



# PRODUCTIVITY AND VISIBILITY OF THE JOURNAL "CULTIVOS TROPICALES" 2009-2013

## Productividad y visibilidad de la revista "Cultivos Tropicales" 2009-2013

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**ABSTRACT.** Bibliometric analysis was performed with the aim of analyze scientific productivity and visibility of the journal "Tropical Crops" through the articles that have been published in the period between 2009-2013. Were quantified the number of articles published by researchers at Instituto Nacional de Ciencias Agrícolas (INCA), the number of articles published by foreign authors, national and international articles published per year and scientific category, the percentage of articles published by scientific category, the percentage of researchers who published in the scientific category five years, the level of productivity divided into three categories: large producers, medium producers and small producers, the rate of publications per researcher in each research department, and the percentage of publications by type of tax. The main conclusions of the paper highlights the increased number of international and extra-institutional authors in the journal "Cultivos Tropicales" and that few authors who have a large volume of documents and many who published shortly. The journal is included in international indexes relevant to their specialty and in different databases that provide visibility and dissemination as scientific publication.

*Key words:* publications, quantitative analyses, networks, databases, researchers

**RESUMEN.** Se realizó un análisis bibliométrico con el objetivo de evaluar la productividad científica y la visibilidad de la revista "Cultivos Tropicales", a través de los artículos que se han publicado en el período comprendido entre los años 2009-2013. Se cuantificó la cantidad de artículos por investigadores del Instituto Nacional de Ciencias Agrícolas (INCA); la cantidad de artículos por autores externos, tanto nacionales como internacionales; los artículos por año y por categoría científica; el porcentaje de artículos publicados por categoría científica; el porcentaje de investigadores que publicaron en el período estudiado por categoría científica; el nivel de productividad dividido en tres categorías: grandes, medianos y pequeños productores; el índice de publicaciones por investigador en cada departamento de investigación; y el porcentaje de publicaciones por tipo de contribuciones. Como principales conclusiones del trabajo se destaca el incremento del número de autores internacionales y extra institucionales y que son menos los autores que tienen un gran volumen de documentos y muchos los que publican poco. La revista está incluida en los índices internacionales relevantes a su especialidad y en diferentes bases de datos que le proporcionan difusión y visibilidad como publicación.

*Palabras clave:* publicaciones, análisis cuantitativo, redes, bases de datos, investigadores

## INTRODUCTION

Scientific productivity is an indicator of the research activity that allows to determine science growth through the number of published papers, their chronological evolution, authors' productivity, institutions or regions, and an analysis of the collaboration degree among scientists and institutions in addition to the structure and dynamics of researchers staff (1).

In order to measure the scientific productivity, bibliometry is used since it provides bibliometric indicators to measure the editorial and scientific quality of a journal (2). This science permits the quantitative analysis of scientific production through the literature by studying the nature and the course of scientific discipline; it also quantifies the yield of a researcher, of a collection of selected articles from a scientific journal or institution.(3, 4, 5). Research yield is a wide evaluation that takes into account the number of quantitative metrics and combines them with qualitative

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data. Quantitative metrics is gaining momentum since it facilitates the comparison, both objective and global, of everything important for an efficient bibliometric study<sup>A</sup>.

This production and quality of scientific research are based on the number of quotes received by scientific journals at a certain period according to published articles (6). Indicators are used to evaluate researchers, institutions and countries, though data should not be interpreted isolately as frequently happens with the impact factor (7). At present they are an essential tool to know about research activity, it provides data on the scientific situation of a country or research line, and also permits to evaluate the yield of the scientific activity and its impact on society (8).

These indicators, in recent years, have gone through an important momentum, demanded by actors involved in scientific evaluation, though they do not meet all needs to measure research; however, they are necessary to provide objectivity and complement judgment and criteria of evaluators (9); besides facilitating decisions and objectivity contribution to evaluations (10).

The impact and prestige factors are some of these indexes or indicators, the problems shows up when these factors are used as quality index and based on them, an article is considered good or not, depending on the impact or prestige of the journal where it was published. This is a very controversial issue nowadays (6).

