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A Scientometric Analysis of Global Goat Research Indexed in the Scopus

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ABSTRACT: The multi-functional animal goat plays a significant role in the nutrition and revenue of landless and marginal farmers in the country. An elaborate study of the research findings on goats will offer expertise to policymakers. A scientometric analysis of global goat research from 1841 to 2024 was done utilizing the Scopus online database. The primary objectives included; mapping the literature growth, leading countries, highly productive institutions, leading funding agencies sponsoring, prolific authors, active journals, citation metrics of publications in the field of goat research. The total publication output on goat research from 1841 to 2024 was 41,101. In the field of goat research, there were 159 countries or regions with at least one relevant publication. Among all the countries, the United States ranked high in publication numbers (n=5149) followed by India (n=4840). A total of 160 institutions were registered with at least one publication. A total of 159 funding agencies supported goat research and the top funding agency is the National Natural Science Foundation of China (n = 1500) followed by Conselho Nacional de Desenvolvimento Científico e Tecnológico, Brazil (n=603).The study revealed that Sahlu T is the prolific author in the field of goat research with highest number of publications (n= 137). From 1841–2024, a total of 159 journals were identified as publishing outlets for research in this domain. In terms of citation metrics, three authors exceeded 1000 citations. The insights garnered from this study aim to enrich the understanding of goat research over the past and assist in charting future research trajectories.

Keywords: *Capra hircus*, Goat research, scientometrics, Scopus.

INTRODUCTION

Humans have used goats for a long time under various conditions, but until recently goats were less publicly and academically supported than other livestock production industries.

The study of goats needs steady progress as that of any other domesticated species, especially in milk and meat production. Most of the revenues of world goat production come from meat sales, but goat milk and fiber production and consumption are still growing. The number of goats in the world is increasing and they are increasingly important worldwide for various reasons (Argüello, 2011). The world's goat population is estimated to be around 1 billion, with the majority of goats living in Asia and Africa, whereas the goat population in India in 2019 was 148.88 million showing an increase of 10.1% over the previous census in 2012.Since 1980s, interest in goats and goat breeding has increased, and several institutions and organizations have been established to develop goat production, milk, meat and fiber. The International Goat Association (IGA) has been supporting the goat industry world wide since 1982 and is promoting knowledge and practice of the goat through conferences, academic journals and social media. Goat husbandry provides limitless scope for employment generation and nutritional security (Singh *et al*., 2023). However, the goat industry in India has yet to be firmly laid down on scientific lines. Therefore, a systemic study on the quantitative aspects of scientific communication and Research and Development practices is need of the hour to recommend suitable thrust area of research to the academicians and recommend policy decision to the law makers. Scientometrics is one such study which involves "quantitative study of science, communication in science, and science policy" (Hess, 1997). Similar scientometric analysis have been done earlier about animal research to understand the current trends with scopus data (André *et al*., 2021) and also from other sources like web of sciences (Yousefi *et al*., 2015, Lianou and Fthenakis 2022; Idamokoro *et al*., 2023; Jiang *et al*., 2023), CAB Direct Online Database (Rathinasabapathy, 2012). Knowledge of the trends in goat research is essential to plan future research. This paper aims to update the trend in goat research globally; their impact on the goat industry and its future.

MATERIALS AND METHODS

A scientometric analysis of global goat research was conducted utilizing the Scopus online database. Scopus is one of the best bibliographic databases in the international scientific Community (Sau, 2020). Scopus has comprehensive scholarly literature, data and analytical tools to keep you up-to-date with more than 97.3 million records. The Scopus database has numerous advantages, which is the prime reason for its maximum usage by several researchers for bibliometric analyses across the globe (Montoya *et al*., 2018). The primary objectives of this paper include: (i) to map the literature growth on goat research; (ii) leading countries in goat research; (iii) active journals publishing goat research literature; (iv) highly productive institutions in goat research; (v) leading funding agencies sponsoring for goat research; (vi) prolific authors; and (vii) citation metrics of goat research publications with highly cited publications. For the current work, all data were collected from Scopus, with the following searching string ((TITLE (goat) OR TITLE (caprine) OR TITLE ("Capra hircus")) on July 2024. The method of search employed in the current study has been adopted by several authors for data collection on various topics (Akhilesh *et al*., 2017; Espinoza *et al*., 2024). A total of 41,106 documents published between 1841 and 2025 were retrieved. Qualitatively the documents' titles were inspected to ensure that the included documents are relevant to the field of goat research and 5 documents that are accepted for 2025 were exempted. Thus, the final sample comprised 41,101 documents published between 1841 and 2024. To characterize the structure of knowledge in the goat research literature, we analyzed the collected data to detect the literature growth, most involved countries, productive institutions, authors, scientific journals and citation metrics of goat research literature.

