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Transfer of three species of *Cayratia* Juss., to *Causonis* Raf. (Vitaceae)

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Abstract

Phylogenetic studies have shown that *Cayratia* Juss. is not monophyletic. *Cayratia s.str.* is now confined to those species with a U-shaped endosperm rather than a T-shaped endosperm. The latter are now in three genera *Causonis* Raf., *Pseudocayratia* J.Wen, L.M.Lu & Z.D.Chen, together with an undescribed African genus. As a result, new combinations are required for three species occurring in Australia: *Causonis clematidea* (F.Muell.) Jackes, *C. eurynema* (B.L.Burtt) Jackes and *C. maritima* (Jackes) Jackes. *Cayratia japonica* (Thunb.) Gagnep., and *Cayratia trifolia* (L.) Domin, have been transferred as *Causonis japonica* (Thunb.) Raf., and *Causonis trifolia* (L.) Mabb. & J.Wen.

Introduction

The genus *Cayratia* was first described by Jussieu (1818) and was subsequently conserved over *Columella* Lour. (Loureiro 1790). Süssenguth (1953) recognized two sections based on the nature of the endosperm: section *Discypharia* Suess., with a T-shaped endosperm, and section *Koilosperma* Suess., with a U-shaped endosperm. Li (1998) regarded these two sections as subgenera based on seed morphology and nature of the inflorescence. Phylogenetic studies showed that *Cayratia* was not monophyletic (Soejima and Wen 2006, Rossetto *et al.* 2007, Trias-Blasi *et al.* 2012, Lu *et al.* 2013). Wen *et al.* (2013) treated taxa in subgenus *Discypharia* as two separate genera thus splitting *Cayratia s.lat.* into three genera: *Cayratia s.str., Causonis* and a new African genus. Later, Wen *et al.* (2018a) based on phylogenetic and morphological studies classified the Vitaceae into five tribes, with the tribe Cayratieae J.Wen & L.M.Lu including seven genera: *Cayratia* Juss. *s.str.*, with 25 species, widespread throughout tropical and subtropical areas and extending into temperate regions; *Causonis* Raf., with at least 30 species occurring chiefly in the Asian-Australia area; *Pseudocayratia*, J.Wen, L.M.Lu & Z.D.Chen., currently with five species in China and Japan; *Acareosperma* Gagnep., a monotypic genus occurring in Laos; *Cyphostemma* (Planch.) Alston, is essentially an African genus with about 200 species; *Tetrastigma* (Miq.) Planch., with about 100 species occurring in Asia, Australia and an undescribed African genus "Afrocayratia" with about seven species (Wen *et al.* 2018a).

Taxonomy

Causonis can be distinguished from *Cayratia s.str.*, by the seed which in cross section has a T-shaped endosperm lacking a membrane covering the two cavities, rather than a U-shaped endosperm with a membrane covering the cavities, and also by the large compound inflorescence v. a dichotomous cyme. Morphologically, the newly

segregated genus *Pseudocayratia* can be distinguished from *Causonis* by a suite of seed characters, as well the fruiting pedicels are enlarged and fleshy (Wen *et al*. 2018b). In *Causonis* the lateral margins of the endosperm are often strongly concave while in *Pseudocayratia* the lateral margins are only slightly concave if at all. New combinations are made for the following three species, detailed descriptions and illustrations can be found in Jackes (1987).

Causonis clematidea (F.Muell.) Jackes, *comb. nov.*

Basionym: *Vitis clematidea* F.Muell., *Fragm*. 2: 74 (1860)

Synonyms: *Cissus clematidea* (F.Muell.) Planchon in A. and C.DC., *Monogr. Phan.* 5: 566 (1887)

Cayratia clematidea (F.Muell.) Domin, *Fedde, Repert*. 11: 264 (1912)

Lectotype: Clarence River, Qld, *H.Beckler s.n.* (lecto: MEL 0540138!; isolecto: K)

Distribution: Usually found on edge of rainforest extending from southern New South Wales to west of Mackay in Queensland.

Causonis eurynema (B.L.Burtt) Jackes, *comb. nov.*

Basionym *Cayratia eurynema* B.L.Burtt, *Bull. Misc. Inform*., *Kew* 1939: 179 (1939)

Type: Comboyne, NSW, May 1935, *E.C.Chisholm s.n.* (holo: K 000736397!; iso: BRI, L, MO, NSW 142593)

Distribution: Usually found on rainforest margins from the Barrington Tops area in New South Wales to north of Brisbane in Queensland.

Note: Although the results of a molecular analysis (Rossetto *et al.* 2007) were inconclusive as to the phylogenetic position of *C. eurynema*, this species lacks the typical U-shaped endosperm of *Cayratia s.str*. Hence it is being transferred to *Causonis.* Further molecular analyses are required to establish its relationship with other genera in the tribe.

Causonis maritima (Jackes) Jackes, *comb. nov.*

Basionym: *Cayratia maritima* Jackes, *Austrobaileya* 2(4): 366 (1987)

Type: Lakefield 15° 07'S, 144°17'E, Qld, 26 Jun 1982, *B.R.Jackes s.n.* (holo: BRI AQ0441384; iso: A, CANB, DNA, K, L, MEL, NSW.)

Synonym: *Vitis carnosa* Wall. Cat. 6018 (K), *nom. nud*.

Distribution: A widespread vine growing along coastlines and other seasonally inundated areas extending from Cairns in North Queensland north to Taiwan.

Causonis japonica (Thunb.) Raf., *Sylva Tellur*. 87 (1838).

A molecular analysis of the *Cayratia japonica-Cayratia tenuifolia* species complex found that the Australian *C. japonica* formed a monophyletic clade and was clearly distinct from the species complex. The only morphological difference noted by Ishikawa *et al.* (2014) was in the colour of the floral discs. Further studies are required to determine if the Australian material is distinct from non-Australian specimens, and if so, it should be recognized as a new species.

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