National Herbarium Plant Collecting Programme reveals new country and provincial distribution records from South African National Parks (Apocynaceae, Xanthorrhoeaceae: Asphodeloideae & Asteraceae)

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Abstract

New country and provincial distribution records for South Africa of specimens collected mainly in various South African National Parks are reported on here. The taxa included in this contribution are of *Orthanthera albida* (Apocynaceae), *Doellia cafra* (Asteraceae), *Bulbine ophiophylla* (Xanthorrhoeaceae: Asphodeloideae) and *Trachyandra asperata* var. *basutoensis* (Xanthorrhoeaceae: Asphodeloideae).

Introduction

A comprehensive collection representing the range of the distribution and as much as possible of the morphological variation of indigenous and naturalized plant taxa, is a prerequisite for high standards in the taxonomic, phytogeographic and morphological

studies undertaken by staff of the South African National Biodiversity Institute (SANBI).

However, to indiscriminately expand the collection of the National Herbarium (PRE), Pretoria (South Africa), could result in an excess of specimens from certain areas or in only some taxa being well represented in the Herbarium. To this end, the *National Herbarium Plant Collecting Programme* (NHPCP) was established at the Pretoria campus of the former National Botanical Institute (NBI), now SANBI. This programme uses the PRE Computerised Information System (PRECIS) database to identify areas of poor specimen representation in PRE. The aim of the NHPCP is to obtain a complete record of the Flora of southern Africa (FSA), to record accurate distribution data for all taxa, to record plant biodiversity in a defined area, to record variation in plant species and to obtain a record of plants that flower at times other than at the peak season.

In 2005 a facet of the NHPCP was undertaken that focus specifically on selected South African National Parks (SANParks). Priority collecting in the SANParks include areas of poor representation at PRE, inadequately known taxa, unique habitats, remote and inaccessible areas and plants flowering at irregular times, especially after events such as fire or unusual and good rains, and plants flowering throughout the year.

Numbers of species per quarter degree square, using PRECIS information, shows that many areas of South Africa and especially in the targeted SANParks, are critically under-sampled and poorly represented at PRE (Figure 1). This contribution reports a number of new records and range extensions resulting from collecting efforts in the SANParks of the Northern Cape Province.

Materials and methods

Since the initiation of the NHPCP's facet that focus on various National Parks in 2005, several general collecting trips were undertaken to the Namaqualand, Richtersveld, Augrabies Falls and Mokala National Parks in the Northern Cape Province, South Africa.

Many QDS (Quarter Degree grids Squared) in the aforementioned national parks are considered as under collected and these were targeted for general collecting. This entails collecting herbarium specimens of all fertile plants from the various collecting sites that were chosen. Collecting sites were selected to represent the variety of habitat types found within the specific QDS in order to get a full floristic representation for the various parks. This is an on-going and long term project and with every visit more taxa, previously not encountered, are sampled.

Fertile herbarium specimens were collected and identified mainly at the National Herbarium in Pretoria (PRE). Specimens are housed at PRE and duplicates, where available, were distributed to the Kimberley South African National Parks Herbarium (KSAN), the Compton Herbarium in Cape Town (NBG) and the McGregor Museum Herbarium in Kimberley (KMG). Herbarium acronyms follow Holmgren *et al*. (1990).

Specimen information was incorporated into the main database (PRECIS) which facilitated analysis of distribution data. New specimen records were compared to existing records in PRECIS.

All relevant specimens acting as vouchers of the new records reported on here are cited under each taxon in the results section of this article.

New records and range extensions for the Northern Cape

Apocynaceae (Asclepiadoideae–Ceropegieae)

First herbarium record of *Orthanthera albida* in South Africa at PRE

The genus *Orthanthera* Wight (1834: 48) is endemic to Africa and currently consists of four species (Klopper *et al*. 2006). *Orthanthera butayei* (De Wildeman 1904: 192)

Werdermann (1938: 240) and *O. gossweileri* Norman (1929: 98) are restricted to southern Tropical Africa (Angola and Zambia), while *O. albida* Schinz (1888: 265) and *O. jasminiflora* (Decaisne 1844: 630) Schinz (1888: 265) occur mainly in southern Africa (Namibia, Botswana and South Africa) (Victor *et al*. 2003, Leistner 2005, Bester *et al*. 2006) although the former also extends to southern Angola.

Previously *O. albida* was seemingly restricted to Namibia and Angola (Victor *et al*. 2003, Bester *et al*. 2006) and was not listed for South Africa. On a collecting trip to the Richtersveld National Park (RNP) in August 2010, as part of the ongoing NHPCP, it was found in the park (Figure 2). The location seems to be limited to the stream bank vegetation along the Orange River.

Orthanthera albida was, however, previously listed on a checklist of the Augrabies Falls National Park (Zietsman & Bezuidenhout 1999). On investigation it was revealed that the name was placed on the list based on a report where it was listed for the park (Werger & Coetzee 1977), but even in this paper no voucher specimens were cited. Attempts to locate vouchers of this plant in NMB, KSAN, PRE and the field herbarium at the Augrabies Falls National Park were unsuccessful and it is concluded that possibly only a sight-record was made.

This species forms shrubs with an untidy appearance of spreading stems. In the RNP where plants were observed, it was severely grazed by goats from the community, shaping them into low rounded and very compact bushes. When stems are crushed, a clear sap emerge which is quite bitter. The stems are somewhat succulent (Figure 3).

Specimens examined:—SOUTH AFRICA. Northern Cape: Richtersveld National Park, north of De Hoop campsite between Gaimus/Stuiweoog and Rooilepel (QDS: 2817AA), 12 September 2010, *S.P. Bester 10112* (KMG!, KSAN!, MO!, PRE!).

Richtersveld National Park, between Richtersberg campsite and Adventure Bush Camp (QDS: 2817AC), 14 September 2010, *S.P. Bester 10136* (PRE!).

