Since their discovery, two Nepalese mahonias have either been regarded as the same species, or been confused, by botanists and gardeners. Tony Schilling and Mark Watson conclude that they are distinct and show how to separate them.

Three species of Mabonia are reported as native to Nepal (Press et al. 2000): M. acanthifolia G. Don, M. borealis Takeda and M. napaulensis DC. Both M. acanthifolia and M. napaulensis have been in cultivation in Western gardens since the middle of the 19th century. However, despite the passing of nearly 200 years since they were described, the separate identity and synonymy of these two taxa continue to be debated.

In our opinion, these two Nepalese species are clearly distinct and readily separated, so much so that it is difficult to understand how and why the confusion came about initially and has persisted for so long. Following an examination of living and herbarium material of Nepalese Mabonia, combined with our own field observations, we here attempt to resolve this confusion.

The Nepalese records of M. borealis, a northwest Himalayan species, have been re-examined and are now considered to be misidentifications of M. acanthifolia, and so we recognize only two species of Mabonia in Nepal.

Early taxonomic history

Both M. acanthifolia and M. napaulensis were described in the early 19th century, based on herbarium specimens collected by Francis Buchanan-Hamilton (in 1802; see Boufford 2013) and Nathaniel Wallich (in 1818–1821) respectively. The latter included material sent to Wallich by Edward Gardner, the first British Resident (ambassador) in Kathmandu.

Mabonia napaulensis was the first to be described (in 1821) by the Swiss botanist Augustin de Candolle using material gathered by Buchanan-Hamilton in the Kathmandu Valley. It has leaves bearing six pairs of similarly sized leaflets and a smaller pair of lower leaflets inserted close to...
of two Nepalese Mahonia

Making taxonomic decisions based on limited or inadequate collections was clearly a problem then, and continues to be so today. Mahonias are large, spiky shrubs that have tended to be avoided by collectors of herbarium specimens. Furthermore, it is difficult to represent the variation seen in a large Mahonia plant on a single herbarium sheet and so early collections can be difficult to interpret. However, by combining studies in the herbarium with observations taken from living plants in the field and in cultivation, we have come to a better understanding of the delimitation of these species.

Joseph Hooker studied Mahonia in Sikkim and Darjeeling in the late 1840s, and concluded that these two species should be united under the earlier name of M. napaulensis (Hooker & Thomson 1855). They adopted a very broad species concept, writing ‘we have no hesitation in uniting the Peninsular and Khasia with the Himalayan species, notwithstanding the difference in shape of the berries and leaflets between the extreme states of each. Dr Wight informs us that he has cultivated the Himalayan one side by side in his garden with that of the Nilghiri, and finds them to be

Mahonia napaulensis (left) has significantly fewer leaflets per leaf than M. acanthifolia (above)

the base of the leaf (often appearing like stipules).

Ten years later George Don described M. acanthifolia. He took up a manuscript name of Wallich, written on original labels on two specimens in the East India Company Herbarium, now at Royal Botanic Gardens, Kew (herbarium code K-W). He described it as a larger shrub with a greater number of leaflet pairs, he thought up to 10. But Don commented that it might be the same as M. napaulensis.
indistinguishable. Specimens of the Sikkim plant, cultivated for a good many years at Dorjiling [Darjeeling], acquired longer racemes, larger flowers, and more slender pedicels than the wild specimens in the adjacent woods. The bracts are very variable organs.’

This early use of comparing plants in the wild and in cultivation is notable, but it is not clear if material of *M. napaulensis* (in our narrow sense) from the Kathmandu Valley was included in these experiments. The *Mahonia* grown at the Calcutta Botanical Garden (*Berberis pinnata* Roxb., listed in the 1814 garden catalogue *Hortus Bengalensis*), was collected by MR Smith from Manipur, northeast India, and so could not have been *M. napaulensis* as we now understand it, and was presumably *M. manipurensis* Takeda.

