

## Metric analysis of the Revista de la Facultad de Agronomía de la Universidad del Zulia (2011-2021)

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Análise métrica da Revista de la Facultad de Agronomía de la Universidad del Zulia (2011-2021)

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### Invited article

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### Abstract

The Revista de la Facultad de Agronomía de la Universidad del Zulia (LUZ), is a publication of the Instituto de Investigaciones Agronómicas de la Facultad de Agronomía, (LUZ) Venezuela. The digital content of the journal is hosted on the web site <https://produccioncientificaluz.org/index.php/agronomia> and is indexed in national and international databases. The objective of this research is to analyze the editorial management of the Revista de la Facultad de Agronomía (LUZ) in the period 2011 to 2021 through a bibliometric analysis of authorship, production, and collaboration, emphasizing the identification of the main research topics, their relationship and the components that integrate them. A descriptive, longitudinal, retrospective study of trend (analyzes changes over time) was carried out using quantitative techniques. It is based on the theoretical and methodological framework provided by information metric studies. Searches were carried out in the Scopus database. Several computer programs were used for data processing: VOSviewer, bibliometrix and Publish or Perish. The journal has a total of 442 original papers, from 2010 to 2021, with a total of 1375 authors, with an average production for the period of 40 articles per year and an average of 4.43 authors per article.

## Resumen

La Revista de la Facultad de Agronomía, de la Universidad del Zulia (LUZ) es una publicación del Instituto de Investigaciones Agronómicas de la Facultad de Agronomía (LUZ), Venezuela, está indizada en bases de datos nacionales e internacionales. El objetivo de esta investigación es analizar la gestión editorial de la Revista de la Facultad de Agronomía (LUZ) en el periodo 2011 a 2021 usando el análisis bibliométrico de autoría, producción y colaboración, haciendo énfasis en la identificación de los principales temas de investigación, su relación y los componentes que los integran. Se realizó un estudio de alcance descriptivo, longitudinal de tendencia (analiza cambios a través del tiempo) y retrospectivo, usando técnicas cuantitativas. Se sustenta en el marco teórico y metodológico provisto por los estudios métricos de la información. Las búsquedas se realizaron en la base de datos Scopus. Se utilizaron varios programas informáticos para el procesamiento de los datos: VOSviewer, bibliometrix y Publish or Perish. La revista cuenta con un total de 442 trabajos originales, desde del año 2011 hasta el 2021, con un total de 1375 autores, una producción promedio para el período de 40 artículos por año y un promedio de 4,43 autores por artículo.

**Palabras clave:** Bibliometría, publicaciones, Revista de la Facultad de Agronomía, Universidad del Zulia, Venezuela.

## Resumo

A Revista de la Facultad de Agronomía de la Universidad del Zulia (LUZ), é uma publicação do Instituto de Pesquisa Agrônômica da Faculdade de Agronomia (LUZ), Venezuela. O conteúdo digital da revista está hospedado no site <https://produccioncientificaluz.org/index.php/agronomia> e está indexado em bases de dados nacionais e internacionais. O objetivo desta pesquisa é analisar a gestão editorial da Revista de la Facultad de Agronomía (LUZ), no período de 2011 a 2021 por meio de uma análise bibliométrica de autoria, produção e colaboração, enfatizando a identificação dos principais tópicos de pesquisa, sua relação e os componentes que os integram. Foi realizado um estudo descritivo, de tendência longitudinal (analisa mudanças ao longo do tempo) e escopo retrospectivo, utilizando técnicas quantitativas. Baseia-se no referencial teórico e metodológico proporcionado pelos estudos métricos de informação. As buscas foram realizadas na base de dados Scopus. Vários programas de computador foram utilizados para o processamento dos dados: VOSviewer, bibliometrix e Publish or Perish. A revista possui um total de 442 trabalhos originais, de 2011 a 2021, com um total de 1375 autores, uma produção média para o período de 40 artigos por ano e uma média de 4,43 autores por artigo.

**Palavras-chave:** Bibliometria, publicações, Revista de la Facultad de Agronomía, Universidad del Zulia, Venezuela.

## Introduction

Publications in peer-reviewed and indexed journals is the most expeditious way to demonstrate the results of scientific research and thus promote the dissemination of scientific knowledge in all subject areas (Capurro, 2015). Journals in agricultural sciences aim to disseminate research in the field of agronomy and related sciences (Sangerman *et al.*, 2015).

