= Alloxylon pinnatum =

Alloxylon pinnatum , commonly known as Dorrigo waratah , is a tree of the family Proteaceae found in warm @-@ temperate rainforest of south @-@ east Queensland and northern New South Wales in eastern Australia . It has shiny green leaves that are either pinnate and up to 30 cm (12 in) long , or lanceolate (spear @-@ shaped) and up to 15 cm (5 @.@ 9 in) long . The prominent pinkish @-@ red flower heads , known as inflorescences , appear in spring and summer ; these are made up of 50 to 140 individual flowers arranged in corymb or raceme . These are followed by rectangular woody seed pods , which bear two rows of winged seeds .

Previously known as Oreocallis pinnata for many years , it was transferred to the new genus Alloxylon by Peter Weston and Mike Crisp in 1991 . This genus contains the four species previously classified in Oreocallis that are found in Australasia . Its terminal tubular flowers indicate that the species is pollinated by birds . Classified as near threatened under the Queensland Nature Conservation Act 1992 , Alloxylon pinnatum has proven difficult to keep alive in cultivation .

= = Description = =

The Dorrigo waratah is a rainforest tree that reaches 25 m (82 ft) high and a has non @-@ buttressed trunk of 1 @.@ 5 m (5 ft) diameter at breast height (dbh) . The bark is greyish brown and covered in many small pimples , rendering it sandpaper @-@ like in texture . The green foliage consists of several distinct juvenile and adult leaf forms , which are arranged alternately along the stems . Juvenile leaves are light green and at first simple , with a single blade . Successive leaves on more mature plants become more complex , or pinnate , with deep ' pinnae ' (lobes) ; these leaves are up to 30 cm (12 in) long with 2 ? 11 leaflets . Some adult leaves are simple ? with a single lanceolate leaf blade ? and up to 15 cm (5 @.@ 9 in) long ; these are generally located near the flower heads . Among the green foliage there are occasional yellow leaves . New branchlets and leaves are covered in brown hair .

The pinkish @-@ red compound flowerheads , known as inflorescences , are up to 20 cm (8 cm) across in spring to summer , and contain between 50 and 140 smaller flowers , arranged in a corymb or raceme . These individual flowers are 3 ? 3 @.@ 8 cm (1 1 ? 8 ? 1 1 ? 2 in) long and sit atop stalks (known as pedicels) up to 3 @.@ 5 cm (1 3 ? 8 in) in length , which arise in pairs off the main stalk within the inflorescence . Each flower consists of a tubular perianth , which partly splits along one side at anthesis to release the thick style . The stigma is contained within a slanting disc @-@ like structure at the tip of the style . The tubular perianth splits into four segments at its tip , and the anther lies in the concave parts within each of these segments . The flower parts are glabrous (smooth) . The pollen is crimson . After flowering , the 8 ? 10 cm (3 @.@ 1 ? 3 @.@ 9 in) long woody seedpod develops . Cylindrical in shape , it splits down one side to release the seed , which are ripe from February to June . The seeds are arranged in two rows , with at least four seeds in each row . Each seed is separated from the others by a membranous separator , and has a long rectangular wing , which is much longer than the seed itself . Alloxylon pinnatum can be distinguished from other members of the genus Alloxylon by its pinnate adult leaves . This feature serves to differentiate it as other species in the genus have simple adult leaves . The other species have inflorescences with fewer flowers (50 maximum) , and have yellow pollen .

