

Analysis of Czech Journals from the Field of Natural Sciences in the Database Web of Science

Věra Kroftová

Agrotest Fyto, Ltd., Kromeriz

kroftova@vukrom.cz

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Abstract

A set of Czech journals from the field of natural sciences indexed in WOS (JCR) in the period of 1998-2005 was analyzed. The number of titles (20-22) in individual years and their selection were relatively stable. In the examined group of journals, the year of their initial inclusion in WOS was determined, the number of Czech titles was compared with that of titles from other countries, and their classification into subject categories of WOS (JCR) was analyzed. Comparison of journals IF with the IF median of corresponding categories of WOS (JCR) revealed that even a relatively low value of the journal IF did not necessarily mean a lower level within the given category. Some erroneous data concerning Czech journals according to the territory were found and described. The title of one of Czech journals, ROSTLINNA VYROBA, was changed to PLANT SOIL ENVIRONMENT. However, after a two-year transient period, when both titles were included in the database, they were both deleted in 2005 even though this journal still meets criteria for indexing in WOS.

Introduction

The databases Web of Science (WOS) and Journal of Citation Report (JCR) are based on the database of articles from 8,700 selected journals. Due to the analysis of citations (references) relevant to individual bibliographic records, the databases WOS and JCR are a unique system used for evaluating outcomes of science and research worldwide. The journals included in it are generally called “impacted journals“. Approximately 75% of these journals cover natural sciences, 25% social sciences and arts & humanities. The database retrospective of natural sciences goes back to 1945. Journals are enlisted in WOS based on comprehensive evaluation of all criteria. These are: timeliness and regularity of publishing, reviewing process, English abstracts and key words, international importance of the journal (composition of an editorial board, published authors, citations to foreign authors' papers), journal citing, and others. Besides the evaluation of publication activity and citations of individual scientists, research teams and entire research institutions in WOS, in JCR citations of individual articles are related to journal titles and used to evaluate them using calculation to the value which is called Impact Factor (IF). This paper is too short to describe how broad spectrum of search options and evaluating tools are provided by WOS and JCR. Both databases are interconnected and, for example, when searching in WOS, it is possible to look at the IF in JCR. An h-index and consulting the Ulrich's WEB have recently been completed, and another novelty is adding full first names.

The aim of this paper is to provide information about the proportion of Czech journals in WOS (JCR) and to evaluate them considering quantitative and qualitative aspects in both European and global context.

Materials and Methods

Basic materials for the present paper were the databases WOS and JCR, Thomson Scientific (formerly ISI). The analysis was carried out only in titles of natural sciences (Science Citation Index Expanded 1945 – present in WOS), as for the IF of the journals, a set of 25 Czech titles was evaluated in JCR in the period of 1998-2005. Simple methods for sorting, making tables and graphs were used in MS Excel software. Out of statistical values, particularly *median* (\tilde{x}) was used, which is a midpoint of ascending or descending number series, in this case IF values. If there are an even amount of numbers in the series, the median is found by taking the mean of the two numbers in the middle of the distribution (Swoboda 1977). Median is a value that is not affected by marginal values, therefore, it is suitable to evaluate number series composed of numbers that do not change continuously, but their value is calculated separately, as is the case of the IF.

The paper analyzes the IF value of Czech journals and compares it with the other journals. This parameter expresses a relationship between the number of published articles in previous two years and the number of citations relevant to these articles over the same period.

Calculation of the IF:

Cites in 2005 to articles published in:	2004= 40	Number of articles published in:	2004= 150
	2003= 42		2003= 128
	Sum: 82		Sum: 278
Cites to articles 2004 + 2003		82	
IF 2005:	-----	----	= 0.295
	Number of published articles 2004 + 2003	278	

If the number of citations is lower than the number of published articles, the $IF < 1$;

if the number of citations is higher than the number of published articles, the $IF > 1$.

In this paper, the terms title and journal are distinguished because if the title of the journal is changed, both titles – an old and new one, are included in WOS and JCR simultaneously for two years. When searching in JCR, the retrieved number is always the number of included titles.

