

Title: INTERNATIONAL SCATTER OF SALVIA-RELATED ARTICLES IN SERIAL PUBLICATIONS AND AVAILABILITY OF CORE SALVIA-RELATED SERIALS IN THE LIBRARIES IN SLOVENIA

Author: Tomaž BARTOL ^a (Tomaz Bartol, T. Bartol)

Source/Journal:

Zbornik Biotehniške fakultete Univerze v Ljubljani, Kmetijstvo, 1999, vol. 73, no. 1, p. 231-244

Abstract: Scatter of information on medicinal plant genus *Salvia* in international journals via bibliographic records in major international life-sciences databases (AGRIS, CAB Abstracts, Derwent Biotechnology Abstracts, EMBASE, FSTA, ISTP, Life Sciences Collection, MEDLINE, NAPRALERT; SCI (SciSearch), and to a limited extent in the Chemical Abstracts and the Biological Abstracts) is investigated. An experimental union database in order to exclude all the duplicates was compiled. Some 1600 different references for the period 1986-1995 were obtained. 1274 references-articles that were judged as relevant by an end-user from the field were considered for further investigation. These were extracted from 503 different journals. 629 relevant references amongst the 1274 were available in Slovenian libraries in each pertaining year. 421 amongst 1274 were indexed by SCI. 322 of SCI references were available in Slovenia. The nucleus of 14 core journals (amongst 503) contains approximately a third of all relevant references/articles with the most productive journal containing as many as 116 *Salvia*-related articles not being directly available in Slovenia. 6 are not indexed by SCI. Regardless of the zone in the bibliograph some 50% of articles are available in Slovenia, on the other hand the available articles/journals appear on average in more than 2 copies what leaves some room for improved subscription policy.

Key words: medicinal plants, *Salvia*, data analysis, diffusion of information, information processing, information retrieval, information storage, information needs, end-users, journals, databases, libraries, documentation, information science

MEDNARODNA DISTRIBUCIJA ČLANKOV O RODU SALVIA V SERIJSKIH PUBLIKACIJAH IN DOSTOPNOST OSREDNJIH SERIJSKIH PUBLIKACIJ V KNJIŽNICAH V SLOVENIJI

IZVLEČEK: Preučevali smo distribucijo informacij o kadulji (*Salvia*) v mednarodnih revijah, in sicer prek bibliografskih zapisov v mednarodnih podatkovnih zbirkah (AGRIS, CAB Abstracts, Derwent Biotechnology Abstracts, EMBASE, FSTA, ISTP, Life Sciences Collection, MEDLINE, NAPRALERT; SCI (SciSearch) in delno v Chemical Abstracts ter Biological Abstracts). Iz vseh zapisov smo sestavili skupno zbirko, da bi izločili podvajanja istih člankov v različnih zbirkah. Zbirka je za obdobje 1986-1995 štela 1600 referenc različnih tipov dokumentov - večinoma člankov. Od tega smo dalje obdelali le 1274 takih, ki jih je uporabnik ocenil kot relevantne članke. Izvirali so iz 503 različnih revij. 629 člankov od 1274 je bilo dostopnih v revijah v knjižnicah v Sloveniji. 421 od 1274 je indeksiral SCI, 322 od le-teh je bilo dostopnih

^aPh.D. Agr., M. Sc. Agr., B. Sc. Zoot., SI-1111 Ljubljana, Jamnikarjeva 101, P. O. Box 2995

tudi v Sloveniji. Jedro osrednjih 14 revij (od 503) je zajelo kar tretjino člankov od 1274, najbolj plodna revija, ki pa ni dostopna pri nas, pa kar 116. & revija iz jedra SCI ne indeksira. Povprečno je v Sloveniji direktno dostopnih približno polovico revij/člankov, le-ti pa so sicer dostopni povprečno vsej v dveh izvodih, tako da obstaja nadaljnja možnost za racionalnejšo nabavo literature v knjižnicah.

Ključne besede: zdravilne rastline, *Salvia*, kadulja, analiza podatkov, razširjanje informacij, procesiranje informacij, iskanje informacij, hranjenje informacij, informacijske potrebe, uporabniki, revije, podatkovne zbirke, knjižnice, dokumentalistika, znanstvena informatika

^aPh.D. Agr., M. Sc. Agr., B. Sc. Zoot., SI-1111 Ljubljana, Jamnikarjeva 101, P. O. Box 2995

1 INTRODUCTION

The field of medicinal plants is in its characteristics a typical interdisciplinary or transdisciplinary field within the life sciences. It is composed of agricultural, biomedical, biological, chemical and other aspects. It may also imply cultural and social dimensions. End-users must therefore expect such information to be scattered across variety of disciplines and pertaining information sources. These sources must be identified in order to supply the end-user with as many relevant items as possible. Sources hold different information value for the end-user. Primary sources appear as different document types where journal articles represent by far the most significant segment. However, articles my scatter quite differently in different journals. Some journals my hold only one or two relevant articles over a period of many years, whereas some other journals may boast several dozen pertinent articles in the same period. The end-user will wish to obtain as many relevant articles as possible. Many journals will not be immediately available so some international document delivery services will have to be considered.

