

TAXONOMIC TREATMENT OF CALADENIA IN SOUTH-WESTERN AUSTRALIA — APPRAISAL, 1995

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The recent lodgment with the Australian Orchid Foundation Research Committee of S. D. Hopper's and A. P. Brown's manuscript covering south-west Australian terrestrials after some 15 years of research must be a relief to the authors and all who were involved in assisting them over such a protracted period.

This is far from an anticlimax as the authors have provided a rundown of progress throughout the period, that has been widely publicised, by a series of papers and lectures to Orchid, Wildflower and Naturalist Societies. These have been supported by slides representing the proposed new names, reinstatements and changes to existing groups as new genera.

The publication of Noel Hoffman's and Andrew Brown's second edition of *Orchids of South-west Australia 1992* contained all these proposals supported by colour plates and text, presumably to be the basis of the manuscript and was presented as a *fait accompli*, where we read on page 9: "Full descriptions of orchids illustrated here for the first time are included in *Australian Orchid Research* Volume 3, published by the Australian Orchid Foundation." When I read this statement I rang the A.O.F. to order a copy of the research and was amazed to find that the manuscript had not been lodged and was not expected for some considerable time. It was eventually lodged approximately two years and eight months later.

During this period the professional sector has been kept up-to-date by a series of papers and lectures at seminars and conferences, by the progressive lodgment at the W.A. Herbarium files of voucher specimens supporting new names and alterations to existing files covering reinstatements and genera changes, with minimum information.

Possibly the most important paper was delivered by S. Hopper at the 12th Australian Orchid Conference, Perth 1991. This extensive paper was entitled "Caladenias: History of

"Taxonomic Concepts" and covered the sections, Taxonomy as science — *Caladenia* taxonomy — A historical perspective — New techniques — Biological and morphological concepts — Hybrids and what makes a *Caladenia*? — covering nine pages in the conference proceedings. Because of the volume of the paper, I have extracted a few snippets that I found of more than passing interest.

Stephen Hopper states when covering *Taxonomic Science*:-

"The focus of my talk on systematic concepts is deliberate, I consider that systematics, the classification and naming of living things is one of the most important fields of biological science. It has fallen out of fashion in recent decades, with notions promulgated of venerable old gentlemen poring over even older dusty specimens in mysterious antiquated buildings (herbaria) and finally producing descriptions of new species in an even older language (Latin). Hardly stimulating fare for a high-tech society which places newness on a pedestal (at least the constant bombardment of television advertising would have us believe so).

"In fact, systematics is one of the most rigorously refereed and widely used sciences. It has the excitement of discovery combined with an acute sense of history and of place. To be fully effective, today's systematist has to be an experienced bushman, explorer, historian, geographer, ecologist and field reproductive biologist. He or she also needs skills in computing, molecular biology, chromosome and genetic studies, horticulture, palaeontology, anatomy as well as the traditional fields of comparative morphology and nomenclatural analysis. Increasingly, the taxonomist now plays a major role in conservation biology and practical conservation initiatives. No other branch of botany is so challenging nor exciting in my view.

"Few taxonomists make it clear that the product they generate, the names of organisms, are rigorously derived hypotheses in the best of scientific tradition. When a species of plant is described for the first time, the taxonomist is saying that the diagnostic characters provided in the description are consistent throughout the identified geographical range of the organism. This is a scientific hypothesis, in that it makes a proposition about the natural world that can be examined and tested by others.

"One of the hallmarks of taxonomy is that such testing occurs far more often than for many other arenas of science. This is because we all need names to communicate and to appreciate the existence of plants. A thing without a name is a thing unrecognised and ignored. Far more people use the names of plants and animals than they do the published results of most biological science. In this sense, then, I contend that the results of systematic research are much more rigorously tested, scrutinised, discussed and disputed than most biological hypotheses.

"This is healthy, ensuring that the taxa ultimately recognised are based on substantial empirical observation and have long-term stability."

CALADENIA TAXONOMY — A HISTORICAL PERSPECTIVE

Under this heading Stephen Hopper lists the inevitable problems between British-based taxonomists Bentham (1873) and Reichenbach (1871) and their broad concepts in relation to specimens submitted by R. D. Fitzgerald and J. Drummond and their justifiable criticisms of determinations that bore little resemblance to living specimens. He gives a series of examples that support this, he goes on to say: "What has happened since is a growing recognition that there is also remarkable variation within species such as *C. patersonii*, *C. filamentosa*, *C. dilatata* and *C. huegelii*.

