



## BIBLIOMETRIC STUDY OF WORLD RESEARCH OUTPUT ON HORTICULTURE SCIENCE DURING 1989-2016

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### ABSTRACT

**H**orticulture is a branch of agriculture, it includes the cultivation of medicinal plants, fruits, vegetables, nuts, seeds, herbs, sprouts, mushrooms, algae, flowers, seaweeds and non-food crops such as grass and ornamental trees and plants. This study carried out a bibliometric analysis of horticulture science. This bibliometric analysis reflects the key activities of horticultural science research being carried out through the globe. Bibliometric is an emerging thrust area of research and has now become a well established part of information research and a quantitative approach to the description of documents. Bibliometric has grown out of the realization that literature is growing and changing out of a rate with which no librarian or information worker equipped with traditional bibliographic skills and methods could keep breast. This study found that during the year 1989 to 2016, 3074 paper were published. This study generally aim to analyse and evaluate form wise distribution of publication, year wise distribution, most prolific authors published in horticultural science, country wise distribution of publication, top funding agency for publication of horticultural science, top horticultural science publication in various research areas and organisational contribution to horticultural science publication. The required is collected through secondary sources.

**KEYWORDS :** Horticultural science; Bibliometric analysis; research growth.



### INTRODUCTION

Bibliometric is a branch of information theory that attempts to analysis quantitatively the properties and behaviour of recorded knowledge which helps to explore the growth of literature in the field. Through this technique, we can study only the recorded knowledge, not the knowledge itself. Since, it is looking forward to research based on quantitative measurement and objective analysis of data. Among several other such kinds of analytical scientific developments, many that has been inviting lot of attention to research activities in the field of 'Bibliometrics'. Horticulture is the branch of agriculture that deals with the art, science, technology, and business of growing plants. It includes the cultivation of medicinal plants, fruits, vegetables,

nuts, seeds, herbs, sprouts, mushrooms, algae, flowers, seaweeds and non-food crops such as grass and ornamental trees and plants.

## REVIEW OF LITERATURE

Anwar (2005) focus in research on identifying active components in the seeds of *Nigella sativa* for various purposes, especially in Medical Sciences and Chemistry and this study findings confirm that the literature on this plant is of interdisciplinary nature and also indicates that research on *Nigella sativa* will continue to grow in the future. Bakri & Willett (2008) analysed that there have been significant changes in the types of article in the number of references per article and in the lengths of the article. There is a unreasonable spread in all categories of publication. Al-Qallaf (2009) identified identify and analyze the intellectual structure of the *Punica granatum L* (pomegranate) literature and to determine trends and patterns. The study reveals that the bibliometric study is an encouraging sign to the scientific community to pursue research endeavors related to the *Puncia granatum L* as well as other nutritional and medicinal plants. Chiang & others (2010) studied the bibliometric study on e-learning literature as indexed from SSCI database during 1967-2009. which concludes as Bradford's law, the three zone ration comparisons almost equal to 1:8:82, which means data, does not match Bradford's Law. Sudhier and Kumar (2010) examined the scientific research contained in doctoral dissertations produced at the University of Kerala, India. Gupta and Karisiddappa (2002) who have worked in the field of Theoretical Population Genetics for the period from 1907-1980, by applying different growth models, concluded that power model is observed to be the only model among the models viz., exponential logistics. Karki and Garg (1999) have studied the activity and growth of Organic Chemistry research in India during the years of 1971-1989 using Chemical Abstracts as source database.

## OBJECTIVE OF THE STUDY

- + To identify the type of documents published in horticultural science
- + To identify the year wise distribution of Horticultural Science Publications
- + To know the prolific Authors in Horticultural Science
- + To identify the top published Country in Horticultural Science
- + To identify the funding agency for Horticultural Science research
- + To identify prolific institution involved in horticultural science research

## METHODOLOGY

The data source for the study is ISI Web of Science, Science Citation Index, published by Thomson Scientific. It is the world's leading abstracting & indexing service providing on all aspects of science. By using suitable strategy related to literature produced Horticultural Science, the bibliographic details for each record included author, authors affiliation, title, type of document, source of publication, year of publication of the article and country of input have been collected. Further all the bibliographic details have been transferred to a spreadsheet. Later the data was analyzed as per the objectives of the study. Bibliometrics method has been used in the present study. At very initial stage researcher has started to search the articles from the web of science on Horticultural Science from 1989 to 2016 has taken into consideration.

