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Research Contributions of CCS Haryana Agricultural University, Hisar : A Bibliometric Analysis

Anil Kumar Siwach[#,*] and Seema Parmar[$]

[#]*Department of Library & Information Science, Maharshi Dayanand University, Rohtak - 124 001, Haryana, India*
[$]*Nehru Library, CCS Haryana Agricultural University, Hisar - 125 004, Haryana, India*
[*]*E-mail: aks.mdu@gmail.com*

ABSTRACT

CCS Haryana Agricultural University (CCSHAU) is among the top ten agricultural universities of India according to ICAR ranking 2016-17. The present study has been undertaken to find out the publication trends in this university during 2001-2015. The study mainly focusses on year-wise research output, major subject categories, national and international collaborations, top journals for publication, most prolific authors, keywords, authorship pattern, citations pattern and highly cited paper of CCSHAU. The 15 year publication data of the university indicate that a total of 2649 paper were published from 2001-2015 receiving 15282 citation. Nearly 47% of the university research was published in ten journal and it has collaborated with many institutions at national and international level in its research publication.

Keywords: Agricultural research; Research productivity; Bibliometrics

1. INTRODUCTION

The Indian Council of Agricultural Research (ICAR)[1], an autonomous organisation under the "Department of Agricultural Research and Education (DARE), Ministry of Agriculture and Farmers Welfare, Government of India", is the apex body involved in co-ordinating, guiding and managing research and education in India in the field of agriculture and related disciplines like horticulture, fisheries and animal sciences. More than hundred ICAR institutes and more than 70 Agricultural Universities comes under ICAR.

ICAR in its ranking status of Agricultural Universities for the year 2016-17[2] have listed 57 Agricultural Universities according to their ranks. Chaudhary Charan Singh Haryana Agricultural University Hisar, which is selected for this study, stands at fourth position in this list.

The research outputs in the form of different publication are indexed by many popular indexing databases. Scopus[3] is one such citation databases which index the research output published in popular peer reviewed journals. An analysis of the publication of an institution provides a clear picture of its research output.

Many scientometric and bibliometric studies have been conducted to analyse the research output of institutions and organisations. Khanna et al[4] conducted a scientometric study of the physics and astronomy research output of Guru Nanak Dev University (GNDU) during the period from 2006-2015. Pradhan and Ramesh[5] conducted a scientometric study of IIT Madras and IIT Bombay. Singh[6] conducted a study of research output of chemistry of Panjab University during 2008-15. Bansal et al[7] conducted a scientometric study of research output of mathematics of Panjab University during 2005-14. Nagarkar, Veer & Kumbhar[8] conducted a bibliometric study of faculty of Life Science Department Savitribai Phule Pune University during 1999-2013 through Web of Science database. Siwach and Kumar[9] investigated the research contributions of Maharshi Dayanand University, Rohtak during 2000-2013. Baskaran[10] studied the research growth trend and author collaboration of Alagappa University during 1999-2011. Vasishta[11] studied the contribution and impact of research output of PEC University of Technology during 1996-2009. Kumbar, Gupta & Dhawan[12] analysed the growth and impact of research output of University of Mysore during 1996-2006. Jeevan & Gupta[13] provided a scientometric profile of research output from Indian Institute of Technology, Kharagpur.

Some bibliometric and scientometric studies have specifically been conducted on agricultural research and agricultural institutes also. Parabhoi, Sahu and Kumari[14] conducted bibliometric study of Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Solan. Tripathi and Garg[15] undertook scientometric study of Indian crop science research during 2008-2010 which was covered in Scopus, CABI and ISA databases. Sagar, Kademani and Bhanumurthy[16] did scientific mapping of agriculture research in India using Web of Science data for the period 1993-2012. Tandon et al.[17] studied the publication trends, authorship pattern, availability and accessibility of articles for the time span 2008-10 in Indian Agricultural Research Institute (IARI). Maharana[18] studied the researchers' output in terms of growth, contribution and impact at Orissa University of Agricultural Technology during 2008-12.

