



# 1. *Codia* J.R. Forst. & G. Forst.

Char. Gen. Pl. (ed. 1): 30 (1775), (ed. 2): 59 (1776); Labill., Serot. Austro-Caledon.: 45 (1825); D. Don, Edinburgh New Philos. J. 9: 95 (1830); Brongn. & Gris, Bull. Soc. Bot. France 9: 76 (1862), Ann. Sci. Nat. Bot., sér. 5, 1: 377 (1864); Benth. & Hook. f., Gen. Pl. 1: 649 (1865); Baill., Hist. Pl. 3: 381, 453 (1871), (éd. angl.) 3: 379, 452 (1874); Schtr., Bot. Jahrb. Syst. 39: 129 (1906); Engl., Nat. Pflanzenfam. (éd. 2) 18a: 259 (daté 1930, publ. 1928); Guillaumin, Bull. Bot. Soc. France 87: 254 (daté 1940, publ. 1941), Fl. Anal. Synopt. Nouv.-Caléd.: 142 (1948); Hutch., Gen. Flow. Pl. Dicot. 2: 12 (1967); Barnes & Hill, Austral. Syst. Bot. 12: 647 (1999) (fossiles); J. Bradford *et al.*, in Kubitzki (éd.), Fam. Gen. Vasc. Pl. 6: 107 (2004); H.C. Hopkins, Adansonia, sér. 3, 27: 243 (2005) (nomenclature); Pillon *et al.*, Mol. Ecol. 18: 2263 (2009) (phylogénie).  
 – Pfeifferago Kuntze, Rev. Gen. Pl. 1: 227 (1891), *nom. superfl.*  
 Type: *Codia montana* J.R. Forst. & G. Forst., Nouvelle-Calédonie.

**Arbuste ou arbre**, à système sexuel hermaphrodite. Jeunes rameaux ± aplatis aux nœuds. *Stipules* interpétiolaires, caduques ou persistantes, marge entière. *Feuilles* opposées ou verticillées par 3 (4), décussées, simples, pétiolées ou sessiles; marge entière; nervures secondaires brochododromes, paraissant parfois eucamptodromes lorsque l'indument est épais; face inférieure glabre ou à indument clairsemé à dense, blanc à ferrugineux, persistant; domaties absentes. *Plantules*: stipules interpétiolaires; feuilles simples, marge grossièrement dentée, nervures secondaires craspédodromes à semi-craspédodromes, indument variable.

**Inflorescences** en capitule sphérique, chacun sur un pédoncule grêle. Capitules denses de 25 à 140 fleurs sessiles sans bractées. *Fleurs* bisexuées; hypanthe obconique, surface externe densément velue (poils longs, ondulés et parallèles, apprimés). Calice à 4 à 6 lobes, elliptiques à triangulaires, ± coriaces, souvent velu, à préfloraison valvaire. Pétales absents ou alternant avec les lobes du calice, petits, membraneux, oblancéolés, généralement glabres, se détachant facilement. Étamines 2 fois plus nombreuses que les lobes du calice; filets linéaires, cylindriques; anthères souvent apiculées. Disque absent. Gynécée inférieur, à 2 (3) loges, surface supérieure velue; styles 2 (3), grêles, velus au moins vers la base; ovules 2 par loge, placentation axiale. Formule florale (cas le plus fréquent):  $K5^* C5^* \text{ ou } C0 A5 \leftrightarrow 5^* G(2)^* Yx4$ ; formule globale:  $K4-6^* C4-6^* \text{ ou } C0 A4-6 \leftrightarrow 4-6^* G(2)^* Yx4$ .

**Fruits** indéhiscents, nombreux par capitule, de taille comparable aux fleurs, couverts d'une laine brun-orange abondante sur la surface externe (sauf la base) et la surface supérieure de l'ovaire; lobes du calice, styles et parfois filets persistants; fruits se détachant à maturité du capitule, mais maintenus par les poils emmêlés. *Graines* 1 par fruit, rondes, lisses, pâles et dures.

Le genre *Codia* comprend 15 espèces, toutes endémiques de la Grande Terre et des îles adjacentes au nord de celle-ci (Néba, Yandé, îles Belep, Balabio); il n'est pas connu de l'île des Pins. Il se rencontre en maquis, en forêt, en lisière de forêt et dans certaines végétations secondaires ou dégradées (y compris la savane à niaouli – *Melaleuca quinquenervia* (Cav.) S.T. Blake, Myrtaceae), de 0 à 1050 m d'altitude, sur substrats ultramafique et non-ultramafique. Il est connu à l'état fossile en Australie (Barnes & Hill 1999).

