

# The Impact of the Impact Factor®: Survey among Plant Scientists

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## ABSTRACT

The Thomson Reuters marketing tool, the Impact Factor® (IF), is currently the only global quantitative system of assessing the impact (indirectly the quality) of a journal (therein the manuscript and the authors associated with it), solely as a function of referencing and/or indexing frequency. Despite its simplistic brilliance, as for any other monopolistic system in any sector of society, the IF is now beginning to have profound (negative) effects on how science is being selected, funds are being allocated and this in turn is driving science in an unnatural way, not driven any longer by core scientific values and principles, but rather by the inherent (implicit and explicit) benefits underlying the IF score of a scientific journal. This survey aspired to ascertain the notions that exist among plant scientists (n = 162) regarding the IF and how this system of quality assessment in the bio-medical sciences affects their way of conducting science and the niche in which they work and study. Twelve questions were posed and respondents could respond online with the possibility of also freely adding any additional comments. Except for one question, all other questions stowed an extremely polarized response, with 10/11 questions showing a YES: NO response ratio of  $\geq 7:3$ . Almost all respondents (93%) had published in an IF journal, and 72% supported the IF. Of all respondents, 60% were made to (= forced by implicit or explicit rules and regulations) publish in an IF journal. Just over half of all respondents (51%) are compensated for publishing in an IF journal while a shocking amount (70%) are reprimanded, or suffer some form of negative consequence (by their Department, Institute, Funding Agency or Government) should they not publish in an IF journal. 73% of respondents felt that the IF should not be held in the hands of a media company or publisher (i.e., Thomson Reuters) and 91% felt that they had the right to know how an IF is assigned and calculated and to freely request the IF of any publication from any year, i.e. the IF history of a journal. Even though 85% felt that an alternative system to the IF was required, only 24% knew of such a system, although most of these were local and not global, or had their inherent problems and limitations. Closely related to the IF, most (70%) respondents felt that print versions of journals were still important, 94% felt that publication of a manuscript should be free, while 80% felt that papers should be Open Access. Without a doubt, the IF is here to stay. However, the great displeasure, exhibited by 91% of respondents who felt that an alternative system of quantitative measurement is required, points towards a desperate need for the (plant) scientific community to act towards countering the monopolistic activities of a single company, Thomson Reuters, by providing one or more competitive, alternative systems of assessing and quantifying the quality of science.

**Keywords:** Impact Factor, IF, monopoly, quality of research, publishing values

## INTRODUCTION

The Impact Factor® (IF) is the brainchild of Dr. Eugene Garfield, who devised a system of quantifying the number of times a manuscript is referenced in the literature. As indicated by Thomson Reuters ([http://thomsonreuters.com/products\\_services/science/free/essays/impact\\_factor/](http://thomsonreuters.com/products_services/science/free/essays/impact_factor/)), the IF is calculated as an extremely simple equation (the dates have been adjusted to give a more realistic and modern representation):

A = total cites in 2012

B = 2012 cites to articles published in 2010-2011 (this is a subset of A)

