

The mysterious *Widdringtonia wallichii* (Cupressaceae) and the correct scientific name for the Clanwilliam cedar

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We review the complicated nomenclatural history of the Clanwilliam cedar. Much of this centres around the application of the name *Widdringtonia wallichii* Endl. ex Carrière. We are unable to identify any original material of this name and designate a neotype to fix its application as it appears to have been originally intended and as it is currently understood. We also confirm that the correct name for the Clanwilliam cedar is *W. cedarbergensis* J.A.Marsh.

Keywords: Africa, *Frenela hugelii*, *Widdringtonia cedarbergensis*, nomenclature, typification.

Introduction

Widdringtonia Endl. (Cupressaceae) is a small genus of four species of evergreen shrubs or trees of limited distribution in southern and east tropical Africa (Marsh 1966a; Page 1990; Farjon 2005). Among the three southern African species, the Clanwilliam cedar is a large and charismatic tree, and a major focus for conservation efforts.

The Clanwilliam cedar is endemic to the Cederberg in Western Cape, South Africa, and is the only true 'fynbos tree' in a flora of over 9 300 species of seed plants in the Core Cape Floristic Region (Manning & Goldblatt 2012). As such it was important as a source of timber in the region in the past. It is still an icon of the Cederberg Mountain range, a popular hiking and holiday destination that derives its name from the species. The gradual decline in the cedar populations in the region has been well documented, leading to substantial research on the topic, as well as citizen-science activities around replanting the species (Manders et al. 1990; Mustart 1993). The Clanwilliam cedar is a flagship species for conservation and is among the best-researched species in the Cape flora (Richardson 1993). This includes work on palaeoclimates, phytochemistry, conservation biology, population biology and population genetics. There is also a substantial grey literature, published as internal reports by researchers in the Forestry Department, summarised by Richardson (1993).

The taxonomic distinctness of the Clanwilliam cedar has not been in question since specimens were first collected in the middle of the nineteenth century (Endlicher 1847; Masters 1905; Stapf 1933), but its nomenclatural history has been fraught by uncertainties and frequent changes. The species was initially, and for a long time thereafter, known under the misapplied name *W. juniperoides* (L.) Endl. but has subsequently been identified with the name *W. cedarbergensis* J.A.Marsh since that name was published (Marsh 1966b). Recently, however, the older name *W. wallichii* Endl. ex Carrière (Carrière 1867) has

been applied to the species, without fully appreciating the identity of this name nor the confusion that this might cause. Although *W. wallichii* was treated as a later synonym of *W. nodiflora* (L.) Powrie by Farjon (2001, 2005), we establish that the application of this name is problematical as it is not possible to identify any original material on which it was based. The attempt by Farjon (2005) to lectotypify the name and thus fix its application is not effective, and we therefore designate a neotype. We also establish that *W. cedarbergensis* is legitimate and that it is the correct name for the Clanwilliam cedar.

Materials and methods

Nomenclatural conclusions are based on the *International Code of Nomenclature for algae, fungi and plants (Shenzhen Code)* (Turland et al. 2018). Authors of plant names are abbreviated following the International Plant Names Index (<https://www.ipni.org>).

Taxonomic History

The first botanist to collect specimens of the Clanwilliam cedar was Johann Franz Drège (1794–1881), who collected the species in December 1831 near the summit of the ‘Blaauwberg’ in the northern Cederberg. We have been unable to locate a mountain of this name in the Cederberg but its location ‘inter Boschklouf et Honingvalei [Heuningvlei]’ places it in the Krakadouw Mountains. Drège distributed his collections under the manuscript name *Callitris arborea* Schrad. (see the duplicate at the Muséum National d’Histoire Naturelle MNHN-P01582404) although others bear the name *Callitris arborea* Lehm. ms. (see the duplicate MNHN-P-P01582405). It appears that Drège also distributed Cederberg material that had been collected at much the same time by C.F. Ecklon & C.L. Zeyher under the same name (see MNHN-P-P01582399).

