International Journal of Research in Library Science (IJRLS)

ISSN: 2455-104X

DOI: 10.26761/IJRLS.9.4.2023.1723

Volume 9, Issue 4 (Oct-Dec.) 2023, Page: 235-245, Paper ID: IJRLS-1723

Received: 9 Oct. 2023 ; Accepted: 18 Dec. 2023 ; Published: 28 December. 2023

Research Contribution of Pest Management in the World: A Scientometrics Study

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ABSTRACT

The present study aimed at scientometrics analysis of the Pest Management *research publications among the various countries. The study spotlights the research trends on the* Pest Management *among the worldwide. Scientometrics is the study of measuring research quality and impact, understanding the processes of citations, mapping scientific fields, and using indicators in research policy and management. The data collected since the beginning of 2022 through the Web of Science database, which belongs to Thomson Reuters Corporation. The study reveals that 192 countries contributed to research in Pest Management. the ascendancy of USA 14739 was found in the research on pest management which published one-fourth of the research in the world. India (5.40%) has the fourth position in research publications on pest management. it is noticed that the relationship between the country-wise citations linked documents. The USA contributed 367072 citations for the publications of 14739 which had the links of 7552 documents. It is understood that among the relationship between country-wise citations linked with co-authorship, USA ranked with 14739 co-authorship documents. The second country China linked 8506 and the third rank Australia linked with 3660 co-authorship and fourth rank noted by India with 2840 co-authorship.*

KEYWORDS: Scientometrics, Pest Management, Citation, Co-authorship, VOS.

INTRODUCTION

Scientometrics provides information about the structure of knowledge and the way it is communicated; measures the publication patterns of all forms of written communication; provides evaluative measures to indicate an individual country's output; indicate the citation pattern of literature and studies the use of documents. Scientometrics as a technique has extensive applications in identifying the research trends in a subject, trends in authorship and collaboration in research, core periodicals, obsolescence and dispersion of scientific literature useful in estimating the comprehensive of secondary periodicals, studying the author's productivity and impact of research, distribution of scientific publications by the research organization, citation studies, and so on. It could be considered as the study of the quantitative aspects of science and technology seen as a process of communication. Some of the main

themes include ways of measuring research quality and impact, understanding the processes of citations, mapping scientific fields, and the use of indicators in research policy and management. Scientometrics focuses on communication in the sciences, the social sciences, and the humanities among several related fields.

REVIEW OF LITERATURE

Kasyapa (1998) reported that chili + garlic solution and NSKE spray was the common practice used by local farmers for pest management. Among different botanicals tested by Sridevi (1998), NSKE (5%) proved to be effective in reducing sucking pests' population in sunflowers and all botanicals were found to be safer than natural enemies and pollinators Mallikarjun Rao et al. (1998) reported the effectiveness of garlic extract in combination with other extracts like neem, chili, ginger, tobacco, and cow urine against H. armigera and S. litura up to 13 days of spray

Sudhakar et al. (1998) observed the effect of fertilizer and insecticides on brinjal shoot and fruit borer Leucinodes orbonalis Guane. Among the different treatments shoot infestation and per cent fruit damage was least in soil application of neem cake (2 t/ha) and this was on par with vermicompost @ 6.6 t/ha.

Narayanasamy (1999) studied the insecticidal activity of 23 selected traditional pest control practices (plant extracts) against pests of rice viz., brown plant hopper and leafhopper under laboratory conditions. The most effective practices against brown plant hopper were spraying the extract of garlic + kerosene (39.29% mortality) followed by neem oil and rice bran + kerosene Natarajan et al. (2000) studied the efficacy of some botanicals like NSKE, garlic kerosene extract, and Vitex extract against the leafhopper, A. biguttula biguttula on okra and found that garlic kerosene extract recorded the lowest number of leafhoppers.

Patel et al. (2003a) studied that cow urine has some insecticidal properties but it needed enrichment to enhance this effect therefore cow urine alone and with some plant extract and some botanical preparation were tested against Lipaphis and the results proved to be significantly superior over control in reducing the Lipaphis populations.

Patel et al. (2003b) tested the efficacy of cow urine alone and in combination with some plant extracts against sucking pests of cotton. The results revealed that all the treatments proved significantly superior to control to reduce the sucking pests population. It was also found that although applications of cow urine 20 percent alone were found to be effective in reducing the aphid population, its insecticidal effect could be further enhanced by enriching it with other botanical products. Further, it was concluded that enrichment of cow urine with various botanicals enhanced the insecticidals property.