## DATA ANALYSIS AND INTERPRETATION

**Table 1: horticultural science related publications in various categories**

Sl No.	Category	TP	%
1	Article	2548	82.89
2	Review	205	6.67
3	Proceedings paper	160	5.21
4	Meeting abstract	137	4.46
5	Editorial material	99	3.22
6	Book review	37	1.20
Total		3074	100

\*TP= Total Publication

The above table (1) reveals that horticultural science publications in various categories, and it shows that articles have highest share that is 82.89% (2548) in total publications 3074. Followed by this review, proceedings paper, meeting abstract, editorial material and book review has 6.67% (205), 5.21% (160), 4.46% (137), 3.22% (99) and 1.20% (37) respectively.

**Table 2: Year Wise Distribution of Horticultural Science Publications**

Sl No	Year	TP	Citation	ACPI	Sl No	Year	TP	Citation	ACPI
1	2016	127	2624	4.84	15	2002	66	363	18.18
2	2015	256	5216	4.91	16	2001	79	293	26.96
3	2014	208	4319	4.82	17	2000	62	240	25.83
4	2013	241	3924	6.14	18	1999	47	202	23.27
5	2012	210	3309	6.35	19	1998	44	142	30.99
6	2011	237	3037	7.80	20	1997	49	143	34.27
7	2010	219	2457	8.91	21	1996	44	99	44.44
8	2009	201	1954	10.29	22	1995	43	72	59.72
9	2008	206	1505	13.69	23	1994	46	45	102.22
10	2007	144	1159	12.42	24	1993	46	18	255.56
11	2006	117	1035	11.30	25	1992	33	16	206.25
12	2005	107	755	14.17	26	1991	43	6	716.67
13	2004	77	582	13.23	27	1990	18	5	360.00
14	2003	89	473	18.82	28	1989	15	0	0.00

\* ACPI= Average Citation per Item

Table 2 indicates year wise distribution of horticultural science publications, during the sample years 1989 to 2015. Total of 2947 publications were published, out of which 2015 is the more productive year because the percentage of share is highest that is 8.33%. There is an increasing trend from 1989 to 2011. But in 2011 and 2014 there is a slight decline in the publications. More over there is a chance of more publications in the 2016, because till now 127 publications are published. There is a similar trend in respect to the citation.

**Table 3: most prolific Authors Published in Horticultural Science**

SI No	Author	TP	%
1	Park Sa	15	0.49
2	Liu Mz	14	0.46
3	Son KC	14	0.46
4	Vanderzanden AM	13	0.42
5	Duchovskis P	12	0.39
6	Graves WR	12	0.39
7	Haynes C	12	0.39
8	Janick J	11	0.36
9	Singh B	11	0.36
10	Van Staden J	11	0.36
11	Waliczek TM	11	0.36
12	Zajicek JM	11	0.36
13	Brazaityte A	10	0.33
14	Horrocks M	10	0.33
15	Maertens M	9	0.29
16	Meyer MH	9	0.29
17	Samuoliene G	9	0.29
18	Jones DL	8	0.26
19	Kumar S	8	0.26

The above table (3) describes that most prolific author who published horticultural science publications. PARK SA was published 15 papers, followed by him LIU MZ and SON KC publishes 14 papers each. Then VANDERZANDEN AM published 13 paper related to horticultural science. DUCHOVSKIS P, GRAVES WR and HAYNES C contribute 12 publications each. JANICK J, SINGH B, VAN STADEN J, WALICZEK TM and ZAJICEK JM contributed 11 publications each and followed by remaining authors listed in the table.

**Table 4: Top 20 Country Contribution to Horticultural Science Publications**

SI No	Country	TP	%
1	USA	805	26.19
2	England	210	6.83
3	India	205	6.67
4	Germany	198	6.44
5	Australia	196	6.38
6	Netherland	132	4.29
7	Spain	131	4.26
8	Peoples R China	121	3.94
9	Canada	120	3.90
10	Brazil	100	3.25

11	France	96	3.12
12	New Zealand	86	2.80
13	Italy	83	2.70
14	Japan	71	2.31
15	Belgium	61	1.98
16	South Africa	54	1.76
17	Denmark	50	1.63
18	Poland	47	1.53
19	Sweden	43	1.40
20	South Korea	42	1.37

The above table (4) explains top 20 countries which contribute highest to the Horticultural Science Publications. Total of 3074 publications around the world published relate to horticultural science, USA contributes more to this publications that is around 26.19% (805). Followed by England, India, Germany and Australia contributes slightly same viz., 210 (6.83%), 205 (6.67%), 198 (6.44%) and 196 (6.38%) respectively. Then the remaining country in the table contributes less than 150 publications.