The impact factor or index measures the influence a journal has had on the scientific literature by analyzing the quotes their articles have received. It makes possible comparing journals, set up rankings and reflect the relative relevance of each title<sup>B</sup>

It is contrasting to know that once an article is published on a first-line journal, where not even the author is owner of the information to have free access to it, it is still measured as an important aspect within the parameters evaluated at all scientific levels.

In fact, there are already talks on the "crisis of impact journals"<sup>C</sup>, where *Insurgent Scientists say: the factors of impact journals distort science*, and a call is being done to the scientific community to eliminate

the impact factor from the evaluation of research for funding purposes, allocation of work posts, promotion and institutional effectiveness".

However, most of the Cuban scientific journals, that also enjoy a high prestige and scientific quality, are incorporated to the Open Access movement, but they are underestimated, both by researchers and scientific institutions in spite of being endorsed by the Ministry of Science, Technology and Environment (CITMA) and meet the established parameters by the different databases and reference indexes.

The scientific production of these open-access journals that are not included in the first-line class or are not visible for *rankings*, is expected to be modified in a not-too-distant future (11).

The dissemination of scientific production is recognized by its validity and contribution, which can occur in different ways, the publication of articles in scientific journals is the most formal, active and mediate way of communication for researchers, scientists and professors; either printed or in electronic format. That is why the evaluation of scientific production is a necessary task to acknowledge and in some cases improve its yield (12)

At present, it is admitted that the product of the scientific activity is sold when author's reports ends up on a publication with spreading possibilities at the reach of the scientific community. Therefore, the publication is strictly the final product of research. Scientific journals play the most important role in the process of transferring information between growers and users (1).

The quarterly Journal "Cultivos Tropicales" is edited by the National Institute of Agricultural Sciences (INCA). It is conceived for researchers, professors, experts, technicians and students of the agricultural branch. Its main target is to spread out the results of agricultural research at INCA as well as those of other similar institutions, both from Cuba and abroad dealing with tropical and subtropical crops.

The objective of the present study has been analyzing the scientific productivity and the visibility of the Journal "Cultivos Tropicales" through articles published from 2009 to 2013.

## MATERIALS AND METHODS

The Journal "Cultivos Tropicales", since its inception in 1979 and till December 2013, published a total of 1876 articles in the categories of original, bibliographic references, reviews, reports on new varieties and short communications.

<sup>A</sup>SCOPUS. *Bibliometría/Evaluación de la producción científica* [en línea], 2009, [Consultado: 21 marzo 2015], Disponible en: <[http://americalatina.elsevier.com/corporate/pdf/scopus/FSRPM\\_EN\\_0707\\_a885\\_FactSheet\\_RPM\\_ESP\\_09OUT.pdf](http://americalatina.elsevier.com/corporate/pdf/scopus/FSRPM_EN_0707_a885_FactSheet_RPM_ESP_09OUT.pdf)>.

<sup>B</sup>Universidad Autónoma de Barcelona. *Guías de las bibliotecas. Indicadores de impacto de revistas* [en línea], 2009, [Consultado: 21 enero 2015], Disponible en: <[http://biblioteca.unileon.es/documentos/guia\\_factorimpacto.pdf](http://biblioteca.unileon.es/documentos/guia_factorimpacto.pdf)>.

<sup>C</sup>NCO-351. *Notas y comentarios ocasionales. La historia reproduce materiales suministrados por la American Society for Cell Biology, por vía de EurekAlert!, un servicio de la AAAS, Asociación Americana para el Avance de la Ciencia*, 2013.

The National Institute of Agricultural Sciences (INCA), according to the system of scientific categories in Cuba, has at present 72 researchers, out of them 15 are Regular, 24 are Assistant, 21 are Aggregates and 12 are Applicants. It also has 40 Experts that have also published articles.

This study looks at the scientific productivity of the Journal "Cultivos Tropicales" through 164 articles published from 2009 and 2013 by internal authors as main authors, distributed in five volumes (30, 31, 32, 33 and 34) and 20 numbers.

