

ONLINE COMPUTER RETRIEVAL OF INFORMATION ON EPHEMEROPTERA: A
COMPARISON OF DIFFERENT SOURCES

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ABSTRACT

A bibliography of 179 references on Ephemeroptera and pollution resulted from a series of online computer searches of commercially available data bases in March 1979. Eighty-three percent of the references retrieved came from two data bases, BIOSIS Previews and Selected Water Resources Abstracts, at a cost of \$14.00. A further expenditure of \$40.00 in searching nine other data bases retrieved the remaining references.

INTRODUCTION

The Ephemeroptera are well known as indicators of pollution. To find references on this topic a series of online* bibliographic searches were made in March 1979 on commercially available systems. The purpose of the searches was threefold:

- 1) references obtained would be useful to Freshwater Institute staff members preparing papers for this volume;
- 2) costs and efficiency of retrieval using different data bases* and the same data base on different systems would be compared; and
- 3) the procedure would demonstrate the service to a scientist unfamiliar with online searching.

* See Glossary (Appendix 1) for definition of computer science terms used.

Online bibliographic search services have been available in North America for many years. We have been using these services at the Freshwater Institute since March 1974. Currently we have access to four different systems, two Canadian and two in the U.S.A. (See Appendix II for addresses). These four systems allow access to over 100 different data bases covering most fields of knowledge. Thirty of these data bases are used regularly at the Institute. In an average month 30 searches are made in response to requests from staff.

PREPARING THE BIBLIOGRAPHY

Searches were made on all of the data bases containing references on Ephemeroptera within one week. Since the various vendors are constantly improving their services the results of the searches indicate the relative performance of the systems at that time.

As well as making a general search for references on Ephemeroptera and pollution, a specific search was made for references dealing with mercury, cadmium or selenium.

The following search strategy was used:

1. Search for: EPHEMEROPTERA\$* OR MAYFLIES OR MAYFLY
2. Search for: POLLUTION
3. Combine 1 AND 2 (*General Search*)
4. Search for: MERCUR\$ OR SELENIUM OR CADMIUM
5. Combine 1 AND 4 (*Specific Search*)

The bibliography obtained appears in Appendix II. Full details of the status of the data bases when the searches were made and further discussion on the principles of online searching are in Marshall (1979).

DATA BASES SEARCHED

Table 1 summarizes the data bases used and Table 2 shows the cumulative cost of production of the bibliography.

BIOSIS Previews

This data base is a machine readable version of the indexes and bibliographic references in *Biological Abstracts* and *Bioresearch Index*

* \$ indicates truncation of a word - EPHEMEROPTERA\$ will retrieve Ephemeroptera, Ephemeropteran and Ephemeropterans; similarly MERCUR\$ will retrieve any word beginning mercur.

Table 1. Comments on the data bases used in compiling the bibliography.

| Data Base | Comments |
|------------------------------------|---|
| BIOSIS Previews | The most productive source. Full use made of Biosystematic and Concept Index terms. |
| Selected Water Resources Abstracts | Only available to us on QL Systems. Abstracts searchable. |
| Chemical Abstracts | Searches on Dialog on the full data base gave more references than CAN/OLE which lacks the subject index terms. |
| NTIS | A comprehensive data base on U.S. Government Research Reports. |
| Pollution Abstracts | A good data base to search for references on pollution. Dialog carried an updated form with searchable abstracts. Orbit lacked this form when searched and gave relatively poor retrieval. |
| Canada Water | Covers Canadian publications on the aquatic sciences. |
| Enviroline | Similar subject area coverage to Pollution Abstracts. The paper version is <i>Environment Abstracts</i> . |
| Excerpta Medica | Good coverage of European literature. Medical bias but one section covers environmental pollution. |
| Commonwealth Agricultural Bureaux | Machine readable form of all of the abstracting and indexing services published by the Bureaux. The only other source for the one reference found by this data base was <i>Aquatic Science and Fisheries Abstracts</i> . |
| SciSearch | Corresponds to <i>Science Citation Index</i> . Very current but subject searches not easy to carry out as no subject headings are added. Words from the title must be search and many synonyms and related terms are need for good retrieval. |
| Conference | Specializes in conference papers. |

