References: Jacobsen (1986), Eggli (2002c).

Phytolacca dioica (Fig. 327, 328, 329) is native to South America and introduced elsewhere as an ornamental tree. It is also much used as a shade tree, hence its common names. The Afrikaans names are a corruption of 'belle ombre' (French) or 'bella sombra' (Spanish), meaning beautiful shade. It is widely cultivated in eastern South Africa around homesteads and trading stores (Von Ahlefeldt *et al*., 2003). The plant is also visited by honeybees and provides fodder and fruits (Fig. 330) which are locally eaten or made into jams but they have also been reported in the literature as being poisonous (Orwa *et al*., 2009). Seeds, leaves and roots contain saponins (Van Wyk *et al*., 2002). The leaves and fruits have been used as a purgative.

Phytolacca dioica is aggressive in gardens, with root suckers appearing above the soil and the thick fleshy roots growing to a great size, often damaging walls and pavements. Its appearance gave rise to the name 'elephant tree' by which the tree is also known (Jacobsen, 1986). In South Africa this species was classified in Category 3: a declared invader (ornamentals) and no new planting, trade or propagation is permitted (AGIS, 2006).

Phytolacca dioica was reputedly introduced into South Africa by Baron von Ludwig of Cape Town around 1845 (Smith, 1966). It is now found growing wild in savanna, fynbos, coastal bush and riverbanks where it competes with indigenous species. It is naturalised in Botswana, Namibia, Swaziland and South Africa.

Fig. 327. *Phytolacca dioica* L.
(Picture by Neil R. Crouch)

Fig. 328. Female flowers of *Phytolacca dioica* L. (Picture by Geoff R. Nichols)

Fig. 329. Male flowers of *Phytolacca dioica* L. (Picture by Geoff R. Nichols)

Fig. 330. Fruits of *Phytolacca dioica* L. (Picture by Neil R. Crouch)

PORTULACACEAE Juss.

(Purslane family; *Porseleinfamilie*)

by

M. Walters and E. Figueiredo

Annual or perennial herbs, usually succulent and mucilaginous, with fibrous to tuberous roots, sometimes minute and ephemeral; stems herbaceous to somewhat succulent, rarely woody, or very succulent, sometimes articulated; nodes sometimes with scales and/or hairs in complete whorls around the nodes. **Leaves** alternate (sometimes opposite), linear to obovate, flat to terete, sessile, succulent, glabrous (rarely tomentose); axils appearing naked or often with scales or short to long hairs sometimes almost completely enveloping the leaves. **Inflorescence** terminal, much congested and head-like, surrounded by 2–several involucral leaves, rarely an open cyme. **Flowers** sessile or pedicellate, fugaceous, developing in succession and open only for a short time in sunny or inclement weather. **Sepals** 2, ovate-triangular, united at base. **Petals** (4–)5(–8), very shortly connate, united basally to the sepals, delicate and usually showy with bright colours, white, yellow, red, pink to violet, orange and usually somewhat glossy. **Stamens** 4–ca. 100; filaments glabrous or hairy; anthers dorsifixed. **Ovary** semi-inferior with (4–)5–8 carpels, 1-locular, at least in the upper part, with many ovules; style simple, long filiform; stigma with 2–many lobes, often brightly coloured. **Fruit** a circumscissile capsule with a persistent basal part, the brittle top forming an operculum often covered with the collapsed dry perianth. **Seeds** usually numerous, reniform to rounded, 0.3–3 mm long, smooth or with intricate stellate pattern, sometimes with tubercles or short to long spines, yellow, brown to black or grey, often iridescent.

The Portulacaceae is a family containing only the genus *Portulaca* L. (incl. *Lamia* Endl., *Lemia* Vand., *Merida* Neck. and *Sedopsis* Exell & Mendonça) consisting of c. 100 species that are distributed throughout the tropics and subtropics but very rare in temperate regions (Nyffeler & Eggli, 2010). This family was until recently considered to be much larger with 20–30 genera and around 500 species (depending on family circumscription) (Packer, 2004), but has since been split into four families of which the Talinaceae and Montiaceae (long disused families), and Anacampserotaceae (a newly created family) are the others (Nyffeler & Eggli, 2010; Ocampo & Columbus, 2010). Members of this family can easily be distinguished from other members of the Portulacineae by the contracted head-like inflorescences and the operculate capsules (pyxidia) (Nyffeler & Eggli, 2010).