Agricultural science journals in Latin America have achieved a prominent presence in international databases. From the study of the articles published in them, it is possible to know the thematic evolution of the research, so in this research an analysis of the main bibliometric indicators of the Revista de la Facultad de Agronomía (LUZ) will be made, since it is a journal that has maintained for many years the publication of scientific articles in the Venezuelan agricultural sector.

The process of generating a scientific journal aims to influence the dissemination of the work of researchers from different regions and countries (Baiget, 2020). In the case of Venezuela, the Revista de la Facultad de Agronomía (LUZ) is a publication of the Instituto de Investigaciones Agronómicas of the Facultad de Agronomía (LUZ), published since 1968. The internationally recognized abbreviation is Rev. Fac. Agron. (LUZ), is a scientific publication in digital format with ISSN 0378-7818.

The journal publishes four issues per year, under a continuous publication format. The digital content of the journal is hosted in the Sistema de Servicios de Bibliotecas e Información (Serbiluz), of the Universidad del Zulia <https://produccioncientificaluz.org/index.php/agronomia>. It is also indexed in national and international databases: Scopus and WoS, among others.

In Scimago, the set of journals is classified according to their SJR and is divided into four equal groups, four quartiles (Q). Q1 comprises the quarter of the journals with the highest values, Q2 the second highest values, Q3 the third highest values, and Q4 the lowest values. In the case of Rev. Fac. Agron. (LUZ) has remained in Q4 in all categories where it is analyzed, except for the year 2016 in the Food Science Category where it ranked in Q3.

Based on the above, the following study was designed to analyze the editorial management of the Rev. Fac. Agron. (LUZ) in the period 2011 to 2021 through a bibliometric analysis of authorship and production, emphasizing the identification of the main research topics, their relationship and the components that make them.

### Metric studies of information

Information metric studies have gained acceptance for their usefulness in the description, evaluation and monitoring of scientific activity and information flows in general. Among their main purposes are to understand the dynamics of science, identify new research fronts, characterize the intellectual structure of a knowledge domain and its communication patterns, analyze thematic and collaborative networks, evaluate research results, contribute to prospection and the definition of scientific policies (Sánchez and Zacca, 2021).

### Background

The antecedents considered are related to this work, from the methodological and content point of view. Among the research related to the bibliometric proposals proposed and carried out prior to this research, the following can be mentioned:

Metric studies have been carried out in different regions of the world, using different databases or data sets and various indicators to analyze this dynamic (Nuño *et al.*, 2022). In the Latin American context, studies on scientific journals have been presented (Chaparro & Maldonado, 2004), most of the studies have focused on the area of animal and veterinary science (Hinojosa *et al.*, 2020).

In journals in agricultural sciences, very specific bibliometric analyzes have been carried out, such as the one performed to the journal Zootecnia Tropical (Montilla, 2016), in the journal La Técnica (Quindemil *et al.*, 2017), in the journal Centro Agrícola (Paz *et al.*,

2016) and the one performed for the Revista Mexicana de Ciencias Agrícolas (Sangerman *et al.*, 2015).

Duarte *et al.*, (2021) studied the main international topics on agricultural labor research using Scopus. The bibliometric review allowed the identification of scientific communities (USA, France, United Kingdom) that have conducted the most relevant research related to labor in agriculture in the last 10 years.

A bibliometric review of work in agriculture was identified based on articles indexed in Web of Science (Malanski *et al.*, 2019). Other areas that have been studied are: veterinary sciences (Rojas *et al.*, 2013) and agricultural sciences (Saavedra *et al.*, 2002).

## Methods

A descriptive (Hernández *et al.*, 2018), longitudinal (analyses changes over time) and retrospective study was conducted, using quantitative techniques and supported by the theoretical and methodological framework provided by information metric studies. A bibliometric approach was adopted by applying quantitative methods (indicators and mathematical models) to the scientific literature published in Rev. Fac. Agron. (LUZ). The standard bibliometric procedure consists of the steps scientific document collection, processing, visualization and data analysis. The work was developed considering this structure.