The sample included 75 researchers from the Institute that have published articles as main authors in the studied period, either part of the current payroll or not. Other parameters evaluated were: the quantity of articles published by authors from INCA; the quantity of articles published by external authors, both national and international; the articles published by scientific category; the percentage of articles published by scientific category where a proportion comparison was done (Square Chi); the percentage of researchers that published in the five-year period by scientific category.

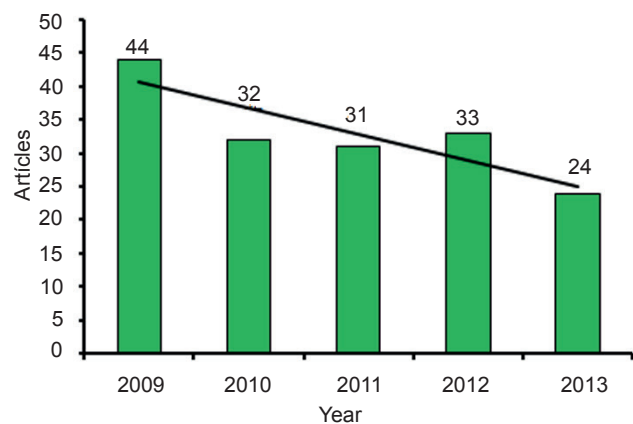
The productivity level was divided into three categories based on the author's criteria, these were: high article writers (5-6), medium article writers (3-4) and small article writers (1-2); the index of publications by researcher in each research department and the percentage of publications per type of contribution.

Search on different indexes and databases that provide visibility to the journal were made, namely, SciELO, SciELO citation index EBSCO, Redalyc, Latindex, NAL-Agrícola, to find references and quotes in the studied period.

## RESULTS AND DISCUSSIONS

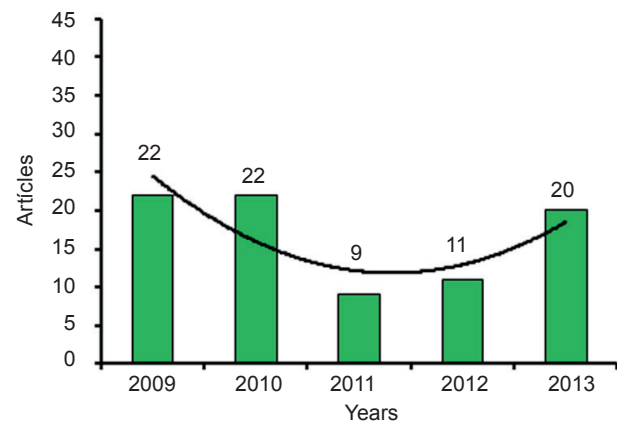
The Journal "Cultivos Tropicales" is published in Spanish and English with abstracts in both languages. Specialties like sustainable agriculture, agroecology, biotechnology applied to agriculture, biofertilizers, agricultural biotechnology, edaphology, abiotic stress, plant physiology and plant biochemistry, plant protection, genetics, plant breeding, local agricultural innovation, applied Mathematics, plant nutrition, bioactive products, irrigation and drainage are accepted.

Figure 1 shows the articles published by researchers from INCA. There is a tendency to reduce the quantity of published articles in nearly twice the quantity.



**Figure 1. Quantity of articles published by researchers from INCA**

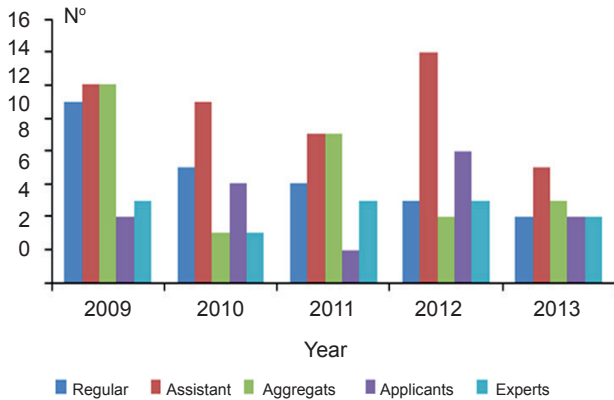
On the other hand, Figure 2 shows a tendency curve reflecting the reduction of articles published by other institutions, both national and international till 2011, but from that year on they started increasing reaching nearly the quantity of articles published by researchers from INCA. It is the result of the scope the journal has acquired in recent years through the reference indexes and databases that provide visibility, the new strategies implemented by social networks and the internal actions that have helped increasing the quality of the journal.