C = number of articles published in 2010-2011

D = B/C = 2012 impact factor

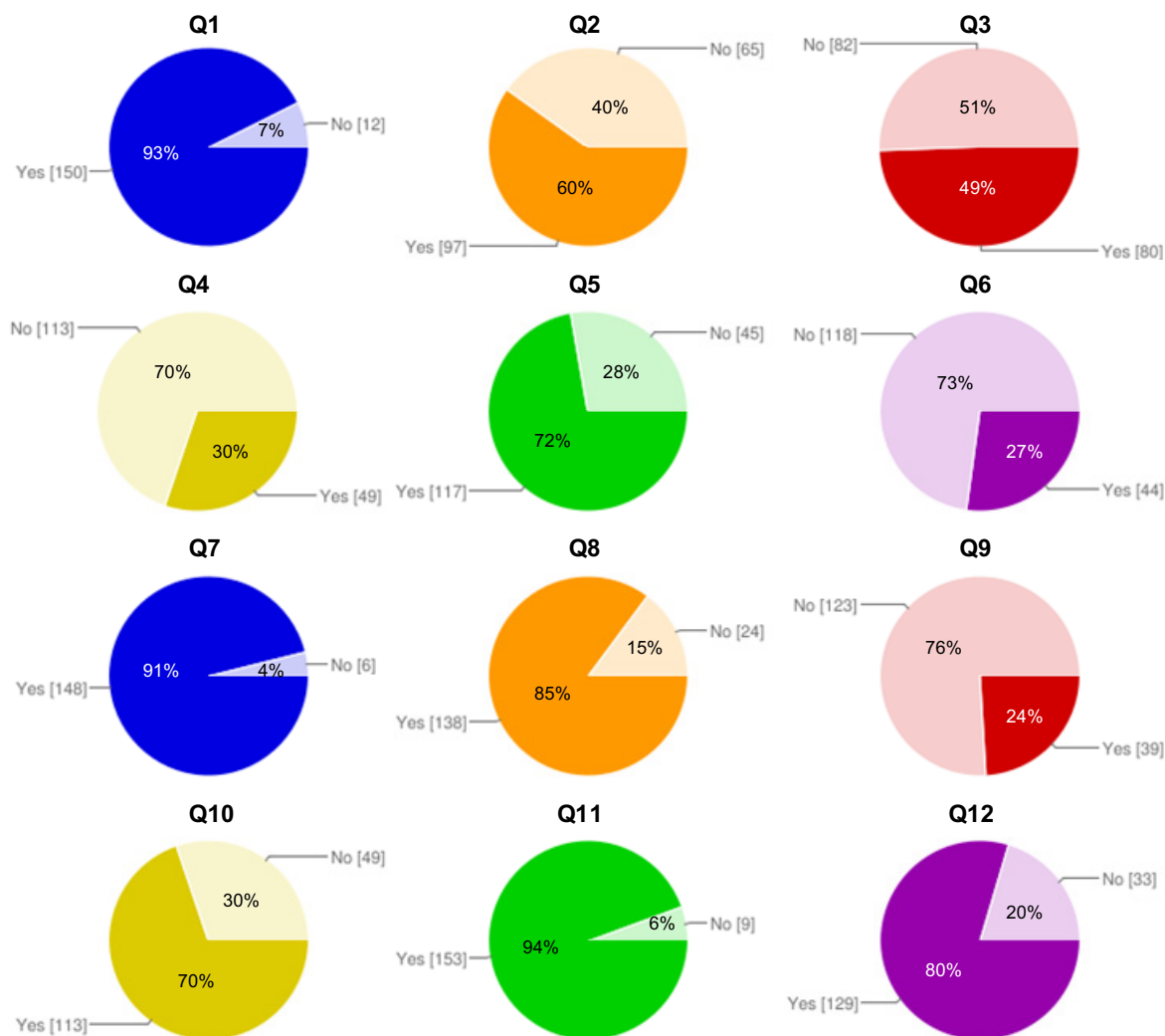
Very briefly, The Institute for Scientific Information® (ISI®) was the former entity of Thomson Reuters. According to Thomson Reuters, "...using journal statistical data in-house to compile the Science Citation Index® (SCI®) for many years, Thomson Reuters began to publish Journal Citation Reports® (JCR®) in 1975 as part of the SCI and the Social Sciences Citation Index® (SSCI®)". The remaining equations used to calculate IFs, cumulative IFs, and the

excessively voluminous pages of self-appraised vision and evaluation of the IF may be found on multiple Thomson Reuters web-site pages.

The objective of this survey is not to praise or critique Thomson Reuters or the IF. Rather, the sole purpose of this survey was to assess, in as transparent and unbiased a manner as possible, the importance that the IF plays in publishing and research funding for plant scientists, and hopefully detect some vital information that would explain the pleasure and displeasure being simultaneously felt by plant scientists towards the IF, and its possible repercussions not only to plant science, but to the wider science community, both related to research and publishing. The survey also aimed to assess the overall feeling and impression of the impact of the IF on science, more specifically plant science since all respondents were plant scientists, and how decision-making is influenced by it.