The two southern African species of *Orthanthera* are easily distinguishable from each other. In *O. albida* plants have a shrubby appearance with much reduced linear leaves (8–30 × 1–3 mm). In comparison, *O. jasminiflora* has a creeping habit with well-developed elliptic to ovate leaves (20–70 × 5–42 mm). The flowers of *O. jasminiflora* (Figure 4) are also much larger (12–35 mm long with the lobes ± as long as the tube) and cream, compared to *O. albida* which have smaller (5–10 mm long with the lobes ± half as long as the tube), yellow to yellow-green flowers.

Orthanthera gossweileri is only known from the type locality (Figueiredo & Smith 2008) in the Cunene Province in southern Angola. The type specimen (*Gossweiler 3881*, BM, JSTOR 2012a) has flowers that range from 20–30 mm long, but the outstanding feature of this species seems to be the 33–67 mm long filiform leaves. The material of *O. butayei* (*Butaye s.n.*, BR, JSTOR2012b) very much resemble that of *O. jasminiflora* and needs to be studied in more detail to assess its recognition as a separate taxon.

Asteraceae (Inuleae)

Doellia cafra* vs *Pulicaria scabra*, and range extension records for *Doellia cafra

In September 2010, a specimen of *Doellia cafra* (De Candolle 1836: 38) Anderberg (1995: 21) was collected along the Orange River in the Augrabies Falls National Park (*Bester 10188*)—totally out of its then known distribution range as it was not previously recorded from the Northern Cape (Herman *et al*. 2003).

Doellia cafra looks superficially very similar to *Pulicaria scabra* (Thunberg 1800: 153) Druce (1917: 642), which is known to occur in the Northern Cape (Herman *et al*. 2003). As it is possible that specimens could have been wrongly identified, all the *Doellia cafra* and *Pulicaria scabra* specimens housed in PRE were carefully studied and identified using Hilliard (1977). A number of miss-identifications were corrected: *Acocks 2561* was collected in the Hay Division along a tributary to the Orange River. This specimen was also miss-identified as *P. scabra* and re-identified as *D. cafra*, but because of the miss-identification, the distribution of this taxon in the Northern Cape was never realized until now. While preparing distribution maps for this article, two other overlooked localities (Potjiespram and near Pella) for *D. cafra* in the Northern Cape were discovered [*Pearson 3836* (NBG), *Williamson & Williamson 5876* (NBG)].

The genus *Doellia* was attributed to the tribe Plucheeae (Anderberg 1994, 1995) but further research proved that the tribe Plucheeae should be included in the tribe Inuleae (Anderberg & Eldenäs 2007; Anderberg 2009). The genus *Pulicaria* Gaertn. also belongs to the tribe Inuleae (Anderberg 1994; Anderberg & Eldenäs 2007; Anderberg 2009). In southern Africa both these genera are represented by only one species: *Doellia cafra* (DC.) Anderb. [= *Blumea cafra* (DC.) O.Hoffmann (1889: 274)] and *Pulicaria scabra* (Thunb.) Druce (Herman *et al*. 2000, 2003). Both these species grow in moist habitats along watercourses, edges of dams, etc. Vegetatively they look very similar and both are aromatic. In the fresh state, they can be distinguished by having purple (*Doellia cafra*) or yellow (*Pulicaria scabra*) inflorescences. When examining the inflorescences closely, the following distinguishing characters can be observed:

Doellia cafra: The outer female florets are arranged in several rows, their corollas filiform (without a noticeable corolla limb, the protruding bifurcate styles easily observed); few central disc florets and the pappus consisting of a few scabrid bristles only (Figure 5 A–C).

Pulicaria scabra: The outer female florets are arranged in one or two rows, having a small, but distinct corolla limb; many disc florets and the pappus consisting of an outer row of small scales fused into a shallow corona and an inner row of scabrid bristles (Figure 5 D–E).

According to PRE records *Doellia cafra* was known to occur in Namibia, Botswana, Limpopo, North-West, Gauteng, Mpumalanga, Swaziland, KwaZulu-Natal and the Eastern Cape. The Acocks, Pearson, Williamson & Williamson and Bester specimens mentioned above extended the distribution range to the Northern Cape (Figure 6), but the localities are far apart and the collections made with long time lapses in between. *Pulicaria scabra* occurs in Namibia, Botswana, Limpopo, North-West, Gauteng, Mpumalanga, Swaziland, Free State, KwaZulu-Natal, Lesotho, Northern, Western and Eastern Cape (Figure 7). On the label of a *Pulicaria scabra*-specimen collected by Giess [*Giess 13838* (PRE)] in Namibia along the Nuob River, 3 km from where it flows into the Orange River (QDS: 2817AA), it is stated that it is growing with *Doellia cafra* (= *Blumea cafra*). However, no *Doellia cafra*-specimen from that area is represented in PRE.

Pulicaria scabra is commonly known as *aambeibos* (Wells *et al*. 1986) most likely because of its usage as a lotion for bathing haemorrhoids (Watt & Breyer-Brandwijk 1962). According to a label on a herbarium specimen [*Gerstner 2335* (PRE)], the Zulu used it as an eye medicine. Watt & Breyer-Brandwijk (1962) also

recorded it being used by the Zulu for vaginal diseases and Hutchings *et al*. (1996) recorded its usage by the Zulu as an eye medicine and for gynaecological purposes. No medicinal or other usage could be found for *Doellia cafra*.

Specimens examined for *Doellia cafra*:—SOUTH AFRICA. Northern Cape: Richtersveld National Park, Poortjiespram [Potjiespram], bank of Orange River, (QDS: 2816BB), December 1996, *Williamson & Williamson 5876* (NBG). Augrabies Falls National Park, Farm Daberas 8, Vaalsand area, (QDS: 2819BD), 19 September 2010, *S.P. Bester 10188* (PRE!). Bushmanland, banks of a water conduit in the Pella area, (QDS: 2819CC), 8 January 1909, *H.H.W. Pearson 3836* (NBG!, digital scans). Hay Div., in kloof at Lelikstad, (QDS: 2922AB), 12 November 1937, *J.P.H. Acocks 2561* (PRE!).

