

Reflection of Scholarly Communications on Journal of Genetics: A Bibliometrics Study

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Abstract - The Journal of Genetics is among the oldest English language journals in genetics and has a unique history. The journal covers all areas of genetics and evolution, including molecular genetics and molecular evolution. It publishes papers and review articles on current topics, commentaries and essays on ideas and trends in genetics and evolutionary biology, historical developments, debates and book reviews. Since 2010 the journal has published a special category of papers termed 'Online Resources'. An attempt has been made to analyze the contributions in 32 issues of 10 volumes of the Journal of Genetics Indian Academic Science Journals of genetics. The study covers the years from 2006 to 2015. A total number of 752 scientific papers are published. The highest numbers of 125 articles were published in the year 2014. It witnessed the overall relative growth rate mean 1.5 and doubling time mean 0.66. Degree of Collaboration is 0.86. Maximum number of articles above five 260 were published by two authors. The highest growth rate of 1.84 was found 25 publications in the year 2008 and the lowest exponential growth rate was 0.72 published in 2012. The highest contributions were from Research institutions. The results revealed that the frequency value was 752 at overall total and then frequency Fd^1 value was 9925 and then frequency Fd^2 value was 178125 and length of articles calculated was 79.17. Around 214 articles were published with 11-20 citations. 129 articles were published with 21-30 citations followed by 79 articles with 31-40 citations. It was observed that the distribution of year wise Collaboration Coefficient (CC) and the value the collaboration coefficient (CC) has been calculated as 0.78

Keywords: Bibliometrics, Journal of Genetics, Degree of Collaboration, Citations

I. INTRODUCTION

Bibliometrics is a qualitative study of various aspect of literature on a topic and is used to identify the pattern of publication authorship, citations and for secondary journals coverage with the objective of getting an insight in to the dynamics of the growth of knowledge in the areas under consideration. Nicholas and Ritchie (1978), in their book entitled "Literature on Bibliometrics", stated that bibliometrics "Provide information about the structure of Knowledge and how it is communicated?" More recently Sengupta has defined this term as the "organization, classification and quantitative evolution of publication patterns of all macro and micro communications along their authorship by mathematical and statistical calculus".

The present-day bibliometric research is aimed at the following three main target-groups that clearly determine topics and sub-areas of "contemporary bibliometrics". Bibliometrics for bibliometricians (Methodology) is the domain of basic bibliometric research and is traditionally funded by the usual grants. Methodological research is conducted mainly in this domain. Bibliometrics for scientific disciplines (Scientific information) is for the researchers in scientific disciplines form the bigger, but also the most diverse interest group in bibliometrics. Due to their primary scientific orientation, their interests are strongly related to their specialty. This domain may be considered an extension of science information by metric means. Here we also find joint borderland with quantitative research in information retrieval. Bibliometrics for science policy and management (science policy) is the domain of research evaluation and the most important topic in the field. Here the national, regional, and institutional structures of science and their comparative presentation are in the foreground.

II. JOURNAL OF GENETICS

The Journal of Genetics is among the oldest English language journals in genetics and has a unique history. It was founded in England by W. Bateson and R. C. Punnett in 1910, and later edited by J. B. S. Haldane. When Haldane and his wife, Helen Spurway migrated to India in 1957, they brought the journal with them. Haldane edited the journal from India until his death in 1964, after which Helen Spurway continued to publish the journal with Madhav Gadgil H. Sharat Chandra (both from Indian Institute of Science, Bengaluru) and Suresh Jayakar (Laboratorio de Genetica Biochimica ed Evoluzionistica, Pavia) as editors. After the Helen Spurway death of in 1977, the journal was not published for several years (the last issue published by her was Vol. 63 No. 2 of December 1977). In 1985, the Indian Academy of Sciences, Bengaluru, revived the publication of the journal with the permission of Lady Naomi Mitchison, Haldane's sister and heir to the Haldane estate. The first issue published by the Indian Academy of Sciences was Vol. 64. No. 1, July 1985. Since then, the journal continues to be published by the Indian Academy of Sciences. Journal of Genetics is now distributed in print outside India and online worldwide by Springer, co-publisher of the journal together with the Indian Academy of Sciences.

III. REVIEW OF LITERATURE

Sankar, P and Kavitha E S (2016) have analyzed the journal "Asia-Pacific Journal of Management Research and Innovation" for the period from 2005 to 2015. The Journal published 11 volumes, 37 issues and 533 research articles during the period 2005- 2015. The result showed that out of 533 articles joint authors contributed 296 (55%) articles while the rest 237 (45%) were contributed by single author. The study revealed the domination of collaborative research and the degree of collaboration (DC) found to be 0.55. The numbers of references used by the authors were high with majority of them citing 21 to 40 references and on an average the journal authors have cited over 33 references per article.

Salisu. *et al.* (2015) stated that number of scholarly articles per year increased over the time frame of this study, as well as the average number of authors per article. The results of this study identified three core journals that published most of the articles namely Law Library Journal, Legal Information Management, and Legal Reference Services Quarterly.

Krishnaswamy (2015) conducted a study with 1171 original contributions published in the Indian Journal of Traditional Knowledge during 2002-2014. Contributions by more than five authors and small teams comprising four, three and two authors account for about 92% of the papers. The length of a maximum number of articles (41.9%) ranges from six to ten pages. Articles occupying 1 to 5 pages rank next accounting for 38.9%. Maximum authors from academic contributed 678 (57.9%) papers.