The following steps were carried out for the development of the research:

### Source of information

The searches were performed in the Scopus database, it has been chosen for having to date, the highest coverage at the journal level (Guerrero-Bote *et al.*, 2021) has been used in scientometric studies (Baas *et al.*, 2020) and for its metadata quality and annual growth of indexed journals (Leydesdorff *et al.*, 2010).

### Search strategy

Search in the ISSN field of the journal: 0378-7818

### Timing

The search was carried out limiting the analysis to the articles included in this source for the years 2011-2021.

### Documentary typology

Scientific articles

### Data collection

The data collected by Scopus are presented, it should be noted that there may be some differences with what is reflected on the journal's website, in all cases it surely corresponds to the reality of the scientific production of Rev. Fac. Agron. (LUZ).

### Data analysis

Once the numerical data were collected, they were transferred to a matrix, which was analyzed using statistical procedures. Description of trends, contrast of groups or relationship between variables.

### Analysis programs

Several computer programs were used for data processing (Bales *et al.*, 2020), such as VOSviewer (Van Eck and Waltman, 2018), bibliometrix (Aria and Cuccurullo, 2017) and Publish or Perish 8.2.3944.8118 (Harzing, 2007).

### Presentation of results

The presentation format is relatively standard, such as tables, figures, and statistical models.

### Scope of the study

Unidimensional indicators were analyzed: production by years, author production and productivity by keywords. Impact indicators

were also used to determine the most cited authors and the most cited publications. Multidimensional indicators were also applied: author collaboration and co-occurrence of keywords.

## Discussion

### General characteristics of the Rev. Fac. Agron. (LUZ)

This study provides evidence of the editorial management in the Rev. Fac. Agron. (LUZ). The total number of original papers, the number of papers per year and the average for the period considered and the chronological distribution of the total number of original papers were calculated based on these data. The journal has a total of 442 original papers, with an average production for the period of 40 articles per year.

The general characteristics of Rev. Fac. Agron. (LUZ) in the Scopus search using the programs Publish or Perish 8.2.3944.8118, Bibliometrix are as follows:

- Publication years: 2011-2021
- Citation years: 12 (2011-2021)
- Papers: 442
- Citations: 470
- Citations/year: 39.17 (acc1=22, acc2=3, acc5=0, acc10=0, acc20=0)
- Citations/paper: 1.06
- Authors/paper: 4.43/4.0/4 (mean/median/mode)
- Age-weighted citation rate: 74.34 (sqrt=8.62), 22.02/author
- Hirsch h-index: 8 (a=7.34, m=0.67, 84 cites=17.9% coverage)
- Egghe g-index: 9 (g/h=1.13, 92 cites=19.6% coverage)
- Average years from publication 6.46
- Average citations per documents 1,063
- References 9964

### Document types

- Articles: 427
- Publisher: 3
- notes: 8
- review: 4
- Author: 1375
- Authors of single-authored documents: 15
- Authors of multi-authored documents: 1360
- Single-authored documents 15
- Authors per Document 3.11
- Co-Authors per Documents 4.44
- Collaboration Index 3.19

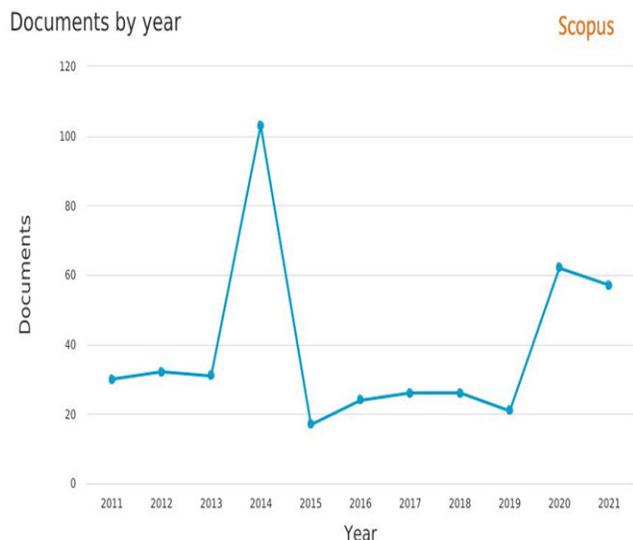
The details of the Revista de la Facultad de Agronomía of the Universidad del Zulia in Scopus are the following:

