Editorial:

Bibliometric insights into the South African Journal of Animal Science: Trends and contributions

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Abstract

Articles (1558 in total) published in the South African Journal of Animal Science (SAJAS) were identified in the Scopus, Scielo, and InCites (Web of Science) databases. The Scimago Journal Rank (SJR) indicator for SAJAS in 2022 was 0.33, with a journal H-index of 37. The journal is in the Q3 quartile, reaching Q2 in 2014 and 2017, and has the 2nd highest SJR in African Animal Science and Zoology journals. The InCites average Category Normalised Citation Index is 0.43, with 77% of articles being cited, but varies between research fields, with a score of 0.32 for Agriculture, Environment, and Ecology (85% of published papers), 0.23 for Clinical and Life Sciences (14% of published papers), and 0.44 for Social Sciences. There is a mean of 43 references per article, with each article receiving, on average, 1.1 citations. Most papers are on poultry and ruminants, with fewer papers on wild animals and less prominent farm species. The major breeds studied include Merino sheep and Holstein cattle, with fewer papers on South African breeds. This analysis is important for the journal and its readership as a self-evaluation of the scope and impact of the journal and how this is changing, as well as aiding editors in shaping the journal's future direction. Citations have decreased over the last 20 years, and international collaborations are few; however, bias in this analysis should be noted, as recent papers and papers not indexed in Scopus have lower numbers of citations. The journal must reaffirm itself as a leading journal for tropical animal production.

Introduction

The South African Journal of Animal Science (http://www.sasas.co.za/journals) serves as the official journal of the South African Society for Animal Science, and operates as an open-access journal.

Previously, the South African Society for Animal Science was known as the South African Society of Animal Production. The society was founded on 28 April 1961, and the journal was established in 1971 as the South African Journal of Animal Science or the "Suid-Afrikaanse Tydskrif vir Veekunde". In 1982, the journal integrated with Agroanimalia, and in 1992, it removed the Afrikaans name and replaced/incorporated the South African Society of Animal Production Proceedings.

The journal publishes research on livestock species, including cattle, sheep, goats, pigs, and poultry, as well as pertinent aspects of research on aquatic and wildlife species. The main disciplines covered are nutrition, genetics, and physiology. Manuscripts addressing sociological aspects of well-defined livestock production systems are also invited, provided they are scientific and have been carried out systematically. All submitted articles are subjected to a single-blind peer review process, managed by a sub-editor under the supervision of the editor-in-chief. Authors retain the copyright of the published articles, and published articles are covered by the Creative Commons Attribution 4.0 South African License terms, allowing users to copy, distribute, transmit, and adapt the work. However, users must recognise the authors and the South African Journal of Animal Science.

The bibliometric analysis of the South African Journal of Animal Science can facilitate our understanding of the evolutionary nuances of this field of knowledge and can help highlight emerging areas. This analysis will reveal emerging trends and collaboration patterns, while exploring their intellectual structure, making it an essential component of research evaluation. Bibliometric analysis has been used to analyse trends in areas of knowledge (McManus *et al.,* 2023a), scientific journals (McManus *et al*., 2023b), and animal species (Pimentel *et al*., 2023). Moral-Muñoz *et al*. (2020) presented an overview of the potential applications of such analyses, as an integral part of the development of science. The goal of the current study was to survey journal publications, identify major trends, and attempt to identify where information is missing and where future research needs to be expanded.

Materials and methods
Data description
The information used to perform the bibliometric analyses presented in this study was extracted from official databases. Since the study aimed to evaluate various aspects of the South African Journal of Animal Science, multiple sources were utilised to collect information about the journal, viz.:

- Scielo (https://analytics.scielo.org/w/accesses?journal=0375-1589&collection=sza): to download compositional data, and received and given references.
- Scimago (https://www.scimagojr.com/journalsearch.php?q=54988&tip=sid&clean=0): to download the H-index, coverage, and quartile.
- InCites (https://incites.clarivate.com/#/landing), from Clarivate Analytics and based on Web of Science: to assess the impact, international collaboration, and sustainable development goals.
- Scopus (https://scopus.com): to search for parameters included in titles using the SQL query SRCTITLE (south AND african AND journal AND of AND animal AND science).

The retrieval date was the 7th of September 2023, and all years in the database were considered (1968 to 2023). Data were exported in CSV format, including the following information: publication year, journal, title, author name, author affiliation, keywords, document type, abstract, and citation counts. Then, quality control was implemented on the data to ensure that the information was standardised based on author names, keywords (single and plural, or words with the same meaning, such as *Bos indicus* and zebu), and journals (abbreviated names).

Analysis
The cleaned data was imported into VOSviewer® (van Eck & Waltman, 2010, 2017; Waltman & Van Eck, 2012, 2013) and analysed to investigate citation networks and bibliographic mapping. VOSviewer® is a software tool designed to construct and visualise bibliometric networks. These networks can include items such as journals, researchers, or individual publications and are typically based on co-authorship, citation, or co-occurrence relationships. The software employs the VOS (visualisation of similarities) mapping technique, which optimises the positioning of items to highlight clusters and relationships, facilitating the identification of patterns and trends in large-scale datasets.

VOSviewer® is widely used for bibliometric analysis and science mapping because of its user-friendly interface, ability to handle large datasets, and advanced clustering algorithms.

Figure 1 illustrates key bibliometric relationships used in this analysis. The left panel shows the citation relationship, where citing papers (e.g., papers indexed in Scopus) reference cited papers. The middle panel highlights a co-citation pattern, where two papers are co-cited by the same citing paper, indicating a potential conceptual or topical similarity. The right panel depicts bibliographic coupling, where two papers share a connection by citing the same reference, suggesting a shared intellectual foundation. These relationships are important in bibliometric studies for understanding the structure and connections within scientific literature.
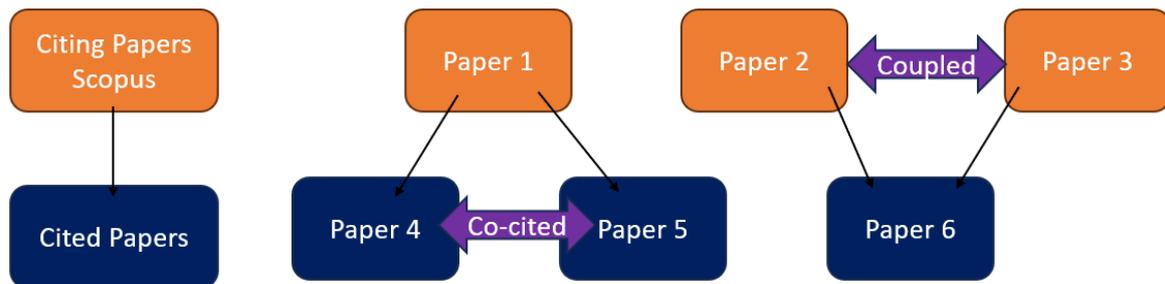

Figure 1 Schematic diagram of bibliographic analyses: The left panel displays citation relationships, the middle panel illustrates co-citation, and the right panel depicts bibliographic coupling.

The data analysed and generated by VOSviewer® can be described as follows:
- Co-authors – analysing the co-authors from the Scopus-indexed papers and their countries of origin and affiliations, with links between them.
- Author keyword co-occurrence networks, whereby each keyword is represented as a node, and each co-occurrence of a pair of words is represented as a link (Radhakrishnan *et al.*, 2017).
- Bibliographic coupling – measuring the similarity between two documents based on the number of references they have in common (Figure 1).
- Co-citation – analysing papers that have cited pairs of documents (Köseoglu *et al.*, 2015; Wong *et al.*, 2021). This measures the extent to which two or more documents are frequently cited together in other scientific articles. This can be used to identify influential articles and researchers in a given field, as well as potential sources of information and inspiration for future research.