The family has some economic importance with certain species popular as garden ornamentals due to their bright flowers (particularly *Portulaca grandiflora* Hook. and cultivars selected from it) that may even be variously coloured within the same species (Eggli, 2002d). *P. oleracea* L. is an edible plant that has, as a result of its past popularity, become a weed throughout the tropics and sub-tropics (Eggli, 2002d; Smith & Figueiredo, 2010).

Only two species in the Portulacaceae are naturalised in southern Africa.

Portulaca L.

Genus description as for the family.

Portulaca is a cosmopolitan genus that includes several species that have become cosmopolitan weeds. The total number of species in the genus is a matter of controversy due to the existence of different genus treatments. Estimates range between c. 40–100 species (Eggli, 2002d; Mabberley, 2008). Almost all species are very variable and many are self-pollinating, resulting in a variety of different forms, which make classification rather difficult (Eggli, 2002d).

The genus includes some ornamental species such as *Portulaca grandiflora* (see under family description) and potherbs or salad greens such as purslane (*P. oleracea*), which also has medicinal uses and is a common weed throughout the tropics and subtropics (Eggli, 2002d; Mabberley, 2008).

In southern Africa the genus is represented by c. 10 species (Klopper *et al*., 2006). Two of these species are confirmed to be introduced and can be easily distinguished from the others.

Key to the two species of *Portulaca* naturalised in southern Africa:

1. Very large, variously coloured flowers (petals 1.5–3 cm long, sometimes double). Stamens 40–80. Leaves linear-terete ….. **1. *Portulaca grandiflora***

1'. Much smaller, yellow flowers (petals up to 8 mm long). Stamens up to 12. Leaves obovate-spathulate . . . . . **2. *Portulaca oleracea***

1. *Portulaca grandiflora* Hook.

In: *Botanical Magazine* 56: pl. 2885 (1829).

Common names: eleven-o'clock, moss-rose, moss-rose purslane, portulaca, rose moss, sun plant (English); potjielekkers (Afrikaans).

Annual or short-lived perennial herbs with procumbent or ascending stems up to 30 cm long, mostly branching from near the base. **Leaves** alternate, spreading, blade linear to lanceolate, terete to semi-circular in cross section, 10–30 × 2–3 mm, acute or subacute; axillary hairs few to abundant, whitish-woolly, in shaggy tufts up to c. 7 mm long. **Flowers** in terminal clusters of 3–5, surrounded by 8–10 involucral leaves larger than the stem leaves, enclosing woolly hairs. **Flowers** very large, 2.5–4 cm wide. **Sepals** 6–8 mm long. **Petals** 5 or more, obovate, rounded, 15–30 mm long, mostly bright magenta-pink in the original form or pink, red, purple, white, orange or yellow in the horticultural form. **Stamens** 40–80. **Stigma** 5–9-branched, whitish. **Fruit** a capsule 4–6.5 mm long, transversely dehiscent near the middle. **Seed** reniform, orbicular or elongate, 0.75–1 mm long, iridescent grey-black to black, mostly with stellate testa cells. **Distribution**: SA. (Fig. 331).

Reference: Eggli (2002d), Matthews (2004).

This is a species from South America (Uruguay and Argentina) where it prefers

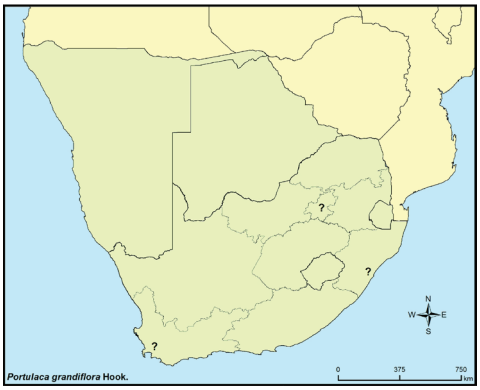

Fig. 331. Distribution map of *Portulaca grandiflora* Hook.

sandy soils and shows uniform pink-magenta flowers across most of its range in Argentina, with only a few plants displaying irregular flower colour. The plant commonly grown in gardens for its colourful flowers [sometimes double-flowered (Fig. 332) or multicoloured (Fig. 333)], was selected from this taxon (Eggli, 2002d; Rowley, 2010) and is now widespread in warmer parts of the world as a garden subject.

Fig. 332. *Portulaca grandiflora* Hook. with double flowers. (Picture by Gideon F. Smith)

Fig. 333. *Portulaca grandiflora* Hook. with single flowers. (Picture by Geoff R. Nichols)

Portulaca grandiflora has escaped from gardens and is recorded as naturalised in South Africa (Klopper *et al*., 2006).

