Thirteen years of Indian Journal of Animal Research: A Scientometric view

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Abstract

The study involves scientometric analysis of journal- Indian Journal of Animal Research (IJAR). Data was sourced from Scopus (Elsevier) for the study. Total 1890 records were retrieved and analysed from coverage years 2008 to 2020. The study reveals various comprehensive bibliometric aspects like annual research growth (research yield), document types, renowned authors and their contributions, most cited documents, contributing affiliations and countries.

Keywords: Scientometrics, Science Mapping, Indian Journal of Animal Research (IJAR), Research Growth and Trends, Research Metrics, Bibliometrics, Scopus, etc.

Introduction: Indian Journal of Animal Research (IJAR) which is published by Agriculture Research and Communication Centre. The main objective of this centre is to disseminate the latest research knowledge in the field of Agriculture, Animal, Dairy and Food Science by publishing various journals. Since 2008, Scopus database is regularly covering the Indian Journal of Animal Research (IJAR). Thirteen years of continuous and successful journey motivated researchers to appreciate its contribution through this comprehensive bibliometric study.

Literature Review: Number of bibliometric as well as scientometric studies have already done by various scientists and researchers in different subjects for past years. Some of the seminal researches done by the researchers are:

Kraus (2004)[4] researched the citation patterns of advanced undergraduate biology students and later Kraus compared the differences between citation usage of undergraduates and faculty in the biology department. Graduate students are heavy users of library resources, and theses and dissertations are often readily available. This makes them a well-known user group for citation analysis.

Patra and Mishra (2006)[6] tried for systematic analysis of the rise in bioinformatics literature through Scientometrics. Bioinformatics is a multidisciplinary and comparatively new area of science that has made a significant impact within a short period. This study analyses the growth of the scientific literature in this area as available from NCBI PubMed using standard bibliometric techniques. Bradford's law of scattering was used to identify core journals and Lotka's law employed to analyse author's productivity pattern. Twenty core journals were identified and found that the primary mode of dissemination of information was through journal articles. Authors with single publication were more predominant (73.58%) contrary to that

predicted by Lotka's law. The study provides useful information to scientists wishing to undertake work in this area.

Simon (2011)[7] in his project generated a theory of the process of expansion/contraction or staying stagnant of scientific knowledge, He applied methodological approach that includes studies of four domains- Anaerobic Bacteriology, Aeronautics, Forensic Psychology and Clinical Biochemistry- each with a different set of values on productivity and also institutionalization, Data was came from Bibliometric Indicators derived from over 8500 Scientific Publications and interviews with 52 scientists actively working in four research domains.

Raja and Balasubramani (2011)[8] have analysed plasmodium falciparum research publication in India measured from Histcite software and other tools. The results show that the growth of Indian literature in plasmodium falciparum deposition and make the quantitative assessment of the research in terms of year-wise research output, geographical distribution, nature of collaboration, characteristics of highly productive institutions and the channel of communication used by the scientists.

Method and Material: For this bibliometric study of Indian Journal of Animal Research (IJAR) researchers have used Scopus database and under source search journal name used for getting all years publications of timespan 2008-2020. Total 1890 documents were retrieved with two broad subject area i.e. Agricultural and Biological Sciences and General Veterinary Science.

Computer Tools Used: To analyse research growth and trends based on retrieved data, the following Scientometric and computer tools have been used:

- **Biblioshiny (R-metrics Package) [1, 2]:** Biblioshiny Package is add in software tool of initial part of R-Metrics Application used for data analysis.
- **Histcite Scientometrics Tool[3]:** Histcite is a dedicated application for Science mapping and used in bibliometric/scientometric studies.
- **Microsoft Excel[5]:** Microsoft Excel is the basic spreadsheet programme that is used for basic and complex arithmetic operations, functions and graphical presentations.

Analysis, Results and Discussion:

Yearly Research Yield: In this section researchers analysed yearwise reseach productivity of the journal- Indian Journal of Animal Research (IJAR) from the year 2008 to 2020. It's observed that research yield is increased year by year in every year. It has taken a peak from the year 2013. And in year 2019 it's seen negative growth (-16%) in chart. Sometimes volumes have been cancelled of the journal so productive declines in the year.

