Current Profiling of Research on Donkeys and Its Implications in Global Studies Based on Bibliometric Analysis

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Abstract

Tremendous work has been conducted in equine medicine research, with special reference to donkeys. Our study surveyed applied studies on donkeys by 2023 in a quantitative manner. Data were retrieved from the Web of Science database. The points investigated addressed the general criteria of global donkey research. Statistical data were set for each studied item using VOSviewer software, with a focus on the top ten results for each item. A total of 2947 documents were extracted, results revealed that author Burden F.A. had the highest number of published papers (68, 2.30%), publications in 2020 (8.92%) were at the front. The Egyptian Knowledge Bank (EKB) had the highest number of papers (177, 6.01%), the National Natural Science Foundation of China (Nsfc) (91, 3.08%) was the top funding agency, USA was the top nation in publications (13.87 %), and the majority of publications were in English (2757, 93.55 %). The highest publications in WOS categories, were collected from Veterinary Sciences (1695, 57.51%). Research articles were the most abundant form (85.61 %). Dairy and Animal Sciences was at the top of citation topics (351, 11.91%). Elsevier had the highest publications (23.58%), Journal of Equine Veterinary Science was placed in the top journals (163, 5.53%). The data from the current study can be used to assess the situation of applied research on donkeys, helping to set possible future maps.

KEYWORDS
Donkeys, Research, Bibliometric analysis, Publications

INTRODUCTION

Donkeys resemble a unique class of equine, sensitive, and smart, as is known for this species category, with specific differences from horses (Grosenbaugh *et al.*, 2011). Globally, they have been the focus of attention as animal models for studying all aspects of equine medicine and behavior (Marzok and El-khodery, 2015; Marzok et al., 2022). Being an animal that can withstand poor feed, diseases, and masking overt emblems of distress and discomfort, they have been regarded as requisites, especially for human countryside livelihoods. Donkeys are less of a flight animal and have been used by humans for packing and draught work. Donkeys are distributed at varying densities worldwide. To date, the world of veterinary sciences has paid attention to equine health, which resembles a wealth to date (Wang *et al.*, 2022).

Anticipating the emerging trends in donkey medicine is a mast that necessitates evaluating the publication's coherence and quality. Bibliometric analysis can also be helpful in the same context. Bibliometric analysis is an analytical method that employs statistics to quantitatively assess research productivity for a certain scientific trend (Drijvers *et al.*, 2020). Pritchard (1969) identified that the term "bibliometrics" is an expression alternative to the term "statistical bibliography." This type of metric analysis is used to set descriptive guidelines for scientific literature concerning core research publications in a specific field worldwide. It comprises a wide range of assessment bases, providing insight into the current situation, possible future output, and the influence of the studied fields (Hsu *et al.*, 2020). Focusing on these words, it could be helpful to flare-up the point where a research field is present. At the literature level, various descriptive items are categorized and analyzed, such as handling specific research fields, authors and co-authors contributions, specific veterinary journal (Crawley-Low, 2006; Krauskopf *et al.*, 2017; Pelzer and Wiese, 2003; Schoenfeld-Tacher and Alpi, 2021) collaborative and interdisciplinary publications, and universities. There

are many different types of bibliometric analysis used in scientific research. The most commonly used methods are citation analysis, co-citation analysis, co-occurrence (keyword or co-word) analysis, bibliographic coupling, and co-authorship analysis (Van Eck and Waltman, 2014). Citation analysis measures the impact of relevant research units in the scientific field, such as authors, journals, and institutions) in a scientific field. It is presumed that these research units receive more citations, which are considered the most significant, indicating greater effectiveness, rank, and quality (Donthu *et al.*, 2021). Additionally, Co-citation analysis determines whether two research units appear together in the bibliography, indicating a strong co-citation relationship (Van Eck and Waltman, 2014). Moreover, Co-occurrence analysis elucidates concepts that are frequently shared in abstracts, titles, or even keywords of publications based on thematic clusters created by the relationships between these concepts and visualizes this as a conceptual network (Donthu *et al.*, 2021). Similarly, bibliographic coupling displays all current studies, and old and seminal studies appear in the co-citation analysis. It depicts the current situation of intellectual structure in a certain scientific trend (Boyack and Klavans, 2010). In addition, co-authorship analysis was used to demonstrate social partnerships in a field study (Rousseau *et al.*, 2018).

In contrast to traditional literature reviews, such as systematic literature reviews or meta-synthesis, which could embrace analysis bias or even publication bias, bibliometric inquiry presents a more objective assessment of a specific literature. Moreover, bibliometric analyses provide substantial issues for researchers that guide to the most effective studies before they start reading, helping them find the current gaps in a specific field of research and inspiring new ideas to study, identify, and map research trends to appreciate the conceptual, social, or cognitive structure of their future studies (Donthu *et al.*, 2021; Zupic and Čater, 2015). Over the past decades, only a few bibliometric publications on veterinary research have been documented as a general concept. To the best of our knowledge, this study is the first to apply this type of metric analysis in future research on donkeys.