Xanthorrhoeaceae (Asphodeloideae)

Range extension record for *Bulbine ophiophylla*

Bulbine ophiophylla Williamson (2003: 19) was described in 2003, although the type specimen was already collected at Alexander Bay in 1970. This species grows in small clumps or often as single plants. It is characterised by the curled tips of its leaves—the specific epithet also alludes to the tangled and curled leaves that resemble a serpent's nest. Leaves have a narrow, succulent base and lack the broad, often almost transparent, sheathing base of many other *Bulbine* species. Bracts have an elongated and drawn out apex, and oblong base with a serrated, white and papery margin. *Bulbine ophiophylla* is restricted to the low rainfall, sandy coastal plain within the Atlantic fog zone (Williamson 2003).

A few localities in the vicinity of Alexander Bay in the Northern Cape, South Africa and Oranjemund in Namibia are known. The southernmost locality recorded to date is near Port Nolloth where this taxon was collected in 2004. During August 2006, *B. ophiophylla* was collected in the Namaqua National Park. Two populations in adjacent quarter degree squared grids were seen, each consisting of several plants growing in full sun in well-drained sand in Namaqualand Strandveld and Namaqualand Coastal Duneveld of the Namaqua Sandveld Bioregion (Mucina & Rutherford 2006), at elevations ranging from 30–152 m. This represents a significant southward extension of the known distribution range of this taxon by ± 150 km (Figure 8).

Specimens examined:—SOUTH AFRICA. Northern Cape: Namaqua National Park, Farm Driekop 500, last intersection of Sarrisam road with 'big' road before coast, (QDS: 3017CB), 02 August 2006, *R.R. Klopper 304* (KSAN!, PRE!). Namaqua National Park, Farm Driekop 500, plain ± 2 km south of Bitter River, (QDS: 3017DA), 02 August 2006, *R.R. Klopper 302* (KSAN!, PRE!).

New provincial record for *Trachyandra asperata* var. *basutoensis*

Trachyandra asperata Kunth (1843: 574) is a widespread and variable species with seven recognised varieties. However, it has been suggested that the species is best treated as a variable one since intermediates between the various forms in certain areas make separation difficult (Obermeyer 1962). Some forms, such as *T. asperata* var. *basutoensis* (Von Poellnitz 1942: 51) Obermeyer (1962: 756), are nonetheless usually fairly distinct. *Trachyandra asperata* var. *basutoensis* is distinguished by its grasslike, nearly glabrous leaves, and principally by its capsules that are covered with short, gland-tipped tubercles and carried on twisted pedicels of up to 7 mm long. It invariably

grows in mountain grasslands and not in marshy areas like some of the other varieties of this species (Obermeyer 1962). It occurs fairly widespread throughout the Eastern Cape, Free State and North-West provinces of South Africa and in Lesotho.

Trachyandra asperata var. *basutoensis* was collected in the newly established Mokala National Park, near Kimberley, in November 2009. Several scattered plants were found growing in full sun on a rocky outcrop in Vaalbos Rocky Shrubland of the Eastern Kalahari Bushveld Bioregion (Mucina & Rutherford 2006) at an elevation of 1 258 m. This represents a first record for this taxon in the Northern Cape Province of South Africa (Figure 9).

Specimens examined:—SOUTH AFRICA. Northern Cape: Mokala National Park, (QDS: 2924AB), 19 November 2009, *P.C. Zietsman & L. Zietsman 4495* (KSAN, NMB, PRE!).

Conclusion

The general collecting done in the National Parks under the NHPCP has significantly increased our knowledge of under-collected areas and has improved available data on the distribution of many taxa. This helps in understanding these plant species much better, for example to do accurate Red Data List assessments. It also aids in the decision-making process for the conservation and management of specific species. The NHPCP further provide important data that is essential in conservation and monitoring actions within the National Parks and the Northern Cape Province as a whole.

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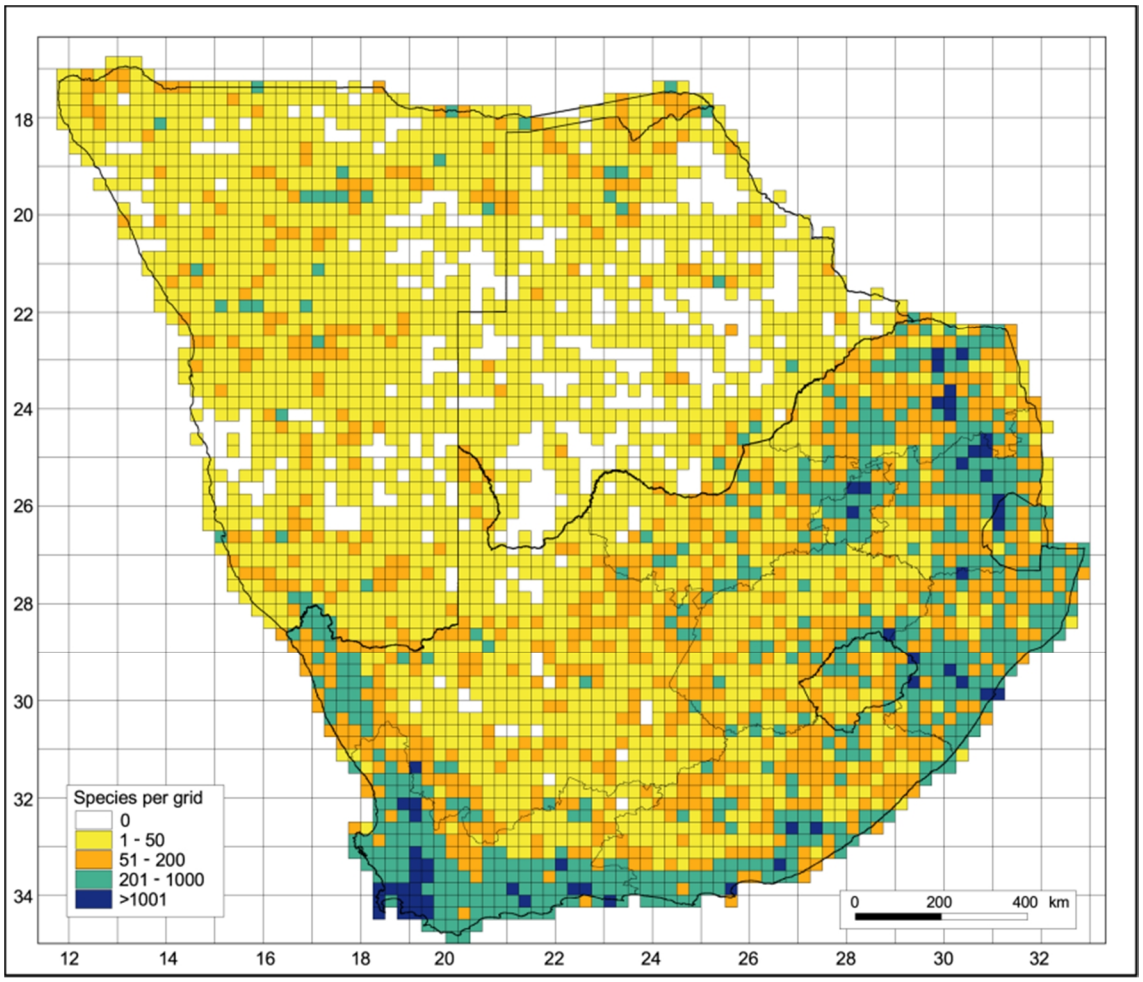

