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Pilbara, a new genus of Asteraceae (tribe Astereae) from Western Australia

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Abstract

Lander, N.S. *Pilbara*, a new genus of Asteraceae (tribe Astereae) from Western Australia. *Nuytsia* 23: 117–123 (2013). A new monotypic composite genus endemic to the Hamersley Range of Western Australia is described and the new species *Pilbara trudgenii* Lander is illustrated and mapped. Its affinities within the tribe Astereae Cass. are discussed. The new species is an obligate lithophyte.

Introduction

Surveys of the extensive Banded Iron Formation ranges of the Pilbara region of Western Australia in recent years have discovered a significant number of plant species new to science. Amongst them is *Pilbara* Lander, the new genus and species described here, discovered in 1985 by Colma Keating and Malcolm Trudgen, east of Paraburdoo in the Pilbara region of Western Australia.

Pilbara appears best placed in the tribe Astereae Cass. which are mostly characterised by their ecaudate, ecalcarate anther bases (though a few genera have caudate anther bases), totally separated stigmatic lines of the style, and short to elongate and deltate-triangular stylar appendages that are glabrous adaxially and with sweeping-hairs abaxially (Nesom & Robinson 2007: 284–285; Brouillet *et al.* 2009: 589).

Within the Astereae, *Pilbara* appears to belong to the subtribe Grangeinae Benth. in the Nesom and Robinson (2007) classification where it seems to be closest to the Australian genus *Erodiophyllum* F.Muell. This is further discussed below.

Methods

The descriptive terminology used in this paper follows Radford (1986). For more specific terms applied to the Asteraceae I have followed Jeffrey (2007).

The map was prepared using the program DIVA-GIS 7.5 (Hijmans *et al.* 2011). Distribution is summarised in terms of the Interim Biogeographic Regionalisation for Australia (IBRA 6.1) established by Environment Australia (2000, revised 2004).

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Taxonomy

Pilbara Lander, *gen. nov.*

Aromatic shrubs. Vestiture of vegetative parts comprising multicellular, biseriate, capitate glandular trichomes. Leaves alternate, clasping. Capitulescences corymbiform. Heads homomorphic, discoid, homogamous, pedunculate. Receptacles strongly convex, paleate; paleae similar to the inner involucral bracts. Disc florets many, tubular, hermaphrodite; anthers ecaudate and ecalcarate basally, with triangular sterile apical appendages; stylar arms with stigmatic lines separate and triangular sterile appendages bearing minute sweeping-hairs. Achenes ellipsoid, sericeous with duplex hairs, 5-ribbed, carpopodium inconspicuous. Pappi uniseriate, with barbellate bristles *c.* half as long as the florets.

Type: *Pilbara trudgenii* Lander

The generic name refers to the region in Western Australia to which this taxon is endemic.

Pilbara trudgenii Lander, *sp. nov.*

Typus: east of Paraburdoo, Western Australia [precise locality withheld for conservation reasons], 24 October 1985, *C.D.M. Keating* 411 *& M.E. Trudgen* (*holo*: PERTH!, *iso*: AD!, DNA!, K!, NSW!).

Aromatic *shrub* to 0.6 m high, becoming straggling with age. *Vegetative parts* hispid; vestiture dense, with patent, multicellular, biseriate, capitate, glandular trichomes. *Stems* ascending; bark exfoliating, fissured and fibrous, mottled cream and grey becoming dark grey. *Leaves* alternate, crowded apically, ascending, clasping; petiole 3–12 mm long; lamina flat, narrowly to broadly ovate, obovate, elliptic or spathulate, 20–50 mm long × 7–32 mm wide, discolorous, abaxially pale yellow-brown, adaxially pale to mid-green, both surfaces pustulate; venation distinct, reticulate with prominent mid-vein; vestiture uniform, densely glandular with long capitate trichomes; texture herbaceous; base attenuate; margin double serrate, flat; apex acute, muticous. *Capitulescences* corymbiform. *Heads* pedunculate, discoid, 13–20 mm diam.; peduncle 4–20 mm long × 0.7–1.3 mm diam.; bracts several, grading into those of the involucre. *Involucre* broadly conic; bracts 3–5-seriate, pale to light green, 6.0–10.5 mm long × 0.4–1.5 mm wide, glandular with short and long capitate hairs and multicellular, uniseriate, simple eglandular hairs, entire; outer bracts flat, narrowly obovate, pale yellow, uniformly moderately to densely glandular, entire, acute to acuminate apically; inner bracts cymbiform, elliptic to very narrowly obovate, pale green to yellow, weakly to densely glandular abaxially, glabrous adaxially, entire, narrowly acute to acuminate apically. *Receptacle* strongly convex, paleate; paleae similar to the inner involucral bracts. *Disc florets* white, 44–53, infundibular, 8–10 mm long, with multicellular, biseriate, simple eglandular trichomes scattered basally to centrally; lobes 5, 2.0–2.6 mm long, acute; anthers 3.00–3.75 mm long, ecaudate, ecalcarate, acute basally, with triangular sterile apical appendages; filament collar 0.3–0.7 mm long; stylar arms 2.5–3.1 mm long × 0.5 mm wide, with stigmatic lines separate and triangular sterile appendages bearing minute botuliform to cylindric sweeping-hairs. *Achene* ellipsoid, 3.3–4.6 mm long × 0.9–1.5 mm wide, pale brown, uniformly densely sericeous with duplex hairs, 5-ribbed, obtuse basally, truncate apically; carpopodium inconspicuous, oblique. *Pappus* uniseriate, with 25–29 barbellate bristles *c.* half as long as the florets, often with a single short bristle. *Chromosome number* unknown. (Figures 1, 2)

