

Veterinary Research Institute, Brno, Czech Republic: Analysis of papers published from 1990 to 2005

K. HRUSKA

Veterinary Research Institute, Brno, Czech Republic

ABSTRACT: The Web of Science database searched results for papers published from the Veterinary Research Institute, Brno, Czech Republic, were analysed. The Veterinary Research Institute has increased publication activity in 2001–2005; more than 4 times in comparison with the period 1990–2004. The impact factor of journals has increased 5.5 times. The collaboration with 31 foreign countries and 175 institutions resulted in the publication of 277 papers in 93 journals during the past five years. Positioning of the Veterinary Research Institute is now among the worldwide leading teams is evident in twelve research profiles. The Web of Science is an efficient tool for record analysis and researcher's and institution's publication activities.

Keywords: research evaluation; Web of Science; publications

The Veterinary Research institute, Brno, Czech Republic, was established in 1956 and has operated in two distinctly different periods. Being generously supported by the government from the beginning, the Veterinary Research Institute had produced important results widely applied to veterinary practice and agriculture. However, until 1989 Czech research and university facilities had suffered for more than thirty years from a lack of international collaboration and personal contact with colleagues from other countries. Research was negatively influenced by the limited access to the publications in international journals and books, and the limited availability of instruments, laboratory glassware, disposables, fine chemicals and technology. Staff members were not encouraged to improve their knowledge of foreign languages, namely English. Publishing in the international peer reviewed journals and participation in meetings, conferences and congresses abroad was not supported and for some individuals it was even forbidden. Visits of scientists from unrestricted countries were rare. Only a few people were privileged to have longer stays and training in the better foreign laboratories. Current Contents – Agriculture, Biology and Environmental Sciences and Current Contents

– Life Sciences (ISI Philadelphia, USA) presented mostly full bibliographical data and addresses of the institutions, and were the main source of information for the research and science in the world. However, full papers had to be requested as reprints by mail and the efficiency of feedback was no higher than 60 per cent. The international collaboration of libraries was also limited, and the time required for receipt of a paper copy requested exceeded several months. The political changes in November 1989, with transition to the market economy and abolition of the totalitarian regime had a substantial impact on further development. Opening the borders for people movement and trade, free access to all information, free access to the PubMed database (since 1996) as a result of a generous decision by the US government. Subscription to the Web of Science database, as well as enormous financial support from the Czech government since 1999, brought great changes to every researcher. The chemicals and instruments were made available, researchers are now able to participate in international meetings, and foreign colleagues frequently visit the institute for substantial periods of time. Significant upgrading and training also took place. Calls for research proposals were open for the new European

Supported by the Ministry of Agriculture of the Czech Republic (Project No. MZE 0002716201).

Union member states and the successful research teams participate in the international research collaboration.

From 1997, the link of the Veterinary Research Institute with FAO and FAO/IAEA initiated several workshops, which were very important for further development. The networks and cooperation with the FAO sub-regional office for Central and Eastern Europe, as well as contacts with the FAO David Lubin Central Agricultural Library were strengthened. Speakers like Dr Barry McSweeney, the future Director General of the European Commission's Joint Research Centre and at present, the Chief Science Advisor to the Irish government, taught us how to prepare research project proposals. The Veterinary Research Institute was the subject of an international audit. The Institute began to host, finance and collaborate with the coordinator of the Veterinary Biotechnology, Epidemiology and Food Safety network (CENTAUR), continuing and broadening the FAO-initiated activities. It has contributed to the dissemination of scientific information on a global scale. The Veterinary Research Institute has been honoured a by nomination from the World Animal Health Organisation (OIE) Reference Laboratory for Paratuberculosis. Participation in a number of research projects of the 5th and 6th Frame Programme of the European Union, and in a number of bilateral international research projects, confirmed the competence of the Veterinary Research Institute in many fields of research.