In the analysis, fractional counting was applied to determine the authors' contributions, with each paper being divided according to the number of co-authors (Cancino *et al.*, 2017; Gaviria-Marín *et al.*, 2018; Martínez-López *et al.*, 2020). For example, if a paper had four authors, then the weight for each author was one-quarter (i.e., 1/4) (Perianes-Rodriguez *et al.*, 2016). Consequently, both the number of documents co-authored and the number of authors of each co-authored document determined the strength of a co-authorship link between two authors (McManus *et al.*, 2023a). The units of analysis included countries, (co)authors, documents, references, and publishing sources.

VOSviewer® produced network maps (i.e., linkage maps) based on the above data and assigned authors, papers, keywords, countries, and cited sources to clusters visually depicted using different colours. Clusters were formed using association strength/proximity or the probabilistic affinity index. This index is a statistical metric that quantifies the likelihood of association or affinity between two or more variables. Unlike deterministic measures, it incorporates uncertainty and variability by calculating the probability of specific outcomes, making it particularly useful in scenarios in which stochastic processes influence relationships. This index has been widely applied in fields such as genetics, epidemiology, and behavioural sciences to assess patterns of association, interaction, or preference within a probabilistic framework. It provides a robust measure of affinity that accounts for randomness and variation in the observed data, enabling more accurate inferences about underlying relationships.

Timelines were also constructed in VOSviewer® to show the mean years for publications of the same variables, which helps understand the journal's progress and future trends (Ding & Yang, 2020). In the VOSviewer® figures, a larger circle indicates a more frequent occurrence of a keyword, country, author, etc., in the author list, title, and abstract, according to Scopus. A more vibrant colour in the connections between words signifies a higher frequency of occurrence in various documents. Conversely, weaker connections are displayed in more transparent colours.

Results
Bibliometric overview
A total of 1558 articles were identified in Scopus. The earliest article dates back to Grosskopf (1974), but there was otherwise a general lack of information until 1996. According to Scimago, the South African Journal of Animal Science has an H-index of 37. While it was initially and is currently classified in the Q3 quartile, the journal advanced to Q2 in both 2014 and 2017. In 2022, the Scimago Journal Rank (SJR) indicator was 0.33, making the South African Journal of Animal Science the second-highest ranked journal of African Animal Science and Zoology journals.

The average Category Normalized Citation Index (CNCI) reported for the journal by InCites is 0.43, with 77% of published articles being cited. The CNCI differs based on the research sector, with a score of 0.32 for Agriculture, Environment and Ecology, the sector in which 85% of publications are classified. Clinical and Life Sciences, which accounts for 14% of papers, has a CNCI of 0.23, and Social Sciences has a CNCI of 0.44. There is a mean of 43 references per document, with each document receiving, on average, 1.1 citations. The number of citations represents the popularity and influence of a scientific document or author (Merigó *et al.*, 2017).

In descending order, the papers published in the South African Journal of Animal Science mainly reference documents published in the Journal of Animal Science, the Journal of Dairy Science, Poultry Science, Meat Science, and the South African Journal of Animal Science. Conversely, the journal receives citations mainly from its own publications, followed by the Revista Brasileira de Zootecnia, the Brazilian Journal of Poultry Science, the South African Journal of Agricultural Extension, and Arquivo Brasileiro de Medicina Veterinária e Zootecnia.

The number of papers published per year gradually increased up to 2006, and, while there have been peaks in some years, the average remains around 80 publications per year (Figure 2).
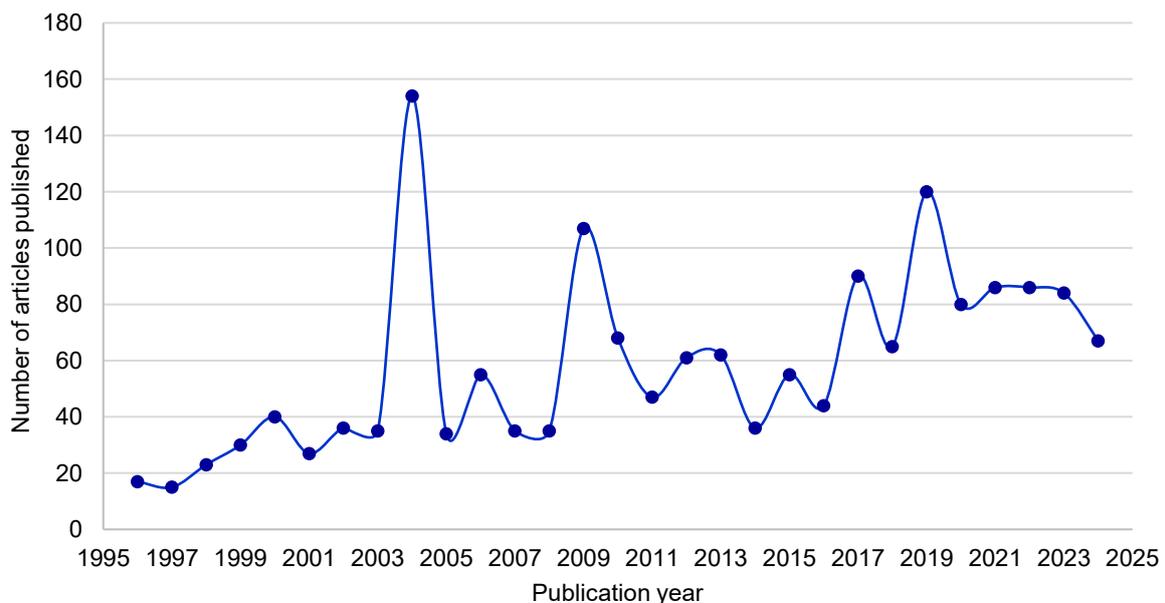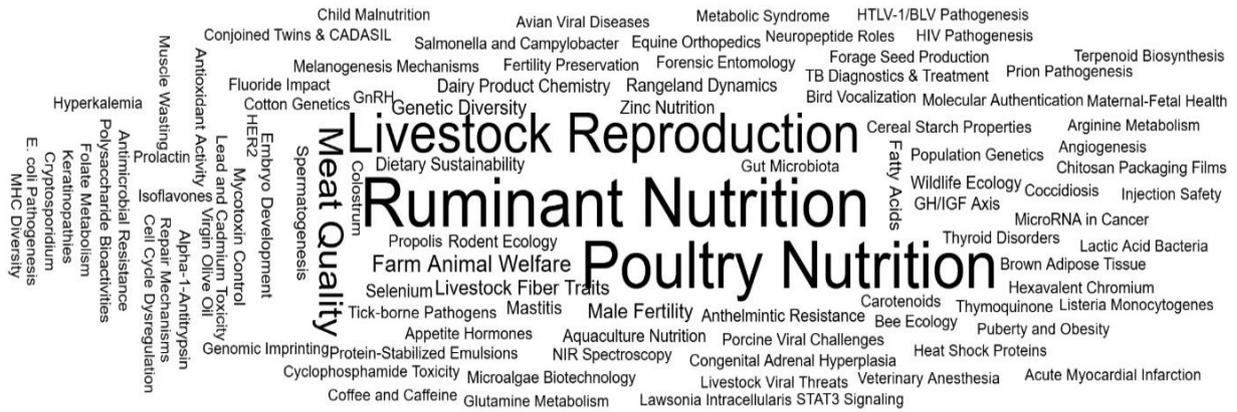

Figure 2 The number of articles published per year in the South African Journal of Animal Science.

The papers published per year in the South African Journal of Animal Science, according to the specific words included in their titles, are presented in Figure 3. Words such as poultry nutrition, ruminant nutrition, and meat quality are featured strongly.

Indicators: Web of Science Documents.**Schema**:Citation Topics. **Level**:Micro. **Collaborates With ID Type Group**:name. **Collaborates With ID Type**:fullName.
Publisher Type:All. **Publisher**:SOUTH AFRICAN JOURNAL OF ANIMAL SCIENCES. **Dataset**: InCites Dataset
InCites dataset updated May 29, 2025. Includes Web of Science content indexed through Apr 30, 2025.Export Date: Jun 3, 2025.

Figure 3 A word cloud illustrating the frequencies of occurrence of specific words in the titles of articles published in the South African Journal of Animal Science.

