* species specimens housed at the National Herbarium (PRE), but two specimens were found under *Paspalum* spp. the species cover was matched with the new specimen (Figure 1). The occurrence data was extracted from herbarium specimens deposited at the National Herbarium (PRE) (Figure 2).

Results and discussion

Currently, *P. guenoarum* is known only from Gauteng Province, South Africa, suggesting Gauteng as the primary point of introduction. Its successful

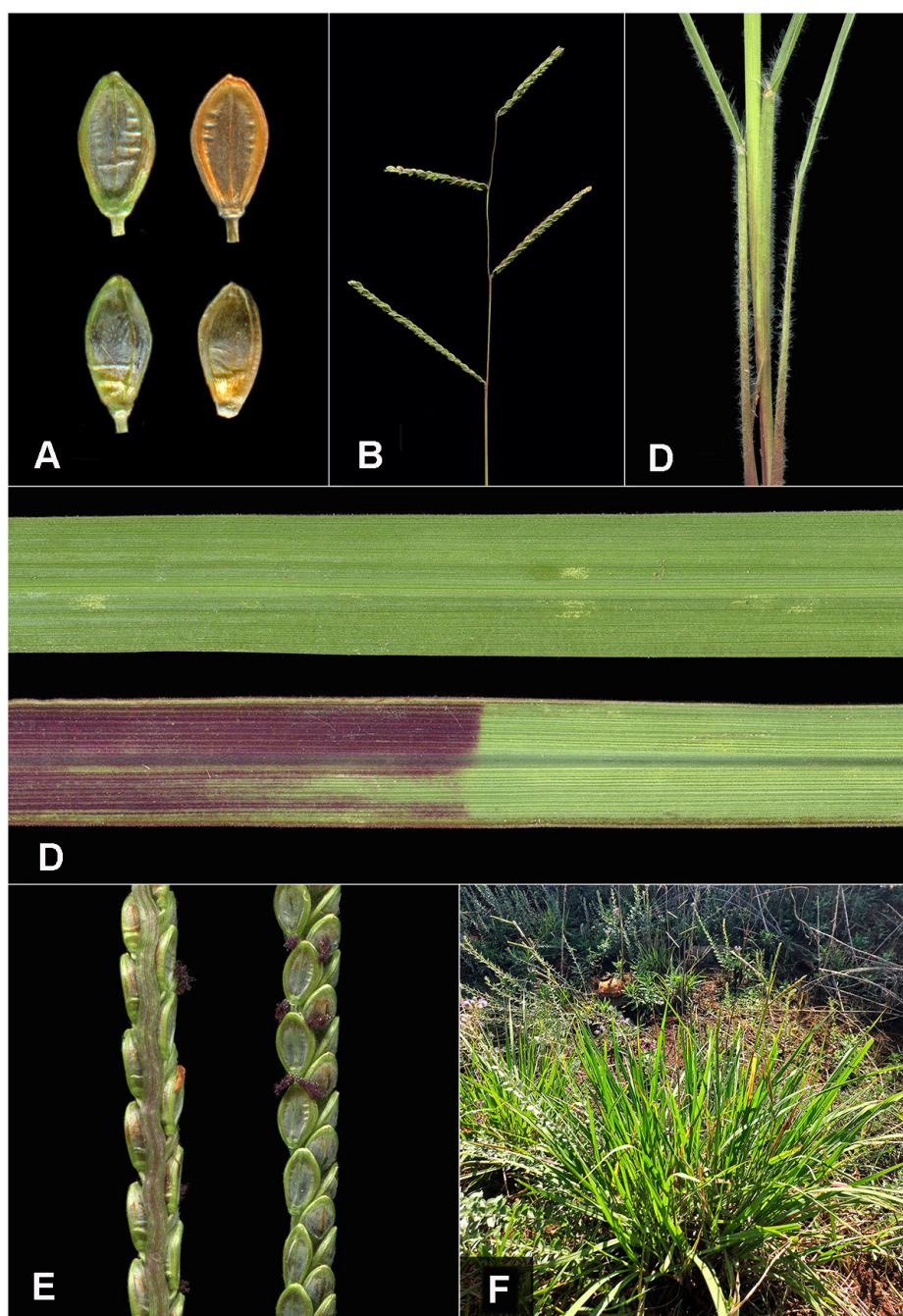


Figure 1. Different diagnostic parts of *Paspalum guenoarum* recorded in Gauteng province, South Africa. A) spikelet, B) inflorescence, C) leaf sheath D) leaf blade, E) racemes, F) habit. Photographs by Frits van Oudtshoorn.