Although the papers published and cited offer important and real data, these criteria are not the only ones available. The number of projects supported by independent foundations, total budget available, number of patents and licences, membership in the advisory and editorial boards and committees, the number of invited speakers to important international meetings, most valuable textbooks and monographs published by important editors, number and quality of graduate students and other criteria are also important (Hruska, 2000). Nevertheless the Web of Science database offers an important look at all researchers as well as all institutions. The search result analysis was already used in previous papers (Hruska, 2004; Franek and Hruska, 2005). Recently published papers confirm the significance of analyses of publications (Torricella-Morales et al., 2000; Gu, 2004; Benito et al., 2005; Cardinal and Thomas, 2005; de Araujo et al., 2005; Musi-Lechuga et al., 2005; Reid and Chen, 2005; Franks et al., 2006).

METHODS USED IN ANALYSIS

Publications from 1990 to 2005

ISI Thomson Web of Science[®] database was used for the search for papers published by the staff members of the Veterinary Research Institute, Brno, using the address (VET RES INST) AND BRNO and time span 1990–2005. Data on the number of publications, number of citations of the most frequently cited paper, and number of citations of top ten most frequently cited papers were recovered. The numbers of papers published from 1990 to 1994, and from 2001 to 2005 were also compared.

Publications from 2001 to 2005

The search for records indexed in the period from 2001 to 2005, were analysed by the countries of collaborating author's affiliation, number of institutions participating, number of journals, number of publications by the most productive author and the total number of publications by the top ten most productive authors.

Position of the Veterinary Research Institute in some research fields

The search results from profiles, representing some of the research activities of the Veterinary Research Institute, were analysed in the period from 2001 to 2005 by the number of records indexed and the number of institutions and authors contributing to the search result.

All search results were analysed by means of the Web of Science[®] software. The impact factor of the journals was determined by the Journal Citation Reports[®] Science Edition 2004 (Web of Knowledge[®], ISI Thomson, Philadelphia, USA).

RESULTS AND DISCUSSION

A list of publications from the Veterinary Research Institute, with abstracts and links to the full text if it is published on the internet, is updated weekly and is available at the web site <http://www.vri.cz> (under Publications). Only articles published in the peer reviewed journals and indexed in the

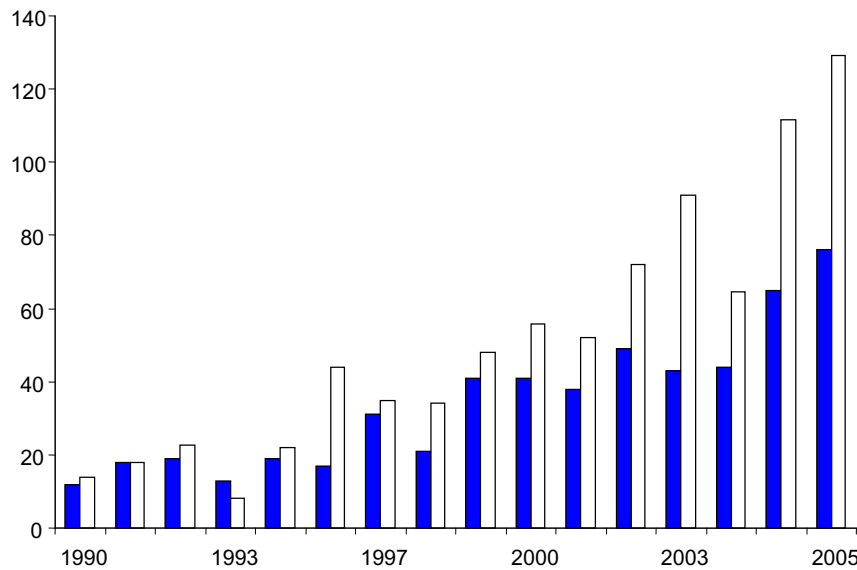


Figure 1. Number of publications (blue/black) and total impact factor (white) of the Veterinary Research Institute, Brno

Web of Science® database are listed. The Veterinary Research Institute staff members are able to use a personal link from their curriculum vitae or another document, to offer their updated lists of publications. The number of papers published, and the sum of impact factors are summarised in Figure 1.

Publications from 1990 to 2005

Authors from the Veterinary Research Institute published in total 520 papers from 1990 to 2005. During the two periods of five years analysed (1990–1994 and 2001–2005), 65 and 277 papers were published, respectively. These numbers represent a 4.3 fold increase. An even higher increase was evident in the impact factor of journals publishing the papers from the Veterinary Research Institute. In the period 1990–1994, the sum of impact factors was 84.381, whilst in 2001–2005 the value reached 468.139, indicating an increase of 5.5 fold. The paper by Rubes et al. (1998) was the one most frequently cited (80 times), and the total citations value of the top 10 papers was 578 (Table 1).