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1.1 Chaudhary Charan Singh Haryana Agricultural University

Chaudhary Charan Singh Haryana Agricultural University[19] (CCSHAU) popularly known as HAU, is one of Asia's biggest agricultural universities, located at Hisar in the Indian state of Haryana. CCSHAU was initially set up as a campus of Punjab Agricultural University, Ludhiana and later became an autonomous institution on February 2, 1970 after the formation of Haryana in 1966. The university made significant contributions to White Revolution and Green Revolution during 1960-70. CCSHAU not only has a large campus but also have several research centres in different districts of Haryana. In 1997 the university was awarded as Best Institute by ICAR.

2. OBJECTIVES

The prime objective of this study is to investigate the performance of CCSHAU during 2001 to 2015 in terms of its publication output. In particular, the study is carried out with following objectives.

- To study the growth of publication of CCSHAU during 2001-2015
- To analyse the preferred journals for publication of CCSHAU research
- To study the national and international research collaborations of CCSHAU publication
- To study the authorship pattern and collaborative coefficient of CCSHAU publication
- To identify the most prolific authors of CCSHAU
- To identify the major subject categories of CCSHAU publication
- To analyse the citations received by publication of CCSHAU and
- To identify the highly cited publication of CCSHAU.

3. METHODOLOGY

The present study is restricted to CCSHAU, one of the ten agricultural universities which were ranked at top positions in ICAR Ranking of Universities, 2016-2017. The data was extracted from Scopus database which is a popular largest abstracting and citation database of peer-reviewed scientific literature. The data was extracted in Dec 2017. Using the string AF-ID ("CCS Haryana Agricultural University" 60023050), the data was obtained from the Scopus database and then the data was limited to the time period 2001 to 2015. The obtained data was entered in a MS-excel sheet and then analysed to obtain relevant findings. The author keywords were analysed and Tagxedo[20] (www.tagxedo.com) was used for creating cloud cluster of the author keywords. Collaborative coefficient (CC) was also calculated in the study using the methodology by Ajiferuke, Burrel & Tague[21] which is based on the fractional productivity defined by Price & Beaver[22] using the formula as follows.

$$cc = 1 - \frac{\sum_{j=1}^{k} \left(\frac{1}{j}\right) f_j}{N}$$

where, $f\,j$ denotes the "number of j authored research papers"; N is "total number of research papers published" and; k is "the greatest number of authors per paper".

4. ANALYSIS

4.1 Year-Wise Contributions

The year-wise publication of Chaudhary Charan Singh Haryana Agricultural University (CCSHAU) from 2001 to 2015 are shown in Table 1. During this time period, the authors of the university published 2649 publication with an average of 177 publication per year which received a total of 15282 citation. The university is having an h-index of 52 and Average Citation Per Paper (ACPP) of 5.77. The highest number of 235 publication were published in the year 2014. This is followed by year 2013 and 2005 in which 228 and 202 article were published respectively. The least number of 140 publication appeared in the year 2002. The ACPP is highest for the year 2001 (11.49), followed by the year 2002 (10.55).

Table 1. Year-wise publication of CCSHAU during 2001-2015

Year	TP	TC	ACPP
2001	167	1918	11.49
2002	140	1476	10.55
2003	179	1432	8.00
2004	186	1854	9.97
2005	202	1541	7.63
2006	160	1231	7.69
2007	173	1331	7.69
2008	174	894	5.14
2009	159	502	3.16
2010	157	659	4.19
2011	154	612	3.97
2012	175	518	2.96
2013	228	923	4.05
2014	235	216	0.91
2015	160	175	1.09
2001-2005	874	8211	9.41
2006-2010	823	4617	5.61
2011-2015	952	2444	2.57
2001-2015	2649	15282	5.77

TP= Total Publication, TC= Total Citations, ACPP= Average Citations Per Paper

The analysis of publication was also done in three slabs of five years each, i.e., 2001-2005, 2006-2010 and 2011-2015. It was found that a total of 874 publication of CCHAU appeared during five-year span of 2001 to 2005 with an ACPP of 9.41. During the span of 2006-2010, the university published 823 publication with and ACPP of 5.61. In the time period from 2011 to 2015, a total of 952 publication appeared having an ACPP of 2.57. Thus, it was observed that nearly equal number of publication appeared during five year slabs of 2001-2005,

2006-2010 and 2011-2015, with a little more publication seen in the third slab.

