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## **Scientometric assessment of publishing patterns of agricultural researchers in the Slovenian national journals as indexed by the national online bibliographic database COBISS/COBIB**

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### **ABSTRACT**

The aim was to systematically analyze the patterns of scatter of both scientific and non-scientific articles by the scientists of the Agronomy, Biology, Food Science and Technology, Forestry, Wood Science and Technology, and the Zootechnical Departments of the Biotechnical Faculty of the University of Ljubljana in the Slovenian national journals in the period 1995-2002. The national online catalogue and bibliographic databases COBISS/COBIB were employed to this end. Two experimental databases were set up to upload the data for further analysis. 240 different journals that published 4163 different articles were identified. 3141 Scientific and 1022 non-scientific articles were published in 82 and 203 journals respectively. 45 journals published both scientific and non-scientific articles. 12 journals published more than 100 articles each, and 78 different journals published a single article. The five core journals published 39% of all articles. This is an assessment of the national serial productivity and does not reflect the total scientific productivity as many authors may publish mainly in international periodicals which were not the object of this analysis. The main difficulties of this kind of study were presented in establishing a uniform group of authors. COBIB can be used to some extent but with limitations as a lot of manual editing is needed to extract the relevant data into a consistent group of articles for further analysis.

**Keywords:** agriculture, scientometrics, bibliometrics, data analysis, databases, national bibliographies, OPAC catalogues, documentation, information processing, information science, information scatter, publications, journals, research evaluation

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## IZVLEČEK

### SCIENTOMETRIČNO OVREDNOTENJE ZNAČILNOSTI OBJAVLJANJA BIOTEHNIŠKIH RAZISKOVALCEV V SLOVENSkih REVIJAH PO PODATKIH IZ NACIONALNE BIBLIOGRAFSKO-KATALOŽNE ZBIRKE COBISS/COBIB

Naš namen je bil sistematično analizirati razkropljenost znanstvenih in neznanstvenih člankov raziskovalcev, učiteljev in drugih strokovnjakov z oddelkov Biotehniške fakultete Univerze v Ljubljani za agronomijo, biologijo, gozdarstvo, krajinsko arhitekturo, lesarstvo, zootehniko in živilstvo v obdobju 1995-2002. Pri tem smo uporabili nacionalno bibliografsko-kataložno zbirko COBISS/COBIB. Za nadaljnje podrobnejše analize smo izbrali ustrezne dokumente in na tem temelju zasnovali dve eksperimentalni zbirki. Identificirali smo 240 različnih revij, kjer je bilo objavljeno 4163 različnih člankov avtorjev z BF. 82 različnih revij je objavilo 3141 znanstvenih, 203 revij pa 1022 neznanstvenih člankov. 45 revij je objavilo tako znanstvene kot neznanstvene članke. Pri 12 različnih revijah je bilo objavljeno po več kot 100 člankov v vsaki, medtem ko je 78 različnih revij objavilo le po en članek. Pet osrednjih revij je objavilo 39% vseh člankov. Objave slovenskih avtorjev v revijah zunaj Slovenije niso bile predmet analize, zato številke iz raziskave ne odražajo celotne biotehniške produkcije, pač pa le objave v Sloveniji. Največjo težavo pri raziskavi je predstavljala metodika poenotenega zajemanja avtorjev in posameznih zapisov ter s tem zasnova eksperimentalnih zbirk za nadaljnjo obdelavo. Način vnosa v bazo COBIB glede na avtorja in avtorjevo ustanovo nudi le omejeno možnost uporabe za tovrstne analize, saj vnos ustanove ni normiran, zelo dobro pa je moč uporabiti bibliografsko funkcijo normativne kontrole pri naslovih publikacij. Za identifikacijo konsistentne skupine člankov na osnovi avtorjev in torej za izbor relevantnih podatkov za nadaljnje analize je potrebno mnogo naknadne kontrole ter ročnega urejanja izpisov.

**Ključne besede:** kmetijstvo, biotehnika, scientometrija, bibliometrija, analiza podatkov, podatkovne zbirke, nacionalne bibliografije, katalogi OPAC, dokumentalistika, procesiranje informacij, znanstvena informatika, razkropljenost informacij, publikacije, revije, vrednotenje raziskovanja

## 1 INTRODUCTION

The global scientific community is under constant pressure to publish research articles of scientific excellence. The aim is to attract attention of renown citation indexes which then scientometrically evaluate the international impact of such articles. Slovenian researchers are exposed to the same demands while vying for limited financial resources and competing with an ever increasing number of scientists at home and worldwide. In the long run this may also impact on publishing patterns in domestic journals. An interest is already growing to publish articles only in the so called scientific journals of national importance which receive more points in the research evaluation system. Each broader scientific discipline in Slovenia recognizes a journal or two as having a special role in the process of dissemination of scientific research. The articles in these journals are almost always considered as original scientific articles. Besides the few so called national scientific journals, there exist in Slovenia dozens of journal titles that also publish scientific articles and hundreds of other journal titles that also bring out articles by scientists. Many journals publish both scientific and non-scientific articles.