Publications from 2001 to 2005

From 2001 to 2005 the total number of published papers was 277. These papers were published in 93 different journals in collaboration with 564 col-

Table 1. The ten most frequently cited papers (31 December 2005)

Times cited	
80	Rubes et al., 1998
75	Franek et al., 1994
62	Greig et al., 1999
58	Pavlik et al., 1999
54	Rodak et al., 1990
53	Pavlik et al., 1995
50	Smid et al., 1989
50	Docekalova et al., 1991
49	Van Soolingen et al., 1998
47	Sram et al., 1996
578	

leagues from 31 countries and 175 institutions. The ten most productive authors published altogether 167 papers, and the most productive author participated in the publication of 54 papers. Eighteen papers were published with co-authors from Germany, 16 from the USA, 11 from Hungary, 10 from Slovakia, and 9 from England. With colleagues from the Academy of Sciences of the Czech Republic, Masaryk University Brno, University of Veterinary and Pharmaceutical Sciences, Charles University Prague, Mendel University Agricultural and Forestry Brno, 38, 25, 23, 12 and 11 papers, respectively, were published. The international collaboration and co-operation of the Veterinary Research Institute with different Czech universities is clearly evident from these results.

Table 2. Position of the Veterinary Research Institute in selected research profiles (2001–2005)

SEARCH PROFILE					
Records	Institutions	The best institutions	The best author from Vet Res Inst	Position	Number of authors
MYCOBACT* AND AVIUM					
1 820	1 638				
49	1	Harvard Univ			
41	2	Vet Res Inst	Pavlik	1	5 930
31	3	Univ Minnesota			
(PCB OR POLYCHLOR* OR DIOXIN) AND (BIOASS* OR IMMUNO* OR ELISA)					
704	760				
29	1	Michigan State Univ			
27	2	Univ Calif Davis			
23	3	US EPA			
13	9–12	Vet Res Inst	Franek, Machala	15–24	2 467
SALMONEL* AND COLONIZATION					
479	463				
46	1	USDA ARS			
28	2	Texas A&M Univ			
17	3	ARS			
5	21–31	Vet Res Inst	Rychlik	36–43	1 561
(CHROMOSOM* AND (SPERM* OR EMBRYO*) AND HYBRIDIZATION AND (PIR OR PORCINE OR CATTLE OR FISH))					
473	634				
32	1	Univ Autonoma Barcelona			
14	2	Univ Calgary			
12	3	St. Barnabas Hosp			
7	12–14	Vet Res Inst	Rubes	25–34	1 801
SPERM* AND ANEUPLOIDY					
339	423				
23	1	Univ Autonoma Barcelona			
19	2	Univ Calgary			
14	3	Alberta Childrens Prov Gen Hosp			
5	16–22	Vet Res Inst	Rubes	33–47	1 170
DIOXIN* AND BIOASSAY*					
137	185				
14	1	Michigan State Univ			
12	2	Univ Calif Davis			
10	6	Sci Inst Publ Hlth			
5	10–13	Vet Res Inst	Machala	9–17	489
(NITROFURAN* OR FURAZOLIDONE) AND (ASSAY OR ANALYSIS)					
127	185				
6	1	Univ Autonoma Barcelona			
5	2	Queens Univ Belfast			
4	3	Dept Agr & Rural Dev			
3	6–9	Vet Res Inst	Franek	8–14	459