MATERIALS AND METHODS

Data source and search strategy

Data collection was achieved by first identifying the databases and choosing appropriate search strategy techniques, data retrieval techniques, and cleaning the data before feeding them into different tools for analysis and visualization.

In this bibliometric analysis, publications on donkey field research up to March 2023 were retrieved from the Web of Science (WoS) database. The search equation was developed by using the main terms of donkeys identified in the literature as follows: ("DONKEYS"). In addition, the search was performed using the WoS topic field, which included the title, abstract, and author keywords. Moreover, the search was performed on a single day to avoid bias caused by daily database update.

Raw data were extracted in the BibTeX and txt formats using the WoS extraction tool. Information fields related to authors, institutions, countries of publication, citation topics, WOS categories, publication types, languages, research areas, funding agencies, publishers, publication titles (journals), and publishing ages (years) were included in the extraction process (Figure 1).

Eligible criteria

In the current study, only original articles and reviews pub-

lished in field research on donkeys were included. Documents, including (1) retracted publications, (2) record reviews, (3) theater reviews, and (4) fiction and creative prose, were excluded.
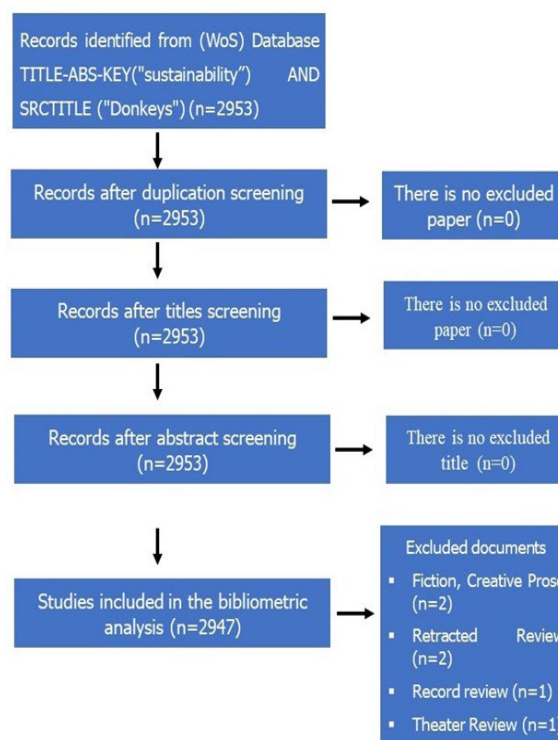

Figure 1. Diagram shows the number of documents on donkey's research at each stage of the screening process.

Data analysis

Publication characteristics were tabulated, including authors, institutions, countries of publication, citation topics, WOS categories, publication type, languages, research areas, funding agencies, publishers, journals, and publishing year. The co-cited authors have indicated that they have been cited together. VOSviewer (version 1.6.14) software was used to analyze the relationships among the most highly productive countries, research institutions, and frequently used keywords. We performed cluster analysis and generated social network maps (consisting of nodes and links) for countries, institutions, and keywords using VOSviewer (Mulet-Forteza *et al.*, 2019). The cluster was also obtained using VOSviewer by analyzing the frequency of the same keywords appearing within different papers. We set either two or four times the minimum frequency of keyword occurrence in the publications, reflecting the number of included studies (2947) and the consequent analysis results, respectively. Different nodes in a map represent elements including a country, institution, or keywords. The size of the nodes reflects the number of publications or frequencies; the larger the node, the greater is the number of publications or frequencies (Liang *et al.*, 2017). The links between nodes represent the relationships among collaboration, co-occurrence, or co-citations. The colors of the nodes and lines represent different clusters (Gao *et al.*, 2019).

RESULTS

Using the term "Donkey" in the paper title, summary, or search terms, the WOS database was accessed to collect reference information on the study participants. In total, 2947 documents were extracted from the WOS until March 2023.

Authors

The 2947 publications related to donkeys and their implications in global studies were collected based on our search criteria were published by 200 authors (not including anonymous). Author Burden F.A., has the highest number of published papers (68, 2.30%), followed by Wang Changfa (32, 1.08%), Hidalgo Manuel, Dorado Jesus, and Mclean Amy (24, 0.81%), Dang Ruihua (23, 0.78%), Camillo Francesco, Whay Helen R., Trawford Andrew (22, 0.74%), Lei Chuzhao (21, 0.71%). Co-authorship networks at the author level by VOSviewer of 2947 publications related to donkeys and their implications in global studies until March 2023 are shown in Figure 2.
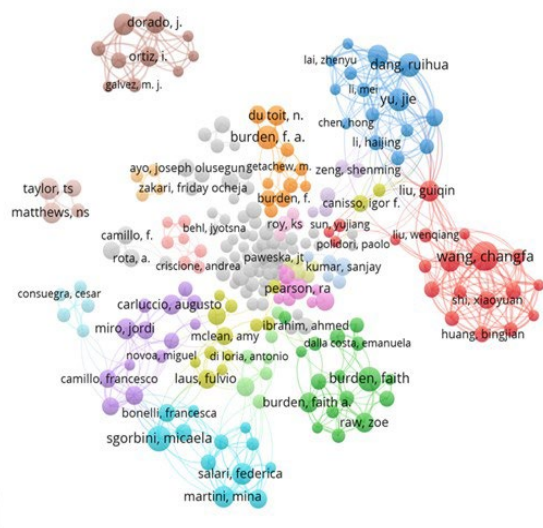

Figure 2. VOSviewer diagram on authors contributing research on donkeys.

