Taxonomic treatment

Fruits

The fruits of *Abrahamia* are always drupes with a resiniferous mesocarp and thin papyraceous endocarp, but several characters are very useful for delimiting species.

Shape

Fruits in *Abrahamia* can vary from globose or ellipsoid to ovoid or obovoid, depending on the species.

Size

Fruit dimensions are also useful for delimiting species within *Abrahamia*, varying from 1-1.5 × 0.5-0.8 cm in *A. minutifolia*, which has the smallest fruits, to 3-3.5 × 1.5-1.8 cm in *A. ellipticarpa* Randrian. & Lowry, which has the largest fruits in the genus.

Surface indument

The fruits of *Abrahamia* are either glabrous or velutinous, and this character is very useful for distinguishing species. Eight species have fruits with indument, viz. *A. betamponensis* Randrian. & Lowry, *A. buxifolia*, *A. delphinensis*, *A. ditimena*, *A. itremoensis*, *A. lenticellata*, *A. minutifolia,* and *A. sericea*, while those of the remaining 25 species are glabrous (fruits of *A. pauciflora* are unknown).

Taxonomic treatment

Abrahamia Randrian. & Lowry, **gen. nov.**

Typus: *Abrahamia ditimena* (H. Perrier) Randrian. & Lowry (≡ *Protorhus ditimena* H. Perrier).

Diagnosis

Dioecious trees or shrubs. Leaves simple, persistent, opposite, subopposite, verticillate or alternate, chartaceous, subcoriaceous or coriaceous, lateral veins parallel, arcuate, forming an obtuse to acute angle with the midrib toward the base of the blade. Inflorescence erect, a thyrse or panicle. Flowers (4-)5(-6)-merous; pedicel short, articulated; sepals much smaller than petals; stamens alternipetalous, filament broadened at the base (sterile in female flowers, forming staminodes), anthers dorsifixed, introrse, glabrous; ovary pubescent or glabrous (rudimentary or absent in male flowers), with 1 locule containing a single subpendulous or pendulous ovule. Fruits drupaceous, ellipsoidal or ovoid, symmetrical or slightly asymmetrical, resiniferous; seeds ruminate; cotyledons usually inseparable (except in Abrahamia ibityensis (H. Perrier) Randrian. & Lowry, in which the resiniferous canals are only peripheral).

Description

Dioecious *trees* or *shrubs*; bark with white, translucent or red resinous latex. *Leaves* alternate, opposite or subopposite (verticillate in one species), simple, coriaceous, subcoriaceous or chartaceous, persistent (deciduous in *A. humbertii*). Venation pinnate, craspedodromous or semicraspedromous, midvein usually flat, rarely very slightly raised above, prominently raised below (rarely on both surfaces), secondary veins parallel or nearly so, straight or arcuate, prominent below or on both surfaces, forming an obtuse to acute angle with the midrib toward the base of the blade. *Inflorescence* terminal and/or axillary, an erect thyrse or panicle, or intermediate and forming a paniculiform thyrse. *Flowers* usually 5-merous (sometimes 4- or 6-merous); sepals much smaller than petals;

stamens 5 or 4 (rarely 6), alternipetalous, filaments straight, flattened, broadened at the base, inserted basally on the outer surface of the disk, anthers dorsifixed, introrse, dehiscent with longitudinal slits (stamens reduced in size and sterile in female flowers, forming staminodes); disk usually cupuliform and crenulate in *male flowers*, annular and cupuliform in *female flowers*; ovary with 1 locule containing a single pendulous or subpendulous or ovule on a short funiculus, placentation subapical (ovary rudimentary or absent in male flowers); style one, short, apically trifid or unbranched with 3 capitate stigmatic lobes. *Fruits* drupaceous, ellipsoidal or ovoid, symmetrical or slightly asymmetrical, exocarp usually with longitudinal striations on surface, glabrous or velutinous, mesocarp resinous, endocarp thin, papyraceous; seed solitary, with resiniferous canals throughout (only peripheral in *A. ibityensis*), ruminate; cotyledons usually inseparable (separable in *A. ibityensis*).

Etymology

The genus is named in honor of the late Jean Prosper Abraham (1936-1996), a well-known Malagasy forester with a remarkable knowledge of the woody plants of Madagascar and who contributed much to our knowledge of the island's rich and diverse flora.

Notes

Abrahamia includes a total of 34 species, all endemic to Madagascar, including 15 species formerly placed in *Protorhus* (e.g., by Perrier de la Bâthie, 1944, 1946), to which 19 additional species are newly described here. With the recognition of *Abrahamia* as a separate genus, *Protorhus* is now restricted to a single species in Africa, *P. longifolia*. The two genera differ in several flower and fruit characters, as indicated by Pell (2004) and Pell et al. (2011), and summarized in Table 1.

Table 1. Morphological features distinguishing *Abrahamia* Randrian. & Lowry from *Protorhus* Engl.

	Abrahamia	***Protorhus***
Fruit shape	Ellipsoidal or ovoid, radially symmetrical	Ovoid, mango-shaped or transversely oblong, asymmetrical
Seed	Resiniferous canals present, making the seed ruminate; cotyledons inseparable	Resiniferous canals lacking, seed not ruminate; cotyledons separable
Number of styles	1 (apically trifid or with 3 capitate stigmas)	3, slightly connate at the base or completely free

Abrahamia is represented in all of Madagascar's major vegetation types (Moat & Smith, 2007) and broad bio-climatic zones (Cornet, 1974; Schatz, 2000). Species can be found in humid forest in the eastern and Sambirano regions *(A. antongilensis, A. sambiranensis)*, wooded grassland and bushland in the center of the island *(A. ibityensis, A. buxifolia)*, western dry forest *(A. deflexa, A. humbertii)*, and southwestern subarid spiny forest-thicket (*A. phillipsonii* Randrian. & Lowry). Members of the genus occur on many types of substrate and at a wide range of elevations, from littoral forest on sand at the sea level (*A. nitida* (Engl.) Randrian. & Lowry, *A. suarezensis* Randrian. & Lowry) to humid forest on lateritic soil at altitudes up to 2000 m *(A. buxifolia, A. itremoensis)*.

Species of *Abrahamia* were described by Perrier de la Bâthie (1946) as polygamo-dioecious, indicating that he interpreted them as having both unisexual and hermaphroditic flowers on the same individual. However, careful observation has shown that all members of the genus are functionally dioecious. Female flowers have rudimentary, sterile stamens that are reduced in size, whereas male flowers either have an ovary that is rudimentary and non-functional or lack an ovary altogether.