



ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(1): 626-628
© 2022 TPI
www.thepharmajournal.com

Received: 25-11-2021
Accepted: 27-12-2021

Poonam Yadav
Department of Livestock
Production Management,
SKNAU, Jobner, Rajasthan,
India

Mahesh Datt
Department of Livestock
Production Management,
SKNAU, Jobner, Rajasthan,
India

A Scientometric analysis of research on egg fertility and hatchability in poultry during 2000-2020

Poonam Yadav and Mahesh Datt

Abstract

The research productivity data for the period from 2000 to 2020 were extracted from Google Scholar, web search engine. A total of 142 research items were published on egg fertility and hatchability across the world during the study period. The number of papers published in a year from India ranged from 12 (2013) to 2 (2006). The percent share of total publication was highest in 2013 (8.45%) and lowest in 2006 (1.41%). The relative growth rate (RGR) is highest in the year 2001 with the value 0.938 and it is found to be gradually decreasing throughout the years and reached the value 0.035 in the year 2016. However, the broad trends and key metrics derived from the study could provide inputs for making policy decisions on institutional strengthening, forging collaborations, enhancing grants and prioritizing research focus.

Keywords: poultry, egg fertility, hatchability, research productivity, Scientometric

Introduction

Domesticated birds, particularly those valued for their meat and eggs, such as chickens, turkeys, ducks, geese, and guinea fowl, are referred to as poultry. Chicken breeds account for 63% of all avian breeds, followed by ducks (11%), geese (9%), and turkeys (5%), while indigenous or heritage breeds account for the majority of the world's poultry genetic diversity (Pym, 2013). Poultry is fastest growing sector of Indian agriculture today. Poultry is currently India's fastest-growing agricultural sector. Since its inception, the Indian poultry industry has experienced remarkable growth, and is now emerging as a sunrise sector, with growth rates of 8.51 and 7.52 % in egg and broiler production, respectively (BAHS, 2019), compared to 2.5 % for agricultural crops (The Economic Survey, 2019-20). Several causes, including active developmental support from the state and central governments, research and development support from research institutes, international collaboration, and private sector participation, have undoubtedly contributed to this extraordinary growth. Poultry contributes significantly to food and nutrition by providing proteins, energy, and micronutrients to humans through a short production cycle and the ability to convert a wide range of wastes as well as agri-food byproducts into human-eating meat and eggs. Fertility and hatchability are used to determine genetic and reproductive fitness of poultry, as well as to assess the economic efficiency of parent stocks. To grow this sector, however, basic information on the influence of genetic and environmental factors on fertility and hatchability are essential. As a result, scientists all around the world are conducting extensive research on poultry. In this regard, the current study used scientometric analysis to map the scientific literature related to research productivity of poultry industry during 2000 to 2020. The key objectives of the present study were to examine the research efforts on fertility and hatchability of poultry, based on the publication outputs indexed in Google Scholar with special emphasis on (i) understanding the research trend of India *vis-a-vis* the world over the years, (ii) characterizing the co-authorship collaboration across the world.

Material and Method

Collection of Literature

The study was undertaken following various bibliometric research analyses (Gupta and Bala, 2013; Zyoud *et al.*, 2015, Antony *et al.*, 2019) ^[5, 6, 4]. The present study focused on papers published on egg fertility and hatchability in poultry during 2000–2020. The publication search was conducted in Google Scholar during December, 2021 deploying the keywords, “egg fertility and poultry”, “egg hatchability and poultry”, “egg fertility and egg weight”, “egg hatchability and egg weight” and “egg mortality and poultry” in the advance search option,

Corresponding Author
Poonam Yadav
Department of Livestock
Production Management,
SKNAU, Jobner, Rajasthan,
India

which covers title, abstract and keywords of each publication. The search yielded a total of 142 records.

Relative Growth Rate

The increase in the number of publications per unit period is known as the relative growth rate. The formula proposed by Mahapatra (1985) [7] can be used to compute the relative growth rate.

$$R = W_2 - W_1 / T_2 - T_1$$

Where R = Mean relative growth rate of the specific period of the interval; W₁= Natural logarithm of the initial number of publications; W₂ = Natural logarithm of the final number of publications; T₁= Initial time T₂ = Final time

Doubling Time

The time required to twice the number of poultry industry research publications is known as doubling time. If the number of publications in this field doubles over time, the difference between the logarithms of the numbers at the start and end of the period must be the natural logarithms of the number 2, i.e., 0.693. As a result, the formula can be used to compute the equivalent doubling time for a certain period of the interval.

$$\text{Doubling time (Dt)} = 0.693/R$$

Where R is the Relative growth rate per unit of publications per unit of time.

