

ANIMAL SCIENCE, PRODUCTION AND PROTECTION: BIBLIOMETRIC EVALUATION OF BIBLIOGRAPHIC DATA IN DOCUMENTS PUBLISHED IN SLOVENIA BETWEEN 1994–2000

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Received March 07, 2002, accepted July 19, 2002.

Delo je prispelo 07. marca 2002, sprejeto 19. julija 2002.

ABSTRACT

We evaluated bibliographic elements in 790 documents related to animal science, production and protection from among 2844 documents (D) published in Slovenia between 1994–2000 and indexed by the Slovenian Agris Centre for inclusion in Agris database. Yearly output differed due to intensive production of proceedings papers in certain years. About 69% of D were published in Slovenian language and 27% in English. Among 675 authors, 371 authors published only one D, and 7 published 20 or more D. More than 50 D were written by 5 to 10 co-authors, and 313 D by only one author. Slovenians accounted for the majority of authors, as expected. Croatia, Hungary and Germany accounted for the majority of foreign D. Among university-affiliated contributors, there was slight advantage of the Veterinary Faculty of the University of Ljubljana over the Biotechnical Faculty and its Zootechnical Department. Most D (735) were journal articles, 181 proceedings papers, and 126 were articles in journal supplements. The final selection of 790 records was strongly impacted by the existing Agris classification scheme. We included most D pertaining to various aspects of animal production, physiology, and health. We had to exclude food and feed-related D, however, because these categories do not differentiate between plant/crop-related and animal-related topics. The existing schemes, nevertheless, use the same criteria for different (sub)disciplines, e.g. animal and plant/ crop science, forestry, wood technology, food/ feed science, so they present a possibility for comparison of (sub)disciplines.

Key words: agriculture / animal science / data collection / data analysis / databases / diffusion of information / documentation / information processing / information science / publications / research evaluation

ZNANOST O ŽIVALIH, REJA IN ZAŠČITA ŽIVALI: BIBLIOMETRIČNO VREDNOTENJE BIBLIOGRAFSKIH PODATKOV V DOKUMENTIH, OBJAVLJENIH V SLOVENIJI V OBDOBJU 1994–2000

IZVLEČEK

Ovrednotili smo bibliografske elemente v 790 dokumentih v povezavi z znanostjo o živalih, rejo in zaščito med 2844 dokumenti (D), objavljenimi v Sloveniji v obdobju 1994–2000, in ki jih je za vnos v zbirko Agris indeksiral slovenski center. Letno število D močno niha zaradi velikega števila zbornikov s posvetovanj v posameznih letih. 69 % D je bilo tiskanih v slovenščini in 27 v angleščini. Med 675 avtorji jih je 7 objavilo 20 ali več D, 317 pa le enega. Več kot 50 D je imelo od 5 do 10 soavtorjev, 313 pa le enega. Največ avtorjev je bilo iz Slovenije, gre namreč za nacionalni vnos, med tujimi gosti pa iz Hrvaške, Madžarske in Nemčije. Med domačimi univerzitetnimi avtorstvi jih je bilo nekoliko več z Veterinarske kot z Biotehniške fakultete. Večina (735) D so bili članki v revijah, 181 je bilo prispevkov s posvetovanj, od katerih je bilo 126 tiskanih kot supplement revije. Izbor 790 D je močno pogojevala obstoječa klasifikacijska shema sistema Agris. V raziskavo smo vključili večino vidikov živalske proizvodnje, fiziologije

in zaščite, izpustili pa smo nekatere D s področja živilstva in prehrane, ker živilske oz. prehranske kategorije ne ločijo med žvili živalskega in rastlinskega izvora. Kljub temu zbirka nudi dobro možnost nadaljnega medsebojnega primerjanja nekaterih biotehniških (pod)področij, kot so agronomija, zootehnika, gozdarstvo, živilstvo, saj se vsi D obdelujejo po enakih kriterijih.