Publishing age (Year)

The investigation displays donkey-related research publications until March 2023, in order of publication year. There of 263 publications that were published in 2020 (8.92%), followed by 238 articles were published in 2022 (8.07%), 215 articles were published in 2021(7.29%), 197 papers were published in 2019 (6.68%), 172 papers were published in 2018 (5.83%), 148 articles published in donkey research, representing a 5.02% in the year of 2017), 130 papers were published in 2015 (4.41%), 128 papers were published in 2013 (4.34%), and 118 papers were published in 2014 and 2016 (4.00%).

Institutions

The Egyptian Knowledge Bank (EKB) had the highest number of publications (177, 6.01%), followed by the Donkey Sanctuary (108, 3.66%), Universidad De Cordoba (81, 2.74%), University of PLSA (80, 2.71%), and University of California System (174, 5.90%), Cairo University (59, 2%), University of Edinburgh (56, 1.90%), University of California Davis (49, 1.66%), Indian Council of Agricultural Research ICAR (48, 1.62%), and liaocheng University (48, 1.62%). Co-authorship networks at the institutional level by VOSviewer of 2947 publications related to donkeys and their implications in global studies until March 2023 are shown in Figure 3.

Funding agencies

Regarding funding agencies, 2947 publications appeared in the search through the WOS. The highest publications received
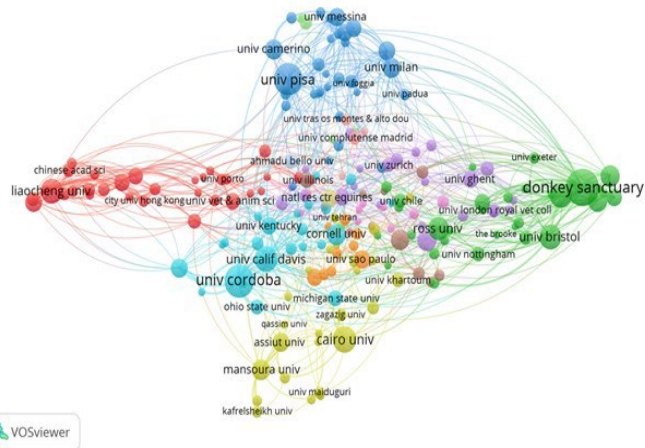

Figure 3. VOSviewer diagram on institutions contributing research on donkeys.

funding from the National Natural Science Foundation of China (Nsfc) (91, 3.08%), followed by European Commission (41, 1.39%), Conselho Nacional De Desenvolvimento Cientifico E Technologico Cnpq (33, 1.11%), Co ordenacao De Aperfeicoamento De Pessoal De Nivel Superior Capes (28, 0.95%), Spanish Government (28, 0.95%), Donkey Sanctuary (27, 0.91%),United States Department of Health Human Services (20, 0.67%), National Institutes of Health Nih, USA (19, 0.64%), Open Project of Shandong Collaborative Innovation Center for Donkey Industry Technology (19, 0.67%), and Taishan Leading Industry Talents Agricultural Science of Shandong Province (15, 0.50%).

Countries of publication

Researchers reporting affiliations in 129 countries participated in 2947 publications related to donkeys and their implications for global studies. The top ten nations with regard to total publication number were the USA, England, Italy, Peoples R China, Spain, Egypt, Brazil, India, Scotland, and Germany. USA, with 409 publications (13.87 %), was the top nation in donkeys and its implications in global studies, followed by England (349 publications, 11.84 %), Italy (333 publications, 11.29 %), People's R China (236 publications, 8.01 %), Spain (196 publications, 6.65 %), Egypt (181 publications, 6.14 %), Brazil (174 publications, 5.90 %), India (128 publications, 4.34 %), Scotland (127 publications, 4.30 %), and Germany (125 publications, 4.24 %) until March of the year, 2023. Co-authorship networks at the country level by VOSviewer of 2947 publications related to donkeys and their implications in global studies until March 2023 are shown in Figure 4.
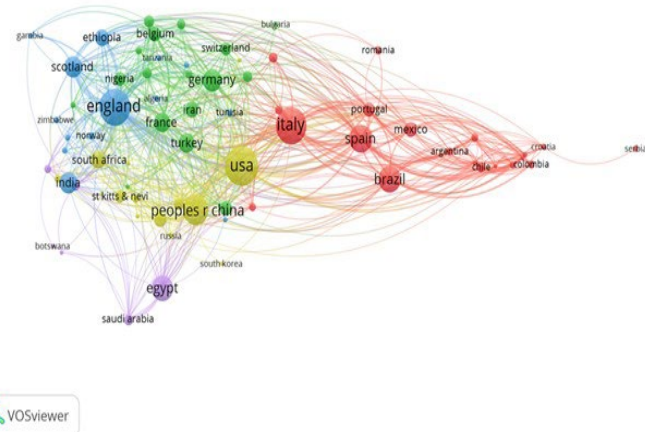