Table 2 continued

SEARCH PROFILE					
Records	Institutions	The best institutions	The best author from Vet Res Inst	Position	Number of authors
(TRIAZINE OR SIMAZINE) AND (ELISA OR IMMUNOASSAY)					
90	113				
7	1	Lund Univ			
6	2	Tech Univ Munich			
5	3–4	Vet Res Inst, Univ Calif Davis	Franek	1–2	315
LYMPHOCYTE AND DOG					
81	142				
5	1–2	Univ Calif Davis, Univ Washington			
4	3–4	Fred Hutchinson Canc Res Ctr, Univ Bristol			
2	13–25	Vet Res Inst	Faldyna, Toman	7–39	379
(PCB OR POLYCHLORINATED BIPHENYL*) AND (ELISA OR IMMUNOASSAY)					
63	99				
6	1	Vet Res Inst			
5	2	US EPA			
4	3	Purdue Univ	Franek	1	228
MICRODISSECTION AND CHROMOSOM* AND PAINTING					
51	90				
4	1–4	Inst Human Genet & Anthropol			
4		Russian Acad Sci			
4		Univ Maastricht			
4		Univ Zurich			
2	7–20	Vet Res Inst	Rubes	15–42	226
(SPERM AND CHROMATIN) AND (BULL OR BOAR)					
47	57				
4	1	Swedish Univ Agr Sci			
3	2–3	Lithuanian Vet Acad, Natl Res Inst Anim Prod			
2	4–13	Vet Res Inst	Rubes, Rybar	7–30	141

Names of institutions as in the Web of Science results of analysis (Vet Res Inst used for the Veterinary Research Institute, Brno). The number of records, institutions and authors in highlighted rows indicate the parameters for the whole search result. The numbers (records and position) in non-highlighted rows are related to the institution or author in the same row

The position of the Veterinary Research Institute in some research fields is summarised in Table 2. The position of the Veterinary Research Institute is among 10 percent of the most productive institutions in twelve search profiles, indicate that the teams from the institute efficiently contribute to the global scientific knowledge on different issues. In 12 search profiles with more than 50 institutions involved, the Veterinary Research Institute reached a position of 1 to 10 a total of 8 times. Eight different authors from the Veterinary Research Institute were

among the 10 percent of the most productive authors, in all 12 profiles listed in Table 2. Three times an author from the Veterinary Research Institute was positioned first, among the 5 930, 315 and 228 authors publishing papers on *Mycobacterium avium*, atrazine or simazine immunoassays and polychlorinated biphenyl immunoassays, respectively.

Using the Web of Science database and the ISI Thomson utility for the records analysis was and is a very important tool for the assessment of scientific achievements, one of the most valuable results

of research. The analysis demonstrates the position of institutions and individuals in different fields of activity, which is a more descriptive indicator than only the number of publications. However, such analyses cannot be the determining approach to an evaluation, because a number of other important parameters, including good knowledge of other activities, as well as further indicators of success, should be investigated.

Acknowledgement

The critical reading by Prof. M. Toman and Prof. J. Rubes (Veterinary Research Institute, Brno), Prof. B. Nagy (Veterinary Medical Research Institute, Budapest), and Prof. K.J. Wojciechowski, Dublin, and their valuable comments are appreciated. The author gives thanks to Miss Eloise Kok (Veterinary Research Institute, Brno) and Christopher McKenzie (University of Aberdeen) for the language revision of the manuscript.