In Figures 4a and b the species and breeds included in paper titles are reflected, respectively. The major species studied are chickens (broilers), goats, cattle, and sheep. The major breeds studied include Merino sheep (*Ovis aries*) and Holstein cattle (*Bos taurus*), with fewer papers on South African breeds.
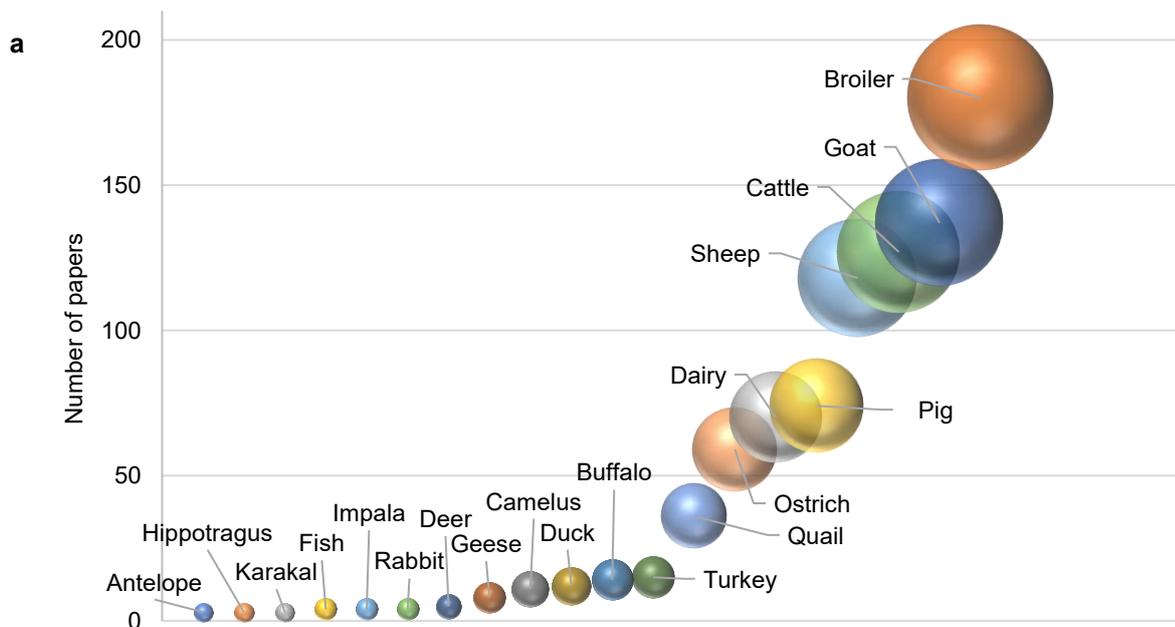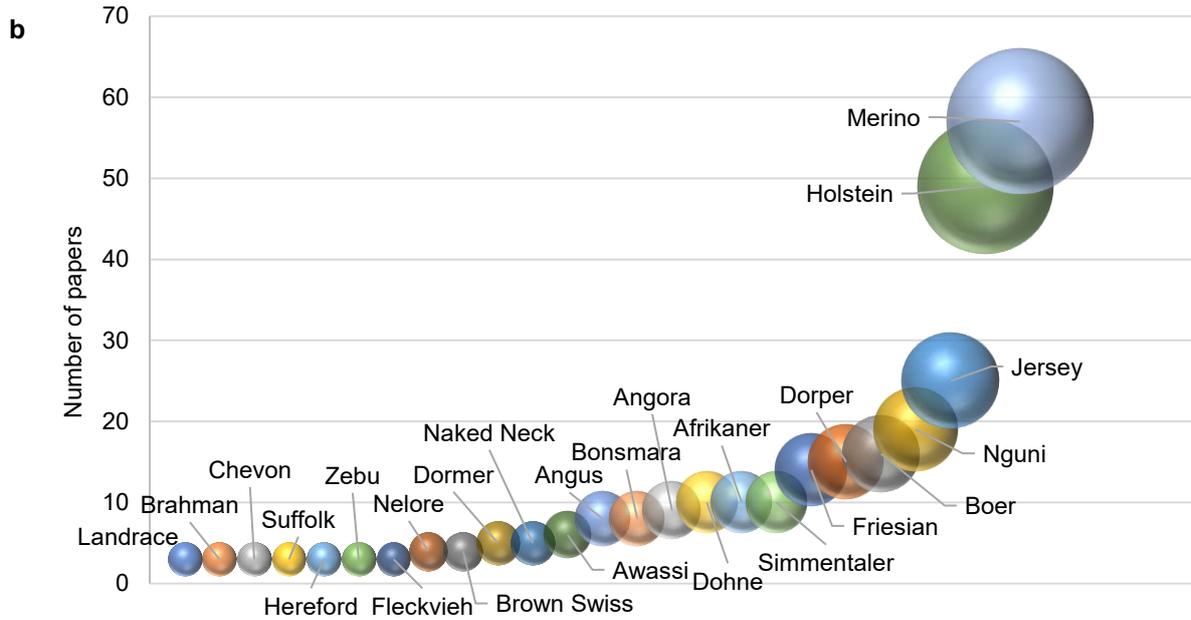
Figure 4 Number of papers published in the South African Journal of Animal Science with (a), specific species in the titles, and (b) specific breeds in the titles. The size of the sphere represents the number of occurrences of each species/breed in the article titles.

Authorship trends

The distribution of authors of articles published in the South African Journal of Animal Science, according the country of their affiliation, is mapped in Figure 5. Most authors are researchers from South Africa, along with contributors from Brazil and Turkey.
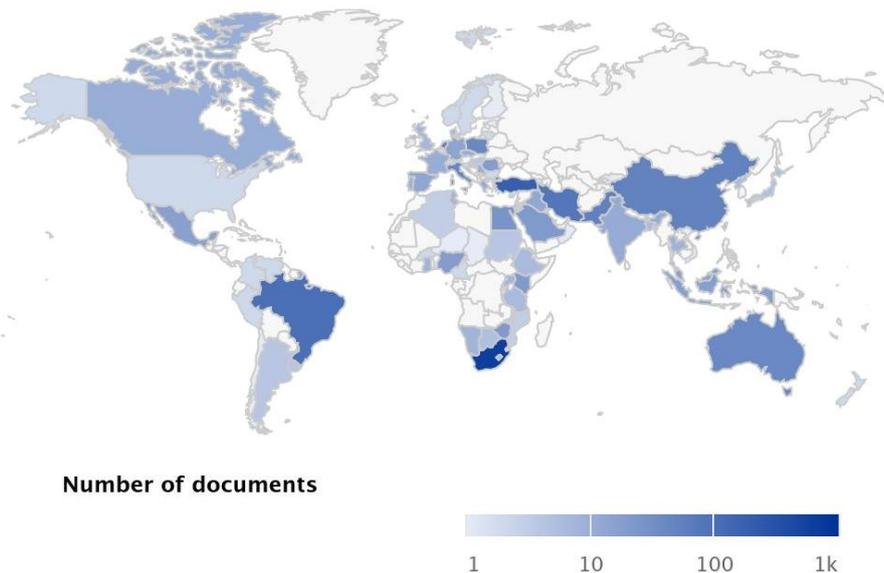
Figure 5 The distribution of author affiliations by country in the South African Journal of Animal Science (Scielo.org).

Network maps derived for the South African Journal of Animal Science, illustrating connections in terms of (a) clusters, (b) average publication years, and (c) citations, are presented in Figure 6. A map generated by VOSviewer® visually represents the relationships between bibliometric items – such as authors, keywords, institutions, or publications – based on data like co-authorship, co-citation, or

keyword co-occurrence. Each item is shown as a node (or circle), and the size of the node reflects the item's importance or frequency within the dataset. For example, a frequently occurring keyword will appear as a larger node. These nodes are grouped into colour-coded clusters that indicate thematic areas or groups of closely related items. The spatial distance between nodes represents the strength of their relationship: the closer the nodes, the more closely related they are. Lines connecting the nodes indicate the existence of a relationship, such as co-authorship or co-occurrence, and the thickness of that line shows the strength of that connection.