RESULTS AND DISCUSSION

The dataset consisted of 37, 953 articles, 1071 conference papers, 752 reviews, 428 book chapters, 344 letters, 239 notes, 163 erratum, 67 short surveys, 47 editorials, 23 books, 10 data papers and 4 retracted publications. Another important observation is that out of 41,101 publications, about 77.75% (n=31,954) are published in open access journals consisting of full open access (n=14059), gold open access (n = 7790), hybrid gold open access (n = 1393), bronze open access (n = 3370) and green open access (n=5342) which indicates that the researchers in this field preferred to publish in open access journals since it enables the results of scholarly research to be disseminated more rapidly and widely in addition to bring worldwide visibility to their research publications without barriers, demonstrably leads to more citations and more impact.

A. Bibliographic characteristics of goat research publications from 1841 to 2024

The results of bibliographic characteristics of goat research publications from 1841 to 2024 are depicted in Fig. 1. The total publication output on goat research from 1841 to 2024 is 41,101. Rathinasabapathy (2012) retrieved 31,413 papers from web of science for the period from 1960 to 2012 pertaining to goat research. Over the past decade, there has been a noticeable upward trend in the volume of research publications on goat research. This growth in scholarly output can be categorized into distinct phases: (*i*) an initial phase from 1841–1899, (*ii*) phase scanning from 1900-1950; (iii) phase spanning from 1951-1999; and (iv) a more recent phase from 2000 to 2024. The study revealed that the total number of publications between 1841 and 1899 was only 33 while the total publications indexed from 1900-1950 increased to 2044. During the period 1951-1999 a total of 2745 publications indexed and a spurt in literature output happened during 2008 with 1051 publications and thereafter, a significant increase was noticed in the number of publications and the annual average of publications was also increasing steadily.

B. Bibliographic dispersion among countries

In the field of goat research, there were 159 countries or regions with at least one relevant publication. Among all the countries, the United States had an overwhelmingly high publication numbers (n=5149, accounting for 12.53%). India ranked second in terms of publication numbers (n=4840, accounting for 11.78%). Rathinasabapathy (2012) reported that India holds the first rank followed by Brazil, France and China based on the number of papers retrieved from web of science for the period from 1960 to 2012 pertaining to goat research. The other quantitative productive countries are China (10.97%), Brazil (6.27%), Spain (5.52%), United Kingdom (4.03%), France (3.89%), Italy (3.81%), Germany (2.73%) and Turkey (2.61%) and the details are furnished in Table 1. It has been observed that the top 10 productive countries have produced 64.12% of the global research output on goat research while the remaining 35.88% are produced by 149 countries/regions.

C. Active Scientific Journals

The top 10 journals are furnished in Table 1. The study identified and examined the journals active in this field. From 1841–2024, 159 journals were identified as publishing outlets for research in this domain. Of these, 62 journals met a minimum criterion of publishing 100 or more documents in the subject area. The journal "Small Ruminant Research" emerged as the primary platform for disseminating research in this field, with 2,398 publications, followed by Indian Journal of Animal Sciences (n=919), Indian Veterinary Journal (n = 846), Journal of Dairy Science ((n = 791) and Tropical Animal Health and Production ((n = 662). It has been observed that the top 10 journals produced 19.02% of the global research output (n=7818) and two of them are Indian journals. These two Indian journals produced 1765 publications, about 4.29% of the global research literature on goats. Rathinasabapathy (2012) reported Small Ruminant Research, Indian Journal of Animal Sciences and Indian Veterinary Journal as the top three journals publishing research papers in goat.

