The Rhamnaceae of the Kimberley Region of Western Australia

Six native species of Rhamnaceae, all in different genera, are known from the Northern Botanical Province of Western Australia. This province is equivalent to the Kimberley Region as defined in "Flora of the Kimberley Region", in which five of the Rhamnaceae species are described and illustrated (Wheeler 1992). Since publication of the Kimberley flora, a further species and genus, *Colubrina asiatica*, has been discovered at Koolama Bay in the far north of the Kimberley, and there has been an alteration of the specific name used for the *Alphitonia* species in the region. In addition, unpublished work on generic boundaries in the Rhamnaceae suggests that the species currently known as *Cryptandra intratropica* should be placed in a new genus (K. Thiele pers. comm.).

Prior to publication of the Kimberley regional flora, *Colubrina asiatica* was included in a census of Western Australian plants (Green 1985), but this record was apparently based on a misidentified specimen (*P.G. Wilson* 11141) of *Emmenosperma cunninghamii*. *Colubrina* has been collected from many locations on sandy coasts in Northern Territory and Queensland and has a wide distribution in tropical regions of the world. However, since it is known from only one locality in Western Australia, it has been placed on the Declared Rare and Priority Flora List.

This publication provides a key and distribution maps for the Rhamnaceae species of the Kimberley Region, a description and illustration of the priority taxon *Colubrina asiatica* and a synopsis of the other species in the region. Abbreviations used here for the botanical districts of the Northern Botanical Province follow those used in "Flora of the Kimberley Region".

Key to genera in Kimberley Region

1. Shrubs up to 2.5 m high, with densely stellate-hairy leaves 2-20(30) mm long. Floral tube with a short but distinct free portion extended above a stellate-hairy disc. Aril basal, succulent ..... **CRYPTANDRA**
1. Scrambling shrubs or trees up to 25 m high, with partially to fully glabrous leaves 30-170 mm long. Floral tube either fully adnate to ovary or (in *Emmenosperma*) extended above the ovary and lined with a glabrous disc. Aril (when present) enclosing seed, dry.
   2. Leaves more or less linear. Petals absent. Fruit a samara, compressed, prominently winged, brown ..... **VENTILAGO**
   2. Leaves more or less narrowly elliptic to broadly ovate. Petals 5. Fruit a 2-4-celled schizocarp or drupe, more or less globular, not winged, yellow to red or purple to black.
      3. Leaves pinnately veined, with 6-12 main lateral veins on each side of the midvein. Fruit casing shed leaving shiny orange to red seeds persistent on the receptacle.
         4. Floral tube fully adnate to the ovary and the margin of the broad horizontal disc which covers the summit of the ovary. Fruit succulent at first, becoming black and splitting, with a distinctive mealy layer below the thin outermost layer. Seed coat greenish; aril almost covering seed, reddish ..... **ALPHITONIA**
         4. Floral tube with an erect free portion, lined by the disc and surrounding the largely free superior ovary. Fruit dry, brittle, yellow to orange, without a mealy layer. Seed coat orange to red; aril absent ..... **EMMENOSPERMA**

3. Leaves either palmately 3-veined or with 2-4 main lateral veins on each side of midvein. Fruit casing shed with or after the dull brown seeds.
   5. Scrambing shrub, with inconspicuous caducous stipules. Leaves pinnately veined, with 2-4 main lateral veins on each side of midvein. Fruit a schizocarp, 3-celled ..... **COLUBRINA**
   5. Tree, with stipules on juvenile shoots modified to prominent deciduous spines. Leaves palmately 3-veined. Fruit a drupe, (3)4-celled ..... **ZIZIPHUS**

Colubrina Rich. ex Brongn.

Shrubs, *trees* or rarely woody *vines*, sometimes thorny; indumentum (where present) of simple hairs. *Young stems* usually hairy. *Stipules* usually caducous. *Leaves* alternate or opposite, usually with minute glands. *Flowers* pedicellate, often in axillary cymes, bisexual. *Sepals* 5. *Petals* 5, usually with a hooded lamina enclosing an anther. *Stamens* 5. *Disc* broad, covering summit of ovary, glabrous. *Ovary* 3-celled. *Style* 3-lobed or 3-branched. *Fruit* a schizocarp, dry, largely superior, usually subglobular and shallowly 3-lobed; outer layer thin, leathery to crustaceous, irregularly dehiscent; cocci crustaceous or membranous, usually longitudinally dehiscent along adaxial line and over summit. *Aril* absent or very reduced and obscure. A genus of over 30 species, distributed through the tropics from the east coast of Africa east to the Caribbean and extending to temperate parts of the Americas.

Colubrina asiatica (L.) Brongn.

