

Cordyline indivisa in the British Isles

Gary Dunlop¹

Despite its common name of mountain cabbage tree, *Cordyline indivisa* is the most subtropical looking cabbage tree from New Zealand. It is also known as the broad-leaved cabbage tree and in New Zealand has a range of Māori names, including tōi.

The species was first described by the Prussian Johann Georg Forster in 1786 under the name *Dracaena indivisa* (Forster, 1786). He and his father Johann Rheinhold Forster accompanied James Cook on his second voyage around the world as the official naturalists, and found this species in Dusky Sound, Fiordland, in south-west New Zealand. Among other name changes, it was subsequently transferred to its current name, *Cordyline indivisa*.

Although it was introduced into cultivation in England almost 150 years ago, *Cordyline indivisa* is not so widely known or grown as the almost ubiquitous *C. australis* or cabbage tree (also known in the UK as the cabbage palm), found in coastal areas around the British Isles and introduced into cultivation several decades earlier.

It is not clear exactly when *C. indivisa* was first introduced into cultivation in the UK but a specimen, which must have been several years old, was put up for award by John Standish of the Sunningdale Nurseries (Berkshire, England) in 1860 and received a 'First Class Certificate' (FCC) from the Royal Horticultural Society (RHS) (Anon., 1860). Ambroise Verschaffelt, the editor of *L'Illustrations Horticole* based in Ghent (Belgium), was quick off the mark and published the first illustration of Standish's plant, in colour, the same year (Verschaffelt, 1860). It shows a plant about 2–3 years old (Fig. 1). Presumably the editors of *Curtis' Botanical Magazine* preferred to wait until the flowers could be illustrated before featuring the plant, which they finally did in 1922 from material supplied from

Mount Usher Garden in County Wexford, south of Dublin, courtesy of Mr Walpole (Stapf, 1922).



Fig. 1 The earliest colour illustration of *Cordyline indivisa*, published in 1860 in *L'illustration Horticole*, tab. 264. Image courtesy Missouri Botanical Garden, www.botanicus.org.

As the common name mountain cabbage tree suggests, *Cordyline indivisa* typically grows at higher elevations than *C. australis* and thus may be relatively hardier than its more common relative. Lawrie Metcalf notes "being a plant of high rainfall regions and growing in cool mountain forests which are frequently shrouded in mist, it demands a cool moist soil, and in warm climates a cool rather shady position in the garden" (Metcalf, 1987). Although not as ubiquitous as *C. australis*, *C. indivisa* nevertheless has an extensive natural range growing in subalpine forests from Hunua and Coromandel Ranges south to Banks Peninsula and Fiordland (Moore and Edgar, 1970; Fisher et al., 1988; Simpson, 2000).

Cordyline indivisa as its specific name implies forms a stout, usually single-stemmed tree, with a normally unbranched head of pale green

leaves, radiating from the top of the trunk, which can be up to 2 m long and 150 mm at its widest, gradually tapering to the apex (Moore and Edgar, 1970; Poole and Adams, 1990). The conspicuous central vein is orange, with many finer orange veins running the length of the leaves, although these are less conspicuous on the glaucous undersides, or even on the upper surface from any distance. The maximum height of the tree is about 8 m although a maximum of 6–7 m is more common in cultivation when the plants are not drawn up in dense forest. The leaves are evergreen with the older leaves persisting for several years before dying and turning brown as the sap drains from them. During their senescence they gradually droop before finally hanging vertically beside the trunk. At this stage they can be fairly readily removed with a downward tug, starting with the lowest one, as the base of the leaves overlap one another where they attach to the trunk.

Some people may consider the plant to be at its most exotic looking at about 5–6 years old and about 2 m tall, with several years of foliage radiating out in an almost spherical shape and the oldest leaves touching the ground, but the young trunk still disguised by the attached foliage. It is only at this stage that a fleeting resemblance to an *Agave* could be imagined, though one without succulent leaves. One such plant is illustrated by Cave and Paddison (1999), although the size of this plant is difficult to judge from photographs. However, my photograph of a similar specimen (Fig. 2), with Jeff Irons the President of the Australasian Plant Society (UK) alongside, provides a good sense of scale.