No uses, beyond its horticultural value, are recorded for this species in southern Africa. Elsewhere it is used medicinally for, amongst others, hepatitis, pharyngeal pain, burns and snake bites (Plants for a Future, 2008). The leaves were used as salad greens by the Native Americans and the seeds were ground up and made into bread (Yanovsky, 1936).

2. *Portulaca oleracea* L.

In: *Species Plantarum* 1: 445 (1753a).

=*Portulaca oleracea* L. subsp. *sylvestris* (DC.) Thell.
=*Portulaca oleracea* L. var. *oppositа* Poelln.

Common names: common purslane, pigweed, purslain, purslane, pusky, wild purslane (English); beesporselein, bobbejaandraad, misbredie, porselein, porslein, postelein, rooipootjiepors(e)lein, snotterbel, varkbossie, varkkos (Afrikaans); Rapunzelsalat [German, Namibia; note that in Germany this name refers to species of *Valerianella* and *P. oleracea* is there called 'Sommerportulak' or 'Gemüse-Portulak' (U.Eggli, *pers. comm*.)]; ojitandavare (Herero); bobo (Kung San); oshimhelewene (Kwanyama); solele (Sotho); silele (Swati); makhulu-wa-luvhisi (Venda); ingwanitsha (Xhosa); amadilika, ilenjane, isilate, isilele (Zulu).

Annual herbs with spreading or prostrate stems up to 40 cm long, up to 5 mm in diameter, thickly succulent, sometimes with purplish tinge; taproot 2–10 cm. **Leaves** alternate (subopposite on branchlets), succulent, sessile or with petiole 1–3 mm long, obovate-spathulate, flattened, up to 4(–6) × 2(–2.5) cm, apex rounded to truncate, green sometimes tinged purplish; axillary hairs inconspicuous, up to 1 mm long, caducous. **Flowers** terminal, 1–5(–30), surrounded by c. 4 involucral leaves and an inner whorl of triangular scales, opening in the morning, self-pollinating in bud. **Sepals** broadly ovate, keeled or slightly winged, 8 × 8 mm. **Petals** (4–) 5, obovate-oblong to obovate, emarginate to bilobed, 3–8 mm long, yellow. **Stamens** 7–12 (–15). **Ovary** ovoid; style short; stigma 3–6-branched. **Fruit** a capsule, obovoid to ovoid, c. 4 × 3 mm in diameter, enveloped in the marcescent corolla, transversely dehiscent across the middle or higher, operculum conical, the apical portion retaining 1–more seeds. **Seeds** many, orbicular-reniform, 0.5–1 mm in diameter, verrucose-granulate, usually glossy, black. **Distribution**: L, N, S, SA. (Fig. 334)

References: Eggli (2002d), Phillips (2002), Matthews (2004).

Portulaca oleracea (Fig. 335, 336, 337) is a highly variable species, a polyploid complex, that has been divided into several subspecies on the basis of seed size and ornamentation (see for example Von Poellnitz, 1934). The cultivated form, sometimes called subsp. *sativa* (Haw.) Celak, but better referred to as a cultivar, is distinguished by its larger seeds (more than 1 mm long) (Phillips, 2002).

The Afrikaans common name ‘porselein’ (and its derivations) is a corruption of the Dutch ‘purslaan’ (Rood, 1994a). Interestingly, ‘porselein’ is the Afrikaans word for ‘ceramic’ and refers to the shiny leaf surfaces of the plants. Other Afrikaans names refer to properties of the plant, for example ‘varkkos’ [fodder, feed (kos) for pigs (varke)], ‘snotterbel’ [hanging (bel of) nose mucus, because of the slimy consistency of the plant when boiled] and ‘rooipootjiepors(e)lein’ [for the red (rooi) stems (pootjie=little leg)] (Smith, 1966; Smith & Figueiredo, 2010).

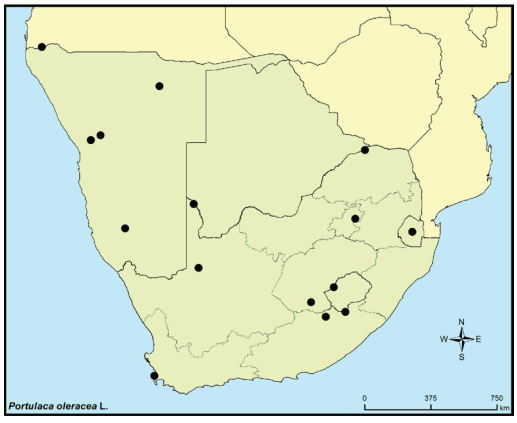

Fig. 334. Distribution map of *Portulaca oleracea* L.