The name *Callitris arborea* was published without description in the *Zwei Pflanzengeographische Documente* (Drège, 1844: 73 [as *Calitris* (sic.) *arborea*] and on page 170 in the index [as *Callitris arborea* Schrad.]), and the name was also occasionally used in Forestry reports in the late 19th and early 20th centuries. As it was not accompanied by a description it is treated nomenclaturally as a *nomen nudum* and not validly published (ICN Art. 38.1: Turland et al. 2018). Diederich von Schlechtendal (1794–1866), Director of the Botanical Gardens at the Martin Luther University of Halle-Wittenberg at the time, proposed the alternative name *Callitris stricta* for the Drège collection (Hooker, 1845; Schlechtendal, 1864) but this is also a *nomen nudum* without description.

Endlicher (1847) subsequently listed and described Drège’s collection from the Cederberg under the name

Widdringtonia juniperoides in his *Synopsis Coniferarum* when he established the genus *Widdringtonia* for the southern African Cupressaceae. His citation of the earlier *Cupressus juniperoides* L. in the synonymy makes it clear that he was publishing the new combination *W. juniperoides* (L.) Endl. based on that name. The name *C. juniperoides* is currently regarded as a synonym of *W. nodiflora* (L.) Powrie, a relatively widespread resprouting species that ranges from the south-western Western Cape along the eastern escarpment to southern Malawi. Endlicher (1847) was clearly incorrect in applying the name to Drège’s Cederberg material. Nevertheless, it was in this sense (i.e., as applying to the Cederberg species) that the name *W. juniperoides* was subsequently used (e.g., Masters 1905; Stapf 1933).

At the same time, Endlicher (1847) listed the name *W. wallichii* as an uncertain species, based solely on a comment by Hooker (1845: 141) about a collection that had been forwarded from South Africa by Nathaniel Wallich. The specimen that Hooker (1845) was referring to is K75280 at Kew, bearing the label ‘*Pachylepis*, *P. cupressoides* ... *C. arborea* Schrad., Swellendam, Dr Wallich’ (Figure 1).

Although Stapf (1933: 24) in his treatment of the genus for the *Flora Capensis* was aware of the problem of the misapplication of the name *W. juniperoides*, he resorted to the extraordinary and nomenclaturally indefensible solution of excluding all synonyms from *W. juniperoides* sensu Endlicher in order to keep it in the sense that Endlicher (1847) intended. This procedure left the Clanwilliam cedar without a validly published scientific name, and Marsh (1966b) accordingly published the name *W. cedarbergensis* for the species, designating a contemporary collection made by the Forestry expert Hilmar Lückhoff (1916–1995) as the type.

To confuse matters further, although the name *W. wallichii* was published without a description by Endlicher (1847), and is thus a *nomen nudum*, it was mistakenly accepted as validly published in that publication by Farjon (2001, 2005) in his two definitive works on conifers, where it is incorrectly cited as *W. wallichii* Endl.

Here matters rested until Govaerts (2011) realised that the name *W. wallichii* had in fact been validly published by Carrière (1867: 62). This validating description of *W. wallichii* by Carrière (1867) had been noted but ignored by Stapf (1933) in the *Flora Capensis*, and completely overlooked by Marsh (1966a, b) in the *Flora of Southern Africa*. Both authors, however, considered that the name *W. wallichii* applied to the Cederberg taxon (i.e., as synonymous with *W. juniperoides* sensu Engler). The basis for this interpretation appears to be the opinion by Stapf (1933: 24) that the locality ‘Swellendam’ on the Wallich collection at Kew was an error. This conclusion stems from Stapf’s observation that Wallich had annotated other collections of *Widdringtonia* made by

him and held in the British Museum as having been collected in the Cederberg. Stapf (1933) did not consider the possibility that Wallich had in fact collected specimens of *Widdringtonia* in both locations!

