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RHAMNACEAE STUDY GROUP

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Hello members. After some reasonably good rainfall towards the end of last year, the country around here greened up again, and, at present, it's hard to remember how bad things were just a few months ago. Rhamnaceae certainly seem to be a hardy lot though. Some of my *Pomaderris* were too far from the house to get watered, and began to look very poorly with drooping, limp leaves. However, once the rains came, they all perked up again and I don't seem to have lost any. I thought I'd lost one or two of the Cryptandras (some *C. amara* var. *longifolia*, *C. leucophracta* and *C. buxifolia*), but they all sprouted new leaves once the soil was moist again.

Natalie Peate has continued to do a wonderful job chasing up some of the harder to find Pomaderris species and propagating them. She has passed on quite a few to me. Some of these have been planted out and the rest are being carefully tended.

In August last year, Natalie, Naomi Bell and I went over to the Eyre Peninsula to the SA APS Regional Conference. It was an exceptionally well-run and very enjoyable event, and afterwards we headed (with Hazel O'Connor) for the Wanilla-Koppio area to see the range of Spyridiums that grow along the roadsides there. Sadly, all of that area has been savagely burnt in the recent bushfires. The Eyre Peninsula people we met at the Conference were rightly proud of their fascinating flora and deeply involved in its conservation, so this is a very sad blow for them.

Jürgen Kellerman, who has been working on the Australian Rhamnaceae for his Ph.D at the University of Melbourne and the National Herbarium of Victoria, has kindly sent us an article on his extensive research for this Newsletter. His work will certainly make relationships within the Rhamnaceae much clearer. Jürgen is now involved in more work on the Rhamnaceae for the "Flora of Australia" series.

Cathy Hook (ANPS Canberra Region) has joined our Study Group, and has already discovered two populations of a *Pomaderris* species on Tugalong Road (east of Goulburn NSW) that we have so far failed to key out. Another discovery in the same area was *P. cotoneaster*, our first sighting of this species.

I'm hoping that all your Rhamnaceae are doing well – and I'd be grateful for any news of them for the next Newsletter.

NB Study Group subscriptions: Subscriptions were due in June last year, and there are still a few outstanding. I've left a few 'non-subscribing members' on the list for some time now, but, now that our finances have to be audited yearly, I have to be more regulatory. If there is a red X on the top of your newsletter, it's time for you to re-subscribe. **The annual Study Group subscription is $5.00.**

Current research on the Australian Rhamnaceae

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Rhamnaceae is a cosmopolitan family, and it is represented by about 200 species in Australia; it is among the 20 largest families of flowering plants on the continent. Most of the species (90% or 180 species) belong to a distinct group of Rhamnaceae that is endemic to Australia, and which can be recognised by the presence of minute star-shaped hairs on stems, leaves and/or flowers. This stellate-haired group is classified as the tribe Pomaderreae, and contains the well-known genera *Cryptandra* (30-35 species), *Pomaderris* (75-80), *Spyridium* (c. 35), *Stenanthemum* (25-30), *Trymalium* (c. 15), as well as two smaller Western Australian genera, *Siegfriedia* and *Blackallia*, comprising of only one and two species, respectively. *Pomaderris*, after which the tribe Pomaderreae is named, is the largest genus and the only one to extend to New Zealand, with eight species mainly on the North Island. In Australia the tribe is distributed throughout the temperate to semi-arid southern regions. Some species also occur in the arid centre and the tropical North.

The number of genera has been disputed over the last 150 years, with anything between two and seven genera being accepted. For example, the genus *Stenanthemum* was established in 1858, but soon afterwards was not recognised by many botanists, such as Ferdinand von Mueller and Joseph Hooker. In 1995 Barbara Rye from the Western Australian Herbarium reinstated the genus after thorough examination of herbarium specimens from all over Australia. The uncertainty regarding the limits of the genera also resulted in many species being transferred from one genus to the next. *Pomaderris albicans*, for instance, was described in 1845, transferred to *Trymalium* in 1847, then to *Cryptandra* (1883) and *Spyridium* (1904), before being finally accepted in *Trymalium* today.