Results

In the analysis of the duration of journal enlistment in WOS, the year of initial inclusion was determined, however, it was not verified if the journals were included in the database continuously. The journal COLLECTION OF CZECHOSLOVAK CHEMICAL COMMUNICATIONS was included in WOS already in 1949. The largest number of Czech journals was included in the 1970s (8), and on the contrary, no journal was included in the 1980s. A revival started again in the 1990s (5) and continued in a new millennium, when the journal PRESLIA was included in WOS and later in JCR (IF from 2005) (Figure 1). In this figure, CZECH JOURNAL OF FOOD SCIENCES is also involved, however, the IF value has not been determined yet in the JCR, and therefore it was not subjected to further analyses.

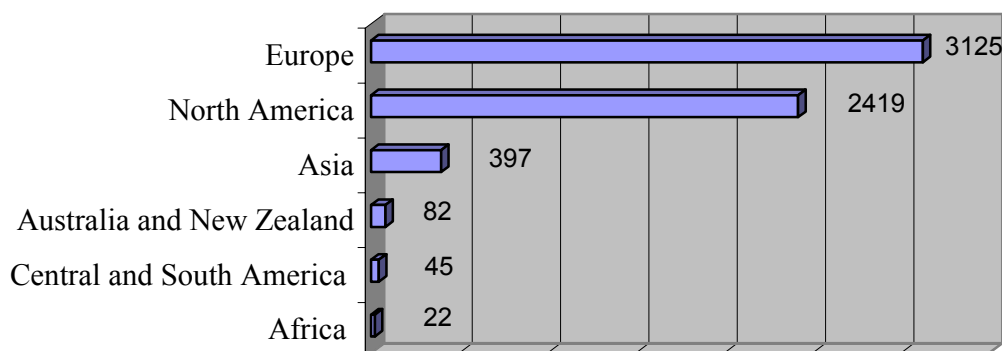
The Czech Republic ranked the 24th of a total number of 68 countries and the 15th out of European countries in 2005. Twenty Czech titles accounted for 0.3 % of all titles and 0.6 % of European titles in the database. Lower numbers of journals were found for Sweden (18), Hungary (15), Belgium (12), Finland (11), Romania (7), Bulgaria (1), and others (Table 1). In comparison of continents considering numbers of titles in JCR in 2005, Europe has a better score than North America, and the number of titles in countries of the other continents is abysmally lower (Figure 2).

It is necessary to point out the fact that the data for some Czech titles in the field Journal Country/Territory are not correct in JCR and a real number is other than that retrieved. If CZECH REPUBLIC is searched in 2005 in JCR, the total number is 21. One of searched titles, ACTA VIROLOGICA, is not a Czech but Slovak one. Therefore, the number of Czech titles had to be corrected to 20, and the number of Slovak titles increased from 11 to 12 (Table 1). In the same field in 1998-1999, CZECHOSLOVAKIA was indicated for two Czech and one Slovak titles, and in the same years, even UNITED STATES was indicated for Czech journal COLLECTION OF CZECHOSLOVAK CHEMICAL COMMUNICATIONS. If a publisher finds such an error, it should ask for correction.

Table 1 Rank of countries by a number of titles in JCR in 2005

Rank	Country	Title number	Rank	Country	Title number	Rank	Country	Title number
1	United States	2339	24	Czech Republic	20	42-48	Venezuela	3
2	England	1267	25	Sweden	18	42-48	Yugoslavia	3
3	Netherlands	584	26-28	Brazil	17	49-53	Bangladesh	2
4	Germany	427	26-28	South Africa	17	49-53	Ethiopia	2
5	Japan	160	26-28	Taiwan	17	49-53	Lithuania	2
6	Switzerland	147	29	Hungary	15	49-53	Pakistan	2
7	France	146	30-31	Belgium	12	49-53	USA	2
8	Russia	107	30-31	Slovakia	12	54-68	Armenia	1
9	Canada	78	32-33	Finland	11	54-68	Bulgaria	1
10	China	75	32-33	Croatia	11	54-68	Costa Rica	1
11	Italy	63	34	Israel	10	54-68	Cuba	1
12	Denmark	61	35	Mexico	8	54-68	Egypt	1
13	Australia	60	36-38	Chile	7	54-68	Equador	1
14	Poland	53	36-38	Romania	7	54-68	Estonia	1
15	India	49	36-38	Ukraine	7	54-68	Jamaica	1
16	Norway	36	39	Wales	6	54-68	Kuwait	1
17	South Korea	34	40	Argentina	5	54-68	Latvia	1
18	Singapore	32	41	Greece	4	54-68	Malaysia	1
19	Spain	30	42-48	Iran	3	54-68	Philippines	1
20-21	Austria	23	42-48	Saudi Arabia	3	54-68	Thailand	1
20-21	Scotland	23	42-48	Slovenia	3	54-68	Uruguay	1
22	New Zealand	22	42-48	Turkey	3	54-68	Uzbekistan	1
23	Ireland	21	42-48	Un Arab Emirats	3		TOTAL	6087