## METHODOLOGY

A survey was established using a simple easy to use online format with 12 clearly defined questions (see **Appendix**). Respondents were also allowed to freely express any opinion they wished at the



**Fig. 1** Quantitative response by survey respondents ( $n = 162$ ) to 12 questions, represented graphically as pie-charts. Q = question (e.g., Q1 = Question 1 in the **Appendix**). Values are represented as the absolute number of respondents in square brackets e.g. [150] = 150 respondents. The absolute percentage of respondents responding to each question is also indicated, i.e., 150 respondents = 93%.

end of the survey. At least 1000 leading plant scientists from various fields of plant science were contacted by e-mail, and invited to participate voluntarily in the survey. All questions had to be answered and the survey could not be returned unless all questions were completed (default setting) to ensure that no imbalance result. We estimated that each survey to take between 10 and 15 min to complete. Incomplete surveys could not be submitted, thus total number of respondents = total number of valid survey results. After a 3-month waiting period (January-March, 2011), survey results established from 162 respondents from 49 countries (**Table 1**) were assessed. Names, institutional associations, e-mails and countries were determined. Age and gender were felt to be unnecessary and irrelevant to our discussion, and thus were not monitored. All respondents were confirmed to be plant scientists with at least a PhD and with publishing experience in international journals, 93% of which had published in IF journals. Final results were shown in the form of simple, easy to understand pie-charts and summary table of opinions. All respondents were informed that the survey results and their opinions would be published and 100% of respondents provided full consent to publish this data, a pre-requisite for completing the survey.

## RESULTS AND DISCUSSION

All responses to survey questions are represented in **Fig. 1**.

Except for one question, all other questions stowed an extremely polarized response, with 10/11 questions showing a YES: NO response ratio of  $\geq 7:3$ . Almost all respondents (93%) had published in an IF journal, 72% supporting the IF. However, only a very low percentage of respondents

(6%) responded to a voluntary sub-Q1, requesting them to quantify the percentage of papers published in IF journals, although those that did respond showed, on average, a total of 75.5% (range = 30-100%) of all papers published in IF journals. Of all respondents, 60% were made to (= forced by written or implicit / explicit rules and regulations) publish in an IF journal. Just over half of all respondents (51%) are compensated for publishing in an IF journal while a shocking amount (70%) are reprimanded, or suffer some form of negative consequence (by their Department, Institute, Funding Agency, or Ministry of Education, i.e., Government) should they not publish in an IF journal. 73% of respondents felt that the IF should not be held in the hands of a media company or publisher and 91% felt that they had the right to know how an IF is assigned and calculated and to freely request the IF of any publication from any year. Even though 85% felt that an alternative system to the IF was required, only 24% knew of such a system, although most of these were local and not global, or had their inherent problems and limitations, such as the ERA system in Australia (**Table 1**). Closely related to the IF, most (70%) respondents felt that print versions of journals were still important, 94% felt that publication of a manuscript should be free, while 80% felt that papers should be Open Access. Several respondents provided personal and pertinent critiques (last column in **Table 1**).

The IF is currently the only system that is used globally to monitor and quantitatively assess the quality of a journal, and consequently the manuscripts and authors therein, although no quantitative number is provided for the latter