FIGURE 1. Number of species per quarter degree grid housed in PRE (2010). Grids with less than 200 species are generally regarded as under-collected.

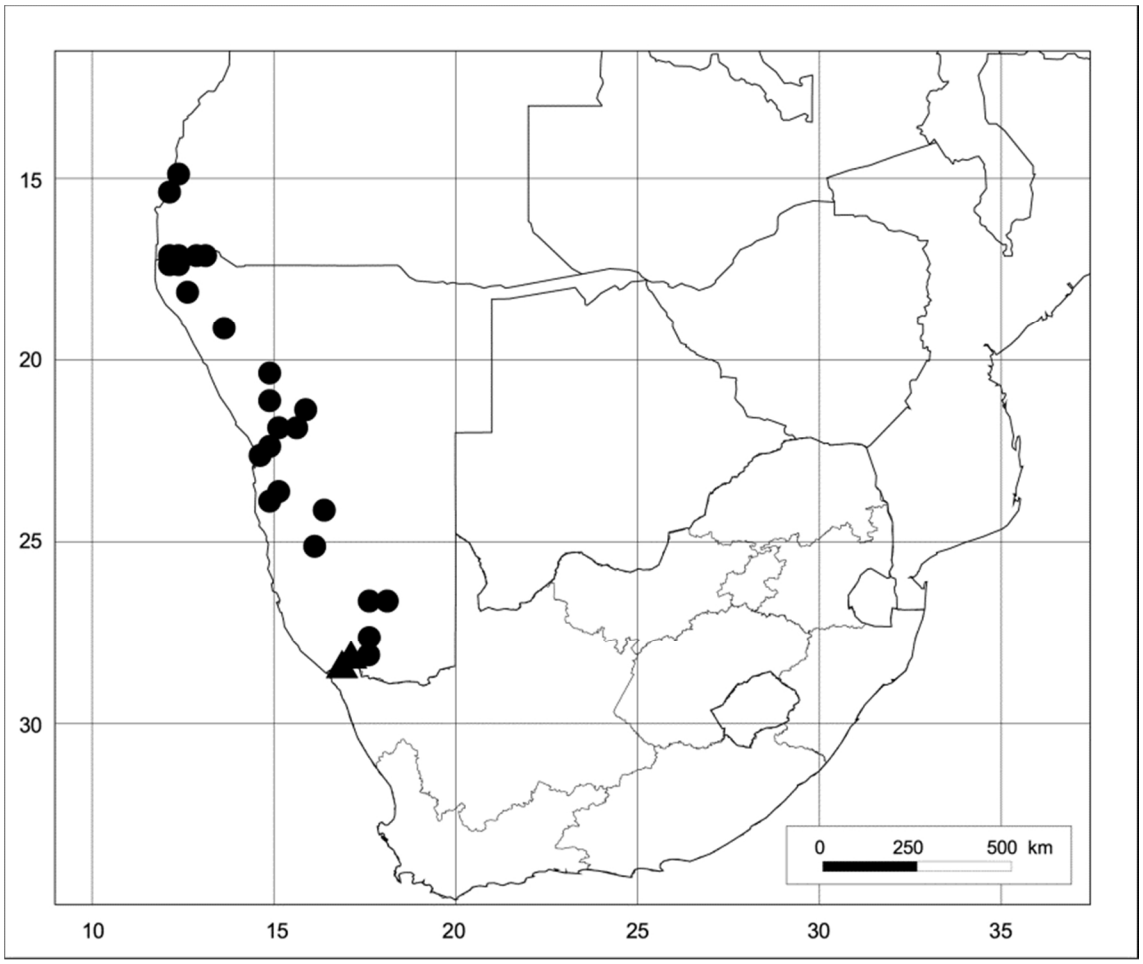

FIGURE 2. Known distribution of *Orthanthera albida*, ●. New localities, ▲.

Specimens housed at PRE and NBG.

FIGURE 3. *Orthanthera albida* from the Richtersveld National Park, Northern Cape Province, South Africa (photographs by S.P. Bester). **A**. Plant (in foreground) in habit—transitional zone between Lower Gariep Alluvial vegetation and Richtersveld Sheet Wash Desert (Mucina & Rutherford 2006). **B**. Close-up of sessile inflorescence, flowers yellow to yellow-green. **C**. Fruit, cream background mottled maroon. All from *Bester 10112* (PRE). Scale bar: A = 45 cm, B = 12 mm, C = 15 mm.

