

A CARDIGANSHIRE *AFFINIS* HUNT

In 2005 I was fortunate enough to have the expertise and company of Ken Trewren and Sam Thomas for four gloriously sunny and productive days from the 11th to 14th of July. Ken has been studying the *Dryopteris affinis* group for forty years and, along with Christopher Fraser-Jenkins and Anthony Pigott, has more experience of the group in Britain than anyone else, and Sam has been studying the group for several years chiefly in North Wales. The general aims of the occasion were to work out what morphotypes occurred in VC 46, to get some idea of their distributions, and to get confirmed records of *D. xcomplexa*, the hybrid between *D. affinis* and *D. filix-mas* which had up till then not been very satisfactorily recorded in the county. A more particular aim was for Ken to teach Sam and myself how to do chromosome counts, and how to use spore fertility to assess hybridity. We visited sites throughout the county, reaching the north, south-west and south-east corners, and spent long hours each evening at the microscope. We had slightly misjudged the season, as the sori on most of the material we saw had developed beyond the stage at which chromosome counts could be made, but we found enough young ones to be able to learn the techniques and to make several useful counts. What little time was left over around midnight was spent by Ken in naming the piles of material I had collected over the last ten years.

An earlier *affinis* hunt had taken place in the county in October 1996 when I had taken Anthony Pigott and Clive Jermy around sites in the north of the county for two days. On that most stimulating occasion many records of the morphotypes were made, and a large number of specimens I had collected up to that date were named, and for the first time an idea of the *affinis* situation in the county emerged. *D. xcomplexa* though was not so well understood at that time, and we had made no records of it.

There has been much controversy over how best to treat the variation within the *affinis* complex, which consists of apogamous diploids and triploids derived from hybridisation between *D. oreades* and *D. caucasica* and some other diploid species. Stace, *New Flora* (1997), Page, *The Ferns of Britain and Ireland* (1997), Hutchinson & Thomas, *Welsh Ferns* (1996) and others have followed Fraser-Jenkins in recognising three subspecies, *affinis*, *cambrensis* and *borreri*. Pigott (a now rather outdated version of whose system can be found at www.btinternet.com/~pigott/affinis.htm) and Jermy & Camus, *The Illustrated Field Guide to Ferns* (1991) (a rather simplified version) have preferred to recognise a series of informal morphotypes, of which between about five and fifteen have been recognised in Britain; these are roughly equivalent to the species in *Rubus fruticosus* agg., and, as with *Rubus*, there are in addition many local forms which are too restricted in their distribution or too poorly defined to be worth naming. More recent opinion, including that of Trewren, is that it would be best to treat these three taxa as species, and the variation within them as subspecies and formae. A local Flora writer like myself does not need to worry too much about which interpretation is "correct", but should always record and give information in as much infraspecific detail as practicable. If one records *affinis* by the morphotypes, then someone who uses the three subspecies concept can easily make the adjustment, but the converse is not true and much potentially useful information is lost. The VC46 *affinis* can be arranged for convenience as follows:

subsp. *affinis* 2n=82 (incl. morphotypes *affinis*, *paleaceo-lobata*, *convexa*)

subsp. *cambrensis* 2n=123 (morphotype *cambrensis*)

subsp. *borreri* 2n=123 (incl. morphotypes *borreri*, *insolens*, *robusta*, *foliosa*)

A few further even more informal morphotypes, not yet so well recognised, are mentioned in the account that follows, these names being given in quotes. There are in addition two hybrids:

