

Short communication

Dioscoreaceae, new for the adventive flora of New Zealand

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Abstract *Dioscorea communis*, hitherto known as *Tamus communis*, black bryony, is a temperate Eurasian species here recorded as adventive from Wellington, New Zealand. The family Dioscoreaceae is otherwise only known from a few other species of *Dioscorea* that are occasionally cultivated, this having very probably been so since pre-European times.

Keywords *Dioscorea communis*; adventive; New Zealand; Dioscoreaceae; key to family

INTRODUCTION

The mainly tropical yam family Dioscoreaceae has hitherto been unconfirmed in the wild state for New Zealand. Healy & Edgar (1980, p. 23) mentioned that *Dioscorea alata* L. was listed by Hooker (1867, p. 762) “as a naturalised plant”, but they could not find a specimen to substantiate this. However, Hooker (1867) only stated that *D. alata* was “occasionally cultivated during late years by the natives” and he made no mention of wild plants. Also, this is a tropical Asian species which has been grown in the Pacific region for a very long time. Today it is usually the most popular and common yam in cultivation in Melanesia and tropical Polynesia, but it is usually sterile and does not properly naturalise, at least in Polynesia.

The term “yam” has long been in use in English-speaking countries to refer to the mainly edible tubers of species of *Dioscorea*. Thus it was known to Captain James Cook and his men, but, unfortunately, yam was also used for the tubers of *Colocasia esculenta* (taro) and *Ipomoea batatas* (kumara), especially when these were prepared for the table, and the plants were perhaps not seen. Evidence of confusion is suggested by Cook’s comment from North Queensland (Beaglehole 1955, p. 353) where one reads the comment “some wild Yamms of Cocco growing in the swampy ground”, because *Dioscorea* species rarely grow in such a habitat. But when D. C. Solander refers to yams in his unpublished *Primitiae Florae Novae Zelandiae sive Catalogus Plantarum* (1769–1770, p. 569) he is most likely to be correct in recording *Dioscorea* for it would be surprising if at least one species of yam had not been introduced in pre-European times. Several species of *Dioscorea* were cultivated then as now in tropical Polynesia for their edible tuberous roots. In the absence of specimens and good descriptions it is not possible to name the species Solander saw in New Zealand. (In more recent times the name yam has mistakenly been applied to another quite unrelated plant in New Zealand, namely *Oxalis tuberosa* or oca.)

Dioscorea communis in New Zealand

In 1969 a specimen of a climbing plant growing wild on the “bush margin” in the Otari Reserve, Wellington, was sent by the then Curator, R. H. Mole, to the former Botany Division, DSIR, Lincoln, now Landcare Research, for identification. It was identified as *Tamus communis* L., very recently reclassified as *Dioscorea communis* by Caddick et al. (2002). Unfortunately the specimen has been overlooked since 1969 because it was mistakenly put in a folder of cultivated specimens in the Allan Herbarium (CHR) at Botany Division, another form of this variable Eurasian species having been collected in cultivation in and around Christchurch. In December 1997, W. Cowan sent a range of

material of this plant from the tuberous roots to flowers and fruits, and from a similar habitat at Otari Reserve, to Landcare Research for identification. The collector stated that the plants were "twining around native vegetation" and the species now occurs sporadically over about $\frac{3}{4}$ ha, mainly on and just inside the margin of indigenous forest along the boundary adjacent to Wilton Road, as well as at the back of nearby garden borders. It was also seen in a neighbouring property c. 100 m from the Otari sites that corresponds to the original Wilton Farm, to where it may have been introduced. The plants fruit prolifically and the ripe, pea-sized berries hang on the vines until well into winter with birds apparently avoiding them. The seeds inside are viable, as indicated by the presence of seedlings in the vicinity (T. O'Leary pers. comm.). Therefore, *Dioscorea communis*, black bryony, is here recorded for the first time as adventive in New Zealand.

The description below was compiled from the Otari specimens, those of cultivated plants in Canterbury having smaller, differently shaped leaves. The Otari plants with their entire, usually broad ovate-cordate leaves resemble a common form in Britain as is illustrated in such works as that of Ross-Craig (1972). This contrasts with cultivated plants in the Christchurch area which have smaller and hastately lobed leaves that correspond to *Tamus communis* subsp. *cretica* (L.) Kit Tan (infraspecific taxa have not been named in *Dioscorea* yet). This plant is as widespread in Europe as subsp. *communis*, despite its name that links it to one island.

Dioscorea communis, black bryony, is a widespread European species that extends into SW Asia, N Africa, and Macaronesia. It was presumably introduced for cultivation, as already indicated, although it is rarely deliberately grown in Europe. The attractive red berries are poisonous but the blackish tubers are edible when cooked and the Macaronesian taxon *Tamus edulis* Lowe, now considered to be part of *D. communis*, is presumably so named because of the edible tubers.

The common name, black bryony, invites comparison with the equally common English name white bryony. The latter refers to the unrelated dicotyledonous *Bryonia cretica* L. in the Cucurbitaceae. This is also a deciduous dioecious vine, almost glabrous, and with fleshy, globose red fruits. White bryony also has tuberous roots, but these are pale in colour in contrast to those of black bryony. *B. cretica* subsp. *dioica* (Jacq.) Tutin is

adventive in New Zealand in a remote part of the Rangitikei Valley and was only first recorded in 1995 (Webb et al. 1995, p. 163.) Black and white bryony have similar regions of origin and are considered to be potentially serious weeds in New Zealand from their freely produced fleshy fruits and scrambling or climbing habit with a tendency to smother other vegetation. Therefore, attempts have been made to eradicate both.