Figure 2 Number of titles in JCR by continents, 2005



The number of Czech journals covered by JCR in 1998-2005 is rather stable, ranging around 20 items and their selection does not differ very much over the examined period. Since 2000, BIOLOGIA PLANTARUM has been published as a Dutch and not Czech journal, and ZIVOCISNA VYROBA has changed the title and has continuously been included in WOS under the title CZECH JOURNAL OF ANIMAL SCIENCE. Though the journal STUDIA GEOPHYSICA ET GEODAETICA is published in New York, it still remains a Czech journal.

In 2005, the journal LISTY CUKROVARNICKE A REPARSKÉ, which differed a lot from the other evaluated Czech journals, was deleted from the database. In 2003, PLANT SOIL ENVIRONMENT was included in the database as a new title of the journal ROSTLINNA VYROBA. After the two-year transient period 2003-2004, both titles were deleted even though the journal still meets the criteria for indexing in WOS (JCR). Also, the IF for the journal PRESLIA was indicated for the first time in 2005 (Table 2).

Tabulka 2									
Zastoupení českých přírodovědných časopisů v JCR v letech 1998 - 2005									
	název časopisu	1998	1999	2000	2001	2002	2003	2004	2005
1	BIOL PLANTARUM	*	*	*	*	*	*	*	*
2	ZIVOCISNA VYROBA	**	**						
3	ROSTL VYR	*	*	*	*	*	**	**	
4	PLANT SOIL ENVIRON						**	**	
5	LISTY CUKROV	*	*	*	*	*	*	*	
6	ACTA VET BRNO	*	*	*	*	*	*	*	*
7	CERAM-SILIKATY	*	*	*	*	*	*	*	*
8	CESK SLOV NEUROL N	*	*	*	*	*	*	*	*
9	CHEM LISTY	*	*	*	*	*	*	*	*
	COLLECT CZECH CHEM C	*	*	*	*	*	*	*	*
	CZECH J ANIM SCI	**	**	*	*	*	*	*	*
	CZECH J PHYS	*	*	*	*	*	*	*	*
	CZECH MATH J	*	*	*	*	*	*	*	*
	EUR J ENTOMOL	*	*	*	*	*	*	*	*
	FOLIA BIOL-PRAGUE	*	*	*	*	*	*	*	*
	FOLIA GEOBOT	*	*	*	*	*	*	*	*
	FOLIA MICROBIOL	*	*	*	*	*	*	*	*
	FOLIA PARASIT	*	*	*	*	*	*	*	*
	FOLIA ZOOL	*	*	*	*	*	*	*	*
	KYBERNETIKA	*	*	*	*	*	*	*	*
1	PHOTOSYNTHETICA	*	*	*	*	*	*	*	*
	PHYSIOL RES	*	*	*	*	*	*	*	*
	VET MED-CZECH	*	*	*	*	*	*	*	*
4	STUD GEOPHYS GEOD			*	*	*	*	*	*
	PRESLIA								*
	Počet časopisů celkem	20	20	21	21	21	21	21	20
	Počet titulů celkem	21	21	21	21	21	22	22	20

In the field of natural sciences, the database WOS (JCR) is classified into 170 subject categories. Our journals match 20 of them whereas three categories contain more than one journal and three journals match more than one category (Table 3).