No one has previously attempted to systematically assess this kind of scientific production of the scientists of the Biotechnical Faculty of the University of Ljubljana.

Our objective is to explore the possibilities of determining domestic publication patterns of the respective scientists and departments of the Faculty, and to assess some characteristics of the scatter of agriculture-related information in Slovenian periodicals. We wish to systematically collect and rank journal articles according to different criteria with the help of online catalogues or bibliographic databases. We also aim to look at some limitations of such scientometric analysis with regard to available bibliographic services.

We addressed some scientometric issues such as subject indexing and particular journal-related agricultural subjects in our previous research (Bartol 2001, 2002). Here we review some literature that focused on the topic of national publishing in agriculture, and literature that dealt with national bibliographies or online catalogues as resources for bibliometric research.

Key agricultural journals in Malaysia in the period 1981-1990 were investigated by Nasir et al. (1994). Malaysian authors and yearly production were explored. Thomas (1996) investigated several databases such as Biological Abstracts, Agris, Current Advances in Biological Sciences, and Current Contents with regard to coverage of 360 Indian agricultural journals. Anduckia et al. (2000) bibliometrically evaluated research projects in Colombia between 1983 and 1994. The paper also assessed parameters such as institutions, mean number of authors of articles, and origin of publication. Sigogneau (2000) investigated document types in journals related to physics. He addressed the issue of what document types to consider in order to compare scientific performance in different countries. Special emphasis was given to proceedings-papers included in journals that are indexed by the Science Citation Index database. An analysis of national historic development was carried out by Meikar (2000) who explored non-periodical forestry publications in Estonia between the 18th century and 1959. Somme (2001) questioned the need for Nordic national entomological journals as the Nordic entomologists can publish their papers in international journals issued in the Nordic countries or in the national journals of other countries. Jacobs (2001) investigated publication patterns of academic and research scientists of ten South African universities between 1992-1996, including the field of plant and animal sciences, and compared the level of productivity in each area of science. Scientific journals were used by Mesa et al. (2002) in order to analyze production of Cuban scientific centers in the field of animal sciences. The most productive and most highly indexed journals were identified. Adigun (2002) analyzed 348 publications of scientists at the West Africa Rice Development Association for the period 1991-2000 with regard to article type, authorship, and scientific discipline.

National bibliographies or online catalogues were also used as a source of document analysis. Wallace (1997) looked at user behaviour and shift from subject to journal title searching and examined user problems while searching the periodical title index in an online catalogue. Schwens (1999) investigated the European Commission's Computerized Bibliographic Record Actions (CoBRA) project which assessed the possibility of extracting data from national bibliographies to produce a database on book trade statistics. An online catalogue was used by Ebersole (1999) to evaluate possibilities for planning of cooperative buying and to develop collections for groups of academic libraries. Byrum and Myers-Hayer (2000) published a report of a survey carried out 1998 in 59 countries on inclusion of electronic resources in national bibliographies. Murany (2001) compared Latvian and Hungarian national

bibliographies and the journal articles with regard to the number of articles, rate of processing, and length of delay between publication and indexing of an article in the respective bibliography. Some principles of cataloguing in the Slovenian national bibliographic system COBISS/COBIB were pointed up by Vončina and Jug (2002). Inconsistency in the definitions of document types was also addressed.

## 2 MATERIALS AND METHODS

We investigated the affiliates (authors in further text) of the six departments of the Biotechnical Faculty (Agronomy, Biology, Food Science and Technology, Forestry, Wood Science and Technology, and the Zootechnical Department) and the articles that were published by these authors in any of the Slovenian periodicals (journals).

The initial step was to establish the most applicable bibliographic service or database. Slovenian journal articles from the agricultural or biotechnical field are regularly indexed by several international databases such as Agris, CAB Abstracts, and others. As these databases generally include only a limited number of titles of a more scientific nature they could not be used for this kind of analysis. The most suitable (the only) choice was the Slovenian national bibliographic database COBIB of the system COBISS (Cooperative Online Bibliographic System and Services) which is the principal Slovenian bibliographic utility and as such is supposed to trace and subsequently index all documents published by any Slovenian researcher anywhere in Slovenia, and also worldwide.

