BIBLIOMETRIC ANALYSIS OF 'ENTOMOLOGY' RESEARCH THROUGH DIMENSIONS.AI DATABASE: A STUDY

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Abstract: This research investigation carried out the impact of current research progress in the papers published from 2014 to 2023 in the open access UGC-Journalist Group articles. This study searches the word 'Entomology' in the title, abstract, keywords, and text of the article from Dimensions.ai.Bibliometric analysis that turned up 81204 articles between the years of 2014 and 2023.This article has indicates that the year 2021 has the highest contributors with 9840 (12.12%) with 247332 citations, Bruce Dupree Hammock having 369 contributions, with 11.88%,'PLOS ONE' contributed 3149 articles, with 13.10% secured first, 'University of California, Davis', occupies the first position in scientific publications, 'United States' was in the 1st position amounting 38.99% that conducted the investigation

Key words: Entomology, Dimensions.ai, Bibliometrics, Scientometrics,Citations.
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1.0. Introduction

Bibliometrics One of the widely used methods or metric studies that aids in assessing the qualities of subjects and the type of citations in diverse formats and fields of study. Bibliometrics, also known as scientometrics, is the quantitative assessment of scientific publications through the use of mathematical and statistical techniques. It was first used by Pritchard in 1969. Additionally, Suebsombut et al. (2017) contend that bibliometric research is a technique for the quantitative and visual examination of the relationships between scientific publications. The accelerated advancement of entomology research and publications necessitates the assessment and mapping of research with the goal of raising the caliber of upcoming publications (MohdRazali et al., 2022). Therefore, it is important to conduct a bibliometric analysis of entomology.

The affiliations, collaborations, periodicity, country of origin, citations, and other factors are analyzed bibliometrically in this article. In addition, VosViewer can create maps of scientific knowledge based on bibliographic coupling, co-occurrence, co-authorship, authors, and citations. Scientific work requires the use of keywords because they can give a summary of the primary concept or subject of the study.

Entomology is the study of insects; it includes biological, agricultural, and environmental sciences that are relevant to the study of insects and how they interact with other organisms and humans. A wide range of disciplines, including chemistry, biology, forensics, human and animal health, and agriculture, benefit from the work of entomologists. Developments in food production and storage, pharmaceuticals, biological and chemical pest control, robotics, mapping biological diversity, and other scientific domains are all based on research on insects. It also covers pests that aren't insects, like rats and nematodes, among other invertebrates.

A database called Dimensions links research grants to patents, publications, and clinical trials. Dimensions is a division of Digital Science, a technology company with its headquarters located in London, England (also known as Digital Science and Research Solutions Ltd.). With over 1.6 billion citations, Dimensions.ai covers almost 130 million publications. (Vinayak Hakkaraki, 2023). This work's primary goal is to determine the most pertinent sources, nations, and research areas in the field of entomology. In order to do this, we present a descriptive analysis of this field along with a methodology that makes use of a particular database. The most prolific nations, writers, associations, and journals are displayed, along with a summary of the influence on citations across the various research domains.

2.0 Objectives of the study
    The main objectives of the study are:
    1. To understand the distribution of articles and citations by year in pattern research.
    2. To determine the pattern of authorship.
    3. To determine which twenty top journals have published the most.
    4. To know the most active organizations.
    5. To determine how articles are distributed across countries.

3.0 Methodology
In this study, bibliometric analysis is the methodology used (van Eck & Waltman, 2010; Van Eck & Waltman, 2012). Bibliometric analysis can be used to expand on earlier research from articles published in different nations. Including development, publications, writers, and fields of study (Davis & Gonzalez, 2003; Rajendram et al., 2006; Rajendran et al. 2005), Rahman et al. (2005). From 2014 to 2023, Dimensions.ai provided the research data, which produced 81204 articles.

