LICHENS AND HABITAT MANAGEMENT

Workshop - September 3-6 1997

The workshop aims:
(1) To allow members with experience of lichen habitats to discuss how best to advise on site management and ensure their continued lichenological interest.
(2) To produce a publication on Habitat Management for Lichens, for widespread distribution.

A common enquiry which we receive is how to manage a site to ensure that lichens are conserved and promoted. We know however, that considerable expertise exists among BLS members which has never been made public. So this workshop is an opportunity for us to share our experience, contribute ideas, and have them distributed in a publication. This will be inexpensively produced so that it can be disseminated as widely as possible, for example to Wildlife Trusts, site managers, landowners, agencies, etc., with active conservation interests.

The format for the workshop will be of morning presentations and discussions, followed by afternoon excursions to view and discuss lichen management problems. We are promised that some of North Wales' NNRs will be made open to us. In the evenings, we will discuss and develop our ideas, leading to firm action plans. Participants will be expected to write relevant sections of the publication, preferably having a draft ready for use in the workshop.

The workshop will start on Thursday morning, 4th September and finish on Saturday at 1 pm. Accommodation for 40 persons has been booked at the brand new Student Halls at University College Bangor, from Wednesday night to Saturday afternoon, at an inclusive cost of £117 plus VAT. It should be possible to arrange to stay on for the weekend afterwards if desired. The ensuite rooms are very modern and comfortable, together with a large meetings room with audio-visual aids, and of course, there will be a bar. It is hoped that we can negotiate grants allowing reimbursement of at least some costs, at least on a needs basis.

We would like to include as many habitats as possible, but still await offers of presentations on some key ones. So, volunteers to lead discussions are welcomed. Inclusion of habitats we know little about would also be welcomed.

For further details, special needs and booking forms, please contact me at, Holly Hayes Environmental Resource Centre, 216 Birstall Rd, Birstall, Leicester, LE4 4DG (0116-267-1950, FAX 0116-267-7112).

Anthony Fletcher
IDENT: A COMPUTER-AIDED MULTI-ACCESS KEY FOR THE IDENTIFICATION OF LICHENS OF THE NEGEV DESERT

Introduction
The majority of keys for lichen identification are based on the dichotomous principle: thesis - antithesis. This requires knowledge of particular characters of the specimens being identified. Absence of even one of these characters often impedes identification of the family to which the lichen specimen belongs. For instance, the first differentiating characters in the key to the families of Israeli lichens are those of the fruiting bodies (Galun, 1970). This makes it difficult to identify sterile species, such as *Ramalina maciformis* and *Diploicia canescens*. Furthermore identification of atypical specimens may require the trained eye of an experienced specialist in the group.

In some cases, particularly for the purposes of ecological monitoring and assessment of biodiversity undertaken by non-specialist taxonomists, it is convenient to use a multi-access key for lichen identification. This incorporates an automatic selection process for species meeting certain conditions at each step of the identification process. Such ideas led to the elaboration of an interactive identification computer program.

Morse and Edwards (1995), in their review of computer species identification, did not mention lichens among the groups to which computer-assisted identification has been applied. In fact, there are a number of lichen keys using computers in different ways. To the best of our knowledge the only computer-aided lichen key described in periodicals to date is *LICHENOLOG* (Zeltyn & Pchelkin, 1993). It was developed for epiphytic lichens from the Kandalaksha (Kola Peninsula) and Gissar (Central Asia) nature reserves. However, several others exist. Gerhard Rambold and D. Triebel have created a key to the lichenized and lichenicolous Ascomycetes, a subset of which (relating to 270 lichen genera found in Germany) can be downloaded from the Internet Web site: http://www.botanik.biologie.uni-muenchen.de/botsamml/lias/modules.html. Keys for certain lichen genera (c 20) can also be downloaded from this site. These interactive keys have been created using the DELTA software (“Description Language for Taxonomy”) (Pankhurst, 1991; T A Paine, pers. comm.). The number of genera for which the keys are available is expected to increase to 780. In addition, Darrell Wright (pers. comm.) has written the dBASE IV.5 random access MS DOS-based key to *Bryoria* in North America. Bruce Ryan (pers. comm.) has used the Word Perfect 5.1 (WP51) text processor to input computer keys to North American genera and species and then employed WP51 random access tools to search species’ descriptions for selected terms. Fred Rhoades (pers. comm.) has developed
the multi-access key PC-TAXON for US Pacific Northwest foliose and fruticose lichen genera and for species of *Hypogymnia*, *Peltigera*, *Bryoria* and *Cladonia*, and Harrie Sipman has loaded his computer-aided key to lichen genera of the Guianas (c 190 genera) on the Internet Web site: http://osfl.gmu.edu/~thollowe/lichkey2.html. Most of the existing keys are available from the authors or directly from the Internet. Development of new computer-based keys for lichens is expected in the near future.