The Biotechnical Faculty fully implemented COBISS/COBIB in 1995 so this was the year that we used as the starting point of the analysis. We completed our observation with the inclusion of the year 2002. We then had to decide on the body of the authors. We gathered the data for the observation period 1995-2002 from the administrative services of the Biotechnical Faculty. These services collect only the data on the regularly employed affiliates of the particular year so an author who retires in that year does not feature any more in the official statistics of Faculty at the end of the year. As most authors remain very active and publish a great deal after their retirement we felt that such an exclusion would not offer an accurate picture as to the Faculty production. We therefore decided to cumulatively include all the authors that were still employed as of 31 December, 1994, and then to gradually attach all the authors that became employed after this day, even if they later for any reason left the Faculty. For all of the above authors we considered the entire period 1995-2002. However, if an author retired before 31 December, 1994, such an author did not enter the analysis. We are aware of limitations of such a method; however, a departing date had to be placed at some point. We chose 1995 as this was the first year when the authors from the Biotechnical Faculty began to be systematically covered by the COBIB database.

Analysis included all the employees of the departments of the Biotechnical Faculty. We included full-time and part-time employees. Initially we employed special "Researcher's Codes" that are assigned to most Slovenian professional researchers and university teachers. However, a few authors do not have a code so we also had to use full names. This was the case with technical staff and young researchers who were also included in our analysis if they were professionally employed by the Faculty.

We collected the data for the above authors in separate files by the respective Departments. We present the list of publication types (Table 1) that were used in order to download the documents. These types represent all the journal-article-types (publication types) available in COBISS/COBIB. In order to assess the *scientific* output of both the authors and journals we merged the first three types from the list (1.01 through 1.03) into the "scientific" group, and the remaining types (1.04 through 1.25) into the "non-scientific" group. Selected scientific articles are employed by the Slovenian Ministry of Education, Science and Sport in the process of assignment of grants for research projects.

Table 1: Types of serial journal-articles as employed by COBIB (Scientific types are italicized).

<i>1.01 Original Scientific Article</i>	1.19 Review, Book Review, Critique
<i>1.02 Review Article</i>	1.20 Preface, Afterword
<i>1.03 Short Scientific Article</i>	1.21 Polemic, Discussion
1.04 Professional Article	1.22 Interview
1.05 Popular Article	1.25 Other Articles or Component Parts

We then organized all the Department files into a single experimental database with the sorting possibility for the following data: *author-and-title*, *source*, *publication-year*, *collation*, *department*. A lot of manual work was involved in the creation of the database as there exist in the COBIB no field-specific delimiters which would facilitate a downloading for the purpose of creating a more complex experimental database for scientometric function. However, the journal-title authority-file utility was very helpful in later sorting and ranking of articles. This also enabled quicker exclusion of all articles not printed in Slovenian journals. Many proceedings-articles also had to be searched for and manually excluded as they had been wrongly classified by information professionals as journal types. We also excluded book series. We were finally left with regular serial journals with an ISSN number. If proceedings were published in the serial journals with an ISSN they were also included in our analysis.

This experimental database (Database A) was used for the analysis of the output by the departments as presented later in Table 3. However, to present the total number of articles by journal types or titles, and total yearly output of journals we had to create another database (Database B) where we excluded the multiple-department duplicates. Namely the multiple-author duplicates were excluded on the level of the particular department. So if an article was written by authors from two (three) different departments it got downloaded in each department file and thus appeared twice (or three times) in counting. This had to be corrected by alphabetic sorting and manual searching of such duplicates. Only then was the second database, with the single counting of records, ready for further analyses of totals. The work with the experimental databases was carried out with MS tools.

The Database A contained 4230 records and was used for calculations of individual departments. The database B, which contained 4163 records from 240 different journals, was used for most other calculations, such as the total number of article types, number of articles per journal title, and total yearly output of the Faculty.

### 3 RESULTS

In order to enable some degree of objective comparison we initially present in Table 2 the makeup of the Faculty staff by departments: Agronomy (Agr), Biology (Bio), Food Science and Technology (Food), Forestry (For), Wood Science and Technology (Wood), and the Zootechnical Department (Zoo); these abbreviations will be used in all subsequent tables. Teachers, researchers, assistants, advisers, experts, and instructors are merged in the group of educational staff. Other affiliates, such as administration and technical support, are presented in the group of technical staff.

Table 2: Composition of Biotechnical Faculty affiliates by respective Departments: Agronomy (Agr), Biology (Bio), Food Science and Technology (Food), Forestry (For), Wood Science and Technology (Wood), and the Zootechnical Department (Zoo)

Faculty	Agr	Bio	Food	For	Land	Wood	Zoo	Total
Educational Staff	74	70	49	28	7	30	63	321
Technical Staff	44	32	24	19	1	14	79	213
<b>Total</b>	<b>118</b>	<b>102</b>	<b>73</b>	<b>47</b>	<b>8</b>	<b>44</b>	<b>142</b>	<b>534</b>

Altogether we identified 240 different journals with 4163 different bibliographic units (documents). Scientific articles were published in 82 journals and non-scientific articles in 203 journals. There were 45 journals which published both scientific and non-scientific articles. Twelve journals published more than 100 articles each, one journal even more than 400. However, as many as 78 different journals published a single article in the entire period. There were 70 such journals that published only one non-scientific article, and 32 journals that published an only scientific article by an author from the Biotechnical Faculty. These data are systematically displayed in the tables and figures that follow. The data are cumulatively presented in the Appendix.