Purwar and Yadav (2003) determined the efficacy of pesticides from different origin against tobacco caterpillar Spodoptera litura on soybean.Conventional synthetic insecticides i.e.Dimlin (Diflubenzuron). Entomo-pathogenic fungi Beaveria bassiana showed more effectiveness than botanical i.e neem seed kernel extract and animal origin pesticides i.e. cow urine and cow dung ash for suppressing the population of tobacco population.

Shukla et al., (2003) tested the efficacy of different botanicals formulations in combination with cow urine against sucking pests and capsule borer. Results revealed that the sucking pest population was significantly low in 10 and 20

percent cow urine treatments however efficacy of cow urine was higher when it was fortified with various plant products

Mandal and Mandal (2010) reported the efficacy of insecticides against mustard aphid, Lipaphis erysimi Kalt.Difenthiuron 50 WP@50g a.i/ha proved most effective in managing the aphid incidence and realizing a higher yield of mustard(10.70q/ha)followed by thiamethoxam 25 WG@25g a.i/ha(10.53 q /ha) and acetamiprid 25 SP@40 g a.i /ha (10.12 q/ha)Treatments viz.imidacloprid 200 SL@50g a.i/ha and beta cyfluthrin 25 SC@25 g a.i /ha were comparatively less effective in reducing the pest population and they were statistically equal in realizing the yield of mustard but superior to a chook 0.15 EC@800g a.i/ha(8.68)q /ha and dimethoate 30 EC@400g a.i /ha(8.85 q /ha) Satyanaryana et al. (2010) studied the incidence of Spodoptera litura in terms of larval population which showed a non-significant relationship with maximum temperature, relative humidity wind speed spiders and coccinellid predatory beetles, but significant relationship with minimum temperature.The result of chemical control trials indicated that emamectin benzoate 0.00725% was the most effective treatment followed by indoxacarb 0.0145% and indoxacarb 0.00725%, novaluron 0.005% in reducing the larval population of S. litura.

THE AIM AND OBJECTIVES OF THE STUDY

The present study aimed at scientometric analysis on the Pest management research publications among the various countries. The study spotlights the research trends on Pest management worldwide. This research is based on the analysis of research contribution to Pest management research. For the study required data were collected from the Web of Science database which belongs to Thomson Reuters Corporation using the keyword “Pest management”. All available data collected up to the 2022. Totally 52500 documents were retrieved. Using Bib Excel the collected data was analysis.

Table - Country Wise Document Published Ranking

Sr No.	Country	Documents	Citations	Percentages
1	USA	14739	367072	28.04
2	China	8506	126342	16.18
3	Australia	3360	88426	6.39
4	India	2840	38841	5.40
5	England	2751	99901	5.23
6	Brazil	2603	42232	4.95
7	France	2215	74847	4.21
8	Canada	2074	57727	3.95
9	Italy	1858	48492	3.53
10	Germany	1788	65121	3.40
11	Spain	1628	40847	3.10
12	Portugal	1243	32950	2.36
13	New Zealand	1134	34233	2.16
14	Japan	993	20900	1.89

15	Pakistan	990	11258	1.88
16	Belgium	857	24428	1.63
17	South Africa	839	15163	1.60
18	Netherlands	832	36370	1.58
19	Switzerland	780	29269	1.48
20	Kenya	727	15671	1.38