There are, however, possibly a few highly relevant journals that will contain a significant part of all relevant articles. We will try to identify such journals in order to rationalize document retrieval. Moreover, we will, amongst those highly relevant journals, identify those that are directly available in the libraries in Slovenia, or, for that matter, those that are not as yet (or no more) available. We will with those highly relevant journals also identify duplication in libraries in order to assess if there may exist further possibilities for more rational subscription. We will also juxtapose all articles with the articles indexed by SCI (Science Citation Indexed) and the former and the later with the articles that are available in Slovenia. As there are tens of thousands of articles related to the field of medicinal plants we will, as a model population, consider only those articles that are associated with the medicinal plant genus *Salvia*. *Salvia* exhibits well pronounced medicinal properties. There are also great number of articles that deal with chemical aspects. Moreover, many documents associated with agronomic aspects can also be found with this genus.

We will search for information on this genus in major international life-sciences databases. Bibliographic databases still represent by far the most important source of synthesized science and technology information. Data in such databases are organized in a systematic manner so it is possible to study well the scatter of information. These data may serve as a reliable tool to assess library collections.

Our research deals with journal articles only. These represent the bulk of current scientific information in libraries. This is the case with information costs as well as information quantity. The average balance between expenditure on books and on journals has shifted dramatically in the period between 1997 and 1990 or so years, from 60:40 to some 35:65 (Line 1994). The shift continues and is in medical libraries, according to some reports, now at 20:80, and is moving toward a probable 5:95 split by the end of the century (Timberlake 1997).

We consider only those journals that have been indexed by international databases because these can be more easily evaluated scientometrically. Rousseau and Spinak (1996) use such journals that have been published continuously for at least five years and are covered at least by one international indexing service. There is also correlation between journals indexed in databases and journals held in library collections. Eldredge (1993) concedes that collection development librarians rarely select a new subscription if no major biomedical indexing service covers the contents of that journal. Numerous library subscriptions are based on SCI criteria which are comprehensible and easy to justify. Slater BM and Slater MA (1994), with the field of behavioural medicine, assume that the journals most frequently cited are those that are most needed in a library collection for this field. The National Library of Medicine (NLM) in the USA, e.g., uses another method (landmark citation method) that is also based on citation (Soehner et al 1992). To assess the biotechnology collection all sources that cite a certain landmark article were identified with this method.

However, there is more to selection policy than mere citation. An end-user might wish to obtain some potentially useful document even though it had not been indexed by the SCI. Copper and McGregor (1994) are of opinion that the Institute of Scientific Information (ISI - SCI) measurements show little power for estimating actual use in a small local collection. Their research shows that 14 users out of 491 under study accounted for more than half the photocopy requests. Line (1978) summarizes that no measure of journal use other than one derived from a local-use study is of any significant practical value to libraries. Carrigan (1996), however, argues that user-based studies will not identify overselection: He holds that overselection is a more serious error than underselection because libraries purchase an item that later turns not to be used and so financial resources get wasted.

Selection of relevant sources is usually based on an assumption that many sources have a few relevant items whereas a few sources have many relevant items. Classical examples of this theory are represented by Bradford's law (1934), 80/20 rule (Trueswell 1969, op. cit. Carrigan 1996), and Price's law (De Solla Price 1971). Bradford assumed that if one selects a nucleus of journals that yield a fair percentage of the articles, then the number of periodicals needed to provide similar numbers of articles are in the ratio $1:n:n^2$ (Simpson 1988). Nucleus may contain more than one periodical what depends on the nature of discipline. If correct nucleus is selected, then a large proportion of the relevant literature will be found. The 80/20 rule states that 20% of the most important sources will contain 80% of all the items. Price's law states that if there are N sources, then \sqrt{N} of the top sources will have 50% of all items (Egghe and Rousseau, 1990). However, there remains question of the notion of relevance. Absolute relevance is namely difficult to assess and different documents will

be judged as relevant by different users (Van Rijsbergen, 1981). Much user-oriented research has been carried out in order to define relevance where many authors disagree in definition. Problems of relevant and nonrelevant items retrieved in relation to information seeking behaviour by end-users were studied in detail by Saracevic and Kantor (1988a, 1988b)

The libraries may never again be in a position to uphold self-sufficient collections (Exon and Puch 1997). According some analyses (Stubbs 1992) interlibrary lending and borrowing increased by some 45% between 1986/1987 and 1990/1991. As of 1991 the interlibrary lending increased even more. Kilpatrick and Preece (1996) report how the serial crises which peaked in 1990 gave rise to the cancellations and consequently to the interlibrary loan traffic. United States National Library of Medicine's Docline system received more than two million requests annually through interlibrary loan (Lacoix 1994). 97% of all requests were for journal articles. However, until access to specific articles can be gained as easily and as quickly through technological means as by walking into the stack area of the library and pulling a journal off the shelf, ownership versus access will continue to be an issue in libraries (Kilpatrick and Preece 1996).