D. xcomplexa nothosubsp. *complexa* (*D. affinis* subsp. *affinis* x *D. filix-mas*)

D. xcomplexa nothosubsp. *critica* (*D. affinis* subsp. *borreri* x *D. filix-mas*)

The 2005 hunt began in Cwm Woods c.SN600832, secondary estate woodland with a lot of beech, just north-east of Aberystwyth. It proved a marvellous introduction and was the richest site of the whole hunt. Among clumps of *affinis*, *paleaceo-lobata*, *borreri*, *insolens* and *robusta* were several of *D. xcomplexa* nothosubsp. *complexa*, confirmed by their largely abortive spores. Only the *paleaceo-lobata* had young enough sori for a chromosome count, for which we got the diploid count $2n=82$. Two forms of *borreri* were present, as in several of the later sites we visited, the normal one and a 'golden-scaled' one. Moving on to Forestry Commission woods in the Ystwyth valley SN700717 we saw more *affinis*, *paleaceo-lobata* and *borreri*, a *D. xcomplexa* nothosubsp. *complexa* that perhaps had *paleaceo-lobata* rather than the usual *affinis* as a parent, and lunched with our backs to another fine *complexa* clump. A little further on a small rocky bluff by the road opposite Craig Golomenod SN73247201 had a fine display of *affinis*, *paleaceo-lobata* and our first *cambrensis*. Amongst *Silene uniflora* by a stream through the ruins of the Pontrhyd-y-groes lead mine SN73837223 was *cambrensis* again (later shown to have its characteristic mixture of good and abortive spores), *borreri*, *insolens* and *robusta*, as well as intermediates between these last two which we saw in other sites later. Our final stop was at Hafod, where in mixed conifer woodland below the drive SN76147301 we found among masses of *D. dilatata* and *D. filix-mas* fine *D. xcomplexa* nothosubsp. *complexa*, *affinis*, *paleaceo-lobata*, *borreri* and *insolens*, and a few plants of *D. carthusiana*.

On day two we went north, to Furnace and Cwm Einion where Ken was anxious to investigate more closely some interesting plants he had seen on the BPS meeting here in June 2003. Three big clumps in woodland between the drive and the Afon Einion just across the A487(T) from the mill SN68489520 were confirmed as *D. xcomplexa* nothosubsp. *complexa* by its abortive spores, and *affinis* and *insolens* were nearby. On the stream bank by the mill itself there was a large clump of what appeared to be a hybrid, but it was that evening counted as having $2n=123$ and this, along with the arrangement of the chromosomes, indicated that it was in fact an unusual form of *borreri*. After recording *affinis*, *paleaceo-lobata*, *borreri*, *insolens* and the intermediate between the last two in the woodland at Ty'n-y-garth SN691945 up Cwm Einion, we went on to where a footpath SN69919429 led us to three clumps of a very distinctive form of *affinis*, 'black-scaled' on the rachis, which Ken had noted here in 2003. Ken had seen this previously in south-west Ireland and Sam had seen probably the same thing in Merioneth. Like *paleaceo-lobata*, it was at a much earlier stage of development than any of the other morphotypes. We then went down to the Ynys-hir RSPB Reserve SN681962 where the quarried laneside had a good display of *affinis*, *paleaceo-lobata*, *cambrensis*, *borreri*, *robusta* and *D. xcomplexa* nothosubsp. *complexa*, and in and around a rock cutting by Ty'n-berllan SN68259633 we saw about ten clumps of a very distinctive form of *affinis* with unusually strongly toothed pinna-lobes, a good example of a probably very local form. After lunch we went to the northern boundary of the county in the Llyfnant valley, chiefly to refind *convexa* which Anthony Pigott had discovered here in 1996. It was indeed still there, some fifty clumps, under alders and on rocks by the road along some 350m of the valley SN72739751-73009745, clearly a different form from the one with paler green, broader fronds that Ken knew in Yorkshire, and clearly distinct from *paleaceo-lobata* which it has been suspected of being confused with. The 'black-scaled' *affinis* that we had seen earlier in the day was nearby, and *affinis*, *paleaceo-lobata* (but with less crimped pinna-lobes than usual), *cambrensis*, *borreri* and *insolens* and were also along the roadside.

