ANDIRA ANTHELMIA

Leguminosae-Papilionoideae

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Summary. The history, taxonomy, distribution, habitat and cultivation requirements of the unusual legume tree *Andira anthelmia* are discussed; a full botanical description, watercolour illustration and dissection drawings are also provided.

Andira is a genus of 29 species of trees and shrubs, all of which are found in Latin America (Pennington, 2003), with just one species, *Andira inermis*, which is found in both tropical America and Africa, and that is the only other species in the genus that has been featured in Curtis Botanical Magazine (Pennington et al., 2000). *Andira* is unusual because its fruits are not normal legume pods, but fleshy drupes that are mostly dispersed by bats (Pennington and Lima, 1995), which is the case for the species featured here, *A. anthelmia*. "Andira" means bat in the Tupi Amerindian language (Milliken *et al.*, 1992) and "anthelmia" is a reference to the use of the seeds of this species as a drug to treat intestinal parasites (Cunha e Silva et al., 2003). *Andira anthelmia* was first described by the Brazilian botanist José Mariano de Conceição Vellozo (1829) in his monumental work, *Florae Fluminensis* (Lima, 1995). The first illustration of the species is also in *Florae Fluminensis*, and this is the Type for the species because it is unclear which herbarium specimens Vellozo may have been working from.

Andira anthelmia is confined to the Atlantic coast of eastern Brazil, from Alagoas State in the north, to Rio de Janeiro State in the south. It grows mostly in the Atlantic costal rain forests ("Mata Atlântica"), mainly in lowland areas on clay soils and on the banks of rivers and lagoons, but is also found right by the coast in the lower "restinga" forests, which grow on white sand soils. Although the Mata Atlântica has been massively deforested, *A. anthelmia* is still relatively common in many areas because it is often left as an isolated tree in pastures because it forms a broad crown in such situations, which offers deep shade for cattle.

Andira anthelmia has two morphological characteristics of note, which add to its interest as a cultivated plant. First, the showy, papilionoid flowers, which are pink except for a white marking in the centre of the standard. At over 2cm long, these are amongst the largest flowers in the genus and may be pollinated by large, black bees in the genus *Xylocopa*, which we have observed visiting flowers in Bahia and Rio de Janeiro States. Second, the stipules of *A. anthelmia* are characteristic - very large (up to 6 cm long) and highly persistent on the branches, and even

on the trunk of younger trees. These large stipules are shared by three other species in the genus, *A. grandistipula*, *A. multistipula* and *A. legalis*. A phylogenetic study shows that *A. legalis* is the sister species of *A. anthelmia* (Pennington, 1996; Simon et al. 2009). They are co-distributed in eastern Brazil, but *A. legalis* has a massive, rodent dispersed fruit, whereas the more common *A. anthelmia* has smaller fruits dispersed by bats.

The cultivated specimen at the Royal Botanic Garden Edinburgh, from which the colour plate presented here was prepared, results from fruit collected in Bahia State in 1991. The seed were germinated at Kew when the first author was based there for his PhD studies. In 1994 the plants were transferred to the Royal Botanic Garden Edinburgh, and the first flowering was in 2017, a remarkable 26 years after germination. This is the first time the species has flowered in cultivation under glass in a temperate country, though there are four individuals cultivated at the Botanical Garden of Rio de Janeiro. The most recently planted of these, collected by H.C. Lima, was sown in April 2007 and first flowered ten years later in September 2017. These cultivated trees generally flower annually, between September and November.

CULTIVATION. Germination of *Andira* species is much more rapid when seeds are excised from the hard endocarp, which requires a small saw and a careful touch not to damage the embryo at the tip of the seed. If seeds are not excised, germination does not take place until the hard, woody endocarp has rotted away, which could take months or years.

The illustrated specimen of *Andira anthelmia* is a small tree of c. 2 m height, currently growing in the Tropical Backup Glasshouse of the Royal Botanic Garden Edinburgh, which has a temperature of 22°C during the day and 18°C at night. The house vents at a temperature of 25°C and the humidity is maintained between 75% and 90% by manually damping down the floor and benches three to four times per day. The tree is growing in a 45 litre pot in a bark-based compost mix of equal proportions of Melcourt potting bark, Melcourt propagation and Melcourt grow bark plus 10% John Innes soil, perlite and a 7-9 month Osmacote slow release fertiliser. Further feeding is undertaken every two weeks through the summer growing season with vitafeed 19-19-19+1.6 MgO+TE (1-1-1) and with vitafeed 15-7-30+1.6 MgO+TE (2-1-4) monthly in spring, autumn and winter. The plant is watered heavily throughout the summer months, but more sparingly over the winter and is never allowed to dry out completely.