Significant clusters (Figure 6a) indicate connections to Asia (marked in red), although other clusters are not defined by region. Asian publications are more recent (Figure 6b), as are those from Brazil, while publications by Turkish authors exhibit higher citation counts (Figure 6c). The timeline facilitates an assessment of the longitudinal framework to track the evolution of topics published in the journal and to identify emerging groups of countries.
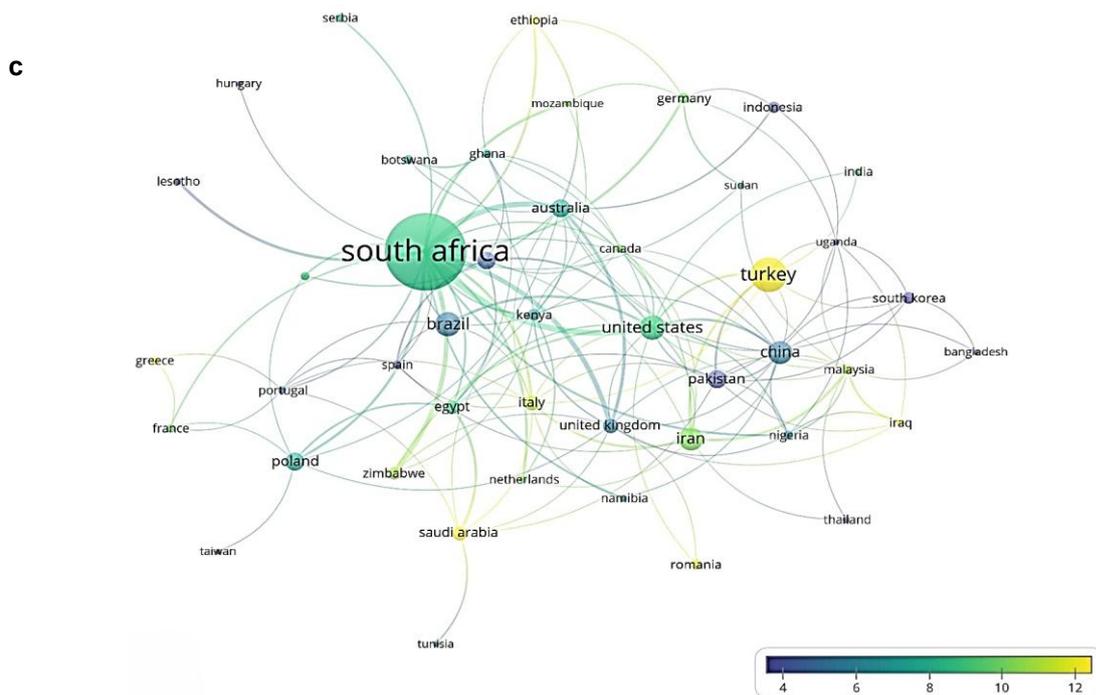
Figure 6 Network maps illustrating (a) clusters, (b) average publication years, and (c) number of citations in the South African Journal of Animal Science (VOSviewer®). The size of the circle represents the number of observations.

Key contributors and funding sources

The major publication institutions, funders of research, and authors of articles published in the South African Journal of Animal Science are presented in Table 1. The key publishing institutions include the Agricultural Research Council (ARC), the University of Pretoria, Stellenbosch University, and the University of the Free State. Of the 1331 articles published, these four institutions account for 59%, totalling 787 articles. The publications by authors affiliated with the ARC were listed under the affiliations 'Agricultural Research Council, Pretoria', 'ARC-Animal Improvement Institute', and 'Animal Nutrition and Animal Products Institute', but these were combined into one affiliation for the analysis. The National Research Foundation (NRF) served as the main funding source, followed by two sponsors from Brazil, and these three sponsors together contributed 42% of funding, out of the thirty-one funding institutions. A total of 44 of the papers published in the journal received NRF funding. Funding from Red Meat Research and Development South Africa (RMRDSA) is acknowledged in 18 of the articles. Surprisingly, Milk SA does not feature as a sponsor in any of the articles, although it receives statutory funds to support research, like RMRDSA.

The four most prolific authors were authors or co-authors in 19% of the published articles. The 10 major authors are all South Africans or ex South Africans, viz. (with the number of articles in brackets) Cloete (72), Neser (64), Hoffman (63), van Wyk (58), Webb (43), Brand and Gous (37 each), and Coertze, Fair, and Scholtz (32 each). The 10 most cited authors are not necessarily the same as the 10 major authors. They are (with the number of citations in brackets) Cloete (751), Hoffman (675), Neser (448), van Wyk (532), Webb (438), Scholtz (343), Schoeman (337), van Marle-Koster (310), Olivier (360), and Meissner (325).

Table 1 Major publication institutions, funders of research, and authors of articles published in the South African Journal of Animal Science

Publication institutions		Funders of research		Authors/co-authors		
Affiliation	Number of articles	Sponsor	Number of articles	Author	Number of articles	Number of citations
Agricultural Research Council	201	National Research Foundation	44	Cloete, S.W.P.	72	751
University of Pretoria	198	Coord. Aperfeiçoamento de Pessoal de Nível Superior	35	Neser, F.W.C.	64	448
Stellenbosch University	195	Cons. Nacional de Desenvolvimento Científico e Tecnológico	20	Hoffman, L.C.	63	657
University of the Free State	193	Red Meat Research and Development South Africa	12	Van Wyk. J.B.	54	532
Univiversity of KwaZulu-Natal	71	Rural Development Administration	10	Webb, E.C.	43	438
University Veterinary and Animal Sciences, Lahore	39	National Natural Science Foundation of China	9	Brand, T.S.	37	219
Western Cape Government	39	Consejo Nacional de Ciencia y Tecnología	7	Gous, R.M.	37	289
University of Fort Hare	33	Agricultural Research Council	7	Coertze, R.J.	32	196
Tshwane University of Technology	30	University of Pretoria	7	Fair, M.D.	32	249
Institute for Animal Production: Elsenburg	25	National Institute of Food and Agriculture	6	Scholtz, M.M.	32	343
North-West University	25	Western Cape Agricultural Research Trust	6	Van der Merwe, H.J.	30	147
University of Limpopo	24	Higher Education Commission, Pakistan	5	Dzama, K.	29	273
Bursa Uludağ Üniversitesi	21	King Saud University	5	Schoeman, S.J.	26	337
Grootfontein Agricultural Development Institute	21	European Regional Development Fund	5	Muchenje, V.	24	271
Ege Üniversitesi	18	FAP Pernambuco	4	Hugo, A.	23	155
Elsenburg Agricultural Centre	18	European Commission	4	Van Marle-Koster, E	23	310

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Table 1 Major publication institutions, funders of research, and authors of articles published in the South African Journal of Animal Science (continued)

Publication institutions		Funders of research		Authors / co-authors		
Affiliation	Number of articles	Sponsor	Number of articles	Author	Number of articles	Number of citations
King Saud University	16	Dept. Science and Technology, Government of Kerala	4	Greyling, J.P.C.	20	91
Universidade Federal Rural de Pernambuco	15	U.S. Department of Agriculture	4	Erasmus, G.J.	19	192
Central Univ. Technology, Free State	15	Islamic Azad University	4	Olivier, J.J.	19	360
Univ. New England Australia	15	North-West University	4	Cruywagen, C.	18	120
KwaZulu-Natal Dept. Agriculture and Rural Development	15	National Institute of Animal Science	3	Maiwashe, A.	18	194
Kahramanmaras Sütçü Imam Üniversitesi	14	Inner Mongolia Agricultural University	3	Meissner, H.H.	18	325
University of the Witwatersrand, Johannesburg	14	Thailand Research Fund	3	Muller, C.J.C.	18	81
Universidade Estadual do Oeste do Paraná	13	Fundamental Research Funds for the Central Universities	3	Theron, H.E.	18	182
Università degli studi di Bari Aldo Moro	13	Firat University Scientific Research Projects Management Unit	3	Brand, Z.	17	115
University of Tehran	13	National Research Foundation of Korea	3	Casey, N.H.	17	167
University of Venda	13	FAP Maranhão	3	Hassen, A.	17	55
Ankara Üniversitesi	12	Deanship of Scientific Research, King Saud University	3	Jordaan, G.F.	17	250
Universiti Putra Malaysia	12	FAP Mato Grosso do Sul	3	Meeske, R.	17	137
		Government of Inner Mongolia Autonomous Region	3	Van Ryssen J.B.J.	17	159
		University of Mohaghegh Ardabili	3			