= = Taxonomy = =

First described as a variety of what was then known as Embothrium wickhamii by Joseph Maiden and Ernst Betche in 1911 after a collection by J.L.Boorman , the Dorrigo waratah was raised to species status and reclassified as Oreocallis pinnata by Dutch botanist Hermann Otto Sleumer in 1954 . The Australian members of the genus Oreocallis were recognised as markedly distinct from the South American species , which saw them allocated to the new genus Alloxylon . Hence , Oreocallis pinnata was given the new combination Alloxylon pinnatum in 1991 by Peter Weston and Mike Crisp of the Royal Botanic Gardens in Sydney . The species name refers to the pinnate leaves

. Aside from Dorrigo waratah , it has also been called the Dorrigo oak , red silky oak , tree waratah , pink silky oak , red oak , Queensland waratah , and waratah oak . The genus name is derived from Ancient Greek allo- , meaning " other " or " strange " , and xylon , meaning " wood " . It refers to the genus 's unusual cell architecture compared with the related genera Telopea and Oreocallis .

Alloxylon pinnatum and the other three tree waratah species lie in the subtribe Embothriinae , along with the true waratahs (Telopea) , Oreocallis and the Chilean firetree (Embothrium coccineum) from South America . Almost all these species have red flowers that are terminal (arising at the ends of branches) , and hence the subtribe 's origin and floral appearance most likely predates the splitting of Gondwana into Australia , Antarctica , and South America over 60 million years ago . The position , colour and tubular shape of the flowers suggest that they are bird @-@ pollinated , and have been so since the radiation of nectar @-@ feeding birds such as honeyeaters in the Eocene . Triporopollenites ambiguus is an ancient member of the proteaceae known only from pollen deposits , originally described from Eocene deposits in Victoria . The fossil pollen closely resembles that of Telopea truncata , A. pinnatum and Oreocallis grandiflora .

Cladistic analysis of morphological features within the Embothriinae showed A. pinnatum to be the earliest offshoot within the genus and sister to the other three species . Along with members of other genera in the Embothriinae , A. pinnatum has crimson pollen , while the other three Alloxylon species have yellow pollen . Hence it is likely that the ancestral pollen colour was red , and remained so with the emergence of the genus Alloxylon , yet changed to yellow after the divergence of A. pinnatum .

= = Distribution and habitat = =

The Dorrigo waratah is found in warm @-@ temperate rainforest from altitudes of 700 to 1 @,@ 250 m (2 @,@ 300 to 4 @,@ 100 ft) along the McPherson Range in south @-@ east Queensland and the Dorrigo Plateau in northern New South Wales , with dominant tree species such as coachwood (Ceratopetalum apetalum) and Antarctic beech (Lophozonia moorei) . In Queensland it is associated with golden sassafras (Doryphora sassafras) and native crabapple (Schizomeria ovata) . It commonly grows on southern aspects of hills and slopes .

= = = Conservation status = = =

Alloxylon pinnatum is classified as 3RCa under the Rare or Threatened Australian Plant (ROTAP) criteria for threatened species , and listed as near threatened under the Queensland Nature Conservation Act 1992 . In 2016 , it was one of eleven species selected for the Save a Species Walk campaign in April 2016 ; scientists walked 300 km to raise money for collection of seeds to be prepared and stored at the Australian PlantBank at the Australian Botanic Garden , Mount Annan .

= = Cultivation = =

The bright , prominently displayed flowers and bird @-@ attracting properties of Alloxylon pinnatum make it a desirable garden plant . It reaches only about 6 ? 10 m (20 ? 33 ft) in cultivation , but has proven difficult to grow . Alloxylon pinnatum has been successfully cultivated at the Australian National Botanic Gardens in Canberra in a sheltered position in part @-@ shade with a thick layer of mulch . It is propagated most easily by seed , which is ripe from February to June and keeps for around twelve months . Seedlings often perish once 15 cm (6 in) high , and are difficult to transplant . It has also been grown at Mount Tomah Botanic Garden , where it was noted to be exacting in its requirements , needing very good drainage as well as a sheltered location to survive . It is slow growing ; specimens planted in 1989 have been flowering since 1999 . The considerably easier to grow A. flammeum has been considered as a stock plant for grafting .

The pinkish red timber has been used for cabinet- and furniture making . It is soft and light , weighing 500 kg per cubic metre .