**First monographs**

At the end of the 19th century and first half of the 20th century there was an increase in botanical exploration of Asia, and the first monographic treatment of Old World *Mahonia* by Friedrich Fedde (1901). Fedde followed Hooker & Thomson, including *M. acanthifolia* within *M. napaulensis*.

Takeda (1917) took a fresh look at the Indian species, commenting that since Hooker and Thomson ‘unhesitatingly united all Indian species ... into a single species, *M. napaulensis*, ... almost all the later workers have indiscriminately followed this opinion.’ Takeda set out ‘to ascertain the real *M. napaulensis*’, concluding that this species had never been found outside Nepal, and that previous authors were misguided. Takeda reported that the leaves of *M. napaulensis* had 3–7 pairs of leaflets, and was only known from a few specimens collected by Buchanan-Hamilton and ‘Wallich’ from the Kathmandu Valley. Takeda referred all the other *Mabonia* in Nepal to *M. acanthifolia*, a species with leaves of up to 11 pairs of leaflets, and geographically much more widely spread, from northwest Himalaya to east Himalaya and northeast India. He commented that ‘among the Indian species *M. acanthifolia* can easily be distinguished by having very small outermost sepals [enclosing the flower in bud], apiculate-triangular connective, and large luxuriant leaf with numerous leaflets which are furnished with a few large teeth.’

Leslie Ahrendt (1961) published the most recent comprehensive monographic treatment of *Mabonia* in his global revision of both *Berberis* and *Mabonia*. Ahrendt agreed with Takeda and increased the distinction between *M. napaulensis* and *M. acanthifolia* by placing them in separate subsections. He highlighted the very short, ‘insignificant’ style of *M. napaulensis* as another useful distinction, as compared with the 1mm style of *M. acanthifolia*.

Himalayan floristic works continued to follow this separation of the Nepalese species until the *Flora of Bhutan* in which Grierson (1984) felt that available herbarium material was too scanty to differentiate between the east Himalayan species reliably. Grierson concluded that ‘until the genus is better collected it seems preferable to regard *Mabonia* as being represented in this area by a single species’. The illustration provided in the *Flora* is reminiscent of *M. napaulensis*, in the narrow sense, in regard to the number of leaflet pairs. This taxonomy was followed in Ying et al. (2011) in *Flora of China* in which they also subsumed many of the Indian species, including the south Indian *M. leschenaultii* (Wight & Arn.) Tanaka ex Dunn and the northeast Indian *M. manipurensis*, within *M. napaulensis*.

**Recent studies**

Boufford (2013) recently commented: ‘the wide variation in leaf and leaflet morphology in *Mahonia napaulensis* [in the wide sense] makes it easy to understand why so many names have been applied to this complex and wide-ranging species. In the flowers and fruits and in the structure of the inflorescence, however, there is remarkably little variation. And, when large numbers of specimens are examined the variation in the leaves can be seen to be continuous and not warranting taxonomic recognition.’ We agree that the variation seen in dried material makes it difficult to delimit species based on herbarium specimens alone, but combined with ecology, phenology and geographic distribution we believe that it is
possible to delimit separate species within this complex.

The situation may be comparable to Sino-Himalayan Taxus where some authors have recognized several species based on subtle morphological differences and geographic range, whereas others have preferred to combine them within a variable and wide-ranging Taxus wallichiana. Recent molecular studies analyzing the DNA of Taxus populations across the whole range show that this complex comprises of several genetically distinct entities, some of which correspond to previously named species and others which have now been described as new species (Poudel et al. 2012).

It would appear that Asian Mahonia is ripe for a similar approach. However, it should be acknowledged that current phyllogenies based on DNA sequences show that Mahonia is nested within Berberis, and so there may need to be some generic level reassignments.

**Horticultural literature**

In the horticultural literature the situation has been similarly confused and inconsistent, with only Herklots (1964) and Bean (1973) having come to what we believe is the correct conclusion.

