

## THE USE OF PUNCH CARDS IN THE SURVEY OF THE EUROPEAN ODONATE FAUNA

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A description is given of a manually punched card with special imprint (Fig. 1) to be used in a survey of European Odonata in the framework of the international project "The European Invertebrate Survey".

## THE INTERNATIONAL PROJECT "THE EUROPEAN INVERTEBRATE SURVEY"

Starting in England (Biological Records Centre, Abbots Ripton, Dr. J. Heath) computer centres are being set up for the survey of the European invertebrate fauna. On the Continent the centre at Gembloux, Belgium (Prof. J. Leclercq) has been active for some time; another in Saarbrücken, German Federal Republic (Prof. Dr. Müller) is just starting, whereas others, e.g. in Sweden and in the Netherlands, are still in a preliminary stage (cf. HEATH & LECLERCQ, 1969; HEATH, 1971a; R.I.N., 1971; MÜLLER & SCHREIBER, 1972).

Data from field work, museum collections and from the literature are brought together. The data are entered on one of three types of cards, viz. (1) individual record cards (one card for each record of a species), (2) one species cards (for several records of one species), and (3) field cards (listing all species recorded from one locality). These cards are available without cost to collectors and research workers who are willing to cooperate in the project. The completed cards are punched at the Centre, and their data transferred to other punch cards or to magnetic tape; the original cards are then returned to the sender if desired (HEATH, 1971b; MULLER & SCHREIBER, 1972).

The object of the project is, first of all, the preparation of up to date distributional maps for as many invertebrate species as possible. The computer prints cards on which the grid fields are marked for which records are available, if necessary specified according to time of collecting. Point distributional maps for individual species, however, with localities precisely indicated within each grid square — which is especially interesting for regional analyses — have still to be prepared manually by specialists. Individual species records or lists of species for the grid fields, classified according to years but not according to ecological criteria, can be produced by the computer at any time.

The geographical reference system for the localities is the UTM (Universal Transverse Mercator) grid. The units in this system are squares of 50 km, 10 km or 5 km, depending on the size of each locality and/or the amount of data recorded for it. Data collected using a grid system other than the UTM grid can easily be converted to it.

Electronic data processing would thus seem to be the only practicable way to obtain an up to date distributional survey of the commoner species, especially in groups like the Lepidoptera, that are being collected on a large scale. Today such a survey is more than ever needed in view of the numerous attacks on the few remaining natural biotopes, the resulting dramatic decrease of the numbers of species and individuals, and the rapidly growing amount of data combined with the decreasing number of competent investigators who, moreover, have to occupy themselves with other topical (ecological) problems.

However, for smaller groups that are accessible to specialists only, or for detailed analyses of restricted areas, a computer is not always needed. Thus, for Odonata the use of manually punched cards is to be recommended, as will be explained. The advantage of individual treatment of data (tracing of controlling factors, presentation of data in point distributional maps) can thus be combined with that of a more personal contact with other workers on the same group. This type of research should be carried out in close contact with the Centres, in order to make the data generally accessible. The Centres may support this work effectively by making preprinted cards for point distribution maps and by printing the accompanying lists of localities, both of which for financial reasons are difficult to get published in specialized periodicals.

Summarizing we may conclude that the introduction of electronic data processing marks a tremendous progress in faunistic and zoogeographical research. It is, however, essential to the success of the project that the available data do indeed reach the Centres and that specialists are found for all invertebrate groups to check the reliability of the material offered (especially taxonomic identifications).

Special regulations will be needed concerning access to the stored unpublished material. Free access would refrain certain collectors who want to publish their own findings from cooperating; too rigid regulations, on the other

hand, would detract from the advantage of electronic processing.

## MANUAL PUNCH CARDS AS A TOOL IN THE SURVEY OF THE EUROPEAN ODONATA

For a survey of the European odonate fauna a careful analysis of those areas that have been investigated in detail is of prime importance. This is the only way to present data in accordance with present day standards of accuracy and, in making comparisons, to allow for differences in the amounts of available information. For the non-professional odonatologist who does his work at home the punch card is an invaluable tool: this relatively cheap and very practical card index system enables one to answer all kinds of questions mechanically by simply selecting the clipped key words, one after another, using a needle.

Encouraged by my own very positive experience with an excursion card index of German dragonflies for predominantly biological-ecological purposes (SCHMIDT, 1970), I have adapted the key to suit the more faunistically oriented European Odonate Survey, and I presented it at the Second Colloquium of Dutch Dragonfly Workers, Utrecht, 1970. A grant from the "Deutsche Forschungsgemeinschaft" has made it possible to print the key for species, 10 km square UTM coordinates and year of collecting on the cards. This saves a considerable amount of time when completing the cards and clipping the key words. The punch card also proved extremely useful in the indexing of extensive unpublished data, museum material and literature data (e.g. in preparing point distributional maps of Schleswig Holstein, German Federal Republic), which in the limited time available would have been impossible otherwise. The same imprint can very profitably be used for an excursion card index.

For the list of species found at one locality only one card is needed; locality descriptions and ecological data thus need to be entered only once (Fig. 1). Separate species can be entered by simple crossing or ticking, but there is enough space to add details if necessary. More extensive notes can be made in the top half of the back of the card. With a needle all records of a given species, or all records for a certain UTM square, or a combination of both can be quickly selected mechanically. In addition to this it is possible to differentiate according to year of collection or ecological criteria, if these have been keyed on the left side of the card. The different localities within one 10 km square can be assorted visually but only in exceptional cases will there be more than 50-100 cards for one square, and they can quickly be looked through. The same holds for species that have been placed at the same pair of holes: only those species have been put together for which there are only few records; moreover in most cases they can be mechanically separated on the basis of their different distribution (e.g. *Coenagrion armatum* and *C. ornatum*, or *Calopteryx haemorrhoidalis* and *Epalage fatime*) or ecology (e.g. *Coenagrion mercuriale* and *C. vernale*).

[illegible]

**Fig. 1** Punch card to be uses in the "Survey of European Odonata" (top: front side; bottom: back), with keys for species (front and back, long sides), UTM grid reference for 10 km-squares (back, right side) and decade of last record (lower part of front left side). Upper part of left side free for ecological data.

These cards with special imprint can be obtained from the manufacturer without extra cost.

## COORDINATION OF PUNCH CARDS AND COMPUTER CENTRES

The card described here has been adapted to the requirements of electronic processing for the "Survey of the European Invertebrate Fauna". Both systems can profitably be made to complement each other.

At the International Symposium on the Survey of the European Invertebrate Fauna held at Saarbrücken, German Federal Republic, (June 1-2, 1972), it was agreed with the directors of the existing Centres that the above described punch cards may be used in the framework of this project as field cards for the Odonata.

Cooperators in the project may use the cards to communicate their dragonfly records to the Centres and obtain them without cost, together with a pair of clipping tongs and two needles, to be returned to the Centre after the work is finished. This opens the possibility for them to make full use of their own material without extra work and costs before submitting it to the Centre.

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