Scrambing *shrub* up to 2 m high. *Young stems* sparsely hairy. *Stipules* small, caducous. *Leaves* alternate; petiole 10-15 mm long; blade broadly ovate, commonly 60-75 x *c.* 50 mm, discolorous, with 3-5 main veins arising on each side of the midvein, including 1 or 2 basal veins, glabrous except for a few hairs scattered along the main veins, the base broadly rounded or shallowly cordate, the apex attenuate, the margins shallowly serrate, each tooth terminating in a small dark gland. *Inflorescence* usually of 2 or 3 pedunculate axillary clusters each of 5 or more flowers, about as long as the petioles, much shorter than the full leaves; peduncles and pedicels hairy. *Flowers* yellowish green, somewhat hairy outside especially on floral tube, glabrous inside. *Sepals* broadly ovate, *c.* 1.5 mm long. *Disc c.* 2 mm across. *Style* deeply 3-lobed, the lobes about as long as the entire portion. *Fruit* depressed obovoid with a slightly 3-lobed summit, 7-10 mm long, on a long pedicel (commonly 5-8 mm long). *Seeds* dull pale brown, *c.* 6 mm long, broad and somewhat compressed. (Figure 1)

Specimens examined. WESTERN AUSTRALIA: Koolama Bay, 30 Mar. 1993, *A.A. Mitchell* 2983 (PERTH)
NORTHERN TERRITORY: Wessel Islands, 5 Oct. 1972, *P.K. Latz* 3424 (PERTH).
QUEENSLAND: Cooktown, along Leprosy Creek, 16 May 1970, *S.T. Blake* 23333 (PERTH).

Distribution and habitat. Occurs on the coast, recorded in white sand next to mangroves at Koolama Bay in the far north of the Kimberley Region (CGa). Also occurs in Northern Territory and Queensland. Extends through the tropics from the east coast of Africa east to Hawaii and the Caribbean area. (Figure 2B)