2 METHODS

2.1 Database selection

Number of databases grows almost monthly so we present only major information systems/databases in life sciences. These databases generally hold several million references each and register annual growth of up to several hundred thousand. They have been in service for many years and have gained global recognition. Online versions sometimes cover longer periods and more data. With most databases there exist also older printed versions for early periods. Moreover, some of the services may compile some additional databases with data on selected specific documents such as conference proceedings or reviews. As we cannot in detail expand all such possibilities we provide WWW URLs of all the database compilers so the users can get prompt and constantly updated information on coverage and access possibilities to different products.

Most references in these databases are of bibliographic type and scientific and technical in nature. With increased WWW accessibility it is to be expected that a growing number of full text papers will be linked to bibliographic references. However, there are serious copy-right issues to be considered, with authors as well as publishers involved, so even though there exist technical possibilities these will not so soon lead to absolute global online accessibility of abstracted material that is being compiled in these databases. This will remain even more so the case with older documents because very high expenses are involved with inputting of analog data.

In the preceding and following text we sometimes interchangeably use terms documents, references and records. Records are usually considered as database references that were derived from a particular document. A term citation is sometimes also used in this context. The later, however, is more appropriate with respect to "cited" references, i.e. "quotations" which were not subject of our research.

We have not extended our review into the field of legal and market-related issues and pertaining specialized databases. Some of the databases, listed beneath, do provide exhaustive information on documents such as patents or standards. End-users should nevertheless consider also other sources to acquire further information of this type.

AGRICOLA - mostly US agricultural and life sciences information, compiled by National Agricultural Library; <http://www.nalusda.gov>

AGRIS - world-wide agricultural and life sciences information, compiled by some 140 national and international centres in coordination by FAO; <http://www.fao.org/agris>

CAB ABSTRACTS - world-wide agricultural and life sciences information, compiled by CAB International in UK; <http://www.cabi.org/>

DERWENT BIOTECHNOLOGY ABSTRACTS - world-wide biochemical, pharmacological and related information, compiled internationally by DERWENT; <http://www.derwent.com/>

EMBASE (Excerpta Medica) - world-wide biomedical and pharmacological information, compiled by Elsevier Science in the Netherlands; <http://www.elsevier.com/>

FSTA (Food Science and Technology Abstracts) - world-wide information on food science, food technology and human nutrition, compiled by IFIS (International Food Information Service) which is sponsored internationally by four organizations (CABI, DLG, IFT, PUDOC) <http://www.ifis.co.uk/>

ISTP (Index to Scientific and Technical Proceedings) - world-wide life sciences and technical conference proceedings, compiled by Institute for Scientific Information (ISI), USA; <http://www.isinet.com/>

LIFE SCIENCES COLLECTION - world-wide information on life sciences, compiled by privately owned CSA (Cambridge Scientific Abstracts), USA; <http://www.csa.com/>

MEDLINE (MEDlars onLINE) - world-wide biomedical information and, compiled by National Library of Medicine, USA; <http://www.nlm.nih.gov/nlmhome.html>

NAPRALERT - (NAtural PRoducts ALERT) world-wide relational database on the chemical constituents and pharmacology of plant, microbial and animal (primarily marine) extracts, compiled by the Program for Collaborative Research in the Pharmaceutical Sciences, Department of Medicinal Chemistry and Pharmacognosy, College of Pharmacy of the University of Illinois at Chicago, USA; <http://pcog8.pmpmp.uic.edu/mcp/Welcome.html>

SCISEARCH (Science Citation Index) - multidisciplinary citation database, covers world-wide life sciences and technical information, compiled by Institute for Scientific Information (ISI), USA <http://www.isinet.com/>

The above databases are available on CD-ROMs, via online services and increasingly also via WWW.

In order to estimate characteristics of the above databases we carried out a complex scientometric analysis of all possible references to the genus *Salvia*. We chose a ten-year period of 1986 - 1995. With most databases we used CD-ROM versions. With EMBASE and NAPRALERT we searched via online or WWW providers. We tested a possibility of using also Biological Abstracts and Chemical Abstracts, namely, the two databases were for the entire ten-year period available only in an online format. With an unrefined search there were more than 1.000 hits in the Chemical Abstracts. The costs per obtained unit were, however, so high, that we had to give up this database. The same was the case with the Biological Abstracts.