4.2 Subject Wise Contribution

The subject-wise distribution of CCSHAU publication are indicated in Table 2. The major subject category for the university is Agricultural and Biological Sciences. 2083 publication appeared under this subject category which is apparent as CCSHAU is an agricultural university. The next subject category is Veterinary under which come 339 publication of CCSHAU. The third important subject category is Biochemistry, Genetics and Molecular Biology under which comes 276 publication. One publication may be represented under many subject categories, thus the number of publication shown in table 2 are much more than the actual number of publication of the university.

Table 2. Top ten subject categories of CCSHAU publication

Subject-Categories	TP	TC	ACPP	h-index
Agricultural and Biological Sciences	2083	10288	4.93	40
Veterinary	339	1144	3.37	16
Biochemistry, Genetics and Molecular Biology	276	3152	11.42	28
Environmental Science	209	2215	10.59	27
Immunology and Microbiology	168	2366	14.08	24
Chemistry	104	753	7.24	14
Engineering	97	158	1.62	5
Medicine	91	1145	12.58	16
Earth and Planetary Sciences	75	301	4.01	11
Pharmacology, Toxicology and Pharmaceutics	69	307	4.44	10

TP= "Total Publication", TC= "Total Citations", ACPP= "Average Citations Per Paper"

The ACPP is highest for the subject category Immunology and Microbiology (14.08), followed by Medicine (12.58) and Biochemistry, Genetics and Molecular Biology (11.42). The h-index is highest for the subject category Agricultural and Biological sciences (40), followed by Biochemistry, Genetics and Molecular Biology (28) and Environmental Science (27).

4.3 National and International Collaborations

CCSHAU collaborated with many institutions in its research publication. The top 10 institutions with which the university has collaborated are as shown in Table 3. All these top 10 institution are from India.

CCSHAU has maximum collaborative publication with College of Veterinary Science 141 publications during 2001-2015. These 141 publication received a total of 576 citation and have h-index of 13. The second highest collaboration is with Punjab Agricultural University with which CCSHAU published 60 paper in collaboration. The next important institute in terms of collaborative publication is Indian Agricultural Research Institute with which CCSHAU has 55 collaborative paper. Other important institutions collaborating with CCSHAU are G B Pant University of Agriculture & Technology (39 collaborative publication), International Crops Research Institute for the Semi-Arid Tropics (33 collaborative

Table 3. Top ten collaborating institution

Name of Institution	Country	TP	TC	ACPP	h-index
College of Veterinary Science	India	141	576	4.09	13
Punjab Agricultural University	India	60	296	4.93	10
Indian Agricultural Research Institute	India	55	421	7.65	11
G B Pant University of Agriculture & Technology	India	39	234	6.00	7
International Crops Research Institute for the Semi-Arid Tropics	India	33	716	21.70	16
Guru Jambeshwar University of Science and Technology	India	28	166	5.93	5
Kurukshetra University	India	27	123	4.56	7
Indian Veterinary Research Institute	India	26	177	6.81	7
Indian Council of Agricultural Research	India	26	87	3.35	5
National Research Centre on Equines India	India	24	147	6.13	6

TP= "Total Publication", TC= "Total Citations", ACPP= "Average Citations Per Paper"

Table 4: Top ten collaborating country

Country	TP	TC	h-index
United States	64	1932	20
Germany	48	1280	17
United Kingdom	45	1345	20
Australia	22	653	12
Canada	20	352	10
Netherlands	16	287	10
Japan	13	204	7
Hungary	11	60	6
China	8	123	7
Israel	8	191	6

TP= "Total Publication", TC= "Total Citations"

publication), Guru Jambeshwar University of Science and Technology (28 collaborative publication) and Kurukshetra University (27 collaborative publication).