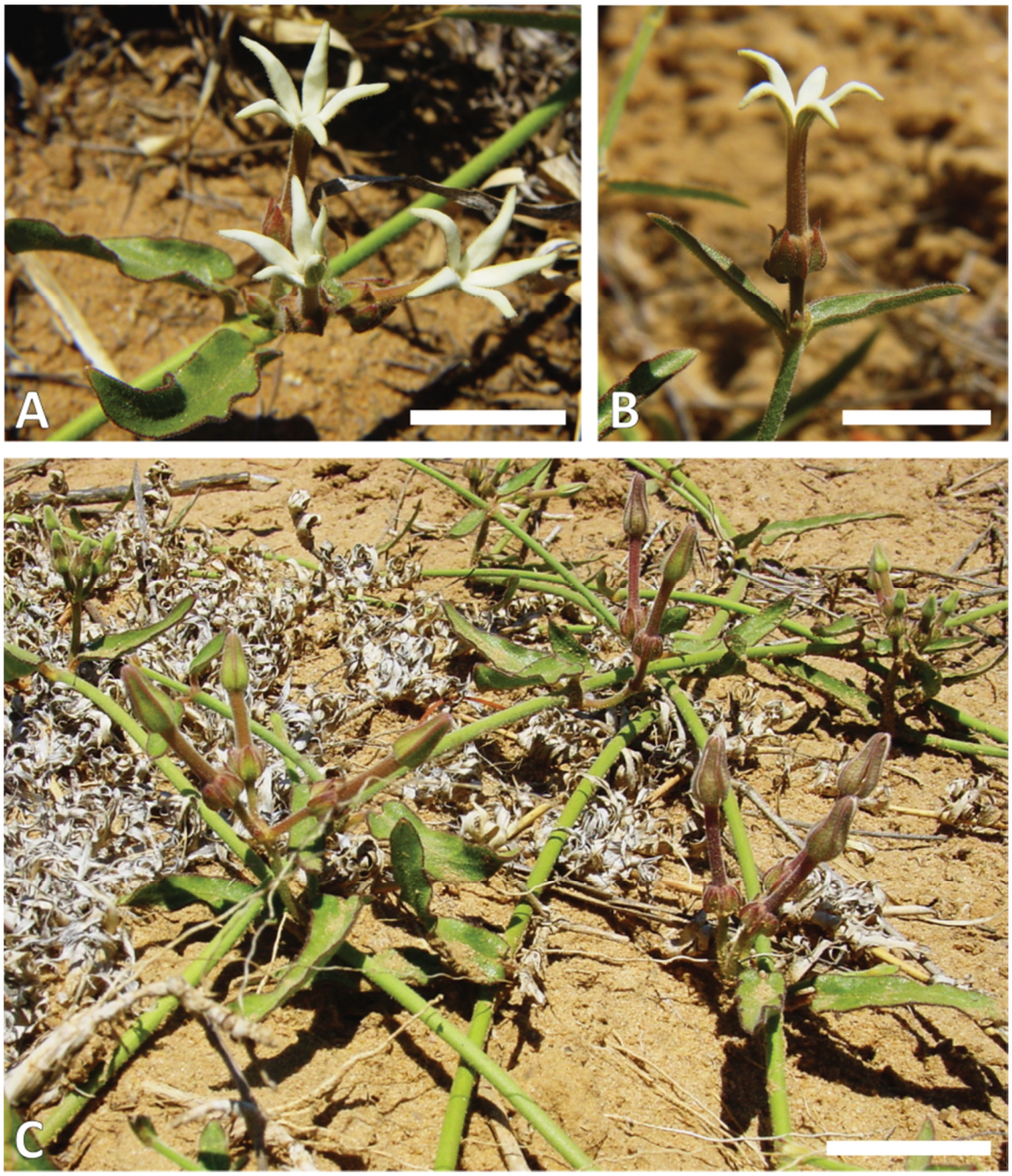

FIGURE 4. *Orthanthera jasminiflora* from Bloemhof, North-West Province, South Africa (photographs by S.P. Bester). **A**. Inflorescence and leaves. **B**. Single flower with swollen base and relatively long segments. **C**. Trailing stems depicting the habit—individual stems up to 15 m long. All from *Bester 5301* (PRE). Scale bars all 30 mm.