2.2 Data extraction and compilation

With the use of data of the above eleven databases we compiled an experimental union database. This enabled us to investigate relations amongst references synthesized from particular documents. Many articles, as was expected, appeared as records in several databases simultaneously. We developed a procedure that helped us to analyze single occurrences of multiple records (duplicates, triplicates, etc.). To set up our experimental database we used MS-Access. We further analyzed the records with MS-Excel and MS-Statistica.

Before compiling our experimental database we examined thoroughly the existing indexing systems of the databases under study. We performed many test searches in each of the databases to prepare optimal search strategy and to maximize recall (percentage of all existing relevant documents). We therefore formulated our search request for both *SALVIA* and *SAGE* bound together with the Boolean OR. We searched in all the content fields, such as title, abstract and keywords (descriptors, identifiers). Keyword field had to be defined very carefully as there were with some single databases as many as four different keyword fields. Especially with sage we expected lower precision turnout, i.e. more "noise", owing to the terms such as "sage grouse", "sage scrub" etc. However, as we sought to establish maximum recall, we decided to obtain all the references. We then refined our searches "manually" by deleting those references that did not refer to our subject.

2.3 Attribution of journal-article relevance

In our experimental database we compiled from the above databases more than 3.500 *Salvia* or sage related documents for the ten-year period. This number of course included all the duplicates (many multiple duplicates). This database served as our main apparatus. We then filtered the duplicates to obtain some 1.600 single references which we then compiled in another database. We further sorted the documents according to the document type. With the help of an end-user we assigned each document a respective relevance category:

1 - highly relevant, 2 - moderately relevant, 3 - less relevant

For further analysis we considered only the documents of the first and second relevance category. We evaluated all such documents. To assess our domestic availability of documents, however, we further considered only journal articles.

2.4 Attribution of journal-article availability

In our experimental database we then introduced a field on the availability of a particular journal (article) in our libraries. We searched Slovenian national electronic online union catalogue COBISS (Cooperative Online Bibliographic Information System and Services). We assigned each article one of the following values with regard to the availability in Slovenian libraries:

1	has been currently available
10	this particular volume available; journal later cancelled
0	not available; was never available
01	this particular volume not available yet; later volumes available
00	journal used to be available; no more available with this volume

We identified all the articles that had been in the particular year available in Slovenia. We also identified all the SCI articles, and those SCI articles that were available in Slovenia. We then evaluated domestic availability for those journals (articles) that have been currently accessible in our libraries. As there exists in our libraries with many journals duplication of titles we sought to establish the level of duplicating in order to estimate a possibility of a better and more rational subscription policies. With this aim we identified all the libraries that held a copy

of a journal from which we extracted a record/article in that particular year and are still accessible in Slovenia.

Not all the journals, however, bear the same importance for an end-user. This is even more so the case in a highly interdisciplinary field. To track core journals we thus identified number of relevant articles per journal. We included all 1274 highly and moderately relevant articles/records extracted from 503 different journals. In order to achieve common sortability for all the journals we introduced a system of assigning a special acronym to each journal. Namely the same journals appeared under different name forms in different databases what rendered systematic sorting impossible. The same journal might assume different names, such as either English or original language journal title in different databases. There occurred also differences within English-language or within original-language titles.

Example:

The-Journal-of-Biological-Chemistry / Journal of Biological Chemistry /
Journal-of-Biological-Chemistry / J.-BIOL.-CHEM. / J-Biol-Chem.

China Journal of Chinese Materia Medica / China J of Chinese Materia Medica / Zhongguo Zhongyao Zazhi / Chung Kuo Chung Yao Tsa Chih (here we may even observe two different spelling standardards for Chinese characters)

All these differences required a synthesizing of a common denominator. This we set up arbitrarily in assigning each journal title a two-to-four letter acronym.

2.5 Scatter of articles amongst journals

After we had assigned the acronym to each article we clustered all the articles under the respective journal title and generated frequency tables. We then sorted all the journals with regard to the highest frequency of relevant articles per journal. Hereby we sought to identify type of scatter of journal articles per single journal in the field of medicinal plants. We compared the bibliograph of our experimental distribution with the theoretical scientometric Bradford's bibliograph (Bradford 1934) in order to establish whether it is possible to define the core of source journals. Further we compared our theoretical distribution with other principal bibliometric tools, such as 80/20 rule (Trueswell 1969, op. cit. Carrigan 1996), and Prices's law (De Solla-Price 1971).