**Figure 2. Articles published by authors from other institutions (national and international)**

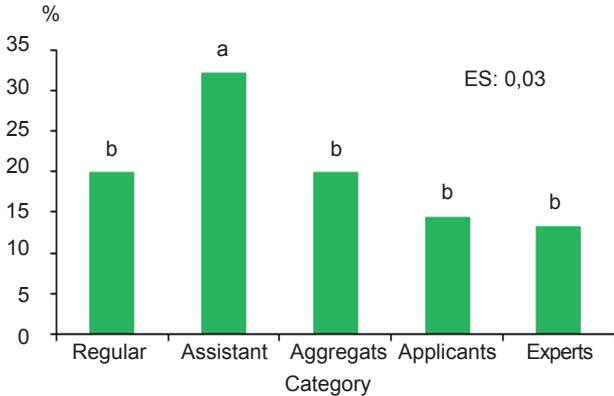
When looking at the articles published by year and scientific category (Figure 3) a downward trend in the category of Regular Researchers is noticed; as for the Assistant category, there is a certain decreasing tendency in the studied period, though, not so much sharpened as in the case of the higher category; except in 2012 that showed an important publication peak in this category. Aggregates suffered a sharp reduction in 2010, climbed up again in 2011 and then fell in the following

years. In general, Applicants recorded the lowest number of published articles ranging from four to eight articles per year. Throughout the studied period, publications from Experts remained stable (from two to five articles).



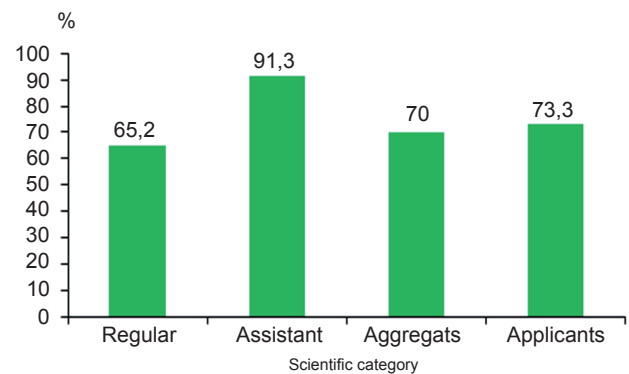
**Figure 3. Articles published by year and scientific category**

Nevertheless, looking at the publications in the studied period, it is important to stand out that Assistant Researchers are the most prolific ones, showing significant differences with the rest of the categories, which do not differ among themselves (Figure 4).



**Figure 4. Percentage of articles published by scientific category**

When looking at the percentage of publications by scientific category and taking into account the quantity of researchers per each of them (Figure 5), it can be seen that the category with the lowest number of published articles is Regular and the most productive one is Assistant, without important differences between Agregats and Applicants.



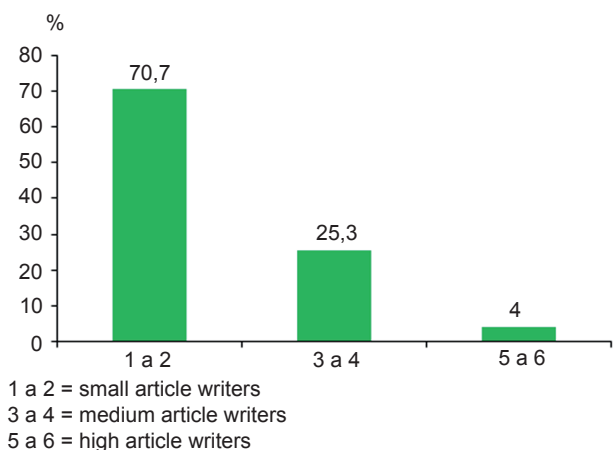
**Figure 5. Percentage of researchers that published in the five years of the study by scientific category**