This investigation looked for the term "Entomology" in Dimensions.ai's article's title, abstract, keywords, and body text.Because this is the analysis's focus area, the discipline category is limited to "Entomology" for research purposes. The literature type is then filtered using the UGC-Journalist Group, Open Access, and Article criteria, yielding 81204 results. To analyze, interpret, and tabulate the recorded data, Microsoft Excel and the Dimensions database were utilized. For this study, all of the data have been retrieved, stored, reviewed, analyzed, and tabulated.

4.0 **Results and Discussion**
4.1 Year-Wise Distribution of Contributions and Citations of Publications
The Table and Figure-1 and shows the contributions made year-by-year and the publication citations. between the time frame of 2014- 2023. From Table 1, it is evident. that 2021 has the highest contributors with 9840 (12.12%) with 247332 citations, followed by 2022 has 9519 (11.72%) contributions with 281660 citations, in the year 2020 has 9636 (11.57%) contributions with 184854 citations, in the year 2023 has 8930 (11.00%) contributions with 295442 citations, in the year 2019 has 8100 (9.97%) with 127236 citations, 2018 (9.51%) has 7722 contributions, 2017   has 7431 (9.15%) contributions with 67073 citations, while 2016 has 6977 (8.59%) with 43423 citations, 2015 has 6502 (8.01%) with 19737 citations and 2014 has 6787 (8.36%) with 4347 citations contributions.

Table-1: Year-Wise Distribution of Contributions and citations of Publications

Year	Number of Contributions	Citations	Percentage of Contributions (%)	Percentage of Citations (%)
2014	6787	4347	8.36	0.32
2015	6502	19737	8.01	1.45
2016	6977	43423	8.59	3.18
2017	7431	67073	9.15	4.91
2018	7722	93565	9.51	6.86
2019	8100	127236	9.97	9.32
2020	9396	184854	11.57	13.55
2021	9840	247332	12.12	18.12
2022	9519	281660	11.72	20.64
2023	8930	295442	11.00	21.65
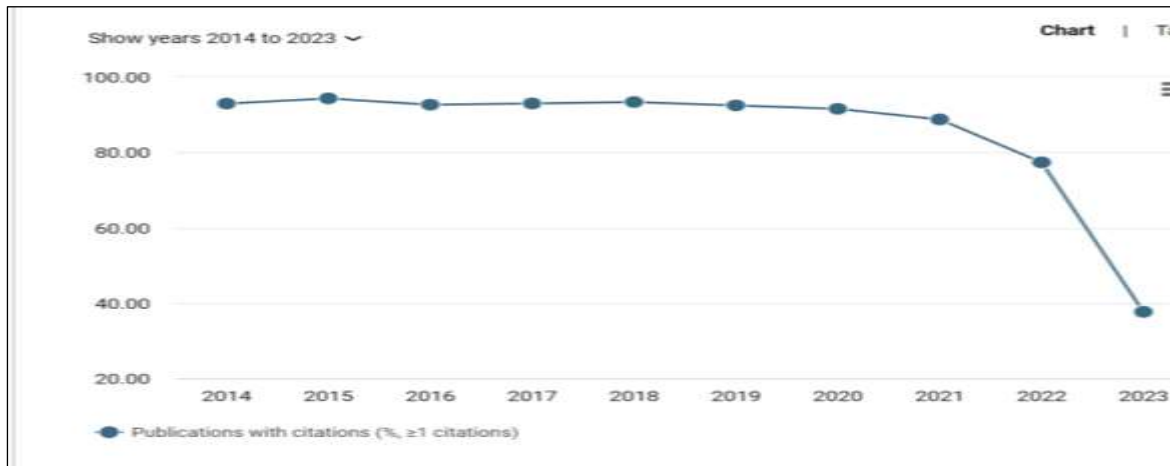
Figure-1: Publications with Citations