At the international front as shown in Table 4, CCSHAU has maximum collaborative publications with United States (64 collaborative publication), followed by Germany (48 collaborative publication) and United Kingdom (45 collaborative publication). The university has 16 collaborative publication with Netherland and all of these publication have been collaborated with Wageningen University and Research Centre.

4.4 Top Journals Preferred for Publication

The 2649 publication of CCSHAU from 2001 to 2015 appeared in 422 source. The top 10 journal which were preferred for publishing CCSHAU research are listed in Table 5. These 10 journal accounts for 46.55% of the total publication of CCSHAU during 2001-2015 indicating that nearly half of the publication of the university are covered in these 10 journal only. The journal which is preferred the most by authors of CCSHAU for publishing their research is "*Annals of Biology*" in which 325 paper were published accounting for 12.27% of the total publication of the university. This is followed by "*Annals of Agri Bio Research*" in which 320 paper were published accounting for 12.08% of the total university publication. These two journal are published by the same publisher, i.e., Agri Bio Research Publishers (India) and cover about one-fourth of the publication of CCSHAU. The next most preferred journals are "*Indian Journal of Animal Sciences*" (178 paper), "*Indian Journal of Agricultural Sciences*" (96 paper) and "*Journal of Food Science and Technology*" (68 paper).

The average citation per paper (ACPP) of the CCSHAU publication in these top 10 journal was also calculated. The ACPP is found to be highest for the papers published in *Physiology and Molecular Biology of Plants* (ACPP= 7.59). This is followed by *Journal of Food Science and Technology* (ACPP= 5.39) and *Indian Journal of Agronomy* (ACPP= 4.66). As far as h-index for the CCSHAU articles published in the top journals, it was found that the h-index is highest for the articles published in the *Journal of Food Science and Technology* (h-index= 37) which is followed by *Physiology and Molecular Biology of Plants* (h-index= 21), and *Indian Journal of Agricultural Sciences* (h-index= 20).

SCImago Journal Rank (SJR)[23] and Impact Factor (JCR-IF)[24] are also shown for the journals listed in the (Table 5). According to SJR value, the top five journals are *Physiology and Molecular Biology of Plants* (0.571), *Journal of Food Science and Technology* (0.544), *Indian Journal of Agronomy* (0.414), *Indian Journal of Agricultural Sciences* (0.26) and *Indian Journal of Animal Sciences* (0.247).

4.5 Most Prolific Authors

The list of 10 most prolific authors of CCSHAU is as given in Table 6. Among these 10 author, 2 are from Department of Entomology and 1 each from Department of Animal Biotechnology, Department of Biochemistry, Department of Biotechnology and Molecular Biology, Department of Foods and Nutrition, Department of Horticulture, Department of

Table 5. Top ten journal for publication

Journal	Publisher/Country	TP	TC	ACPP	SJR	IF (JCR 2015)	h-Index
Annals of Biology	Agri Bio Research Publishers (India)	325	99	0.30	0.204	-	5
Annals of Agri Bio Research	Agri Bio Research Publishers (India)	320	44	0.14	0.104	-	3
Indian Journal of Animal Sciences	Scientific Publishers (India)	178	269	1.51	0.247	0.174	6
Indian Journal of Agricultural Sciences	Indian Council of Agricultural Research (India)	96	186	1.94	0.260	0.172	20
Journal of Food Science and Technology	Scientific Publishers (India)	68	367	5.39	0.544	1.241	37
Research on Crops	Gaurav Society of Agricultural Research Information Centre (India)	61	19	0.31	0.151	-	4
Indian Veterinary Journal	Indian Veterinary Association (India)	53	45	0.85	0.166	-	12
Physiology and Molecular Biology of Plants	Prof. H.S. Srivastava Foundation for Science and Society, in association with Springernature (India)	46	349	7.59	0.571	1.351	21
Indian Journal of Agronomy	The Indian Society of Agronomy	45	210	4.66	0.394	-	17
Journal of Agrometeorology	Association of Agrometeorologists (India)	41	19	0.46	0.217	0.361	6
Total of top 10 source		1233					
Share of top 10 source in total publication		46.55%					

TP= "Total Publication", TC= "Total Citations", ACPP= "Average Citations Per Paper", SJR= "SCImago Journal Rank", IF= "Impact Factor"

Microbiology, Department of Plant Breeding, Department of Textile and Apparel Design.