2.6 Identification of core journals and their availability

As the journal articles and so the journals themselves behaved in conformity with standard scientometriy rules we were able to define the nucleus of the most important journals (Bradford 1934, Vickery 1948). With this nucleus or core we defined availability of journal titles in Slovenia. With these core journals we also examined whether they are indexed in the SCI database. We then also investigated if the core SCI journals are available in Slovenia. We expanded slightly the nucleus of journals that hold more than 13 relevant articles to include also all those journal titles that yielded 10 articles or more.

If the core journals are not available they should be acquired via subscription. Other articles may be obtained via commercial Document Delivery services. We hereby also evaluated international document delivery possibilities in our libraries.

3 RESULTS AND DISCUSSION

Amongst more than 1600 different records/documents we identified 1274 such documents that could be described as highly or moderately relevant journal articles.

These were extracted from 503 different journals. Among these there were 629 records/documents whose respective journal was that particular year available in the libraries in Slovenia. Amongst the 1274 articles at least 421 were indexed by the SCI. 322 of those were available in the libraries in Slovenia (figure 1).

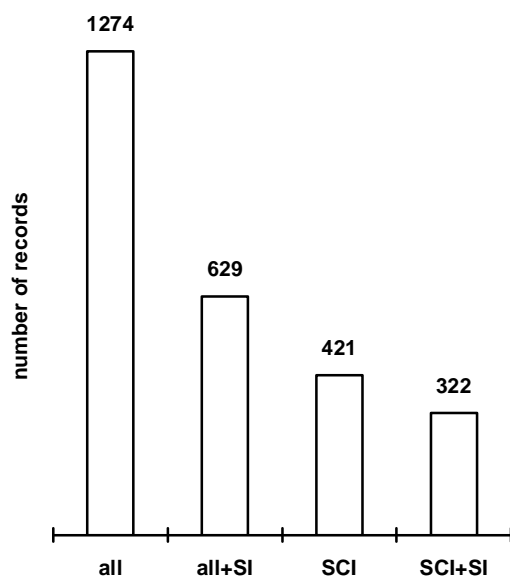


Figure 1: Cumulative number of *Salvia*-related records in the 1986-1995 period as indexed by some major international databases (all), *Salvia*-related records indexed by SCI, and both groups (all, SCI) in relation to article-availability in the libraries in Slovenia (+SI)

The 629 records available in Slovenia were contained in 186 different journals. There are now only 149 of the 186 journals still available in our libraries. These account for 473 of the above articles. Table 1 shows course in duplicating of those articles/journals in libraries in Slovenia.

Table 1: Duplication of issues of journal titles currently available in Slovenia (1-one issue in Slovenia, 3-three issues, ... m-more than ten issues)

duplications	1	2	3	4	5	6	7	8	9	m	all
titles	185	144	100	23	2	12	2	0	1	4	473

We may see that the relative majority of articles (185) don't duplicate. However, there do exist many duplicates and multiple duplicates so there have been on average 2,05 copies of the same article. We may here observe that only 50% of all articles are available in Slovenia, whereas those that are available duplicate on average 2,05 times. Also, 75% of SCI articles are available in Slovenia.

The information on general availability of all the articles/journals in the libraries does not offer enough information to the end-user. These articles may be scattered amongst very different journals, some of which may contain one article only and may therefore be of only a minor importance to the end-user. On the other hand, some journals may

contain a high number of relevant articles. These journals must therefore be identified (table 2).

Table 2: Number of journal titles and number of *Salvia*-related articles in each particular journal in the period 1986-1995

No. of journals	No. of articles	No. of journals	No. of articles
331	1	1	13
82	2	1	14
31	3	2	17
17	4	1	18
10	5	2	21
7	6	1	23
3	7	1	26
3	8	1	28
2	9	1	31
1	10	1	37
1	11	1	47
1	12	1	116

An average number of relevant articles per journal-title was only 2,5. However, a mean frequency value can never serve as a source of meaningful information in this kind of bibliometric analysis. Articles are in fact scattered in a very specific way. We may observe that the large majority of journal titles (331 amongst 503) yielded one relevant article only. This journals may be considered of minor importance to our end-user. On the other hand there were quite a few journals which produced ten or more relevant articles each. One journal yielded as many as 116 relevant articles. Let us now observe a pattern of experimental distribution (figure 2) with the theoretical Bradford's Bibliograph (figure 3).