"Taxonomists in the first half of the present century began to tease apart this variation,

slowly at first, with the recognition of new species and varieties by Domin (1912), Rogers (1909, 1920, 1923, 1927a, 1927b, 1938), Coleman (1930), Nicholls (1947, 1950) and others. Because much of the work of these authors was done without reference to the type specimens used by their British and European predecessors, some confusion and description of previously named taxa resulted. George (1971) and more recently Clement (1989) and Hopper and Brown (in prep.), have clarified most of the resultant nomenclatural problems."

NEW TECHNIQUES

He lists a series of the new approach — working with living specimens and current advantages that are available to researchers of today compared with those earlier. He gives particular emphasis to preserving flowers and leaves, to sample a population "by dismembering, flattening and separately mounting in rows the petals, sepals, labellums and columns, beneath clear magic tape on a system card;" and lists the advantages that accrue from this.

BIOLOGICAL AND MORPHOLOGICAL CONCEPTS

After introducing the subject he states:—

"While we accept that an element of subjectivity is part of all scientific enquiry, the best works in the field are those that present ideas and data in a way that ensures that they can be examined critically and tested by other workers.

"Perhaps the most important difference between some current Australian systematic philosophy and that of earlier workers is an emphasis on biological as well as morphological attributes in recognising species and subspecies. New species are now recognised by authors such as myself and Andrew Brown, Jones (1991) and Carr (1991) if they grow in populations (i.e. are not aberrant individuals within normal populations), if they have features or a combination of features not seen in any previously named species and especially if

they grow with previously named species and produce few or no natural hybrids. Differences in flowering times, in habitats occupied and in pollinators or other attributes used to help identify new species in some cases.

"Geographical races with minor morphological differences are recognised by myself and Andrew Brown as subspecies. These may hybridise and intergrade extensively where their geographical ranges overlap.

"These species and subspecies concepts are thus both morphological and biological springing from the approaches lucidly summarised by Grant (1981).

"It is important to note that a consideration of biological as well as morphological data in deciding on species rank is a fundamental difference to the approach of George (1971) and his predecessors. It leads to the recognition of more species."

HYBRIDS

He states that presumed hybrids: "cause considerable identification problems because, hitherto, they have largely been ignored in published works on Western Australian orchids (other than by Hopper, 1979; Heberle, 1982)."

"For these reasons, hybrids are recognised and will be named formally by myself and Brown if they occur as sporadic individuals among mixed populations of likely parental taxa and where their flowers are clearly intermediate between those of their presumed parents. The presence of an "x" preceding a species' name denotes its presumed hybrid status.

"We have not formally named hybrids where their identification is rendered difficult by the presence of backcrosses in many populations, so that a complete transition in form occurs from one species to the other. In such situations, reference to hybrids is preferred by the conventional formula of the names of the parental taxa linked by an "X".

"We have opted for quite broad hybrid species concepts to avoid an unnecessarily complicated taxonomy and to ensure continued

applications of names as previously used."

WHAT MAKES A CALADENIA

He gives comparisons between early botanists from Brown (1810), Lindley (1840), Reichenbach (1871), Bentham (1873), Mueller (1882) and George (1971) and the varying differences in their taxonomy. He goes on to say: "On the basis of detailed studies described elsewhere, myself and Andrew Brown consider that a few small groups in *Caladenia* warrant recognition as distinct genera — the blue flowered species (e.g., *C. caerulea*, *C. deformis*, *C. gemmata*, to be placed in the genus *Cyanicala*, Hopper and A. P. Brown ined.), the leafless orchid (*C. aphylla*, to become *Praecoxanthus* Hopper and A. P. Brown ined.), the dragon orchid (*C. barbarossa* and its undescribed relatives, to become *Drakonorchis* Hopper and A. P. Brown ined.) and Lindley's *Leptoceras*."

Whilst the detailed studies described elsewhere are not available, I question the proposals to erect a new genus *Cyanicala* to include all the blue caladenias on morphological features *C. amplexans*, *C. caerulea* and *C. sericea* are closely related. However, *C. deformis*, *C. gemmata* (including the yellow and white variants) are the reverse. It is interesting to note that *C. saccharata* fits in with the first three, but has apparently been excluded because it is not "blue". This is "sloppy" taxonomy and should be rejected.

Proposals to submerge the *C. barbarossa* complex and erect a new genus *Drakonorchis* to replace *Caladenia* poses the question that this group, hitherto, has been accepted by all previous researchers and revisions. Is this proposed change valid? The only structural difference between *C. barbarossa* and other caladenias are the unique labellum appendages, because a species has been found that has an elastic-hinged labellum reminiscent of the genus *Drakaea*, it is doubtful whether these differences warrant change.

An obvious spin off from the proposals to erect these two genera changes is that, if implemented, will result in the creation of intergeneric hybrids.