Even when previous figures proved the need of laying down a strategy as to the publication of original articles considering the different scientific categories, it should be taken into account that this paper only examines first authors, so it would be interesting to look at co-authors in a future since higher scientific categories (Regular and Assistant) have the function of leading staff of researchers of lower category, projects and research lines that in general should be co-authors of scientific articles. What is really true is that researchers with lower categories (Agregats and Applicants) should increase their scientific production.

By evaluating the productivity level (Figure 6) it is important to stand out that the number of articles published by researchers from INCA in the Journal “Cultivos Tropicales” still falls short from the expectations of the institution, since just 4 % has between five and six publications and 70 % has published between one and two articles in the five-year period. The Journal “Protección Vegetal” reports similar results were 60,53 % of the authors has a low productivity, 33,40 % medium and only 6,07 % were high article writers (12).

Authors’ productivity has been studied by Alfred James Lotka (Lotka Law or Exponential Knowledge Law) who claims an unequal distribution in authors’ productivity and that regardless the discipline, most of the authors publish the least number of papers, while a few publish most of the important bibliography on a research topic<sup>D</sup>.

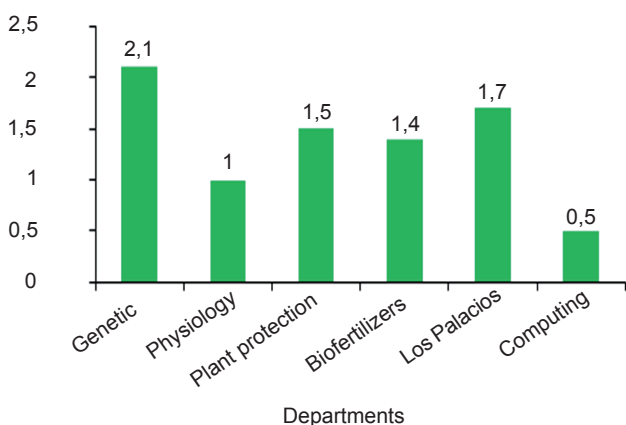
<sup>D</sup>“Ley de Lotka” [en línea], *Wikipedia, la enciclopedia libre*, 5 de febrero de 2014, [Consultado: 21 marzo 2015], Disponible en: <[http://es.wikipedia.org/w/index.php?title=Ley\\_de\\_Lotka&oldid=72351197](http://es.wikipedia.org/w/index.php?title=Ley_de_Lotka&oldid=72351197)>, [Page Version ID: 72351197].



**Figure 6. Productivity level of researchers from INCA**

It is important to stand out that scientific production on a certain area is still a good indicator of research progress and the generation of knowledge. The bibliometric analysis allows for a retrospective examination on the way it has been investigated and published, but also can evaluate the potential of research at institutional level (13).

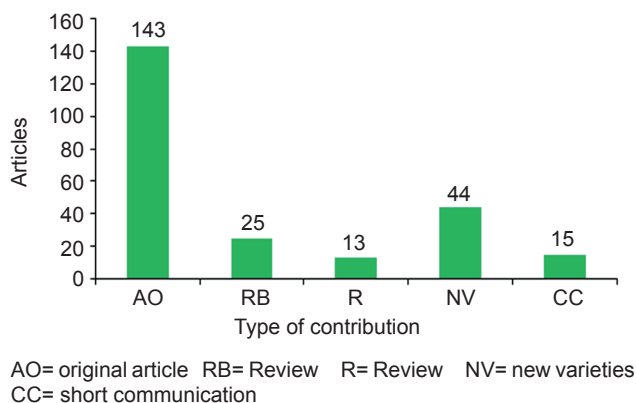
Figure 7 shows that the research area with the lowest index of publications is Computing and Communication; the one with the highest productivity is Genetics, Plant Breeding; the rest is from 1 to 1,7 %.