D. Highly Productive Institutions

The top 10 institutions with the highest number of publications on goat research are furnished in Table 2.

160 institutions registered a presence within the goat research landscape with at least one publication. Of these, a subset of 36 institutions distinguished themselves with a publication count exceeding 200 papers, and an additional 86 institutions had a record of more than 100 publications. This stratification of institutional contributions elucidates the distribution of scholarly activity across various research entities. Among all the institutions, Northwest AF University, China ranked first (n=993), followed by INRAE, France (n=981), IVRI, India (n=789), CIRG-ICAR, India (n=789), and Chinese Academy of Agricultural Sciences (n=384). Moreover, it was found that out of the top 10 institutions with the highest number of publications in the world, four are Chinese institutions, two are from India and Brazil, and each one from France and the USA respectively.

E. Leading Funding Agencies for goat research

The top 10 funding agencies that contributed to goat research are furnished in Table 2. A systematic analysis of leading funding agencies for goat research was conducted. According to the results, a total of 159 funding agencies supported goat research and the top funding agency is the National Natural Science Foundation of China (n = 1500) followed by Conselho Nacional de Desenvolvimento Científico e Tecnológico, Brazil (n=603). Indian Council of Agricultural Research is in 6th position (n = 314).

F. Prolific Authors

The top 10 prolific authors in the field of goat research are furnished in Fig. 2. The study revealed that Sahlu T is the prolific author in the field of goat research with the highest number of publications (n=137) followed by Figueiredo, JR (n=132), Goetsch, AL (n=127). The top 10 prolific authors produced 1063 publications which is about 2.57% of the global research output on goats. It has been further observed that 64 authors have contributed at least 50 and above publications. Rathinasabapathy (2012) reported Morand Fehr as the most productive author with 234 papers for the period from 1960 to 2012 pertaining to goat research.

G. Citation Metrics

The top 10 highly cited papers on goat research are furnished in Table 3. In terms of citation metrics, three authors exceeded 1000 citations. Notably, Wiiffels M.C.E.F. of University of Limburg, The Netherlands topped the list by amassing 3,048 citations from his publication entitled "Atrial fibrillation begets atrial fibrillation: A study in awake chronically instrumented goats" followed by Chilliard Y. (n = 1308) of INRA, France and Park Y.W. (n=1005) of Fort Valley State University, USA. Additional high-impact authors encompassed Baguisi A, Murphy JM, Payne S, Ausma J, Haenlein, Waghorn G and Zedder MA.

Table 1: Active countries/regions and scientific journals in the goat research.

Sr. No.	Particulars	Publications	%
ACTIVE COUNTRIES/REGIONS IN THE GOAT RESEARCH			
1.	United States	5149	12.53
2.	India	4840	11.78
3.	China	4507	10.96
4.	Brazil	2575	6.26
5.	Spain	2268	5.52
6.	United Kingdom	1656	4.03
7.	France	1600	3.89
8.	Italy	1565	3.81
9.	Germany	1122	2.73
10.	Turkey	1073	2.61
	Total	**26,355**	**64.12**
ACTIVE SCIENTIFIC JOURNALS IN GOAT RESEARCH			
1.	Small Ruminant Research	2398	5.83
2.	Indian Journal of Animal Sciences	919	2.24
3.	Indian Veterinary Journal	846	2.06
4.	Journal Of Dairy Science	791	1.92
5.	Tropical Animal Health and Production	662	1.61
6.	Animals	525	1.28
7.	Theriogenology	499	1.21
8.	Veterinary Record	431	1.05
9.	Veterinary Parasitology	397	0.97
10.	Livestock Research for Rural Development	350	0.85
	Total	**7,818**	**19.02**

Table 2: Top 10 Institutions and Leading Funding Agencies on Goat Research.