Table 2. Comprehensive search for references on Ephemeroptera and pollution: retrieval and costs.

| Data Base | System and Years Searched* | Number of References Retrieved | | | | | Costs | | |
|---------------------------------------|-------------------------------|--------------------------------|---------------------|---------------|----------------------------|-----------------------|--------------------------|----------------------|--|
| | | Total for Data Base | Unique to Data Base | New to Search | Running Total of New Refs. | For Data Base \$ Can. | Cumulative Total \$ Can. | Per Reference ¢ Can. | |
| 1. BIOSIS Previews | Dialog 69-71 OLE 72-78; 79 | 120 | 88 | 120 | 120 | 9.35 | 9.35 | 7.8 | |
| 2. Selected Water Resources Abstracts | QL 75-78 | 42 | 23 | 28 | 148 | 4.81 | 14.16 | 9.6 | |
| 3. Chemical Abstracts | Dialog 72-76 and 77-79 | 13 | 6 | 7 | 155 | 4.30 | 19.46 | 12.6 | |
| 4. NTIS | Dialog 64-79 | 10 | 5 | 6 | 161 | 2.83 | 22.29 | 13.8 | |
| 5. Pollution Abstracts | Dialog 70-79 | 16 | 3 | 5 | 166 | 3.19 | 25.48 | 15.3 | |
| 6. Canada Water | QL 70-78 | 7 | 4 | 4 | 170 | 4.33 | 29.81 | 17.5 | |
| 7. Enviroline | Orbit 71-79 | 14 | 3 | 3 | 173 | 6.96 | 36.77 | 21.2 | |
| 8. Excerpta Medica | Dialog 75-78 | 11 | 3 | 3 | 176 | 4.38 | 41.15 | 23.4 | |
| 9. Commonwealth Agricultural Bureaux | Dialog 72-79 | 1 | 0 | 1 | 177 | 2.50 | 43.65 | 24.7 | |
| 10. SciSearch | Dialog 78-79 | 9 | 1 | 1 | 178 | 7.12 | 50.77 | 28.5 | |
| 11. Conference | Dialog 73-79 | 2 | 1 | 1 | 179 | 3.89 | 54.66 | 30.5 | |

* For fuller details see Marshall (1979).

but excludes the abstracts. The biosystematic and concept indexes are valuable search tools for higher systematic groups (e.g. Ephemeroptera) and broad subject areas (e.g. water pollution) respectively. Searching on these index terms was efficient because BIOSIS indexing is thorough. In the general search this was done instead of using the words in the search strategy described above.

Aquatic Science and Fisheries Abstracts

This data base is not included in Table 2. Only two six month samples of this data base were online when the searches were made. Only one reference was found on each of the two different periods covered and these were not unique to this base. However, in June 1979, I repeated my search on QL Systems which had then increased its coverage to 1978 and the first three months of 1979. Nine references on mayflies and pollution were retrieved. Clearly the value of this data base will increase as more references are entered into it.

SciSearch

Because this is the only scientific data base in which the references cited in a paper can be searched a separate search was made on this data base to demonstrate a citation search. The search was made to identify recent papers which had cited Clubb *et al.* (1975). Four references were retrieved. Two were reviews of pollution in general and two specific to mayflies and pollution. One of the latter references was not retrieved in the other searches. SciSearch is usually the most up-to-date of the online data bases.

DISCUSSION

Table 2 indicates the optimum preparation of the bibliography. None of the searches cost more than \$10.00. The total cost for retrieving all of the references was less than \$55.00.

Searches of the two most productive data bases yielded 83% of the references for \$14.16. The remaining 17% of the references were retrieved only by expending a further \$40.50 to search nine additional data bases. Therefore judgement has to be used to decide how complete a search should be. An online search is not 100% complete because most of the data bases online do not cover material published before 1968 and some government publications are not well covered. The *Zoological Record* and early issues of *Biological Abstracts*, and other indexing services relevant to the exact topic being researched have to be searched manually. Current awareness services (e.g. the lists of new publications appearing in *Eatonia* and the North American

Benthological Society annual bibliographies) should be used. Library accession lists (e.g. the Freshwater Biological Association's) also form excellent sources of references.