Specimens examined. WESTERN AUSTRALIA [localities withheld for conservation reasons]: 24 Oct. 1985, *C.D.M. Keating* 419 *& M.E. Trudgen* (BM, MEL, PERTH); 29 Sep. 1998, *S. van Leeuwen* 4094 (AD, BRI, NSW, PERTH); 25 Sep. 1997, *M.E. Trudgen* 16000 (MEL, PERTH).

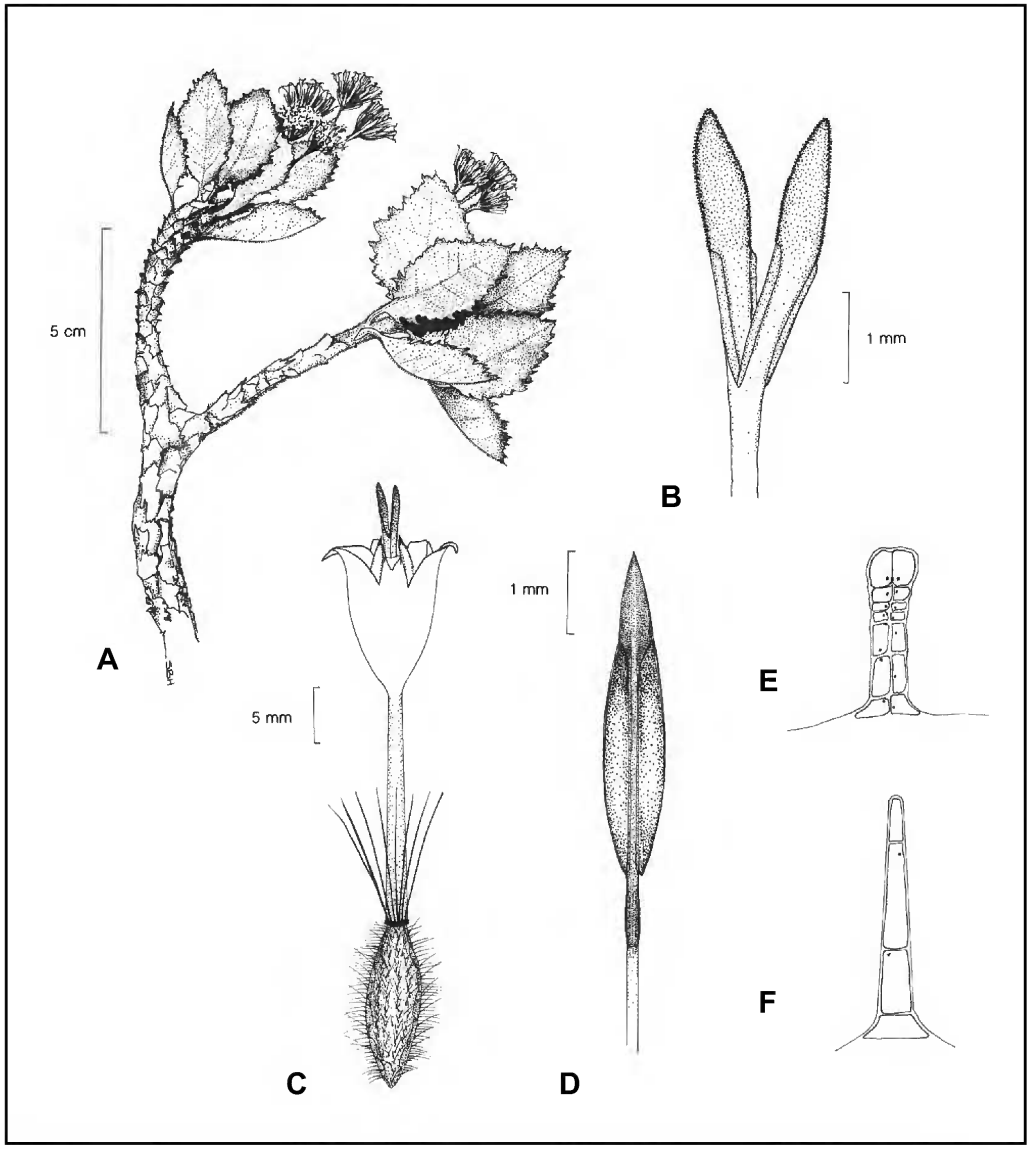

Figure 1. *Pilbara trudgenii*. A – flowering branchlet; B – stylar arms; C – tubular floret; D – anther; E – multicellular, biseriate, capitate, glandular hair; F – multicellular, uniseriate, simple eglandular hair. Scale bars = 5 cm (A); 1 mm (B); 5 mm (C); 1 mm (D). Drawn from *C.D.M. Keating* 411 & *M.E. Trudgen* (*holo*: PERTH).

Flowering period. October.