Sr. No.	Institution	No. of Documents
	Top 10 Institutions on Goat Research	
1.	Northwest AF University, China	993
2.	INRAE, France	981
3.	Indian Veterinary Research Institute, ICAR, India	789
4.	Central Institute for Research on Goats, ICAR, India	410
5.	Chinese Academy of Agricultural Sciences, China	384
6.	Ministry of Agriculture of the People's Republic of China, China	367
7.	Empresa Brasileira de Pesquisa Agropecuária – Embrapa, Brazil	365
8.	University of California, Davis, USA	335
9.	Universidade Federal da Paraíba, Brazil	326
10.	Ministry of Education of the People's Republic of China	321
	Leading Funding Agencies	
1.	National Natural Science Foundation of China	1500
2.	Conselho Nacional de DesenvolvimentoCientífico e Tecnológico	603
3.	Coordenação de Aperfeiçoamento de Pessoal de Nível Superior	493
4.	National Key Research and Development Program of China	378
5.	European Commission	318
6.	Indian Council of Agricultural Research	314
7.	U.S. Department of Agriculture	228
8.	Ministry of Science and Technology of the People's Republic of China	218
9.	National Institutes of Health	212
10.	Fundamental Research Funds for the Central Universities	184

Table 3: Top 10 most globally cited articles on goat research from 1841 to 2024.

Sr. No.	Authors	Title	Year	Source Title	Cited by
1.	Wijffels M.C.E.F.	Atrial fibrillation begets a trial fibrillation: A study in awake chronically instrumented goats	1995	Circulation Vol. 91 (7)	3048
2.	Park Y.W.	Physico-chemical characteristics of goat and sheep milk	2007	Small Ruminant Research Vol.68 (1)	1005
3.	Baguisi A.	Production of goats by somatic cell nuclear transfer	1999	Nature Biotechnology Vol. 17 (5)	901
4.	Murphy J.M.	Stem Cell Therapy in a Caprine Model of Osteoarthritis	2003	Arthritis and Rheumatism Vol.48 (12)	898
5.	Chilliard Y.	Diet, rumen biohydrogenation and nutritional quality of cow and goat milk fat	2007	European Journal of Lipid Science and Technology Vol.109 (8)	720
6.	Payne S.	Kill-off Patterns in Sheep and Goats: The Mandibles from Aşvan Kale	1973	Anatolian Studies Vol.23	702
7.	Ausma J.	Structural changes of atrial myocardium due to sustained atrial fibrillation in the goat	1997	Circulation Vol. 96 (9)	679
8.	Haenlein G.F.W.	Goat milk in human nutrition	2004	Small Ruminant Research Vol.51 (2)	635
9.	Chilliard Y.	A review of nutritional and physiological factors affecting goat milk lipid synthesis and lipolysis	2003	Journal of Dairy Science Vol. 86 (5)	588
10.	Waghorn G.	Beneficial and detrimental effects of dietary condensed tannins for sustainable sheep and goat production-Progress and challenges	2008	Animal Feed Science and Technology Vol. 147 (1)	544

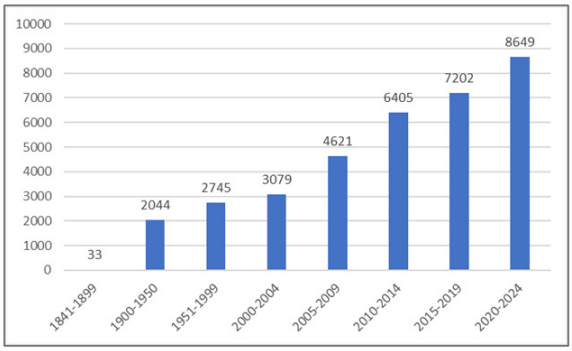

Fig. 1. Publication output on Goat Research (1841-2024).

