When is a leaf not a leaf?

December 2005

The local Black Wattles (*Acacia mearnsii*) have been covered lately in creamy blossoms. These trees are one of the two main types of tree-sized wattle that are native to this area. The others are the Blackwoods (*Acacia melanoxylon*). The two can be easily told apart, because Black Wattles have feathery leaves while Blackwoods have flat leathery leaves.

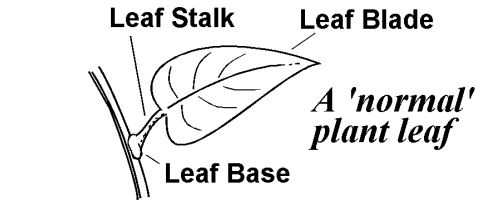
These two completely different types of leaf constitute one of the interesting features of Australian wattles. The true leaves, which all wattles show as seedlings, are fern-like. Some wattles, such as the Black Wattle, keep this sort of leaf throughout their lives. However, a larger group, including the Blackwood, quickly abandon these feathery leaves in favour of simple broad "leaves". These are in fact not true leaves but flattened leaf stalks, known to botanists as phyllodes.

The top diagram shows the parts of a "normal" plant leaf. The leaf blade is the obvious part, and is attached to the plant stem by a stalk and a leaf base. The lower diagram shows how the stalk becomes expanded into a phyllode in the wattles. On the left a juvenile leaf from a young Blackwood has the original feathery leaf blades at the end and below that the stalk, which is beginning to expand into a flattened phyllode. The adult, shown beside it, has lost the feathery leaves and has only the broad phyllodes. If you wander through a grove of young, waist-high, Blackwoods you will see both types of leaf, and some transitional forms. Sometimes, if an adult branch is damaged or pruned, the juvenile feathery leaves may reappear briefly.

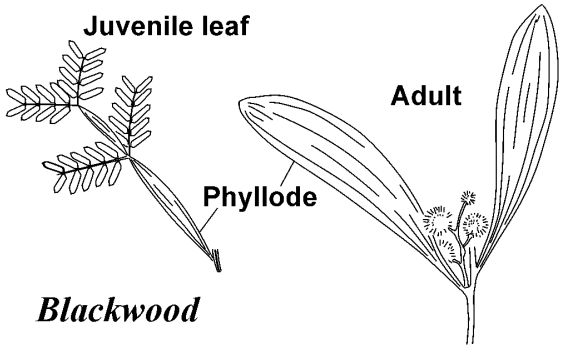
Phyllodes do the work of a true leaf: making food from sunlight (photosynthesis) and exchanging water vapour and gases with the air through tiny pores. They are thought to be an adaptation to a dry climate, because they lose less water than the feathery leaves.

The phyllodes of wattles can be large (up to 30 cm long) or small and needle-like: as in Prickly Moses (*Acacia verticillata*). They have veins, which can be parallel (similar to the original stalk), feather-veined (spreading out from a midrib like barbs of a feather) or net-veined. These last two types make it difficult to distinguish a phyllode from a true leaf unless one sees the transitional form in a young plant.

There are many species of Acacia that are native to other parts of the world, particularly Africa, but it is mainly the Australians – what we call wattles – that have the phyllodes. Other plants of dry areas have their leaves replaced by altered stems, called cladodes. Examples of these are the fine needles of casuarinas (sheoaks and bulokes) and the large fleshy 'stems' of cactuses, such as Prickly Pear.



A 'normal' plant leaf



Blackwood

Photo
Blackwood (*Acacia melanoxylon*), showing juvenile and mature foliage