Table No. 1: Yearly research growth:

Year	Records	Mean TNC/ Record	Mean TNC/Year	Growth%
2008	81	1.1605	0.0893	--
2009	84	1.5476	0.129	0%
2010	68	1.8824	0.1711	-1%
2011	61	1.541	0.1541	0%
2012	91	1.4066	0.1563	1%
2013	113	1.3717	0.1715	1%
2014	129	1.9922	0.2846	1%
2015	177	1.9379	0.323	2%
2016	202	1.6386	0.3277	1%
2017	236	1.5127	0.3782	2%
2018	364	0.7335	0.2445	6%
2019	32	0.375	0.1875	-16%
2020	252	0.1786	0.1786	11%

*TNC: Total Number of Citations

Document Type: This section discusses about document types produced in thirteen years from journal- Indian Journal of Animal Research (IJAR). Articles (1878) is dominant document type in all publications of Indian Journal of Animal Research (IJAR). Subsequently it comes- Reviews (9), Notes (2) and one Conference paper (with update version) has been found in total distribution of document types.

Table No. 2: Document types:

Sr. No.	Document Type	Documents
1	Article	1878
2	Review	9
3	Note	2
4	Conference Paper	1
	Total	1890

Prolific Authors Contributed for Journal: Following table no. 3 depicts the prolific authors contributed to the Journal- Indian Journal of Animal Research (IJAR). Ten top collaborated authors were excerpted from the data. In this list Verma A. is at the top of list, Gupta I. D. and

Lucy K. M. are subsequent authors in the list. As we can see their rank as per h-index is different but here authors considered their yield only for IJAR Journal.

Table No. 3: Prolific Authors

Sr. No	Author	Documents	h_index	Rank_h_index
1	Verma, A.	24	6	4
2	Gupta, I. D.	20	5	5
3	Lucy, K.M.	19	3	6
4	Bhakat, M.	18	7	3
5	Chakravarty, A.K.	18	10	2
6	Chungath, J.J.	18	3	6
7	Ashok, N.	17	3	6
8	Harshan, K.R.	16	2	7
9	Mohanty, T.K.	16	15	1
10	Shridhar, N.B.	14	5	5

Most prolific documents: In this section total 10 documents excerpted as top citation yielding documents. At the top of list co-authored document Prevalence and assessment of risk factors for haem protozoan infections in cattle and buffaloes of South-West Gujarat, India found with 16 number of citations, it's co-authored by 7 authors. Subsequently in second place 2 documents- a) 'Changes in expression of Th_1 and Th_2 cytokines in bovine peripheral blood mononuclear cells during early pregnancy', and its co-authored by 3 authors and 'Thermoregulation of female Aardi goats exposed to environmental heat stress in Saudi Arabia', which is co-authored by 3 authors. Both documents earned 15 citations. Digital identifiers are also mentioned of each document enlisted as most cited in the list.

Table No. 4: Most Cited Documents

Sr. No.	Authors	Title	Year	TNC	DOI/Id Link
1	Maharana B.R., Kumar B., Prasad A., Patbandha T.K., Sudhakar N.R., Joseph J.P., Patel B.R.	Prevalence and assessment of risk factors for haem protozoan infections in cattle and buffaloes of South-West Gujarat, India	2016	16	10.18805/ijar.10268
2	Yang L., Wang Y., Ma X., Wang S., Zhang L.	Changes in expression of Th1 and Th2 cytokines in bovine peripheral blood	2016	15	10.18805/ijar.5538

