



77 LINACEAE ¹

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Annual or perennial herbs, rarely shrubs; stems simple or branched, sometimes woody at the base. Leaves mostly alternate, rarely opposite, exstipulate, simple, entire or minutely serrate. Inflorescences cymose or corymbose, or flower solitary; bracts absent, although the smaller, upper leaves, sometimes bracteal. Flowers actinomorphic, bisexual. Sepals 5, free. Petals 5, free, often clawed, imbricate. Nectary glands sometimes present between base of petals and filaments. Stamens 5, united at base and often alternating with 5 staminodes; filaments expanded below and united into a short tube; anthers 2-celled, dehiscence introrse by 2 longitudinal slits. Carpels 2–5, fused; ovary superior, 4–10 locular by development of septa; ovules 1–2 per cell, placentation axile; styles 2–5, free or partially united; stigma variable. Fruit a globose capsule, usually splitting into 4–10 one-seeded divisions, or rarely a drupe. Seeds compressed; embryo straight, with little endosperm.

A family of about 10–12 genera and 300 species; cosmopolitan but found chiefly in temperate regions with a centre of diversity around the Mediterranean region. In Australia 3 genera (1 naturalized) with 9 species (6 naturalized). Linaceae are placed in the Malpighiales and Hugoniaceae (pantropical, 6 genera, c. 53 spp.) is sometimes treated as a distinct family (see Brummitt 2007a, 2007b).

Synonymy: Hugoniaceae.

External resources: accepted names with synonymy & distribution in Australia (APC); author & publication abbreviations (IPNI); mapping (ALA, AVH, NVA); nomenclature (APC, APNI, IPNI).

1 LINUM

Linum L., *Sp. Pl.* 1: 277 (1753).

Annual, biennial or perennial herbs, usually slender but occasionally somewhat robust and with stems ± woody at the base. Leaves usually alternate, rarely opposite, sessile, entire or minutely serrate. Inflorescences terminal, few-flowered loose cymes, usually corymbose, occasionally flower solitary. Sepals 5, persistent in fruit. Petals 5, blue, yellow or white. Stamens 5, alternating with 5 staminodes; filaments united to form a short tube; anthers and pollen blue, yellow or white. Carpels 5, fused; ovules 2 per carpel; styles usually 5, free or variously united; stigmas capitate or linear and decurrent along inner side of the styles. Capsule subglobose to ovoid and sometimes slightly flattened, beaked, dehiscing by 10 valves. Seeds 10.

A genus of about 230 species, cosmopolitan though found chiefly in temperate regions, especially the Mediterranean; 7 species in Australia (3 native, 4 naturalized); 5 in Tasmania (1 native, 4 naturalized).

The genus has some commercial value. *Linum usitatissimum*, the source of flax fibre, which when treated (retted) is used to make paper, linen and other textiles. The seeds are processed to extract linseed oil which is used in printing, painting, soaps etc. The species is also used in medicine. Some species of *Linum* are reported to be toxic to stock.

Access to fresh or spirit material, particularly flowers, is essential for the identification of the species.

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² Tasmanian Herbarium, Tasmanian Museum & Art Gallery, Private Bag 4, Hobart, Tasmania 7001.

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|----|--|---------------------------|
| 1. | Stem leaves opposite; petals white | 1 L. catharticum |
| 1: | Stem leaves alternate; petals blue, white, or yellow | 2 |
| 2. | Styles free throughout | 3 |
| 2: | Styles fused for (0–)½–¾ their length | 4 |
| 3. | Petals yellow, 4–6 mm long; stigmas capitate | 2 L. trigynum |
| 3: | Petals usually blue or white, 8–15 mm long; stigmas linear | 3 L. usitatissimum |
| 4. | Petals blue-violet, 8–12 mm long; sepals entire or fimbriate-laciniate; style fused for (0–)½ length | 4 L. bienne |
| 4: | Petals blue or white, (3–)8–10(–12) mm long; sepals ciliolate; style fused for ½–¾ length | 5 L. marginale |

1 * *Linum catharticum* L., *Sp. Pl.* 1: 281 (1753)*White Flax, Purging Flax**Illustration: Richardson et al., Weeds of The South-East, an Identification Guide for Australia 304 (2006).*

Slender, glabrous annual or biennial herbs, 30–40 cm high; stems erect, simple to much branched at base. Leaves distant, opposite, 3–8(–12) mm long, (1.5–)2–3(–4) mm wide, upper leaves usually shorter and narrower, oblong to narrow elliptic-obovate, margins minutely serrulate, particularly nearer the base, apex obtuse to sub-acute. Inflorescence a diffuse, compound dichasium. Sepals 2–3 mm long, elliptic, acuminate, margins glandular-ciliolate. Petals white, 4–6 mm long, narrow obovate. Styles free; stigmas capitate. Capsule globose, 2–3 mm diam., glabrous, dehiscent. Seeds light brown, c. 1 mm long, plano-convex. Flowering & fruiting Sept.–Apr.