4.2 Authors and the Number of Papers Published during the Period

The Table-2 and Figure-2 indicates authors and the number of papers published during the period. Due to large number of publications In order to investigate the connections between co-author and author papers published during the period 2014-2023.In order to identify the co-author network visualization map between 11415 authors 96 meet the requirement of at least two documents for each author. Top 20 authors were selected. The five largest set of connected authors with the highest number of articles 'Bruce Dupree Hammock' having 369 contributions, with 11.88%, followed by 'Wopke Van Der Werf' having 192 contributions with 6.18%, 'Josep Anton JaquesMiret' having 181 contributions with 5.83%, 'Marcel Dicke' having 179 contributions with 5.76%, 'Claude Bragard' having 168 contributions with 5.41%, 'Nigle Charles Bennett' having 154 contributions with 4.96%, 'Roel P JPotting, 'Hans-Hermann Thulke', 'Stephen R Parnell', 'Annemarie FejerJustesen' contributions respectively.
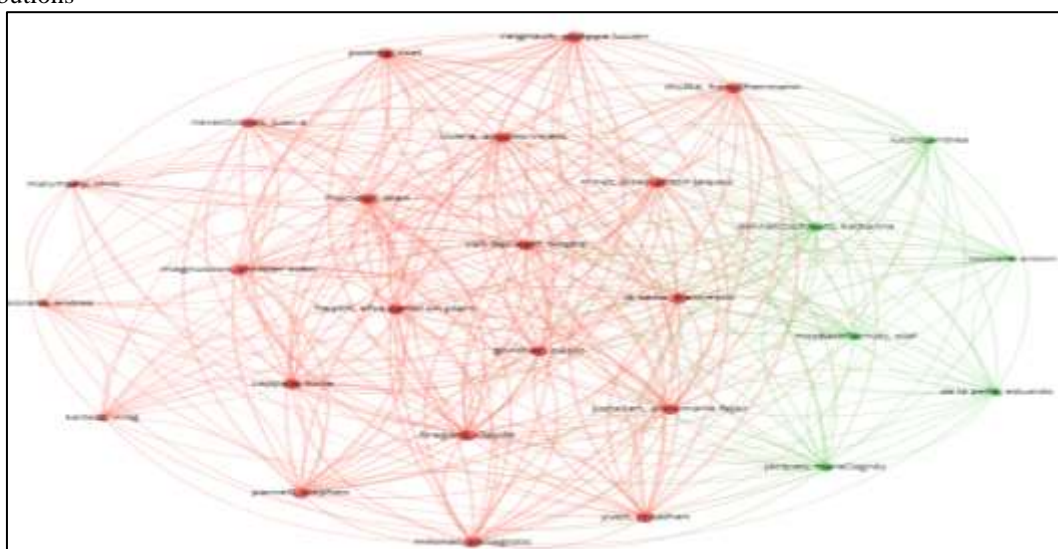
Table-2: Authors and the Number of Papers Published during the Period

Sl. No	Researcher	Number of Contribution/ Published	Percentage (%)	Cumulative Percentage
1	Bruce Dupree Hammock	369	11.88	11.88
2	Wopke Van Der Werf	192	6.18	18.06
3	Josep Anton JaquesMiret	181	5.83	23.89
4	Marcel Dicke	179	5.76	29.65
5	Claude Bragard	168	5.41	35.06
6	Nigle Charles Bennett	154	4.96	40.02
7	Roel P J Potting	149	4.80	44.82
8	Hans-Hermann Thulke	148	4.76	49.58
9	Stephen R Parnell	143	4.60	54.18
10	Annemarie FejerJustesen	143	4.60	58.78
11	Christer Sven Magnusson	142	4.57	63.35
12	Michael S Engel	137	4.41	67.76
13	Alan Macleod	136	4.38	72.14
14	Frédéric Francis	136	4.38	76.52
15	Panagiotis G Milonas	134	4.31	80.83
16	Jun Yang	122	3.93	84.76