Nantu Acharjya (2015) intended to discover the growth and authorship pattern of productivity of articles of source journal of "Journal of Library and Information Science ". It was observed from the study that the year 2013 was the most participating year during the study period 2010 - 2014. The Relative Growth Rate (RGR) was high in terms of literature productivity and degree collaboration (DC) was less in terms of authorship pattern i.e., 31 out of 124 (0.25) and many more features were identified.

SankuBilas Roy and MoutusiBasak (2013) have analyzed Bibliometrics as the discipline where quantitative methods were employed to probe scientific communication process by measuring and analyzing various aspects of written documents. It helps to monitor growth of literature and patterns of research. This paper examines the articles published in the Journal of Documentation for authorship pattern, degree of collaboration, geographical distribution of papers and citation analysis. The study carried out for this paper found that the majority of papers are multi- authored. The degree of collaboration is found to be 0.51. The geographical distribution reveals that the contribution by United Kingdom is the highest. The average citation per paper is 43.

Thavamani, (2013) identified and analysed the growth and authorship pattern of productivity of articles of source journal "DESIDOC Journal of Library and Information Technology". It was found from the study that the year 2008 was the most participating year during the study period 2007 - 2011. The Relative Growth Rate (RGR) was high in terms of literature productivity and Degree Collaboration (DC) was also high in terms of authorship pattern i.e., 108 out of 194 (0.556), and many more features were identified.

Hemanta Kumar (2012) carried out a bibliometric analysis of 210 papers and 2999 citations published in the journal Nelumbo published by the Botanical Survey of India for the period 2004 to 2011. Yearwise distribution of contributions in their different volumes, authorship pattern, degree of collaboration, length of papers, citation pattern, average citation per contribution per volume, type of documents and their citations, subject wise distribution of papers, rank list of cited journals, ranking of contributors were studied. Joint authorship pattern comes to 74.76% which is higher than single authorship pattern. Out of 2999 citations maximum 52.59% were from journals. Number of papers on New Record came first with 20%. The Journal of Hattori Botany Lab came top in journal rank study which is a foreign journal followed by two Indian journals i.e. Journal of Economic and Taxonomic Botany and the Study Journal Nelumbo respectively.

IV. OBJECTIVES OF THE STUDY

1. To know the year wise distribution of articles.
2. To know the volume wise distribution of articles document output.
3. To observe the author productivity.
4. To identify geographical distribution of articles.
5. To classify the contribution distribution, institution wise.
6. To identify the page and length wise distribution.
7. To classify the reference source output.
8. To categorize the single and multiple authored publications output.
9. To calculate the year-wise documents type.
10. To estimate the Degree of collaboration, RGR, DT, CI, CAI, CC and Time Series Analysis during the period of study.

V. METHODOLOGY

The data pertaining to Indian Journal of Genetics regarding 752 contributions made from volume number 85 to 94. The analysis made was on authorship pattern, degree of collaboration, length of articles, geographical distribution of articles, average number of references, and institution wise contributions. The authorship pattern was analyzed by using degree of collaboration in quantitative terms. Bibliometrics indicators such as DC, RGR, and DT were used to arrive at the result. All the data were subsequently examined, observed, analyzed and tabulated for making observations. The URL www.indianacademyscience.in has the total

number of records calculated from the 2006-2015. The data was collected manually from the website.

VI. SCOPE AND LIMITATIONS

An attempt has been made to analyze the contributions in 32 issues of 10 volumes of the Journal of Genetics Indian Academic Science Journals of genetics. The study covered is from year 2006 to 2015.

VII. DATA ANALYSIS AND INTERPRETATION

Table I shows the year wise distribution of articles during the study period 2006-2015 with three and four issues. It can be noticed that totally 752 articles were published. The highest number of 125 (16.63%) articles were published in the year 2014 with three issues is followed by publication of 106 (14.09%) in 2015 with 4 issues. It can be noticed that a very less number of articles 39 (5.19%) ,42 (5.59%) were published in the year 2007 and 2006 respectively. In the year 2011, 2010 2008 and 2009 respectively 80 (10.63%),

74 (9.84%), 72 (9.54%), 69 (9.18%) were the publications of articles during the study period. It slightly increased and decreased from 42 to 106.

TABLE I YEAR WISE DISTRIBUTION OF ARTICLES

| Year | Vol. No. | No. of Issues | No. of Contribution | % |
|-------|----------|---------------|---------------------|-------|
| 2006 | 85 | 3 | 42 | 5.59 |
| 2007 | 86 | 3 | 39 | 5.19 |
| 2008 | 87 | 3 | 72 | 9.57 |
| 2009 | 88 | 3 | 69 | 9.18 |
| 2010 | 89 | 4 | 74 | 9.84 |
| 2011 | 90 | 3 | 80 | 10.63 |
| 2012 | 91 | 3 | 58 | 7.71 |
| 2013 | 92 | 3 | 87 | 11.57 |
| 2014 | 93 | 3 | 125 | 16.63 |
| 2015 | 94 | 4 | 106 | 14.09 |
| Total | | 32 | 752 | 100 |