Distribution. Found in the southern central part of the Hamersley subregion (PIL3) of the Pilbara bioregion (PIL) in the Eremaean Botanical Province of Western Australia (Figure 3).

Habitat. In skeletal, red, stony soil on steep, scree slopes and in crevices on steep gully walls and cliff faces of massive banded ironstone amongst sparse subshrubs, tussock grasses and sedges (Figure 2). Thus *P. trudgenii* is an obligate lithophyte with little plasticity in its habitat preference of massive banded ironstone landforms.

Figure 2. *Pilbara trudgenii*. A – habitat and mature habit; B – juvenile habit; C – flowering head. Images: A – Stephen van Leeuwen (unvouchered); B, C – Emil Thoma (unvouchered).

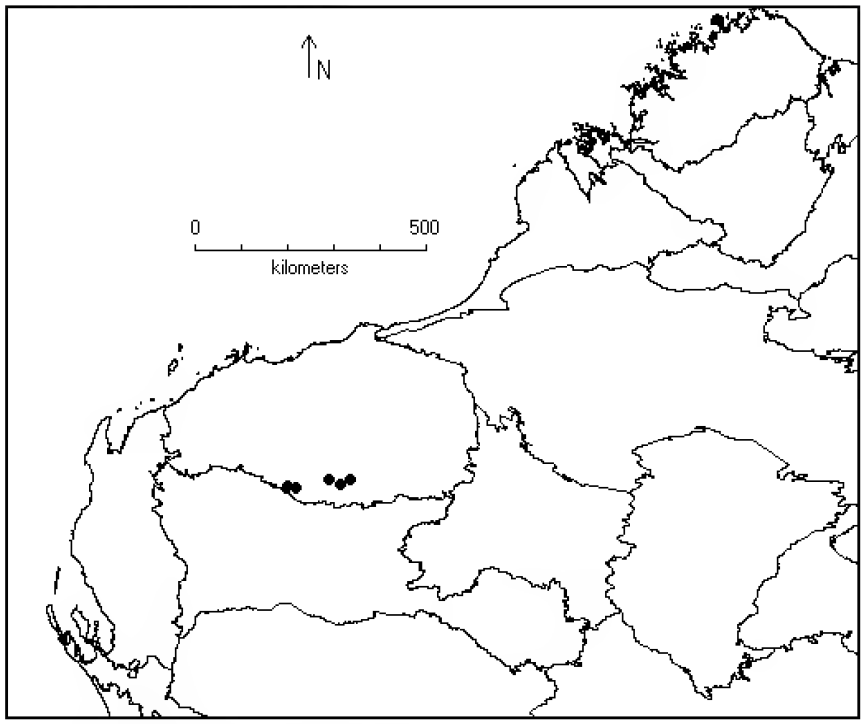

Figure 3. Distribution of *Pilbara trudgenii* in Western Australia.