Farjon (2001, 2005), however, was in no doubt that the Wallich collection from Swellendam was correctly localised and he identified it as *W. nodiflora*. In contrast, Govaerts (2011) followed Stapf (1933) and regarded

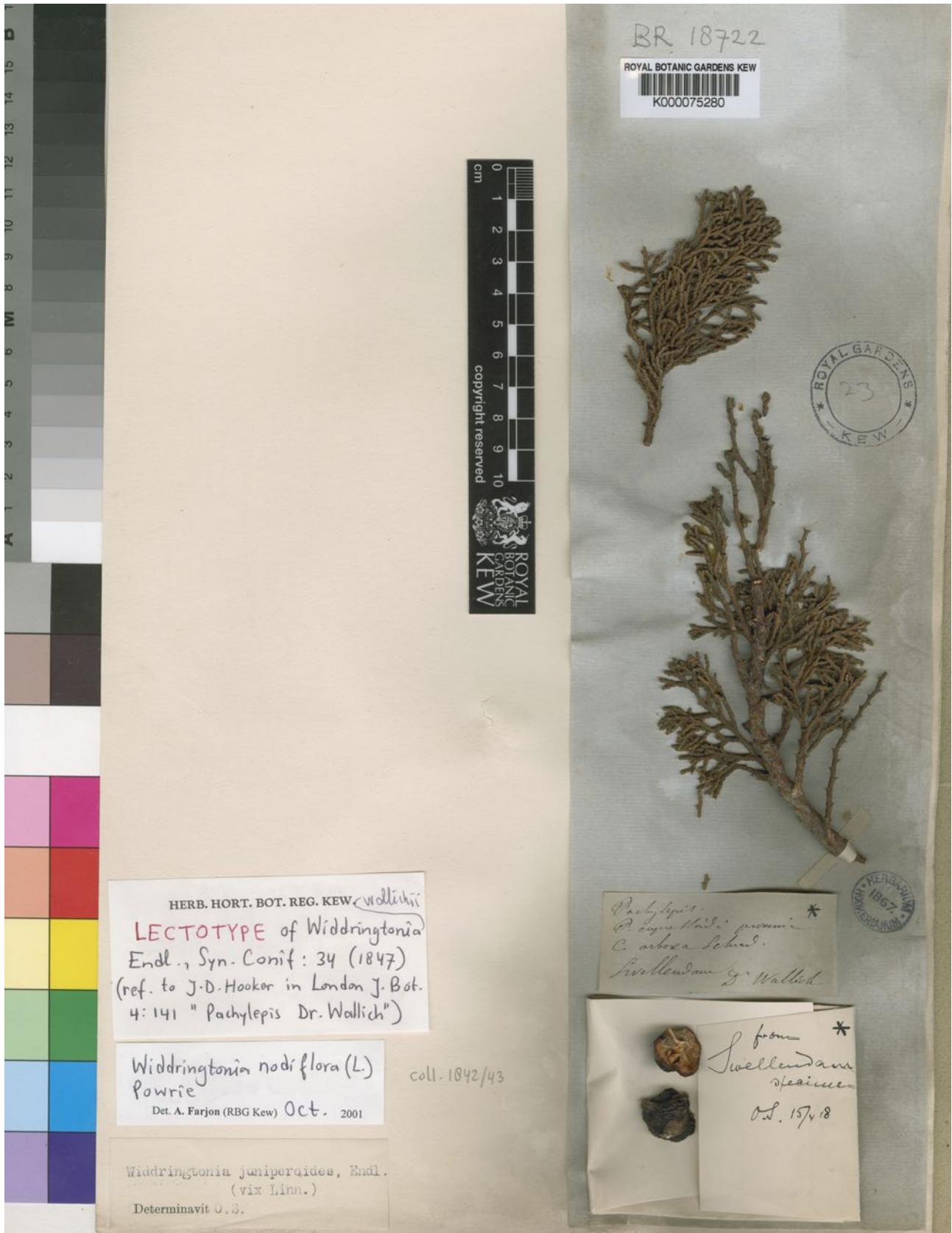


Figure 1. Specimen of *Widdringtonia nodiflora* (K75280) sent by N. Wallich to J.D. Hooker, and the origin of the name *W. wallichii*.

the name *W. wallichii* Engl. ex Carrière (1867) as the earliest available name for the Cederberg taxon, thereby relegating *W. cedarbergensis* to synonymy.