Le nom *Codia* est dérivé du grec « kodia » ou « kodeia » désignant une fleur ou inflorescence en boule. Ce genre fut décrit par les naturalistes allemands Johann et Georg Forster qui accompagnèrent James Cook durant son deuxième voyage autour du monde. Ils récoltèrent cette plante lors de leur passage à Balade en septembre 1774.

Fig. 1. Pages 34 and 35 of *Flore de la Nouvelle-Calédonie* 26: Cunoniaceae, introducing the genus *Codia*. (see article on facing page)

## Book review: Flore de la Nouvelle-Calédonie 26: Cunoniaceae.

Rhys Gardner

The region between New Guinea and New Zealand is usually known as "the South-West Pacific", but the romantic French call it Océanie, and treasure as its jewel the uniquely interesting island of New Caledonia. How could the plants there be so diverse, on a landmass just a tenth the size of New Zealand, and one that was fully submerged a mere 37 million years ago? (See Heads (2013) and Nattier et al. (2017) for differing ideas about the island's biogeography).

The Flore de la Nouvelle-Calédonie ("FNC") series began in 1967 with Sapotaceae, one of the larger families: 75 species in an extraordinary 16 genera. Big volumes followed on ferns, Proteaceae, gymnosperms, Orchidaceae and Apocynaceae. Mainly smaller families have featured in the last twenty years but the era of the blockbuster is not over: the genus *Phyllanthus* has 116 spp., and John Dawson took two volumes to account for Myrtaceae (incl. 66 spp. of *Syzygium*!). About half the flora, including Cyperaceae and Poaceae, is still to be treated; see Jaffé et al. (2001) for a review.

FNC's first twenty-five volumes were produced by the Natural History Museum at Paris. They are standard-size books, in lateritic-orange paper covers, section-bound and of matt-finish paper, thus opening to lie non-reflective by one's elbow at the microscope. Their typeface is of a size and weight to suit ageing eyes and imperfect lighting. Each species is mapped, vouchered, and illustrated by a well-crafted ink drawing. They have been called "staid" but in my opinion they are classics of thoughtful, inexpensive, effective design.

However, there is a problem: FNC 1–25 is entirely in French. School education here at the wrong end of the subtropics gives some exposure to Polynesian languages (good if you want to do conservation work) but increasingly neglects European ones. Fortunately, the logical French have come to our rescue: FNC 26 has its principal keys duplicated in English (Hopkins et al. 2014).

There is another problem: many of us now want sugar in our *café au lait*; that is, in recent times publishers of taxonomy have discovered the marketing power of colour. *Taxon* now startles with viridescent close-ups and cladograms that look like Tokyo at night, and even its Reviews section flaunts miniature coloured book-covers in front of its underfunded readers.

I have to wonder if all this might not be an arms race, dooming at least the smaller publishers' efforts

to sustain print productions (*va/le* Blumea) — "Keep colour for the e-version" might be a rallying cry. Too late, however, for FNC to take notice: this new volume has been redesigned and is overflowing with colour. A less-attractive group of plants (if there is such a thing) might not have been able to carry it off, but by luck or prescience one of New Caledonia's prettiest has been chosen to make the grand entrance.

The introduction says that this change in format is to make the series more widely accessible (English speakers are not mentioned specifically, but "*amateurs d'un jour*" are!), that is, FNC 26 is intended to act as a field guide as well as a Flora. Its production is now in the hands of IRD, the cash-rich French government research and development agency that before 1998 was called ORSTOM. Colour appears in FNC 26's photographs, maps, text boxes, tables and headings (see Fig. 1, facing page), keys, "practical keys" and "quick keys". An entity named Zipshebam.com (now invisible to Web-searches, perhaps having loaded up with champagne and departed our galaxy "now that its work is done") is credited with the graphical design.