Figure 4. VOSviewer diagram on countries of publication on donkey's research.

Language

The majority of publications were in English (2757, 93.55 %). The other publications were in German (54, 1.83 %), Portuguese (34, 1.15 %), French (20, 0.67 %), Italian (19, 0.64 %), Spanish (19, 0.64 %), Russian (6, 0.20 %), Dutch (5, 0.16 %), Turkish (5,0.16 %), and Polish (4, 0.13%).

WOS categories

All 2947 publications related to donkey searches were observed in 172 categories of WOS, of which the highest publications were collected from Veterinary Sciences (1695, 57.51%), followed by Agriculture Dairy Animal Science (509, 17.27%), parasitology (257, 8.72%), zoology (225, 7.63%), reproductive biology (119, 4.03%), microbiology (88, 2.98%), infectious diseases (77, 2.61%), multidisciplinary science (74, 2.51%), genetics heredity (72, 2.44%), and agronomy (68, 2.30%).

Research areas

The most frequently researched areas were veterinary sciences (1689, 57.31%), agriculture (613, 20.80%), parasitology (256, 8.68%), zoology (224, 7.60%), reproductive biology (118, 4%), environmental sciences ecology (102, 3.46%), microbiology (87, 2.95%), science technology other topics (80, 2.71%), infectious diseases (76, 2.57%), and genetics heredity (72, 2.44%).

Citation topics

According to the citation topics meso, the ten most highly cited publications in Section 3.51. Dairy and Animal Sciences (351, 11.91%), followed by 3.232. Veterinary Sciences (347, 11.77%), 1.163. Parasitology: general (260, 8.82%), 1.258. Zoonotic disease (151, 5.12%), 1.81. Reproductive Biology (117, 3.97%), 3.85. Food Science and Technology (102, 3.46%); 1.217. Parasitology, Malaria, Toxoplasmosis and Coccidiosis (86, 2.91%): 1.261. Parasitology: Trypanosoma and Leishmania (83,2.81%), 1.43. Anesthesiology (72, 2.44%) and 1.104. Virology: General (71, 2.40%) until March of the year of 2023.

In addition to the citation topics micro, the most top ten highly cited publication topics are 3.232.1304 Horse (226,7.66%), followed by 1.163.1022 Haemonchus Contortus (211, 7.15%), 3.51.799 Animal Welfare (191, 6.48%), 1.258.227 Lyme Disease (136, 4.61%), 3.85.784 Cheese (97, 3.29%), 1.81.176 Spermatozoa (91,3.08%), 3.51.115 Corpus Luteum (87,2.95%), 1.217.1038 Toxoplasma Gondii (86, 2.91%), 1.261.596 Trypanosoma Cruzi (71,2.40%), and 1.43.1642 Xylazine (66, 2.23%) (Figure 5, 6 and 7).
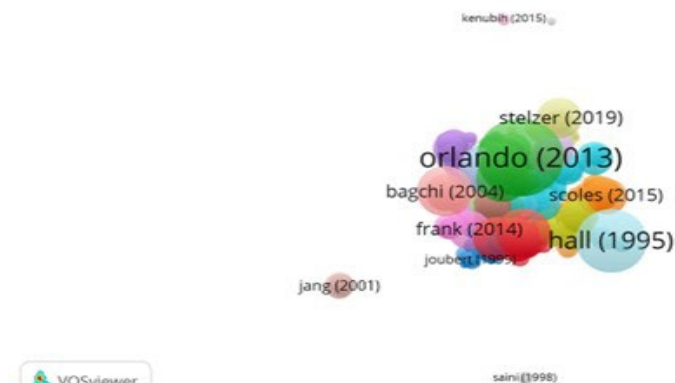

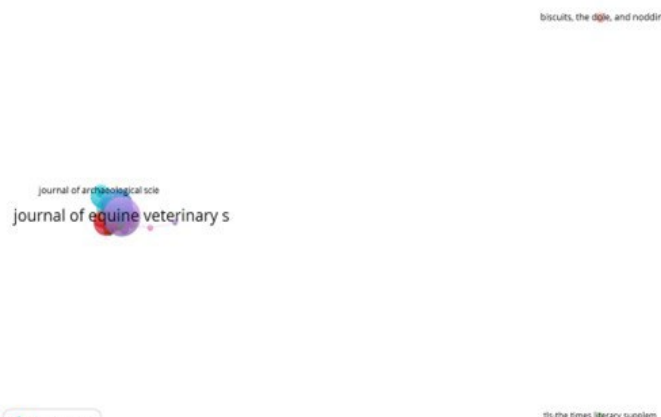Figure 5. VOSviewer diagram on Citation topics of authors on donkey's research.