While the date of first introduction of *C. indivisa* is not known with certainty, two nurserymen, Mr B.S. Williams and Mr J. Burley, both exhibited specimens at the horticultural exhibition of 1869

¹ 35 Ballyrogan Park, Newtownards, Co Down, BT23 4SD, Northern Ireland; gary.dunlop@btinternet.com

as part of displays of 'stove foliage' plants (plants that require warm greenhouse conditions in winter), and Mr Williams put on a similar display the following year (Anon., 1969, 1970). It is likely these specimens did not survive for long in cultivation as apart from apparently being treated as stove plants *C. indivisa* resents being pot grown for any length of time. One plant growing in the open at Tresco Abbey in the Scilly Isles first flowered in 1895 (Fitzherbert, 1901) and was apparently first recorded at Tresco in 1853 (King, 1985). This specimen may be part of the same batch from which Mr Standish's plant received its award.



Fig. 2 Young (5–10 year old) plant of *Cordyline indivisa* with Jeff Irons at Mt Stewart, Co Down, N Ireland.

The various species of *Cordyline* were easily confused both in cultivation and by botanists from an early date. In 1859 the German botanist Eduard von Regel published a description of *C. indivisa* in *Gartenflora* which turned out to be *C. australis*. Mr Lee of the Vineyard Nursery obtained an Award of Merit from the RHS in 1864 for *C. indivisa* which was later correctly identified as *C. banksii*. Around the turn of the century various periodic notes and illustrations in the *Gardeners' Chronicle* indicated the degree of confusion that still existed amongst the species in cultivation, with a large clump of *C. banksii* growing in Torquay (Devon, England) in 1901 captioned *C. indivisa* (Ramsey, 1901) but some weeks later it was correctly identified by Mr S.W. Fitzherbert (Ramsey, 1901). A row of mature *C. australis* at Abbotsbury Gardens (Dorset, England) was also captioned as *C. indivisa* but corrected. This

confusion was finally resolved with the first publication of a photograph of a seven year-old plant of *C. indivisa vera* growing in Castlewellan Arboretum (County Down, Northern Ireland), in 1904 (Ryan, 1904) and again as a supplementary illustration to *Gardeners' Chronicle* in 1906 (Ryan, 1906). The suffix 'vera' (Latin for genuine, real, or true) was apparently added by Mr Burbidge of Trinity College Gardens, Dublin who obtained the seeds from New Zealand and supplied some to Lord Annesley at Castlewellan, to emphasise that they were the true species (Ryan, 1901). The following year a photograph by Mr Fitzherbert of both *C. australis* and *C. indivisa* growing in proximity to one another was published (Fitzherbert, 1907) thus removing any further confusion between the two species.

Younger plants have larger leaves than mature plants, and when growing in optimal conditions they may be even larger than typical, as appears to be the case with an immature specimen 3.5–4 metres tall at Mount Stewart (Co Down, N Ireland, Fig. 3 A–C).



Fig. 3 Immature (10–15 year old) specimen of *Cordyline indivisa* with relatively large leaves at Mt Stewart, Co Down, N Ireland. **A**, entire plant. **B**, Leaf measuring about 2.2 m long and 200 mm at its widest, larger than the 1–2 m × 100–150 mm cited by Moore and Edgar (1970). **C**, close-up of a leaf backlit by the sun and showing venation patterns.

In reasonable moist and shaded growing conditions, based on my experience of growing it, *C. indivisa* takes about 20 years to approach its typical full height in cultivation of 5–6 metres. The tallest specimens are likely to grow in reliably moist conditions.

Once mature, one or more additional growth points can sprout from the base of the trunk. These will start to grow into additional trunks as the head of the original tree gradually weakens and eventually dies. In time, after several generations of this process, the tree forms clumps of full height trunks as is evident in the several venerable plants at Castlewellan Arboretum which are just over 100 years old. They include the champion specimen in the British Isles (Fig. 4), which is multi-stemmed, and one trunk has flowered at least twice with an interval of 2–3 years between flowering (Johnson, 2008). Trees measured there are considerably taller, at 7.5 metres, than the other one mentioned by Johnson (2008) at Glendurgan (Cornwall, England) at 3 metres tall. There is however a possibly even taller specimen at Mt Stewart, growing in moist shade, though it may be a cluster of plants in close proximity with rather thin trunks and small heads, and probably drawn up by the proximity of a large rhododendron, which is still taller than the *Cordyline*.



Fig. 4 Mature *Cordyline indivisa* at Castlewellan, Co Down, N Ireland. This champion tree is more than 100 years old.