Purslane is eaten as a vegetable throughout southern Africa (Rood, 1994a; Von Koenen, 2001), the leaves of the young plants are usually cooked or used as an ingredient in salad. The seed is also edible and can be made into flour and porridge (Yanovsky, 1936). The plant is one of the most widely used medicinal plants, and has been used in folk medicine since ancient times (Rood, 1994b; Smith & Figueiredo, 2010). It is also used as livestock fodder.

Portulaca oleracea was introduced from Europe to South Africa for its value as an antiscorbutic (against scurvy). Scurvy is a consequence of lack of vitamin C, which affected many sailors after spending months at sea with an inadequate diet (Smith & Figueiredo, 2010). *P. oleracea* was planted in ports of call for vessels sailing east around the Cape to supply them with this supplement. In 1811 it was recorded as occurring wild at Asbestos Mountains (Afrikaans: Asbesberge) in the Northern Cape Province, by the early traveling explorer, William Burchell (Rood, 1994b). It is thought that it was spread to the interior by cattle. It is a weed of fields and disturbed localities, and also occurs in open grassland and bushveld, from sea-level up to an altitude of 2 400 m (Smith & Figueiredo, 2010).

It generally perpetuates itself by reseeding. The seed is easily dispersed by water and wind. Stem fragments also root easily after being cut. Uprooted plants left on the ground will also re-root (Smith & Figueiredo, 2010).

Although purslane is often listed as one of the world's worst weeds it is considered by some as innocuous because of its shallow rooting and because it is a nutritious leafy vegetable that can be easily collected and used (Smith & Figueiredo, 2010; Matthews, 2004). It rarely becomes established in heavily mulched beds, and mulch placed over it will smother plants and prevent seed from germinating (Smith & Figueiredo, 2010).

Fig. 335. *Portulaca oleracea* L. (Picture by Neil R. Crouch)

Fig. 336. Flower of *Portulaca oleracea* L. (Picture by Neil R. Crouch)

Fig. 337. Fruit of *Portulaca oleracea* L. (Picture by Neil R. Crouch)

TALINACEAE Doweld

(Flameflower family; *Vlamblomfamilie*)

by

M. Walters and E. Figueiredo

Dwarf shrubs, rarely small caudiciform trees, often with tuberous roots or rootstock. **Leaves** alternate, sometimes clustered on short shoots, flat, sometimes assymetrical, mucilaginous, slightly succulent, apex variable, entire (rarely papillate or ciliate), sometimes deeply revolute, glabrous or tomentose. Axils usually with rudimentary axillary short shoot (though appearing naked). **Inflorescence** a terminal or lateral panicle or flowers solitary from leaf axils, open to compact. **Flowers** small to medium sized, bisexual, sometimes dioecious (rarely gynodioecious), actinomorphic. **Sepals** 2, deciduous or persistent when fruiting. **Petals** usually 2–5 but if fewer than 5 then not clearly separated from sepals. **Stamens** 15–35, sometimes attached to a nectar disc. **Ovary** superior, 1-locular, with 3–5 carpels. **Fruits** a mucilaginous berry or many-seeded loculicidal capsule with persistent perianth, dehiscent from the top and/or bottom with valves deciduous. **Seed** mostly black (rarely dark grey), glossy with a strophiola.

References: Nyffeler & Eggli (2010).

As with the Montiaceae, this family was until recently considered part of the Portulacaceae, which has since been split into four families of which the Talinaceae (a long disused family) is one. The others are Portulacaceae (now only containing *Portulaca*), Anacampserotaceae (a newly created family), and Montiaceae (a long disused family) (Nyffeler & Eggli, 2010; Ocampo & Columbus, 2010). The Talinaceae now includes 3 genera (*Amphipetalum* Bacigalupo, *Talinella* Baill. and *Talinum* Adans.) and c. 28 species (Nyffeler & Eggli, 2010).

The Talinaceae is found in Madagascar (the genus *Talinella* being endemic), America and Africa, with two species [*Talinum paniculatum* (Jacq.) Gaertn. and *T. triangulare* (Jacq.) Willd.] being pantropical weeds (Applequist, 2005; Nyffeler & Eggli, 2010).

Only one exotic species from the family Talinaceae is naturalised in southern Africa.

Talinum Adans.