Co-authorship analysis

The data analysis was done in MS excel and VOS viewer (Leiden University, Leiden, Netherlands). VOS viewer is a free software for analyzing and visualizing relationships between authors and co-authors. It was used to split the results into groups, each of which was labelled with a different colour (van Eck *et al.*, 2011; Waltman *et al.*, 2010) [8,9].

Result and Discussion

In the present study, the research trend of total number of research papers published on egg fertility and hatchability in poultry during 2000-2020 was analysed. Globally, the total number of papers published in this field during the study period were 142 (Table 1). The highest number of records were found in 2013 (12) and lowest was observed in 2006 (2) (Fig 1). The percent share of total publication was highest in 2013 (8.45%) and lowest in 2006 (1.41%).

Table 1: Global research trend of egg fertility and hatchability in poultry during 2000-2020

Year	Total records	% Share of total	Cumulative sum	ln	RGR	Dt
2000	5	3.52	-	1.26	-	-
2001	4	2.82	9.00	2.20	0.94	0.74
2002	7	4.93	16.00	2.77	0.58	1.20
2003	6	4.23	22.00	3.09	0.32	2.18
2004	9	6.34	31.00	3.43	0.34	2.02
2005	10	7.04	41.00	3.71	0.28	2.48
2006	2	1.41	43.00	3.76	0.05	14.55
2007	6	4.23	49.00	3.89	0.13	5.31
2008	7	4.93	56.00	4.03	0.13	5.19
2009	6	4.23	62.00	4.13	0.10	6.81
2010	6	4.23	68.00	4.22	0.09	7.50
2011	8	5.63	76.00	4.33	0.11	6.23
2012	9	6.34	85.00	4.44	0.11	6.19
2013	12	8.45	97.00	4.57	0.13	5.25
2014	6	4.23	103.00	4.63	0.06	11.55
2015	8	5.63	111.00	4.71	0.07	9.26
2016	4	2.82	115.00	4.74	0.04	19.58
2017	7	4.93	122.00	4.80	0.06	11.73
2018	8	5.63	130.00	4.87	0.06	10.91
2019	7	4.93	137.00	4.92	0.05	13.21
2020	5	3.52	142.00	4.96	0.04	19.33

Ln- Natural logarithm, RGR-relative growth rate and Dt- doubling time



Fig 1: Global research trend over the years

The relative growth rate (RGR) is highest in the year 2001 with the value 0.938 and it is found to be gradually decreasing throughout the years and reached the value 0.035 in the year 2016. The mean RGR was observed 0.185. The doubling time (Dt) was highest in the year 2016 with the value 19.575 and it is found to be gradually increasing over the years and reached the value 0.738 in the year 2001. The mean Dt was observed 8.06.

Fig 2 depicts the collaboration pattern of researchers working on egg fertility and hatchability in poultry. Global researchers on egg fertility and hatchability were grouped into three clusters of authors, each with more than two researchers, implying that the researchers collaborated to address this significant threat to the poultry industry by leveraging their mutual strengths and thus contributing to more impactful research publications.