establishment in the Pretoria National Botanical Garden, as documented in this study, indicates rapid geographical expansion. The *P. guenoarum* is closely related to *P. quadrifarium* Lam. (see key to species above). The documentation of this species in the botanical garden particularly at the education centre could suggest that possible pathway of introduction was through vehicles that visit the education centre. The phenomenon of vehicles facilitating the dispersal of invasive plants is well document (Von Der Lippe and Kowarik 2007). *Paspalum guenoarum* is also present in Zimbabwe, where it is cultivated for pasture (Maroyi 2006). The emergence

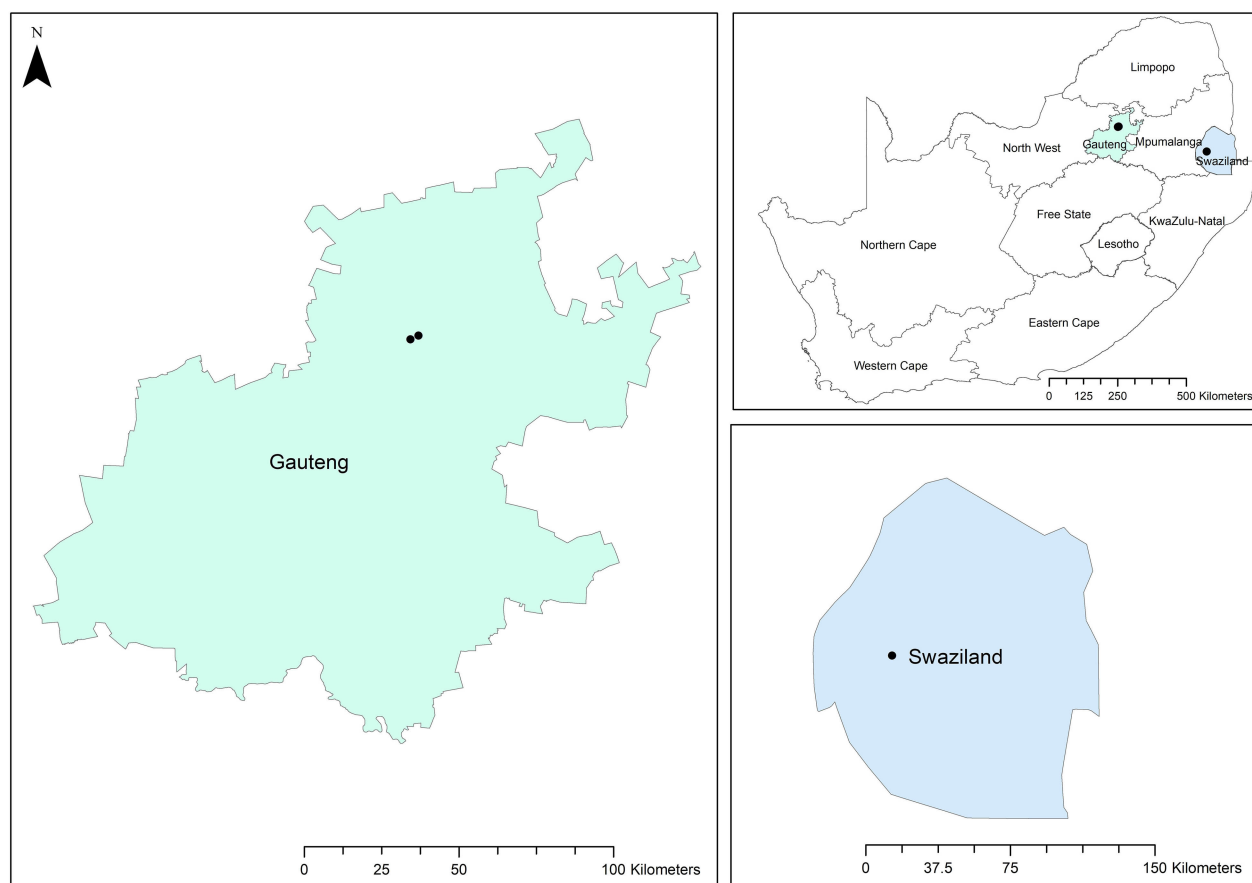


Figure 2. The known occurrence records of *Paspalum guenoarum* outside of cultivation in South Africa.

of *P. guenoarum* in Gauteng province of South Africa is worrying (Moshobane et al. 2022). This pattern aligns with global projections on the accumulation of introductions and emerging invaders (Seebens et al. 2018, 2021; van Kleunen et al. 2015).