Andira anthelmia (Vellozo) J. F. MacBride, Candollea 8: 26. 1940. *Lumbricidia anthelmia* Vellozo, Fl. flumin. p. 306. 1829. *Andira anthelmintica* Bentham *orth. var.*, Comm. legum. gen. p. 44. 1837. *Andira anthelmintica* Bentham var. *acuminata*, Fl. bras. 15(1):

294. 1862, *nom. superfl*. *Vouacapoua anthelmia* O. Kuntze, Revis. gen. pl. 1: 212. 1891.—Type: *J. M. Vellozo, Fl. flumin., icon. 7: 104. 1831.*

Andira stipulacea var. *bahiensis* Bentham, J. Proc. Linn. Soc., Bot. 4 (Supplement "A synopsis of the Dalbergieae"): 119. 1860. *Andira legalis* var. *bahiensis* (Bentham) N. F. Mattos, Loefgrenia 40: 3. 1970.—Type: Brazil. Bahia: *Blanchet 607* (holotype BM).

Andira frondosa var. *longifoliolata* N. F. Mattos, Loefgrenia 58: 3. 1973.—Type: Brazil. Rio de Janeiro: Restinga de Jacarepaguá, 23 Sep 1958, *E. Pereira, Liene, Sucre & Duarte 4311* (holotype HB, isotypes RB (2 sheets)).

DESCRIPTION (Based on Pennington (2003)). Tree to 25 m tall with large, broad, spreading crown in open situations; bark grey-brown to brown, fissuring vertically and scaling on larger trees; slash pale salmon pinkish, oxidising red-brown, with clear exudate and small amount of red exudate; wood buff to yellowish, streaked; twigs with crowded persistent stipules, stipule scars and leaf scars, with sparse red-brown appressed hairs, glabrescent; lenticels few or absent. Stipules large, persistent, ovate, pale brown, 1.5-6 cm long, generally >0.5 cm wide, with sparse, red-brown appressed hairs, glabrescent and generally glabrous at maturity; leaf axis 24-55 cm long; rhachis dark to pale brown, sparsely hairy when young, glabrescent, hairs red-brown, erect; stipels 1-9 mm long; petiolules 1.5-4.5 mm long, indumentum as rhachis; leaflets in (3-) 4-6 (-7) pairs, (2.2-) 4.1-12.5 (-20.5) cm long, (1-) 2.2-6.5 (-7.5) cm wide, elliptic, narrow obovate, (rarely narrow ovate, narrow elliptic, wide obovate to oblanceolate), thick chartaceous (rarely chartaceous or subcoriaceous), shiny dark green adaxially, matt abaxially, base obtuse or rounded, often slightly decurrent, apex obtuse or rounded (rarely acute), often slightly retuse or with short acumens to 10 mm long, glabrous adaxially except the groove of the primary vein very sparsely hairy, glabrescent; primary vein channelled adaxially; secondary veins 8-13, +/- plane to slightly sunken adaxially, raised abaxially, pattern eucamptodromous becoming brochidodromous, tertiary veins plane to slightly impressed adaxially and raised abaxially. Panicles terminal and axillary, 11-35 cm long, hairy to sparsely hairy at branch tips, glabrescent towards the base, hairs red-brown, +/- appressed; bracts narrow, caducous, 2-6 mm long, sparsely hairy, hairs red-brown, appressed; pedicels 2-6 mm long; bracteoles 1.5-2.5 mm long, indumentum as bracts. Flowers rose-violet to purple, 19-24 mm long. Calyx purple-brown, 8-10 mm long, with sparse, red-brown, appressed hairs, indumentum most dense on lobes; lobes obtuse to acute, 0.3-2 mm long. Standard-blade 14-16 mm wide, 13-15 mm high, claw 6-7 mm long; wing 10-13.5 mm long, 4.5-6.5 mm wide, claw 6-10 mm long, lamellate sculpture present; keel 9-12 mm long, 5-6.5 mm wide, claw 7-10 mm long. Stamens white, 15-20 mm long, filaments united for the basal 8.5-14

mm, free for the distal 4-7 mm, vexillary stamen 12.5-16.5 mm long. Gynoecium 15.5-21 mm long, ovary hairy, stipe and style sparsely hairy to upper and lower surface of ovary hairy, stipe and style with scattered hairs, hairs red-brown, appressed; ovules 4-5. Fruits strong smelling when ripe, dark brown, this surface layer thin, green abaxially, drying dark brown with surface smooth (minutely wrinkled with lens or microscope), elongated, 3-6.2 cm long, 2.5-4 cm high, 2.2-4 cm wide; mesocarp green to pale lime-green, drying pale brown, fibrous and granular, somewhat air-filled and soft, 1.5-3 mm; endocarp 1-2.5 mm, brown to pale brown, woody, fibrous.

DISTRIBUTION. Brazil (Alagoas, Bahia, Espirito Santo, Rio de Janeiro).

HABITAT. Grows in Atlantic coastal rain forest, especially on clay soils and banks of rivers and lagoons, and also in restinga forest on white sand near the coast.

FLOWERING TIME. September to December in Brazil; this cultivated specimen flowered in March.

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