TABLE II DISTRIBUTION OF ARTICLES (ISSUE WISE)

| Year | Volume | Month and Issue wise | | | Total | % | |
|-------|--------|----------------------|--------|-----------------|----------|-------|------------|
| | | April | August | December | | | |
| 2006 | 85 | 15 | 11 | 16 | 42 | 5.59 | |
| 2007 | 86 | 12 | 12 | 15 | 39 | 5.19 | |
| 2008 | 87 | 13 | 17 | 42 | 72 | 9.57 | |
| 2009 | 88 | 20 | 18 | 31 | 69 | 9.18 | |
| 2010 | 89 | 17 | 21 | September 14 | 22 | 74 | 9.84 |
| | | | | | | | |
| 2011 | 90 | 27 | 32 | 21 | 80 | 10.63 | |
| 2012 | 91 | 15 | 24 | 19 | 58 | 7.71 | |
| 2013 | 92 | 24 | 25 | 38 | 87 | 11.57 | |
| 2014 | 93 | 35 | 52 | 38 | 125 | 16.63 | |
| Year | Volume | March | June | September | December | Total | Percentage |
| 2015 | 94 | 25 | 27 | 26 | 28 | 106 | 14.09 |
| Total | | 203 | 239 | 40 | 270 | 752 | 100 |

Table II shows the Issue wise distribution of articles during the research period 2006-2015. Out of 752 articles, 203 articles were published in the month of April and March, 239 articles 40 were published in the month of August and September issue and 270 articles were published in December issue. It can be clearly noticed that more number of articles were published in the month of August issue and a very less number of articles were published in April issue.

Tables III indicates that the relative growth rate of articles output and also doubling time of the publication. It could be observed that the relative growth rate was increased and at the same time doubling time also decreased. The relative growth rate 0.65 in 2007 gradually increased to 1.46 in the year 2010 and the mean of the relative growth rate

being 1.15 during the year 2006-2010. The doubling time decreased from 1.06 to 0.47 and the mean for doubling time 0.66. 1.86 is the mean relative growth rate for the periods 2011-2015 and 0.37 is the doubling time mean. The study period witnessed the overall relative growth rate mean to be 1.50 and doubling time mean 0.51 during the study period 2006-2015.

Table IV shows the degree of collaboration in with the Journal of Genetics. The Degree of Collaboration is an examination of the prominent area of inquiry of bibliometric studies indicating the trend in patterns of single and joint authorship in the publication of the research period 2006-2015.

TABLE III RELATIVE GROWTH RATE AND DOUBLING TIME MEAN

| Year | Total Article | Cumulative Total | W1 | W2 | W2-W1 | Mean | DT | Mean |
|-------|---------------|------------------|------|------|-------|------|------|------|
| 2006 | 42 | - | 3.74 | - | - | 1.15 | - | 0.66 |
| 2007 | 39 | 81 | 3.66 | 4.39 | 0.65 | | 1.06 | |
| 2008 | 72 | 153 | 4.28 | 5.03 | 1.37 | | 0.51 | |
| 2009 | 69 | 222 | 4.23 | 5.40 | 1.12 | | 0.61 | |
| 2010 | 74 | 296 | 4.30 | 5.69 | 1.46 | | 0.47 | |
| 2011 | 80 | 376 | 4.38 | 5.93 | 1.63 | 1.86 | 0.42 | 0.37 |
| 2012 | 58 | 434 | 4.06 | 6.07 | 1.69 | | 0.41 | |
| 2013 | 87 | 521 | 4.47 | 6.25 | 2.19 | | 0.31 | |
| 2014 | 125 | 646 | 4.83 | 6.47 | 2 | | 0.34 | |
| 2015 | 106 | 752 | 4.66 | 6.62 | 1.79 | | 0.38 | |
| Total | 752 | | | | | 1.50 | | 0.51 |

TABLE IV DEGREE OF COLLABORATION

| Year | Single Author | | Multi Author | | Total | Degree of Collaboration |
|-------|---------------|-------|--------------|-------|-------|-------------------------|
| | No of Output | % | No of Output | % | | |
| 2006 | 4 | 3.92 | 38 | 5.85 | 42 | 0.90 |
| 2007 | 4 | 3.92 | 35 | 5.38 | 39 | 0.89 |
| 2008 | 18 | 17.65 | 54 | 8.31 | 72 | 0.75 |
| 2009 | 10 | 9.80 | 59 | 9.08 | 59 | 0.85 |
| 2010 | 16 | 15.68 | 58 | 8.92 | 74 | 0.78 |
| 2011 | 12 | 11.76 | 68 | 10.46 | 80 | 0.85 |
| 2012 | 11 | 10.78 | 47 | 7.23 | 58 | 0.81 |
| 2013 | 8 | 7.85 | 79 | 12.16 | 87 | 0.90 |
| 2014 | 9 | 8.82 | 116 | 17.85 | 125 | 0.92 |
| 2015 | 10 | 9.82 | 96 | 14.76 | 106 | 0.91 |
| Total | 102 | 100 | 650 | 100 | 752 | 0.86 |
| % | 13.56 | | 86.44 | 100 | | |

It was calculated using Subramanian’s formula:

$$C = \frac{NM}{NM + NS}$$

Where C = degree of collaboration,
 Nm=Number of multi-authored works,
 Ns= Number of single-authored works.

It is found that DC range started from 0.90 and ended with 0.91. DC range slightly increased and decreased. 0.92 is the highest DC value in 2014, Followed by 0.91 in 2015, 0.90 in 2006 and 2013 and a very less number in the year 0.75. The overall Degree of Collaboration is 0.86 during the study period. Therefore the collaborative works are remarkably observed in the study. In other words multiple authors’ contributions are dominant in Journal of Genetics as mentioned in the above table.