Table 3 shows all article types published by the departments of the Biotechnical Faculty. The total number in the last column was calculated separately with the method of single counting of the articles that had been co-published by the authors from different departments (Database A), so the values in the horizontal lines do not add up in the last column which represents the entire Faculty. So if an article was published by two authors from different departments it is counted only once in the last column, but is still presented in both department columns. The overall level of such duplications was rather low given that there were 4163 individual bibliographic units based on exclusion of duplicates and 4230 units of both single and multiple occurrences.

Table 3: Document types in Slovenian journals for articles published by the respective departments of the Biotechnical Faculty and by the total of the Faculty.

Article type	Agr	Bio	Food	For	Land	Wood	Zoo	Total
Original Scientific Art.	242	140	76	154	7	116	145	848
Review Art.	30	18	5	14	5	57	40	162
Short Scientific Art.	1	1	-	5	1	-	10	17
<i>All Scientific Art.</i>	<i>273</i>	<i>159</i>	<i>81</i>	<i>173</i>	<i>13</i>	<i>173</i>	<i>195</i>	<i>1027</i>
Professional Art.	591	118	113	109	40	120	435	1503
Popular Art.	222	115	23	104	34	162	54	712
Review, Critique	59	13	3	5	2	4	10	96
Preface, Afterword	4	2	6	8	-	2	16	37
Polemic, Discussion	19	10	1	26	3	3	14	76
Interview	41	9	11	8	8	9	39	125
Other Art.	217	32	26	87	7	162	57	587
<b>All Non-Scientific Art.</b>	<i>1153</i>	<i>299</i>	<i>183</i>	<i>347</i>	<i>94</i>	<i>462</i>	<i>625</i>	<i>3136</i>
<b>Total</b>	<b>1426</b>	<b>458</b>	<b>264</b>	<b>520</b>	<b>107</b>	<b>635</b>	<b>820</b>	<b>4163</b>

Table (4) shows journal titles with the highest occurrence of articles published by the members of the Faculty without regard to the department (based on Database B). The articles are divided into the scientific and non-scientific group.

Table 4: Leading ten Slovenian journals with the highest number of articles (irrespective of the Department).

<b>Total Journal Articles</b>	<b>n</b>	<b>Scientific A.</b>	<b>n</b>	<b>Non-Scientific A.</b>	<b>n</b>
Sodob. kmet.	474	Zb. Bioteh. Agr.	174	Sodob. kmet.	380
Kmeč. glas	296	Zb. gozd. lesar.	141	Kmeč. glas	296
Les	272	Les	103	Gozd. vestn.	198
Gozd. vestn.	261	Zb. Bioteh. Zooteh.	95	Les	169
Zb. Bioteh. Agr.	189	Sodob. kmet.	94	Naša žena	166
Naša žena	166	Gozd. vestn.	63	Moj mali svet	156
Moj mali svet	156	Acta biol. slov.	47	Gea	143
Zb. gozd. lesar.	146	Zb. Bioteh. Supl.	35	Delo	135
Gea	143	Acta chim. slov.	31	Proteus	124
Delo	135	Hmelj. bilt.	19	Kmetovalec	90
<b>Total</b>	<b>4163</b>	<b>Total</b>	<b>1027</b>	<b>Total</b>	<b>3136</b>

Further analysis was carried out with regard to the frequency of all articles published in a single journal title. In order to show the data more clearly both a table and a figure (5 and 1 respectively) are presented. There are twelve different journals that published more than 100 articles each. On the other hand, there were, among 240 journal titles, as many as 78 different journals that only issued one article by an affiliate of the Biotechnical Faculty. The majority of these single-articles were of non-scientific nature (see Appendix).

Table 5: Number of articles per journal title.

<b>Art. per journal</b>	<b>No. of journals</b>						
474	1	90	1	34	1	12	1
296	1	72	1	32	2	11	1
272	1	66	1	27	1	10	6
261	1	62	1	22	2	9	2
189	1	59	1	21	1	8	8
166	1	53	1	20	1	7	6
156	1	52	1	19	1	6	5
146	1	51	1	18	2	5	17
143	1	44	1	17	2	4	12
135	1	41	1	16	2	3	22
132	1	39	1	15	2	2	37
104	1	36	2	13	3	1	78