Ključne besede: kmetijstvo / zootehnika / znanost o živalih / zbiranje podatkov / analiza podatkov / podatkovne zbirke / razširjanje informacij / dokumentalistika / procesiranje informacij / znanstvena informatika / publikacije / vrednotenje raziskovanja

INTRODUCTION

In Slovenia, there are several major national journals that cover most aspects of agricultural sciences. In addition, every year several national and international scientific and professional meetings or symposia are organized, and papers are regularly published as proceedings. The aim of our investigation is to assess Slovenian national input with regard to publications or parts of publications that have been issued in Slovenia. We will identify documents that are related to different aspects of animal sciences, such as ecology, physiology, production and protection, and will then aggregate the data. We will measure the scatter of documents, or information, according to some standard bibliometric principles. We will assess the documents with reference to bibliographic elements, such as authors, source, language, publication type. We will also assess participation of foreign authors in Slovenian publications. In this way we aim to quantify animal-sciences-related publications to enable later comparison with other agricultural sub-disciplines.

Here we present an overview of recent scientific literature in the field of agricultural bibliometrics and selected similar areas, with emphasis on animal sciences and related disciplines. We focus mainly on research based on parameters such as countries or geographical area, and research based on a particular journal or research topic.

Hernandez-Gonzalez and Hernandez-Espinosa (1994) reviewed literature with regard to the characteristics of the rodents and lagomorphs in studies published in Mexico for 1980–1989. Agricultural journals in Malaysia between 1981–1990 were investigated by Nasir *et al.* (1994). Databases, such as Biological Abstracts, Agris, Current Advances in Biological Sciences, and Current Contents, were investigated by Thomas (1996) for 360 different Indian agricultural journals. Liu *et al.* (1997) investigated world-wide scientific contributions on yak science between 1950 to 1995, focusing on journal titles and languages. Anduckia *et al.* (2000) evaluated research projects in Colombia between 1983 and 1994, including agricultural sciences and marine sciences with regard to institutions, mean number of authors of articles, and origin of publication. Animal or fish microbiology, and other microbiology areas were investigated by Aksnes *et al.* (2000), who assessed performance of Norwegian scientists from the database ISI / National Science Indicators on Diskette NSIOD. Jacobs and Ingwersen (2000) studied publication patterns of South African scientists between 1981–1996. They surveyed animal and plant sciences, biochemistry and microbiology, and physics and chemistry. Shaheen (2001) took an approach based on religious affiliation of a country and investigated the use of Agris database by 10 Muslim countries with the aim of encouraging better documenting of indigenous agricultural literature. In Slovenia, the Zootechnical Issues of the Research Reports of the Biotechnical Faculty were bibliometrically compared for the periods of 1986–1987, and 1996–1997 by Grbec and Južnič (2001).

In our previous assessment of Slovenian scientific and professional publications we investigated Slovenian documents as covered by Agris database between 1975–1993, i.e. prior to the establishment of the Slovenian Agris service (Bartol 1994). We totaled the documents by type of document and identified all journal titles. We also investigated broad subject areas such as animal, plant and food sciences in all Slovenian agricultural documents published between

1993–1994 (Bartol, 1995). Recently we explored narrower (based on descriptors) and broader (based on Category Codes) research areas in the 1999 and 2000 volumes of the Zootechnical Issue of the Research Reports of the Biotechnical Faculty (Bartol 2001).

MATERIAL AND METHODS

International Agris database was used to identify all Slovenian national input. Information system for Agriculture AGRIS/WAICENT is constructed and maintained cooperatively by member countries of the FAO. Each national centre processes only those documents that had been issued in that particular country. Authors can be domestic researchers or foreign participants who choose to present their research in Slovenian publications. According to these principles, the Slovenian national centre cannot process those documents of Slovenian authors that were published in foreign publications; this is a task of a respective national centre in other countries. Slovenian Centre processes only those documents that have supplied an English language title and abstract.