- Scopus coverage years: 2008 to present
- Publisher: Universidad del Zulia
- ISSN: 0378-7818 E-ISSN: 1690-9763
- Subject areas:
- Agricultural and Biological Sciences: Food Science.
- Agricultural and Biological Sciences: Agronomy and Crop Science
- Agricultural and Biological Sciences: Plant Science
- Agricultural and Biological Sciences: Zoology and Zoology

### Annual distribution of articles

The data shows that the largest number of articles in the period analyzed is concentrated in the year 2014, with more than 100 articles. This is followed by the year 2020 with more than 60 articles and the year 2021, with more than 55 articles respectively. It is valid to point

out that in the years 2008, 2010, 2012, 2013, 2009, 2011 and 2017, the scientific production was between 29 and 32 articles per year, being 2015 the year with the lowest amount (figure 1).

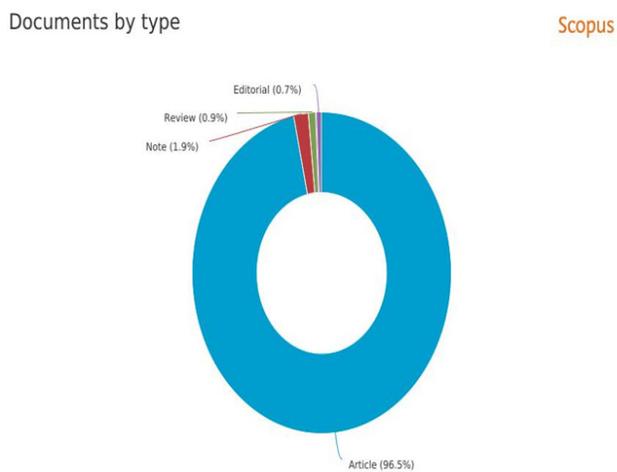


**Figure 1. Annual distribution of articles. Period 2011-2021.**

Source: Authors' elaboration based on Scopus data.

### Documentary typology

Figure 2 shows the distribution of the documentary typology, prevailing (96.6%) the articles published in the journal, this present higher quality information, because they have rigor from peer review.



**Figure 2. Distribution of documentary typology. Period 2011-2021.**

Source: Authors' elaboration based on Scopus data.

### Authorship

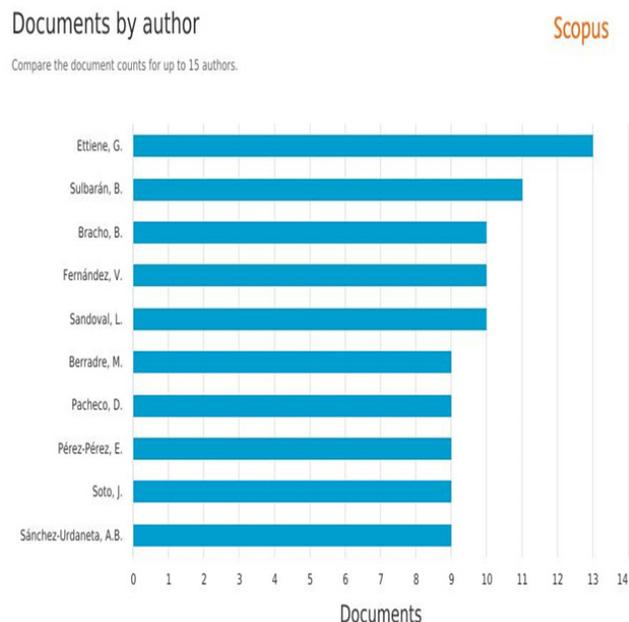
Figures 3 and 4 show the data of authorial scientific production in the period under study. A widely used bibliometric indicator is the productivity of researchers, which is governed by Lotka's law. In our case, it was used to measure the productivity of the authors of Rev. Fac. Agron (LUZ).

The productivity index is mathematically calculated according to the formula:  $IP = \text{Log } n$ , where:  $IP$  = Productivity index,  $n$  = number of articles.

Thus, a  $PI \geq 1$  indicates a production of 10 articles or more; similarly,  $PI = 0$  indicates the production of only one article. This productivity index makes it possible to establish three classes of authors according to their productivity: major producers with 10 or more articles ( $IP \geq 1$ ), intermediate ( $0 < IP < 1$ ) and transient ( $IP = 0$ ).