The problem, however, is that it is not clear to which species the name *W. wallichii* should be applied. The protologue (Carrière 1867) contains three elements that could be used to establish the identity of this species: the description, the provenance of the species and the synonym citations. No actual specimen is cited.

The description of *W. wallichii* is very general and deals only with the growth form and the leaves. The female cones and the seeds, which are diagnostic for generic and specific identification (Marsh 1966a), are not mentioned. The description of the height and habit of the species ('arbre pyramidal, atteignant 12 mètres et plus de hauteur') are evidently based on cultivated plants as this level of detailed information was not generally added to herbarium specimens at the time. It is certainly not on any of the collections of Drège, Ecklon and Zeyher, or Wallich. The location and source of this cultivated material is not given and from the description itself it is not even clear if it was a *Widdringtonia* that Carrière was describing.

The locality data for *W. wallichii* are equally vague, being merely 'Habite l'Afrique australe', with an added note that it was introduced (presumably into cultivation in Europe) around 1844. These observations might be based solely on the information that Endlicher (1847) associated with the name, and do not necessarily indicate Carrière's personal knowledge. Indeed, this vague information contrasts markedly with his detailed entry for *W. juniperoides* (Carrière 1867: 59), viz. '...nommé Cerdenberg (sic.), à cause de l'abondance de ces arbres, ains que les monts Blaubeurg', in which he states it to be not only common in the Cederberg and the origin of the name itself, but critically cites it as occurring on the Blaauwberg, the locality of Drège's collection of the Clanwilliam cedar. This makes it quite clear that Carrière identified Drège's collection with *W. juniperoides* sensu Engler and not with *W. wallichii*.

The synonymy for *W. wallichii* includes three components:

1. 'FRENELA HUGELII, Hort., Carr. Man. Des Pl. IV. 318. – Tr. gén. Conif. 73 (pro parte). Gord. Pinet. 85 (pro parte).'

The name *Frenela hugelii* hort. ex Carrière (now a synonym of *Callitris columellaris* F.Muell.) was first published by Carrière (1855: 73) in his *Traité général des Conifères*, based on a plant from Moreton Bay in Australia. The cone is described as having six scales in two whorls, a character state that is found in *Callitris* but never in *Widdringtonia*, which characteristically has four scales in the cone. It is

possible that the specimen on which Carrière based his description of *W. wallichii* was previously included in *F. hugelii*, and so the 'pro parte' citation can be understood to mean that it had been incorrectly included under the Australian species. It does not, however, tell us what Carrière (1855) identified as *W. wallichii* but only what he did not.

The citation by Carrière (1867) of 'pro parte' against the protologue citation of the earlier legitimate name *F. hugelii* Carrière (1855) that he cited in the synonymy of *W. wallichii* is a clear indication that he could be excluding the type of *F. hugelii*, and the name *W. wallichii* should not therefore be treated as an illegitimate superfluous name (ICN Art. 52. Ex. 5 & Note 1, Turland et al. 2018). The unqualified citation by Carrière (1855) of the later publication of the name *F. hugelii* in the *Manuel Général des Plantes* (Duchartre, 1865) constitutes a later homonym or an isonym depending on typification but does not affect the legitimacy of the name *W. wallichii*.

2. 'WIDDRINGTONIA WALLICHIANA, Gord. Pinet. Suppl. 107.'

(See comments below)

3. 'WIDDRINGTONIA WALLICHII, Endl. Syn. Conif. 34. Lindl. et Gord. Journ. Hort. Soc. V. 203. Carr. Tr. géén. Conif. 68. Gord. Pinet. 335.'