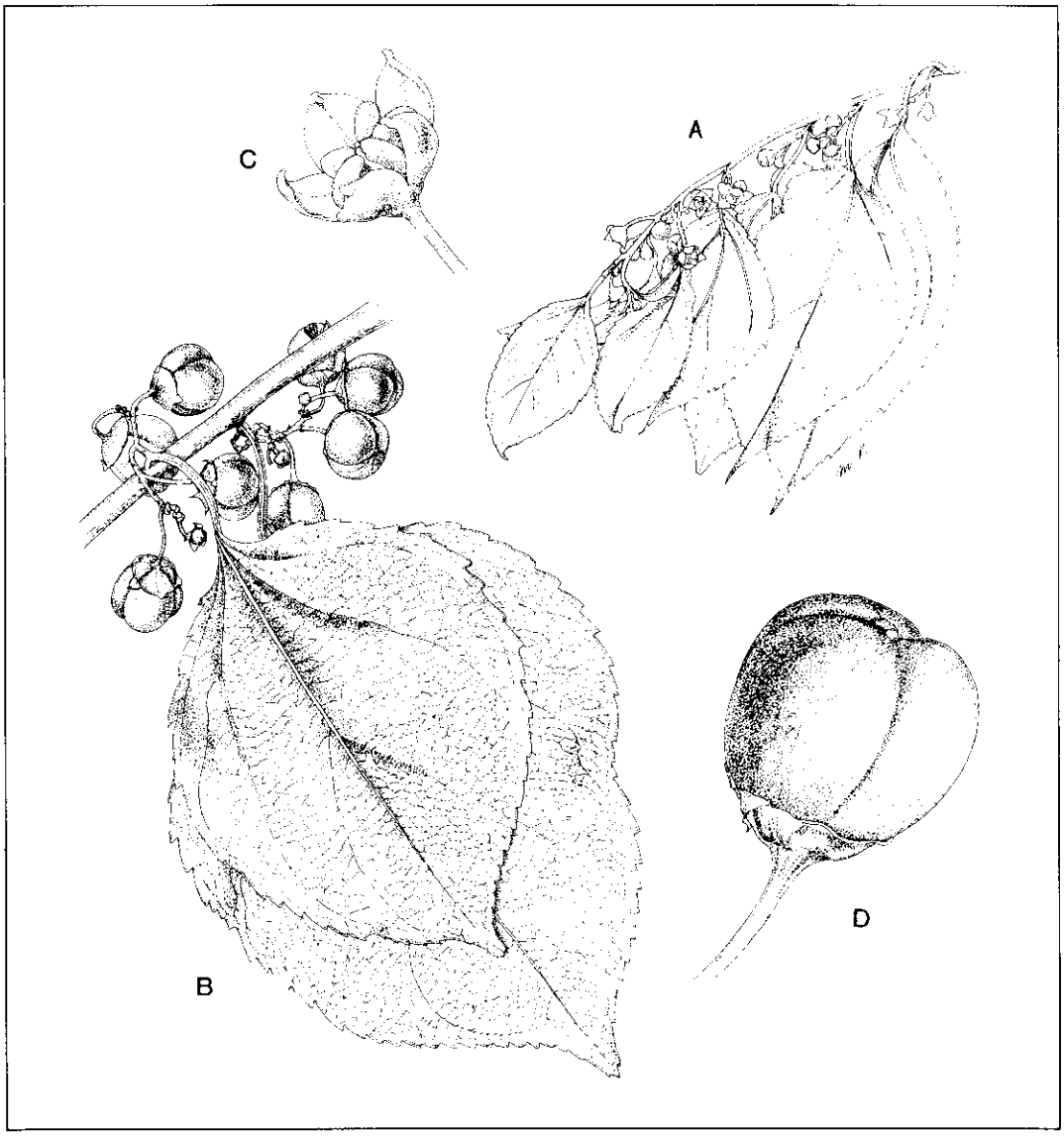

Figure 1. *Colubrina asiatica.* A - flowering stem (x1), B - fruiting stem (x1), C - flower (x6), D - fruit (x4). Drawn from *A.A. Mitchell* 2983.

Phenology. Flowers and fruits recorded March-April.

Conservation status. CALM Conservation Codes for Western Australian Flora: Priority 1.

Notes. All Australian material is of *C. asiatica* var. *asiatica.* Judging from material from other parts of Australia, the species can grow much larger than indicated in the description above, which is based on the single Kimberley specimen. For a full description of the species throughout its geographical range see Johnston (1971: 47-49). Johnston lists many synonyms for the species, including the two nomenclatural synomyms *Ceanothus asiaticus* L. and *Rhamnus asiaticus* (L.) Lam.

Other Kimberley species

Alphitonia incana (Roxb.) Teijsm. & Binn. ex Kurz. Tree 3-20 m high. Illustrated in Wheeler (1992: Figure 193A, as *A. excelsa*). Occurs along watercourses, often in sandstone gorges or gullies, sometimes in vine thickets. Extends from Bougainville Peninsula south to King Leopold Range and from Kuri Bay east to Drysdale River National Park in the Kimberley Region (WGa, CGa, Fi). Also occurs in Northern Territory and Queensland. Flowers: April-June. Fruits: May-October. *Rhamnus incanus* Roxb. Previously misidentified as *Aphitonia excelsa* (A. Cunn. ex Fenzl) Reissek ex Benth., a species occurring in adjacent parts of Northern Territory; possibly *A. excelsa* extends into the eastern Kimberley but there are no records from this region to date. (Figure 2A)

Cryptandra intratropica W. Fitzg. Shrub 0.7-2.5 m high. Illustrated in Wheeler (1992: Figure 193B). Occurs on a variety of sandstone habitats in the Kimberley Region (WGa, CGa, EGa, Fi), extending from Bonaparte Archipelago and Talbot Bay east to an isolated record in Weaber Range and from Napier Broome Bay south to isolated records from Mt Broome and Mt Wells. Most records are from near the coast. Since the species occurs close to the Northern Territory border, it may well extend into that region, although no specimens have been collected outside Western Australia to date. However there are two closely related species occurring in Northern Territory and Queensland (K. Thiele pers. comm.), both lacking formal taxonomic names; at least one of these has been confused with *C. intratropica*. Flowers and fruits: March-August. Atypical of the genus *Cryptandra* in having completely free stipules and long pedicels. (Figure 2C)

Emmenosperma cunninghamii Benth. Tree 3-25 m high. Illustrated in Wheeler (1992: Figure 193C). Occurs mainly on sandstone outcrops, slopes or plateaus but also recorded from quartzite, often in vine thickets in the Kimberley Region (WGa, CGa), extending from near Cone Mountain and the Osborne Island group south-west to Glenelg River. Also occurs in Northern Territory and Queensland. Flowers and fruits: February-September. (Figure 2D)

Ventilago viminalis Hook. Tree 3-10 m high, with drooping branches. Illustrated in Wheeler (1992: Figure 193D). Occurs mainly on red soils, with two main areas of occurrence, one in the southern half of the Kimberley Region (Fi, Da, Ha) and far north of the Eremaean, extending from Pentacost Downs Station south to near Gilgie Downs Station and from Broome east to Nicholson Station. The other area is in the Pilbara Region of Western Australia, extending from Barrow Island south-east to Hamersley Station. Also occurs in Northern Territory, Queensland and New South Wales. Flowers: mainly June-September. Fruits: recorded September-October, March. (Figure 2E)