We decided to analyze the period of 1994–2000, because Slovenia became an official participating country in Agris only in 1994. The Slovenian Agris participation was begun with the documents issued in 1993. The first full annual input dates back to 1994; subsequent years were covered rather completely. In our research, we included all documents regardless of document type. There were 2844 records of documents. We will use the terms records and documents more or less synonymously; record, however, denotes a document that has been bibliographically indexed by a database.

We used Agris Categorization Scheme (Category Codes) to identify all existing broader subject areas (e.g. animal science, plant science, forestry, and human nutrition). There are 17 major subject categories and 115 sub-categories. In Table 1, we present the occurrences of records classified with some of the principal categories.

Table 1. Occurrences (n) of records classified with selected Agris Categories between 1994–2000

Category	n	Category	n
Soil science	77	Forestry	606
Human nutrition	105	Plant science, production, protection	768
Processing of agricultural products	569	Animal science, production, protection	790

Note that the total number of the records classified by one of the broader categories is not the sum of all occurrences. This inconsistency is because, according to Agris indexing rules, up to three broad subject categories can be assigned to each particular document. From among the above records, therefore, we separated only animal science, production and protection records. In Table 2, we present all animal science sub-categories used to retrieve the 790 documents.

In further analysis, we investigated the following parameters:

- Year of publication (PY)
- Original language of text (LA)
- Authors of documents (AU)
- Author's affiliation (name of institution) (AD)
- Source (title of journal, conference, publisher) (SO)
- Type (journal article, conference paper, monograph chapter/contribution etc.) (PT)

Table 2. Animal science, production and protection sub-categories according to the Agris Categorization Scheme

L01	Animal-husbandry	L52	Animal-physiology-growth-and-development
L02	Animal-feeding	L53	Animal-physiology-reproduction
L10	Animal-genetics-and-breeding	L60	Animal-taxonomy-and-geography
L20	Animal-ecology	L70	Veterinary-science-and-hygiene
L40	Animal-structure	L72	Pests-of-animals
L50	Animal-physiology-and-biochemistry	L73	Animal-diseases
L51	Animal-physiology-nutrition	L74	Miscellaneous-animal-disorders

We present some possibilities of Source (journal/publisher) data in the original database:

Document 1

SO (source (bibliographic citation)): Veterinarske-novice (Slovenia). (2000). v. 26(11) p. 413-417.

Document 2

CA (corporate and conference author): Animal Science Days (6th International Symposium). Portoroz (Slovenia). 16-18 Sep 1998.

SO (source (bibliographic citation)): Zbornik-Biotehniške-fakultete-Univerze-v-Ljubljani (Slovenia). Supplement - Kmetijstvo. (1998). (suppl.30) p. 303-308.

Document 3

SO (source (bibliographic citation)): Ljubljana (Slovenia). Ljubljana Univ., Biotechnical Fac., Agronomy Dept., Agrarian Economics Inst. 1996. 186 p.

ST (series/title information): Studies on Agricultural Economics and Policy (Slovenia). no. 3.

Document 4

CA (corporate and conference author): 20th Food Technology Days ... 26-27 Oct 2000.

SO (source (bibliographic citation)): Antioxidants in Food Science and Technology. Proceedings ... Ljubljana (Slovenia). 2000.

ST (series/title information): Bitencevi zivilski dnevi (Slovenia). no. 20.

RESULTS

Among 2844 records spanning the period 1994–2000, there were 790 records (or documents) classified as pertaining to all aspects of animal sciences. Among these 790 records, the 315 were related to animal protection (animal health with regard to diseases, pests, and miscellaneous disorders). Some documents were indexed both with animal production and animal protection categories. The documents can be classified with up to three categories according to the Agris Categorization Scheme.

Year of publication (PY)

In Table 3, we present the number of records for each year of the analysis. The highest number of records (209) occurred in 1995. In certain years, many records could be attributed to meetings and symposia. In 1995, for example, two meetings accounted for as many as 83 (40%) of the 209 records.