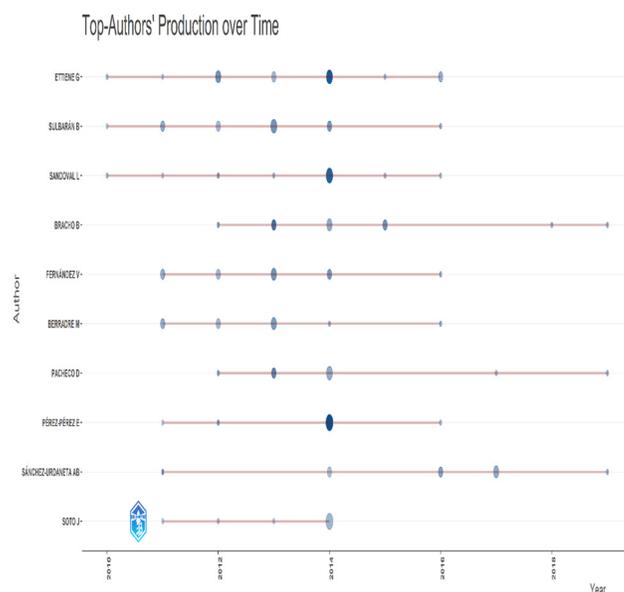
To calculate the IP, a list of authors was prepared containing each of the authors and co-authors, indicating their affiliation, total production of articles and participation as main and secondary author.

In this analysis, Ettiene G. stands out with 14 articles, followed by Sulbarán B., with 12, Sandoval L., with 11, Bracho B. and Fernández V. with 10 articles. The fifth position is occupied by Berradre M., Pacheco D., Pérez-Pérez, Soto J. and Sánchez-Urdaneta with 9 articles each (figure 3).



**Figure 3. Distribution of authors. Period 2011-2021.**

Source: Authors' elaboration based on Scopus data.



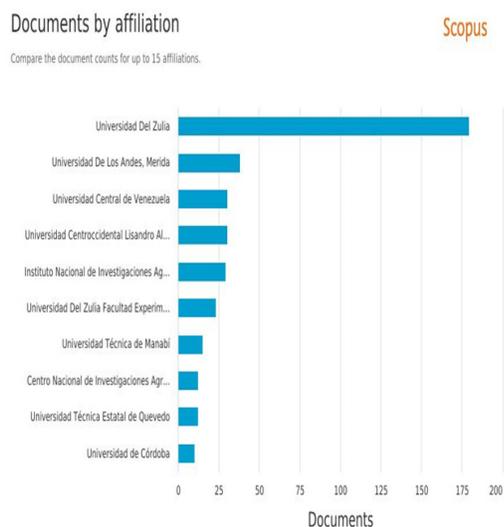
**Figure 4. Evolution of authors. Period 2011-2021.**

Source: Authors' elaboration based on Scopus data.

Figure 3 shows the productivity index of the journal. There are only 5 authors who have a  $PI \geq 1$  and who can be considered as major producers; that is, they have published 10 articles or more. On the contrary, 340 of the authors have produced a single article ( $IP=0$ ). Analyzed from another point of view, 97 of the authors have written between 2 and 9 articles. Although these figures refer to both main authors and co-authors, they agree with data obtained in other investigations.

#### Affiliations

The analysis by institutional affiliation shows the origin of the authors by institutions. In the first place is the Universidad del Zulia (LUZ), with 193 authors in the published papers; it is followed by the Universidad de Los Andes, with 38 authors in the published articles (figure 5).

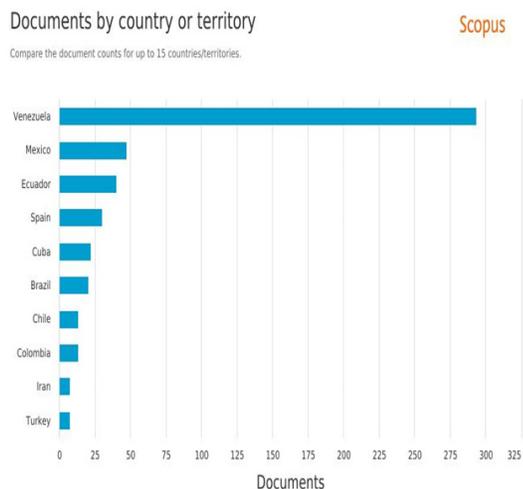


**Figure 5. Distribution of articles by institutional affiliation.**

Source: Authors' elaboration based on Scopus data.