**Table 1** Personalized information provided by survey respondents regarding the Impact Factor® (IF).

Country	Absolute No.	Relative %	Ranking	Pertinent comments (Question 12, open question)*, **
India	29	17.90	1	<p><b>1.</b> The IF is one of the important parameter to check the quality of work. I strongly feel that the IF is necessary, including for GSB journals. IF also gives importance to the journals. <b>2.</b> I firmly believe that, through the IF, we will be able to asses the quality of work! <b>3.</b> Publishing in IF journals is mandatory (in India) to receive grants for research, as well as for self-appraisals and for promotions in careers. The articles published in non-IF journals are not counted or considered for promotions or research funding. Also, Indian University regulations require that every PhD student publish at least two papers prior to submission of their thesis in IF journals. Hence in such cases, it is mandatory that our research be sent to journals with an IF, although personally, I am sure that papers published even in several non-IF journals are of very good quality. Recently, our university provides funding when research publications are published in high IF journals. Hence, it is but natural that we are asked to publish in IF journals. Moreover, students also build up their bio-data with such publications for their future. If the scientific community comes out with a better alternative, it will be highly appreciated. The so-called open access journals charge a huge publication fee, which is totally out of reach of researchers from poor countries, hence even that practice is not fair. Publications should be charged, if the research funding allows it, or else, it should be free of cost. <b>4.</b> Publications with an IF will be helpful for the career of researchers and academicians. <b>5.</b> In India publications in agricultural science are evaluated by a set of IF as a score out of 10 as specified by NAAS (<a href="http://naasindia.org/rating.html">http://naasindia.org/rating.html</a>). <b>6.</b> The IF of Journals is very important for any one who wants to publish his/her research because nowadays, in India, when a scientist approaches a funding agency or attends an interview for a job, he or she is asked by the board that how many articles he or she has published in journals with an IF. Journals without an IF are not considered to be good publications. <b>7.</b> Of course, the IF helps in the evaluation of the standards of a journal. However, the review process of some IF journals is biased. The referee(s) or reviewer(s) sometimes show partial behaviour in publication towards some known authors / labs / countries. For example, in the Journal of Basic Microbiology published in Germany I have come across the one of the editors who favours some particular groups of persons for publication whereas other articles of good quality are rejected. <b>8.</b> The IF should be given to all journals and if possible to each paper. The IF must be given by a reputed expert committee or organization other than the media or printing association (i.e., publisher). It should be open to know how an IF was assigned and calculated and free to request the IF of any publication from any year. <b>9.</b> Publication in IF journals impresses the biodata of a researcher. However, many government jobs and R&amp;D units select candidates with publication in peer reviewed, indexed as well as IF journals. <b>10.</b> Clearly, the IF of papers in journals has become one the means of gauging the quality of research. <b>11.</b> Although the IF is good and important, more emphasis on IF journals tend to provide a researcher a bias to publish in an IF journal. In fact, it should not. One should be able to publish in a good, standard, peer reviewed journal, even though it may not carry an IF. An alternative system to the IF should be made available. <b>12.</b> Science Citation Indexed journals are recognized by Govt. of India's agencies. It is a pity that all journals are not provided IF and some narrow segment journals are left out altogether.</p>