The major author clusters (Figure 7a) are in the areas of meat (yellow, sheep and exotic), genetics (light blue, cattle), animal nutrition (green), and pasture management (orange). New groups are emerging, especially from Brazil (Figure 7b), while citations (Figure 7c) tend to be low. These clusters reveal leading academic relations and researchers based on the average publication year in the network (Guleria & Kaur, 2021).
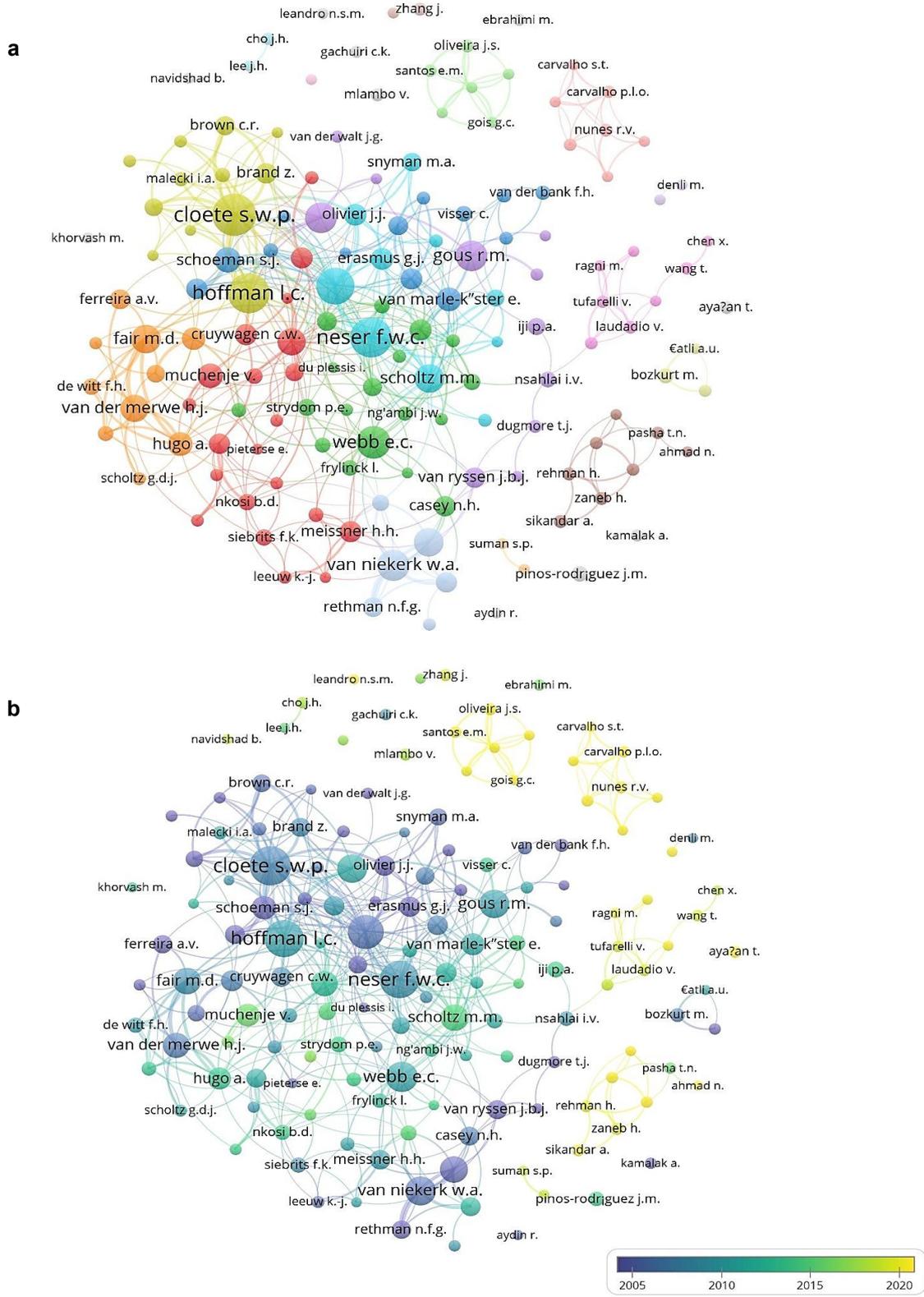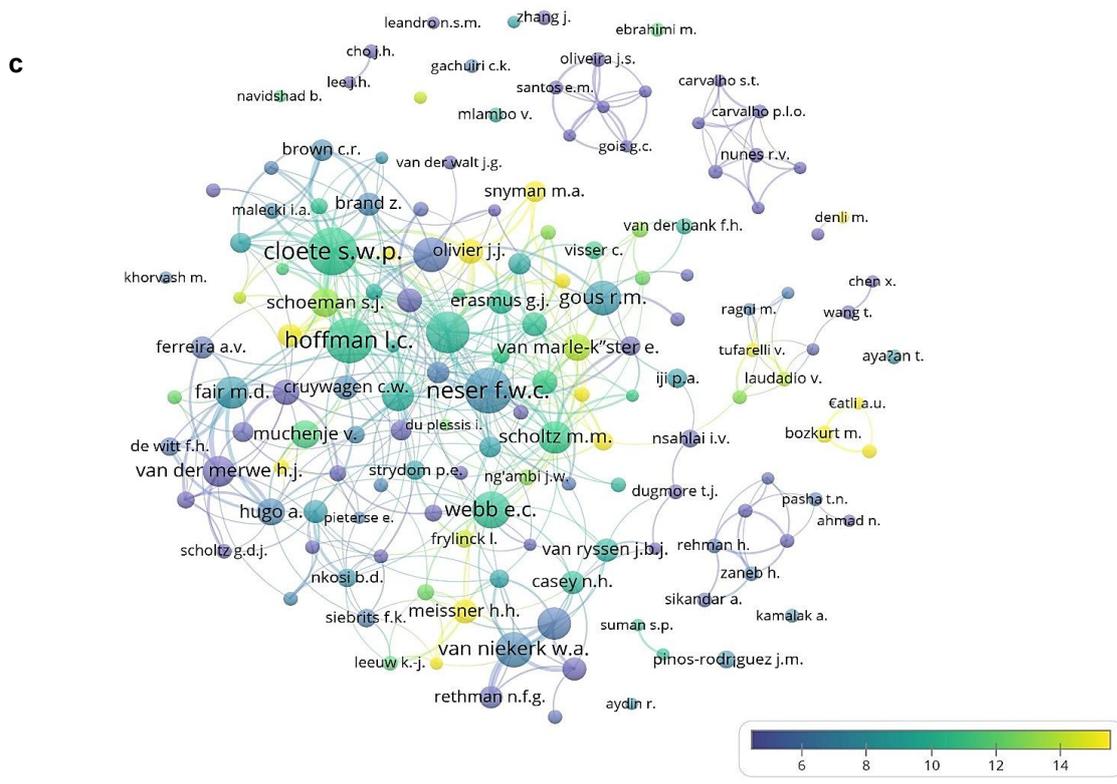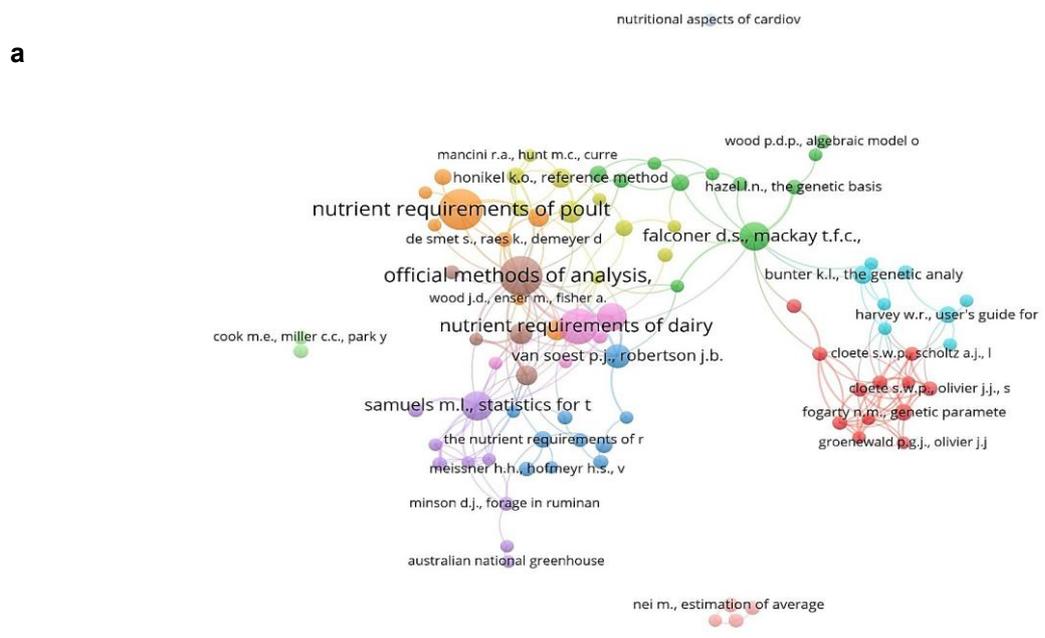
Figure 7 Major authors in the South African Journal of Animal Science, according to (a) publishing clusters, (b) mean publishing years, and (c) average numbers of citations (VOSviewer®).