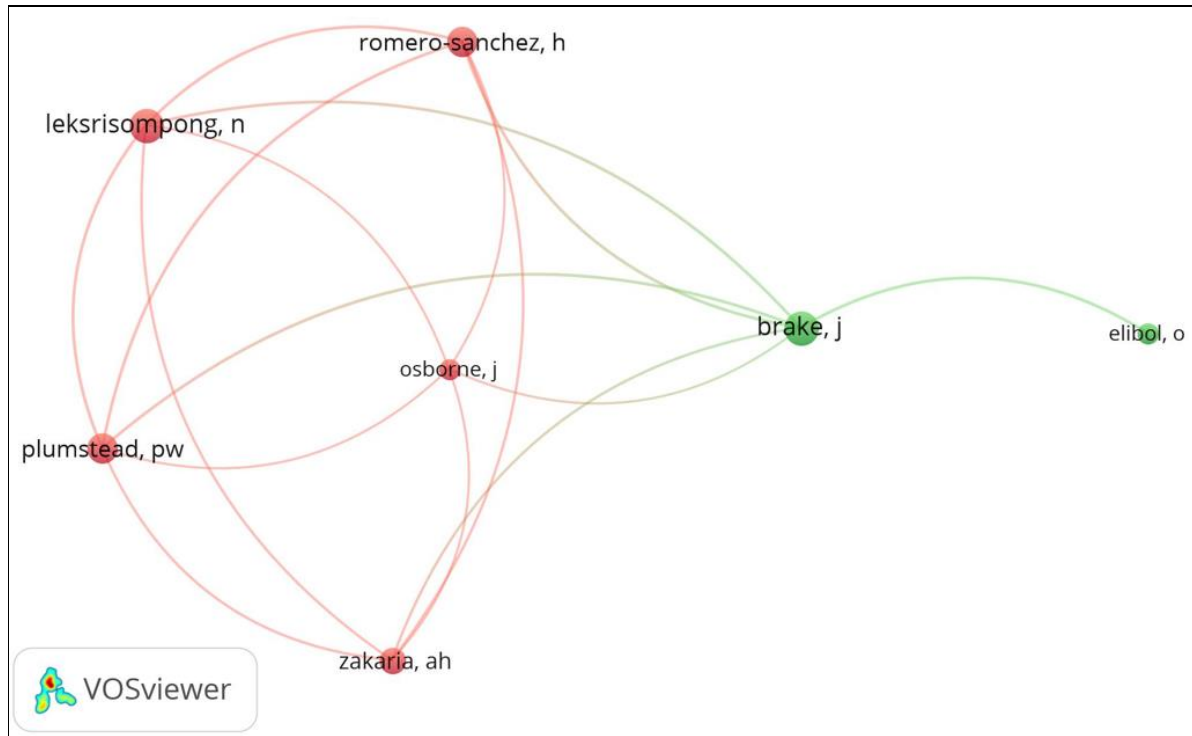


Fig 2: Network visualization of co-authorship at global level

Conclusion

The goal of this study was to quantify the research efforts of international academics on egg fertility and hatchability in chicken from 2000 to 2020. Major findings of the study during the period 2000 to 2020 is that the highest number of records were found in 2013 (12) and lowest was observed in 2006. Mean RGR was 0.185 and means doubling time was 8.06. The study depended almost entirely on the data sets accessed from Google scholar, and, thus, suffers from its inherent limitations in terms of scope.

Reference

1. Pym R. Poultry genetics and breeding in developing countries: Genetic diversity of genetic resources. FAO Poultry Development Review, 2013, 1-3
2. BAHS (Basic Animal Husbandry Statistics). BAHS (Basic Animal Husbandry Statistics) Department of Animal Husbandry, Dairying and Fisheries, Government of India, 2019.
3. Economic Survey. Economic Survey Agriculture and food management. Department of Economic Affairs, Government of India, New Delhi, 2019-2020.
4. Antony J, Raja S, Dhanya P. Scientometric Study of Poultry Industry Research Publications: A Global Perspective. Asian Journal of Information Science and Technology. 2019;9(S1):25-30.
5. Gupta BM, Bala A. A scientometrics approach to schizophrenia research in India: An 32 analysis of publications output during 2002–11. Asian J. Psychiatr. 2013;6(4):292-298.
6. Zyoud SH, Al-Jabi SW, Sweileh WM, Al-Khalil S, Alqub M, Awang R. Global methaemoglobinaemia research output (1940–2013): a bibliometric analysis. Springerplus. 2015;4(1):6-626.
7. Mahapatra M. On the Validity of the Theory of Exponential Growth of Scientific Literature. Proceedings of the 15th IASLIC Conference, Bangalore1985),. 61-70
8. Van Eck NJ, Waltman L, VOS viewer manual. Manual for VOS viewer version, 2011, 1(0).
9. Waltman L, van Eck NJ, Noyons ECM. A unified approach to mapping and clustering of bibliometric networks. J Inform. 2010;4(4):629-635.