It is not clear how many years it takes before *C. indivisa* first flowers and it is reputed to be shy to flower. However, at Mt Stewart one robust plant flowered at barely 3 m tall under the optimum conditions of moist soil and a humid shady environment.

My plant of *C. indivisa* took about 20 years to flower. My tree, which is planted in shade in reasonably moist ground (which can become dry in summer), produced its first basal growth point in spring 2007, when it was about 18–19 years old, and produced its first flower spike in 2009. It produced the flower spike on the side least easily seen, and was only discovered on 1st May (late spring) when some of the drooping dead leaves were being removed. It was fully formed and in bud, shortly before the flowers started to open. The inflorescence must have started to develop shortly after mid winter, and throughout a rather long cold spring. It emerged from below a bract, which appears to be a modified leaf, broader and shorter than the normal leaves. Closer inspection revealed a much smaller secondary inflorescence immediately above the main one, with its own smaller bract above it, but rather larger than the inflorescence, which was only partially visible between the two bracts (Fig. 5).



Fig. 5 *Cordyline indivisa* flowering in authors garden, Co Down, N Ireland. Note the small secondary inflorescence with its own bract.

The flower spikes of *C. indivisa* are quite distinct from the open and upward pointing inflorescences of both *C. australis* and *C. banksii*. Unlike all other species in the genus, the inflorescence is very dense and

droops downwards close to the trunk, similar to some true palms. Simpson (2000) states that the inflorescence of *C. indivisa* has a reduced structure, with only three orders of branching compared to four in the other species.

The flowers (Fig. 6) are described as perigones, i.e., in which the perianth is not clearly differentiated into a calyx and corolla. They are purplish externally and white internally suffused with green and lilac, and when fertilised mature to form purplish blue berries. John Salmon published a good close-up photograph of the flowers (Salmon, 1999) and the spike in flower (Salmon, 1986).



Fig. 6 Close-up of the inflorescence in Fig. 5 showing the individual flowers and buds.

The flowers open from the base of the various segments of the inflorescence and from the base to the tip. The small pale green ovary starts to expand after fertilisation, gradually turning deeper green with the surrounding flower turning brown and eventually shedding the stigma and the surrounding anthers, before eventually turning purplish blue. Whilst no agent was noticed, flies are a likely agent of fertilisation and midges are abundant in my garden during the flowering season. Elsewhere in *Cordyline*, Simpson (2000) mentions that *C. australis* flowers are adapted for insect (moth, fly, and other insect) pollination.

According to Ross Beever (pers. comm. 2009), New Zealand species of *Cordyline*, other than *C. indivisa*, are self-incompatible and set little or no fruit in isolation (although often hybridising). In contrast, Dr Beever suspects that *C. indivisa* is self-compatible, and cases of good seed set in isolated plants support this hypothesis. My garden in Co Down is isolated in farm land and the nearest house and garden is about 1km away. *C. indivisa* is uncommon in the region,

as it is elsewhere in the British Isles. The nearest *C. indivisa* that I know of is at Mt Stewart, about 12km away. This indeed supports the idea that *C. indivisa* is self-compatible. My plant is currently bearing immature berries, which show remarkably good seed set (Fig. 7 A–B).



Fig. 7 Immature berry-like fruit showing a remarkably high fruit set in the authors' garden. **A**, general view. **B**, close-up.

C. indivisa has a fairly compact root ball and probably makes new roots annually like some other New Zealand genera, such as *Phormium*. Reasonably mature specimens can be moved successfully as was undertaken many years ago at Mt Stewart Garden with several specimens. One unexpected side effect of the move was that the transplanted trees promptly produced new growth points at the base of the trunk. Nigel Marshall, the then head gardener, suspected that severing the root tips prompted this reaction and verified his theory by cutting around the root ball of a couple of plants that were not moved which resulted in similar sprouting of new growth points at the base of the trunk (Nigel Marshall, pers. comm. 1992, Fig. 8).

The trunk of *C. indivisa* is usually unbranched (Moore and Edgar,

1970; Simpson, 2000) and shoots sprouting from part way up the trunk are uncommon (Lawrie Metcalf, pers. comm. 2008). However there is one specimen at Mt Stewart which has not only a double head but also two well developed growth points sprouting from half way up the trunk (Fig. 9). Replacement shoots arise from the axil(s) of the uppermost leaves usually following flowering, and trunk and basal sprouts arise when there is some damage and consequent change in hormone balance that releases the apical dominance. The trunk has numerous dormant buds laid down in the axils of leaves before the leaves are lost (Tomlinson and Fisher, 1971; Simpson, 2000; Ross Beever, pers. comm. 2009).