Conservation status. Priority Two under the Department of Environment and Conservation's (DEC) Conservation Codes for Western Australian Flora (Smith 2012). This species is restricted to five small populations less than 130 km apart in an area where there are limited threats to its continued existence, although at least one population occurs within the footprint of a future iron ore mine. Two of the known populations are secure within Karijini National Park. At all sites combined there are at most only 160 individuals. It remains in need of further survey.

Etymology. The specific epithet honours botanist Malcolm Eric Trudgen (1951–), whose collections over many years have added so much to our knowledge of the flora of the Pilbara region. The Western Australian Herbarium currently holds over 8,300 of his specimens.

Notes. Other lithophytic species recorded in the Hamersley Range include *Astrotricha hamptonii* (Araliaceae), *Ptilotus mollis* (Amaranthaceae), *Olearia xerophila* (Asteraceae), *Pomax rupestris* (Rubiaceae), *Corymbia ferriticola* (Myrtaceae) and *Tetratheca fordiana* (Elaeocarpaceae).

Discussion

Within the Astereae, a number of characters place *Pilbara* within the subtribe Grangeineae, notably its homomorphic, discoid heads, involucral bracts lacking resinous veins, ecaudate anther bases, style bases not broadened basally, style appendages ± equal in length to the stigmatic lines and papillose, and pappus (or pseudo-pappus) with a single series of bristles.

Within the Grangeinae, only two other genera share the paleate receptacles observed in *Pilbara*, namely the northern and western African *Ceruana* Forssk. and the Australian *Erodiophyllum* (Nesom & Robinson 2007: 304). The following diagnostic key will serve to distinguish these three genera.

1. Heads in cymbiform capitulescenes with racemiform branches, disciform. Florets dimorphic: outer florets tubular, filiform, 4-lobed, estaminate; inner florets tubular, hermaphrodite, 5-lobed. Receptacles flat. Pappus of short, basally connate, bristle-like scales or setae ..... **Ceruana**

1: Heads solitary and terminal or in leafy, corymbiform capitulescences, radiate or discoid. Florets homomorphic (all tubular) or trimorphic (ligulate, reduced ligulate and tubular). Receptacles strongly convex to conical. Pappus of barbellate bristles or pseudopappus of minute, fused scales (pericarpic appendages)

2. Perennial herbs. Leaves pinnatisect. Heads solitary, terminal, radiate. Florets trimorphic: ligulate (estaminate), reduced ligulate (estaminate) and 220–307 tubular (pseudo-hermaphrodite, functionally male). Involucral bracts 1–2-seriate; outer bracts becoming obdurate throughout or cartilaginous basally, fused basally and sometimes marginally, and reflexed, sometimes forming spiny horns. Receptacular paleae 6–7-seriate, subtending reduced ligulate and outer series of tubular florets. Sterile anther appendages deltoid. Pseudopappus of minute scales (pericarpic appendages) fused to form a short, lobed collar ..... **Erodiophyllum**

2: Shrubs. Leaves entire. Heads in leafy, corymbiform capitulescences, discoid. Florets homomorphic: 44–53, tubular (hermaphrodite). Involucral bracts 3–5-seriate, herbaceous throughout; outer bracts not forming spiny horns. Receptacular paleae subtending all florets. Sterile anther appendages triangular. Pappus of barbellate bristles ..... **Pilbara**

Although they do not propose a new classification of the Astereae, Brouillet *et al.* (2009) present an ITS-based phylogeny of the tribe which identifies a number of lineages at variance with the classification of Nesom and Robinson (2007). In particular, they find the Grangeinae to be a monophyletic group of African and south Asian genera which does not include Australasian or American elements. Their analysis suggests a number of Australasian lineages, amongst them a lineage (4) which groups *Erodiophyllum* with *Calotis* R.Br., the latter placed in the subtribe Brachyscominae G.L.Nesom by Nesom and Robinson (2007). Both these genera have a base chromosome number of x=8 (Watanabe *et al.* 1996, 2006) and both have achenes with a pseudopappus of pericarpic awns.

Vegetatively, *P. trudgenii* displays a superficial resemblance to *Olearia xerophila* (F.Muell.) Benth. (also a lithophyte, and found in the Pilbara region) from which it is readily distinguished by its paleate rather than epaleate receptacles and its discoid rather than radiate heads.

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