		mononuclear cells during early pregnancy			
3	Al-Samawi K.A., Al-Hassan M.J., Swelum A.A.	Thermoregulation of female Aardi goats exposed to environmental heat stress in Saudi Arabia	2014	15	10.5958/0976-0555.2014.00453.1
4	Gao Q.X., Xiao C., Min M., Zhang C., Peng S.M., Shi Z.H.	Effects of probiotics dietary supplementation on growth performance, innate immunity and digestive enzymes of silver pomfret, *Pampus argenteus*	2016	14	10.18805/ijar.9640
5	Albarran B., Garcia A., Espinoza A., Espinosa E., Arriaga C.M.	Maize silage in the dry season for grazing dairy cows in small-scale production systems in Mexico's highlands	2012	13	https://www.arccjournals.com/journal/indian-journal-of-animal-research/ARCC474
6	Saravanan R., Das D.N., De S., Panneerselvam S.	Effect of season and parity on somatic cell count across zebu and crossbred cattle population	2015	12	10.5958/0976-0555.2015.00127.2
7	Das A.K., Chakraborty D., Kumar N., Gupta P., Khan N.N., Bukhari S.	Effects of non-genetic factors on performance traits of Kashmir Merino sheep	2014	12	10.5958/j.0976-0555.48.2.024
8	Suja R.S., Nair A.M.C., Sujith S., Preethy J., Deepa A.K.	Evaluation of immunomodulatory potential of *emblica officinalis* fruit pulp extract in mice	2009	12	https://www.arccjournals.com/journal/indian-journal-of-animal-research/ARCC474
9	Ayaz N.O., Ramadan K.S., Farid H.E.A., Alnahdi H.S.	Protective role and antioxidant activity of Arabic gum against trichloroacetate-induced toxicity in liver of male rats	2017	11	10.18805/ijar.10976
10	Kovshov S.V., Iconnicov D.A.	Growing of grass, radish, onion and marigolds in vermicomposting made from pig manure and wheat straw	2017	11	10.18805/ijare.v51i04.8417

*TNC: Total Number of Citations

Three-Field Plot (Authors, Keywords and Affiliations): A three field plot were drawn with the help of Biblioshiny package- that shows relationships with authors their study area keywords and their affiliation connected with. In this diagram one can see 'Sahiwal', 'Mastitis' and 'Polymorphism' are seen most used keywords and in middle fold their connected authors like for 'Sahiwal': Gupta I.D., Verma A., Mohanty T.K, Bhakat M., Singh A, Kumar C., and Kumar S. seems connected. And in third fold we can see affiliations contributed and connected by authors and keywords in the journal publications from - Indian Journal of Animal Research (IJAR).