In terms of number of publication, N. Khetarpaul is the most productive author with 63 publication, followed by B. Kumar with 41 publication and R.K. Jain with 40 publication. The ACPP is highest for R.K. Jain (13.02), followed by R.K. Behl (12.25) and S. Jain (12.2). The h-index is highest for N. Narula (13), followed by N. Khetarpaul (12), R.K. Behl and B. Kumari (10 each).

Table 6. Most prolific ten author

Author	Department	TP	TC	ACPP	h-index
N. Khetarpaul	Foods and Nutrition	63	436	6.92	12
B. Kumari	Entomology	41	442	10.78	10
R.K. Jain	Biotechnology and Molecular Biology	40	521	13.02	9
R.K. Behl	Plant Breeding	36	441	12.25	10
R. Singh	Entomology	36	258	7.16	9
S. Jain	Biochemistry	34	415	12.20	9
G. Prasad	Animal Biotechnology	34	276	8.11	8
K. Khambra	Textile and Apparel Designing	32	4	0.12	1
R.K. Malik	Horticulture	32	296	9.25	9
N. Narula	Microbiology	32	360	11.25	13
	Total	380	3449	-	-

TP= "Total Publication", TC= "Total Citations", ACPP= "Average Citations Per Paper"

Table 7. Publication types

Publication Type	TP	TC	ACPP
Article	2489	13924	5.59
Review	74	961	12.98
Conference Paper	38	274	7.21
Book Chapter	29	58	2.00
Letter	7	3	0.42
Book	3	47	15.66
Note	3	14	4.66
Short Survey	3	1	0.33
Editorial	2	0	0.00
Erratum	1	0	0.00
Total	2649	15282	5.77

TP= "Total Publication", TC= "Total Citations"

4.6 Type of Publication

The publication types of CCSHAU during 2001-2015 are listed in Table 7. Out of the total 2649 publication, 2489 (94%) are article, 74 (2.79%) are reviews, 38 (1.44%) are conference papers, 29 (1.1%) are book chapters, 7 (0.26%) are letters, 3 (0.11%) are books, 3 (0.11%) are notes, 3 (0.11%) are short surveys, 2 (0.08%) are editorials and 1 (0.04%) is erratum. In terms of citations, the highest ACPP is for books (15.66) in which 3 books received a total of 47 citation. It is followed by reviews for which the ACPP is 12.98, i.e. 74 review received a total of 961 citation. The 38 conference papers received a total of 274 citation with an ACPP of 7.21. As far as articles are concerned, the 2489 articles received 13924 citation and thus have ACPP of 5.59. So, it was observed that books and reviews received more citations.

4.7 Authorship Pattern and Collaborative Coefficient

The year-wise distribution of authorship pattern is shown in Table 8. As is evident from the table, only 2.83% publication were single author publication while the rest 97.17% had two or more authors. The highest number of publication had three authors (31.6%), followed by four author publication (25.44%), two author publication (19.97%) and five author publication (11.66%) while more than five author publication accounted for 8.49% of the total. The collaborative coefficient (CC) was 0.668 for the total publication. It was highest for the year 2012 (0.698), followed by 2010 (0.686), 2013 and 2014 (0.685 each). CC was lowest for the year 2009 (0.637). Thus, it was observed that three authors collaboration dominates the CCSHAU research.

4.8 Author Keywords

The authors of CCSHAU used a total of 11065 keywords in their 2649 publication from 2001-2015 with an average of almost 4 keywords per paper. The cloud cluster of the author keywords is shown in Fig. 1 in which the major keywords like 'Wheat', 'Water', 'Seed', 'Soil', 'Yield', 'Rice', 'Production', etc. are prominently highlighted.