Perennial herbs or subshrubs with tuberous, fleshy to woody roots. Stems simple or branched, sometimes shrubby. **Leaves** alternate, rarely subopposite or in basal rosette, succulent or semi-succulent, broadly planate, entire, articulate at the base, petiole short or leaf subsessile, not clasping with attachment points round. Axils naked or with scale-like prophylls, often in pairs. **Inflorescence** a terminal or axillary cyme, panicle or raceme, sometimes a panicle that can be reduced to axillary flowers, peduncle short to elongate, few–many flowered. **Flowers** pedicellate. **Sepals** 2, deciduous or persistent, distinct. **Petals** mostly 5 (rarely more), free or united at the base, distinct, fugaceous. **Stamens** 15–35, anthers 2-locular, oblong. **Ovary** with

many ovules; stigma 1–3-lobed. **Fruit** a capsule, 3-valved (rarely 5), with the valves wholly or partly deciduous, tardily dehiscent from the apex, erect. **Seeds** many, circular-reniform, ± compressed, minutely tuberculate or striolate, black.

References: Gilbert (1993), Kiger (2003), Nyffeler & Eggli (2010)

Talinum is a genus with c. 15 species (in this treatment excluding the genus *Phemeranthus* Raf. which has been transferred to Montiaceae) (Nyffeler & Eggli, 2010). It is distributed mostly in the Old World, with few species in North and South America (Eggli, 2002e) and five species indigenous to southern Africa (Jordaan, 2000a). The genus includes some species cultivated as ornamentals. *T. triangulare* is also cultivated as a pot-herb and used medicinally for illnesses ranging from stomach trouble and oedema to kidney problems (Burkill, 1985b). It is naturalised in other parts of Africa but it has not been recorded in southern Africa.

Six species of *Talinum* occur in southern Africa, of which one is introduced (Germishuizen *et al*., 2006). Several indigenous species are eaten or used medicinally in South Africa, Botswana, Swaziland and Namibia (Fox & Norwood Young, 1982; Von Koenen, 2001; Arnold *et al*., 2002) while the introduced one is used medicinally in South Africa and Swaziland (Arnold *et al*., 2002).

Talinum paniculatum (Jacq.) Gaertn.

In: *De Fructibus et Seminibus Plantarum* 2: 219 (1791).

=*Portulaca paniculata* Jacq.

Common names: flameflower, jewels of Opar, pink baby-breath (English).

Annual or perennial herbs 0.3–1.5 m high, glabrous, with fleshy, elongate, tuberous, branched roots and succulent stem; stems simple or sparsely branched basally, semi-woody, sometimes reddish, thin. **Leaves** alternate, simple, sessile or with a petiole up to 15 mm; blade elliptic to obovate or obovate-lanceolate, up to 3–12 × 1.5–5 cm, basally cuneate, apex acute, margins rarely revolute. **Inflorescence** terminal, paniculate, up to 60 cm long, sometimes nodding, with many small flowers maturing at different times, so that at one time the plant has both flowers and fruits. **Flowers** bisexual, actinomorphic, c. 1 cm in diameter, probably self-pollinating, opening towards evening. **Sepals** ovate to suborbicular, deeply concave, 1–2 mm long, deciduous. **Petals** 5, obovate to suborbicular, apex rounded (rarely obtuse), 3–6 mm long, usually pink or reddish-purple, sometimes yellow or white. **Stamens** 15–20. **Ovary** ovoid, 1-locular, green; stigmas 3. **Fruit** a capsule, subglobose, 3–5 mm long, 3-valved, papery, many-seeded. **Seed** lenticular to reniform, c. 1 mm in diameter, smooth or tuberculate, shining black. **Distribution**: S, SA. (Fig. 338)

References: Steyn & Smith (2001), Eggli (2002e), Phillips (2002), Dequan & Gilbert (2003), Kiger (2003).

In the checklist of South African Plants (Germishuizen *et al*., 2006) this species is mistakenly listed as indigenous while *Talinum portulacifolium* (Forssk.) Asch. ex Schweinf. is listed as naturalised in South Africa. It is, of course, the other way

round. The two species are distinguished by the 1–few-flowered lateral cymes of *T. portulacifolium*, as opposed to the many-flowered *T. paniculatum* (Fig. 339, 340, 341), as well as the larger flowers (2–2.5 cm wide) and capsules (6–7 mm long) of *T. portulacifolium* (Eggli, 2002e) and smaller size of flowers (1 cm across) and capsules (3–5 mm long) of *T. paniculatum.* The other *Talinum* species in the region have yellow flowers.