To more sober matters. Preliminary work for FNC 26's taxonomy was carried out by Canberra legend, the late Ru Hoogland. Its completion is largely due to Helen Hopkins, who has been studying Cunoniaceae "head down at Kew", that is, without much help from molecular investigations, since the 1990s. She first visited New Caledonia in 1996. Her young but well-published French co-author, and the work's other three taxonomic contributors, are likewise field-hardened veterans. Help from the professional ecologists at Nouméa, and from several amateurs, including Auckland Botanical Society's friends M. et Mme Letocart, is gratefully acknowledged.

Nearly all taxa have been seen in their natural habitats. There has also been an abundance of herbarium material. The *Liste du matériel examiné* is given without a total, but I estimate (having stopped counting at the first of H. S. McKee's efforts: c. 150 collections for *Codia*) that there might be nearly 3000 in all. This must have sometimes been felt as a plethora not a blessing, but it would have been essential in the making of comparable descriptions, the detection of hybrids (four are sufficiently common as to be treated fully), and the accurate presentation of flowering and fruiting times. The specimens are listed at the rear of the book, facilitating that most pleasant of herbarium tasks, the effort-free putting of correct names on duplicates.

The rest of this review relates some facts about Cunoniaceae in New Caledonia (hereafter "NC"), then examines the new style as shown in the treatment of the first genus there, *Codia*.

FNC 26 first discusses the family's morphology, ecology, etc., with particular reference to NC. This introduction covers 30 or so pages, and except for two keys to the genera, is entirely in French. To fully conform to the new mission statement, a good long summary in English would seem to be needed. The tribal classification is referred to, but I would have liked to see a cladogram too. The family has a distinctive look (hairy, opposite leaves and big stipules) but only *Vitex* and Rutaceae are noted as having a confusing resemblance.

We learn that NC contains seven genera. *Hooglandia* is a monotypic genus, very rare and apparently related to New Guinea's *Aistopetalum*. *Codia* and *Pancheria* are endemic and together have 42 spp. *Cunonia* is nearly endemic (*C. capensis*, only distantly related to the NC plants, is confined to South Africa) and contains 24 spp. The remaining species are in *Geissois* (NC to Fiji), *Spiranthes* (Molucca Is. to Samoa), and *Weinmannia* (widespread, but absent from Australia). This makes a total (excluding the four hybrid taxa) of 87 species. All are endemic. They occur on New Caledonia's Grande Terre (mainland) and the small islands but are completely absent from the low-altitude, limestone Loyalty Islands. More than half are confined to ultramafic substrates. Although a good modern reference to ultramafic vegetation is supplied (Jaffré et al. (2013)) I would have welcomed a summary of the latest geological thinking about the island's formation. A geological map, and also a topographical map with place-names, should be on the currently blank endpapers.

Many representatives are shrubs or small trees. Few are small-leaved. Most prefer stable habitats, higher altitudes, and damp rather than dry sites. Rather few appear to be colonizers of disturbed open ground or *Melaleuca*-dominated savanna. Generally, they seem not to be fire-adapted, but at least a couple regularly re-sprout after fire. One or two in each genus are 20–30 m tall trees. These are mostly widespread on non-ultramafic terrain, but *Codia jaffrei* seems to be confined to the ultramafics, and *Geissois hirsuta* and perhaps *Cunonia linearisepala* grow on both kinds of substrate (but whether these can get to their maximum size on both kinds of substrate is not clear).

Judging from the keys and tables it appears that most of the morphological evolution of these plants has concerned their vegetative parts. The inflorescences are relatively uniform in each genus (but in *Cunonia* and *Weinmannia*, variable in their

aggregate arrangement). The fairly small flowers range from white to yellowish to red and are otherwise rather uniform (though some species of *Codia* are apetalous, and the colours vary sufficiently in *Cunonia* as to form the basis for a "quick key"). Pollination is largely accomplished by animals: by insects (work by New Zealander Barry Donovan is mentioned), birds (especially in the glorious *Geissois*), and probably by lizards too. Except for the drupe-bearing *Hooglandia*, the fruits are small-seeded capsules.

There are a few oddities. *Cunonia deplanchei* and a few other taxa are swamp-dwellers. The small-leaved *Pancheria minima* is a rare geoxylic (lignotuberous) shrub less than a metre tall and could well be fire-adapted. *Pancheria elegans*, which has willow-shaped leaves, may be a facultative rheophyte. Only *Geissois balansae* regularly has domatia. The big tree *Geissois hirsuta* and several smaller species are said to "hyperaccumulate" nickel (perhaps collections of these get a blue tinge on drying?).