Italy	14	8.64	2	<p><b>1.</b> I support the IF system because in principle allows a standardized assessment of the quality of published research. My Institute grants more funds to groups that publish a large number of IF papers. <b>2.</b> I support the IF because is the parameter most commonly adopted by the scientific community to qualify a scientific journal. It is also considered by public Universities in Italy to select (in the context of public competitions) new research personnel to be hired. <b>3.</b> I think an optimal way to weigh papers does not exist. It hopefully ranges according to the reader. However, in this imperfect world, a way to weight journals could be helpful, with all mistakes that it includes. ISI is a private company that replies to needs of the scientific community. You can accept their guidelines or reject them according to your and your institutional needs. <b>4.</b> The Italian system allocates funding to research according to a score depending on scientific publications. For instance, Palermo University permits to gain a maximum of 15 points with papers published in non-IF journals. After 15 points only IF papers can be considered, thus allowing unlimited scores. <b>5.</b> I support the IF because I think that it is important to differentiate the scientific value of different journals. <b>6.</b> I want to clarify my position about IF, that may seem too favourable. I think that IF does not necessarily reflect the quality of a scientific work, but only the most read journals: is a bit like evaluating music or movie quality on the basis of copies sold. However, an evaluation of the scientific work is necessary, but now I am not able of imagine what. <b>7.</b> In Italy, the total IF of the publications is essential for participation in competitions for public and private' institution and for project approval. <b>8.</b> Although being unfair and questionable, at present the IF is important in that it is the only means to evaluate the relevance of scientific publications.</p>
USA	12	7.41	3	<p><b>1.</b> More and more researchers want to publish in journals with an IF. If a journal does not have an IF or is not listed in PubMed, I may get discouraged to publish. It is very important that FOB (GSB journal) has an IF. <b>2.</b> The best alternative system of quantifying the quality of scientific publications is the well-established peer-reviewer system. Beyond having that firmly in place, the IF is completely useless... all it does is tell you how many times an article has been cited, which is incredibly self-centered for egotistical scientists or administrators. Who cares how many times something has been cited? The point is, it is science, and is useful forever! <b>3.</b> The IF is considered as a measure of the quality of research and many institutions use this as a tool to evaluate their scientists' performance. Therefore, I have been publishing in Journals with IF like many researchers. Citation index (CI) is yet another measure of publication quality, I suppose. However, IF and CI are not without drawbacks. It would be better if the IF and CI could be openly available on public domains. <b>4.</b> The IF system so far fairly measures the importance of a published article and a journal's quality, most of the times.</p>