**Figure 7. Publication index by researchers in each department**

A positive element to emphasize is the quantity of original articles published, approximately 60 % (Figure 8), it can be considered appropriate because the objective of the journal is to spread out results from

research, the rest of the contributions is between 5 and 18 %, which shows an acceptable level among the different types of contribution, except reviews that only reached 5,4 %, a figure that could be taken as low if the importance of this type of contribution is taken into account. A similar research done in Cuba on this topic, reports that a level of 50 % original articles for a journal is an appropriate figure (12).



**Figure 8. Quantity of publications by type of contribution**

It is highly known that a scientific publication is the last link or the part that closes a research cycle, so to produce it, it is required to have gone through a process that tries to answer and provide a solution for a scientific problem (14).

Scientific communication is going through great changes in recent decades. With the expansion of Internet, the immediacy sense gains more importance than ever, seriously influencing the access to scientific publications and expanding the communication channels (15).

The initiative based on the principles of Open Access looks at promoting the visibility and access to scientific journals<sup>E</sup>.

As a result of the new requirements to publish in the journal “Cultivos Tropicales” and the accommodation of the information as per the features of the Databases and Reference Index, modifications in the instructions to the Authors have emerged as well as in the delivery of the articles, which have caused increased quality of the articles and shortening of the arbitration time, thus helping to guarantee updated information.

<sup>E</sup>Serradas, A. y Ferreira, S.M.S.P. *El Open Journal Systems en la Universidade de São Paulo: la experiencia de gestión del Portal de Revistas da USP* [en línea], edit. PKP Scholarly Publishing Conference, 2013, [Consultado: 21 marzo 2015], Disponible en: <<http://pkp.sfu.ca/pkp2013/paper/view/437>>.

<sup>E</sup>Serradas, A. y Ferreira, S.M.S.P. *El Open Journal Systems en la Universidade de São Paulo: la experiencia de gestión del Portal de Revistas da USP* [en línea], edit. PKP Scholarly Publishing Conference, 2013, [Consultado: 21 marzo 2015], Disponible en: <<http://pkp.sfu.ca/pkp2013/paper/view/437>>.

The quality and updating of the publications have led to increased Data Bases and Reference Indexes gaining more visibility and indexing requests for new data bases. The Journal is referenced and indexed in relevant national and international databases of its specialty that provide its dissemination and visibility as publication.

As strategy to increase visibility and exchange with other sites, magazines and editorial houses of the same profile, "Cultivos Tropicales", since the beginning of 2013 has inserted on social networks, ECURED, Twitter and Facebook in order to increase its visibility to people linked to agricultural sciences with a global approach. These social networks are linked among themselves and in turn with the INCA website favoring a higher number of enquiries, quotes and people interested in receiving articles and publish their reports.

In Facebook, the Journal has 92 friends linked to agriculture systematically receiving news on the main activities and comments on it. In Twitter, the Journal follows up 183 persons also linked to agriculture and has 70 followers. These figures keep on rising as new links and connections take place among social networks, websites and Databases.

## CONCLUSIONS

- ◆ There is a downward trend as to published articles in the Journal Cultivos Tropicales by researchers from INCA and an upward trend of external researchers in recent years.
- ◆ Researchers from INCA have a low productivity index.
- ◆ The strategy of inserting the Journal into new reference indexes and national and international databases, as well as the use of social networks as a way to spread information, has endowed it with more visibility and number of enquiries and quotes.
- ◆ There is a lack of proportion relative to the publication of articles of different specialties.

## RECOMMENDATIONS

- ◆ It is necessary to take into account the results of this study to design an editorial policy at INCA that helps improving the delivery of publications and guarantee the scientific quality of the articles.
- ◆ Current instructions as to how scientific articles from INCA should be published on impact journals and other international journals should be followed.
- ◆ To carry out a co-authorship study taking into account scientific categories.

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