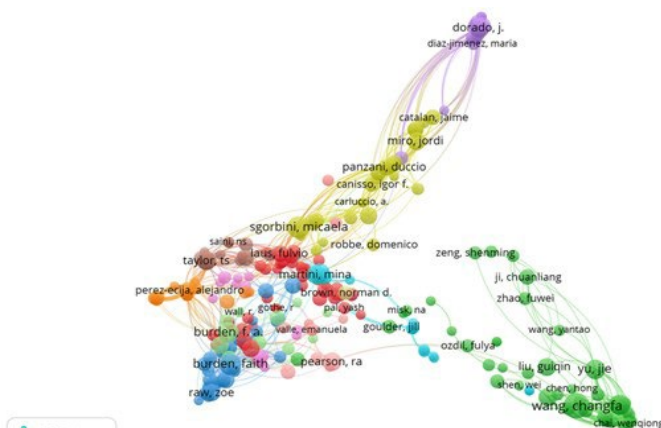Figure 6. VOSviewer diagram on Citation topics of journals on donkey's research.

Figure 7. VOSviewer diagram on Citation topics of references on donkey's research

Co-Citation analysis

Author co-citation analysis was performed to identify and visualize the intellectual structure of donkey research. A visualization of the co-citation network shown in Figure 8 reveals that the most co-cited versus cited reference is the Burden F., 2015 j. Equine Vet. Sci. in donkey field research.
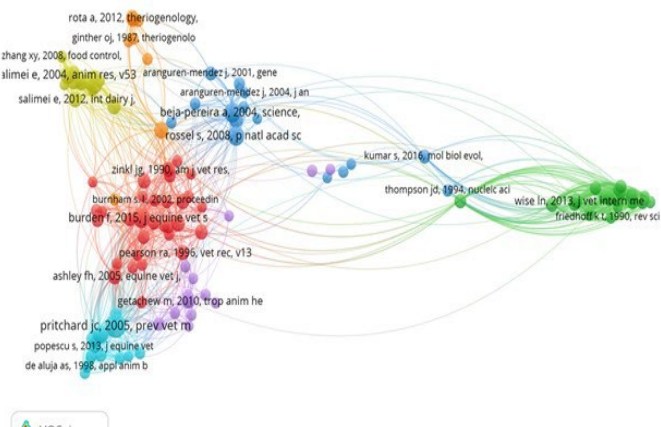

Figure 8. VOSviewer diagram shows the most co-cited versus cited reference network on donkey's research.

Publication type

Among 2947 publications, research articles were the most abundant (2523 of 2947 publications, 85.61 %), followed by proceedings papers (165, 5.59 %), review articles (119, 4.03 %), edi-

torial material (55, 1.86 %), meeting abstracts (47, 1.59 %), book chapters (46, 1.56 %), book reviews (41, 1.39 %), notes (33, 1.11 %), early access (18, 0.61 %), and letters (17, 0.57 %).

Publishers

From the total of 2947 papers in the donkey research field until March of the 2023 year, (23.58%) 695 papers were published in Elsevier, 342 (11.60%) in Wiley, 242 (8.21%) in Spring Nature, 174 (5.90%) in MDPI, 67 (2.27%) in Taylor and Francis, 64 (2.17%) in Frontiers Media Sa, 55 (1.86%) in Uni Edinburgh Ctr Tropical Veterinary Med, 45 (1.52%) in Cambridge University Press, 41 (1.39%) in Indian Counc. Agricultural Res., and 40 (1.35%) in British Veterinary Assoc.

Publication titles (Journals)

Among the 187 publication titles in the donkey search field, the highest publication titles were Journal of Equine Veterinary Science (163, 5.53%), followed by Animals (121, 4.10%), Veterinary Parasitology (78, 2.64%), Equine Veterinary Journal (70, 2.37%),Veterinary Record (67,2.27%), Donkeys, Mules and Horses in Tropical Agricultural Development (55, 1.86%), Tropical Animal Health and Production (51,1.73%), Reproduction in Domestic Animals (45, 1.52%), Indian Journal of Animal Sciences (41, 1.39%), and Equine Veterinary Education (39, 1.32%).

Co-occurrence analysis

We performed a co-occurrence analysis to identify the most focused and accentuated content, topics, or keywords in the donkey research field. While doing this, the minimum number of occurrences of a keyword was selected as five, and thus, 57 keywords out of 2947 satisfied this criterion. Considering the average normalized citations, the 25 most frequently occurring keywords are shown in Figure 9.