In New Zealand a number of other species of *Dioscorea* have been introduced or reintroduced for cultivation in modern times, including two of the most commonly cultivated edible yams in the tropical Pacific. They are *D. alata* L. and *D. bulbifera* L.; both are pre-European introductions to the region, the former probably growing in New Zealand in the 19th century as already discussed. In addition to *D. communis*, the only other species from Europe, *D. balcanica* Kusanin, is reported to have been introduced, as well as two edible East Asian yams from temperate regions, the Japanese *D. opposita* Thunb. and *D. batatas* Dcne, Chinese yam. On the other hand, a few species such as the tropical South American *D. discolor* Kunth are grown here for their ornamental foliage. Also, the well-known elephant's foot, *D. elephantipes* L'H(rit.) Engl., previously known as *Testudinaria elephantipes* (L'H(rit.) Dickson, and several of its relations from southern Africa with similar large woody basal caudices are sometimes cultivated by cactus and succulent fanciers.

TAXONOMY

Because this new record of an adventive species involves an additional family of monocotyledonous plants for New Zealand, a synopsis of Dioscoreaceae is given. The family was mentioned by Healy & Edgar (1980, p. 20) where, although Hooker's (1867) record was treated as unsubstantiated because of the lack of specimens, it is keyed out in the "key to families and some genera based mainly on vegetative characters". This key uses the condition of the leaf base and tuber size for identifying Dioscoreaceae, but is only intended to apply to a single species of *Dioscorea*, namely *D. alata*, although the leaf base character does apply to *D. communis* and many species of the genus. Therefore, a revised section for couplets 57 to 59 (Healy & Edgar 1980, p. 20) is given below.

- 56 Plant a liane, climber or twiner 57
 Plant erect to prostrate, not climbing 60
- 57 Plant a root climber; leaves > 30 cm long, narrow and sword-shaped; secondary veins parallel; inflorescence a dense spadix of flowers enclosed by a sheath; perianth lacking; ovary with many ovules **PANDANACEAE (FREYCINETIA)**
 Plant with twining stems; leaves scale-like or if normal then < 25 cm long, variously shaped but never narrow and sword-shaped; secondary veins reticulate; inflorescence of spaced or discrete flowers in racemes, fascicles or panicles; sheath lacking; perianth present; ovary with 1–few ovules 58
- 58 Leaves reduced to colourless scales and plant with leaf-like or needle-shaped photosynthetic cladodes **RUSCACEAE (ASPARAGUS)**
 Leaves normal, i.e., not reduced to colourless scales; cladodes absent 59
- 59 Plants with slender annual or short-lived aerial stems; leaf lamina thin, usually ovate or broadly ovate with a prominent cordate base; flowers unisexual; ovary inferior **DIOSCOREACEAE (DIOSCOREA)**
 Plants lianoid with stout long-lived stems; leaves distichous; leaf lamina coriaceous or subcoriaceous, usually oblong or oblong–ovate; base broadly cuneate to rounded; flowers bisexual; ovary superior. **SMILACACEAE (RIPOGONUM)**

DIOSCOREACEAE

Climbing herbs with twining usually annual stems, rarely erect, these arising from a fleshy rhizome or tuber. Leaves usually alternate, simple or occasionally palmately compound; lamina with primary veins longitudinal; secondary veins reticulate; base usually \pm cordate. Inflorescence usually an axillary spike or raceme, often a panicle of racemes or spikes in staminate plants. Flowers usually unisexual (plants dioecious), small and actinomorphic. Perianth of six similar tepals in two whorls. Male flowers spreading to pendent, either with six stamens in two whorls, or sometimes only the outer whorl with fertile anthers. Female flowers initially pendent but becoming erect. Ovary inferior, 3-celled, with two ovules in each cell; styles 3. Fruit usually a dry, 3-winged capsule, very rarely an unwinged fleshy berry or a samara with one wing. Seeds few, usually winged, endospermic.

There are four genera and 350–400 species, of which only 13 species are not in *Dioscorea* L. itself (Caddick et al. 2002). Thus, the characters in the family description above nearly all apply to this genus. The great majority of species are from tropical and subtropical regions, especially those with pronounced wet and dry seasons, with very few, such as *Dioscorea communis*, extending north into temperate regions. This species is very unusual in having fleshy fruits, and that in Polynesia they should be freely produced. Further north only one of the species in tropical Polynesia seems to produce fruits.

Dioscorea communis Caddick & Wilkin

black bryony

Glabrous, deciduous, dioecious vine with dark subterranean tubers. Stems slender and twining, ascending to 3 or 4 m. Leaves with petioles to c. 15 cm long, very slender; lamina to c. 15 × 10 cm including a very fine apical mucro 4–5 mm long, ovate or broad ovate, thin, shining beneath; midrib and the 4 or 6 main veins \pm impressed; base deeply cordate. Inflorescence racemose, to c. 14 cm long; bracts acuminate to aristate, < pedicels. Perianth c. 4 mm long, greenish white or cream. Male flowers with stamens < perianth. Fruits in pendulous racemes, c. 1–1.2 cm diam., globose to broad ovoid, shining scarlet; flesh thin, containing 1–2–(3) almost globular seeds 3–4 mm diam.

FIRST RECORD: CHR 201239, Otari Reserve, Wellington, *R. H. Mole*, 25 Feb 1970

ADDITIONAL SPECIMEN: CHR 516130, Otari Reserve, Wellington, *W. Cowan*, 1 Dec 1997.

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