

## SHODH SAMAGAM

ISSN : 2581-6918 (Online), 2582-1792 (PRINT)



# Scientometric study of the research performed on Gall midge biotype in India

**Priti S. Bhandarkar,**

College of Dairy Science and Food Technology,  
(Dau Shri Vasudev Chandrakar Kamdhenu Vishwavidyalaya) Raipur, Chhattisgarh, INDIA

**Rekhraj Sahu,**

BTC College of Agriculture and Research Station, (IGKV), Bilaspur, Chhattisgarh, INDIA

**Sandeep Bhandarkar,**

College of Agriculture and Research Station, (IGKV), Mahasamund, Chhattisgarh, INDIA

### ORIGINAL ARTICLE



### Corresponding Authors

**Priti S. Bhandarkar,**

College of Dairy Science and Food Technology, (Dau Shri Vasudev Chandrakar Kamdhenu Vishwavidyalaya) Raipur, Chhattisgarh, INDIA

**Rekhraj Sahu,**

BTC College of Agriculture and Research Station, (IGKV), Bilaspur, Chhattisgarh, INDIA

**Sandeep Bhandarkar,**

College of Agriculture and Research Station, (IGKV), Mahasamund, Chhattisgarh, INDIA

shodhsamagam1@gmail.com

Received on : 06/08/2021

Revised on : ----

Accepted on : 13/08/2021

Plagiarism : 00% on 06/08/2021



Plagiarism Checker X Originality Report

Similarity Found: 9%

Date: Monday, August 16, 2021

Statistics: 282 words Plagiarized / 3166 Total words

Remarks: Low Plagiarism Detected - Your Document needs Optional Improvement.

Scientometric study of the research performed on Gall midge biotype in India Abstract :  
The paper brings out the results of a scientometric studies entitled "Scientometric study of the research performed on Gall midge biotype in India" for the period from 2001-2010. The data were downloaded from the direct searches in the J - Gate plus

### ABSTRACT

The paper brings out the results of a scientometric studies entitled "Scientometric study of the research performed on Gall midge biotype in India" for the period from 2001-2010. The data were downloaded from the direct searches in the J - Gate plus Database (<https://www.jgateplus.com>). The articles were takeout from a 'Rice Gall midge biotype of India' search query. Various scientometric indicators have been applied to acquire an appropriate perception of the growth and present status of research output of Gall midge biotype in India. This study aims at analysing the research output gall midge biotype in India. The analysis cover mainly the distribution of publications, Authorship pattern and their percentage, Single author vs Multi author contribution, Degree of collaboration, Affiliation of contributors, Geographical Distribution of Articles, Geographical distribution of Research Journals and Publisher wise distribution of Articles

### KEYWORDS

**Bibliometrics, Scientometrics, Authorship pattern, Degree of collaboration, Affiliation of contributors, Institution wise contributors, Geographical Distribution, Publisher wise distribution, Rice, Biotype, Gall midge.**

### INTRODUCTION

The Asian rice gall midge, *Orseolia oryzae* (Wood-Mason; Diptera: Cecidomyiidae), is a

serious pest of rice in India and other Asian countries. Its damage in India causes an average annual yield loss of 0.8% of the total production, amounting to about US\$ 80 million (Bentur *et al.*, 2003). Since the gall midge larvae infest closed galls, chemical control is not very effective. Cultivation of resistant varieties is the most effective and economic way to control this pest, since it is economical, eco-friendly and compatible with other control measures. Over 60 gall midge-resistant rice varieties have been developed and released for cultivation in different parts of the India. Genetic analysis have identified 10 resistance genes, designated as Gm1 –Gm10, conferring gall midge resistance in rice (Kumar *et al.*, 2005). Of these, three genes namely Gm1, Gm2 and unknown gene(s) in the Ptb21 cultivar have been widely used, most often as a single gene in a variety, in 83% of the released varieties. Large area cultivation of a single resistant rice variety over a large area of India resulted in rapid development of virulent gall midge biotypes capable of overcoming host plant resistance.