REFERENCES

- Benito J.G., Montesinos M.D.H., Ferre G.G., Torrente M.M. (2005): A bibliometric study of differential item functioning. *Scientometrics*, 64, 3–16.
- Cardinal B.J., Thomas J.R. (2005): The 75th Anniversary of Research Quarterly for Exercise and Sport: An analysis of status and contributions. *Research Quarterly for Exercise and Sport*, 76, 122–134.
- de Araujo K.M., Mourao P.A.S., Leta J. (2005): Balance between education – and research-oriented publications from a Brazilian University Hospital. *Brazilian Journal of Medical and Biological Research*, 38, 1285–1291.
- Docekalova H., Docekal B., Komarek J., Novotny I. (1991): Determination of selenium by electrothermal atomic-absorption spectrometry. 1. Chemical modifiers. *Journal of Analytical Atomic Spectrometry*, 6, 661–668.
- Franek M., Hruska K. (2005): Antibody based methods for environmental and food analysis: a review. *Veterinarni Medicina*, 50, 1–10.
- Franek M., Kolar V., Granatova M., Nevorankova Z. (1994): Monoclonal Elisa for 2,4-dichlorophenoxyacetic acid – characterization of antibodies and assay optimization. *Journal of Agricultural and Food Chemistry*, 42, 1369–1374.
- Franks A.L., Simoes E.J., Singh R., Gray B.S. (2006): Assessing prevention research impact – A bibliometric analysis. *American Journal of Preventive Medicine*, 30, 211–216.
- Greig A., Stevenson K., Henderson D., Perez V., Hughes V., Pavlik I., Hines M.E., McKendrick I., Sharp J.M. (1999): Epidemiological study of paratuberculosis in wild rabbits in Scotland. *Journal of Clinical Microbiology*, 37, 1746–1751.
- Gu Y.N. (2004): Global knowledge management research: A bibliometric analysis. *Scientometrics*, 61, 171–190.
- Hruska K. (2000): Personal evaluation during the grant application assessment and promotion process (in Czech). *Vesmir*, 79, 549.
- Hruska K. (2004): Research on paratuberculosis: Analysis of publications 1994–2004. *Veterinarni Medicina*, 49, 271–282.
- Musi-Lechuga B., Olivás-Avila J.A., Portillo-Reyes V., Villalobos-Galvis F. (2005): Scientific production of professors of Psychology at Spanish Universities in journals included in Web of Sciences database. *Psicothema*, 17, 539–548.
- Pavlik I., Bejckova L., Pavlas M., Rozsypalova Z., Koskova S. (1995): Characterization by restriction-endonuclease analysis and DNA hybridization using IS900 of bovine, ovine, caprine and human dependent strains of *Mycobacterium paratuberculosis* isolated in various localities. *Veterinary Microbiology*, 45, 311–318.
- Pavlik I., Horvathova A., Dvorska L., Bartl J., Svastova P., du Maine R., Rychlik I. (1999): Standardisation of restriction fragment length polymorphism analysis for *Mycobacterium avium* subspecies *paratuberculosis*. *Journal of Microbiological Methods*, 38, 155–167.
- Reid E., Chen H.C. (2005): Mapping the contemporary terrorism research domain: Researchers, publications, and institutions analysis. 322–339.
- Rodak L., Smid B., Valicek L., Vesely T., Stepanek J., Hampl J., Jurak E. (1990): Enzyme-linked-immunosorbent-assay of antibodies to rabbit hemorrhagic-disease virus and determination of its major structural proteins. *Journal of General Virology*, 71, 1075–1080.
- Rubes J., Lowe X., Moore D., Perreault S., Slott V., Evenson D., Selevan S.G., Wyrobek A.J. (1998): Smoking cigarettes is associated with increased sperm disomy in teenage men. *Fertility and Sterility*, 70, 715–723.
- Smid B., Valicek L., Stepanek J., Jurak E., Rodak L. (1989): Experimental transmission and electron-microscopic demonstration of the virus of hemorrhagic-disease of rabbits in Czechoslovakia. *Journal of Veterinary Medicine Series B-Zentralblatt fur Veterinarmedizin Reihe B-Infectious Diseases and Veterinary Public Health*, 36, 237–240.
- Sram R.J., Benes I., Binkova B., Dejmek J., Horstman D., Kotesovec F., Otto D., Perreault S.D., Rubes J., Selevan

- S.G., Skalík I., Stevens R.K., Lewtas J. (1996): Teplice program – The impact of air pollution on human health. *Environmental Health Perspectives*, 104, 699–714.
- Toricella-Morales R.G., Van Hooydonk G., Raujo-Ruiz J.A. (2000): Citation analysis of Cuban research. Part 1. A case study: the Cuban Journal of Agricultural Science. *Scientometrics*, 47, 413–426.
- Van Soolingen D., Bauer J., Ritacco V., Leao S.C., Pavlik I., Vincent V., Rastogi N., Gori A., Bodmer T., Garzelli C., Garcia M.J. (1998): IS1245 restriction fragment length polymorphism typing of *Mycobacterium avium* isolates: Proposal for standardization. *Journal of Clinical Microbiology*, 36, 3051–3054.

Received: 2006–03–01

Accepted after corrections: 2006–04–18

Corresponding Author:

Prof. MVDr. Karel Hruska, CSc., Veterinary Research Institute, Hudcova 70, 621 32 Brno, Czech Republic
Tel. +420 533 332 014, fax +420 541 211 229, e-mail hruska@vri.cz