This confusion was also one of the reasons for the delay in the preparation of the *Flora of Australia* account for the family, work on which was started about ten years ago. For the last four years I have been working on a Ph.D. project (under the supervision of Pauline Ladiges and Frank Udovicic) with the aim of clarifying the relationships between genera and species of the tribe Pomaderreae, to resolve the limits of the genera and the position of several unusual species. To achive this I examined 75 representative species of the tribe Pomaderreae using molecular and morphological methods.

Molecular analysis is one of the main tools of systematics today. The method relies on the comparison of the same sequence of DNA for all taxa concerned. Species that are more closely related will have more similar DNA sequences than more distantly related species. From these sequences a computer can calculate a tree of relationships, similar to a family tree. This phylogenetic tree is then used to interpret the relationships between genera and species of the Australian Rhamnaceae, in combination with data obtained from the study of herbarium specimens and plants in the wild.

The results of my studies indicate that the tribe Pomaderreae is monophyletic, *i.e.* it contains species that are all derived from a single common ancestor; hence the species are more closely related to each other than to any other species of Rhamnaceae and form a natural group.

Nearly all Australian genera were strongly supported by my research, however a few name changes will be inevitable. *Trymalium* will only include Western Australian species and the sole representative in South Australia, *Trymalium wayi*. The Victorian species will be transferred to *Spyridium*. The only *Trymalium* species from Queensland will be part of a new genus of Rhamnaceae that will also contain three previously unrelated Western Australian species. In addition to the Victorian species of *Trymalium*, *Spyridium* will also contain three *Cryptandra* species from New South Wales, *Cryptandra scortechinii* and relatives (this name change is currently being published by Kevin Thiele and Judy West). Of the two species of *Blackallia*, one will be transferred to *Cryptandra*. The second species, *Blackallia biloba*, groups with two very unusual *Stenanthemum* species. Whether these three species will be combined in one genus, or recognised as three separate genera, is the subject of further research. *Stenanthemum*, excluding the aforementioned species, is a very homogeneous genus, and I was able to confirm the appropriateness of Barbara Rye's decision to reinstate it. *Pomaderris* is most closely related to the Western Australian *Siegfriedia*, a very distinct genus containing only one species, in which the flowers are crowded together in heads that resemble a *Darwinia* or *Pimelea*. Previous suggestions to split *Cryptandra* into smaller genera were not confirmed by my analyses. However my results could not resolve all the questions relating to *Cryptandra* and more research is required.

At the moment I am writing up my Ph.D. thesis and resulting publications. From April 2005 I will be working at the National Herbarium of Victoria, where I will continue the work on the *Flora of Australia* treatment of Rhamnaceae. This project is to be completed in 2007. During this time I will continue to collaborate with other Rhamnaceae botanists in Australia, namely Bill Barker, Barbara Rye, Kevin Thiele, Frank Udovicic and Neville Walsh. I also hope to co-operate more with the *Rhamnaceae Study Group*, especially as many of you have collected a substantial knowledge on Rhamnaceae and the cultivation of its species.

Feature Plants: *Pomaderris betulina* ssp. ***betulina*** and ssp. ***actensis***

P. betulina ssp. *betulina* is a bushy, fairly dense shrub from eastern NSW and Victoria. It grows along roadsides, gullies and river banks, usually in dappled shade. Usually 2-3 metres tall, it can grow into a small tree to 4m. It has quite dark green ovate, slightly toothed leaves 1.5-3cm x 10-15mm. The upper leaf surface is usually smooth and slightly glossy, but may have a few hairs along the veins. The underside of the leaf is covered in a tomentum of pale stellate hairs – at least some of these, especially along the veins, are brown. Flowers are cream in small, dense clusters and not very conspicuous. It would be a useful plant for shelter belts or, with its dark foliage, as a background plant in the garden. *P. betulina* ssp. *actensis* has a more limited range, being found only in the ACT and nearby areas. The leaves are a similar size to those of *P. betulina* ssp. *betulina*, but are mostly obovate and a lighter green. The flowers are also similar, but slightly more noticeable. It grows on rocky hillsides, often in quite extensive stands and under light tree cover (although I have one growing out in the open which is growing sturdily).

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