Geoffrey Herklots, the first British advisor at Godavari, Nepal’s national botanic garden, where he was succeeded by the first author, wrote: ‘I was puzzled by the fact that the shrubs at lower elevations [M. napaulensis] – including those wild in my garden at Godavari – flowered in the early months of the year, whilst those growing between 7,000 and 8,000 feet [M. acanthifolia, 2130–2440m] flowered in the autumn, especially October, and bore their black fruits in abundance in April.’

Bean added: ‘in cultivated plants there is also a difference in flowering time: late autumn and early winter for M. acanthifolia, early spring for M. napaulensis. In foliage M. acanthifolia is the finest of all the species that can be cultivated in the open in the British Isles. It is hardy in the southern and western parts of the country, but needs a sheltered position. It received a First Class Certificate when shown from Windsor Great Park on 25 November 1958. The plant in the Savill Gardens, growing on a wall near the propagating houses, is a cutting from the F.C.C. plant; it has attained a height of 9ft in twelve years (1971).’

The following descriptions and observations are presented in the hope that further misunderstanding may be prevented. The main differences between the two species are summarised in the table on p98.

**Mahonia napaulensis**

This is an evergreen shrub to 2 or 3m in height, but frequently less, apparently localized in and around the Kathmandu Valley, especially on the southern hills. Although attractive in the wild it is generally of limited horticultural merit, being borderline hardy and best suited
for cultivation in warmer parts of the Britain and Ireland.

It is far less majestic than *M. acanthifolia*, having foliage with fewer and more widely spaced leaflets (occasionally up to 8 pairs, but usually 4–6 pairs). The leaves are up to 50cm long and the leaflets up to 15 × 4.5cm, with the terminal leaflet usually not noticeably larger than the rest. Past authors have considered the leaflets to be glossy on the upper surface and of a lighter texture than the matt, thicker leaflets of *M. acanthifolia*, but we have found these to be unreliable characters with glossiness and texture varying greatly depending on maturity of the leaves and growing conditions.

*Mahonia napaulensis* has a late-winter flowering period, ranging from approximately February to April, and occurs in mixed open woodland or at forest margins in the warm temperate zone, which approximates to 1,220–1,800(–1,900)m. The flowers are fragrant, borne in long, terminally arranged clusters of spreading racemes of about 20cm in length, ranging in colour from mid to deep yellow, and very occasionally pale orange. The outer sepals are 3–4 × 2mm and the style about 0.4mm long. The dark blue, heavily pruinose, rounded fruit, about 9 × 6mm, ripens in May to June.

Associated species include *Alnus nepalensis*, *Berberis aristata*, *Elaeagnus umbellata*, *Leucoceptrum canum*, *Ligustrum indicum*, *Luculia gratissima*, *Maesa chisia*, *Osebeckia nepalensis*, *Prinsepia utilis*, *Pyracantha crenulata*, *Pyrus pashia*, *Rubus ellipticus* and *Schima wallichii*.

It has the Nepalese common names of jamane mandro, bhote chotro and mandre chotro. As an indication of its cultural significance, a 5 rupee postage stamp with an image captioned *Mahonia napaulensis* was issued by Nepal in December 2000.

Although uncommon in cultivation, Walters *et al.* (1989) only includes it as a note under *M. × media* Brickell, verified living material can be found in the collections of the Royal Botanic Gardens, Kew (accession number 1973-14517), as well as the Valley Gardens, Surrey, and Trewithen, Cornwall. These all originate from the same collection (Schilling 774), with the following field data: ‘Godavari, Kathmandu

<table>
<thead>
<tr>
<th><strong>MAHONIA NAPAULENSIS AND M. ACANTHIFOLIA</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Characteristic</strong></td>
</tr>
<tr>
<td>Plant height</td>
</tr>
<tr>
<td>Leaflet pairs</td>
</tr>
<tr>
<td>Flowering time</td>
</tr>
<tr>
<td>Habitat</td>
</tr>
<tr>
<td>Altitude range</td>
</tr>
</tbody>
</table>
Plantsman

Valley, C. Nepal, ca. 1,615m. Sweet scented flowering evergreen shrub, approximately 2.5m in height, collected in 1965/6.