#### Production by country

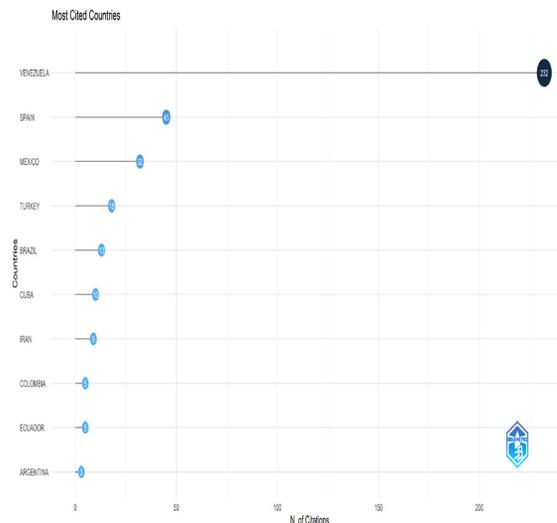
With regard to the analysis by country, the first place in scientific production is held by Venezuela, with a total of 315 articles; the second place is held by Mexico, with 45 articles; the third place is held by Ecuador, with 34 articles; the fourth place is held by Spain, with 32 articles; followed by Cuba, with 21 articles, Brazil, with 20 articles, Colombia, with 13 articles, and Chile, with 11 articles (figure 6).



**Figure 6. Distribution of articles by country**

Source: Authors' elaboration based on Scopus data

In the distribution of the articles by most cited by countries, the most cited were Venezuela with 232 citations, followed by Spain with 45 citations and Mexico with 32 citations (figure 7).



**Figure 7. Distribution of articles by most cited countries.**

Source: Authors' elaboration based on Scopus data.

#### International collaboration

In international collaboration, it can be observed that there are wide and diverse collaboration networks both with countries in the Americas, especially Mexico, Ecuador and Cuba, and in Europe, mainly Spain (figure 8).

#### Country Collaboration Map



**Figure 8. Collaboration map.**

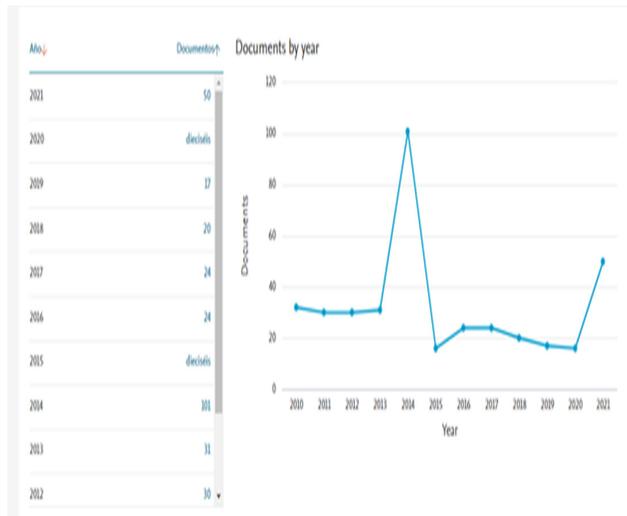
Source: Authors' elaboration based on Scopus data.