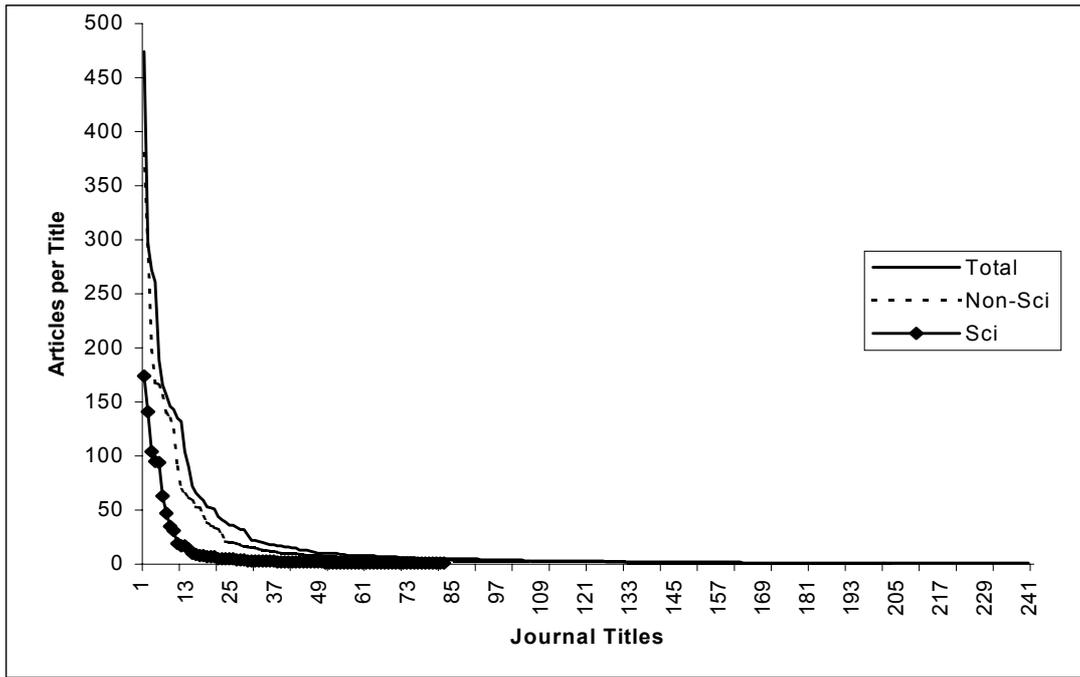


Figure 1: Number of scientific (sci) and non scientific (non-sci) articles in Slovenian journals by the respective journal title.

In the period 1995-2002 there were 1022 scientific, 3141 non-scientific and 4163 total articles published in 240 journals. Figure 2 tracks yearly development in the publishing patterns of both scientific and non scientific articles.

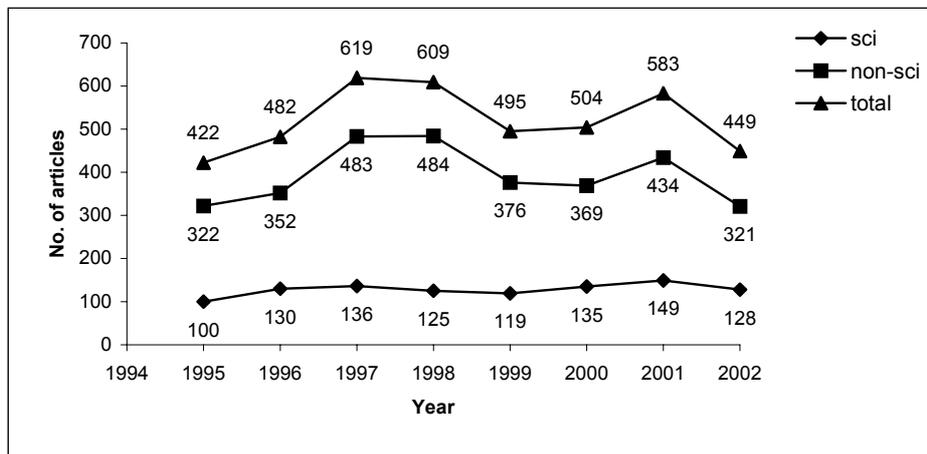


Figure 2: Yearly output of scientific (sci) and non scientific (non-sci) articles in Slovenian journals.

Table 6: Leading five scientific and non- scientific journals by the faculty departments.