The exact number and identity of alien grasses in South Africa, along with their status on the introduction-naturalization-invasion (INI) continuum, remain unclear (Blackburn et al. 2011; Richardson and Pyšek 2012). Although South Africa appears to have experienced roughly 256 introductions of alien grasses compared to other regions, it has been highly active in trialling these species at pasture research stations (Visser et al. 2016). However, no consolidated inventory of species cultivated in these trials exists. Without a comprehensive inventory of alien grasses, it is impossible to fully assess the associated risks from grasses as a functional group.

Despite the small population of *P. guenoarum* discovered in the Pretoria National Botanical Garden, it could still significantly impact native species (Bernard-Verdier and Hulme 2019). *Paspalum guenoarum* is associated with fungi that may threaten susceptible native species in invaded regions (Gasparetto et al. 2021). These impacts could manifest through competition or inhibition of native species' germination and growth. For instance, pathogens associated with *P. guenoarum* can affect the germination potential of seeds, compromise seed stands, and lead to the loss of seed

lots, necessitating the identification of these pathogens and their effects (Marroni et al. 2012). The current study in part further indicates that protected areas are prone to invasive species and which is supported by the findings of the study Nelufule et al. (2024).

This new record increases the number of alien and invasive grasses introduced to South Africa to 257. More effort is needed to study the diversity and structure of invasive alien grasses in South Africa and to investigate their impacts on native biota.

Key to species of the genus Paspalum that are found in southern Africa

Note: The symbol * next to species name represent the alien species.

- 1a. Spikelet with upper glume margins fringed with long hairs, rest of surface pubescent or glabrous, mat 2
- 1b. Spikelet with upper glume margins not fringed, surface glabrous or minutely hairy, usually glossy 3
- 2a. Spikelet 3–4 mm long; racemes (3)4–9, scattered on the central axis; basal sheaths glabrous or sparsely hairy..... **P. dilatatum*
- 2b. Spikelet 1.6–2.8 mm long; racemes 10–30; closely spaced on the central axis; basal sheaths densely hairy..... **P. urvillei*
- 3a. Spikelet yellowish-brown to straw-coloured, often purple-tinged; spikelets arranged in two or four rows; racemes 3–44 4
- 3b. Spikelet green or pale brownish-green sometimes becoming brown; spikelets arranged in two rows; racemes 1–5 5
- 4a. Racemes 15–44; spikelet 2.0–2.5 (3.0) mm long; spikelets arranged in four rows **P. quadrifarium*
- 4b. Racemes 3–13; spikelet 3.0–3.5 mm long; spikelets arranged in 2–4 rows..... **P. guenoarum*
- 5a. Spikelet apex rounded; spikelet ovate to elliptic, 1.0–1.5× as long as wide..... 6
- 5b. Spikelet apex acute; spikelet nearly lanceolate to narrowly obovate, more than 2× longer than wide..... 7
- 6a. Spikelet 2.8–3.7 mm long; rachis often zig-zag; rhizome very well developed, horizontally creeping..... **P. notatum*
- 6b. Spikelet 2.0–2.5 mm long; rachis flat, linear, almost leaf-like; rhizome short, not horizontally creeping..... *P. scrobiculatum*
- 7a. Upper glume minutely hairy (look carefully); spikelet narrowly obovate, 2.5–3.5 mm long; lower glume a small triangular scale up to 2/3 as long as spikelet to absent (all 3 states can occur on the same inflorescence); leaves more than 3 mm wide.....*P. distichum*
- 7b. Upper glume glabrous; spikelet almost lanceolate, 3.0–4.5 mm long; lower glume absent or reduced to a rim; leaves less than 3 mm wide.....
..... *P. vaginatum*

Authors' contribution

ACM (conceptualization, data curation, methodology, resources, supervision, visualization, writing – original draft, writing – review and editing), MCM (conceptualization, writing – original draft, writing – review and editing), FPO (writing – original). All authors provided critical feedback and helped to shape the research and analysis, and the manuscript.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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Disclaimer

The opinions, findings, and conclusions expressed in this paper are the sole views of the authors and are not the views of the funders or the institutions.

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