17	José Cola Zanuncio	121	3.90	88.66
18	Xu-Guo Zhou	118	3.80	92.46
19	Elisavet K Chatzivassiliou	117	3.77	96.23
20	Philippe Lucien Reignault	117	3.77	100

Figure-2: Co-Authorship in terms of Authors

The Table-2 and Figure-2 also indicates that co-author network visualization map between 11415 authors 96 meet the requirement of at least two documents per author. Top 20 authors were selected. The five largest set of connected authors with the highest number of publications 'Bruce Dupree Hammock' 1st positions, followed by 'Wopke Van Der Werf' 2nd positions , 'Josep Anton Jaques Miret' 3rd , 'Marcel Dicke' 4th position, 'Claude Bragard'5th positon, 'Nigle Charles Bennett'6th position, 'Roel P J Potting',7th position, 'Hans-Hermann Thulke' 8th position, 'Stephen R Parnell',9th position and 'Annemarie FejerJustesen'10th position of authorship contributions

4.3 Journals and the Number of Papers Published during the Period

It is seen from that Table 3 demonstrates how many papers were published over the time period. 2014-2023.Top 20 source titles were selected. 'PLOS ONE' contributed 3149 articles, with 13.10% secured first, followed by 'ZOOKeys' contributed 2433 articles with 10.12%, with secured second, 'Scientific Reports', contributed 2111 articles with 8.78%, 'Insects', contributed 1987 with 8.27%, 'Ecology and Evolution', contributed 1750 articles with 7.28% , 'Peer J', contributed 1382 with 5.75%, 'Journal of Economic Entomology', contributed 1318 articles with 5.48%, 'Florida Entomologist', contributed 1167 with 4.86%, 'Journal of Medical Entomology', contributed 1102 articles with 4.21%, 'Parasites'&'Vectors', contributed 1000 with 4.16% during the period from 2014-2023 respectively.

Table-3: Journals and the Number of Papers Published during the Period

Sl. No	Source Title	Number of Contributions	Percentage (%)	Cumulative Percentage
1	PLOS ONE	3149	13.10	13.1
2	ZOOKeys	2433	10.12	23.22
3	Scientific Reports	2111	8.78	32.01
4	Insects	1987	8.27	40.28
5	Ecology and Evolution	1750	7.28	47.56
6	Peer J	1382	5.75	53.31
7	Journal of Economic Entomology	1318	5.48	58.80
8	Florida Entomologist	1167	4.86	63.65

9	Journal of Medical Entomology	1012	4.21	67.86
10	Parasites & Vectors	1000	4.16	72.02
11	PLOS Neglected Tropical Diseases	837	3.48	75.51
12	Zootaxa	767	3.19	78.70
13	Malaria Journal	720	3.00	81.69
14	Environmental Entomology	703	2.93	84.62
15	Journal of Insect Science	687	2.86	87.48
16	Parasite	667	2.78	90.25
17	European Journal of Entomology	650	2.70	92.96
18	Ecosphere	622	2.59	95.55
19	Annals of the Entomological Society of America	544	2.26	97.81
20	Biodiversity Data Journal	525	2.18	100.00

4.4 Organizations Contributions of Publications during the Period

The Table-4 and Figure-3 depicts that Evaluating the cooperation between each of these organizations can be aided by analyzing research organizations. Top 12 organization rank wise were selected and there are 3362 organizations Engaged in studies pertaining to Entomology between 2014 and 2023. The examination's findings indicate 'University of California, Davis', takes the top spot in publications pertaining to science. The University of Wageningen holds the second position. & Research', third 'University of Warwick', fourth 'Agricultural University of Athens', fifth 'Université Catholique de Louvain', sixth 'University of Pretoria', seventh 'Aarhus University', eighth 'Universidade Federal de Viçosa', ninth 'University of the Littoral Opal Coast', tenth 'University of Melbourne', eleventh 'Ain Shams University' and twelfth 'University of Turin'.Organizations Contributions of Publications.