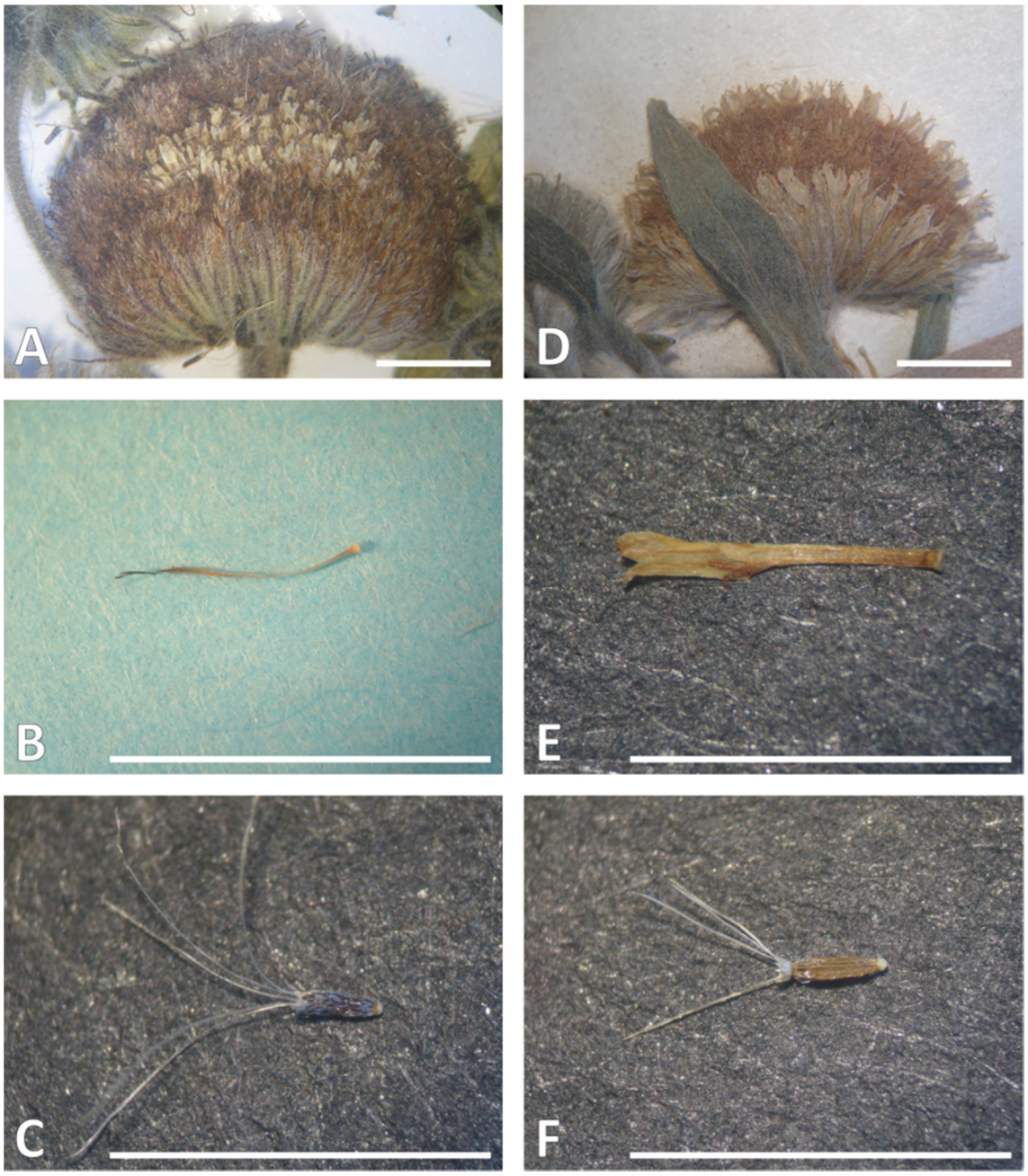

FIGURE 5. *Doellia cafra* (photographs by P.P.J. Herman). **A.** Capitula showing the outer female florets in many rows and a few central disc florets. **B**. Outer female floret showing the filiform corolla and exserted style. **C**. Cypsela showing the pappus bristles. *Pulicaria scabra* (photographs by P.P.J. Herman). **D**. Capitula showing the outer female florets in one row and many disc florets. **E**. Outer female floret with short but distinct corolla limb. **F**. Cypsela showing the outer pappus scales fused in a corona and inner

pappus bristles. A–C from *Koekemoer 2693* (PRE). D from *Leendertz 1127* (PRE). E from *Van Rooyen 2314* (PRE). F from *Hafström Herb. H960* (PRE). Scale bars all 4 mm.

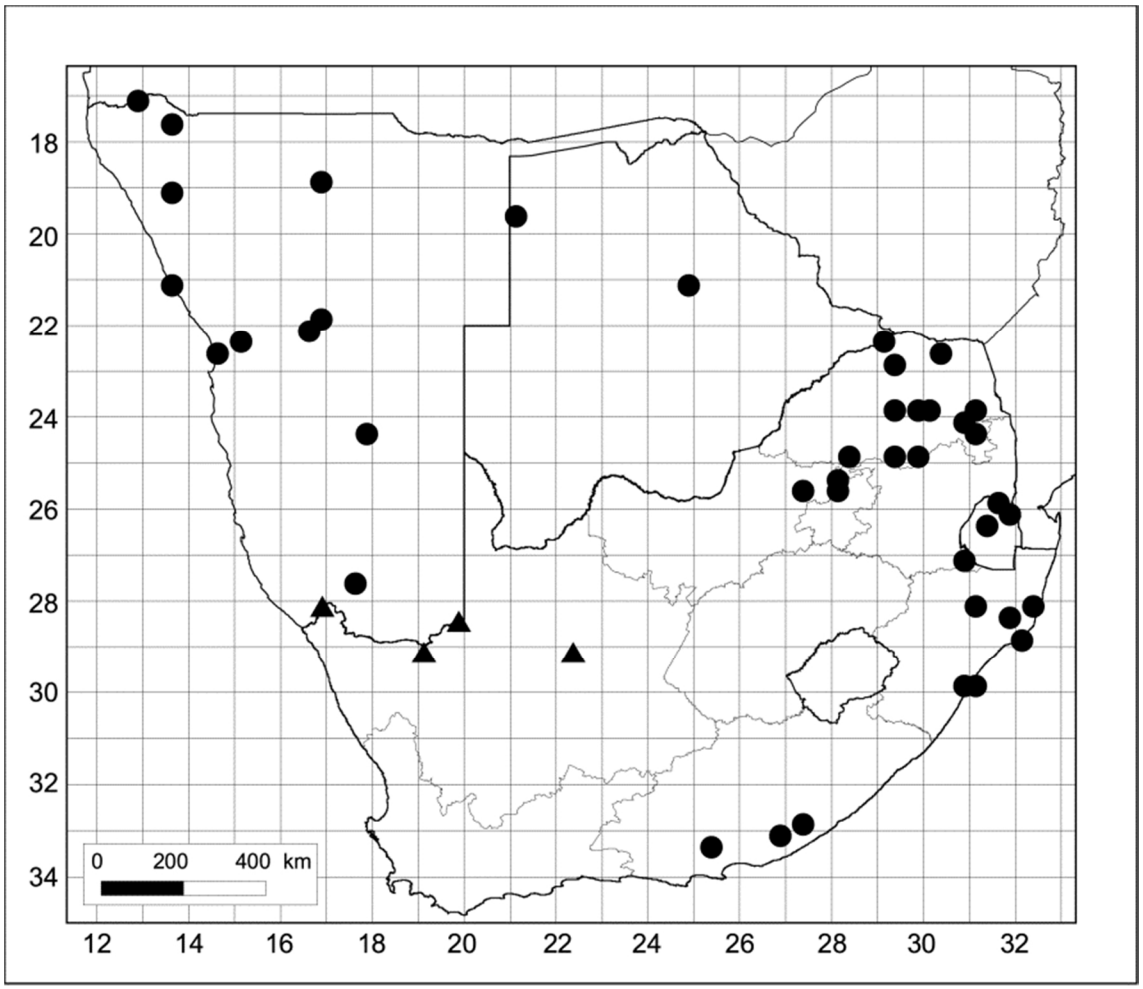

FIGURE 6. Known distribution of *Doellia cafra* in southern Africa, ●. New localities, ▲. Specimens housed at PRE and NBG.