Table 3 Classification of Czech journals into WOS (JCR) subject categories, 2005 (titles matching more categories are in colours)

Subject category in WOS (JCR)	Journal title
Agriculture, Dairy & Animal Science	CZECH JOURNAL OF ANIMAL SCIENCE
Biochemical and Applied Microbiology	FOLIA MICROBIOLOGICA
Biology	FOLIA BIOLOGICA
Cell Biology	FOLIA BIOLOGICA
Computer Science, Cybernetics	KYBERNETIKA
Chemistry, Multidisciplinary	CHEMICKE LISTY COLLECTION OF CZECHOSLOVAK CHEMICAL COMMUNICATIONS
Entomology	EUROPEAN JOURNAL OF ENTOMOLOGY
Geochemistry and Geophysics	STUDIA GEOPHYSICA ET GEODAETICA
Immunology	FOLIA BIOLOGICA
Mathematics	CZECHOSLOVAK MATHEMATICAL JOURNAL
Materials Science, Ceramics	CERAMICS-SILIKATY
Microbiology	FOLIA MICROBIOLOGICA
Neurosciences	CESKA A SLOVENSKA NEUROLOGIE A NEUROCHIRURGIE
Parasitology	FOLIA PARASITOLOGICA
Physics, Multidisciplinary	CZECHOSLOVAK JOURNAL OF PHYSICS
Physiology	PHYSIOLOGICAL RESEARCH
Plant Sciences	FOLIA GEOBOTANICA PHOTOSYNTHETICA PRESLIA
Surgery	CESKA A SLOVENSKA NEUROLOGIE A NEUROCHIRURGIE
Veterinary Sciences	ACTA VETERINARIA BRNO VETERINARNI MEDICINA
Zoology	FOLIA ZOOLOGICA

Comparing the IF of individual Czech journals with the IF median of the corresponding categories revealed that in 2005 the IF of five Czech journals was higher than the IF median of corresponding categories. These are CERAMICS-SILIKATY (0.463 > 0.425), COLLECTION OF CZECHOSLOVAK CHEMICAL COMMUNICATIONS (0.941 > 0.921), EUROPEAN JOURNAL OF ENTOMOLOGY (0.745 > 0.705), PRESLIA (1.545 > 1.046), and VETERINARNI MEDICINA (0.621 > 0.530) (Table 4). The comparison of the trend of the IF of four from these journals with the development of the category median showed that the result in 2005 was not random and that there is a long-term trend in all of them (Figures 3 - 6). The journal PRESLIA could not be compared since it was included in the database as lately as 2005.

Table 4 Comparison of the journal IF and category IF median, 2005

Journal title	Journal IF	Category IF median	Category in WOS (JCR)
ACTA VETERINARIA BRNO	0.353	< 0.530	Veterinary Science
CERAMICS-SILIKATY	0.463	> 0.425	Materials Science, Ceramics
CESKA A SLOVENSKA NEUROLOGIE A NEUROCHIRURGIE	0.070	< 2.362	Neurosciences
		< 1.017	Surgery
COLLECTION OF CZECHOSLOVAK CHEMICAL COMMUNICATIONS	0.949	> 0.921	Chemistry, Multidisciplinary
CZECH JOURNAL OF ANIMAL SCIENCE	0.254	< 0.788	Agriculture, Dairy & Animal Science
CZECHOSLOVAK JOURNAL OF PHYSICS	0.360	< 1.051	Physics, Multidisciplinary
CZECHOSLOVAK MATHEMATICAL JOURNAL	0.112	< 0.465	Mathematics
EUROPEAN JOURNAL OF ENTOMOLOGY	0.745	> 0.705	Entomology
FOLIA BIOLOGICA	0.719	< 1.179	Biology
		< 2.301	Immunology
		< 2.383	Cell Biology
FOLIA GEOBOTANICA	1.033	< 1.046	Plant Sciences
FOLIA MICROBIOLOGICA	0.918	< 1.634	Biochemical and Applied Microbiology
	0.918	< 2.197	Microbiology
FOLIA PARASITOLOGICA	1.138	< 1.293	Parasitology
FOLIA ZOOLOGICA	0.585	< 0.844	Zoology
CHEMICKE LISTY	0.445	< 0.921	Chemistry, Multidisciplinary
KYBERNETIKA	0.343	< 0.647	Computer Science, Cybernetics
PHOTOSYNTETICA	0.810	< 1.046	Plant Sciences
PHYSIOLOGICAL RESEARCH	1.806	< 2.145	Physiology
PRESLIA	1.545	> 1.046	Plant Sciences
STUDIA GEOPHYSICA ET GEODAETICA	0.656	< 1.030	Geochemistry and Geophysics
VETERINARNI MEDICINA	0.621	< 0.530	Veterinary Science