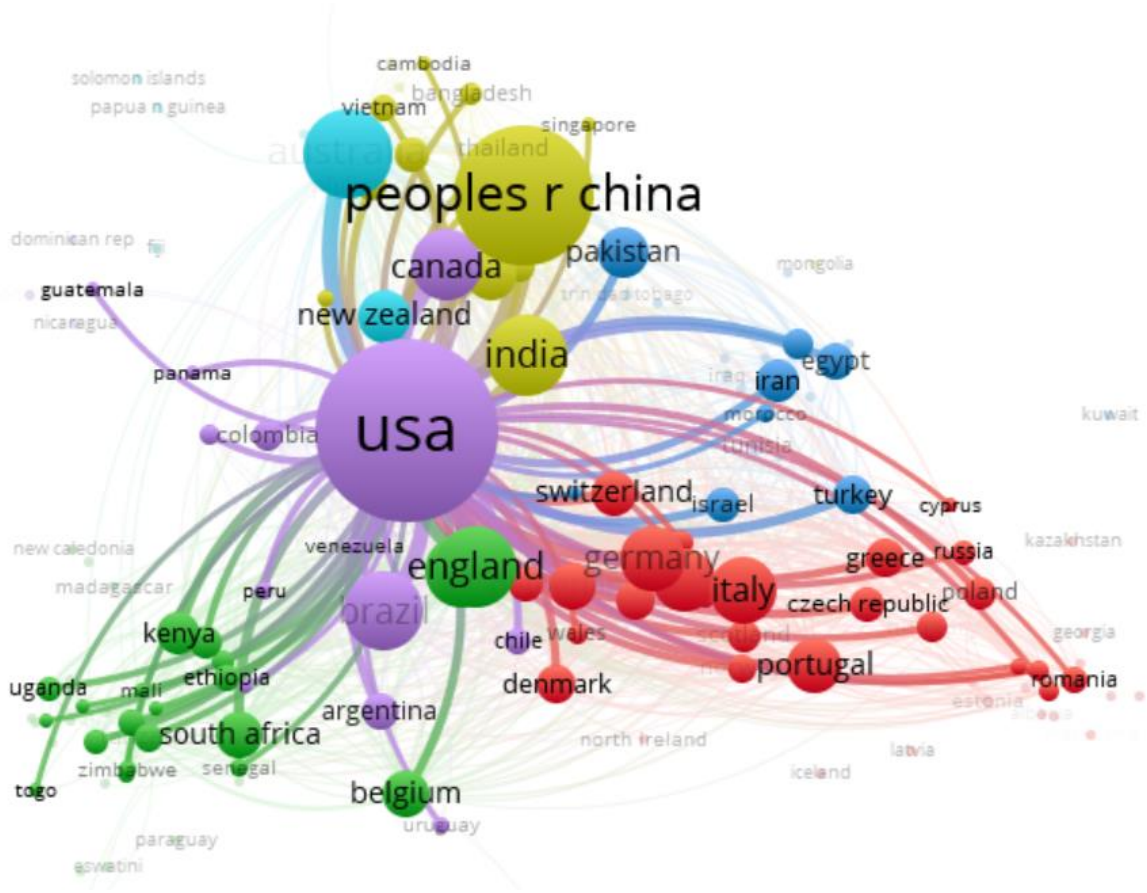

Figure 1 *- country wise document published ranking*

Table 1 - Country Collaboration Of Published Document

Table 1 shows the country-wise distribution of top twenty country-published records on Pest management. It is clear that 28.4% (14749) of the publications were from the USA and 16.18% (8506) of the records were from Republic China. 3360(6.39%) of the publications were from Australia, 2840 (5.40%) of the publications were from India and 2751 (5.23%) of the publications were from England on Pest Management. In this data, India is on the fourth rank in the publication on pest management research in the Web of Science database.

The ascendancy of USA (28.4%) found in the research on pest management which published one-fourth of the research among the world. China (16.18%) found in second, Australia (5.40%) noticed in third, and India (5.40) rated in fourth, England ranked in fifth position on the research in Pest management. India (5.40%) has fourth

position, research contribution on pest management noticed also followed by Brazil, France, Canada, Italy, Germany, Spain, Portugal, Spain, New Zealand, Japan, Pakistan contribution identified.

Table 2 - Relationship of country wise with citation linked documents

Country	Documents	Citations	Total Link Strength	Rank
USA	14739	367072	152703	1
Chana	8506	126342	79858	2
France	2215	74847	59126	3
England	2751	99901	55905	4
Australia	3360	88426	49360	5
Germany	1788	65121	41702	6
Italy	1858	48492	40402	7
Brazil	2603	42232	37025	8
Canada	2074	57727	29934	9
Spain	1628	40847	29231	10
Netherland	832	36370	23177	11
India	**2840**	**38841**	**22668**	**12**
Switzerland	780	29269	21468	13
Kenya	727	15671	20305	14
Belgium	857	244233	18864	15
New Zealand	1134	34233	18683	16
South Africa	849	15163	16480	17
Sweden	596	22973	16436	18
Pakistan	990	11258	13583	19
Greece	543	13886	11831	20