Dept.	Scientific Articles		Non-Scientific Articles	
	Journal	n	Journal	n
<b>Agr</b>	Zb. Bioteh. Agr.	160	Sodob. kmet.	198
	Sodob. kmet.	42	Kmeč. glas	176
	Zb. gozd. lesar.	13	Moj mali svet	104
	Hmelj. bilt.	10	Gea	72
	Razpr. - Dr. met. Slov.	5	Sad	60
<b>Bio</b>	Acta biol. slov.	40	Proteus	96
	Nat. Slov.	17	Delo	35
	Hladnikia	16	Rože & vrt	20
	Ann, Ser. hist. nat.	10	Hladnikia	17
	Anthropol. noteb.	8	Moj mali svet	14
<b>Food</b>	Zb. Bioteh. Agr.	19	Meso mesnin.	43
	Acta chim. slov.	19	Sodob. kmet.	22
	Sodob. kmet.	13	Obv. - Bioteh. fak.	15
	Zb. Bioteh. Zooteh.	9	Delo	12
	Hmelj. bilt.	9	Dober tek	12
<b>For</b>	Zb. gozd. lesar.	95	Gozd. vestn.	185
	Gozd. vestn.	58	Gea	47
	Pr. ser. - UL Inst. Math.	4	Proteus	13
	Sodob. kmet.	4	Kmeč. glas	12
	Razpr. - S. akad. zn um.	2	Sodob. kmet.	10
<b>Land</b>	Urbani izziv	5	Vrtnar	35
	AB, Arhit. bilt.	3	Moj mali svet	17
	Zb. Bioteh. Agr.	3	Gradb. oprema	11
	Geogr. zb.	1	Delo	7
	Kronika	1	Proteus	3
<b>Wood</b>	Les	104	Les	165
	Zb. gozd. lesar.	31	Naša žena	115
	Arheol. vestn.	6	Gradb. oprema	51
	Acta chim. slov.	5	Večer	24
	Zb. znan. razpr.	3	Gea	16
<b>Zoo</b>	Zb. Bioteh. Zooteh.	90	Sodob. kmet.	148
	Sodob. kmet.	40	Kmeč. glas	103
	Zb. Bioteh. Supl.	35	Govedor. zvon.	52
	Znan. praksa goved.	6	Drobnica	49
	Podjet. delo	5	Kmetovalec	40

Table 6 presents publishing patterns in five leading journals according to the Faculty Department in both scientific and non-scientific journals. *Sodobno kmetijstvo* appears in four departments among the five leading journals, occupying rank of 2, 2, 3, and 4. It is the highest ranking general journal, with 474 total articles and 94 scientific articles. The highest rank of scientific journals goes to *Zbornik Biotehniške fakultete* with 174 articles in the *Agronomy Issue*, and 95 articles in the *Zootechnical Issue*. There are an additional 35 articles in the *Supplements of the Zbornik*. *Zbornik* and all its issues thus account for some 304 scientific articles.

#### 4 DISCUSSION AND CONCLUSIONS

A high level of scatter exists among the articles published by the researchers or teachers of the Biotechnical Faculty. The 4163 different (either scientific or non-scientific) articles were printed in as many as 240 different Slovenian journals. Of those journals twelve published more than 100 articles; however, as many as 78 journals published only a single article in the entire period. The following five core

journals: *Sodob. kmet.*, *Kmeč. glas*, *Les*, *Gozd. vestn.*, *Zb. Bioteh. Agr.* (all three issues) account for as many as 39% of all articles. This pattern displays a rather characteristic bend which is also known as a Bradford bibliographic curve.

The scatter varies according to the scientific or non-scientific nature of articles. Agronomy, Biology, Forestry, Wood Science and Technology, and the Zootechnical Departments maintain a single national primary scientific journal. Food Science and Technology scientists tend to publish in two equally important primary journals. We can also see that journals in Slovenia show an established corpus of core journals along each discipline or sub-discipline. There also exists an important general journal that features among five most important scientific and non-scientific journals in four departments.

Non-scientific articles show a much higher scatter than scientific articles. This is somehow logical given the nature of a more general subject of such articles. We randomly checked a few high ranking popular journals and frequently found a single author accounting for most of the articles in one journal. This publication pattern may also involve a personal non-scientific interest of an author. Such articles may nevertheless play an important role in the process of transfer of knowledge towards a wider audience and also increase general visibility of the Faculty. These articles, however, may not necessarily be agriculture-related subjects. Among 3141 non-scientific articles there are also 1508 so called *professional* (non-scientific) and 712 *popular* articles. Other non-scientific articles belong to other types. It is not always clear why there need to be so many different non-scientific categories. In our analysis we therefore considered only two general groups: all scientific and all non-scientific documents were merged into one respective category.

This is not an assessment of the total productivity or the scientific merit of the authors or the value of the journals but merely an attempt to establish some publishing patterns within Slovenia. Namely some authors may be quite prolific in foreign journals but will rarely publish in national publications. Others may publish abundantly in both domestic and foreign publications. Also, some authors will be very prolific in productivity of scientific articles but will somehow snub presentation of their research in the form of an article of general interest. However, the reasons for publishing in non-scientific journals may be difficult to evaluate as these journals sometimes offer some additional motivation such as paying fee to the authors.

The 4163 single-occurrence records were derived from the database of 4230 records as compiled from the department files. The duplicates in the later database can be attributed to the inter-department co-authorship which is rather low. However, this is merely the national input. International publications might yield different results so this can not be used as an assessment of total cooperation.