Table V shows that the extent of research contribution by the authors is explained under the authorship pattern table, indicating that out of 752 articles, maximum number of articles above five 260(34.58%) were published by two authors. Followed by the four authors with the contributed being only 113 (15.03%). Followed by the five authors contribution of 110 (14.63%), followed by the single authors contribution of 102 (13.56%), followed by the three authors contribution of 95 (12.63%) And then the lowest number of articles 72(9.57%) were published by more than two.

Table VI shows the exponential growth rate of publications in Indian academy journal of genetics during the research period of 2006 to 2015 (10 years). The highest growth rate of 1.84 was found in the year 2008 with 72 publications and the lowest exponential growth rate published 0.72 with 58 published in 2012. The exponential growth rate was from 0.92 to 0.84. It was also found that the overall exponential growth rate was 10.35.

TABLE V YEAR WISE AUTHORSHIP PATTERN

| Year | Single | Two | Three | Four | Five | Above five | Total |
|-------|--------|------|-------|-------|-------|------------|-------|
| 2006 | 4 | 8 | 9 | 5 | 6 | 10 | 42 |
| 2007 | 4 | 7 | 4 | 10 | 6 | 8 | 39 |
| 2008 | 18 | 6 | 13 | 11 | 13 | 11 | 72 |
| 2009 | 10 | 4 | 7 | 16 | 7 | 25 | 69 |
| 2010 | 16 | 9 | 10 | 11 | 5 | 23 | 74 |
| 2011 | 12 | 4 | 5 | 11 | 12 | 36 | 80 |
| 2012 | 11 | 5 | 4 | 5 | 11 | 22 | 58 |
| 2013 | 8 | 5 | 12 | 11 | 19 | 32 | 87 |
| 2014 | 9 | 9 | 20 | 16 | 20 | 51 | 125 |
| 2015 | 10 | 15 | 11 | 17 | 11 | 42 | 106 |
| Total | 102 | 72 | 95 | 113 | 110 | 260 | 752 |
| % | 13.56 | 9.57 | 12.63 | 15.03 | 14.63 | 34.58 | 100 |
| TA | 102 | 144 | 285 | 452 | 550 | 1905 | 3438 |
| % | 2.96 | 4.19 | 8.29 | 13.16 | 15.99 | 55.41 | 100 |

TABLE VI EXPONENTIAL GROWTH RATE

| S. No. | Year | Publication | Exponential Growth Rate |
|--------|------|-------------|-------------------------|
| 1 | 2006 | 42 | |
| 2 | 2007 | 39 | 0.92 |
| 3 | 2008 | 72 | 1.84 |
| 4 | 2009 | 69 | 0.95 |
| 5 | 2010 | 74 | 1.07 |
| 6 | 2011 | 80 | 1.08 |
| 7 | 2012 | 58 | 0.72 |
| 8 | 2013 | 87 | 1.5 |
| 9 | 2014 | 125 | 1.43 |
| 10 | 2015 | 106 | 0.84 |
| Total | | 752 | 10.35 |

Table VII shows the extent of research contributions affiliation year wise. These sectors were tabulated in five distinct categories for the convenience of the study as University, College, Research Institutions, Technology and Laboratories. The highest contributions of 250 (34%) were from 250(34%) Research institutions. One fourth of the articles 186(24.74%) were published Universities followed one fifth of the articles 149(20%) from Laboratories. 117 (16%) of the articles were from College. The study also found that a very less number of articles 50 (7%) were published from the Technological Department. Maximum number of contributions was from the Research Institutions was being one third of the articles published in the year the year 2010 and 2015. One fourth of the articles published in 2008, 2009, 2011, and 2013. A very less number of articles of 10 published in the year 2007.

TABLE VII YEAR WISE AND INSTITUTION WISE DISTRIBUTION OF ARTICLES

| Institution | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | Total | % |
|----------------------|------|------|------|------|------|------|------|------|------|------|-------|-------|
| University | 15 | 18 | 28 | 22 | 14 | 23 | 11 | 20 | 20 | 15 | 186 | 24.73 |
| College | 4 | 1 | 6 | 8 | 12 | 10 | 14 | 13 | 25 | 24 | 117 | 15.56 |
| Research Institution | 13 | 10 | 24 | 26 | 33 | 29 | 17 | 25 | 40 | 33 | 250 | 33.24 |
| Technology | 2 | 1 | 3 | 1 | 5 | 3 | 3 | 8 | 15 | 9 | 50 | 6.65 |
| Laboratories | 8 | 9 | 11 | 12 | 10 | 15 | 13 | 21 | 25 | 25 | 149 | 19.82 |
| Total | 42 | 39 | 72 | 69 | 74 | 80 | 58 | 87 | 125 | 106 | 752 | 100 |

TABLE VIII YEAR WISE DISTRIBUTION OF GEOGRAPHICAL AREA

| Institution | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | Total | % |
|-------------|------|------|------|------|------|------|------|------|------|------|-------|-------|
| India | 15 | 14 | 19 | 28 | 26 | 25 | 20 | 28 | 43 | 37 | 255 | 33.91 |
| Foreign | 27 | 25 | 53 | 41 | 48 | 55 | 38 | 59 | 82 | 69 | 497 | 66.09 |
| Total | 42 | 39 | 72 | 69 | 74 | 80 | 58 | 87 | 125 | 106 | 752 | 100 |

Table VIII clearly explains the geographical wise distribution of articles year wise during the study period. The findings reveal that in the 752 articles. Seven out of ten

were published by foreign authors. Three articles out of ten were published by Indian authors. It is found that more number of articles contributions from foreign authors. In

2104 out of 125 publications 82 were from foreign authors and the remaining were rest of 43 from Indian authors.

