

## ART. LVI.—On the New Zealand Olives. By T. KIRK, F.L.S.

[Received by the Wellington Philosophical Society, 13th March, 1881].\*

FEW New Zealand plants have proved greater sources of perplexity to local botanists than the olives. With a certain amount of similarity in the foliage, they possess dicecious apetalous flowers which are very inconspicuous, and as they are for the most part produced on lofty trees, it is not easy to procure good specimens of each form in its various stages. A limited amount of dimorphism on the foliage has increased the difficulty, and it has been erroneously supposed that the characters afforded by the fruit were of little value.

Another source of perplexity has arisen from the application of the native name "maire" to all the species alike, as well as to the sandalwood (*Santalum cunninghamii*), some forms of which closely resemble *Olea lanceolata* and *O. montana* in foliage and general appearance, the resemblance extending even to the venation; the flowers and fruit, of course, differing widely in structure.

In "Flora Novæ-Zelandiæ" and the "Handbook" three species of *Olea* are described—*O. cunninghamii*, *O. lanceolata*, and *O. montana*: a fourth species, *O. apetala*, was added by the writer in 1867.† Together they form the section *Gymnolæna*, restricted to New Zealand and Norfolk Island, and characterized chiefly by the absence of the corolla. I purpose offering a few remarks on the habit and characteristics of each. All the species agree in having opposite or subopposite petioled, coriaceous, glossy leaves: dicecious apetalous flowers, produced in more or less distichous racemes: each flower being jointed to the pedicel, each pedicel to the rhachis, and each rhachis to the branch. The pedicels are minutely bracteolate at the base, and the calyx is unequally 4-cleft. The style is invariably bifid, and staminodia are frequently produced in the female flowers, especially in those of *O. cunninghamii*. The fruit is a red or crimson coloured drupe; occasionally two perfect seeds are developed in the same fruit.

*Olea apetala*, Vahl.

In favourable situations this forms a small tree 20 feet in height, but in exposed situations it is little more than a bush; most frequently it forms a shrub 10 or 12 feet high and branched from the base.

The branches are spreading, and often tortuous; in old specimens the bark is very thick, deeply furrowed, and corky.

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† See Trans. N.Z. Inst., vol. iii., p. 165.

The leaves exhibit a marked dimorphism at different periods of growth ; those of the young state, especially when growing in the shade, are broadly ovate, from 3"-6" long and from  $2\frac{1}{2}$ "-3" across, petioled, acute or sub-acute, narrowed below, coriaceous and of a deep glossy green resembling those of *Camellia japonica*, but with the margins entire. The mature leaves are much narrower in proportion to their length,  $1\frac{1}{2}$ "-3" long and from 1"- $1\frac{1}{4}$ " broad with the midrib prominent on both surfaces, elliptic acuminate, brownish and rough to the touch beneath.

I have not seen male flowers, but the female flowers are produced in vast abundance, the racemes being fully  $1\frac{1}{2}$ " long, 15-18-flowered, glabrous, stout; stigmas spreading short and thick. The drupe appears to be obscurely trigonous, but I have only seen three or four old specimens.

It is worthy of note that in this species the leaves of the young tree are much broader than those of the mature state. In the other species the young leaves are invariably the narrowest. In *O. apetala* the broad leaves are often retained until the tree is fully grown, but this is never the case with either of the other species.

This species has been collected on the Fanal Islands, Arid Islands, Great Barrier, Little Barrier, Taranga Islands, and at Bream Head.

*Olea cunninghamii*, Hook. f.

This is much the largest of the New Zealand species, often attaining the height of 70 feet, with a trunk 3-6 feet in diameter at six feet from the ground, while the principal branches are often of large dimensions. The leaves are rough on both surfaces; in the young state they are linear, 6"-10" long,  $\frac{3}{8}$ "- $\frac{5}{8}$ " wide, acute, gradually passing into the mature form, 3"-6" long,  $1\frac{1}{4}$ "- $1\frac{3}{4}$ " broad, oblong lanceolate or broadly lanceolate, obtuse or acute. Racemes tomentose, rather shorter than those of *O. apetala*, pedicels short, spreading at right angles to the rhachis; pistillate flowers with two sessile staminodia. Drupe  $\frac{1}{2}$ "- $\frac{2}{3}$ " long, ovoid, narrowed upwards, red.

This species occurs from the North Cape to Cook Strait, but is most plentiful in the southern part of the North Island, attaining its greatest dimensions in the south-eastern portion of the Wellington district. At Pakuratahi I measured five trees growing within a short distance of each other, with the following results :—

No.	Height of Tree.	Trunk.	Girth at 5 feet from the base.
No. 1.	.. 70 feet	.. —	.. 20 feet 7 inches
.. 2.	.. 50 "	.. 12	.. 13 " 4 "
(With six large arms averaging from 15 to 20 feet long, and 5 feet in circumference at the middle.)			
.. 3.	.. 60 "	.. 35	.. 4 " 8 "
.. 4.	.. 50 "	.. 35	.. 6 " 4 "
.. 5.	.. 60 "	.. 30	.. 20 " 0 "

Above 6 feet from the ground the trunk tapers very gradually, and holds its girth well up to the crown. No. 5 was a magnificent tree; after making all deductions for bark and waste, it must contain over 500 cubic feet of convertible timber.