We were not able to establish any strong impact that the constraint of publishing articles in high-ranking foreign scientific journals might have on publishing in domestic scientific or non-scientific journals. Yearly output still seems rather constant, particularly as regards the scientific articles. There has been some increase in the last two years. However, there is a decrease in the last observed year (2002). This must be attributed to some delay in the process of indexing and inputting. The decrease is even more pronounced in the case of the non-scientific articles where

authors most likely do not pay so much attention to timely inputting into the COBIB database as these article types do not hold so much significance in the process of promotion. A more accurate report as to this year will thus only be possible after some lapse of time.

As a conclusion we need to point out again that it was not our attempt to assess the overall production of the authors. The number of documents would be too high. Also, it would be difficult to systematically analyze all possible kinds of documents, especially proceedings. We focused on domestic journals only as these offer a higher degree of input consistency and thus offer a better possibility for a scientometric experimental repeatability. The COBIB journal-title utility was quite helpful as it is based on the standardized authority file. Even so it took quite some time to download and prepare the data for further analysis. Also, it was difficult to establish a consistent group of authors. Namely, many authors retired in a certain year of the observation period but we still included their documents after this year. After all, some of them are still very active as partners of the Faculty and regularly publish both scientific and non-scientific documents and thus contribute to the general output of a particular sub-discipline. It is possible to carry out some focused scientometric analyses with the use of COBIB; however, a lot of additional manual editing and reformatting is still needed so such an analysis requires a lot of time and also very careful manual browsing through data and consequent editing. Only then is it possible to upload such data into an experimental database which subsequently enables systematic sorting and analyzing by chosen parameters.

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**APPENDIX: Scientific (sci) and non scientific (n-sci) articles in Slovenian journals by the respective journal title during 1995-2002 (The titles are abbreviated according to the COBIB authority file)**

Journal	n-sci	sci	Total
2000	2		2
7D	8		8
AB, Arhit. bilt.	1	3	4
Acrocephalus	3	5	8
Acta biol. slov.	4	47	51
Acta carsol.		2	2
Acta chim. slov.	1	31	32
Acta entomol. slov.	1	7	8
Acta hydrotech.		3	3
Albert	1		1
Ann, Ser. hist. nat.	5	14	19
Ann, Ser. hist. sociol.		2	2
Anthropol. noteb.	7	8	15
Anthropos	2		2
Argo		1	1
Arheol. vestn.		10	10
Arhivi	1		1
As	3		3

AS. Andrag. spoznan.	1		1
Astro novice	2		2
Bilten	1		1
Biodar	5		5
Biol. šoli	2		2
Biol. vestn.		1	1
Brstika	3		3
Ciciban za starše	1		1
Delo	135		135
Delo + varnost	3		3
Demokracija	1		1
Denar		1	1
Deželne novice	3		3
Dietetikus	1	1	2
Anthropos	11		11
Dober tek	12		12
Dolenj. list	3		3
Drobnica	65	1	66
Družbosl. razpr.	2	3	5

Čas. krit. znan.	2		2
Čas. zgod. narodop.	16		16
ČasopisKa	2		2
EAT	1		1
EGES, Energ. gospod. ekol. Slov.	5		5
Embalaža & co.	1		1
Črnobelo govedo	13		13
EU Novice Slovenija	1		1
Evrobilten	3		3
Fagopyrum	1		1
Falco		1	1
Farm. vestn.		4	4
Finance	5		5
Gaia	44		44
Gea	143		143
Geodet. vestn.		1	1
Geogr. vestn.		1	1
Geogr. zb.		2	2
Gib	1		1
Glas gospod.	2		2
Glas Savinjske	2		2
Glas. ZRS Koper	3		3
Gobar. vestn.	1		1
Gorenj. glas	6		6
Gospod. odpad.		1	1
Gospod. vestn.	2		2
Govedor. zvon.	52		52
Govedorejec	2		2
Gozd. vestn.	198	63	261
Gradb. oprema	62		62
Gradb. vestn.	2		2
Gradbenik	3		3
Grafičar	5	1	6
Hacquetia		1	1
Herbika	20	2	22
Hiše	2		2
Hladnikia	19	17	36
Hmelj. bilt.	3	19	22
Hmelj. inf.	1		1
Hmeljar	15	2	17
Horus	1		1
IB rev.	4	1	5
Ichthyos		4	4
Idrij. razgl.	3		3
Image anal. stereol.		1	1
Index seminum		1	1
Jana	2		2
Javna uprava		1	1
Jelonovice	1		1
Jeseniški zb.		1	1
Kakov. voda Slov.	1		1
Kem. šoli	3		3
Kinolog	1		1
Klasje	1		1
Kmeč. glas	296		296
Kmetovalec	90		90
Knjižn. nov.	1		1
Knjižnica	1		1
Kočev. narav. park	4		4
Kolaps	1		1
Korak	3		3
Kovine zlit. tehnol.		1	1
Kras	2		2
Kronika	8	1	9
Kvarkadabra	5	2	7