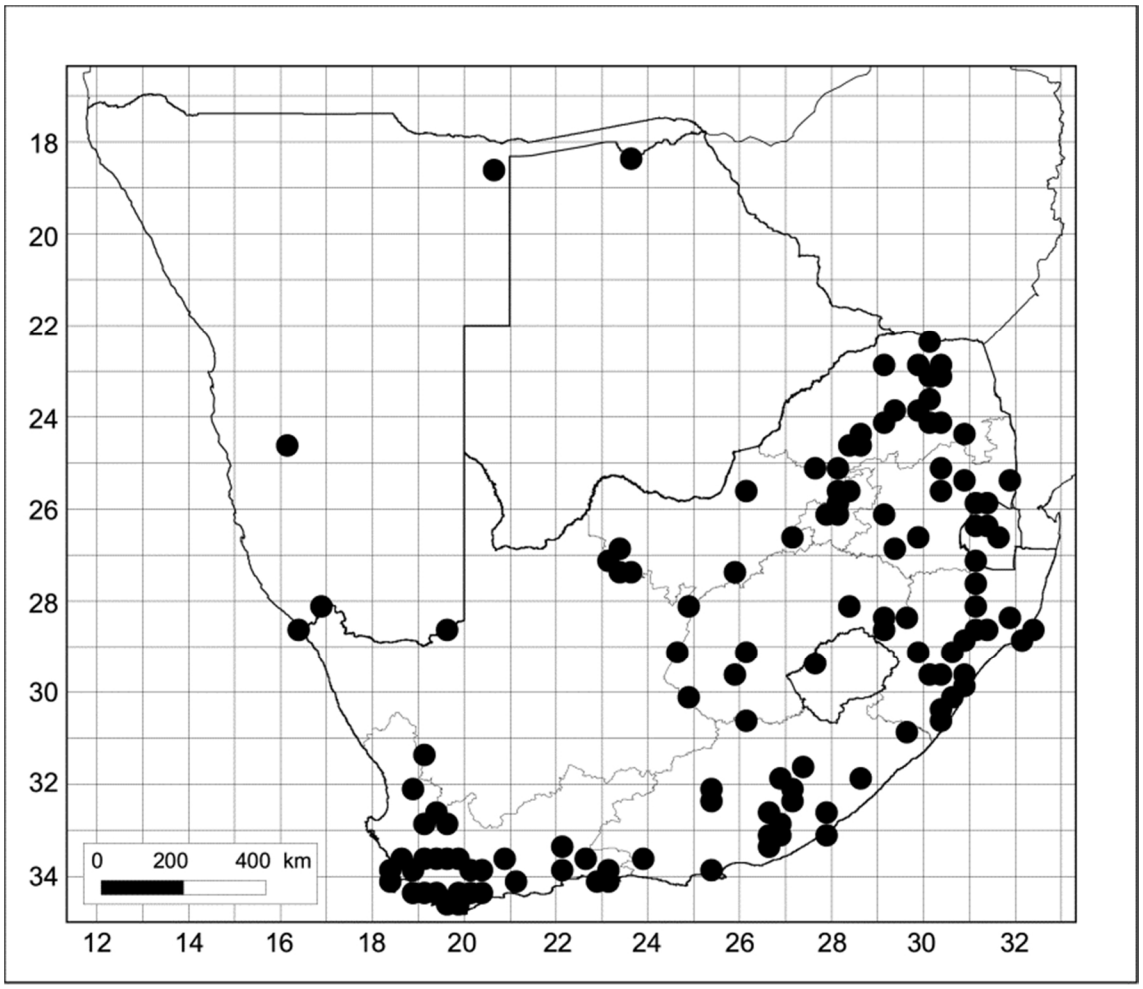

FIGURE 7. Known distribution of *Pulicaria scabra* in southern Africa. All specimens housed at PRE and NBG.