Gall midge biotype is changed and enabled this insect to overcome host resistance. Biotypes differ in host range, depending upon the resistance genes present in the cultivars. A shift in the gall midge population at any given place may render a previously resistant host became susceptible. The appearance of biotype 4 in Vijaynagar and Srikakulam districts of Andhra Pradesh led to the susceptibility of all resistant cultivars with the Gm1 and Gm2 resistance genes, resulting in failure of thousands of hectares of rice. Abhya, a variety bred at Indira Gandhi Krishi Vishwavidyalaya, with the Gm 4 resistance gene was resistant against the new biotype and was immediately released for cultivation. Therefore lot of work on inheritance study and allelic relationship have been done in India.

There have been several reports from different parts of the country of breakdown of resistance in varieties containing the Gm1 or Gm2 gene (Bentur *et al.*, 1987; Nair and Devi, 1994; Srinivas *et al.*, 1994; DRR, 2004). Six distinct gall midge biotypes have been identified so far from different parts of India based on reaction pattern reported against a set of three groups of differential rice varieties (Bentur *et al.*, 2003). Geographical distribution of these biotypes has been well mapped and is being monitored every year through the national gall midge biotype-monitoring studies under the All India Coordinated Rice Improvement Programme (DRR, 2004).

Bibliometric and scientometric analyses of the published research papers bestow a summarized guidance of the latest trends and pinpoint fields that require particulate attention in the future. The concept of these analyses has been employed and utilized extensively in various fields and more effectively in agricultural researches. The acceptance of such methodologies equips plant breeders with the necessary tools for examining current research penchant for modelling sustainable future pathways in gall midge biotype research in India. Furthermore, the assessment of literature is paramount in laying sustainable foundations for building efficient and resilient breeding programmes. This study fulfils this need by gathering and examining the content of high-impact scientific papers archived in J – Gate plus Database. The research objective to assess the patterns in gall midge biotype research by defining research topics, trends, and associations. The evidence collected in this exercise can be used for diagnose the relevant parties, hopeful collaboration, and building platforms for further research in the field of Gall midge biotype in India.

## REVIEW OF LITERATURE

The review of works relating to various aspects of Gall midge research in India has been done. It is observed that by reviewing the related articles, enables the researcher to identify the research gap in the earlier studies.

**Liu *et al.* 2017** Conducted a bibliometric analysis is study the history and status of rice research from 1985 to 2014. It was found that the number of publications has grown rapidly over the past 30 years, especially in Asia. However, the gap of research output quality between Asian countries/regions

and USA is obvious. The keywords co-occurrence analysis showed that the genetic analysis for agronomic traits was hot topic. It is expected that more technologies such as metabonomics and proteomics will be integrated to accelerate the comprehensive analysis of rice genome function.

**Kumar et al 2020.** The study employed both bibliometric techniques as well as social network analysis to analyze the publication output indexed by Scopus database in rice crop research during 1995-2014. The study found that Indian rice scientists prioritize collaborative research practices. Indian rice scientists demonstrated a preference for mega-authored publications. The increased trend in the mean values of Degree of Collaboration, Collaboration Coefficient and Modified Collaboration Coefficient indicate that the proportion of multi or mega-authored papers are accelerating steadily. Moreover, the increase in international collaboration indices manifests that the rice scientists in India have been gradually broadening the ambit of research collaboration to cope with the pace, scope and profoundness of transformations at the global level. The social network analysis of agencies revealed that the State Agricultural Universities, Indian Council of Agricultural Research and International Institutes have emerged as core collaborators in the field of rice crop research. Moreover, weak collaboration profile of industry indicates that although rice crop research has shifted from 'Mode 1' to 'Mode 2' form of knowledge production but its optimization is yet to be realized.

**Amin and Parekh 2019.** Studied the scientometric analysis of research output of biochemistry, genetics and molecular biology from the Gujarat University, Ahmedabad. The research article was published during 1980-2018. However, the data was collected and indexed in Scopus were considered for the analysis included a total of 400 publications. Various scientometric indicators have been calculated to acquire an appropriate perception of the growth and current status of research output of Gujarat University, Ahmedabad. The paper also analysed the publication trend of Gujarat University. The other aspects that were identified in the paper were the most prolific authors, collaborative authorship patterns and trends, most preferred publications.