Table-4: Organizations Contributions of Publications during the Period

Sl. No	Organizations	Rank
1	University of California, Davis,	1
2	Wageningen University & Research,	2
3	University of Warwick,	3
4	Agricultural University of Athens,	4
5	UniversitéCatholique de Louvain,	5
6	University of Pretoria	6
7	Aarhus University,	7
8	Universidade Federal de Viçosa,	8
9	University of the Littoral Opal Coast,	9
10	University of Melbourne,	10
11	Ain Shams University	11
12	University of Turin,	12

Figure-3:Organization visualization network map

It is clear from this Organization visualization network map that the highest number of article productions during each period is used to classify the information. The advancement of creativity and the contribution to entomology have made.University of California, Davis', occupies the first position followed, 'Wageningen University & Research', third 'University of Warwick', fourth 'Agricultural University of Athens', fifth 'Université Catholique de Louvain', sixth 'University of Pretoria, seventh Aarhus University', eighth 'Universidade Federal de Viçosa', ninth 'University of the Littoral Opal Coast', tenth 'University of Melbourne', eleventh 'Ain Shams University', and twelfth 'University of Turin.China', 'United kingdom',by as the most research study 3362 organizations and 303 meet the thresholds.
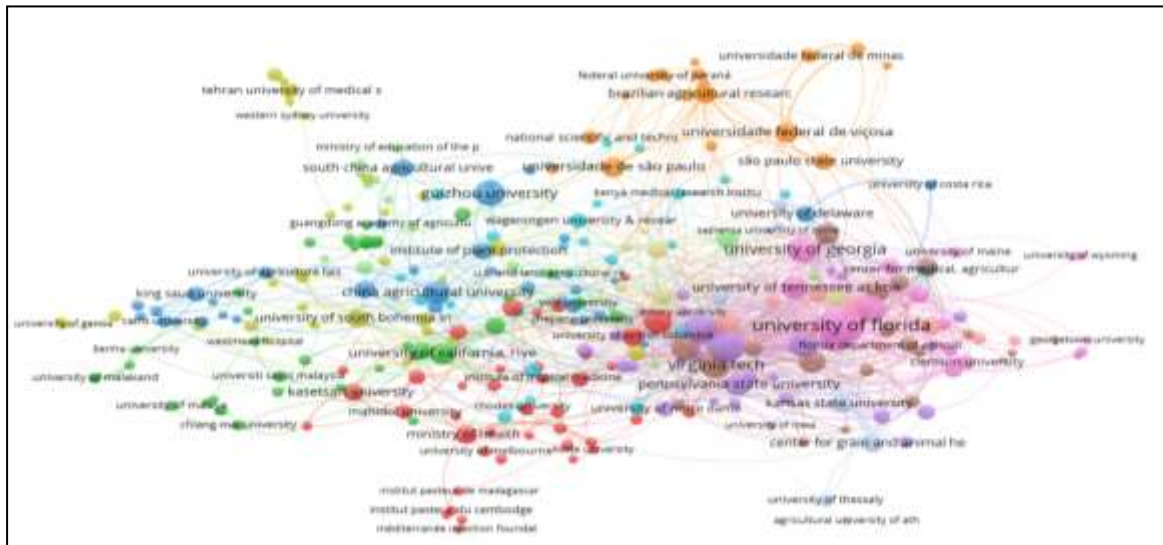
### 4.5 Country and Number of Citations wise Distribution

The Table-5 and Figure-4 shows that in the analysis of country and number of citations wise distribution in the field of "Entomology", lot of its papers are citied during the assessment period. Top 12 countries were selected. It was evident that 'United States',was in the 1st position average 38.99 that conducted the study, followed by second 'Greece', average 8.96,third 'Netherlands', average 7.48,fourth 'Belgium', average 6.54,fifth 'South Africa', average 6.00,sixth 'Denmark', average 5.57seventh 'Brazil', average 4.71eight 'France', average 4.56,ninth 'Australia', average 4.44, tenth 'Egypt', average 4.32,eleventh 'United Kingdom', average 4.25, and 'Italy',average 4.17, in 12th position.