TABLE IX COUNTRY WISE DISTRIBUTION OF ARTICLES

| S.No | Country | Total | % |
|------|--------------|-------|-------|
| 1 | China | 219 | 29.12 |
| 2 | India | 117 | 15.55 |
| 3 | USA | 57 | 7.58 |
| 4 | UK | 21 | 2.79 |
| 5 | Iran | 17 | 2.26 |
| 6 | Tunisia | 14 | 1.86 |
| 7 | Brazil | 12 | 1.6 |
| 8 | Italy | 12 | 1.6 |
| 9 | Japan | 12 | 1.6 |
| 10 | Korea | 9 | 1.19 |
| 11 | Mexico | 8 | 1.1 |
| 12 | Turkey | 8 | 1.1 |
| 13 | Thailand | 6 | 0.79 |
| 14 | Argentina | 6 | 0.79 |
| 15 | France | 5 | 0.66 |
| 16 | Fine land | 5 | 0.66 |
| 17 | Spain | 5 | 0.66 |
| 18 | Russia | 5 | 0.66 |
| 19 | Malaysia | 5 | 0.66 |
| 20 | London | 4 | 0.53 |
| 21 | Kernel | 4 | 0.53 |
| 22 | Jammu | 4 | 0.53 |
| 23 | Portugal | 4 | 0.53 |
| 24 | Greece | 4 | 0.53 |
| 25 | Poland | 4 | 0.53 |
| 26 | Germany | 4 | 0.53 |
| 27 | Beijing | 3 | 0.40 |
| 28 | Australia | 3 | 0.40 |
| 29 | Sweden | 3 | 0.40 |
| 30 | South Africa | 3 | 0.40 |
| 31 | Maringa | 3 | 0.40 |
| 32 | Belgium | 2 | 0.27 |
| 33 | Serbia | 2 | 0.27 |
| 34 | Macedonia | 2 | 0.27 |
| 35 | Rah at | 2 | 0.27 |
| 36 | Sax | 2 | 0.27 |
| 37 | California | 2 | 0.27 |
| 38 | Jordan | 1 | 0.13 |
| 39 | Ethiopia | 1 | 0.13 |
| 40 | Lithonia | 1 | 0.13 |
| 41 | Estonia | 1 | 0.13 |
| 42 | Pakistan | 1 | 0.13 |
| 43 | Cambridge | 1 | 0.13 |

| | | | |
|--------------|-------------|------------|------------|
| 44 | Romania | 1 | 0.13 |
| 45 | Zealand | 1 | 0.13 |
| 46 | Jorhat | 1 | 0.13 |
| 47 | Cyprus | 1 | 0.13 |
| 48 | Oxford | 1 | 0.13 |
| 49 | Egypt | 1 | 0.13 |
| 50 | Nether Land | 1 | 0.13 |
| 51 | New Zealand | 1 | 0.13 |
| 52 | others | 140 | 18.62 |
| Total | | 752 | 100 |

It is found that a total number of 752 articles were published during the period of 2006-2015. During the analysis it has been observed that most of the articles are prepared / contributed by joint authors from different places. From the analysis it has been observed that the highest numbers of contributors are from china with 219 and the percentage is 29.12%, and is followed by india117 (15.55%),USA, UK, Iran, Germany, Korea, are the countries which are in third, fourth, fifth, sixth, seventh, position in the list respectively.

Table X clearly shows the documents type. These sectors have been categorized in 21 types based on the research period. Out of 752 publications 324 are from the research articles and 293 from research note, 55 from review articles and 18 from journal of genetics online research. A very few contribution was from book review with 6, Perspective, author index, view point, special feature, author correction, hypothesis, research commentary. Two publications out of ten in the year 2014 and followed by 106 in 2015. A very less number of contributions of 39 in the year 2007.

Table XI shows the Pattern of Co-Authorship being measured by Co-Authorship Index, which is obtained by calculating proportionately the publications by single, two authors and multi authored papers. CAI is determined with the following formula suggested by Garg & Padhi (2001) [11]. Here,

$$CAI = \frac{\frac{N_{ij}}{N_{io}}}{\frac{N_{oj}}{N_{oo}}} * 100$$

N_{ij} = Number of publications for the particular authorship pattern in the particular block

N_{io} = Total output in the particular block

N_{oj} = Total output for the particular authorship pattern

N_{oo} = Total output CAI = 100 reflects the number of publications corresponds to the world average, CAI > 100 reflects publications higher than the world average and CAI < 100 reflects the publications lower than the world average within a co-authorship pattern. In order to calculate the co-authorship pattern in India, the study period was ten years, i.e. 2006 –2015. Table reveals that the CAI increased for double authors from above five 260 in first output to 72 in second lowest. On the other hand, it is decreased for single and multi authors.

