

# FLORA

## DRYANDRAS ARE BANKSIAS!

Kevin Thiele

The Western Australian Herbarium has recently changed the names of all species of *Dryandra* to an equivalent name in *Banksia*, to reflect a taxonomic change in which the two genera have been merged into one. This change is an important one that affects many people in Western Australia. It is also controversial, both among taxonomists and the wider community. The purpose of this article is to briefly explain the reasons why taxonomists change names from time to time, and the specific reasons behind the merging of *Dryandra* and *Banksia*.

### Why do taxonomists keep changing the names?

Names of plants and animals are changed from time to time for two main reasons. Firstly, the naming of organisms is governed by a set of internationally agreed rules (the International Code of Botanical Nomenclature in the case of plants), and sometimes it is found that a name in current use breaks the rules and needs to be changed to conform with them.

Secondly, names are used to indicate relationships between organisms. The name of a species such as *Banksia coccinea* carries within it the name of the genus to which the species is considered to belong (in this case, *Banksia*). If a taxonomist can demonstrate that a species actually belongs in a different genus from the one it is currently placed in, then the name must change to reflect its new classification.

This is the case with *Dryandra*. Two botanists, Kevin

Thiele from the Western Australian Herbarium and Austin Mast from the University of Florida, recently published a paper with strong evidence that dryandras are actually a subgroup of *Banksia* rather than a genus in their own right. This new understanding of the relationships between the two groups has been accepted by all Australian herbaria. The change of the names is a reflection of this new understanding.

### Why do we now believe that dryandras are actually banksias?

In the past, botanists have believed that banksias and dryandras are two separate but closely related branches of the tree of life, with one branch containing all the *Banksia* species and an adjacent branch containing all the *Dryandra* species (Figure 1).

However, the evidence presented by Mast and Thiele strongly supports a different relationship, in which the dryandras are an offshoot of the *Banksia* branch (Figure 2). This new understanding was gained particularly by studying genetic sequences of species in both genera, supported by studies of their morphology and anatomy. It also used a relatively new technique called phylogenetic analysis, which is believed to be able to accurately reconstruct the way in which species evolve and the branching patterns of the evolutionary tree of life.

In this new understanding, dryandras are seen as specialised banksias. The ancestor of the whole group was a banksia (perhaps similar to the *Banksia*

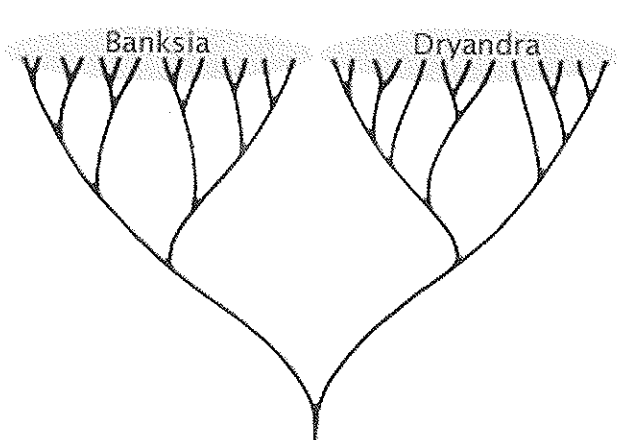


Figure 1. The traditional understanding of the evolutionary relationship between *Banksia* and *Dryandra*. Each 'twig' on the evolutionary tree represents a species. Note that the figure is schematic only, and does not represent actual species.

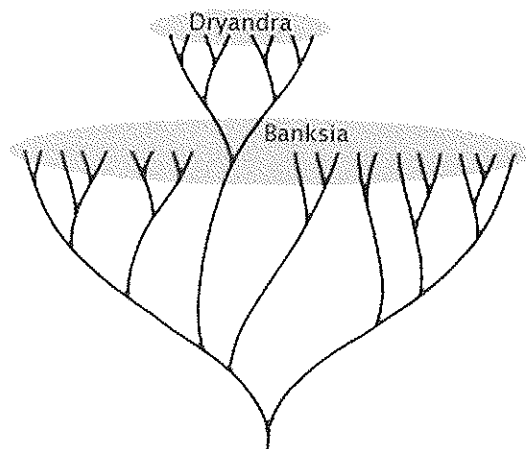


Figure 2. The new understanding of the relationship between *Banksia* and *Dryandra*, with the dryandra branch as an evolutionarily specialised offshoot of the *Banksia* tree.