Talinum paniculatum is a native of tropical America, now a pantropical weed and probably the most widespread taxon in the genus (Eggli, 2002e). In southern Africa it is naturalised in Swaziland and South Africa (Germishuizen *et al*., 2006). It is cultivated as a vegetable in West Africa (Burkill, 1985b) and used medicinally in South Africa (Arnold *et al*., 2002).

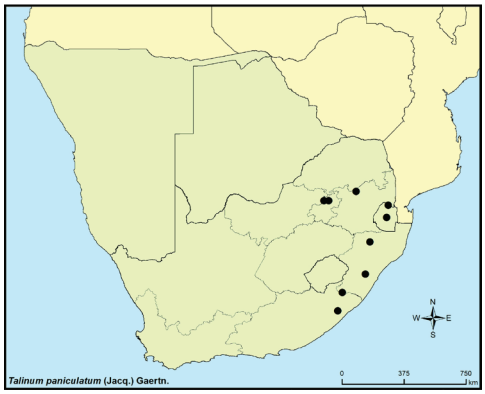

Fig. 338. Distribution map of *Talinum paniculatum* (Jacq.) Gaertn.

Fig. 339. Inflorescence of *Talinum paniculatum* (Jacq.) Gaertn. (Picture by Neil R. Crouch)

Fig. 340. Flowers of *Talinum paniculatum* (Jacq.) Gaertn.
(Picture by Neil R. Crouch)

Fig. 341. Fruits of *Talinum paniculatum* (Jacq.) Gaertn
(Picture by Neil R. Crouch)

The flameflower is a highly variable species and sometimes plants with different flower colour can be found close together (Eggli, 2002e). It grows easily from pieces of root (Fig. 342) in disturbed areas such as roadsides and cultivated lands (Fig. 343, 344) (Burkill, 1985b) as well as escaping from gardens to shaded and wet areas (Dequan & Gilbert, 2003).

Fig. 342. Root of *Talinum paniculatum* (Jacq.) Gaertn. (Picture by Neil R. Crouch)

Fig. 343. *Talinum paniculatum* (Jacq.) Gaertn. invasion. (Picture by Pieter J.D. Winter)

Fig. 344. *Talinum paniculatum* (Jacq.) Gaertn. invasion. (Picture by Geoff R. Nichols)

URTICACEAE Juss.

(Nettle family; *Brandnetelfamilie*)

by

N.R. Crouch

Herbs, shrubs, or rarely lianas or trees, without latex; stems often fibrous, sometimes succulent and/or armed with stinging hairs, often with cystoliths. **Leaves** simple, opposite or alternate; stipules present, sometimes conspicuous. **Inflorescence** a panicle, spike, raceme or cymose cluster. **Flowers** unisexual (plants dioecious or monoecious), small to minute, actinomorphic, usually wind pollinated. **Perianth** segments rarely absent, normally (1–)4–5-merous, free or united. **Male flowers:** stamens as many as perianth segments and opposite to them, incurved in bud, straightening to an exserted position; anthers 2-locular, dehiscing explosively when mature. **Female flowers:** perianth lobes free or connate; ovary superior, 1-locular; ovule 1, basal; style simple or absent; stigma diverse. **Fruit** an achene or sometimes a fleshy drupe, sometimes enclosed in the persistent perianth.

References: Walker (2002), Chen *et al*. (2003).

A family of c. 47 genera and 1 300 species, mostly numerous in wet tropical regions, extending into temperate regions (Chen *et al*., 2003). Only four genera in the family are considered (borderline) succulent: *Obetia* Gaudich., *Laportea* Gaudich., *Sarcopilea* Urban and *Pilea* Lindl. (Walker, 2002).

Plants in this family have numerous uses, with the stem fibers of some genera and species being of high quality and used to make cloth, ropes and fishing nets. In central and southern China, *Boehmeria nivea* (L.) Gaudich. is widely cultivated for ramie fiber (Chen *et al*., 2003). Elsewhere a few species of *Urtica* L. and *Laportea* are similarly sourced for their fibres (Walker, 2002). At least historically in South Africa, *Obetia tenax* (N.E.Br.) Friis has been harvested for its high quality bark fibres (Crouch & Smith, 2000). The leaves of this species are also cooked as a vegetable by the Zulu, much as the young shoots of *Girardinia* Gaudich., *Laportea*, *Urtica* and *Pilea* are boiled and eaten as vegetables (pot herbs) (Boufford, 1997; Chen *et al*., 2003). Various species of *Pellionia* Gaudich. and especially *Pilea* are widely cultivated as ornamentals.

The cystoliths characteristic of this family produce distinctive patterns on epidermal surfaces that are highly diagnostic (Boufford, 1997).