Figure 9 shows a network of keywords that frequently occur in the donkey research field. The nodes in the network represent each of the 57 keywords, and the size of each node indicates the number of keyword occurrences across different studies. While the lines among nodes, if there, indicate that the two-connected keywords co-occurred in a research study, the thickness of the line represents the number of co-occurrences.
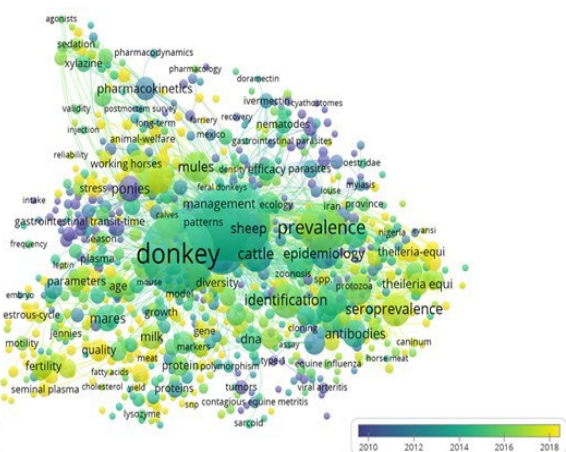

Figure 9. VOSviewer diagram shows the co-occurrence analysis (topics, or keywords) in the donkey research field.

DISCUSSION

As an extension of scientific statistics, side-by-side meta-analysis, and systematic literature scrutiny, bibliometric analysis is a popular technique. It allows the unpacking of the evolutionary nuances of a specific field by analyzing a large input of scientific data (Zan, 2012). However, its application in veterinary research is relatively limited, and considerable effort is required to varnish it. As a suitable model for bibliometric veterinary studies, global publications on donkeys need to be clarified and characterized. In this study, we present an overall view of the global rush point concerning research on donkeys following the descriptive issues of bibliometric analysis.

At the Authors' level of the included publications, Burden F.A. shared the highest number of published papers. Faith has worked for The Donkey Sanctuary since 2004, when she urbanized technical support services and programs of studies. She is an author of over 50 peer-reviewed articles and is proficient in the health and welfare of donkeys 'and mules. Co-authorship networks at the author level were also addressed in this study. This type of metric analysis was utilized to uncover the social structure rather than the intellectual structure of the authors (Lu and Wolfram, 2012). On the contrary of co-citation analysis, co-authorship visualizes the co-citied publications in a form of thematic clusters. One benefit of this type, unlike co-citation analysis, is that the common references between two publications do not change over time and remain identical (Jarneving, 2005; Lu and Wolfram, 2012).

Regarding the publication time analysis displayed on donkey-related research, our investigation revealed a slight gradual increase in the output since 2014, with relatively similar results of publications emitted in 2020 and 2022. As a general concept, public attitudes towards animal sciences have magnified worldwide over time (Pifer *et al.*, 1994). It could be that any research gate opens new horizons to other gates as continuity for supposed research ideas. The matter here is no different, where research on donkeys continues to be emphasized by age. General attributions might be the motive for such attention, such as environmental   changes that were parallel to the flaring of different diseases, and consequently, changing the research maps.

Institutions play an important role in the majority of the available publications. In the current study, The Egyptian Knowledge Bank (EKB) shared the greatest number of publications, although Egyptian universities offered less data, followed by the Donkey Sanctuary. These findings are not surprising, because they are considered one of the largest digital libraries worldwide. This institution collaborates with multiple technology providers to confirm a search experience for its users to be accurate, wholesome, time-saving and multidisciplinary (AbdelKader and Sayed, 2022).

The highest number of publications received funding from the National Natural Science Foundation of China (NSFC). The roles played by funding agencies and research organizations in the advancement of scientific inquiry are of utmost significance (Gläser and Velarde, 2018).

Continuing the overall characterization of the research input on donkeys, we identified the top ten countries, with regard to the total publication number, where the USA, England, and Italy were more interested than the other countries. This matter seems to be controversial, as North American donkeys approximately resemble 0.1% of donkey population worldwide (Kugler *et al.*, 2008). In contrast, the direction of donkey research in Brazil during the last decade has tracked the downward direction, which was coupled with a reduction in donkey populations, as seen in other countries of the continent (Carneiro *et al.*, 2018). In the same context, it is conceivable that the majority of publications were in English language (2757, 93.55 %).

In this study, the extracted documents (2947) were extracted from WoS until March 2023. The WoS Core collection was used because of the rigorous selection and evaluation process of the reported academic information, which is generally considered the best for detailed bibliometric analysis because its granularity enables researchers to objectively measure performance against papers related to scope and citation features. The acquired insights into the most prominent scholars and leading institutions

in the field may also be helpful for identifying funding opportunities and the potential for collaboration. Moreover, WoS encompasses more than 252 subject categories in the science, social sciences, arts, and humanities. In the present study, the highest publications were branded in Veterinary Sciences category (1695, 57.51%). This scheme was implemented by assigning each journal to one or more topic groups. However, because it is often difficult to allocate a journal to a single category, there may be overlapping coverage of categories. Each published item inherits all subject categories assigned to the parent journal (Birkle *et al.*, 2020).