The Trewthen garden specimen is of special interest, being of the seldom seen orange-flowered form, and has only recently (March 2014) been confirmed as being a seedling from the Schilling 774 collection. Trewthen received it from Cambridge University Botanic Garden in the late 1960s (Norman Villis, pers. comm.).

A cultivar of *M. napaulensis* named ‘Maharajah’ can also be found at Kew and the Savill Garden, Surrey, as well as possibly elsewhere. Until relatively recently the origin of this clone was open to question. It is now apparent (Clarke 1988) that it came to Britain from India as a living plant and not, as previously thought, as having been raised from seed at Caledonia Nursery in Guernsey.

This species is illustrated in Lindley & Paxton (1852) and Storrs & Storrs (1998). The coloured plate in the former was drawn in March the previous year from a plant grown at the RHS Chiswick garden. The RHS had been given material by RBG Kew and it was thought that this was the first time the species had flowered in Europe.

**Mahonia acanthifolia**

This is an impressive, large, evergreen shrub or small tree, about 7–9m in height, found throughout the Himalayan midhills. It occurs in open to dense mixed cool-temperate forests at altitudes ranging from 2,150–2,900m. It is a noble and relatively hardy species of considerable garden merit. In spite of Bean’s flattering accolade quoted above it remains an uncommon sight in Western gardens. The foliage is very striking, with individual leaves to 50cm long, commonly bearing 9–12 pairs of...
frequently overlapping leaflets to 7.5 x 4cm, the terminal leaflet being slightly longer than the lateral pairs. The species has an autumn flowering period, immediately post-monsoon, ranging from early September through to early December. The fragrant flowers are deep yellow, produced in terminal, spreading, densely arranged racemes to 25cm in length. The outer sepals are about 1.5 x 1.5mm, and the style is 1-1.5mm long. The fruit are of a similar colour and size to *M. napaulensis*, but more ovoid, and ripen slightly earlier in April to June. It is interesting to record that both Nepalese *Mahonia* species follow the same flowering sequence in cultivation as they do in the wild (M Flanagan, pers. comm.).

Associated species include *Hedera nepalensis*, *Hypericum bookerianum*, *Ilex dipyrena*, *Osmanthus suavis*, *Piptanthus nepalensis*, *Prunus cornuta*, *Sarcococca hookeriana* and *Sorbus vestita*.

Fine specimens are to be found in the Temperate House at RBG Kew (accession number 1962-43701) and in the collections at the Savill Garden. Both of these specimens can be traced to a seed collection made in about 1964 by Herklots at 2,290m on Sheopuri (Shivapuri), north of Kathmandu, under the name ‘*M. napaulensis*’. In addition to the Herklots gathering, the Valley Gardens also holds plants from the 1983 Alpine Garden Society Expedition to Sikkim (AGSES 006). RBG Edinburgh has several plants collected by D Long and S McDermott (1983) in May 1992 from Helambu, central Nepal (accession number 19922354).

Published illustrations of this species are included in Phillips & Rix (1989, photographed at Savill Garden, Windsor), Herklots (1964), Polunin & Stainton (1984), and Lancaster (1995), all under the name ‘*M. napaulensis*’.

The Nepalese distinguish between these two species and give this one the common names of kesari or keshari. Both species are used for firewood, and their fruits are eaten and reputed to be a diuretic, a demulcent and helpful in easing dysentery. The bark of both is used as a dye and the juice of the bark is said to treat inflammation of the eye (Manandhar 2002).

**Conclusion**

In our opinion the differences between these two species are both clearly marked and readily analyzed, so much so that it is difficult to understand how and why the confusion has persisted for so long.

**ACKNOWLEDGEMENTS**

We would like to thank Chris Brickell, David Cooke, Mark Flanagan, Pam Hayward, Andrew Jackson, David Jewell, David Long, Gary Long, Brian Mathew, Henry Noitle, Michael Taylor and Norman Villis.