Citation trends

The co-cited documents (Figures 8a and b) are usually books or manuals, such as those for nutritional analyses (brown, orange) or genetics (light blue, green). The major co-cited authors are also in clusters linked to nutrition (red) and genetics (green). As in McManus *et al.* (2023), one of the major papers is that of Van Soest *et al.* (1991), on analysis methods for dietary fibre, neutral detergent fibre, and non-starch polysaccharides in relation to animal nutrition. This is to be expected, given the nature of this paper and its pivotal role in the context of ruminant nutrition.

b
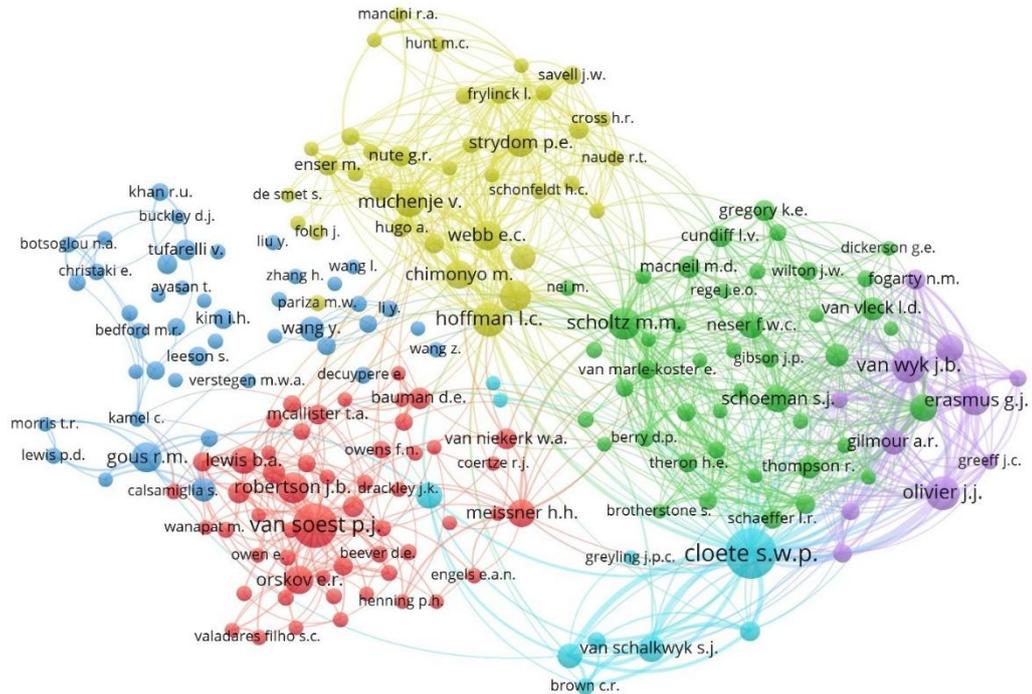
Figure 8 Co-citations in articles published in the South African Journal of Animal Science, for (a) documents and (b) authors (VOSviewer®).

The coupled papers (Figure 9) are grouped into areas of knowledge, such as poultry production (light green) and genetics (light blue). The most cited paper is by Alçiçek *et al.* (2003), on the effect of an essential oil combination derived from selected herbs growing wild in Turkey on broiler performance. Rust *et al.* (2013) is the most cited paper not on poultry production.

a

b

c

Figure 9 Coupled papers, as per (a) clusters, (b) mean publishing year, and (c) mean number of citations.

In Table 2, the first authors, titles, URL/DOIs, and numbers of citations of the most cited papers published in the journal are summarised. The most cited article, by Alçiçek *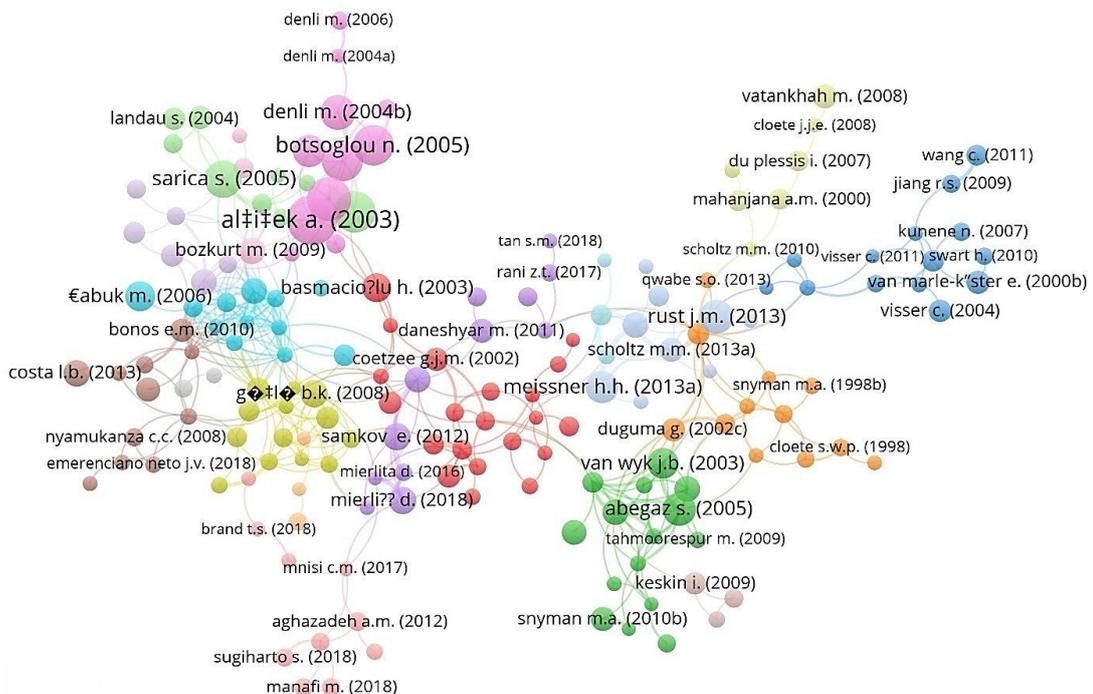et al.* (2003), had 173 citations, and the second-most cited article had 138. It should be noted that both these articles are by the same author from Turkey. The title of the most cited article is "The effect of an essential oil combination derived from selected herbs growing wild in Turkey on broiler performance." The most cited article from a South African author is that of Rust (2013), with 82 citations. The title of this article is "Climate change and livestock production: A review with emphasis on Africa". The four most cited papers published by South African authors all originate from the special issue on "A balanced perspective on animal production, from environmental to human health issues" that was published in 2013. These papers are from Rust, Meissner (a and b), and Scholtz. This demonstrates the value of special issues on a specific topic, in terms of encouraging engagement and citations.