Now for the treatment of the first genus, *Codia* (the logical French submitting, *bien sûr*, to the tyranny of the alphabet). Its first two pages face one another, and to help understand what I am talking about they are reproduced here as Fig. 1 (pg. 118). We see on the left a photograph of a *Codia* species and under it an assessment of the group's diversity, ecology and distribution, and also its etymology. On these two pages there are some very nice touches:

- a) The photograph introducing *Codia* is given a frame by the lowering of the text-box and the shortening of the lines of the synonymy opposite;
- b) the right-page has a coloured tab at its edge, and this carries on until the next genus is reached. The colour for each genus has been chosen to harmonize with the introductory photograph: dark green for *Codia* matches its matured leaves; mauve for *Cunonia* and scarlet for *Geissois* match their inflorescences, and dusky purple for *Pancheria* matches the bloom of its fruit-capsules. Elsewhere in the treatment of each genus the emblematic colour is repeated, for the box-lines, species' name headings and subheadings, and for the colouring of the ultramafic regions in the distribution maps.

The accounts of the fifteen *Codia* species are preceded by a comparative table, and a key in French, this repeated in English. A "quick key" then is given in both languages, but not so for a pictorial "practical key" and a table of comparison between four species that might often be confused — are we English neither practical nor easily confused?

Each species is given a page of description (including a modernized floral formula, which I cannot understand) and, on the next two or three

pages, notes on taxonomy and ecology, a line drawing (full- or half-page) and colour photographs. For *Codia* several artists have contributed the drawings, but their styles are very compatible. Some of the photographs would have benefited from a scale object.

Some fair time ago now an older botanist raised a courteous eyebrow on learning that I had not been to New Caledonia to see the plants I was studying. My thesis supervisor should have blushed too, though possibly he was acquainted with the island's distractions: the ORSTOM herbarium far too close to the beach at Anse Vata, the mind-blowing scenery, the balmy subtropical evenings.

#### References

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But away with these regrets, and with those for the old orange FNCs too. In the first paragraph of his account of what every good Flora should contain, *Taxon* reviewer Rudi Schmid (1979) said of multivolume productions:

“I can hardly expect the long-running [works like FNC] to change course significantly. After all, an ocean liner or aircraft carrier does not readily turn, let alone make a U-turn.”

But in Océanie, where nearly all botanical things are possible, a cruise ship has. *Bon Voyage!* to its helpful crew, and *Long Life!* to all its pretty passengers.

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## ***Wollastonia* and *Youngia* (Asteraceae): how they got their names**

**Rhys Gardner**

Towards the end of my Dictionary of Fijian higher-plant genera (Gardner 2017) there stand two giants of eighteenth century science, William Wollaston (1766–1828) and Thomas Young (1779–1829). They knew each other well and were fellow-secretaries of the Royal Society under Joseph Banks' long presidency (see Note 1, p. 123). They overlapped in their interests mainly in the field of physics, and share the glory of a major advance there, the realization that 'energy' is the crucial quantity in equations concerning heat, motion, etc.

Their busy, useful, and well-regulated lives are examined in the biographies of Robinson (2006) and Usselman (2015). The latter, on Wollaston, is particularly detailed, and anyone without a lingering fondness for school chemistry might find it rather gruelling revision.

In my Dictionary Young gets an adequate tribute but Wollaston certainly does not. To regain a balance, then, here is a very incomplete account of his scientific life.

First, we have Wollaston's youthful interest in botanical matters, culminating in his elucidating the nature of fairy rings (Notes 2 & 3). In these early days, as a doctor, he made discoveries in animal physiology too (Note 4).

Chemistry became Wollaston's focus. Using *platina* ore smuggled out of Spanish Colombia he made a long, arduous and secret exploration of its properties, and eventually found a way to bring its chief component, platinum, into a workable state. Metallurgy was the cutting-edge technology of the day, and platinum soon found use in the production of wires, crucibles, and (the inevitable military use) musket touch-holes that did not corrode. In this way Wollaston became quite adequately wealthy — rather to the annoyance of Banks, who felt that a Royal Society member should not have been so secretive.

In the later part of his career as a chemist Wollaston was able to provide accurate quantitative values for the combining of many of common substances, thus helping lay the basis for the atomic theory of chemistry.