Table-5: Country and Number of Citations wise Distribution

Sl. No	Countries	Number of Citations	Percentage (%)
1	United States	1001	38.99
2	Greece	230	8.96
3	Netherlands	192	7.48
4	Belgium	168	6.54
5	South Africa	154	6.00
6	Denmark	143	5.57
7	Brazil	121	4.71
8	France	117	4.56
9	Australia	114	4.44
10	Egypt	111	4.32
11	United Kingdom	109	4.25
12	Italy	107	4.17

Figure-4: Country Visualization Network Map

This analysis allows for the knowledge of the scientific advancements in each nation, particularly in the area of entomology. The greatest number of articles produced during each period is used to determine this classification. The growth of inventiveness and the advancement of entomology have made 'United States', occupy the 1st position followed,'Greece', 'Netherlands','Belgium', South 'Africa','Denmark' ,'Brazil', 'France','Australia','Egypt', 'United Kingdom', and 'Italy'by as the most research study 3 cluster,137 countries, 71 meet the thresholds.
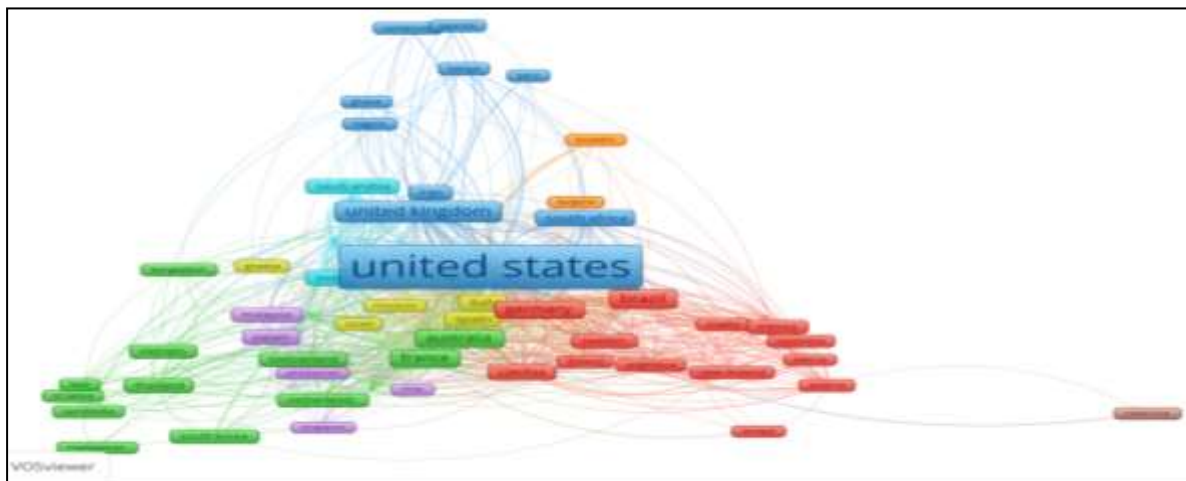
5.0 Conclusion

The study of insects, or entomology, includes biological, agricultural, and environmental sciences that are concerned with insects and how they interact with other living things and humans. Agriculture, chemistry, biology, human or animal health, molecular science, and forensics are just a few of the many fields to which entomologists contribute. As a result, the analysis also shows who the top contributors were between 2014 and 2023, with 9840 (12.12%) citations for articles from the Dimensions AI database. Over the course of the study period, the paper observed Open Access Results with 81204 total citations in 1364669 records. The majority of publications were research articles published by the UGC-Journalist Group. The results show that the greatest number of articles—9840—were released in 2021. The maximum number of citations discovered in 2023 was 295442.

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