

The Red Beech

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The red beech (*Nothofagus fusca*) is one of the five native beeches, all belonging to the genus *Nothofagus*. Other representatives of this genus grow in Tasmania, eastern Australia and southern S. America. Some recently described species from the mountains of New Guinea have tentatively also been classified in *Nothofagus*. The genus as a whole is closely allied to the Northern Hemisphere beeches, of which the horticultural form, the "Copper Beech," is probably the best known here.

In the book, "The Trees of New Zealand," by Cockayne and Turner, there is a good illustration of a sprig of red beech, showing the shape and size of the mature leaves, and also the male flowers and expanding buds. The leaf-shape varies somewhat, depending on what part of the tree the leaves are from, i.e., whether they are sun or shade leaves. The leaves of seedlings and young saplings are of rather different shape, being more abruptly cut off at the base, and generally smaller, with teeth correspondingly more prominent. Also the foliage of young trees has a reddish tinge, compared with the bright green of the mature tree. As a rule the red beech is easily separated from the hard beech (*Nothofagus truncata*), a closely related species, by the shape of the leaves. The teeth of the red-beech leaf are larger, fewer and more pointed, and there is a definite undulation in the leaf margin between each tooth. However, trees can be met with which appear to be intermediate between the two species; a group of trees by the road near Whangamomona is recalled in this connection.

The red beech is a fine tree when well grown, being the largest of the native beeches. Trees with trunks five feet or more in diameter can be found fairly often, with heights of up to 100 feet. The bark of the young tree is smooth, but in old trees it becomes deeply fissured, and prominent buttresses grow out at the base of the trunk.

The timber is hard, strong, easily split, and durable even when in contact with the ground. It is apt to warp if not properly seasoned, and apparently does not nail very well. It is used quite a lot for fencing posts and mine props, and to some extent as a sawn timber.

The red beech is widely distributed in New Zealand. Normally it does not grow in the lowlands or on fertile soils, but grows on the slopes of the mountains, dropping out some way below the timber-line. In the Tongariro National Park district there is much red beech on the slopes of Hauhungatahi, and some fine trees can be seen along the Ohakune track up Ruapehu. Forests of red beech are well distributed in the Kaimanawas in the north

and north-west, more local in the south and east. In the Ruahines it is probably the most abundant tree, dominating the forest over large areas from altitudes of somewhat over 1,500 to 3,500 feet or so, and extending southwards through the ranges to about opposite Apiti and Norsewood. Between there and the Tokomaru Valley in the Tararuas it is absent, but it comes in again in the Mangahao Valley and further south, being well distributed in the ranges, particularly on the eastern side. On the crests of the Gable End and Waiiopehu Ridges, on the western side of the Tararuas, all the old trees were killed in the 1936 storm, and the present red beech trees there are young ones that have grown up in the last fifteen years. In the Rimutakas the red beech appears to be very much less common than it is in the Tararuas, though little is known of its precise distribution.

Wherever the red beech grows well it tends to dominate the forest or at least be one of the dominant trees in it. Red beech trees can grow well together, and there are forests composed almost entirely of red beech, though it is more usual to have an admixture of other trees, and also an undergrowth of shrubs. Although red beech may be the main tree in many areas of forest, yet the type of forest can vary greatly, and this sometimes in quite short distances, depending broadly speaking upon the suitability of the site for the growth of red beech, and the presence or absence of other species, as well as on the history of the forest.

When conditions are right red beech readily colonizes exposed areas, such as stream-beds and slips, sometimes also burnt-over areas as on the way up Mt. Holdsworth. Under such conditions there will be groups of trees of fairly even age, usually closely spaced, straight and tall, the trees being all of much the same height, but varying in girth. The rapid growth of the red beech saplings in such areas usually swamps out all competitors, and later the less vigorous of the red beech themselves get crowded out.

In older forests a number of different forest types occur. Where conditions are rather dry, preventing a heavy growth of foliage on the old trees, and restricting the growth of other species, there will be all ages of red beech growing together, as is well shown in some parts of the Eglinton Valley (see illustration), where old trees, young trees, saplings and seedlings make up almost the whole woody growth. More commonly, however, the canopy is too dense to allow seedlings, which are strongly light-demanding, to develop freely throughout, and although seedlings may be widely distributed, vigorous growth of saplings is confined to where breaks in the upper canopy let in sufficient light (often termed *light pools*). A vigorous growth of shrubs restricts the growth of seedlings, as also does a dense growth of ferns (e.g., the crown-fern), and in such cases red beech seedlings may be largely confined to the trunks of dead fallen trees.

Higher rainfall leads to a greater growth of other species in association with the red beech, but also appears sometimes to let individual red beech trees live longer. There are forests containing large old red beech trees, often widely spaced, with spreading crowns, frequently stag-headed and with hollow trunks; and between these trees there is a vigorous growth of smaller trees and shrubs, but few saplings and young trees of red beech.

Where several other tall trees grow in association with red beech, as in the Mangahao Valley, the forest types become more complex. Near Te Matawai in the western Tararuas, red beech and silver beech grow together, but the area is outside the optimum conditions for the growth of red beech, and the trees do not appear to be doing well. In parts of the Kaimanawas, on the other hand, where red and silver beech grow together, the red beech makes up the greater part of the forest, and young red beech as a result of its greater rate of growth tends to dominate in the light pools. However, silver beech persists in the shade, and being more resistant to exposure is found at bush edges, and at higher altitudes.

All the native beeches display to a marked degree a characteristic shown by many forest trees. This is the tendency to bear abundant crops of seed in certain years, termed *seed years*, which are followed by an irregular number of years in which few or no seeds are produced. In seed years nearly all the trees over large areas of the country flower profusely, and if conditions are right, set big crops of seed. The factors which control this uniform behaviour in a vast number of individual trees are not thoroughly understood. Seed years have been correlated with unusually warm dry preceding seasons, but this may well be an over-simplification. It will probably be necessary to accumulate much more accurate records of the conditions where the trees are actually growing before it can be definitely said what combinations of conditions will lead to a seed year. Such studies are obviously of immediate practical interest in forestry.

The last seed year for the beeches was the 1948-9 season, when several species of beech (notably black and mountain beech) flowered profusely. The writer noted much flowering or seed production, or abundant seedlings in the following year, in the eastern and western Kaimanawas, the western Ruahines, near Opotiki, in the Totara Reserve, and in the eastern Tararuas. No seeding was noted near Te Matawai. A. L. Poole, in the *N.Z. Journal of Forestry*, 1948 and 1949, gives some interesting information concerning beech seed years, this last year in particular.

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RED BEECH
IN THE EGLINTON VALLEY