A single species of Urticaceae is naturalised in southern Africa, arguably the most succulent family member.

Pilea Lindl.

Annual or perennial herbs without stinging hairs, monoecious, or dioecious by abortion; stems simple or branched, often succulent. **Leaves** opposite, equal or unequal in pairs, petiolate or subsessile; blade herbaceous or succulent, entire or

dentate, 1 or 3-veined, cystoliths linear; stipules intrapetiolar, completely connate. **Inflorescence** unisexual or bisexual, solitary or in pairs, axillary, dense subsessile cyme; bracts small. **Male flowers**: perianth lobes 3, equal, with dorsal horn-like appendage; stamens 3, filaments inflexed in bud; rudimentary ovary sometimes present. **Female flowers**: perianth lobes 3, unequal, in fruit enlarged, often boat-shaped with a horn-like corniculate appendix near apex; staminodes 3, opposite perianth lobes, scale-like, minute or inconspicuous, in fruit enlarged and under tension, reflexing to eject the mature achene; ovary straight, ovule orthotropous, stigma sessile, shortly penicillate. **Fruit** a sessile achene, laterally compressed, ovate to orbicular, smooth, not or only partly enclosed by persistent perianth. **Seed** thin coated, cotyledons large, scarcely any endosperm.

References: Jordaan (2000b), Friis & Immelman (2001), Chen *et al*. (2003).

Pilea is a member of the tribe Lecantheae (=Procrideae) which characteristically does not possess stinging hairs, and has female flowers with 3-merous perianths and paintbrush-like stigmas (Walker, 2002). The genus has not attracted monographic attention since Weddell (1869), with the result that conservative estimates for the number of valid species range widely, from 250 to 400 (Jordaan, 2000b; Chen *et al*., 2003; Monro, 2006). Accordingly, it is the largest genus in the family Urticaceae and one of the larger genera in the Urticales and eudicot rosids. *Pilea* is widespread in the tropics and subtropics, and some warm temperate regions, although not naturally in Australia or New Zealand. Many of the taxa are highly localised, with a centre of diversity in the American tropics (West Indies) hosting c. 180 species (Walker, 2002). The seeds of several species are ejected forcefully through the catapult-like action of the enlarged inflexed staminodes (Walker, 2002).

Most genus members are semi-succulent, shade-loving herbs or shrubs, which are easily distinguished from other Urticaceae by the combination of opposite leaves (with rare exceptions) with a single ligulate intrapetiolar stipule in each leaf axil and cymose or paniculate inflorescences (again with rare exceptions). *Pilea* is of little economic importance, with only a few of its species of minor horticultural importance.

The genus name is derived from Latin *pileus*, “felt cap”, referring to the calyx covering the achene of the type species.Its common names derive from the fact that the anthers explosively discharge, releasing a cloud of pollen.

Key to indigenous (*Pilea rivularis* Wedd.) and naturalised species of *Pilea* occurring in southern Africa:

1. Margin of blade entire; leaves, including petiole, less than 1 cm long, succulent . . . . . ***Pilea microphylla***

1’. Margin of lamina with 10–11 pairs of teeth; leaves, including petiole, greater than 7.5 cm long, herbaceous . . . . . .(***Pilea rivularis***)

Pilea microphylla (L.) Liebm.

In: *Kongel Danske Vidensk. Selsk. Naturvidensk. Math. Afh. Ser.* 5(2): 296 (1851).

=*Parietaria microphylla* L.
=*Pilea callitrichoides* (Kunth) Kunth
=*Pilea muscosa* Lindl.
=*Pilea muscosa* Lindl. var. *microphylla* (L.) Wedd.
=*Pilea trianthemoides* (Sw.) Lindl. var. *microphylla* (L.) Wedd.
=*Urtica callitrichoides* Kunth
=*Urtica microphylla* (L.) Sw.

Common names: artillery fern, artillery plant, gunpowder plant, lace-plant, pistol plant, rockweed (English).