Day three started with a long drive to the extreme south-west to investigate the Teifi woodlands. Along the roadside, in a wooded quarry and in two steep ravines by Cwm Du near Coedmore c.SN195444, *affinis*, *borreri*, *robusta*, intermediates between *robusta* and

insolens and several plants of *D. xcomplexa* nothosubsp. *complexa* were in fine form; *insolens* itself, in contrast to its abundance in the woodlands in the north of the county, was conspicuously absent. Some further suspected hybrids proved to be just *D. filix-mas*. We counted 55 clumps of *D. aemula* here, its largest colony in the county. Our next site, Gwachal Dwmlo SN258424, some way up-river, was the only real dud of the hunt, with only *affinis* and *borreri*, but the next, Coed Cwm-du in Cwm Cou SN309439, was one of the best. The very steep slopes above the Afon Ceri were clothed with *Luzula sylvatica* and had a canopy of *Quercus petraea*, and a damp, more base-rich rocky stretch of slope provided variety. *D. dilatata* and *D. filix-mas* were abundant, and among them *affinis*, *borreri* (including two very distinctive variant forms), a very small amount of *insolens*, *D. xcomplexa* nothosubsp. *complexa* and at last the other form of this hybrid, nothosubsp. *critica*, which we had been looking for for the last two and a half days, with abortive spores and much more *borreri*-like in appearance than nothosubsp. *complexa*. There was also a distinctive form of *affinis* with 'truncate-based' fronds, that had in earlier years been collected in other parts of the south of the county. As a finale we treated ourselves to a viewing of the county's only colony of *Melittis melissophyllum*, finding two vegetative plants and three with inflorescences in young fruit, though apparently not setting seed.

Our last day was devoted to the south-east and some more upland areas, though we started at Falcondale Lake near Lampeter SN567498 where in damp woodland by the outflow stream we found *affinis*, *borreri*, *insolens* and *robusta* and their intermediate, and *D. xcomplexa* nothosubsp. *complexa*. A couple of other hybrid-like plants were later shown under the microscope to be just odd forms of *borreri*. Round the other side of the lake along the road through Upper Forest SN574497 we found a very choice display of interesting well-grown forms. A dense growth of *convexa* stretched along the west bank of the road, but the form with paler green, broader fronds familiar to Ken in Yorkshire and not the one we had seen two days earlier in the Llyfnant. A chromosome count of this Upper Forest *convexa* showed it to be diploid, with $2n=82$, thus clearly belonging within subsp. *affinis*. The 'black-scaled' *affinis* was again there, as well as ordinary *affinis*, *borreri* and a huge clump of *cambrensis*. Across the road were several plants with remarkably strongly toothed pinna-lobes that did not seem to belong to any recognised morphotype. We then went through Lampeter, crossed the Teifi into the alien territory of VC44 but soon re-entered VC46 at Cellan and drove into more upland country. At a shaded roadside lunch-stop above the village SN614480 we found *affinis*, *paleaceo-lobata*, *borreri* and *D. xcomplexa* nothosubsp. *critica* and then ascended to 350m altitude 4km to the east SN64634829. Here on the heathy roadside bank was the same *convexa* we had seen in Upper Forest, as well as a few plants of *affinis*. Descending along the Roman Road to 290m altitude, about 2km south-east of Llanfair Clydogau c.SN638497, in an area of heathy roadside banks, *Salix* scrub and conifer plantations we had out last and rather confusing stop. There were scattered clumps of *affinis* and *cambrensis*, and a few of *paleaceo-lobata* and *borreri*. Among *Salix* bushes east of the road there was a plant that after much deliberation seemed best considered a strange form of *affinis*. There was an equally puzzling clump on a bank at the edge of a small pasture SN63575015 which was ultimately put down as a form of *cambrensis* with unusually toothed pinna-lobes.

Ken and Sam collected a number of lateral crowns of the more interesting or problematical plants for growing on and further investigation, and numerous voucher fronds were collected for the NMW Cardiff herbarium. We ended up with ten new hectad records for the hybrids, a useful contribution to the BSBI's hybrid project, and added a vast amount to the information on the distribution of the morphotypes and their variation in the county. Ken and Sam both got valuable further experience of *affinis* in general. Sam and I learnt how to count *Dryopteris* chromosomes. Lucky the County Recorder and Flora-writer who can be out in the field and work in the evenings with two such knowledgeable, stimulating and enjoyable

companions. The BSBI Wales Committee is planning for their 2006 AGM to be based in Gwynedd and to have an emphasis on *Dryopteris*, and a good range of *affinis* morphotypes should be seen on the field meetings.

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