TABLE X YEAR WISE FORMS OF DOCUMENTS

| Document type/ Year | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | Total | % |
|---|------|------|------|------|------|------|------|------|------|------|-------|-------|
| Research article | 13 | 23 | 37 | 30 | 27 | 31 | 22 | 36 | 57 | 48 | 324 | 43.1 |
| Research Note | 22 | 12 | 27 | 27 | 23 | 38 | 23 | 34 | 52 | 35 | 293 | 38.96 |
| Review article | - | - | - | 8 | 13 | 2 | 6 | 7 | 7 | 12 | 55 | 7.31 |
| Book Review | 1 | - | 1 | - | 1 | 2 | - | 1 | - | - | 6 | 0.8 |
| Commentary on J.Genet Classic | 3 | - | - | 1 | - | - | - | - | - | - | 4 | 0.53 |
| J.Genet Classic | 2 | - | - | 1 | - | - | - | - | - | - | 3 | 0.4 |
| Perspective | 1 | - | 1 | 1 | 1 | 1 | - | 1 | 2 | 1 | 9 | 1.19 |
| Preface | - | - | 2 | 1 | 1 | - | - | - | - | - | 4 | 0.53 |
| Journal of Genetics online Research | - | - | - | - | 3 | 3 | 3 | 3 | 3 | 3 | 18 | 2.4 |
| Editorial | - | 1 | 2 | - | 1 | - | - | - | 1 | 1 | 6 | 0.8 |
| Research Commentary | - | - | - | - | - | 1 | - | - | 2 | 1 | 4 | 0.53 |
| Hypothesis | - | - | - | - | 1 | - | - | - | - | 1 | 2 | 0.26 |
| Erratum | - | - | 1 | - | - | - | - | 1 | - | 4 | 6 | 0.8 |
| Author Correction | - | - | - | - | 1 | 2 | 1 | - | - | - | 4 | 0.53 |
| Epplogue | - | - | - | - | 1 | - | - | - | - | - | 1 | 0.13 |
| Special feature | - | 1 | 1 | - | - | - | - | - | - | - | 2 | 0.3 |
| General Editorial on publication ethics | - | - | - | - | - | - | - | 1 | 1 | - | 2 | 0.3 |
| View Point | - | 1 | - | - | - | - | 1 | 1 | - | - | 3 | 0.4 |
| Subject index | - | 1 | - | - | - | - | 1 | 1 | - | - | 2 | 0.3 |
| Author Index | - | - | - | - | - | - | 1 | 1 | - | - | 2 | 0.3 |
| Obituary | - | - | - | - | 1 | - | - | - | - | - | 1 | 0.13 |
| Total | 42 | 39 | 72 | 69 | 74 | 80 | 58 | 87 | 125 | 106 | 752 | 100 |

TABLE XI PATTERN OF CO-AUTHORSHIP

| Year | Single | | Double | | Three | | Four | | Five | | Above Five | | Total |
|-------|--------|-----|--------|-----|-------|-----|------|-----|------|-----|------------|-----|-------|
| | No | CAI | No | CAI | No | CAI | No | CAI | No | CAI | No | CAI | |
| 2006 | 4 | 70 | 8 | 199 | 9 | 169 | 5 | 79 | 6 | 97 | 10 | 68 | 42 |
| 2007 | 4 | 75 | 7 | 187 | 4 | 81 | 10 | 170 | 6 | 105 | 8 | 59 | 39 |
| 2008 | 18 | 184 | 6 | 87 | 13 | 142 | 11 | 101 | 13 | 123 | 11 | 44 | 72 |
| 2009 | 10 | 106 | 4 | 60 | 7 | 80 | 16 | 154 | 7 | 69 | 25 | 104 | 69 |
| 2010 | 16 | 159 | 9 | 127 | 10 | 106 | 11 | 98 | 5 | 46 | 23 | 89 | 74 |
| 2011 | 12 | 110 | 4 | 52 | 5 | 49 | 11 | 91 | 12 | 102 | 36 | 130 | 80 |
| 2012 | 11 | 139 | 5 | 90 | 4 | 54 | 5 | 57 | 11 | 129 | 22 | 109 | 58 |
| 2013 | 8 | 67 | 5 | 60 | 12 | 109 | 11 | 84 | 19 | 149 | 32 | 106 | 87 |
| 2014 | 9 | 53 | 9 | 75 | 20 | 126 | 16 | 85 | 20 | 109 | 51 | 117 | 125 |
| 2015 | 10 | 69 | 15 | 147 | 11 | 82 | 17 | 106 | 11 | 70 | 42 | 114 | 106 |
| Total | 102 | | 72 | | 95 | | 113 | | 110 | | 260 | | 752 |

Table XII explains the page wise distribution of publications. The length categorized 8 types with 5 pages based on the research period. It is found that more number of contributions was from 1-5 pages 344, followed by 289 from 6-10 pages, 90 from 11-15 pages 16 from 16-20 pages. A very less number of contribution 8, 2, 3 the pages 21-25, 26-30 and 36-40. No contribution in 31-35 pages. The study found that one articles out of two published 1-5 pages. Table XIII shows the citation range distribution of publications. Citation is nothing but a reference. It is found

that One fourth of the articles were published with 1-10 citations. Around 214 (29%) articles were published with 11-20 citations. 129 (17.15%) articles were published with 21-30 citations followed by 79 articles (10.51%) with 31-40 citations, 58 articles were (7.71%) published with 41-50 citations. 35 articles were published with 51-60 citations. 53 articles were published with more than 60 citations. It is also found that a Maximum number of articles 214 published with 11-20 citations. And a very lesser number of articles 16 published with above 80 pages. Ever Less a

number of citations (1-10) using the articles published with 80) using the articles publications only 16 (2013%). 183 (24.33%) articles. Maximum number of citations (71-