RESUME

En mars, 1979, on a fait une serie de recherches documentaires en direct d'ordinateur; on les a fait dans les banques de données qui sont commercialement utilisables. Une bibliographie qui contient 179 références liées aux éphéméroptères et à la pollution était le résultat. Quatre-vingts-trois pour cent des références récupérés sont venus des deux bases de données, BIOSIS Previews et Selected Water Resources Abstracts, à un coût de \$14.00. Une additionnelle dépense de \$40.00, en recherchant neuf autres bases de données, a récupérés les références qui reste.

ZUSAMMENFASSUNG

Eine Reihe von "on-line" Computer-Suchen, im März 1979, an kommerziell verfügbaren Informationsspeichern durchgeführt, erbrachte eine Bibliographie mit 179 Literatur-Quellenangaben aus dem Gebiet Eintagsfliegen und Umweltverschmutzung. Dreiundachtzig prozent dieser Quellenangaben kamen von 2 Informationsdiensten, nämlich "BIOSIS Previews" und "Selected Water Resources Abstracts", zum Preis von 14 Dollar (Can.). Mit zusätzlich 40 Dollar (Can.) für 9 weitere Informationsspeicher wurden die restlichen Literaturangaben ermittelt.

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APPENDIX I. GLOSSARY OF COMPUTER SCIENCE AND RELATED TERMS

CAN/OLE (CANadian OnLine Enquiry). The acronym of the online search service operated by Canada Institute for Scientific and Technical Information (CISTI) of the National Research Council in Ottawa.

Data base A machine readable collection of data stored in a computer in a way in which it can be searched by a user. Most bibliographic data bases have a corresponding paper format also (e.g. *Pollution Abstracts*, *Aquatic Science and Fisheries Abstracts*).

NTIS (National Technical Information Service). A service of the U.S. Department of Commerce concerned with disseminating U.S. Government Reports.

Offline A form of communication with a computer in which no immediate response is expected. The response (e.g. a printout of references) is made later at the computer centre and mailed to the user.

Online A form of communication with a computer in which immediate responses are received on the remote terminal. In this mode a "conversation" can be carried out and additional questions asked in the light of previous responses.

QL (Quic/Law). The name given to a project involving the development of a retrieval system for legal information from which the present QL System company developed.

APPENDIX II. ONLINE RETRIEVAL SERVICE VENDORS

The following are the four systems used at the Freshwater Institute. (There are other systems available which we do not use.)

CAN/OLE: Canada Institute for Scientific and Technical Information
National Research Council
Ottawa, Ontario, Canada K1A 0S2

QL Systems: 408 Princess Anne Building
797 Princess Street
Kingston, Ontario, Canada K7L 1G1

Orbit: SDC Search Service
2500 Colorado Avenue
Santa Monica, CA, U.S.A. 90406

Dialog: Lockheed Missiles and Space Co., Inc.
Code 5020/201
3251 Hanover Street
Palo Alto, CA, U.S.A. 94304

APPENDIX III. BIBLIOGRAPHY ON EPHEMEROPTERA AND POLLUTION 1969-78.

Format

This is a format of a sample reference:

- x Clubb, R.W., A.R. Gaufin and J.L. Lords. 1975. Synergism between dissolved oxygen and cadmium toxicity in five species of aquatic insects. *Environ. Res.* 9(3): 285-289.
BA 60:61371; W76-10345; PA 75-04453

The x before the author's name indicates that this reference was retrieved in the search for Ephemeroptera and mercury or cadmium or selenium. Titles of papers may not correspond exactly to the printed papers because most of the data base producers make small changes to conform with their editorial policies. I have inserted punctuation where necessary. On the line following the page numbers I have indicated where an abstract of the paper may be found. (BA = *Biological Abstracts*, BI = *BioResearch Index* [No abstract], C = *Chemical Abstracts*, W = *Selected Water Resources Abstracts*, P = *Pollution Abstracts*, E = *Environment Abstracts*).

Further information on the data base and system from which each reference was retrieved, and for any errors noted in the data bases citing the references, see Marshall (1979).

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