Widdringtonia wallichii sensu Endlicher (1847) is a name without description and as indicated earlier, is derived from comments that were published by Hooker in an article on the biogeography of the southern conifers, viz. 'Dr Wallich has sent another *Pachylepis* from South Africa certainly distinct from *P. cupressoides*, which may however be the *C. stricta*.' (Hooker, 1845: 141, 142). *Pachylepis cupressoides* is currently a synonym of *W. nodiflora*, and *C. stricta* is a manuscript name that was applied to the Drège collection of the Clanwilliam cedar. Endlicher (1847: 34) evidently did not see the Wallich collection, as he did not provide a description.

Nathaniel Wallich (1786–1854), then superintendent of the Botanical Garden in Calcutta, spent a few years in and around Cape Town on sick leave, and sent his collections to Hooker at Kew. Wallich travelled to the Cederberg with Thomas Maclear in early 1843, and collected seed of the Clanwilliam cedar, which he sent to Hooker (Warner 1989). This is evidently the introduction date of 1844 to which Carrière refers.

The only Wallich *Widdringtonia* collection at Kew is the one from Swellendam in the Langeberg (K75280) that was previously referred to. The specimen includes a female cone and was cited under *W. nodiflora* by Marsh (1966a) and annotated as such in October 2001

by the Kew botanist Aljos Farjon in preparation for his monograph of the family (Farjon 2005). These identifications by two experts in the family are consistent with this locality. Wallich also travelled east of Cape Town in October 1843 with a judge of the Circuit Court (Glen & Germishuizen 2010), during the course of which he would have travelled through Swellendam and thus had opportunity to collect this specimen. From this it seems evident that the *W. wallichii* of Endlicher (1847) refers to the Wallich specimen at Kew and therefore to *W. nodiflora*.

The name *W. wallichii* Endl. (sic.) next appears in the *Catalogue of Coniferous Plants* compiled by John Lindley and George Gordon (Lindley & Gordon 1850), where the name is listed as a 'Doubtful Species' originating from the Cape of Good Hope but without any further information. George Gordon's *The Pinetum* (Gordon, 1858), which was published in several editions, merely repeats the information in Endlicher (1847). In the Supplementum to his work, Gordon (1862) changed the name to *W. wallichiana* but gave no reason for doing this. However, he also added brief descriptive material: 'This kind forms a middle-sized tree, with a stem from 15 to 18 inches in diameter.' We do not consider that this little additional information is adequate to satisfy the requirement for a description or diagnosis and thus to constitute valid publication of the name *W. wallichiana* Gordon. The relevant article in the ICN (Turland et al. 2018) reads as follows: 'Art 38.1. In order to be validly published, a name of a new taxon (see Art. 6.9) must (a) be accompanied by a description or diagnosis of the taxon.' The stem diameter information provided by Gordon is clearly not a diagnosis, as defined by the ICN, which reads: 'Art. 38.2. A diagnosis of a taxon is a statement of that which in the opinion of its definition author distinguishes the taxon from other taxa.' Nor do we consider it adequate as a description. The second edition of *The Pinetum* (Gordon 1875) also includes this descriptive statement. Thus, Gordon's initial treatment (Gordon 1858) was also explicitly based on Endlicher (1847), and so on Hooker (1845) and the Wallich collection at Kew. His later addition of stem diameter (Gordon 1862, 1875) must come from elsewhere.

Although Carrière (1867) attributes the name *W. wallichii* to Endlicher (1847), he could not have actually seen the Wallich specimen at Kew as he neither mentions it nor describes the cones that are preserved on it. We cannot therefore accept the Wallich specimen as part of the original material of the name *W. wallichii* Endl. ex Carrière (1867), based on the relevant article in the ICN (Turland et al. 2018), which reads as follows: 'Art. 9.4. For the purposes of this Code, original material comprises the following elements: (a) those specimens and illustrations (both unpublished and published prior to publication of the protologue) that the author associated with the taxon, and that were available to the author prior to, or at the time of, preparation of

the description, diagnosis, or illustration with analysis validating the name.'