Ziziphus quadrilocularis F. Muell. Semi-deciduous tree 5-12 m high. Illustrated in Wheeler (1992: Figure 194B). Juvenile shoots of this species bear prominent stipules in the form of large spines and have broader, more papery leaves than the mature shoots. There are two main areas of occurrence in the Kimberley Region (WGa, CGa, EGa, Ha). The first is in vine thickets or forest, often on rocky sites (basalt, sandstone or laterite), around the north coast from near Evelyn Island south-west to near Mt Talbot (Walcott Inlet), with an isolated record from Drysdale River National Park. The other is associated with springs and watercourses from Behn River south-west to the upper Ord River. Also occurs in Northern Territory. Flowers: October-March. Fruits: January-September. (Figure 2F)

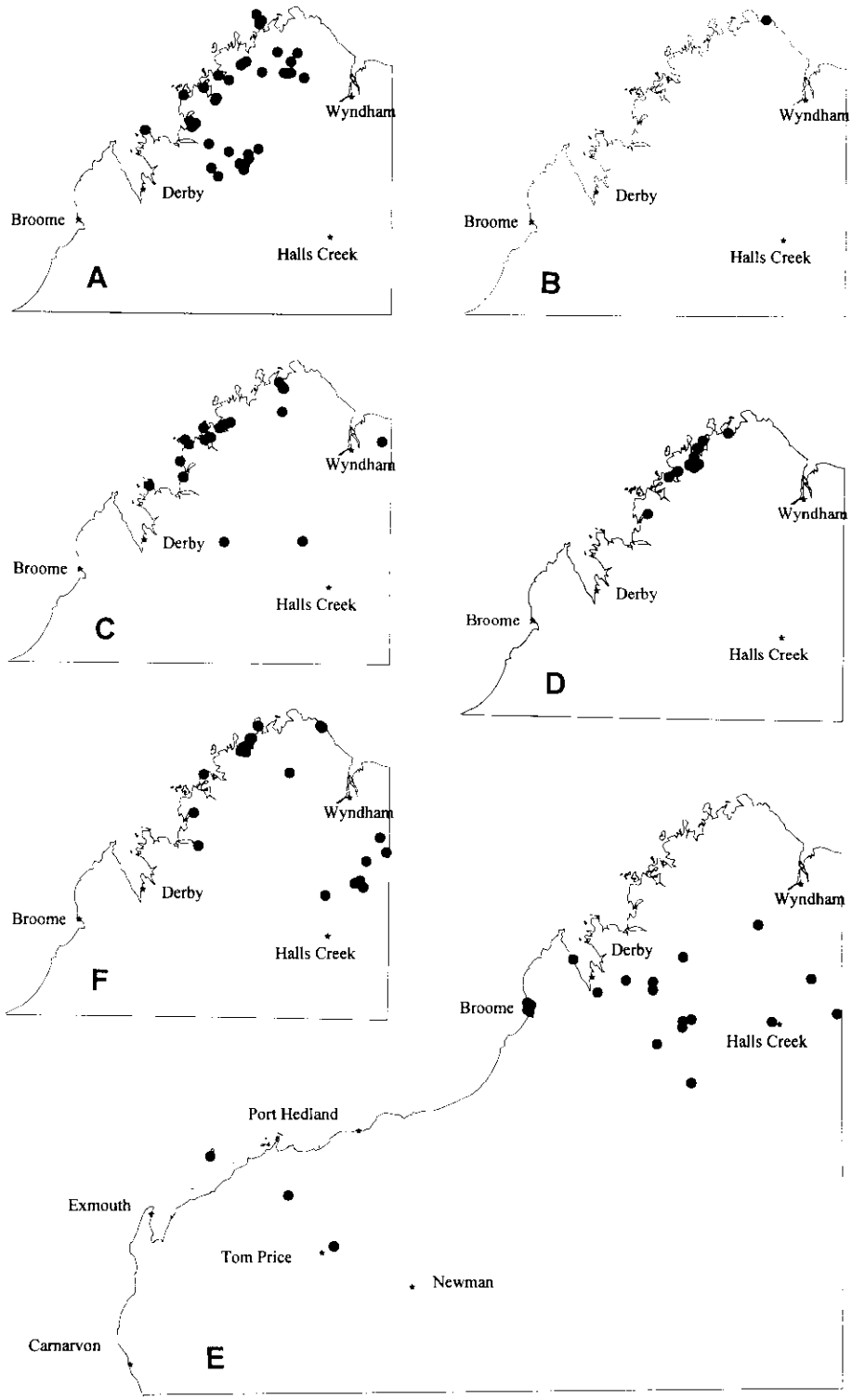

Figure 2. Geographical distributions in Western Australia. A - *Alphitonia incana*, B - *Colubrina asiatica*, C - *Cryptandra intratropica*, D - *Emmenosperma cunninghamii*, E - *Ventilago viminalis*, F - *Ziziphus quadrilocularis*.

Acknowledgements

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B.L. Rye

Western Australian Herbarium, Department of Conservation and Land Management, Locked Bag 104, Bentley Delivery Centre, Western Australia 6983