## OBJECTIVES

The main objectives are to study the research conducted in India on Gall midge biotype between 2001- 2010 based on publications output, as indexed in J gate database. The study focuses on following areas:

- To identify and examine the exponential growth rate of research literature on Gall midge research in Indian Contributions.
- To analyze the Year wise distribution of publications.
- To analyze the authorship pattern and their percentage.
- To analyze the Year wise Single author vs Multi author contribution.
- To analyze the Degree of Collaboration.
- To analyze the Types of Affiliation of contributors.
- To analyze the Geographical Distribution of Articles.
- To analyze the Geographical distribution of Research Journals.
- To analyze the Publisher wise distribution of Articles.

## METHODOLOGY

Scientometrics is a subfield of the bibliometrics scientific domain which includes the quantification and evaluation of the impacts of science, technology, and innovations and the usage of such measurements in the policy and management contexts. Scientometric efforts to estimate the impact of publications and their authors in influencing knowledge. Furthermore, it provides an insight on the behaviour of scientific citations as a medium of scholarly communication, mapping of intellectual

landscapes and the production of focus indicators used in the assessment of performance and productivity.

### Data Collection

A scientometric analysis was conducted on 16 open access and peer-reviewed papers published between the year 2001 and 2010 in J – Gate plus e-Journals. Identification of these articles was recognized in July 2021 (Access Date: 05.07.2021) through direct searches in the J – Gate plus Database (<https://www.jgateplus.com>). The articles were extracted from a ‘Rice Gall midge biotype of India’ search query. The study included all document types (16) published within the targeted timescales (2001 – 2010). J-Gate is an electronic gateway to global e-journal literature. Launched in 2001 by Informatics India Limited, J-Gate provides seamless access to millions of journal articles available online offered by 12,791 Publishers.

### Results and Analysis

The Table -1 explained the yearly allocation of publications of the Gall midge biotype research in India. It provides the year wise output of publications. It found that the most product year in the terms of publications count is three with the highest number of publications in the year of 2003 and 2007. The least number of publications is found to be zero publication in the year 2004.

**Table 1:** Year wise distribution of publications

SN	Year	Number of publications	% of 16
01	2001	2	12.50
02	2002	2	12.50
03	2003	3	18.75
04	2004	0	0
05	2005	1	6.25
06	2006	2	12.50
07	2007	3	18.75
08	2008	1	6.25
09	2009	1	6.25
10	2010	1	6.25

(Source : Primary Data)

### Year wise Authorship pattern and their percentage

Table 2 suggests the year wise authorship pattern in the source topic. Two single authors contributed all over the publication output. Three double authors paper contributed for the source title. 02 triple authors contributed for publishing. Nine multi authors contributed for paper publishing.

**Table 2:** Year wise Authorship pattern and their percentage.

SN	Year	Single author	Two author	Three author	More than three authors	Total	Percentage
01	2001	0	0	0	2	2	12.50
02	2002	0	0	1	1	2	12.50
03	2003	1	0	0	2	3	18.75
04	2004	0	0	0	0	0	0
05	2005	0	1	0	0	1	6.25
06	2006	1	1	0	0	2	12.50
07	2007	0	1	0	2	3	18.75
08	2008	0	0	0	1	1	6.25

09	2009	0	0	1	0	1	6.25
10	2010	0	0	0	1	1	6.25
<b>TOTAL</b>		2	3	2	9	16	
<b>% age</b>		<b>12.5</b>	<b>18.7</b>	<b>12.5</b>	<b>56.2</b>	<b>100</b>	

(Source : Primary Data)

### Year wise Single author vs Multi author contribution

Table 3 exhibits that single author and multi author contribution in the source topic. It is found that two papers are published by single author and 14 papers are published by multi author during the study period.