Tas. (TCH TSE TSR TWE); also naturalized in New Zealand; native to Europe, Caucasia, NW Africa, Iran. Locally common to scattered, from sea-level to c. 1000 m alt., especially in the south of the state, favouring damp locations at higher elevations. The species can be distinguished from other species of *Linum* in Tasmania by its opposite leaves.

2 * *Linum trigynum* L., *Sp. Pl.* 1: 279 (1753)*French Flax**Linum gallicum* L., *Sp. Pl., ed. 2*, 1: 401 (1762).

Illustrations: Jessop, Fl. S. Austral. 2, edn 4: 734, fig. 394c (1986); Gardner, *Fl. New South Wales* 3: 17 (1992); Jeanes, *Fl. Victoria* 4: 122, fig. 21e (1999); Richardson et al., *Weeds of The South-East, an Identification Guide for Australia* 304 (2006).

Glabrous annual herbs, 10–50 cm high; stems slender, erect, branched from the base. Leaves alternate, (3–)5–12(–15) mm long, upper leaves usually a little smaller, linear-lanceolate, acute or acuminate. Inflorescence a loose, spreading, corymbose dichasium. Sepals 3–4 mm long, lanceolate, keeled near the base, margins glandular-ciliolate. Petals yellow, 6–8 mm long, obovate. Styles free; stigmas capitate. Capsule c. 2–2.5 mm diam., about ½ as long as the sepals, globose, occasionally somewhat flattened, glabrous, dehiscent. Seeds light brown, dull, 1.5–2 mm long, ellipsoid, plano-convex. Flowering & fruiting Dec.–May.

Tas. (FLI, TNM, TSE); also naturalized in WA, SA, Qld, NSW, Vic., New Zealand; native to S Europe and the Mediterranean region. Scattered, localised in pastures, on roadsides and disturbed areas, from sea-level to c. 250 m alt.

3 * *Linum usitatissimum* L., *Sp. Pl.* 1: 277 (1753)*Flax, Linseed*

Illustrations: Gardner, *Fl. New South Wales* 3: 17 (1992); Jeanes, *Fl. Victoria* 4: 122, fig. 21c (1999); Richardson *et al.*, *Weeds of The South-East, an Identification Guide for Australia* 304 (2006).

Glabrous annual herbs, 30–80(–100) cm high; stems solitary or branched near the base, often with a stout, woody rootstock. Leaves alternate, 20–40 mm long, (1–)2–5 mm wide, linear-lanceolate, acuminate, margins entire. Inflorescence a loose, terminal, corymbose dichasium. Sepals 5–8 mm long, broadly ovate, prominently keeled, acuminate, margins white-membranous, ciliolate. Petals blue or white, 8–15 mm long, obovate. Styles free; stigmas linear, decurrent along inner sides of style branches. Capsule 6–8(–10) mm diam., glabrous, partially dehiscent. Seeds light grey-brown, lustrous, 3–5 mm long, ovate-ellipsoid, strongly compressed. Flowering & fruiting Sept.–Mar.

Tas. (KIN, TNM, TSE); also naturalized in NSW, Vic.; native to Europe and possibly Asia. In Tasmania the species persists along roadsides and in waste places, near former centres of cultivation, especially in the central north of the state, following past experimentation into its potential as a crop. A number of forms of this species are widely planted throughout European countries for the production of the flax fibre and linseed oil. The species resembles *L. marginale* but usually is more robust (see discussion under *L. marginale* below).

4 * *Linum bienne* Mill., *Gard. Dict.*, edn 8, no. 8 (1768)*Pale Flax*

Linum angustifolium Huds., *Flora Angl. (Hudson)*, edn 2, 1: 134 (1778). *Linum usitatissimum* subsp. *bienne* (Mill.) Stank., *Sborn. Nauch. Tr. Prikl. Bot. Genet. Selek.*, 113: 61 (1987).

Slender or fairly robust, annual to short-lived perennial herbs up to 80(–100) cm high; stems erect, simple to much branched at base, glabrous. Leaves alternate, (5–)8–15(–25) mm long, 1–2(–3) mm wide, upper leaves smaller, linear to narrow elliptic, or obovate towards the base of the stem, margins entire, apex acuminate. Inflorescence of few to many flowers in a diffuse, often corymbose, compound dichasium. Sepals 4–6 mm long, broadly elliptic-obovate, midrib prominent, margins of inner sepals often fimbriate-laciniate toward the apex. Petals pale blue or violet, the veins darker, 8–10 mm long. Styles fused from base for (0–)½ length; stigmas linear. Capsule globose, 5–6(–7) mm diam., glabrous, dehiscent. Seeds light to dark brown, lustrous, 2–3 mm long, ellipsoid, compressed. Flowering & fruiting Oct.–May

Tas. (FLI, KIN, TNM, TNS, TSE, TSR); also naturalized in New Zealand; native to W Europe, Mediterranean to Caucasia, Iraq, Iran. In Tasmania, a scattered weed of roadsides and other disturbed areas, particularly in the north and south, but not common. The species resembles *L. marginale* and they can be difficult to distinguish (see discussion under *L. marginale* below).