Table 3. Animal science-related records between 1994–2000

PY	1994	1995	1996	1997	1998	1999	2000	Total
Records	92	209	79	110	111	85	104	790

Original language of text (LA)

Many documents written by Slovenian authors were published in an "international" language as the editors of some journals habitually encourage such a presentation. In Figure 1, we present distribution of records by languages. An overwhelming majority of non-Slovenian documents was published in English, as expected; 69% of all documents were published in Slovenian, and 27% in English.



Figure 1. Occurrence of language in animal sciences-related records between 1994–2000.

Authors of documents (AU)

We were interested in two different aspects of the authorship of documents. First, to determine the number of documents that each author contributed, and second to determine the number of authors per document. Altogether there were 675 individual authors. Because of multiple authorship we identified 1767 individual author occurrences (units) in 790 documents. The 790 documents were, on average, thus written by 2.2 authors. However, the scatter of data in this kind of analyses does not follow the patterns of mean values. It has long been known that a few highly productive authors contribute a large number of documents (Lotka, 1926). Our results are shown in Table 4, and also as a Bradford bibliograph (Fig. 2), based on research by Bradford (1934).

Table 4. Number of documents by single authors between 1994–2000

Doc. per author	No. of authors	Doc. per author	No. of authors	Doc. per author	No. of authors
27	1	15	2	7	12
26	2	14	2	6	19
22	1	13	1	5	14
21	1	12	2	4	36
20	2	11	3	3	54
19	2	10	5	2	125
18	1	9	7	1	371
16	2	8	10	Total	675

Of 675 different authors, 371 different authors (55%) contributed only one document between 1994–2000, 27 (9%) contributed 10 or more, and 7 authors (1%) contributed 20 or more.

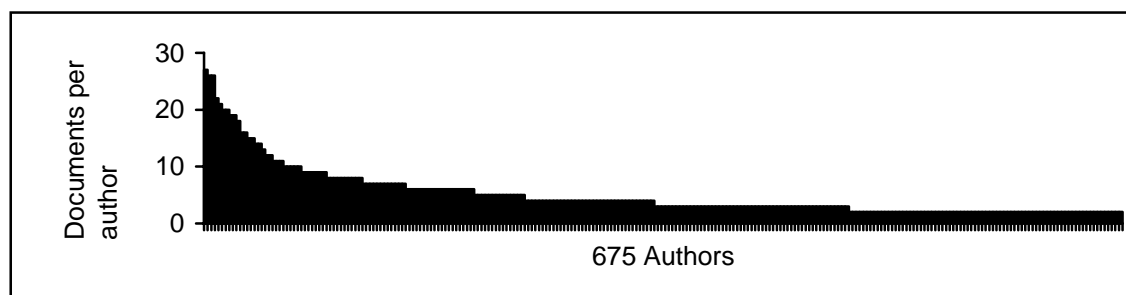


Figure 2. Number of documents by respective authors between 1994–2000

Among 790 documents, 313 were written by one author, and 52 documents by five or more co-authors (Table 5).

Table 5. Number of contributors who (co)authored the respective documents between 1994–2000

No. of co-authors	8	7	6	5	4	3	2	1
No. of documents	2	3	11	36	90	135	200	313

Address or affiliation of authors (AD)

Observing the data, we can approximately compare the instances of domestic/national and foreign participation (Table 6). Most authors came from Slovenia, followed by neighbouring countries Croatia and Hungary. Most foreign participants came from central Europe. Foreign participants published their papers largely as conference proceedings. The number of occurrences does not specify if one or more authors were associated with the country of origin. It indicates a presence of at least one author from a particular country.