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## Banksias

fossils that have been found in the Kennedy Range). For part or perhaps most of the evolution of the group, all new species were typical banksias. Then at some point in evolution, one species of banksia evolved a strikingly new form and became the first dryandra. This new form appears to have been a very successful experiment, as it rapidly evolved into a wide range of species.

Incidentally, our new understanding of the relationships in the two genera provides a simple explanation of their distributions. Banksias are widespread in Australia, but dryandras are much more restricted, occurring only in south-western Western Australia. Figure 2 helps us understand this – the early evolution of banksias occurred before the deserts of the Nullarbor and central Australia had formed, so many groups of *Banksia* occur on both sides of the continent. But the first dryandra evolved from its banksia ancestor in Western Australia after the south-west was isolated by increasing aridity, and none of its ancestors managed to cross the deserts.

When botanists first studied our flora they were tricked by the strikingly different forms of the two groups into believing, intuitively, that all the banksias were closely related and all the dryandras were related separately. In this case, intuition appears to have led to a false understanding, which the new knowledge has corrected.

### OK, but why do we need to change all the names?

It is widely accepted that the names of organisms should reflect their evolutionary relationships. Species in a genus are understood to be all closely related, and to be

all more distantly related to species in a different genus.

For this reason, when we believed that banksias and dryandras had evolved and were related in the manner of Figure 1, it was reasonable to name their species in two different genera. However, if Figure 2 is correct (and we have good evidence that it is), then maintaining the two genera would result in the serious anomaly that some *Banksia* species (such as those on the left hand side of Figure 2) would be evolutionarily more closely related to *Dryandra* species than to other *Banksia* species (such as those on the right hand side).

Botanists believe that naming organisms in a way that doesn't reflect their evolutionary relationships inhibits our understanding and the growth of knowledge. It is for this reason that a consensus of botanists have decided that if dryandras are evolutionarily specialised banksias, then they should be named as such, rather than having a separate genus that doesn't reflect this pattern.

### So how should we call dryandras now?

Scientific names are meant to reflect scientific knowledge, and for this reason the scientific names of all dryandras have been changed to a *Banksia* name. In most cases, the new name carries the same species epithet as in the old (e.g. *Dryandra sessilis* has become *Banksia sessilis*). In some cases, however, the dryandra name is already used in *Banksia*, so the species epithet has been changed according to the rules of the botanical code. Thus, *Dryandra hirsuta* has become *Banksia hirta*, and *Dryandra longifolia* has become *Banksia prolata*. These changes, while unavoidable, are relatively few.

In all publications or discussions that use scientific names, the Western Australian Herbarium will be using the new names rather than the old. Common names, however, reflect more general understandings and can be more loosely applied. The dryandras occupy a clearly recognisable branch in the *Banksia* evolutionary tree. Members of this branch can still be called "dryandras" in a vernacular sense. Note that to reduce confusion a lowercase "d" and roman type is used in this article to refer to dryandras in this vernacular sense, but uppercase and italics are used when referring to a scientific name such as *Banksia sessilis*. In addition, many dryandra common names will undoubtedly persist for many years, and this is perfectly appropriate.

### In conclusion

Taxonomists don't change names on a whim or in order to sow confusion, but as a way of growing our knowledge and keeping taxonomy up-to-date with the latest scientific thinking and understanding. While we recognise that changing names causes difficulty and frustration in the short term, we believe that carefully considered change is appropriate when new knowledge brings new understanding of the relationships of species. A proper naming system that reflects evolutionary understanding brings benefits to everyone in the long term through clearer understanding and through opening new avenues of research. We believe that these benefits outweigh the short-term costs of the change.

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