#### Languages

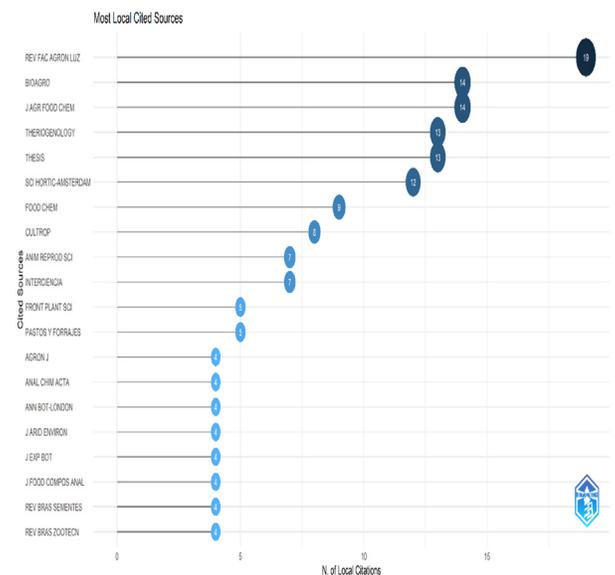
In the period analyzed, 391 articles appeared in English and 126 in Spanish (figure 9), the former prevailing because the journal has within its policies the publication of articles in English. Since English is widely used by scientists all over the world, the production in English guarantees access to researchers from all over the world and is recognized as the language with the greatest impact in science.

#### Citations

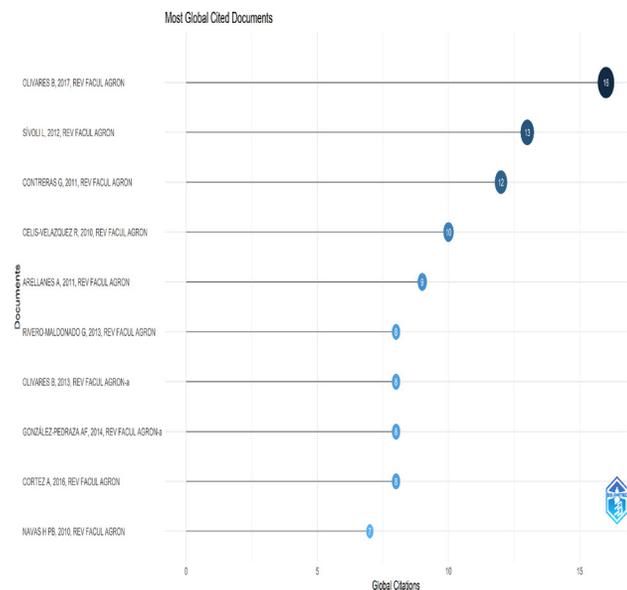
In the analysis of the documents published in Rev. Fac. Agron. (LUZ) with more citations worldwide, 4 authors stand out with more than 10 citations (Olivares B., Sivoli L., Contreras G. and Celis-Velazquez R.) (figure 10).



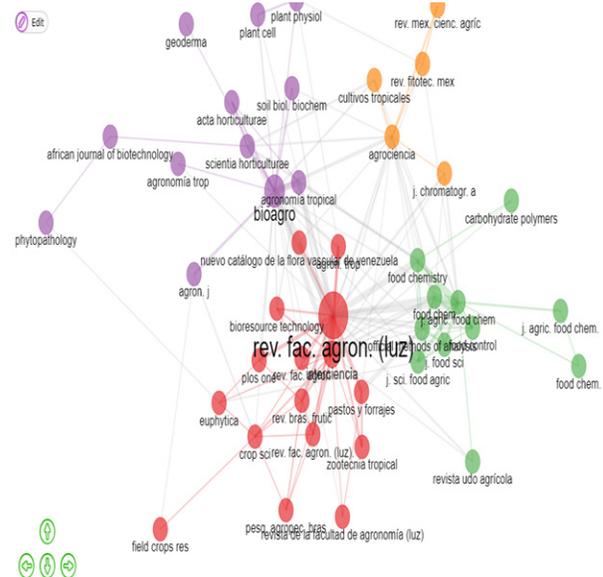
**Figure 9. Language capacity. Evolution of articles in English.**  
Source: Authors' elaboration based on Scopus data.



**Figure 11. Sources of information cited in the Revista de la Facultad de Agronomía.**  
Source: Authors' elaboration based on Scopus data.



**Figure 10. Most cited documents.**  
Source: Authors' elaboration based on Scopus data.



**Figure 12. Citation network in the Revista de la Facultad de Agronomía.**  
Source: Authors' elaboration based on Scopus data.