Table 6. Occurrences (n) of author's country of affiliation between 1994–2000

Country	n	Country	n
Slovenia	847	Czech Republic	3
Croatia	51	Belgium	2
Hungary	50	Yugoslavia	2
Germany	20	Albania	1
Austria	13	Cuba	1
France	9	Germany	1
USA	7	Japan	1
Italy	4	Slovak Republic	1
United Kingdom	4	Spain	1
Bosnia and Herzegovina	3	The Netherlands	1

We also extracted a few other data from the Address field, such as the information on university-affiliated entries (Table 7). Non-Slovenian university institutions account for about 16% of all documents. In Slovenia, about 84% of all documents were produced by the authors

affiliated with the University of Ljubljana, where the Veterinary Faculty holds some advantage (307) over the Biotechnical Faculty (262), and its Zootechnical Department (210). There were also a few authors from some other faculties.

Table 7. Occurrences (n) of author's university affiliation between 1994–2000

Type of Institution	n
All university contributors	684
Slovenian university contributions	576
Faculties of the Ljubljana University	571
Veterinary Faculty	307
Biotechnical Faculty	262
Zootechnical Dept. of the Biotechnical Faculty	210

Source (SO) and type of document or publication (PT)

We also examined the documents by the type of document or publication (PT). Agris differentiates between so-called "conventional" (journals and books) and "non-conventional" publications. It also makes a distinction on the level of presentation, such as journals or conference. A congress paper, for example, might be not only conference type (K), but also journal type (J), if the paper was printed in a journal with an ISSN number.

Among the 790 documents, 735 were published as journal articles in serials (Table 8). Among the 735 journal articles, 126 were presented as papers at a symposium or a congress, and printed as a separate journal supplement, and 55 documents were published in a non-conventional book of proceedings.

Table 8 Occurrences (n) of documents by document type and a few selected publications that accounted for the highest number of records between 1994–2000

Document Type and Title	n
Serials	735
Zbornik-Biotehniške-fakultete-Univerze-v-Ljubljani (Zootehnika)	212
Veterinarske-novice	177
Sodobno-kmetijstvo	125
Zbornik-Veterinarske-fakultete	115
Others	106
Conference proceedings issued as a serial supplement	126
Zbornik-Biotehniške-fakultete-Univerze-v-Ljubljani (Zootehnika)	126
Conference proceedings (book of papers)	55
Conference on Nutrition of Domestic Animals "Zadavec-Erjavec days". 2000	16
Conference on Nutrition of Domestic Animals "Zadavec-Erjavec days". 1999	12
Conference on Nutrition of Domestic Animals "Zadavec-Erjavec days". 1998	9
Others	18

The occurrences in Table 8 cannot be summed because one document can acquire more than one document type. The above "Conference proceedings issued as a serial supplement" were all counted also as Serials.

DISCUSSION AND CONCLUSIONS

With regard to the method of selection of the subject- or (sub)discipline-oriented records, this kind of analysis invariably employs some narrower or broader classification systems, which means that the systems will significantly impact results. Agris, for example, assigns up to three broad categories to a document, whereas CAB does not have such a strict limitation, and will attribute a higher number of categories than Agris. Thus more documents may fall into a certain subject-oriented category using CAB than Agris, because the criteria are not so strict.

Another, maybe even more important, problem is presented in the Classification Scheme itself. Initially we analyzed several possibilities with regard to including as many animal-science-related sub-categories as possible. Considering our previous intensive experiences with Agris we knew that some animal aspects may also be placed into different categories. In some categories there exists, unfortunately, no qualified way of separating plant- from animal-related groups. For example, "Q" categories ranging from Q01 to Q05 are assigned to documents that pertain to food sciences. A document dealing with chemical analysis of meat, therefore, will acquire a Q04 (Food Composition) category. The same category, however, will be assigned also to a document that deals with chemical analysis bread, for example. Fortunately, there exists in the Categorization Scheme sub-category L50 (Animal Physiology and Biochemistry), which implies the analysis of animal body.