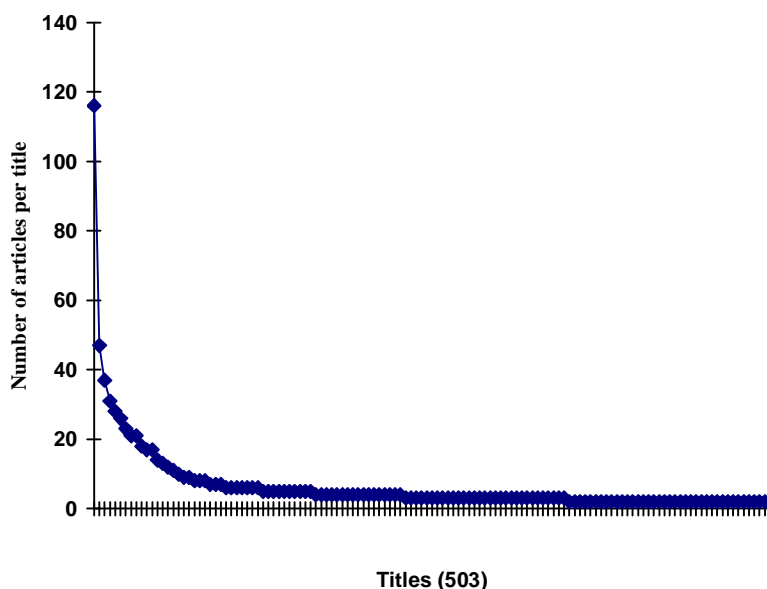


Figure 2: Scatter of 1274 different *Salvia*-related journal articles in 503 different journal titles.

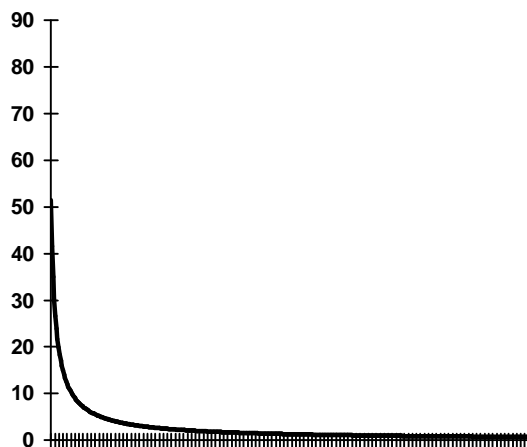


Figure 3: Theoretical Bradford's bibliograph (N=3)

We may observe that our experimental curve fits very well the theoretical Bradford's bibliograph. The latter serves as a tool to define a nucleus - the core journals that pertain to a specific field. The core journals are considered few selected journals that contain a very high number of relevant articles. The curve is usually divided into three areas where the first area represents the nucleus or core. The nucleus in our experimental case contains approximately 420 articles, and so do the other two groups. The core articles are covered by mere 14 different journals. That means that as few as 14 journals (of existing 503) account for one third of all relevant articles. These are doubtless the most important sources for our end-users. The most productive journal contains as many as 116 articles, and the least productive journal in the nucleus 13 articles. The second (middle) group is composed of some 100 journals that contain at least two relevant articles but fewer than 13 and is thus of less importance to the end-user. The third group is represented by large majority of journals - that is slightly fewer than 400 journals. These journals, however, contain roughly one relevant article each.

According to the Price's law \sqrt{N} of the theoretical top sources should have 50% of the relevant items. In our experimental case some 637 ($1274/2$) articles should be contained by 22 journals ($\sqrt{503}$). In fact our 22 journals contain 500 articles what presents some 80% of the theoretical number. Also according to the 80/20 law our 1000 articles should be contained in theoretical 100 journals. In fact our first hundred most productive journals contain 800 relevant articles, what again presents some 80% of the theoretical data.

For a discriminating end-user all relevant articles must be of similar value. As relevant articles are scattered amongst great number of journals it is therefore important for the end-user to at least acquire the bibliographic information on all such articles. These are, in turn, scattered in a number of databases that are available to the end-user in Slovenia. We may consider bibliographic availability in Slovenia to be sufficient. No end-user, however, will expect all the articles to be accessible in "next-door" libraries. The end-user will with many articles seek help from a professional document-delivery service to obtain some articles via mail of photocopies or E-mail attachments.

Nevertheless most end-users will expect at least the core journals to be readily available for immediate use in one of the national libraries.

With our method we thus identified the nucleus of journals which are of special importance to our end-user. We may slightly expand our nucleus of 13 or 14 articles per journal to include all those journals that contain at least 10 relevant articles each. These journals may safely be assumed as high-relevance or core journals which should definitely be available in our libraries. In table 3 we present these highly relevant journals. The journals are sorted in a descending order with regard to the number of relevant articles per journal. In the slightly expanded nucleus we included all those journals that yielded 10 or more articles. We thus obtained 17 different journals with 462 articles. We also present these journals with regard to their indexing by the SCI database and with regard to their availability in the libraries in Slovenia.