Fig. 8 Group planting of *Cordyline indivisa* at Mt Stewart showing secondary basal growth.



Fig. 9 *Cordyline indivisa* at Mt Stewart showing a double head of leaves and two well developed growth points half way up the trunk.

C. indivisa grows well in Co Down with quite a few mature specimens in both Castlewellan and Mt Stewart. The botanist Michael Leer commented that when he undertook the surveys of woody plants for the National Trust he was surprised that he did not see any mature plants in either Devon or Cornwall (Michael Leer, pers. comm. 1997). The species was relatively widely grown there almost a century ago so it is surprising that mature specimens are not common in the south west of England. The climate in the coastal gardens there would be milder than Co Down, but probably hotter and drier in summer with lower humidity. As early as 1906 Mr Arthington Worsley suggested "our midsummer heat may be too much", on the basis that "it is a plant of higher mountains in New Zealand (where very severe frosts occur)" (Worsley, 1906). Dry conditions can certainly greatly reduce the length of the leaves and overall size of the head as one specimen at Mt Stewart has displayed. It is growing in full sun and has clearly suffered during several long, dry periods in the last couple of years. By 1923, the Rev. A.T. Boscawen VMH curiously noted that "it should be, where it has the protection of neighbouring trees, as it is not so hardy as the common *C. australis* and *C. banksii*" (Boscawen, 1923). However, the trees at Mt Stewart are quite cold-hardy, as, whilst the double row of *C. australis* in the Italian Garden were killed back in the winter of 1981–1982 with temperatures down to -16°C , the nearby specimens of *C. indivisa* were unaffected. My tree was raised by Nigel Marshall from seed set at Mt Stewart, given to me as a young plant and is a sibling of some of the other young trees at Mt Stewart. It has survived a couple of nights of -13°C about 10 years ago without any problem and has also proved tolerant of the much more exposed conditions in my garden.

Raising *C. indivisa* from seed is not without its problems as Thomas Ryan, the gardener at Castlewellan a century ago, described (Ryan, 1906). The first batch of seed, obtained by Lord Annesley from Mr Dorrien Smith of Tresco Abbey, failed to germinate. The seeds were planted in

a greenhouse with a temperature of about 13°C . Subsequently the seeds obtained from Mr Burbidge were sown in a pan in a cold frame and took about 3 months to germinate. Within a few days of the first couple of dozen seedlings that germinated, "all lay flat on the ground through lack of moisture and in a rash moment we took the seed pan to a water tank and let the soil soak from the bottom upwards." Whilst a couple of days later the seedlings were well recovered, the remaining seed had rotted. So it would seem that cool and moist conditions are necessary for germination but that soil that is too wet will cause the seed to rot.

Otto Stapf mentions that *C. indivisa* can easily be propagated from cuttings, but to do so it is necessary to decapitate the plant (Stapf, 1922). This will produce many side shoots from the trunk which can be used for cuttings. I intend to try such cuttings later in 2009 but do not intend to decapitate my tree, nor do I need to. In late summer 2008, it produced 20 shoots sprouting from the trunk over much of its height (Fig. 10). This may be due to the stress and loss of apical dominance following a nine-week drought.



Fig. 10 *Cordyline indivisa* with multiple shoots sprouting from the trunk in authors' garden, Co Down, N Ireland.