Referring to pioneered citation topics, the data revealed that the main topics were focused on Dairy and Animal Sciences. Animal science is a broad term that encompasses all issues related to animal beings, where people are paying great attention. Thus, this kind of variety has surely helped rank it as a top field. Moreover, it has long been documented that donkeys are domesticated mainly as pack animals; however, in many countries, cultural notions have imposed other needs, and their talent as draught animals is seldom used. Donkeys' milk contains more sugar and protein, especially albumin, than cow's milk and can be used for special nutritional and dietary purposes as a niche product (Kugler *et al.*, 2008). During the last few years, the marketing of donkey milk and milk by-products has increased, and anticipating this, it is clear to find many citation topics in the dairy sciences related to donkeys.

Among all types of bibliometric analysis, citation analysis is the most widely used. This meaningful method aims to highlight influential publications, authors, institutions, and journals in a certain scientific discipline (Hallinger and Kovačević, 2021). It is used to substantiate that research in a field X is highly influenced by the theoretical perspective Y and that references to other potentially useful theoretical perspectives are relatively few or even nonexistent (Zupic and Čater, 2015).

Co-citation analysis includes organizing scientific literature into similar clusters of papers that are parallel to and handle specific content. Henry Small was the first to apply the co-citation analysis technique to detect the strengths and weaknesses of an institution (Surwase *et al.*, 2011). Co-citation analysis involves tracking pairs of papers cited together in home articles by many authors, and clusters of research have begun to be formed (Donthu *et al.*, 2021). These co-cited papers, represented in clusters, are inclined to share common tunes. In this study, an author co-citation analysis was performed to identify and visualize the intellectual structure of donkey research.

Regarding the publication type in donkey research fields, the form of research articles was the most abundant. This seems quite similar to what is commonly known for researchers in other fields of study. Research papers are usually more detailed and thorough than reviews. A research paper is usually peer reviewed, but a review paper is not always available. Generally, research papers are more formal than review papers (Booth *et al.*, 2003; Ömer Gülpınar, 2013) .

At the publisher level, Elsevier has the most publications, from a total of 2947 papers in the donkey research field until 2023. Elsevier is a leading publisher in the most well-respected science journals worldwide. Hence, publishing research in Elsevier is expected to be widely disseminated. Elsevier journals are a smart choice for scientific authors, including those interested in donkey science. In the aspect concerning the most publication titles (Journals) interested in the field of donkeys' research, the highest publication title was Journal of Equine Veterinary Science, while the least publications were in Equine Veterinary Education. Equine Veterinary Journal (EVJ) publishes evidence of improvements in clinical practice challenges and the expansion of scientific knowledge supporting equine veterinary medicine (Silver *et al.*, 2011). Undeniably, specialist journals have higher absorptive capacity for papers with high specialism in practice.

In this study, we performed a co-occurrence analysis to identify the most focused and accentuated content, topics, and keywords in the donkey research field. Co-occurrence analysis provides insights into the most widespread ideas, patterns, trends, and topics that may be considered in future mapping of scientific research (Wang and Chai, 2018).

CONCLUSION

In this work, for the first time, we offered an overall map to the current situation of efforts exerted on donkeys' science, resembling ''A call for proposal ''to land on the area of need, aiming to characterize the future workflow of the global research on donkeys.

ACKNOWLEDGMENTS

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

REFERENCES

AbdelKader, A.F., Sayed, M.H., 2022. Evaluation of the Egyptian knowledge bank using the information systems success model. The Journal of Academic Librarianship 48, 102506.

Birkle, C., Pendlebury, D.A., Schnell, J., Adams, J., 2020. Web of Science as a data source for research on scientific and scholarly activity. Quantitative Science Studies 1, 363-376.

Booth, W.C., Colomb, G.G., Williams, J.M., 2003. The craft of research. University of Chicago press.

Boyack, K.W., Klavans, R., 2010. Co-citation analysis, bibliographic coupling, and direct citation: Which citation approach represents the research front most accurately? Journal of the American Society for information Science and Technology 61, 2389-2404.

Carneiro, G.F., Lucena, J.E.C., de Oliveira Barros, L., 2018. The current situation and trend of the donkey industry in South America. Journal of equine veterinary science 65, 106-110.

Crawley-Low, J., 2006. Bibliometric analysis of the American Journal of Veterinary Research to produce a list of core veterinary medicine journals. Journal of the Medical Library Association 94, 430.

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., Lim, W.M., 2021. How to conduct a bibliometric analysis: An overview and guidelines. Journal of business research 133, 285-296.

Drijvers, P., Grauwin, S., Trouche, L., 2020. When bibliometrics met mathematics education research: the case of instrumental orchestration. Zdm, 1-15.