TABLE XII PAGE WISE DISTRIBUTION OF ARTICLES

| No. of Pages | Year | | | | | | | | | | Total | % |
|--------------|------|------|------|------|------|------|------|------|------|------|-------|-------|
| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | | |
| 1-5 | 26 | 17 | 36 | 28 | 33 | 43 | 28 | 36 | 53 | 44 | 344 | 45.74 |
| 6-10 | 14 | 18 | 25 | 31 | 28 | 30 | 19 | 34 | 45 | 45 | 289 | 38.43 |
| 11-15 | 2 | 4 | 9 | 6 | 10 | 6 | 9 | 12 | 17 | 15 | 90 | 11.96 |
| 16-20 | | | 2 | 2 | 2 | 1 | 1 | 2 | 5 | 1 | 16 | 2.14 |
| 21-25 | | | | 2 | | | 1 | | 4 | 1 | 8 | 1.07 |
| 26-30 | | | | | 1 | | | 1 | | | 2 | 0.27 |
| 31-35 | | | | | | | | | | | | |
| 36-40 | | | | | | | | 2 | 1 | | 3 | 0.39 |
| Total | 42 | 39 | 72 | 69 | 74 | 80 | 58 | 87 | 125 | 106 | 752 | 100 |

TABLE XIII DISTRIBUTION OF YEAR WISE CITATIONS

| No of Citations | Year | | | | | | | | | | Total | % |
|-----------------|------|------|------|------|------|------|------|------|------|------|-------|-------|
| | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | | |
| 1-10 | 7 | 5 | 9 | 4 | 14 | 30 | 21 | 30 | 35 | 28 | 183 | 24.33 |
| 11-20 | 13 | 8 | 19 | 24 | 28 | 25 | 15 | 26 | 28 | 28 | 214 | 28.46 |
| 21-30 | 11 | 9 | 17 | 13 | 12 | 12 | 6 | 11 | 19 | 19 | 129 | 17.15 |
| 31-40 | 6 | 5 | 11 | 12 | 6 | 7 | 4 | 5 | 13 | 10 | 79 | 10.51 |
| 41-50 | 3 | 8 | 7 | 8 | 3 | 2 | 4 | 5 | 10 | 8 | 58 | 7.71 |
| 21-60 | 2 | 3 | 2 | 3 | 3 | 1 | 3 | 4 | 9 | 5 | 35 | 4.65 |
| 61-70 | | | 4 | 1 | 2 | 2 | 2 | 2 | 3 | 3 | 19 | 2.53 |
| 71-80 | | 1 | 2 | 1 | 1 | 1 | 3 | 1 | 4 | 2 | 16 | 2.13 |
| Above 80 | | | 1 | 3 | 5 | | | 3 | 4 | 3 | 19 | 2.53 |
| Total | 42 | 39 | 72 | 69 | 74 | 80 | 58 | 87 | 125 | 106 | 752 | 100 |

TABLE XIV TIME SERIES ANALYSIS DISTRIBUTION OF ARTICLES

| Year | No. of Publication | X | X ² | XY |
|-------|--------------------|----|----------------|------|
| 2006 | 42 | -4 | -16 | 168 |
| 2007 | 39 | -3 | -9 | 117 |
| 2008 | 72 | -2 | -4 | 144 |
| 2009 | 69 | -1 | -1 | 69 |
| 2010 | 74 | 0 | 0 | 0 |
| 2011 | 80 | 1 | 1 | 80 |
| 2012 | 58 | 2 | 4 | 116 |
| 2013 | 87 | 3 | 9 | 261 |
| 2014 | 125 | 4 | 16 | 500 |
| 2015 | 106 | 5 | 25 | 530 |
| Total | 752 | | 85 | 1985 |

Table XIV shows that the Straight line equation is applied to arrive at the estimates for future growth under the time series analysis.

Straight line equation $Y_c = a + bX$; Since $\sum x = 0$
 $a = \sum Y / N = 752 / 10 = 75.2$
 $b = \sum XY / \sum X^2 = 1985 / 85 = 23.35$

Estimated literature in 2020 is when $X = 2020 - 2010 = 10$
 $= 75.2 + 23.35 \times 10 = 75.2 + 235$
 $= 310.2$

Estimated literature in 2025 is when $X = 2025 - 2010 = 15$
 $= 75.2 + 23.35 \times 15 = 75.2 + 350.25$
 $= 425.45$

The predicted value of literature output for the year 2020 is 310.2 and the predicted literature output for the year 2025 is 425.45.