Table 3: Journals with the highest number (ten or more by title) of articles per journal title (a/j), inclusion of the journal in SCI (1=yes, 0=no), current journal availability in the libraries in Slovenia (av/SI: 1=yes, 0=no), and number of issues in Slovenia (No/SI)

Journal title	a/j	SCI	av/SI	No/SI
Phytochemistry	116	1	0	
Planta Medica	47	1	1	4
Chinese J. Of Modern Develop. In Traditional Med.	37	0	0	
Acta Horticulturae	31	0	1	1
Journal of Natural Products	28	1	1	1
Fitoterapia	26	0	1	4
Archives of Biochemistry and Biophysics	23	1	1	1
Hortscience	21	1	1	2
Journal of Ethnopharmacology	21	1	0	
Flavour Fragrance Journal	18	0	1	2
Journal of Essential Oil Research	17	0	0	
Tetrahedron	17	1	1	2
Phytotherapy Research	14	1	1	1
Acta Pharmaceutica Sinica	13	0	0	
Chemical and Pharmaceutical Bulletin	12	1	1	3
Journal of Organic Chemistry	11	1	1	6
Journal of Biological Science Research	10	1	0	

We can see that the majority of core journals are indexed in the SCI database. The exact availability of articles in the SCI database is somehow more difficult to assess as some journals are not indexed cover-to-cover. If we consider availability of journals (articles) in Slovenia we estimate for more than 300 articles (contained in respective 11 journals) to be available in Slovenia. We also estimate that roughly a half of core SCI journal-articles are available in our libraries. If we look closer we can see that 6 core journals are not available in Slovenia. 4 journals are available in one copy, and 7 journals are available in two copies or more. Again we may observe an interesting pattern: 6 journals (35%) are not available in Slovenia, whereas the available journals

show up, on average, in as many as 2,7 copies what again leaves much room for better coordinated subscription.

We must pay some more attention to the journal PHYTOCHEMISTRY that is evidently by far the most important core journal and which contains as many as 116 relevant articles. This journal has not been available in Slovenia as of 1993. This journal nevertheless holds exceptionally high information value for an end-user in the field of medicinal plants.

The end-user would wish all (or most) core journals to be generally accessible in Slovenia. Average accessibility of all journals regardless of the Bradford group is 50%. The core journal accessibility is higher due to the availability of Phytochemistry until 1993. Following the cancellation of Phytochemistry we may assume that the accessibility in the last few years has dropped significantly and probably does not reach 50%. In order to enhance accessibility of core journals it is advisable that Slovenian libraries in coordination contemplate subscription to at least five more journals. The two Chinese journals are written mostly in Chinese language but are supplied with extensive English-language abstracts. Journal exchange possibilities should be analyzed with regard to these two journals.

Other non-available journal articles may be obtained via Interlibrary Loan or via Document Delivery services. Major Slovenian professional libraries such as Central Medical Library, Central Technological Library, and National and University Library obtain article copies via the following international services:

BLDSC (British Library Document Supply Centre)

British Library Science Reference Library

UB/TIB Hannover (Universitaetsbibliothek/Technische Informationsbibliothek)

Centre de Pret (Bibliotheque Nationale de France)

INIST (Institut de l'Information Scientifique et Technique)

TU Delft (Bibliotheek, Technische Universiteit Delft)

UMI (University Microfilms International) Article Clearinghouse and the Information Store

DBI Link (Datenbankservice des Deutschen Bibliotheksinstituts)

Articles are generally located via international online services such as OCLC First Search, OCLC FastDoc, UNCOVER etc. The costs per 10 pages amount on average to slightly more than 10 US dollars (1.900 SIT). This applies to normal delivery of Xerox copies. It is possible to order fax copies or E-mail attachments, however, the costs are then much higher. Annual Document Delivery frequency must be considered with regard to each journal and juxtaposed with the subscription costs of the journal. Yearly subscription to an average biomedical or agronomy journal adds up to 95.000 or 77.000 SIT respectively.

4 CONCLUSION

Bibliographic information on genus *Salvia* is scattered in a number of databases so only a union analysis with reduction of duplicates may identify well enough majority of relevant records. Records in our analysis apply to journal articles only as these represent by far the most important share of all document types. Even though these are scattered amongst hundreds of journals we may recognise a well pronounced Bradford pattern of scatter. This offers a very good possibility of identifying the core journals. Availability in Slovenia is only moderately sufficient and covers some 50% of possible demands. This means that document delivery service is necessary on half the instances. The available documents, however, are available on average in more than two copies. The same applies both for the group of all journals and the group of highly relevant core journals which were identified via the Bradford bibliograph. In the later group the available journals duplicate even more. We may therefore conclude that while a mere half of all possibly relevant documents are available in Slovenia those that are available duplicate at least twice. This is quite disadvantageous for the end-user as he or she still has to order many documents via commercial delivery; on the other hand same precious funds are lost due to less than optimal national coordination of subscription policy. There is consequently still some room for improvement. With regard to the SCI journals we may also conclude that more than half of all core SCI journals are available in Slovenia. On the other hand, there are in the core-journal group many such journals that are not indexed by the SCI. However, the articles that issue from such journals were identified by our end-user as highly relevant articles. In order to comprehensively identify user-needs one must therefore be very careful not to neglect any of the possibly relevant information sources.