**Table 1** (Cont.)

Country	Absolute No.	Relative %	Ranking	Pertinent comments (Question 12, open question)*,**
Nigeria	9	5.56	4	<p>1. I think a high IF journal should not based on a large number of publication but on the quality of the journal. I believe journals that are free of page charges have the highest impact. Also, partial access is good for scientists to assess the quality of a journal. 2. I support the IF because it expresses the popularity of a journal in its field of coverage and in some countries, the IF is the main yardstick to evaluate a journal's worth. So GSB should work on getting an IF for its journals. 3. It is important that editors and publishers come together to agree on a structure that would evaluate, assess and score journals in a way that everyone would know the ratings are justified. Also publishing in journals should be free for researchers to be able to publish their work at no cost. 4. IF has alot of prejudices!! 5. "Yes" with regards to supporting the IF, since I do not know an alternative and so widely accepted method to do so, I also disagree with the way on how the IF is actually elaborated and the real consequences on the quality of scientific production it has. For example, a typical negative consequence in Nigeria is that publication in local journals, which are expected to deal with problems of more locally relevant interest, is "punished" because of their low IF. Unfortunately, at present, I am not in a position of exerting a significant influence on this topic (nor to developing an alternative option) and, in this sense, I am literally "forced", at least by now, to publish in IF journals to better guarantee my work position. But it is evident that there is an increasing number of colleagues worried about the real consequences of this system of evaluation of scientific quality, and undoubtedly a serious debate and alternative options are expected to come. 6. Open access increases visibility, reduces fraud and enhances impact. 7. I support the IF because I feel there should be a way of assessing scientific publications. However undue importance need not be placed on this IF since in my estimation, there are high quality journals that do not have an IF. My personal feeling is that the number of organizations/bodies abstracting a journal could be a fair tool for assessing the journal.</p>
Japan	8	4.94	5	<p>1. Alternative systems: RAE; Journal Ranking. 2. I am working in the field of horticulture. There are few (or exactly no) journals with high IF. But, even so, horticulture is important as science and technology for human welfare. I think other criteria are necessary to evaluate science papers in the fields like horticulture. 3. IF should be needed for sciences because it partly guarantees the quality of the paper. 4. Counting system of published book copies is essential.</p>
Egypt	7	4.32	6	<p>1. The IF is currently essential for academia to present among their scientific research work, at least two papers that possesses an IF, to the national promotion committee in Egypt, in particular for their promotion to a higher scientific position i.e., associate Prof. or Prof. at the relevant department / faculty / university. Non-IF papers will be subjected to a scientific evaluation, once again, for scoring by the promotion board committee. As an academic, I am rather concerned to publish my work in an outstanding journal in the field of the work that was presented in the paper, regardless whether it holds an IF or not. But again, the need of the academia to pursue further with their academic positions is the main concern, nowadays. I have no information about the other systems or polices that are implemented in other countries. This survey can assist in gathering information relevant to these issues at the global level. An international scientific board should be initiated to coordinate among the different polices (if there are exist) for the benefit of science / welfare at the global level. In addition to enhance and promote new generations of researchers / scientists, especially in developing countries like Egypt, and others sharing similar polices, to disseminate their work, without discrimination. 2. Publishing in IF journals (at least one paper) is very important to improve our scientific position. 3. In my institute, when I submit to improve my research position if I have published a paper in a journal with an IF I will get higher scores and the number of papers I have to submit could be reduced in number. I do not support the IF because I see many good papers published in journals that do not have an IF. I think it depends on the paper not the journal; in addition, most of the journals with IFs are very expensive and take long period of time for reviewing and accepting.</p>
Brazil	6	3.70	7	<p>1. I do support the IF as a means of evaluate the quality of a journal chosen for publication. It serves as other important information for the database where my CV is published. 2. I support the IF because it is the only objective way to measure the quality of a journal? Until now there is no other way to compare journals apart from this one!!! <a href="http://fr.wikipedia.org/wiki/Facteur_d%27impact">http://fr.wikipedia.org/wiki/Facteur_d%27impact</a>. 3. Q3: Yes. See the criteria for proposals received by CNPq (Brazil) requesting financial support for research or Research Productivity Scholarships: <a href="http://www.cnpq.br/">http://www.cnpq.br/</a>; <a href="http://www.cnpq.br/cas/ca-bf.htm#critérios">http://www.cnpq.br/cas/ca-bf.htm#critérios</a>; Q5: No. The criteria of calculation are unfair because it does not determine the quality of the publication, and it takes into account only the last 2 years. This evaluation period is short.</p>
Pakistan	5	3.09	8	<p>1. I think all publications should be IF journals. 2. Most IF journals are not publishing high quality papers, sometimes it's like business and your interaction with members of that journal. I have seen many high quality papers in non-IF journals so IF should not be the sole criterion for the quality of a publication.</p>
South Korea	4	2.47	9	<p>I attended a few job interviews but the selection committee chose a person who had a high total IF for their publications. So, I feel the IF is necessary for me to get a good job.</p>
Australia	4	2.47	9	<p>1. IF is about scientists talking to peers. Science impact is often more about scientists talking to policy-makers, technologists, extension. This important outcome of research is not currently captured by IF. 2. At top universities in Australia publication in journals with a high IF is essential for career progression. Problem with the IF is the fact that some research areas fit well with it (e.g. molecular biology) and get a high IF easily but others (e.g. agricultural work) don't simply because of the turn-around time between planning, conducting and writing up experiments and therefore citing papers that lead to the hypothesis in the first place.</p>