5 *Linum marginale* A.Cunn., *Geogr. Mem. New South Wales* 357 (1825)*Native Flax, Wild Flax*

Linum marginale var. *australe* Wawra, *Itin. Princ. S. Coburgi* 1:40 (1883). *Linum albidum* Ewart & Jean White, *Proc. R. Soc. Victoria* 23(2): 294 (1911).

Illustrations: Morley & Toelken (Eds), *Flowering Plants in Australia* 205, fig. 119a-c (1983); Jessop, *Fl. S. Austral.* 2, edn 4: 734, fig. 394a (1986); Gardner, *Fl. New South Wales* 3: 16 (1992); Jeanes, *Fl. Victoria* 4: 122, fig. 21b (1999); Whiting *et al.*, *Tasmania's Natural Flora* 201 (2004); Richardson *et al.*, *Weeds of The South-East, an Identification Guide for Australia* 304 (2006); Simmons *et al.*, *A Guide to Flowers and Plants of Tasmania*, edn 4, 127 (2008).

Erect, perennial herbs, 10–70(–100) cm high; stems unbranched or branched from the base, glabrous, often glaucous, striate. Leaves alternate, 5–20(–25) mm long, 1–2(–3) mm wide, linear to linear-elliptic, margins entire, apex acuminate. Inflorescence a loose, corymbose dichasium, or sometimes flower solitary. Sepals 4–6 mm long, broadly ovate, keeled near the base, margins translucent, ciliolate near the apex. Petals blue, sometimes with darker veins, or white (particularly at higher altitudes), 8–12 mm long, obovate. Styles fused from the base for ½–¾ of their length; stigmas 5, spreading, linear, decurrent along the inner side of the style branches. Capsule

globose, c. 5 mm diam., as long as or a little longer than the calyx, glabrous, dehiscent. Seeds light brown, lustrous, 2–3 mm long, plano-convex, compressed. Flowering & fruiting Oct.-May.

Tas. (BEL, FLI, KIN, TCH, TNM, TSE, TSR); also all Australian states except NT; also New Zealand. Common in low-land to montane areas where found in wet or dry grasslands and open forests, from sea level to 1200 m alt. The species is suspected of causing cyanide poisoning in stock.

Linum albidum appears insufficiently distinct as to warrant specific separation from *L. marginale* and thus has been placed in synonymy. The distinctions between *L. marginale* and *L. bienne* and, perhaps, *L. usitatissimum*, are also unclear and these species are difficult to separate using dried material. There appears to be no particular character which adequately demonstrates, or allows for, definite distinction between them.

REFERENCES

ALA (Atlas of Living Australia) www.ala.org.au

APC (Australian Plant Census) www.chah.gov.au/apc/about-APC.html

APNI (Australian Plant Name Index) www.anbg.gov.au/cgi-bin/apni

AVH (Australia's Virtual Herbarium) (Council of Heads of Australasian Herbaria) www.rbg.vic.gov.au/avh/

Brummitt RK (2007a) Hugoniaceae. In VH Heywood, RK Brummitt, A Culham, O Seberg (Eds) *Flowering Plant Families of the World*. pp. 167-168. (Royal Botanic Gardens, Kew: London)

Brummitt RK (2007b) Linaceae. In VH Heywood, RK Brummitt, A Culham, O Seberg (Eds) *Flowering Plant Families of the World*. pp. 192-193. (Royal Botanic Gardens, Kew: London)

IPNI (International Plant Name Index) www.ipni.org/index.html or www.us.ipni.org/index.html

NVA (Natural Values Atlas) (Department of Primary Industries and Water: Hobart) www.dpiw.tas.gov.au/inter.nsf/WebPages/LJEM-6TV6TV?open

NOTE: Web addresses can and do change: a list of current web addresses will be maintained on the *Flora of Tasmania Online* website [www.tmag.tas.gov.au/floratasmania].

INDEX

F

Flax 1, 2, 3

French Flax 2

H

Hugoniaceae 1

L

Linaceae 1

Linseed 2

Linseed oil 1, 3

Linum 1

Linum albidum 3, 4

Linum angustifolium 3

Linum bienne 3, 4

Linum catharticum 2

Linum gallicum 2

Linum marginale 3, 4

Linum marginale var. *australe* 3

Linum trigynum 2

Linum usitatissimum 1, 2, 3, 4

Linum usitatissimum subsp. *bienne* 3

M

Malpighiales 1

N

Native Flax 3

P

Pale Flax 3

Purging Flax 2

W

White Flax 2

Wild Flax 3