Review of EUCLID Eucalypts of Australia (Third Edition)

Frank Udovicic

National Herbarium of Victoria, Royal Botanic Gardens Melbourne, Birdwood Avenue, South Yarra, VIC 3141.
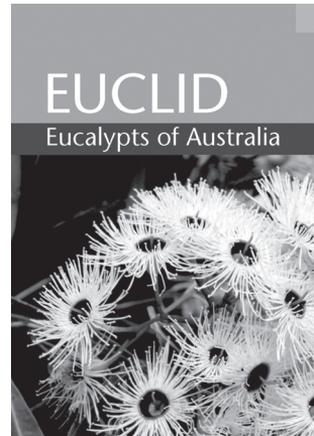
EUCLID Eucalypts of Australia (Third Edition)
Centre for Plant Biodiversity Research
CSIRO Publishing, Collingwood
October 2006
ISBN: 0643093354 (DVD-ROM) AU $120.00
www.publish.csiro.au for ordering, samples and features.

I, and no doubt other botanists, were very excited to hear that finally a version of EUCLID would be available to enable identification of all the eucalypts of Australia. It promises to be, "the definitive electronic identification and information system now covering all 894 eucalypts of Australia in the one publication". Does it live up to the "definitive" claim?

Firstly, a word of warning for those whose computers are more than a few years old; not long after the launch of EUCLID a visiting botanist was looking forward to proudly christening their new copy of EUCLID, but wondered why it wouldn't work on their laptop – they only had a CD drive. This is not an isolated incident either, with several workers expressing disappointment that they would not be able to use it on their current, albeit ageing, machines. Unlike the earlier editions of EUCLID, which were issued on CD-ROM, the third edition has been released on DVD. This has obviously been done to fit the 2.2 Gb of information, including over 9000 colour images, on a single disc, but means that people without DVD drives will be unable to use the program. The software requires a personal computer with a Windows 98/ME/NT/2000/XP operating system; Macintosh and Linux are not supported. An "assumed" limitation I have come across when talking to a couple of people who had an interest in the program, is that they thought it was too expensive, because although the price of $120.00 for EUCLID itself was considered reasonable, they were under the misapprehension that they would also have to spend hundreds of dollars on LUCID software in order to be able to play EUCLID. It must be emphasized that this is not the case. EUCLID comes as a self-contained package including the player software, so assuming you have a modern computer with DVD drive you won't need to buy anything else.

The second edition of EUCLID, released in 2002, covered the area south of 26ºS latitude, or, in other words, Queensland, Northern Territory and the northern half of Western Australia were not covered. The second edition included 690 taxa, and the bloodwood eucalypts (*Corymbia*) were included as a subgenus of *Eucalyptus*. This third edition now covers all of Australia, has 894 taxa, and includes 204 Northern taxa to complement the earlier edition. The authors have adopted the consensus view of generic concepts in this third edition, with the recognition of three separate genera, *Eucalyptus*, *Corymbia* and *Angophora*. The reasons behind this decision are explained in the introductory essay on

Evolutionary Relationships of *Eucalyptus sens. lat.* by Dr Judy West, which covers the phylogenetic hypotheses of the past six years. This provides a very useful summary of the issue for non-specialists and a reference list is provided for further reading.

There are two options for installation of EUCLID. The first involves installing the drivers and player to your hard drive. In this case, all of the information and images remain on the DVD, so the DVD must be inserted into your computer to run the program. The second option entails installing all 2.2 Gb of the program onto your computer's hard drive, and in this case the DVD is not needed after installation. Full installation may take an hour or more, but on a new Intel Core 2 Duo laptop it took 19 minutes and was very straightforward.

The interface will be very familiar to users of previous editions of EUCLID, or for users of other Lucid-based interactive keys. A hardcopy User Guide is no longer included, with the information now available on the DVD. To gain a full appreciation of the many features and information available, the potential purchaser should consult the publisher's website and follow the "Sample" link, which provides the introductory essays, list of taxa, several species fact sheets, and a tutorial key in which the identification of *Eucalyptus globulus* subsp. *bicostata* is demonstrated using a subset of the available characters. As with most interactive keys, it is the ability to use the characters available on the specimen, rather than being constrained by the sequential choices offered by couplets of a dichotomous key that makes EUCLID far and away the easiest, most accurate and most useful key to the eucalypts available.