There exist also the Q51–Q54 sub-categories, which deal with potential animal feed, and are assigned to documents, such as "Impact of different soil tillage systems on nutrient content of maize". These categories were also excluded from our analysis, because the primary aspect of such documents more strongly relates to crop science than to animal sciences. Subsequently, we also excluded the M category (Fisheries and Aquaculture), which deals also with aquatic ecology. This category embraces documents with titles such as "Dam on the River ... macroinvertebrate communities ... river water quality", which bear only weak relation to animal sciences.

Finally, there is the major category of L (ANIMAL-SCIENCE-PRODUCTION-AND-PROTECTION), and the respective sub-categories, which included most animal-related aspects. In addition to animal husbandry, we included all "pure" animal sub-categories, e.g. animal physiology, behaviour, and health. We thus embraced most zoology or veterinary documents that are covered as input by the Slovenian National Agris Centre. With regard to biology and veterinary sciences, however, the Centre includes only journal articles in the respective national periodicals.

Furthermore, we included only documents issued in Slovenia. This is the policy of the international Agris centre, which encourages inclusion of all documents printed in that particular country, regardless of author. Some national bibliographies, such as COBISS/COBIB in Slovenia, may disregard foreign contributors. While analyzing year of the publication, we observed a significant difference in occurrences. This is usually due to some important international meeting that, in some years, might yield dozens of papers in printed proceedings. About 69% of documents were published in Slovenian language, and almost 90% of foreign-language documents were published in English, as expected. There were about 3% (24) of documents published in German and only one in Croatian.

Among some 675 authors, 371 contributed an only document between 1994–2000. There were a few "prolific" authors, however, who contributed more than twenty documents in this

period. The number of single contributors in our analysis was usual, according to a classical research by Lotka. In our case, this was due also to many foreign guest contributors who could not be expected to publish more frequently in Slovenian publications. The information on prolificacy of some authors may also be the subject of some discussion. More than 50 documents had between 5 and 8 co-authors. It is sometimes a policy of some research divisions to include most of their staff as authors. The number of documents per author, therefore, obviously cannot serve as a criterion and must be "corrected" with information on the number of co-authors, which is usually carried out in author-evaluation procedures. This, however, was not an aim of our research.

The Agris data are supplied with address of each author or co-authors of a document, but the data are not entered in a uniform way for each participating author. The address will be given only once, accompanied also with the information on the country of the institution. If the authors come from different institutions and from different countries all respective different addresses are given. Also, an institution or Address field/unit can comprise as many as three different sub-sections (e.g. University, Faculty, Department, etc.) what further complicates consistency of analysis. Such a presentation is still informative for an end-user who is interested in general data. For scientometric purposes, however, this offers only some limited possibilities for an analysis, so we do not advise the application of this method for countries with intensive participation of many authors from many different institutions. These data can serve only as an approximate level of internationality in a certain sub-discipline. Also, the high number of foreign participants in certain period may frequently be caused by a single book of proceedings with a diverse international participation.

Although there may exist certain limitations or even flaws in the existing bibliographic database schemes, bibliometric or scientometric researchers are not offered many other possibilities. Agris, however, applies the same bibliographic and classification procedure to all agricultural areas, including crop or plant sciences, food and nutrition, and forestry, so different sub-disciplines may still be compared with a sufficient level of accuracy and consistency.

