EVOLUTIONARY OPPORTUNITY IN THE *ASPLENIUM HOOKERIANUM* COMPLEX - A COMMENT

John D. Lovis

In my opinion, *'hookerianum* and *'colensoi', sensu* Dobbie/Crookes, are two morphologically very different but interfertile genotypes within one highly polymorphic species containing a complete range of intermediates between extremes. I join with Arthur Ericson in discounting the statement (e.g., Allan 1961, p 63) that "sts both forms are found on the same plant". The implication appears to be that one should infer from this that variation in the complex is primarily plastic (i.e., phenotypic) in character, but I cannot accept such a conclusion.

The dynamics of this situation can only be understood in terms of the recent history of the complex. Thus on Banks Peninsula, the forest has been dissected into disconnected and isolated fragments, most of which have subsequently had their ground vegetation thoroughly ravaged by stock. Nowhere on Banks Peninsula is the forest today in a truly unmodified primaeval state. More recently grazing pressure has been removed or relaxed at a number of localities by fencing, thus allowing palatable ferns like the *Asplenium bulbiferum* group to re-establish. Under such conditions of relaxed natural selection, where there is literally an open opportunity, a whole range of recombinant individual forms within a polymorphic complex like *Asplenium hookerianum* (*sensu lato*) may occur. Many localities in Canterbury currently show such a kaleidoscope of forms. What comes up is essentially a function of the available spore sources and chance. Only later will genotypes best suited to particular habitat conditions be sorted out by natural selection. But some trace of that initial explosion of variation is likely to persist. This is one expression of what is known as the 'Founder Effect' on populations.

It is in just such a combination of circumstances that speciation can have its inception. A particular recombinant form, especially well-suited to a particular micro-habitat, may arise, and, if its advantage is sufficient, persist and prevail against the immigration of older genotypes. Though, to my shame, I have not yet studied the Onuku *Asplenium* in its habitat, I suspect that this plant falls into this category.

I doubt very much, however, whether it is yet a 'good' species, though it is conceivable that it might become one. To be a 'good' species, it needs not only to be a distinctive local form, at an adaptive advantage in a specific habitat, but also to be genetically isolated from its relatives. Reproductive isolation, and therefore speciation, can occur rapidly, notably, for instance, through polyploidy, but the acquisition of genetic isolation is usually a much more long-winded process involving many generations. The evolutionary time-scale is so very different from the human time-scale.

It is only 150 years or so since Europeans started ravaging the Banks Peninsula landscape. In so doing, they unwittingly created evolutionary opportunities, but only our remote descendants will be able to tell what came of them.

To recapitulate: Recent historical events have created an opportunity for the organisation of a new species in the *Asplenium hookerianum* complex, by what can be termed a type of hybrid speciation. Arthur Ericson has discovered an extremely interesting example of what can fairly be interpreted as an early stage in such a process. But it is far too soon to judge the ultimate fate and status of the 'Onuku' *Asplenium*. It may prevail against increasing competition, it might evolve genetic isolation, it may spread into other similar habitats elsewhere. It might become a distinct species. But none of us, living now, will ever know.

A comment on *Asplenium hookerianum* var. *colensoi*

In my opinion, *Asplenium hookerianum* var. *colensoi* is a justified and useful taxonomic concept - as a variety. I thus go along with Brian Molloy's usage (Molloy 1983, pp 46 &47). An opposed but informative viewpoint is given by Brownsey (1977, pp 64-66). Note, however, that the two fronds illustrated in Brownsey & Smith-Dodsworth (1989, p 110) are not extremes of either morphological type.

The differences between various editions of 'Dobbie' are a bibliographer's delight or nightmare, depending on your viewpoint (cf., McCraw 1988). The 6th and final edition of 'Dobbie' is now a scarce book. The illustration of '*colensoi*' to which Arthur Ericson refers is better seen in earlier editions; it has been unnecessarily and brutally cropped in both the 5th and 6th editions (though not in the 4th!). The number of illustrations of the *Asplenium hookerianum* complex was reduced to two in the Crookes revisions. The last Dobbie edition (3rd, 1931) includes no less than six full-page plates, but also contains some taxonomic confusion. Though (97) is labelled 'var. *colensoi'* (this is the figure which survives in later editions), strangely (96b) is *'Asplenium colensoi* var A'. Furthermore, I am reasonably sure that the first figure in the series (96), '*Asplenium hookerianum*' is a hybrid with *A. bulbiferum* (s.l.)! (Not included in the later editions.)

The frequent occurrence of hybrids with other species of course adds another dimension to the variation patterns. However, hybrids between the *Asplenium hookerianum* complex and both the *A. bulbiferum* and *A. flaccidum* groups are sterile, whereas hybrids within the *A. hookerianum* complex are, as far as is yet known, all fertile.

References

Brownsey, P.J. 1977. A taxonomic revision of the New Zealand species of *Asplenium*. *New Zealand Journal of Botany 15*, 39-86

Brownsey, P.J. & Smith-Dodsworth, J.C. 1989. *New Zealand Ferns and Allied Plants*. Bateman, Auckland

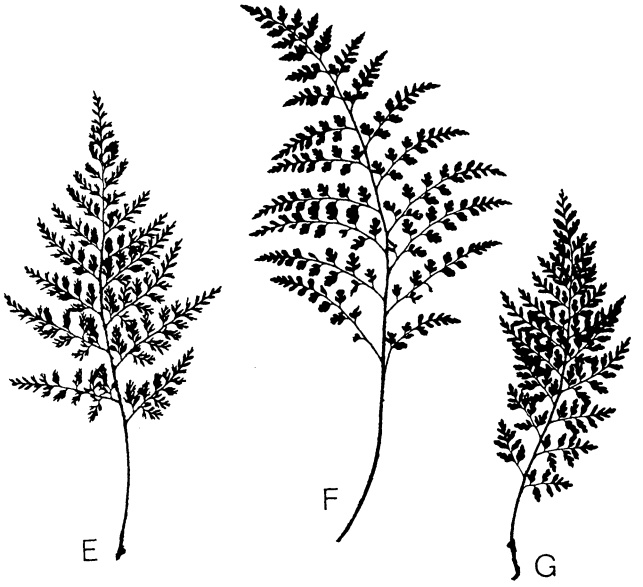
Crookes, M. 1963. *New Zealand Ferns.* 6th edition. Incorporating illustrations and original matter by H.B. Dobbie. Whitcombe & Tombs, Christchurch

Dobbie, H.B. 1931. *New Zealand Ferns.* 3rd edition. Whitcombe & Tombs.

Dobbie, H.B. 1951 & 1952?. *New Zealand Ferns.* Revised and edited with additional matter by Marguerite Crookes. 4th & 5th editions. Whitcombe & Tombs, Auckland.

McCraw, J.D. 1988. H.B. Dobbie - fern enthusiast. *New Zealand Journal of Botany 26,* 171-178

Molloy, B.J. 1983. *Ferns in Peel Forest.* A Field Guide. Department of Lands & Survey, Christchurch.



Asplenium hookerianum. E, Stronvar, Wairarapa; F, Sugarloaf, Port Hills; G, Whangiamoana, Wairarapa. From Brownsey, P.J. 1977. *New Zealand Journal of Botany 15.* (see p. 51 for further illustrations)