Figure 3 The IF of the journal CERAM-SILIKATY in comparison with the IF median of the category *Materials Science, Ceramics* in 1998 - 2005

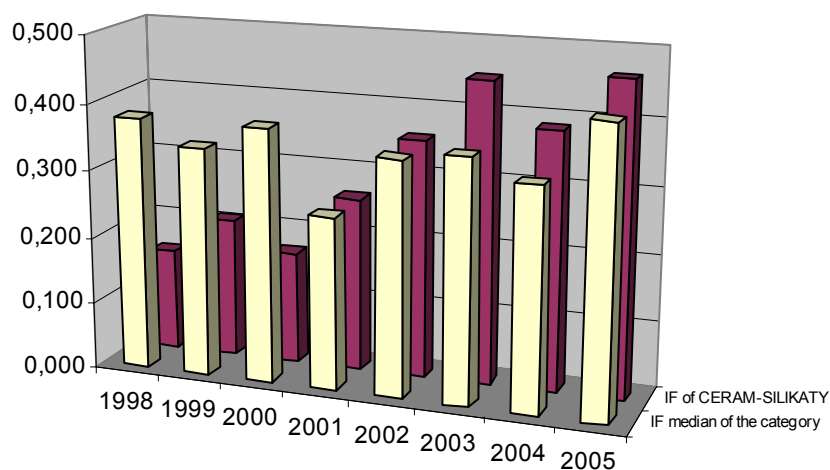


Figure 4 The IF of the journal EUR. JOURNAL OF ENTOMOLOLGY in comparison with the IF median of the category *Entomology* in 1998 - 2005

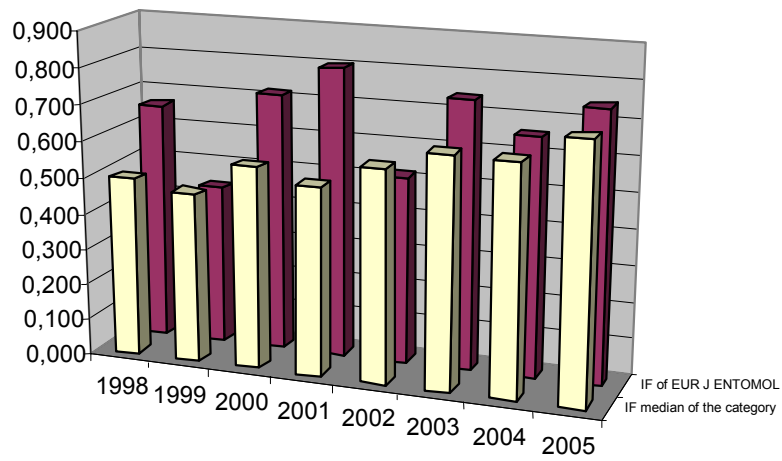


Figure 5 The IF of the journal VETERINARNI MEDICINA in comparison with the IF median of the category *Veterinary Sciences* in 1998 - 2005