5 REFERENCES

- Bradford, S.C. (1934): Sources of information on specific subjects.- *Engineering*, 137: 85-86.
- Carrigan, D.P. (1996): Collection development-evaluation.- *Journal of Academic Librarianship*, 22, 4: 273-278.
- Cooper, M.D., McGregor, G.F. (1994): Using article photocopy data in bibliographic models for journal collection management.- *Library Quarterly*, 64, 4: 386-413.
- De Solla-Price, D.J. (1971): Some remarks on elitism in information and the invisible college phenomenon in science. *Journal of the American Society for Information Science*, 22: 74-75.
- Egghe, L. Rousseau, R. (1990): Introduction to Informetrics. Quantitative methods in Library, Documentation and information science- Amsterdam, Elsevier, 1990, 449 p.
- Eldredge, J.D. (1993): Accuracy of indexing coverage information as reported by serials sources.- *Bulletin of the Medical Libraries Association*, 81, 4: 364-370.
- Exon, F.C.A., Punch, K.F. (1997): The self-sufficient library collection: a test of assumptions.- *Journal of the American Society for Information Science*, 48, 1: 11-16.
- Kilpatrick, T.L., Preece, B.G. (1996): Serial cuts and interlibrary loan: Filing the gaps.- *Interlending & Document Supply*, 24, 1: 12-20.
- Lacroix, E.M. (1994): Interlibrary loan in U.S. health sciences libraries: journal article use.- *Bulletin of the Medical Libraries Association*, 82, 4: 363-368.

- Line, M. B. (1978): Rank lists based on citations and library uses as indicators of journal usage in individual libraries.- *Collection Management* 2: 131-316.
- Line, M.B. (1970): The half-life of periodical literature - apparent and real obsolescence.- *Journal of Documentation*, 26, 1: 46-52.
- Rousseau, R., Spinak, E. (1996): Documentation note. Do a field list of internationally visible journals and their journal impact factors depend on the initial set of journals? A research proposal.- *Journal of Documentation*, 52, 4: 449-456.
- Saracevic, T., Kantor, P. (1988a): A study of information seeking and retrieving. II. users, questions, and effectiveness.- *Journal of the American Society for Information Science*, 39, 3: 177-196.
- Saracevic, T., Kantor, P. (1988b): A study of information seeking and retrieving. III. searchers, searches, and overlap.- *Journal of the American Society for Information Science*, 39, 3: 97-216.
- Simpson, I.S. (1988): *Basic statistics for librarians*.- 3rd edition, London, A Bingles Book, 241 p.
- Slater, B.M., Slater, M.A. (1994): Determining core journals in behavioral medicine.- *Bulletin of the Medical Libraries Association*, 82, 1: 70-72.
- Soehner, C.B., Wray, S.T., Richards, D.T. (1992): The landmark citation method: analysis of a citation pattern as a collection assessment method.- *Bulletin of the Medical Libraries Association*, 80, 4: 361-366.
- Stubbs, K. (1992): Annual statistics 1990-1991: Remembering of things past, present...and future. *Publishers Weekly*. 239: 22-23.
- Timberlake, P. (1997): Serials management in special libraries: Present and future relationships between libraries and vendors.- *Serials Librarian*, 31, 1-2: 255-260.
- Vickery, B.C. (1948): Bradford's law of scattering .- *Journal of Documentation*, 4: 198-203.

Note: This pdf document has been prepared by the author, based on the original printed issue of the ZBORNIK BIOTEHNIŠKE FAKULTETE UNIVERZE V LJUBLJANI, KMETIJSTVO: [RESEARCH REPORTS. BIOTECHNICAL FACULTY. UNIVERSITY OF LJUBLJANA. AGRICULTURE], 1999, vol. 73, no. 1, p. 231-244, now issued as ACTA AGRICULTURAE SLOVENICA.

Additional keywords:

scientometrics, bibliometrics, scientometric analysis, bibliometric analysis, *S. officinalis*, sage, aromatic plants, condiments, drug plants, ethnobotany, healing herbs, herbal drugs, herbal medicine, herbal remedies, herbal supplements, herbs, medicinal crops, medicinal herbs, medicinal plants, natural drugs, natural healing, natural products, natural remedies, officinal plants, pharmaceutical plants, phytomedicinals, phytopharmaceuticals, plant drugs, spice plants, spices, traditional medicine