POVZETEK

V raziskavi smo bibliometrično ovrednotili najpomembnejše bibliografske elemente v dokumentih s področja znanosti o živalih, reje in zaščite živali, ki so bili objavljeni v publikacijah, tiskanih v Sloveniji v obdobju 1994–2000. Kot material smo uporabili zapise v elektronski podatkovni zbirki Agris, kjer se od l. 1993 dalje sistematično zbirajo tudi slovenski dokumenti, ki jih po načelu izdaje dokumenta v Sloveniji za predstavitev v zbirki Agris obdeluje slovenski center. Med 2844 zapisi iz Slovenije v obdobju 1994–2000 smo za nadaljnjo analizo identificiral 790 takih, ki so bili klasificirani z različnimi (pod)kategorijami iz skupine L (Animal-Science-Production-and-Protection). Pri teh zapisih smo analizirali različne bibliografske parametre. Število letnih objav na tem vsebinskem področju močno niha, kar je moč pripisati predvsem načinu objavljanja prispevkov. En sam zbornik s posvetovanja lahko namreč prinese več deset različnih prispevkov z nekega (pod)področja. Med jeziki po pričakovanjih, saj gre za domače objave, z 69 % prevladuje slovenščina, ki ji sledi angleščina s 27 %. Med 675 različnimi avtorji jih je 7 sodelovalo pri 20 ali več dokumentih, kar 371 pa je bilo takih, ki so objavili le po en prispevek, kar je razumljivo, saj je šlo tudi za precejšnje število tujih gostov na posvetovanjih in so pri nas sodelovali le enkrat. Analiza soavtorstva je pokazala, da je imelo več kot 50 dokumentov od pet do deset soavtorjev, 313 dokumentov pa je imelo le enega soavtorja. Avtorjev je bilo daleč največ iz Slovenije, med tujimi gosti pa jih je bilo največ iz Hrvaške, Madžarske in Nemčije. Med domačimi univerzitetnimi avtorji sicer nekoliko prevladuje Veterinarska fakulteta pred Biotehniško, vendar so zaradi narave vnosa podatkov o

avtorskem naslovu v zbirko Agris ti podatki nekoliko nezanesljivi. Frekvenca pojavnosti ustanove se tako nagiba v korist dokumentov z enim samim avtorjem ali s soavtorji iz različnih ustanov, saj se pri soavtorjih iz iste ustanove v polju "Address" ustanova zapiše le enkrat. Po tipu dokumenta je bilo med vsemi 790 dokumenti daleč največje število (735) člankov iz revij. 181 je bilo prispevkov s posvetovanj. Število 790 ni vsota, ker se lahko dokumenti po tipu publikacije hkrati razvrstijo v več skupin. 126 je bilo npr. prispevkov s posvetovanj, ki so bili objavljeni tudi v suplementih revij.

Končno število 790 zapisov so močno pogojevala načela klasificiranja, ki jih že na ravni samega vnosa predvideva sistem predmetnih makro-kategorij v zbirki Agris. Iz analize smo tako nekatere kategorije morali izpustiti, npr. tiste s področja živilstva in prehrane. Gre predvsem za (pod)kategorije kemične analize živil, ki ne ločijo med živili živalskega in rastlinskega izvora, zato je tu v skladu z obstoječimi klasifikacijskimi shemami ni mogoče sistematično določiti raziskovalnega objekta v povezavi z živalmi. Sicer pa klasifikacijska shema k sreči predvideva tudi podkategorijo "živalska fiziologija in biokemija", ki se nanaša na kemično sestavo živalskega telesa v fiziološkem smislu, tako da smo vsaj delno lahko zajeli tudi tovrstni vidik. Izpustili smo tudi dokumente, ki bi se posledično sicer lahko nanašali na prehrano domačih živali, in s tem na naš raziskovalni objekt, a s primarnega vidika obravnavajo predvsem fiziologijo in kemično sestavo (krmnih) rastlin, zato bolj sodijo na področje rastlinske proizvodnje. Obstoječe bibliografske in klasifikacijske sheme torej vsebujejo nekatere posebnosti, ki jih pogojuje sama struktura podatkovne zbirke in se jim ob analizi zbirke ne da izogniti na sistematičen način. Kljub temu pa zbirka Agris predvideva podobno obdelavo vseh kmetijskih oz. biotehniških podpodročij, tudi rastlinsko proizvodnjo, prehrano, gozdarstvo ipd. Pri tem se dosega zadostna raven konsistence, zato rezultati naše raziskave ponujajo možnost nadaljnega primerjanja področja znanosti o živalih z drugimi biotehniškimi (pod)področji.

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