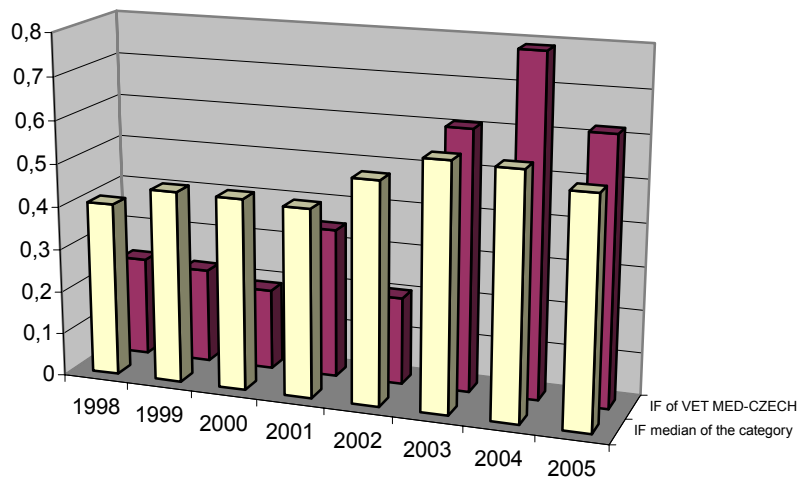
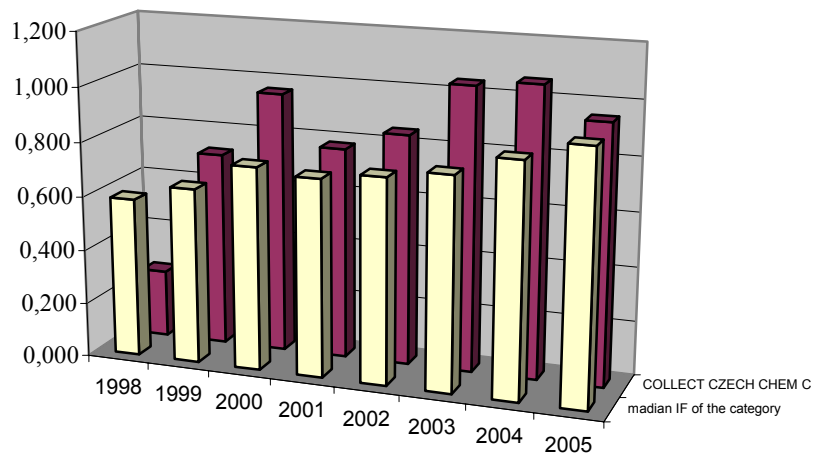


Figure 6 The IF of the journal COLLECT CZECH CHEM C in comparison with the IF median of the category *Chemistry, Multidisciplinary* in 1998 - 2005



Discussion and Conclusion

WOS and JCR are now crucial databases that are used to evaluate journal titles, individual scientists and research institutions. The Research and Development Council of the Ministry of Education, Youth and Sports has included both journal IF and category IF median in formulas for evaluating research outcomes (Anonymous 2006). However, there is some criticism concerning the use of citation analysis for evaluating scientific work, and particularly overestimating its significance (Špála 2006).

It cannot be stated that WOS (JCR) covers all good Czech reviewed journals. There are a number of quality Czech reviewed journals that play an essential role of “a spring board” for young scientists and besides, meet criteria for including in WOS. A level of Czech science cannot be judged based on results of this analysis either because a majority of Czech scientific community publish above all in foreign journals. The presented results can be interesting for journal publishers, members of editorial boards and librarians of specialized libraries, and their users who are also originators of new findings and thus existing or potential authors of new scientific articles.

Now, WOS is not the only database that enables to evaluate scientific work. Since 2002, the publishing house Elsevier began to build a bibliographic database SCOPUS that was launched in 2004. It covers 15,000 journals and besides, proceedings of conferences, business information and multi-piece book publications. SCOPUS also contains citations that can be evaluated in relation to authors. It provides h-index too, however, it does not have any parameter similar to the IF in JCR that would characterize the quality of journals. The criteria for enlisting journals in the database SCOPUS are not as strict as compared to those of WOS, which is confirmed, among others, by 103 Czech journals in SCOPUS (a number on 10 April 2007). It is apparent that this database covers a number of titles that have not been enlisted in WOS (JCR) for many years, and other journals are sure to follow. Since it is a new system, it is not possible to fully compare both systems for the present.

It is sure that the strict rules of Thomson Scientific for including journals in WOS contribute to enhancing the quality of scientific publications. Therefore, the quality of research and scientific work will be further evaluated using particularly the database WOS (JCR). All users are now looking forward to a new version that will be launched in June this year.

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