4.9 Citation Profile and Highly Cited Papers

The citation profile of the total 2649 publication of CCSHAU during 2001-2015 is as shown in Table 9. It was found that 54.47% of the total publication were cited by others and the remaining 45.53% publication were not cited at all. 13 publication (0.49%) received more than 100 citation, 39 publication (1.47%) received citations between 51 to 100, 14 publication (0.53%) received 41 to 50 citation, 37 publication (1.4%) received 31 to 40 citation, 74 publication (2.79%) received 21 to 30 publication, 199 publication (7.51%) received 11 to 20 citation and 1067 publication (40.28%) received citation between 1 to 10.

13 paper of CCSHAU have received more than 100 citation. The top 10 highly cited paper among these are listed in Table 10. These highly cited paper appeared in 9 different journal. These 10 paper received 1959 citation with an average of 196 citation per paper. Five paper have higher citations than this average. The paper by Cavanagh et al. received the highest number of citations (317) and was published in "Proceedings of the National Academy of Sciences of the United States of America" during 2013.

Table 8. Authorship pattern of CCSHAU publication

Year	One Author	Two Authors	Three Authors	Four Authors	Five Authors	> Five Authors	Total	CC
2001	4	39	62	43	11	8	167	0.651
2002	2	30	56	33	11	8	140	0.662
2003	3	48	60	35	19	14	179	0.656
2004	8	35	55	53	24	11	186	0.660
2005	8	40	56	62	24	12	202	0.660
2006	6	37	42	40	16	19	160	0.660
2007	8	29	55	31	27	23	173	0.670
2008	10	34	57	46	19	8	174	0.642
2009	6	36	70	29	11	7	159	0.637
2010	2	27	50	42	24	12	157	0.686
2011	2	36	39	40	17	20	154	0.683
2012	3	30	49	42	31	20	175	0.694
2013	6	34	72	65	25	26	228	0.685
2014	4	41	68	69	36	17	235	0.685
2015	3	33	46	44	14	20	160	0.679
Total	75 (2.83%)	529 (19.97%)	837 (31.6%)	674 (25.44%)	309 (11.66%)	225 (8.49%)	2649 (100%)	0.668

CC= "Collaborative Coefficient"

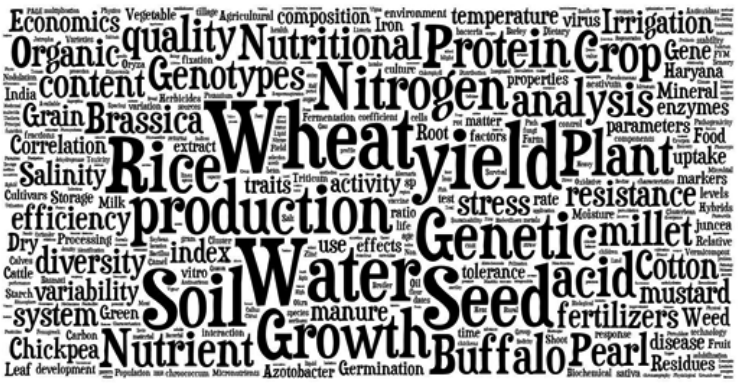

Figure 1. Cloud cluster of author keywords.

Table 9. Citation profile of CCSHAU

No. of Citations	TP	Percentage of TP	Citations	Percentage of Citations
0-0	1206	45.53	0	0.00
1-10	1067	40.28	3636	23.79
11-20	199	7.51	2888	18.90
21-30	74	2.79	1836	12.01
31-40	37	1.40	1289	8.43
41-50	14	0.53	648	4.24
51-100	39	1.47	2697	17.65
>100	13	0.49	2288	14.97
Total	2649	100.00	15282	100.00