Table 2 - Relationship of Country Wise With Citation Linked Documents

The table no 2 shows the top most contributing countries with citation ranking in Pest Management research. 192 countries contributed to research on Pest Management. Among them, USA is the most prolific country having 14739 documents with 367072 citations. The second-ranked country People's Republic of China is contributed 8506 publications with 126342 citations and the third-ranked country France is contributed 2751 publications with 74847 citations. The fourth-ranked country England contributed 2751 publications with 99901 citations and the fifth-ranked country Australia is contributed 3360 publications with 88426 citations. India ranked twelfth position contributing 2840 publications with **38841** citations. Table 2 shows the relationship between the country-wise citation strength linked. Among the countries USA contributed 367072 citations for the publications of 14739 which had a total link strength of 152703 documents. People's Republic China ranked second for 126342 citations with a link strength of 79858 and France ranked third for 74847 citations with a link of 59126. England ranked fourth with

99901 citations of 55905 linked and Australia ranked fifth with 88426 citations of 49360 links strength of 3360 documents. India placed Twelfth rank position in the country citation linked documents which have 38841 citations linked with 2840 documents linked 22668.

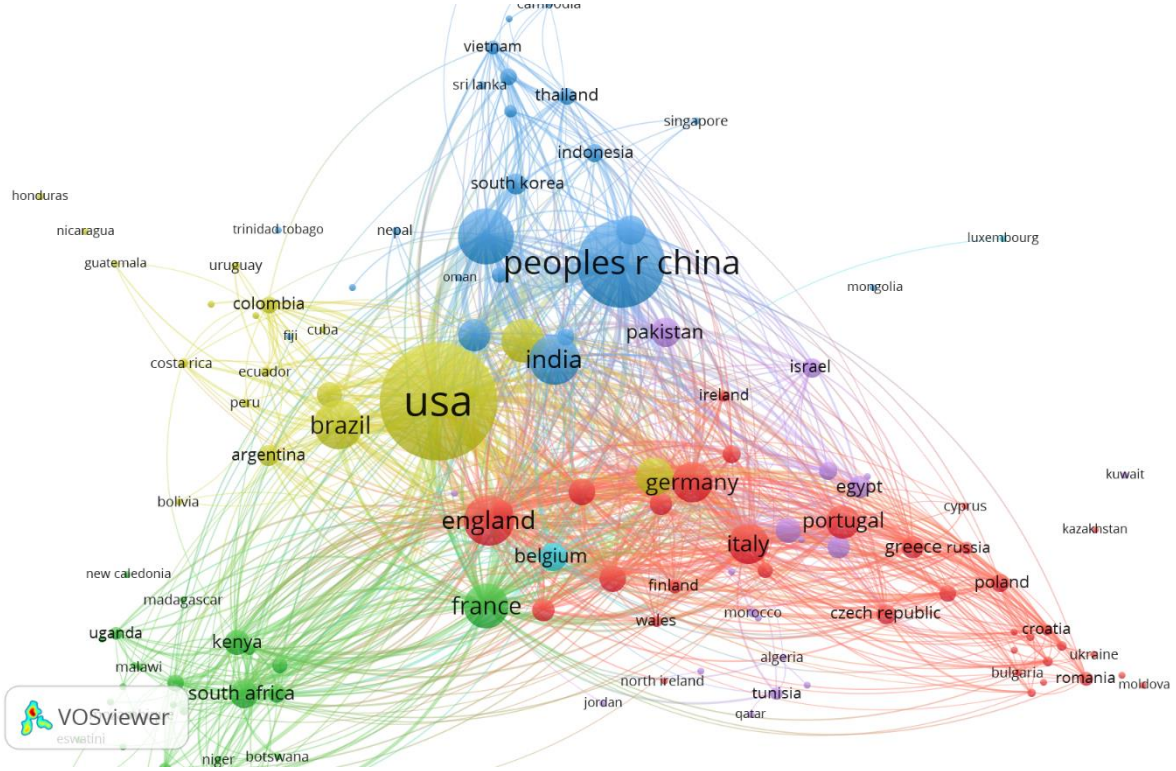

Figure 2 *Country wise network and links strength analysis*

Table 3 Relationship of country with co-authorship

Country	**Documents**	**Citations**	**Total Link Strength**	**Rank**
USA	14739	367072	7556	1
Peoples R China	8506	126342	3993	2
England	2751	99901	3540	3
Australia	3360	88426	2858	4
France	2215	74847	3362	5
Germany	1788	65121	2989	6
Canada	2074	57727	1610	7
Italy	1858	48492	2649	8
Brazil	2603	42232	1539	9
Spain	1628	40847	1953	10
India	**2840**	**38841**	**1152**	**11**
Netherlands	832	36370	1576	12