Negev lichen identification with multi-access key IDENT

The IDENT program is written in the CLIPPER computer language for databases necessitating the use of an IBM-compatible PC. The program works with two dBASE files: a table of species and a table of characters. To compile the table of species for the Negev lichens, we used the following publications: Galun & Reichert (1960), Galun (1966, 1970), Poelt (1969), Kopachevskaya *et al* (1971), Dobson (1992), and Insarov & Insarova (1995). We also used our own unpublished observations in the region.

Each line of the table of species contains a species name and its description. The description comprises a number of character state values which are abbreviated and entered in shorthand form. If the character receives a number of states for one species, up to three versions distinguished by commas are allowed. For instance, *Caloplaca aurantia* var. *aurantia* may have both plane and convex apothecia on the same thallus. In the table of species it appears as “P, Cx” in the column “Shape fr bo” (Shape of fruiting bodies). The table contains 49 lines (one for each species described) and 41 columns (one for each lichen character employed).

Nineteen of the 41 characters can be determined in the field. These are substratum, thallus type, colour of thallus centre, colour of squamules and lobe margins, structure of thallus periphery in crustose species, shape and surface of lobes for foliose, fruticose and placodioid species, colour and shape of apothecial margin, etc. To apply other characters, such as colour of the thallus underside or of the medulla, reactions in chemical tests, structure of the excipulum, number of spores per ascus, etc, one has to take specimens into the laboratory. About half of the lichen species recorded on calcareous rocks in the Central Negev can be identified in the field (Insarov & Insarova, 1995). The table of characters contains abbreviated character names, full character names and comments. Abbreviated character names are used in the table of species. Comments, located in a subsidiary file, contain all character state values and their abbreviations.

While running the program one should enter character state values one at a time.
time. At each step the number of species in the list should decrease. Only those species possessing both the currently selected character state and those previously selected, remain in the list. Thus if the number of species remains the same, the last chosen character does not discriminate among the remaining species. To select a discriminative character one should consult the table of species. If the number of species become equal to zero at a given step, then it is necessary to return to the previous step and delete the last character state value added. Identification is finished when only one species remains in the list.

It is possible to change the number of lines and columns in the table of species. If new species are found in the Negev they can be added to the tables and, consequently, in the computer-assisted key. The same is true for the number of characters (columns) and their state values. If necessary, their number can be increased or decreased, and the state value of characters can be modified. It is possible to construct similar tables for other regions or groups of organisms. The program IDENT accommodates any table of species and characters in dBASE format.

Discussion
Use of the IDENT program is easier than the DELTA-based and PC-TAXON keys, or expert systems. On the other hand, these alternative keys provide more opportunities for the user, such as species comparison, etc. IDENT allows non-specialists to identify Negev lichens in the interactive mode and facilitates identification of specimens lacking in a character that is otherwise essential for identification using a conventional dichotomous key. It therefore reduces the frequency with which the identification process requires an analysis of fruiting bodies and spores, a task which in many cases is beyond the scope of a layman. The key can also be used in conjunction with Galun’s (1970) book on the Negev lichens.

The IDENT key is available from the senior author upon request.

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References


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