Monoecious (sometimes dioecious) annual or short-lived perennial herb, 4–30(–50) cm high, usually much branched and forming mats, glabrous, pale green; stems succulent, sometimes slightly woody at base, freely branching, up to 2.5 mm diameter, usually ± erect, rarely prostrate or pendent. **Leaves** crowded, small, opposite, anisophyllous; petiole 0.5–6 mm long; blade broadly obovate to oblanceolate, elliptic or circular, 1–15 × 0.5–4 mm, base rounded to cuneate, apex rounded to bluntly obtuse, margin entire to slightly crenulate, lateral veins above obscure so leaves appear 1-veined, upper surface transversely striate with linear cystoliths, lower surface finely reticulate; stipules minute, up to 1 mm long, caducous. **Inflorescence** very small, subsessile, cymose-capitate, 1–2 clusters together in the leaf axils, usually androgynous with few male and 5–10 female flowers (or entirely with female flowers). **Flowers** subsessile, 0.5–0.8 mm long (male flowers usually longer). **Perianth** 3-merous; segments subequal in male flowers and with 1 long and 2 short lateral segments in female flowers, glabrous, with a blunt, dorsal, apiculate appendage. **Fruit** an achene, ovoid, 0.5–0.8 mm long, slightly exceeding the persistent perianth segments, smooth, brown. **Distribution**: SA. (Fig. 345)

References: Friis (1989), Walker (2002).

This species is native to southern Florida (USA), Mexico south to tropical South America, and various Caribbean islands, but widely naturalised in Asia, the Balkans, and on tropical Pacific Islands such as Hawaii. It is widely distributed as a garden weed in Africa in coastal zones and some localities inland (Friis, 1989, map 16; Friis, 1991; Burkill, 2000). Its dispersal has been through the agency of humans, who have cultivated plants of this species (Burkill, 2000). Forms of this species vary considerably in size, with the small form found particularly common on walls and along paved pathways.

This species has been recognised as a widespread complex in need of further study. Additionally, several horticultural variants have been developed (Walker, 2002). Different forms appear better adapted to becoming weeds, or occurring naturally in a wide range of habitats. In southern Africa it is one of the smallest forms (Fig. 346) that has become weedy in character. This entity is mat-forming,

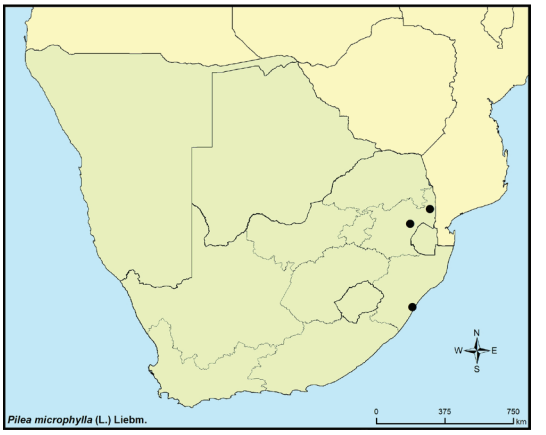

Fig. 345. Distribution map of *Pilea microphylla* (L.) Liebm.

prostrate or creeping, with anisophyllous leaves c. 3 × 2 mm and 1.75 × 1.25 mm respectively (Friis & Immelman, 2001), and inconspicuous flowers (Fig. 347). Although larger forms (Fig. 348) are popular bedding plants—including red-foliaged and variegated forms (Nelson & Scannell, 1989)—these do not appear to have escaped.

This species is unlikely to be confused with the only other species of *Pilea* in our region, nor likely with any other succulent species for that matter. Only one other *Pilea* is native to southern Africa—*P. rivularis* from eastern South Africa—but this taxon is not succulent, and easily separated using the key above. Several other genus representatives have been introduced as horticultural subjects but these are very different in size and vegetative form. Amongst these are the aluminium plant from Vietnam (*P. cadierei* Gagnepain & Guillaumin) with its silvery striped leaves, *P. involucrata* (Sims) C.H.Wright & Dewar and *Pilea repens* (Sw.) Wedd., the blackleaf-panamigo (Glen, 2002).

Pilea microphylla is not listed in South African legislation as a declared weed and invader plant, but is present in the region as a weed as a result of historical human-assisted dispersal across the tropics.

It is possible that the small form of this species was introduced into South Africa as a miniature ornamental for co-planting with bonsai specimens. It was first regionally noted as a weed growing between bricks in a Durban (East coast) garden, and at that time considered to possibly have arrived from East Africa (Friis & Immelman, 2001). It may now frequently be found growing as a weed in moist rock wall cracks, and along the edge of steps and pavers in positions of shade or partial shade. It is particularly prevalent in greenhouses, often growing on the substrate below benches and appearing in pots.

Small pieces of stem, or individual leaves are able to take root if left in contact with soil. Manual removal of plants is near-impossible as the brittle stems break easily, resulting in fragments remaining behind.

Fig. 346. Small form of *Pilea microphylla* (L.) Liebm. (Picture by Neil R. Crouch)

Fig. 347. Flowers of *Pilea microphylla* (L.) Liebm. (Picture by Neil R. Crouch)