Table 2 Major papers published in the South African Journal of Animal Science (SAJAS), ranked according to the number of citations

Article	DOI/URL	Country of 1st author	Number of citations
Alçiçek, A. *et al*., 2003. The effect of an essential oil combination derived from selected herbs growing wild in Turkey on broiler performance. SAJAS, 33 (2), 89–94	DOI: 10.4314/sajas.v33i2.3761	Turkey	173
Alçiçek, A. *et al.,* 2004. The effect of a mixture of herbal essential oils, an organic acid or a probiotic on broiler performance. SAJAS, 34 (4), 217–222	https://hdl.handle.net/10520/EJC94382	Turkey	138
Basmacıoğlu, H. *et al.,* 2004. The effect of oregano and rosemary essential oils or alpha-tocopheryl acetate on performance and lipid oxidation of meat enriche. SAJAS, 34 (3), 197–210	https://www.researchgate.net/publication/299111286	Turkey	123
Botsoglou, N. *et al*., 2005. The effect of feeding rosemary, oregano, saffron and α-tocopheryl acetate on hen performance and oxidative stability of eggs. SAJAS, 35 (3), 143–151	DOI: 10.4314/sajas.v35i3.4053	Greece	118
Botsoglou, N., *et al*., 2004. The effect of a mixture of herbal essential oils or á-tocopheryl acetate on performance parameters and oxidation of body lipid in broilers. SAJAS, 34 (1), 52–61	DOI: 10.4314/sajas.v34i1.4039	Greece	117
Sarica, S., *et al.,* 2005. Use of an antibiotic growth promoter and two herbal natural feed additives with and without exogenous enzymes in wheat based broiler diets. SAJAS, 35 (1), 61–72	DOI: 10.4314/sajas.v35i1.4050	Turkey	100
Denli, M*., et al.,* 2004. Effect of dietary supplementation of herb essential oils on the growth performance, carcass and intestinal characteristics of quail (*Coturnix coturnix japonica*). SAJAS, 34 (3), 174–179	www.sasas.co.za/wp-content/uploads/2012/09/denli_0.pdf	Turkey	85
Rust, J.M. *et al*., 2013. Climate change and livestock production: A review with emphasis on Africa. SAJAS, 43 (3), 256–267	DOI: 10.4314/sajas.v43i3.3	South Africa	82
Abegaz, S., *et al*., 2005. Model comparisons and genetic and environmental parameter estimates of growth and the Kleiber ratio in Horro sheep. SAJAS, 35 (1), 30–40	www.sasas.co.za/wp-content/uploads/2012/09/abegaz35issue1_0.pdf	South Africa	78
Meissner, H.H., *et al*., 2013. Sustainability of the South African Livestock Sector towards 2050. Part 1: Worth and impact of the sector. SAJAS, 43 (3), 282–297	DOI: 10.4314/sajas.v43i3.	South Africa	73
Bölükbaşi, C., *et al*., 2006. Effect of dietary thyme oil and vitamin E on growth, lipid oxidation, meat fatty acid composition and serum lipoproteins of broilers. SAJAS, 36, 189–196	www.ajol.info/index.php/sajas/article/view/4004/11946	Turkey	73
Van Wyk, J.B., *et al*., 2003. Revised models and genetic parameter estimates for production and reproduction traits in the Elsenburg Dormer sheep stud. SAJAS, 33 (4), 213–222	DOI: 10.4314/sajas.v33i4.3777	South Africa	66
Çabuk, M., *et al*., 2006. Effect of a dietary essential oil mixture on performance of laying hens in the summer season. SAJAS, 36 (4), 215–221	www.ajol.info/index.php/sajas/article/view/4008/11949	Turkey	65
Basmacioglu, H., *et al.,* 2003. Effects of dietary fish oil and flax seed on cholesterol and fatty acid composition of egg yolk and blood parameters of laying hens. SAJAS, 33 (4), 266–273	DOI: 10.4314/sajas.v33i4.3776	Turkey	61
Güçlü, B.K., *et al*., 2008. Effects of dietary oil sources on egg quality, fatty acid composition of eggs and blood lipids in laying quail. SAJAS, 38 (2), 91–100	www.ajol.info/index.php/sajas/article/view/4114/38303	Turkey	53

Table 2 Major papers published in the South African Journal of Animal Science (SAJAS), ranked according to the number of citations (continued)

Article	DOI/URL	Country of 1st author	Number of citations
Mierlita, D., 2018. Effects of diets containing hemp seeds or hemp cake on fatty acid composition and oxidative stability of sheep milk. SAJAS, 48 (3), 504–515	DOI: 10.4314/sajas.48i3.11	Romania	52
Samkova, E., *et al*., 2012. Animal factors affecting fatty acid composition of cow milk fat: A review. SAJAS, 42 (2), 83–100	DOI: 10.4314/sajas.v42i2.1	Czech Republic	52
Bozkurt, M., *et al*., 2009. The effect of single or combined dietary supplementation of prebiotics, organic acid and probiotics on performance and slaughter characteristics of broilers. SAJAS, 39 (3), 197–205	DOI: 10.4314/sajas.v39i3.49152	Turkey	50
Costa, L.B., *et al*., 2013. Review article: Herbal extracts and organic acids as natural feed additives in pig diets. SAJAS, 43 (2), 181–193	DOI: 10.4314/sajas.v43i2.9	Brazil	49
Houshmand, M., *et al*., 2012. Effects of non-antibiotic feed additives on performance, immunity and intestinal morphology of broilers fed different levels of protein. SAJAS, 42 (1), 22–32	DOI: 10.4314/sajas.v42i1.3	Iran	48
Snyman, M.A., *et al*., 1996. Variance components and genetic parameters for body weight and fleece traits of Merino sheep in an arid environment. SAJAS, 26 (1), 11–14	www.ajol.info/index.php/sajas/article/view/138365/127933	South Africa	48
Duguma, G, *et al*., 2002. Genetic parameter estimates of early growth traits in the Tygerhoek Merino flock. SAJAS, 32 (2), 66–75	DOI: 10.4314/sajas.v32i2.3747	South Africa	47
Pilarczyk, R., *et al*., 2015. Fatty acid profile and health lipid indices in the raw milk of Simmental and Holstein-Friesian cows from an organic farm. SAJAS, 45 (1), 30–38	DOI: 10.4314/sajas.v45i1.4	Poland	46
Corduk, M., *et al*., 2007. Effects of dietary energy density and L-carnitine supplementation on growth performance, carcass traits and blood parameters of broiler chickens. SAJAS, 37 (2), 65–73	DOI: 10.4314/sajas.v37i2.4029	Turkey	46
Fourie, P.J., *et al*., 2002. Relationship between production performance, visual appraisal and body measurements of young Dorper rams. SAJAS, 32 (4), 256–262	www.sasas.co.za/wp-content/uploads/2012/09/fourievol32no4_0.pdf	South Africa	43
Daneshyar, M., *et al*., 2011. Effects of dietary turmeric supplementation on plasma lipoproteins, meat quality and fatty acid composition in broilers. SAJAS, 41 (4), 420–428	DOI: 10.4314/sajas.v41i4.13	Iran	42
Snyman, M.A., 2010. Factors affecting pre-weaning kid mortality in South African Angora goats. SAJAS, 40 (1), 54–64	DOI: 10.4314/sajas.v40i1.54128	South Africa	42
Ebrahimzadeh, S.K., *et al*., 2018. Effects of grape pomace and vitamin E on performance, antioxidant status, immune response, gut morphology and histopathological responses in broiler chickens. SAJAS, 48 (2), 324–336	DOI: 10.4314/sajas.v48i2.13	Iran	41
Scholtz, M.M., *et al*., 2013. A South African perspective on livestock production in relation to greenhouse gases and water usage. SAJAS, 43 (3), 247–254	DOI: 10.4314/sajas.v43i3.2	South Africa	41
Vatankhah, M., *et al*., 2008. Heritability estimates and correlations between production and reproductive traits in Lori-Bakhtiari sheep in Iran. SAJAS, 38 (2), 110–118	www.scielo.org.za/scielo.php?script=sci_arttext&pid=S0375-15892008000200005	Iran	41

The major groups of keywords used in published articles (Table 3) are linked to genetics, poultry, and nutrition. Papers linked to poultry production are more recent and show higher numbers of citations. The five major keywords are growth, sheep, production, beef, and broiler.