**Table 3:** Year wise Single author vs Multi author contribution.

SN	Year	Single author	Multi authors	Total
01	2001	0	2	2
02	2002	0	2	2
03	2003	1	2	3
04	2004	0	0	0
05	2005	0	1	1
06	2006	1	1	2
07	2007	0	3	3
08	2008	0	1	1
09	2009	0	1	1
10	2010	0	1	1
<b>TOTAL</b>		2	14	16

(Source : Primary Data)

### Degree of Collaboration

The degree of collaboration is defined as the ratio of the number of collaborative research papers to the total number of research papers in the discipline during a certain period of time. The formula suggested by Subramanyam is used in this study.

$$C = \frac{N_m}{N_m + N_s}$$

C = Degree of Collaboration

N<sub>m</sub> = Number of Multiple authors

N<sub>s</sub> = Number of single authors

### Degree of collaboration

Thus the degree of collaboration in present study is 0.875 which clearly indicates its dominance over individual contribution.

**Table 4:** Degree of collaboration.

SN	Year	Degree of collaboration
01	2001	1.00
02	2002	1.00
03	2003	0.67
04	2004	0.00
05	2005	1.00
06	2006	0.50
07	2007	1.00
08	2008	1.00
09	2009	1.00
10	2010	1.00
<b>TOTAL</b>		0.88

(Source : Primary Data)

### Types of Affiliation of contributors

The Table 5 showed the affiliation wise contributors. These sectors have been grouped into four distinct categories for the convenience of the study. The highest contributions were from state universities with 08 (50.0%). This is followed by national institute with 04 (25.0%) and 02 (12.5 %) for deemed university and international institute each.

**Table 5:** Institution wise contributors

Types of Affiliation	No. of Articles	% age
Deemed University	02	12.5
State University	08	50.0
National Institute	04	25.0
International Institute	02	12.5
<b>Total</b>	16	100.0

(Source : Primary Data)

### Geographical Distribution of Articles

Table 6 demonstrate that most of the contributors are from India with 87.5 % and the rest 12.5 % only from foreign sources

**Table 6:** Geographical Distribution of Articles

Types of Affiliation	No. of Articles	% age
Indian	14	87.5
Foreign	02	12.5
<b>Total</b>	16	100.0

(Source : Primary Data)

### Geographical distribution of Research Journals

Table 7 described the analysis of the data, geographical distribution of research journals retrieved for the years considered for the study. There were four articles (25%) each were published in Annals of plant protection Sciences and Euphytica journals. This is followed by Indian Journal of Plant Protection and Journal of Entomological Research with 2 articles (12.5%) each. Crop Protection, Insect Molecular Biology, Oryza and Theoretical and Applied Genetics occupied one article (6.25%) each.

**Table 7:** Geographical distribution of Research Journals

Name of Journal	Published from	No. of Articles	% age
Annals of Plant Protection Sciences	India	04	25.0
Crop Protection	United Kingdom	01	6.25
Euphytica	Netherlands	04	25.0
Indian Journal of Plant Protection	India	02	12.5
Insect Molecular Biology	United Kingdom	01	6.25
Journal of Entomological Research	India	02	12.5
Oryza	India	01	6.25
Theoretical and Applied Genetics	Germany	01	6.25

(Source : Primary Data)

### Publisher wise distribution of Articles

Table 8 demonstrate the name of publisher of the article, in which authors have published their work and findings. Journal Springer Nature got the maximum number of articles viz., five articles (31.25%) followed by Society of Plant Protection Sciences with 4 article (25.0%) and then journals namely Plant Protection Association of India, Malhotra Publishing House and John Wiley and Sons, Ltd each published 2 articles (12.5%). Only single article (6.25%) was published in three journals viz., International Association for Plant Protection Science, Elsevier Science and Association of Rice Research Workers.

**Table 8:** Publisher wise distribution of Articles

Name of Publishers	Total no of articles published	% age of 16
Springer Nature	5	31.25
Society of Plant Protection Sciences	4	25.0
John Wiley and Sons, Ltd	2	12.5
Malhotra Publishing House	2	12.5
Plant Protection Association of India	2	12.5
Association of Rice Research Workers	1	6.25
Elsevier Science	1	6.25
International Association for Plant Protection Science	1	6.25

(Source : Primary Data)

### CONCLUSIONS

It should be highlighted that the articles are the key method of communication by researchers, supplying a primary indication on the quantum associated with work carried out on the topic Gall midge biotype research in India.