VIII. FINDINGS

The following are the major findings of the present investigation on Reflections of Scholarly Communication of Journal of Genetics from 2006-2015: A Bibliometric Study. The findings of the year wise distribution of these reveal the following facts

1. The total out of 752 scientific papers, the highest number of 125 (16.63%) articles were published in the year 2014 with three issues and followed by 106(14.09%) articles in 2015 with 4 issues. It is noticed that a very less number of articles were published 39 (5.19%), 42 (5.59%) respectively in the year 2007 and 2006. It is clearly noticed that more number of articles

- were published in the month of August issue and a very less number of articles were published in April issue.
2. The study period witnessed the overall relative growth rate mean 1.2 and doubling time mean 0.66 during the study period 2006-2015.
 3. It is found that DC range started from 0.90 and ended with 0.91. The DC range then slightly increased and decreased. 0.92 is the highest DC value in 2014. Followed by 0.91 in 2015, 0.90 from 2006 and 2013 and a very less number in the year 0.75. The overall Degree of Collaboration is 0.86 during the study period.
 4. Maximum number of articles above five 260(34.58%) were published by two authors. Followed by four authors that contributed only 113 (15.03%). Followed by the five authors which contributed 110 (14.63%), followed by the single authors had contributed 102 (13.56%), followed by the three authors had contributed 95 (12.63%)
 5. The highest growth rate 1.84 was found in the year 2008 with 25 publications and the lowest exponential growth rate published was 0.72 in 2012. The exponential growth rate from 0.92 to 0.84. It is also found that the overall exponential growth rate is 10.35.
 6. The highest contribution was from 250(34%) Research institutions. One fourth of the articles 186 (24.74%) were published in Universities followed by one fifth of the articles 149(20%) from Laboratories. 117 (16%) of the articles were from College. The study found that very lesser number of articles 50 (7%) were published from the Technological Department.
 7. Seven articles out of ten were published by foreign authors. Three articles out Ten were published by Indian authors. It found that more number of articles contributions were from foreign authors.
 8. Most of the research articles were contributed by China and ranked first and followed by India (117, 15.55%) in the second place, the third place is by USA with 57 (7.58%) and the least number i.e. only one research paper is contributed by 22 countries.
 9. Out of 752 publications 324 were from the research articles and 293 were from research note, 55 were from review articles and 18 were from journal of genetics online research. A very few from book review 6, Perspective, author index, view point, special feature, author correction, hypothesis, research commentary. Two publications out of ten in the year 2014 and followed by 106 from 2015. A very less number of contributions 39 in the year 2007.
 10. It is found that the more number of contribution was from 0-5 pages followed 289 from 6-10 pages, 90 from 11-15 pages 16 from 16-20 pages. A very less number of contribution 8, 2, 3 the pages 21-25, 26-30 and 36-40. No contribution was there in 31-35 pages. The study found that one articles out of two published 1-5 pages.
 11. The average length of articles on Journal of Genetics for the year 2006-2010 was analysed. The results revealed that the frequency value 752 at overall total and then frequency Fd^1 value 9925 and then frequency

Fd^2 value 178125 and length of articles calculated 79.17.

12. Around 214 (29%) articles were published with 11-20 citations. 129 (17.15%) articles were published with 21-30 citations followed by 79 articles (10.51%) with 31-40 citations, 58 articles (7.71%) published with 41-50 citations. 35 articles published with 51-60 citations. And 53 articles published with more than 60 citations. It was found that Maximum number of articles 214 published with 11-20 citations. And a very lesser number of articles 16 published with above 80 pages. Ever Less or number of citations (1-10) using the articles published with 183 (24.33%) articles. Maximum of citations (71-80) using the articles publications only 16 (2013%)
13. It was observed that the distribution of year wise Collaboration Coefficient (CC) and the value the collaboration coefficient (CC) was calculated as 0.78

IX. CONCLUSION

Bibliometrics analysis is one of the quantitative and qualitative analyses in the field of Library and Information Science. In the knowledge world, publication analysis plays a vital role in the scholarly communications. Bibliometrics are used to measure various activities, mainly by producing books, Journals articles, which are indexed in various databases. For the present study, the literature output of the Journal of Genetics which is published by Indian Academic Science (IAS) is chosen for analysis. As far as the researcher is concerned, this is the first study in the Journal of Genetics for the period between 2006 and 2015. From the analysis, it is found that the country – wise distribution was measured and the most of the research articles were contributed by China and only 15.55 percent of the literature output were published by India and it required that Indian scientists must publish their research papers for the growth and development of the Indian literature output.

REFERENCES

- [1] Hemanta Kumar. (2012). Bibliometric Analysis of the Plant Taxonomy Journal Nelumbo, 2004-2011. *International Journal of Library and Information Studies*, 2(4), 51-61.
- [2] Krishnaswamy, N., (2015). Exploration Analysis of Indian Journal of Traditional Knowledge - A Bibliometric Study. *International Journal of Research in Economics and Social Sciences*, 5(9), 122-131.
- [3] Nantu Acharjya. (2015). Italian Journal of Library and Information Science 2010-2014: A Bibliometric study. *International research journal of multidisciplinary studies*, 1(5), 1-6.
- [4] Salisu. *et al.*, (2015). Bibliometric analysis of cancer publication in Nigeria during 2008-2012. *International Journal of Library and Information Science*, 7(3), 69-76.
- [5] Sankar, P., & Kavitha E. S.(2016). Asia-Pacific Journal of Management Research and Innovation. 2004-2015: A Bibliometric Study. *Library Philosophy and Practice (e-journal)*. 1-13.
- [6] SankuBilas Roy, & MoutusiBasak. (2013). Journal of Documentation: a Bibliometric Study. *Library Philosophy and Practice (e-journal)*, 2(14), 1-10.
- [7] Thavamani, K. (2013). Bibliometric analysis of the DESIDOC Journal of Library & Information Technology for the year 2007 – 2011. *International Journal of Information Dissemination and Technology*, 3(1), 38-41.