New Zealand	1134	34233	1001	13
Brazil	1243	32950	1128	14
Portugal	780	29269	1571	15
Switzerland	857	24428	1363	16
Belgium	596	22973	1176	17
Sweden	993	20900	774	18
Japan	564	19676	868	19
Denmark	385	17062	815	20

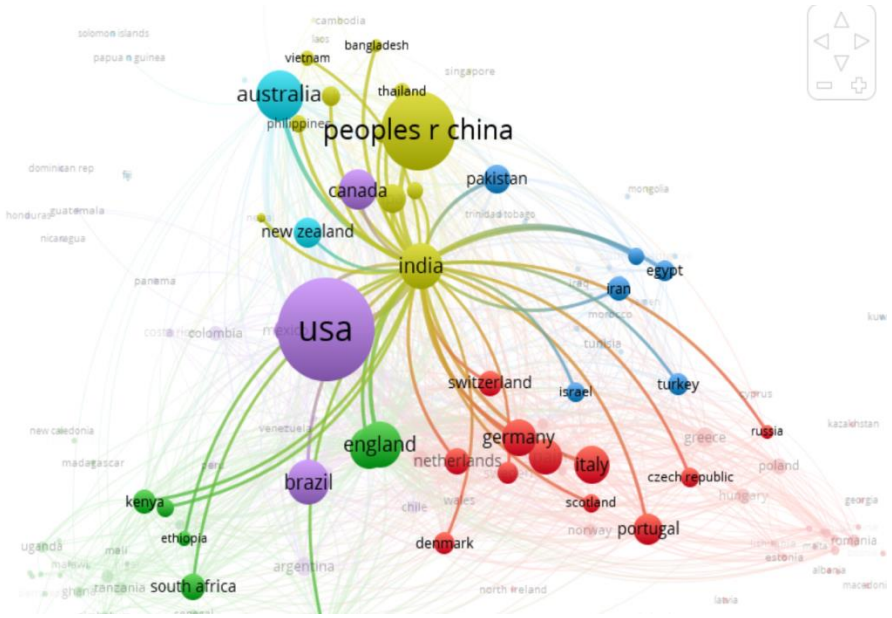

Figure 3 *VOS mapping of Relationship on country wise with citation linked documents*

Table no 3 shows the relationship between country-wise citations linked with co-authorship. Among the countries, USA ranked one with 7557 co-authorship links documents. The second country china linked with 8506 documents and 3993 linked to co-authorship and third rank noted by England 2751 with 3540 co-authorship links. Australia ranked fourth with 3360 co-authorship and France ranked fifth with 2215 co-authorships. India got the eleventh rank in country-wise co-authorship 1152 links. Followed by rank Netherlands, New Zealand, Brazil, Portugal, Switzerland, Belgium, Sweden, Japan, and Denmark

FINDINGS

- It is noticed that 192 countries contributed research in Pest management ascendancy of USA (28.04%) found in the research on Pest management which was published one-fourth of the research in the world. China (16.18%) found in second, Australia (6.39%) noticed in third position and fourth position on the research in Pest management Research.
- It is noticed that India ranked with (5.40%) having the fourth position in research publications on Pest management.

- Among them, USA is the most prolific country having 14739 documents with 367072 citations. The second-ranked country People's Republic of China is contributing 8506 publications with 126342 citations and third-ranked country Australia 3360 documents is contributing citations 88426.
- Among the relationship between the country-wise citations linked documents., USA contributed 367072 citations for the publications of 14739 which had the links of documents. People Republic China ranked second for 126342 citations with links strength of 79858 and France ranked third for 74847 citations with a link of 59126
- India placed Twelfth rank position in the country wise citation linked documents which have 38841 citations linked with 2840 documents linked 22668
- Among the relationships between country wise citations linked with co-authorship, USA ranked one with 14739 co-authorship documents. The second country china linked with 8506 documents and 3993 linked co-authorship and third rank noted by England 2751 with 3540 co-authorship links.
- India got the eleventh rank in country-wise co-authorship 1152 links

CONCLUSION

The research has Scientometric analysis orderly used to access in which scientific any systematical research distribution to energetic information should be used. The principal maker genius in this study has demonstrated to be useful tools in the assessment of research publications of Pest management in information worldwide contributes to the research. Distribution and productivity of authorship from various countries have calculated the relationship between the authorship with citation and co-authorship linked documents. The study will be needful to the library professional and many data collection output of the journal and identify the various countries' research and including in the area of web of science of a scientometric study on pest management.

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