**Table 5: Top funding agency for Horticultural Science Publications**

Sl No	Funding Agency	TP	%
1	National Natural Science Foundation of China	25	0.81
2	European Union	22	0.72
3	Australian Research Council	12	0.39
4	European Commission	9	0.29
5	National Science Foundation	8	0.26
6	Gansu Province Project of Science And Technologies	7	0.23
7	Ministry of Education of China	7	0.23
8	NSF	7	0.23
9	Chinese Academy of Sciences	6	0.20
10	CNPQ	6	0.20
11	National Basic Research Program of China	6	0.20
12	Natural Sciences And Engineering Research Council of Canada	6	0.20
13	INIA	5	0.16
14	Ministry Of Agriculture of The Czech Republic	5	0.16
15	National Research Foundation	5	0.16
16	Research Council of Lithuania	5	0.16
17	Smart Research Professor Program of Konkuk University	5	0.16
18	Feder	4	0.13
19	Fundamental Research Funds for The Central Universities	4	0.13

The above table (5) explains that National Natural Science Foundation of China funded 25 publications which is relate to horticultural sciences. Followed by this agency European Union stands second in funding 22 publications. Australian Research Council contributes 12 publications and the

remaining agency funded less than 10 publications.

**Table 6: Organisations Contribution to the Horticultural Science Publication**

Sl No	Organizations	TP	%
1	Univ Florida	63	2.05
2	Iowa State Univ	38	1.24
3	Texas A M Univ	33	1.07
4	Univ Wageningen Res CTR	31	1.01
5	Univ Georgia	28	0.91
6	Usda ARS	28	0.91
7	Chinese Acad Sci	27	0.88
8	Univ Calif Davis	27	0.88
9	Michigan State Univ	26	0.85
10	Purdue Univ	26	0.85
11	Wageningen Univ	26	0.85
12	Univ Auckland	24	0.78
13	Univ Western Australia	24	0.78
14	Kansas State Univ	22	0.72
15	Univ Kentucky	22	0.72
16	Agr Agri Food Canada	21	0.68
17	Cornell Univ	21	0.68
18	INRA	21	0.68
19	Lithuanian Res Ctr Agr Forestry	21	0.68
20	Swedish Univ Agr Sci	21	0.68

The above table (6) noted that organisations contribution to the horticultural science publication. The University of Florida contributed highest number of publications that is 2.05% (63). Followed by Iowa State University, Texas A M University, University Wageningen Res CTR and other university with a low difference in the contribution.

**Table 7: Top 20 Horticultural Science Publication in various research areas**

Sl No	Research Area	TP	%
1	Agriculture	1343	43.69
2	Environmental Sciences Ecology	377	12.26
3	Plant Sciences	349	11.35
4	Food Science Technology	141	4.59
5	Chemistry	128	4.16
6	Engineering	117	3.81
7	Entomology	110	3.58
8	Science Technology Other Topics	106	3.45
9	Business Economics	104	3.38
10	Anthropology	85	2.77

11	Biotechnology Applied Microbiology	79	2.57
12	Water Resources	77	2.51
13	Geology	68	2.21
14	Archaeology	60	1.95
15	Geography	59	1.92
16	Biodiversity Conservation	55	1.79
17	Public Administration	49	1.59
18	Biochemistry Molecular Biology	46	1.50
19	Forestry	45	1.46
20	Life Sciences Biomedicine Other Topics	39	1.27

The above table lists that top 20 horticultural science publication in various research areas; the most important research area is agriculture (1343 publication, accounting for 43.69% in total of 3074). The other major area is Environmental Sciences Ecology and Plant Sciences stands with 377 (12.26%) and 349 (11.35%) publication respectively. However, none of remaining area accounted for more than 10% of total publication.

## FINDINGS AND CONCLUSION

The present study finds that, in horticultural science publications articles has a highest share in total publications, 2015 is the more productive year because the percentage of share is highest that is 8.33%. With respect to most prolific author who published horticultural science publications PARK SA was published 15 papers. The table 4 explains that USA contributes highest to horticulture science publications (805 publication, account 26.19% in total). Among the funding agency the University of Florida contributed highest number of publications that is 2.05% (63). The most important research area in horticultural science publication is agriculture (1343, 43.69%).

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