**Sources**

In relation to the analysis of the most cited sources of information in the Revista de la Facultad de Agronomía, 19 citations of this journal stand out in the first place. The second place is occupied by Bioagro and J. Agr. Food Chemical, with 14 citations each. The third position corresponds to Theriogenology and Thesis, with 13 citations each. Fourth place goes to SCI Horti Amsterdam, with 12 citations. Fifth place goes to Food Chem. with 9 citations, followed by CULTROP, with 8 citations, in sixth place. The seventh place goes to Anim Reprod SCI and Interciencia, with 7 citations each. The eighth place goes to Front Plant SCI and Pastos y Forrajes, with 5 citations each. The ninth place is shared by: Agron. J., Anal. Chim. Acta, Ann. Bot-London, J. Arid. Environ., J. Exp. Bot., J. Food Compos. Anal., Rev. Bras. Semente and Rev. Bras. Zootecn., with 4 citations each. This panorama shows that researchers use a diversity of national and international sources of information (figure 11 and figure 12).

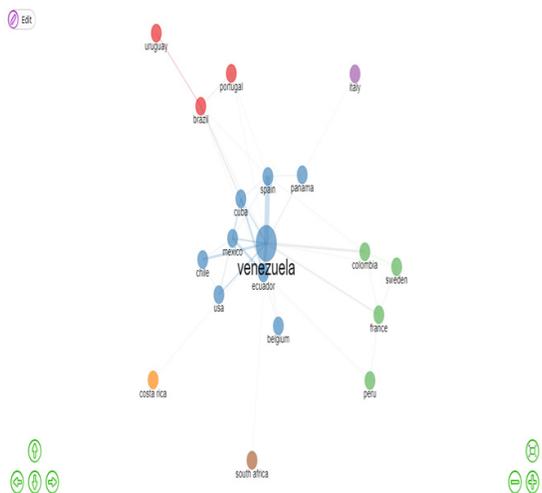
**Thematic trend**

Four clusters are observed (figure 13). The words that constitute agronomic terms in the red cluster are: fertilization, biomass, crops and seeds. In the purple cluster, the term fruit trees stands out. In the green cluster the terms: germination, seeds, water and species. In the blue cluster, the agronomic terms are soils and seeds. These terms that stand out are vegetable agriculture; however, no term related to animal agriculture appears (figure 14).

**Networks of collaboration among authors**

In the collaboration networks between authors, four networks stand out, consisting mainly of authors Pacheco, Ettiene, Rodriguez and Sulbaran (figure 15).





**Figure 18. Collaboration networks between countries.**

Source: Authors' elaboration based on Scopus data.

This work has presented general indicators of the production of Rev. Fac. Agron. (LUZ), since 2011, with the aim of characterizing the historical development of this publication, which has a relevant trajectory in terms of scientific production in agronomy in Venezuela.

The indicators show that currently the Rev. Fac. Agron. (LUZ) is positioned as a space of diverse publication in the agricultural subject at national and international level, it has presented a high growth in its indicators, besides projecting itself as a continuous contribution to the scientific development and diffusion of agronomy.

We found 442 documents published in the journal from 2011 to 2021, with a total of 1375 authors, with an average of 4.43 authors per article, similar to that presented by Schmidt *et al.*, (2017), who identifies that there are 5.2 authors per article in the thematic area of Agricultural and Biological Sciences. In the study period, the number of articles published in the Rev. Fac. Agron. (LUZ), has had a sustained growth.

The information provided has made it possible to give a quantitative account of the changes that the journal has had over time in its citation indexes, which has been considered an adequate way of describing its development.

One of the aspects that is exposed as a continuous challenge for this publication is to propose constant improvement for an increase in the indexes of quality and visibility, aspects that reflect the performance of constant work and strengthening of good editorial practices.

In conclusion, the Revista de la Facultad de Agronomía of the Universidad del Zulia has experienced an improvement in quality, which is confirmed by its permanence in international databases such as Scopus and WoS.

On the other hand, the bibliometric results found in this study are positive and show improvement. However, in order to continue improving the bibliometric and scientometric indicators, the journal should improve the following aspects:

1) it is important that the number of references less than 5 years/ article in relation to the year of submission of the publication increases (to decrease obsolescence),

2) it is necessary to increase interdisciplinary collaboration in the works, in order to favor the Collaboration Index,

3) bibliometric indicators should be monitored, taking into account the versatility of the interpretation,

5) the bibliometric measurements made in the databases in which indexing has been achieved should be incorporated into the monitoring as an added value.

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