5. SUMMARY AND CONCLUSIONS

The study explores the publishing behaviour of researchers of CCSHAU Hisar which is ranked fourth in the ICAR ranking of Agricultural Universities, 2016-17. The 15 year publication data of CCSHAU indicate that a total of 2649 paper were published from 2001-2015 which received 15282 citation with an average citation per paper of 5.77. The major publication of the university fall under the subject category agricultural and biological sciences. The university collaborated with many other institutes at national and international front for conducting research. The major collaborator at national level was College of Veterinary Science and at international level was Wageningen University and Research Centre, Netherland. Nearly 47% of the university research was published in 10 journals among which the maximum papers were published in the journal *Annals of Biology* which accounted for more than 1/10th of the total publication during the time period under study. N. Khetarpaul of Department of Foods and Nutrition was the front runner in terms of publication. Among the various types of publication, the books and review articles of the university received more citations. Three authors collaboration dominated the research of the university and the collaborative coefficient was calculated to be 0.668. More than half of the publication of CCSHAU were cited by others in their publication. The highest citations were received by a paper by Cavanagh et al which was published in "Proceedings of the National Academy of Sciences of the United States of America" during 2013. Out of the total 2649 paper, 13 have been cited more than 100 time. The study gives a good indication of the publication pattern of the university and its collaborations with others for research activities.

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Table 10. Highly cited top ten papers of CCSHAU

Authors	Title	Year	Source title	Citations
Cavanagh, C.R. et al	"Genome-wide comparative diversity uncovers multiple targets of selection for improvement in hexaploid wheat landraces and cultivars"	2013	Proceedings of the National Academy of Sciences of the United States of America	317
Briddon, R.W. et al	"Diversity of DNA Î², a satellite molecule associated with some monopartite begomoviruses"	2003	Virology	249
Goyal, S., Dhull, S.K., Kapoor, K.K.	"Chemical and biological changes during composting of different organic wastes and assessment of compost maturity"	2005	Bioresource Technology	233
Chern, M.-S. et al	"Evidence for a disease-resistance pathway in rice similar to the NPR1-mediated signaling pathway in Arabidopsis"	2001	Plant Journal	217
Kaushik, N. et al	"Genetic variability and divergence studies in seed traits and oil content of Jatropha (Jatropha curcas L.) accessions"	2007	Biomass and Bioenergy	206
Dhanda, S.S., Sethi, G.S., Behl, R.K.	"Indices of Drought Tolerance in Wheat Genotypes at Early Stages of Plant Growth"	2004	Journal of Agronomy and Crop Science	188
Rennenberg, H. et al	"Physiological responses of forest trees to heat and drought"	2006	Plant Biology	169
Briddon, R.W. et al	"Diversity of DNA 1: A satellite-like molecule associated with monopartite begomovirus-DNA Î² complexes"	2004	Virology	134
Mandhania, S., Madan, S., Sawhney, V.	"Antioxidant defense mechanism under salt stress in wheat seedlings"	2006	Biologia Plantarum	123
Jain, S., Jain, R.K., McCouch, S.R.	"Genetic analysis of Indian aromatic and quality rice (Oryza sativa L.) germplasm using panels of fluorescently-labeled microsatellite markers"	2004	Theoretical and Applied Genetics	123
Total Citations Received by Ten Highly Cited Papers				1959

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CONTRIBUTORS

Mr. Anil Kumar Siwach received his M.Sc. (Anthropology), M.Lib.I.Sc., P.G.D.C.A. and Diploma in French from Panjab University, Chandigarh. He has 8 years of teaching experience and is presently working as Assistant Professor in the Department of Library and Information Science at Maharshi Dayanand University, Rohtak. He has to his credit 02 edited books and 25 publications in the form of journal articles, book chapters and conference publications. He is a life member of ILA, IATLIS and HLA.

His contribution to the study is towards selection of topic, data extraction from Scopus, methodology, data tabulation, analysis and conclusion part of the paper.

Dr. Seema Parmar has done her M.A. (English) and P.G.D.T. from Panjab University, Chandigarh and M.L.I.Sc. and Ph.D. from Kurukshetra University, Kurukshetra. She is presently working as Assistant Librarian at Nehru Library, CCS Haryana Agricultural University, Hisar. She has to her credit 02 edited books and many journal articles and conference papers. She has participated in many seminars/ conferences/ training programmes at various institutes at National level. She has been the resource person in many training programmes organised at University level. Her areas of interest include IT and Electronic Resources.

Her contribution to the study is towards introduction, review of literature, analysis and formatting of references.