The study was observed the maximum number of publication was recorded with three (18.75%) in the year of 2003 and 2007 and least number of publications were found to be 2004 with zero publication.

It is observed that Two single authors contributed all over the publication output. Three double authors paper contributed for the source title. 02 triple authors contributed for publishing. Nine multi authors contributed for paper publishing.

It is found that two papers are published by single author and 14 papers are published by multi author during the study period.

In the present study, It was found that the degree of collaboration in present study is 0.875 which clearly indicates its dominance over individual contribution.

It is observed that affiliation wise contributors have been grouped into four distinct categories for the convenience of the study. The highest contributions were from state universities with 08 (50.0%). This is followed by national institute with 04 (25.0%) and 02 (12.5 %) for deemed university and international institute each.

Present study revealed that most of the contributors are from India with 87.5 % and the rest 12.5% only from foreign sources.

In the present study it is observed there were four articles (25%) each were published in Annals of plant protection Sciences and Euphytica journals. This is followed by Indian Journal of Plant Protection and Journal of Entomological Research with 2 articles (12.5%) each. Crop Protection, Insect Molecular Biology, Oryza and Theoretical and Applied Genetics occupied one article (6.25%) each.

It is revealed that journal Springer Nature got the maximum number of articles viz., five articles (31.25%) followed by Society of Plant Protection Sciences with 4 article (25.0%) and then journals namely Plant Protection Association of India, Malhotra Publishing House and John Wiley and Sons, Ltd each published 2 articles (12.5%). Only single article (6.25%) was published in three journals viz., International Association for Plant Protection Science, Elsevier Science and Association of Rice Research Workers.

Scientometric method is used for various purposes such as recognition of different indicators, analysis of scientific results and predicting the potential of a field. This work presents an analysis of Gall midge biotype research in India over a period (2001-2010). These studies can help researchers to understand the magnitude of Gall midge biotype research in India and establish future research directions.

## REFERENCES

1. Amin, Jignesh and Parekh, Yogesh R.,(2019) Scientometric Analysis of the Research Output of Biochemistry, Genetics and Molecular Biology of Gujarat University, Ahmedabad. Library Philosophy and Practice (e-journal). 2633.
2. Bentur J. S., Pasalu I. C., Sarma N. P., Prasad Rao U. and Mishra B. (2003) Gall midge resistance in rice. *DRR Research Paper Series* 01. Directorate of Rice Research, Hyderabad, India. 22 pp.
3. Bentur J. S., Srinivasan T. E. and Kalode M. B. (1987) Occurrence of a virulent gall midge (GM) *Orseolia oryzae* (Wood-Mason) biotype (?) in Andhra Pradesh, India. *International Rice Research Newsletter* 12 (3), 33–34
4. DRR (2004) Progress Report 2004: *Entomology and Pathology*, vol. 2. Directorate of Rice Research, Hyderabad, India. 206 pp.
5. Kumar A., Jain A., Sahu R. K., Shrivastava M. N., Nair S. and Mohan M. (2005) Genetic analysis of resistance genes for the rice gall midge in two rice genotypes. *Crop Science* 45, 1631–1635.
6. Kumar Avinash, Mallick Sambit and Swarnakar Pradip (2020) Mapping Scientific Collaboration: A Bibliometric Study of Rice Crop Research in India. *Journal of Scientometric Res.* 2020; 9(1):29-39

7. Liu Bin, Zhang Lu and Wang Xianwen (2017) Scientometric profile of global rice research during 1985–2014. *Current Science*, VOL. 112, NO. 5, 10 MARCH 2017
8. Nair K. V. and Devi A. (1994) Gall midge biotype 5 identification in Moncompu, Kerala, India. *International Rice Research Notes* 19 (4), 11.
9. Srinivas C., Reddy V. N., Rao P. S. and Ramesh P. (1994) Rice gall midge *Orseolia oryzae* (Wood-Mason) biotype in Karimnagar District, Andhra Pradesh, India. *International Rice Research Notes* 19 (2), 14–15.

\*\*\*\*\*