*Olea lanceolata*, Hook. f.

This makes a round-headed tree of smaller dimensions than *O. cunninghamii*, being rarely more than 50 feet in height, with a trunk from 1 to 3 feet in diameter. Not unfrequently small specimens less than 20 feet high produce fruit in abundance.

The leaves are smooth and glossy in all stages; in the young state narrow-linear, 3"-5" long; in the mature state linear-lanceolate or ovate-lanceolate, acuminate. Racemes slender, calyx deeply cleft, segments linear. Drupe trigonous crimson. There are two primary forms of this species:—

*a.* Bark of twigs whitish, prominently warted, leaves ovate, lanceolate, acuminate, segments of calyx linear.

*b.* Bark of twigs dark, scarcely warted, leaves linear-lanceolate, racemes more slender than in var. *a.*, segments of perianth broader.

This is the most common species, especially in the north. It is also found at Wairoa, in the Nelson district.

*Olea montana*, Hook. f.

This species forms an excessively branched round-headed tree; branches slender. Leaves linear acute, in the young state 3"-5" long, when mature 1"-3" glossy. Racemes slender, finely puberulous, 1" long, about 12-flowered. Calyx lobes shallow, broad, obtuse. Styles shorter than in *O. cunninghamii*. Drupe ovoid, narrowed at base and apex.

In specimens collected at Whangaroa (North) the branchlets are almost capillary, and the leaves less than  $\frac{1}{8}$ " in breadth.

*O. montana* is rare and local north of the Rangitikei, in some localities being restricted to a few specimens, or even to a solitary tree, but in the southern part of the Wellington district it is common. It is especially plentiful in the valley of the Ruamahanga, where it attains a large size.

A solitary specimen at Karori is fully 60 feet high, with a trunk 40 feet in the clear. Girth at base 9' 1", tapering to 7' 4" at 6 feet from the ground, but above that holding its girth well up towards the crown. I have been assured that specimens are found on the lower flanks of the Rimutaka fully equal in dimensions to the largest specimens of *O. cunninghamii*.

It will be seen that *O. apetala* has the most restricted distribution, not being known to occur south of the Little Barrier Island. It extends, however, northward to Norfolk Island. *O. lanceolata* is the only species found on the southern side of Cook Strait.

*Santalum cunninghamii*, from the close similarity of its foliage to *Olea montana* and *O. lanceolata*, is often mistaken for them in districts where it is plentiful, but a cursory examination of the flowers or fruit is sufficient to prevent the error. On the other hand, *Olea cunninghamii* is the *Santalum cunninghamii* of Buchanan's list of Wellington plants, and its wood has been distributed from the Colonial Museum under the name of *Santalum*. It is, however, very rarely that sandalwood forms a trunk of 9' in diameter; most frequently it is no thicker than a man's wrist, and south of the Taupo district it is usually reduced to a mere bush, 5 or 6 feet in height.

The following key to the species of *Olea* may be found useful:—

A. Leaves rough.

- |  |         |                          |
|--|---------|--------------------------|
| 1. Leaves oblong or elliptic acuminate, racemes glabrous | ..      | <i>O. apetala</i> .      |
| 2. ,, lanceolate, racemes tomentose                      | .. .. . | <i>O. cunninghamii</i> . |

B. Leaves smooth.

- |   |    |                        |
|---|----|------------------------|
| 3. Leaves lanceolate acuminate, perianth segments linear, acute |    | <i>O. lanceolata</i> . |
| 4. Leaves linear lanceolate, perianth segments broad, obtuse    | .. | <i>O. montana</i> .    |

ART LVII.—Notice of the Occurrence of *Triodia* and *Atropis* in New Zealand with Descriptions of new Species. By T. KIRK, F.L.S.

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*Triodia exigua*, n.s.

*Danthonia pauciflora*, Buchanan, Grasses of N.Z., t. xxxvi. B., not of R. Brown.

A SMALL grass forming a compact swart, root creeping, leaves tufted 1" long, filiform, rigid, involute, pungent, glabrous, mouth of sheath clothed with a minute pencil of hairs, ligule 0. Culms 1"–2" high, slender, naked above. Panicle reduced to a single spikelet, or rarely two when the lower spikelet is pedicellate. Spikelets 2–3-flowered, empty glumes longer than the flowering, obtuse, flowering glumes 3-toothed at the apex, ciliate, nerved. Palea notched at apex. Caryopsis free.

*Hab.*—South Island: Broken River Basin, Canterbury, on terraces, 2,500–3000 feet; terraces of the Upper Waimakariri, 1,600–2,500 feet; Mount St. Bathans, Otago—*D. Petrie*.

Mr. Enys and myself collected a few specimens of this grass several years ago, but as the specimens were far advanced, little more than the outer glume remaining, it was not possible to make out its affinities. Last year Mr. Enys visited the locality and kindly sent me a supply of good specimens. I am also indebted to Mr. Petrie for good specimens from Otago. In his "Indigenous Grasses of New Zealand" Mr. Buchanan has wrongly referred Mr. Petrie's plant to *Danthonia pauciflora*, but it is clearly a *Triodia*.

\* Title read at Annual Meeting, 12th February, 1881.