Table 3 Major keywords in articles published in the South African Journal of Animal Science

Keyword	Cluster[1]	Occurrences	Average publication year	Average number of citations
growth	9	94	2014	7.55
sheep	4	80	2009	8.24
production	3	68	2013	22.49
beef	2	57	2008	12.00
broiler	3	56	2013	20.21
meat quality	3	47	2014	9.36
pig	6	46	2010	6.11
digestibility	1	45	2013	9.04
heritability	2	43	2007	10.47
milk production	2	42	2009	7.93
nutrition	1	42	2008	8.36
dairy	2	39	2010	8.18
Capra hircus	1	38	2005	11.21
feed conversion	5	35	2014	7.40
body weight	8	32	2012	9.03
fatty acid	5	31	2014	8.87
carcass characteristics	9	27	2015	11.48
poultry	3	26	2013	12.19
intake	1	25	2008	6.48
genetic parameter	2	24	2009	13.21
ruminant	1	24	2012	7.63
Coturnix coturnix japonica	7	23	2012	19.70
carcass	4	22	2014	9.36
reproduction	6	22	2007	11.09
genetic correlation	2	21	2008	15.76
feed intake	9	20	2013	6.40
chemical profile	1	19	2009	11.74
egg production	8	19	2011	13.05
amino acid	4	18	2009	5.17
breed	6	18	2014	16.67

[1]Keywords in the same cluster appear together more often

Since many of the citing countries are in the Global South, these may not be captured in Scopus or Web of Science, as they occur in local or regional journals and books and are affected by access type (open or closed), field, and study topics. International cooperation also helps to increase impact and visibility (Tahamtan *et al.*, 2016; McManus *et al.*, 2021). There is, therefore, a risk of selection bias, citation bias, publication bias, and other forms of bias, due to the starting set of articles retrieved (Belter, 2016; Sarol *et al.*, 2018).

Discussion

This study analysed an extensive range of bibliometric data related to the South African Journal of Animal Science, providing insights into its trends and its regional and global scientific and social impact. This bibliometric analysis reveals important insights into the journal's academic development, impact, and thematic orientation. The journal has shown a steady publication record, reflected by advancements in its Scimago ranking from Q3 to Q2 in both 2014 and 2017. The publication timeline reveals steady growth until 2006, after which the journal stabilised at an average of 80 papers published annually. This consistency demonstrates its establishment as a reliable platform for animal science research. However, despite being the second highest-ranked African journal in the fields of Animal Science and Zoology, it still struggles to achieve global significance, according to the SJR indicator. This situation underscores the journal's regional relevance while indicating that targeted strategies could boost its international standing. The journal's website notes that its primary publication disciplines include nutrition, genetics, and physiology. Additionally, submissions addressing sociological aspects of well-defined livestock production systems are welcomed. Nonetheless, the journal's average CNCI of 0.43 suggests a limited broader impact. While 77% of its articles have been cited, the relatively low CNCI reflects a weak position within international academic circles, as also indicated by the SJR indicator. Given that the journal's impact varies across fields (Agriculture, Environment and Ecology; Clinical and Life Sciences; and Social Sciences), these discrepancies underscore the journal's strengths in agricultural subjects while revealing its limited reach in multidisciplinary and life science fields.

Thematic trends reveal a strong focus on poultry and ruminants, aligning with global agricultural priorities. However, the underrepresentation of research on wild animals and indigenous South African breeds highlights an area for growth. Promoting studies on these underexplored topics could help the journal carve a distinctive identity while showcasing unique regional biodiversity. Currently, the focus on commercially significant breeds like Merino sheep and Holstein cattle dominates. By fostering research on indigenous breeds and their climate adaptability, the journal could lead efforts in sub-tropical, tropical and semi-arid animal production systems, enhancing its relevance and addressing climate-smart production systems and global challenges.

The citation patterns found reinforce the journal's role in African and Brazilian contexts, as it frequently references established global journals like the Journal of Animal Science, while receiving citations mainly from its own publications and regional journals such as the Revista Brasileira de Zootecnia. While this self-referencing underscores the journal's regional influence, it also presents an opportunity to engage with a broader international audience. Increased collaboration with global researchers and targeting high-impact journals could strengthen its integration into global research networks.

The authorship and collaboration dynamics found further illustrate the journal's evolution. While it primarily attracts researchers from South Africa, Brazil, Turkey, and Asia, other contributors have emerged in recent years, reflecting an expanding network. Turkish publications, in particular, exhibit higher citation counts, signalling the relevance of their contributions, especially in poultry research. This geographic diversification demonstrates the potential for the journal to strengthen its international reach. However, clustering research into geographic and thematic groups also indicates a need for more integrated and diverse collaboration across regions. Four South African institutions produce 55% of academic publications, highlighting a regional dominance that may limit diverse perspectives. Strengthening international funding partnerships, especially beyond the Global South, can enhance the journal's impact. While the NRF supported 44 of the publications, Brazilian institutions also notably contributed to funding, showcasing the importance of cross-border collaborations.

The journal's societal impact is reflected in its contributions to policy documents and patents. Ninety-six papers have been referenced in 120 policy documents, aligning with Sustainable Development Goals (SDGs) such as Good Health and Well-Being (SDG 3) and Climate Action (SDG 13). Citations in policy documents published by organisations such as the Food and Agriculture Organization of the United Nations and the European Food Safety Authority highlight the journal's relevance to global policymaking. However, the journal's relatively low Field-Weighted Citation Impact of 0.77 and the limited representation of publications in patents (1.7%) suggests untapped potential in translational research and industrial applications. Encouraging research with broader applicability could address this gap. Contributions to SDGs such as Life Below Water (SDG 14) and Gender Equality (SDG 5) reflect progress in global cooperation. However, challenges persist in engaging with researchers and policymakers in regions not adequately captured by indexed databases like Scopus and Web of

Science. These limitations highlight the risk of biases in citation, selection, and publication. Addressing these biases through proactive outreach to underrepresented regions and promoting open-access publishing could significantly expand the journal's global impact.

Overall, the South African Journal of Animal Science is a key component for the advancement of animal science research within its region, but needs to expand its international influence. By leveraging its strengths in core thematic areas, fostering interdisciplinary collaboration, and addressing gaps in regional representation, the journal can enhance its impact on both academic and societal levels. Strategic efforts to engage with global research networks and broaden its thematic and geographic scope will be key to sustaining its growth and relevance in the evolving landscape of animal science research.

Conclusions

The South African Journal of Animal Science was established as a platform for disseminating research and knowledge on livestock production and health in South Africa, with a strong focus on animal production. However, its scope has yet to incorporate emerging areas such as omics studies or the effects of climate change, which are critical for advancing modern animal science. Expanding its impact requires attracting more authors from global regions and reaffirming its role in supporting sustainable animal agriculture, particularly in tropical regions where challenges are often more significant than in temperate areas. Publishing special issues on topics such as South African breeds or wildlife, omics science integration, and landscape genomics could help highlight the region's unique farming systems and biodiversity. An example is the special issue that was published in 2013 with the theme "A balanced perspective on animal production, from environmental to human health issues". Three of the most cited articles by South African authors are from this special issue.

As a cornerstone for African animal science research, the journal must leverage its strengths, foster interdisciplinary collaborations, and address gaps in regional and thematic representation. By engaging with global research networks and broadening its scope, the journal can sustain its growth, enhance its influence, and remain relevant in the rapidly evolving field of animal science.

Authors' contributions

CM and FP initiated the study following a discussion with MMS. Thereafter all authors contributed equally to the study.

Conflict of interest

The authors declare no conflicts of interest.

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