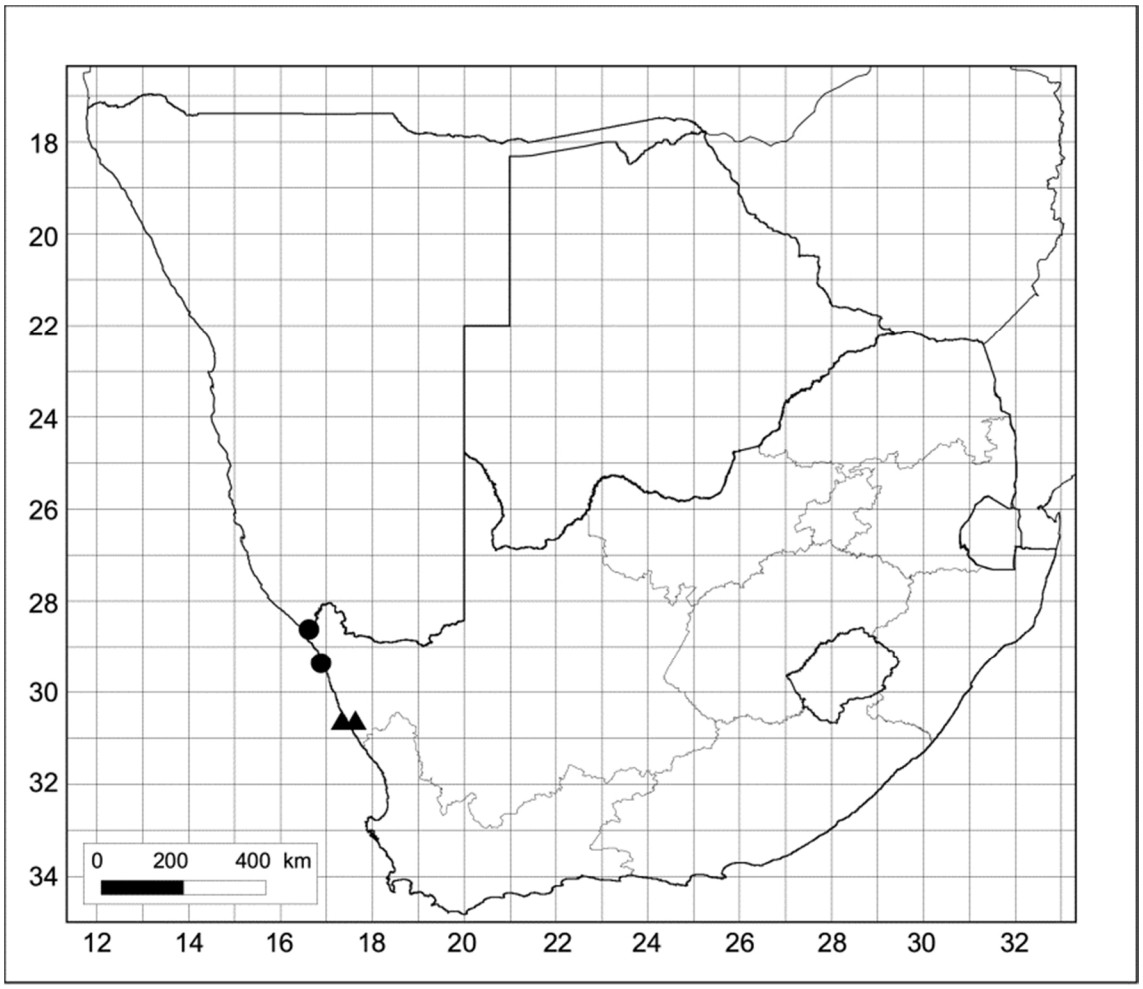

FIGURE 8. Known distribution of *Bulbine ophiophylla*, ●. New localities, ▲.

Specimens housed at PRE and NBG.

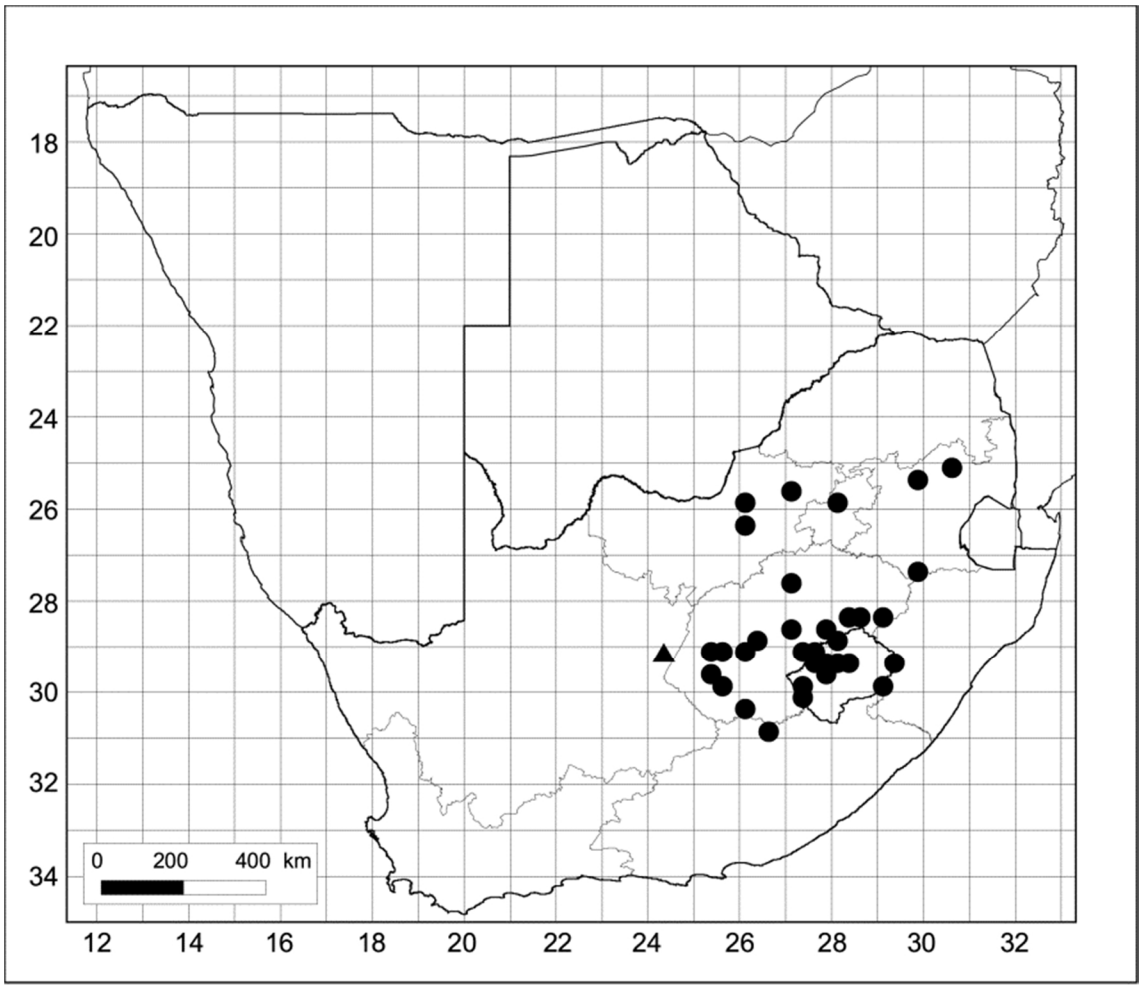

FIGURE 9. Known distribution of *Trachyandra asperata* var. *basutoensis*, ●. New localities, ▲. Specimens housed at PRE and NBG.