The only undoubtedly original material of *W. wallichii* would thus be the cultivated plant/plants that Carrière described. Farjon (2005: 471), however, sought to designate the Wallich collection at Kew as the lectotype of the name *W. wallichii*. Since he cited the name as being published by Endlicher (1847) and as this is a *nomen nudum*, it cannot have a type and Farjon's proposed lectotypification is therefore not nomenclaturally admissible in any event.

So, what is the original material of *W. wallichii*? Élie-Abel Carrière, (1818–1896) was a French horticulturist at Paris, initially employed as a gardener at the Muséum Nationale d'Histoire Naturelle and soon 'chef de culture' of the living plants until 1869 (Staffeu & Cowan, 1976). We assume that Carrière's quite detailed account of the species in the second edition of his *Traité général des conifères* was based on material, perhaps cultivated, in Paris. We have searched the collections of *Widdringtonia* housed at the Muséum Nationale d'Histoire Naturelle (MNHN-P) but have been unable to locate any material labelled *W. wallichii* that could constitute original material. There are also no published illustrations associated with *Frenela hugelii* that Carrière cites under his *W. wallichii*.

Significantly, *W. nodiflora* was introduced into cultivation in England (under the name *Cupressus juniperoides*) as early as 1756 (Aiton 1789: 373), and there are several cultivated specimens dating from the mid-nineteenth century preserved in the herbarium of the Muséum Nationale d'Histoire Naturelle (MNHN-P) under the names *W. cupressoides* and *W. juniperoides* (e.g., MNHN-P-08602789 and MNHN-P-08602790) that testify to its cultivation in France at the time that Carrière (1867) described *W. wallichii*. Well-grown plants of *W. nodiflora* can also attain a height of 20 m (Farjon, 2005), thus consistent with the height of 12 m or more given for *W. wallichii*.

We are therefore left with two options: either treat the name *W. wallichii* as of uncertain application or designate a neotype to fix its application. As most authors have treated *W. wallichii* as synonymous with *W. nodiflora*, and as the protologue of *W. wallichii* could as readily apply to that taxon as to any other species of *Widdringtonia*, we elect to neotypify the name against a modern collection of that taxon from the same location as Wallich's original sample. This preserves its identity as intended by Farjon (2005) and also retains traditional currency of the name *W. cedarbergensis*. Our proposed neotype, Marsh 965 (NBG), comprises two sprigs bearing dehisced female cones, and an attached envelope containing mature seeds. A duplicate of this collection lodged at PRE serves as an isoneotype.

There has also been some concern that the name *W. cedarbergensis* is an illegitimate superfluous name for *W. wallichii*. This is based on the inclusion of the name *W. wallichii* Endl., nom. nud. in the synonymy of *W. cedarbergensis* by Marsh (1966b). However, ICN Art. 46.5 makes it clear that *W. wallichii* is to be attributed to Carrière alone, and so although ‘citation of the name itself’ (Art. 52.2(e)) in the synonymy of a later name does not require citation of the correct place of publication, it does require citation of the name, not of some earlier published ‘designation’. As Marsh (1966b) did not cite the valid *W. wallichii* [Endl. ex] Carrière in his synonymy, the name *W. cedarbergensis* is not

illegitimate, and thus remains the correct name for the Clanwilliam cedar.

Nomenclature

Widdringtonia wallichii Endl. ex Carrière, *Traité Général des Conifères*, ed. 2: 62 (1867), syn. nov. pro **Widdringtonia nodiflora** (L.) Powrie in *J. S. African Bot.* 38: 303 (1972). Type: South Africa, Western Cape, ‘6mi [9.6 km] from Barrydale into Tradouw Pass’, 18 Sept. 1968, J.A.Marsh 965 (NBG, neotype, designated here; PRE-0007375-0, isoneotype).

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