Gao, Y., Ge, L., Shi, S., Sun, Y., Liu, M., Wang, B., Shang, Y., Wu, J., Tian, J., 2019. Global trends and future prospects of e-waste research: a bibliometric analysis. Environmental Science and Pollution Research 26, 17809-17820.

Gläser, J., Velarde, K.S., 2018. Changing funding arrangements and the production of scientific knowledge: introduction to the special issue. Springer, pp. 1-10.

Grosenbaugh, D., Reinemeyer, C., Figueiredo, M., 2011. Pharmacology and therapeutics in donkeys. Equine Veterinary Education 23, 523-530.

Hallinger, P., Kovačević, J., 2021. Science mapping the knowledge base in educational leadership and management: A longitudinal bibliometric analysis, 1960 to 2018. Educational Management Administration & Leadership 49, 5-30.

Hsu, Y.-H.E., Yang, Y.-T., Wang, M.-H., Ho, Y.-S., 2020. Bibliometric analysis of highly cited publications in health policy and services. COLL-NET Journal of Scientometrics and Information Management 14, 177-202.

Jarneving, B., 2005. A comparison of two bibliometric methods for mapping of the research front. Scientometrics 65, 245-263.

Krauskopf, E., Garcia, F., Funk, R., 2017. Bibliometric analysis of multi-language veterinary journals. Transinformação 29, 343-353.

Kugler, W., Grunenfelder, H.-P., Broxham, E., 2008. Donkey breeds in Europe. Switzerland: St. Gallen.

Liang, Y.-D., Li, Y., Zhao, J., Wang, X.-Y., Zhu, H.-Z., Chen, X.-H., 2017. Study of acupuncture for low back pain in recent 20 years: a bibliometric analysis via CiteSpace. Journal of Pain Research 10, 951-964.

Lu, K., Wolfram, D., 2012. Measuring author research relatedness: A comparison of word-based, topic-based, and author cocitation approaches. Journal of the American Society for Information Science and Technology 63, 1973-1986.

Marzok, M.A., El-khodery, S.A., 2015. Comparative analgesic and sedative effects of tramadol, tramadol-lidocaine and lidocaine for caudal epidural analgesia in donkeys (*Equus asinus*). Veterinary Anaesthesia and Analgesia 42, 215-219.

Marzok, M., Almubarak, A.I., Al Mohamad, Z., Salem, M., Farag, A.M., Ibrahim, H.M., El-Ashker, M.R., El-Khodery, S., 2022. Reference Values and Repeatability of Pulsed Wave Doppler Echocardiography Parameters in Normal Donkeys. Animals 12, 2296.

Mulet-Forteza, C., Genovart-Balaguer, J., Merigó, J.M., Mauleon-Mendez, E., 2019. Bibliometric structure of IJCHM in its 30 years. International Journal of Contemporary Hospitality Management 31, 4574-4604.

Ömer Gülpınar, A.G.G., 2013. How to write a review article? Turkish Journal of Urology 39, 44-48.

Pelzer, N.L., Wiese, W.H., 2003. Bibliometric study of grey literature in core veterinary medical journals. Journal of the Medical Library Association 91, 434.

Pifer, R., Shimizu, K., Pifer, L., 1994. Public attitudes toward animal research: Some international comparisons. Society & Animals 2, 95-113.

Pritchard, A., 1969. Statistical bibliography or bibliometrics. Journal of documentation 25, 348.

Rousseau, R., Egghe, L., Guns, R., 2018. Becoming metric-wise: A bibliometric guide for researchers. Chandos Publishing.

Schoenfeld-Tacher, R.M., Alpi, K.M., 2021. A 45-year Retrospective Content Analysis of JVME Articles. Journal of Veterinary Medical Education 48, 729-746.

Silver, I., Jeffcott, L., Rossdale, P., 2011. Fifty years of the British Equine Veterinary Association as a facilitator of progress in equine clinical science. Equine veterinary journal 43, 618-631.

Surwase, G., Sagar, A., Kademani, B., Bhanumurthy, K., 2011. Co-citation analysis: An overview. Beyond librarianship, Creativity, Innovation and Discovery (Bosla National Conference Proceedings), 16-17 September, 2011, Mumbai,India

Van Eck, N.J., Waltman, L., 2014. Visualizing bibliometric networks, In: Measuring scholarly impact: Methods and practice. Springer, pp. 285-320.

Wang, M., Chai, L., 2018. Three new bibliometric indicators/approaches derived from keyword analysis. Scientometrics 116, 721-750.

Wang, Y., Hua, X., Shi, X., Wang, C., 2022. Origin, evolution, and research development of Donkeys. Genes 13, 1945.

Zan, B., 2012. A comparative bibliometric analysis study in scinentific disciplines at Turkey. Unpublished doctoral thesis). Ankara University, Ankara.

Zupic, I., Čater, T., 2015. Bibliometric methods in management and organization. Organizational research methods 18, 429-472.