Unfortunately EUCLID does not cover all species of *Eucalyptus*, ie. the four species endemic outside Australia, *E. urophylla*, *E. orophila* and *E. wetarensis* from Timor and adjacent islands, and *E. deglupta* from northern New Guinea, parts of Indonesia and the southern Phillipines. It can be very difficult to access information on these species, and EUCLID would have provided the ideal vehicle for promulgation of information on these little-known species. The omission of *E. deglupta* is a particular drawback, because it is widely grown around the world for pulpwood, and is of horticultural interest, due to its beautifully coloured bark, hence the common name of Rainbow Eucalyptus. To be able to compare our *E. deglupta* growing at the Royal Botanic Gardens Melbourne to the descriptions in EUCLID would have been purely of academic interest, but for foresters and horticulturists there may be more practical implications in not having a reliable identification key to all species of eucalypts. As with many country or state-based floras and revisions, the fact that the scope of this work is limited on the basis of geography, although only missing c. 0.5% of species, prevents me unequivocally applying the "definitive" tag to this edition of EUCLID.

The Index of synonyms, included in the second edition, has been removed, instead being incorporated in the list of "All Eucalypt Names". Browsing through species of *Eucalyptus* is now much easier because a group of taxa can be selected via an individual letter of the alphabet, compared to the index of the 2ⁿᵈ ed. where the user was required to scroll through one continuous list of all taxa to access the taxon of choice. Taxa in *Angophora* and *Corymbia* are presented as lists, but due to the smaller number of taxa this provides a fast route for selection of the taxon of interest. The list of eucalypt names is seemingly complete (including the four non-Australian species!), but there is noticeable unevenness in the reasons given for various taxonomic concepts being adopted, ranging from the clear and well-explained, to the cursory. This may reflect the personal taxonomic views of the authors, but will be frustrating for non-specialists trying to reconcile the taxa and nomenclature adopted in EUCLID with those in other treatments, such as State floras and censuses.

One of the main strengths of EUCLID is that it is not just a compilation of existing knowledge. The authors made many field trips to take measurements of fresh material and to supplement the information available from their herbarium collection at CANB. Thousands of photographs illustrating the main diagnostic features for identification have been taken, and glasshouse trials were undertaken to obtain seedling characters. In this way, the authors have amassed a huge original data matrix of morphological characters that will prove invaluable for many other uses. The authors had obviously resolved to produce an innovative product, rather than rush out a status quo compromise, and the long-term support of their host institutions, CSIRO and the Centre of Plant Biodiversity Research is to be applauded.

The quality and number of images is extremely impressive, and in this respect EUCLID is without peer. However, in some respects the choice of images appears to be opportunistic, with variation in the images included for each taxon, e.g. juvenile leaves and leaf venation are not illustrated for some taxa. Warty stems can be diagnostic for peppermints, but it is depicted in some of the taxa that possess this character, and not in others. The inconsistency in inclusion of photographed features is particularly irritating when the user is relying on the species descriptions and photographs to discriminate between the last few taxa remaining after having run through the key. For some species a photograph of the type specimen is provided with a useful zooming facility that allows the image to be enlarged in certain critical areas, typically the label and where fruits and/or buds are present (with a scale). Flowers are shown in different ways for different taxa, in some they are fresh, in others on herbarium specimens, and for others, not at all. Care would be needed in the interpretation of flower colour from these varied sources, with some white flowers becoming reddish after drying, and so, becoming potentially misleading for casual users of the key. Despite the few deficiencies, the compilation of so many high quality images of eucalypts in the one place is truly a monumental accomplishment.

The real test is trying to key out specimens. In one case I compared the distribution map of an *Angophora* species in EUCLID to that on Australia's Virtual Herbarium (AVH). The distributions from the two sources matched apart from an outlier on the AVH map. This was a MEL specimen, so I was then able to use EUCLID to check the determination. It turned out it was a *Corymbia* species, a fairly scrappy specimen with only leaves and immature buds. Using EUCLID it was possible to get down to two species and have a fair degree of confidence in a final determination to one species by comparing the detailed species descriptions of the two remaining alternatives. Just at random, another example of trying to identify a scrappy specimen that only had a state locality and no notes on bark, habit etc.; using EUCLID it was possible to very quickly get down to two possibilities and then decide between the two by comparison with the descriptions. It is in this sort of work, trying to identify scrappy specimens, with poor locality and habit information, that EUCLID proves invaluable, providing the non-expert with the opportunity to key out incomplete material that would prove virtually impossible even for a seasoned expert.

So, EUCLID is not perfect, but it is by far the most comprehensive and useful aid to the identification and study of the eucalypts available, and for pure "bang for your buck" has to be considered an absolute bargain and an essential item in the library of anyone interested in these icons of the Australian bush.