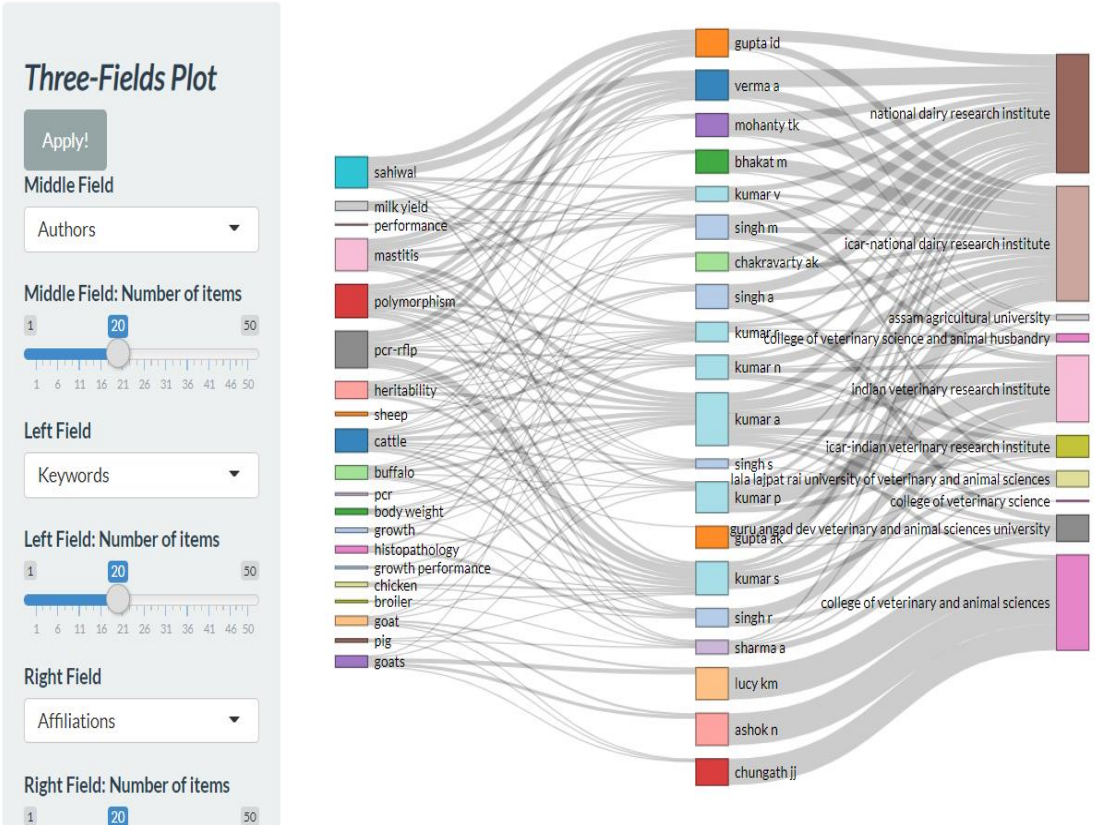

Figure 1: Three field plot: (Authors, Keywords and Affiliations)

Collaborating Institution/Affiliations: The following table no. 5 depicts the highly collaborating Institutions/Affiliations in terms of journal- Indian Journal of Animal Research (IJAR). ICAR's National Dairy Research Institute is at top of list with 211 documents, College of Veterinary Science, Tirupati is 2nd with 154 documents and Indian Veterinary Research Institute is third with 114 documents in their account. Scopus affiliation id is given for exact identification of institution.

Table No. 5: Highly Collaborating Institution/Affiliations

Sr. No.	Institution	Productivity
1	ICAR - National Dairy Research Institute (60012257)	211
2	College of Veterinary Science Tirupati (60016887)	154
3	Indian Veterinary Research Institute (60005564)	114
4	Indian Council of Agricultural Research (60027365)	89
5	Guru Angad Dev Veterinary and Animal Sciences University (60097706)	79
6	Tamilnadu Veterinary Animal Sciences University (60023933)	78
7	Kerala Veterinary and Animal Sciences University (60105898)	67
8	Assam Agricultural University, College of Veterinary Science (60103611)	57
9	College of Veterinary Science and Animal Husbandry Gujarat (60029802)	49
10	Veterinary College Bangalore	48

Country Collaboration: The following table shows the top collaborated countries for Indian Journal of Animal Research (IJAR). India is highest in list because of home country, Chinese (27) authors have contributes second most for journal and then comes South Africa at third position with 25 documents contributed in journal. Other countries like Turkey, Korea, Iran, Nigeria, Mexico, Saudi Arabia and Czech Republic are contributed with single country and multiple country publications.

Table No.6: Country Collaboration

Sr. No.	Country	TNP	Frequency	SCP	MCP	MCP_RATIO
1	India	684	0.78	679	5	0.01
2	China	27	0.03	25	2	0.07
3	South Africa	25	0.03	18	7	0.28
4	Turkey	24	0.03	24	0	0.00
5	Korea	19	0.02	17	2	0.11
6	Iran	16	0.02	16	0	0.00
7	Nigeria	13	0.01	11	2	0.15
8	Mexico	8	0.01	7	1	0.13
9	Saudi Arabia	6	0.01	3	3	0.50
10	Czech Republic	5	0.01	4	1	0.20

*TNP: Total Number of Publications, *SCP: Single Country Publications, *Multiple Country Publications

Concluding Remarks/Results: After analysing Journals' comprehensive scientometric aspects following remarks will be drawn:

1. The Journal shows consistent growth and good impact as citations year by year in given time span.
2. Various document types such as Articles, Reviews, Notes and Conference Paper are seen in Indian Journal of Animal Research (IJAR).

3. Various prolific authors like- Verma, A., Gupta, I. D., Lucy, K.M., Bhakat, M. are contributed consistently for the journal.
4. Most prolific documents found are of studies of characteristics of various species of cattle and goats, their metabolism, ecology and adoption, and some others have medicinal values.
5. Various affiliations like - ICAR's National Dairy Research Institute, College of Veterinary Science, Tirupati, Indian Veterinary Research Institute, Indian Council of Agricultural Research and Guru Angad Dev Veterinary and Animal Sciences University are top yielding and collaborating affiliation for the journal.
6. Various Countries like-China, South Africa, Turkey, Korea, Iran, Nigeria, Mexico, Saudi Arabia and Czech Republic are contributed with single country and multiple country publications.
7. All the identified results shows appreciable impact and coverage of the journal.

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