Heberle (1982) listed as putative hybrids:-
Caladenia caerulea X *C. saccharata* — *C. deformis*
 X *C. saccharata* — *C. barbarossa* X *C. patersonii*
 — *C. lobata* X *C. barbarossa*, with the passage of
 13 years others would doubtless be able to add to
 the list. From the above it is apparent that all on
 the list will become intergeneric hybrids, not by
 nature but by manipulation, hopefully few would
 accept this as valid or warranted.

The proposal to submerge the two species
Lycranthus nigricans and *L. forrestii* under
Biarnetia is a moot point both with many
 professionals and amateurs, my knowledge of this
 genus is negligible, I had the opportunity to
 confer with associates during a visit east in 1993
 and found no support for this proposal.

In referring to S. Hopper's introduction
 covering *Caladenia* he states: "I recognise 131
 validly named species. Andrew Brown and I will
 describe shortly an additional 50 new species and
 14 hybrids from Western Australia giving a total
 of 181 recognised species. I suspect that the genus
 as circumscribed by myself and Andrew Brown,
 eventually will have around 200 species, when
 detailed systematic studies are completed."

Referring to Brown (1993) we find a
 breakdown of *Caladenia* covering *C. filamentosa*
 32, *C. huegelii* 20, *C. longicauda* 25, a total of 77,
 all with their ranges of distribution, flowering
 periods and habitat preferences. Brown states:
 "Other species that will be affected by our
 revision include *C. longiclavata* which will be split
 into five species, *C. falcata* and *C. douglasii* will
 be split into three and *C. integra* and *C. cairnsiana*
 into two. Finally *C. flava* will be split into three
 subspecies and both *C. nana* and *C. reptans* into
 two subspecies. This will increase the number of
Caladenia from 55 in 1989 to 126 in 1993, despite
 nine having been removed.

Whilst this writer does not intend to cover in
 depth the 99 species of *Caladenia* proposed and
 will cover only the three major species of *C.*
filamentosa, *C. huegelii* and *C. longicauda*, all of
 these have distinct and recognisable
 morphological features but because of a long

period of speciation have merged in and out of
 each other with major hybridisation, particularly
 with the latter two and now reflect a bewildering
 array of highly complex forms and variants,
 especially where species intergrade (refer to
 Dockrill, 1995). To say that these species have
 their own preferred habitats, distribution ranges,
 etc., is patently ridiculous, most orchidologists
 who have looked at Western Australian
caladenias will know this is valid only in isolated
 instances at the extremities of distribution.

An appraisal of Hoffman and Brown, second
 edition will confirm that most *caladenias* are
 variants described as species and subspecies, the
 two hundred suggested by Hopper and Brown is
 conservative, from my personal experience, this
 could be much greater.

The proposal to submerge *C. filamentosa*, the
 most widely distributed Western Australia
Caladenia and one of the most abundant and split
 these into species and subspecies is doubtful. This
 species has consistent morphological features such
 as a dentate labellum margin and two rows of
 flattened calli angled toward the apex along the
 central axis. Tepals vary in length and width and
 colour reflecting all shades of white, pink, yellow,
 brown and red and often striped and variegated.

The treatment of *C. longicauda* and *C.*
eminens and their variants, to split these up
 similarly as with *C. filamentosa* is also doubtful,
 these species have four and rarely six rows of golf
 stick-like calli with the same variation of tepals,
 there are varying colours of and length of
 labellum fringes and calli, there are glands at the
 base of the column. This species is not nearly so
 widely distributed as the former. The
 submergence of the *C. pectinata*, the most highly
 variable of all W.A. *caladenias* and to replace this
 with *C. huegelii* that is represented by one
 distinctly different species is a highly controversial
 issue, the historical origin and identification of
 this species is far from cut and dried (Heberle in
 preparation will cover this elsewhere).

Caladenia pectinata has four rows rarely six
 golf stick-like calli with a pectinate fringe of

varying lengths and a purple to red-brown labellum tip, the widely varying sepals in length and width are all clubbed at the apex and there are glands at the base of the column. Petals are not clubbed. This species shows the widest variation of all W.A. *caladenias* particularly in colour that ranges from cream, green, brown and red with striping variegation with many. To split out some of these as species and subspecies is hardly acceptable.

Whilst I am bound to accept that approximately one third of the proposals are valid, most have been commonly known over past decades. In so doing, in common with my many associates, I reject the blatant splitting of species that characterise most of the proposals and the ploy of using the subspecies to achieve this (refer to Dockrill, 1995).

I have been referring throughout this article to the proposals that have been presented as fact and are a *fait accompli*. The wide publicity and premature release of manuscript material prior to valid publication under the Convention of the International Code of Nomenclature has given me a unique opportunity to write this appraisal.

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