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References

- Angiosperm Phylogeny Group (2003). An update of the Angiosperm Phylogeny Group classification for the orders and families of flowering plants: APG II. *Botanical Journal of the Linnean Society* 141: 399–436 (See www.mobot.org/MOBOT/research/APweb/welcome.html).
- Anon. (1860). RHS J, vol. P1, p.130.
- Anon. (1869 & 1970). *The Gardener*. Blackwood & Sons Edinburgh & London. p.419 & p.34.
- Boscawen, A.T. (1923). Some New Zealand trees and shrubs in Cornish gardens. RHS J. Vol. 48, p.7.
- Cave, Y. and Paddison, V. (1999). *The gardener's encyclopaedia of New Zealand native plants*. Godwit, Auckland.
- Endlicher (1836). Ann. Wien. Mus. 1: 162 (No. 766).
- Fisher, M., Satchell, E. and Watkins, J. rev. ed. (1988). *Gardening with New Zealand plants, shrubs & trees*. Collins, Auckland.
- Fitzherbert, S.W. (1901). *Cordylina indivisa* and *C. banksii*. *Gardeners' Chronicle*, Jan. 24, p.63.
- Fitzherbert, S.W. (1907). Fig. 54 *Cordylina indivisa* in the foreground and *C. australis* behind. *Gardeners' Chronicle*, Feb. 23, p.123.
- Forster, J.G.A. (1786). *Florulae Insularum Australium Prodomus*. Göttingen, p.24.
- Johnson, O. (2008). Half hardy trees in Britain and Ireland.
- King, R. (1985). *Tresco: England's island of flowers*. Constable & Co. London. p.142.
- Metcalf, L.J. (1987). *The cultivation of New Zealand trees and shrubs*. Reed Methuen, Auckland.
- Moore, L.B. and Edgar, E. (1970). *Flora of New Zealand*. Vol. II. Indigenous Tracheophyta: Monocotyledones except Gramineae. Wellington.
- Poole, A.L. and Adams, N.M. (1990). *Trees and shrubs of New Zealand*. DSIR Publishing, Wellington.
- Ramsey, H. (1901). *Cordylina indivisa*, Supplementary illustration. *Gardeners' Chronicle*, Jan. 19th.
- Ryan, T. (1901). *Cordylina indivisa vera* and *C. banksii*. *Gardeners' Chronicle*, Feb. 16, p.112.
- Ryan, T. (1904). *Cordylina indivisa vera* & accompanying photograph. *The Garden*. No. 1717, p.261, Oct.15.
- Ryan, T. (1906). *Cordylina indivisa vera* Supp. Illustration and p.245, *Gardeners' Chronicle*, October 6.
- Salmon, J.T. (1986). *The Reed field guide to New Zealand native trees*. Reed Methuen, Auckland.
- Salmon, J.T. (1999). *Native New Zealand flowering plants*. Reed, Auckland.
- Simpson, P. (2000). *Dancing leaves: the story of New Zealand's cabbage tree, tī kōuka*. Canterbury University Press, Christchurch.
- Stapf, O. (1922). *Cordylina indivisa* Tab. 9096, *Curtis Botanical Magazine*.
- Steudel, E.G. (1840). *Nomenclator botanicus*. Ed. 2, part 1: 419.
- Tomlinson, P.B. and Fisher, J.B. (1971). Morphological studies in *Cordylina* (Agavaceae): 1. Introduction and general morphology. *Journal of the Arnold Arboretum* 52: 459–478.
- Verschaffelt, A. (1860). L'illustration Horticole Pl. 264 & accomp. text.
- Worsely, A. (1906). Notes on some Cornish gardens. RHS J. Vol. 32, p.193.

Note on taxonomic classification in the genus *Cordylina*

The history of taxonomic changes and names used in *Cordylina* is complex.

One problem has been the correct family placement. *Cordylina* has been placed in many families including the Agavaceae, Asparagaceae, Liliaceae, and Lomandraceae. However, recent DNA work places it with the Laxmanniaceae (Angiosperm Phylogeny Group, 2003).

There have also been many name changes at the genus level, and current taxonomy recognises about 15 species of *Cordylina*, native to the western Pacific Ocean region, from New Zealand, eastern Australia, south-eastern Asia, Polynesia and Hawaii.

For the mountain cabbage tree, several other names have been applied to what is now known as *C. indivisa* (G.Forst.) Endl. – *C. hookeri* Kirk (1874), *C. hectori* Colenso (1893), *Charlwoodia indivisa* (G.Forst.) Don (1830), *Dracaenopsis indivisa* (G.Forst.) Planch. (1851) and *Terminalis indivisa* (G.Forst.) Kuntze (1801).

The correct authority for *C. indivisa* may be Endlicher rather than Steudel as used by Moore and Edgar (1970) and other New Zealand botanists. Endlicher (1836) appears to have validly published the name before Steudel (1840) so under the International Code of Botanical Nomenclature the earlier name must take priority.

The convolutions of name changes in botany is nothing new, but in the early days of botany a variety of names and descriptions for plants were published and this inevitably took some sorting out.

Gary Dunlop is an amateur gardener who grows a very diverse range of plants in an exposed and windy two-hectare garden with shallow light soil on top of a dolerite sill, with the bedrock protruding through the ground in many places. He has an interest in researching and writing about some less well known plants.

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