Les	169	103	272
Lesar. utrip	14	1	15
Letop. Slov. akad. znan. umet.	7		7
Lib. štud.	3		3
Likov. vzgoja	1		1
Lisast. gov	1		1
List	2		2
Lord	1		1
Lovec	5		5
Lucas	1		1
Mag	1		1
Manager zasebno	1		1
Mars	1		1
Med. razgl.		3	3
Mednar. posl. pravo	5		5
Meso mesnin.	59		59
Mladina	5		5
Mlin. pekar.	5		5
Moj dom	2		2
Moj hobi	1		1
Moj mali svet	156		156
Mostiščar	1		1
Naš dom	4		4
Naša družina	1		1
Naša žena	166		166
Naše gospod.	1	1	2
Naše jame	1		1
Naše kmet. šole	1		1
Nat. Slov.	1	17	18
Nedelj. dnev	3		3
Neprofit. manag.	3		3
Nova revija	1		1
Novice IJS	1		1
Novice SAD	5		5
Novice SSDS	7		7
Objave Univ. Ljubl.	1		1
Obv. - Univ. Ljubl, Bioteh. fak.	36		36
Obz. mat. fiz.		1	1
Okno uprave	1		1
Okolj. vzgoja šoli	6		6
Okolje	6	1	7
Okus	2		2
Oljka	2		2
Organizacija	2	1	3
Otrok & družina	1		1
Papir	1	3	4
Park	1		1
Pedagoš. obz.	1	1	2
Pet zvezd.	6	2	8
PIL plus	3		3
Piranesi	1		1
Pisani list	10		10
Planin. vestn.	8		8
Podjet. delo		5	5
Podjetnik.	1		1
Popek	9		9
PP, Prav. praksa	3	1	4
Pravnik	1		1
Prepr. ser. - Univ. Ljubl.		5	5
Inst. Math.			
Presek	4		4
Primorska srečanja	4		4
Primorske nov.	2		2
Proteus	124	8	132

Ptuj. zb.		1	1
PWS	1		1
Quark	8		8
Quarterly news	1		1
Radiol. oncol.		2	2
Razgledi	5		5
Raziskovalec	6		6
Razpr. - Druš. meteorol. Slov.		5	5
Razpr. - Slov. akad. znan. umet	1	7	8
Reja prašičev	34		34
RES., Dela, = Papers		4	4
Rev. konjih	5		5
Ribe vode	1		1
Rože & vrt	20		20
Sad	69	3	72
Savinjčan	18		18
Sladkorčki	1		1
Slamnik	1		1
Slov. čebel.	12	1	13
Slov. ekon. rev.		1	1
Slov. pediater.		1	1
Slov. vet. res.	1		1
Slov. vodar	2		2
Slovenec	1		1
Snežnik	1		1
Soc. delo	2		2
Sodob. kmet.	380	94	474
Sporoč. - Urad Repub. Slov. stand. merosl	1		1
Stroj. vestn.		2	2
Svet ptic	16		16
Svob. misel (Ljubljana)	4		4
Šol. razgl.	10		10
Tedn. petica	39		39
Tednik	2		2
Teh. narava	27		27
Teor. praksa	5	2	7
Turistične objave	21		21
Ujma	1		1
Univ. rev.	1		1

Uporab. inform.		2	2
Urbani izziv		5	5
Utrip Savinj. dol.	4		4
Val	3		3
Varst. narave	1	1	2
Večer	32		32
Vege scena	1		1
Veritas	1		1
Vestn. - Univ. Ljublj.	10		10
Vestnik	10		10
Vet. nov.	5	1	6
Viharnik	1		1
VIP	1		1
Vita	3		3
Viva	5		5
Vrhniški razgl.	2		2
Vrtnar	53		53
Vzajemnost	1		1
Welwitschia	3		3
Za srce	2		2
Zb. Bioteh. fak. Univ. Ljublj., Kmet.	15	174	189
Zb. Bioteh. fak. Univ. Ljublj., Kmet. Zooteh.	9	95	104
Zb. Bioteh. fak. Univ. Ljublj., Kmet., Supl.	6	35	41
Zb. gozd. lesar.	5	141	146
Zb. inov. proj.	1		1
Zb. Vet. fak. - Univ. Ljublj.		2	2
Zb. znan. razpr.		3	3
Zdrav. Vestn.		2	2
Zdrav. vars.	1	7	8
Zel. pomlad	7		7
Zgod. vse	2		2
Zgodovinski časopis	13		13
Znan. praksa goved.	8	9	17
Znan. rev.		1	1
Znan. Tehnol.	1		1
Življ. teh.	10		10
<b>Grand Total</b>	<b>3141</b>	<b>1022</b>	<b>4163</b>