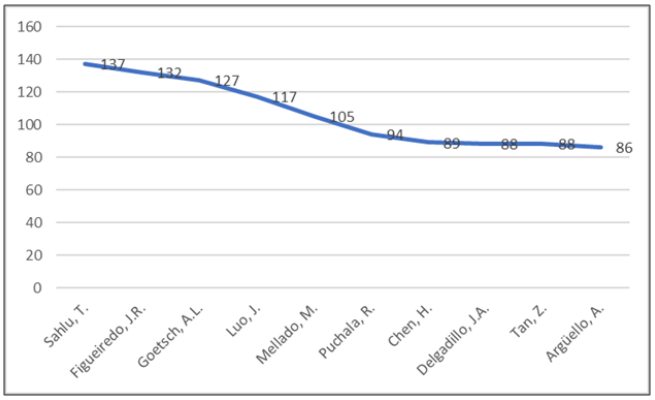

Fig. 2. Top 10 Prolific authors in the field of goat research.

SUMMARY AND CONCLUSION

In this study, a scientometric analysis was conducted using the Scopus database to explore the body of literature on goat research from 1841 to 2024. The notable surge in publication numbers in the field of goat research is indicative of the rapid advancements within this area. The trend highlights the growing interest and active engagement of scholars in goat research. The insights garnered from this study aim to enrich the understanding of goat research over the past and assist in charting future research trajectories. The contribution of India towards global goat research publications is 11.78% (n = 4840) which vouches the great contribution of our country to the global goat research landscape. The collaboration of researchers, producers and policymakers and the sharing of information and experience will enable the goat sector to realize its full potential.

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Conflict of Interest. None.

REFERENCES

Akhilesh, M., Varma, K. and Singh, K. (2017). Scientometric Analysis of Literature on Big Data Research Output in India Based on Scopus Database. *International Journal of Library and Information Studies*, *7*(4), 90–96.

André, A. R., Gama, L. R. M., Pfrimer, G. D. A. and Rodrigues, F. M. (2021). Animal-Assisted Therapy: a scientometric analysis. *Pubvet, 15*(11).

Argüello, A. (2011). Trends in goat research, a review. *Journal of applied animal research*, *39*(4), 429-434.

Espinoza-Carhuancho, F., Medina, J., Mauricio-Vilchez, C., Galarza-Valencia, D., Mendoza, R., Pacheco-Mendoza, J. and Mayta-Tovalino, F. (2024). Scientometric mapping of the trends, impact, and thematic evolution of scientific production on ehrlichiosis in veterinary medicine. *Veterinary World*, *17*(9), 2159-2165.

Hess, D. J. (1997). *Science studies: An advanced introduction*. NYU press.

Idamokoro, E. M. (2023). The significance of goat milk in enhancing nutrition security: a scientiometric evaluation of research studies from 1966 to 2020. *Agriculture & Food Security*, *12*(1), 34.

Jiang, B., Tang, W., Cui, L. and Deng, X. (2023). Precision livestock farming research: a global scientometric review. *Animals*, *13*(13), 2096.

Lianou, D. T. and Fthenakis, G. C. (2022). Scientometrics study of research output on sheep and goats from Greece. *Animals*, *12*(19), 2666.

Montoya, F. G., Alcayde, A., Baños, R. and Manzano-Agugliaro, F. (2018). A fast method for identifying worldwide scientific collaborations using the Scopus database. *Telematics and Informatics*, *35*(1), 168-185.

Rathinasabapathy, G. (2012). Scientometric analysis of publications on goat research: A profile based on CAB Direct Online. *Indian Journal of Agricultural Library and Information Services*, *28*(2), 35-39.

Singh, S., Kumar, A., Kaur, S. and Mansion, H. (2023). Study the Breeding Practices using by Goat Keepers in the Pratapgarh District of Rajasthan. *Biological Forum An International Journal, 15*(8), 443-446

Sau, K (2020). Punitive provision to tackle predatory journals. *Current Science*, *118*(2), 184-185.

Yousefi, A. and Zare Mirakabadi, A. (2015). A Survey of Scientific Outputs of Iranian Researchers in the Field of Poisonous Animals in Web of Science: a Scientometric Study. *Archives of Razi Institute*, *70*(2), 111-117.

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