Table 1 (Cont.)

Country	Absolute No.	Relative %	Ranking	Pertinent comments (Question 12, open question)*,**
				In Australia we have a new system (since 2010) called Excellence in Research for Australia (ERA) (see <a href="http://www.arc.gov.au/era/default.htm">http://www.arc.gov.au/era/default.htm</a> ) which the Australian Research Council (ARC) and Australian Universities seem to be putting ahead of the IF now. It is an attempt to stream journals according to research area. It has just as many issues as the IF because now it is all about getting into A or A* journals and avoiding B or C journals but specialist journals tend to get a lower ranking ... and we have no way of contesting the ranking. <b>3.</b> Q3: Yes, because most universities and funding bodies use the IF to evaluate research excellence. <b>4.</b> Since 2010, all Australian universities receive funding from the ERA program. The funding is metrics-based, with the vast majority of funding being based on citations. However, it is not based on journal IF, but on citations of individual papers. Also, it is currently not based on Thomson Reuters but on citations in Scopus (Elsevier) (though this may change to Thomson Reuters in 2012). Therefore, it is now essential to our funding and our promotion prospects that we publish in journals that are listed by Scopus (or possibly in the future by Thomson Reuters). While I have proudly published two papers with GSB, I cannot continue to do so unless it is listed by Thomson Reuters and Scopus. <b>5.</b> The opposition parties in Australia would prefer to see research quality also measured by expert panels that assess down-stream economic, environmental and social impacts. I think this is a good idea because research quality could, arguably, be negatively correlated with IF (e.g. in fields like horticulture where the requirement for data from multi-year studies tends strongly to reduce IF compared with fields like molecular biology where data can be generated in the laboratory in a matter of months). Ultimately, Thomson has IP rights over their IF, and this is my only reason for defending their right to keep the IF.
Malaysia	4	2.47	9	Provide an opportunity for developing countries such as Malaysia. Create an avenue for our scientists to write in the journal. There are rich ideas particularly on the local environment and issues need to be publicized. There are few articles from Malaysian ecologists even though our country is rich in biodiversity.
UK	3	1.85	12	While there is no written-down policy at this university, it is clear that publishing in non-IF journals will not help your chances of promotion, award of studentships, award of internal funds, etc. UK grant bodies also look at publication track records and would expect that this would be mainly in IF journals. Of course, most "good" journals have an IF. So if IF didn't exist, they would still expect the same journals. Other means to assess quality: eigenvalues, hit counts on websites, Faculty of 1000 (and similar peer-review bodies), community perception. For all its faults, the IF does roughly correlate with the community perception of the quality. Indeed it often tells us what we already know, i.e., Nature is a very good journal.
Spain	3	1.85	12	<b>1.</b> I also strongly feel that an IF is unnecessary to determine the quality of one publication. However, in my Institute, unfortunately, the IF journals are positively appreciated. <b>2.</b> As an IKERBASQUE Research Professor I have to pass an evaluation every 3 years and among other issues, publication in prestigious journals (i.e. with high IF) is very important. <b>3.</b> IF cannot be the only parameter used in order to quantify the quality of science (a journal, a scientist), but its importance should not be simply dismissed. It is a valuable bibliometric parameter and, to my opinion, trying to ignore its relevance does not make much sense. I would be glad to expand these ideas if required.
Belgium	3	1.85	12	<b>1.</b> I feel that the IF system has its merits, but the fact that some journals are arbitrarily kicked out of the system (at least on non-scientific grounds), and the fact that the system is run by a commercial company, makes it hard to swallow. This makes excellent publications with high standards (to choose a non-GSB example: Acta Horticulturae) which publish in small niches undervalued, and makes indeed also that niche largely undervalued. Sadly, funding agencies are going along in this pernicious system; whereas there is not a direct penalty, there is an indirect one for publishing in non-A1 (non IF) journals: it costs time to write a good publication anyway, and the time spent is not rewarded in itself, because the publication will not be considered in the case of future funding proposals or promotions. About time there is some protest against this whole ISI system. <b>2.</b> IF is essential for all scientists in academia; especially for young ones who start their career. High quality papers in high IF journals are essential to obtain PhD grants and certainly for a postdoc position; similar for funding and successful project applications.
Canada	3	1.85	12	<b>1.</b> Many other works are published in book chapters, which have no IF. I consider GSB journals to be of that category, mainly because the publications are one time topical issues (special issues). <b>2.</b> Currently, the IF is the only meaningful way to compare which journal is better and more desirable. As you correctly stated, the journals without IF do not attract quality research.
Slovakia	3	1.85	12	<b>1.</b> Publishing in IF journals has a great and substantial influence on personal scientific career advancement, the University funding by the Ministry of Education, Faculty accreditation, guarantee accreditation for MSc and PhD study programs, salary bonuses, etc. When IF journals are missing in the publishing curriculum of guarantees, the most important consequence is the loss of accreditation for PhD study programs, habilitations and professor inaugurations. In other words, the faculty development is dependent on IF publications (this policy is given by the Ministry of Education). So I encourage younger colleagues to publish their best research in IF journals. Replies to other questions may depend on circumstances. For example, submission and publication of a manuscript should be free, but authors should pay for colour printing. Except the current year, all previous manuscripts should be free for all to view. <b>2.</b> Q3: Publishing in IF journals is highly rated for scientific progress, e.g. to be an associate professor of Genetics you need to have published at least 15 IF papers, if not you need 25 papers ( <a href="http://www.upjs.sk/public/media/3282/kriteria-priloha-1-docent.pdf">http://www.upjs.sk/public/media/3282/kriteria-priloha-1-docent.pdf</a> ). <b>Q5:</b> I support classification of journals by quality which is now mainly mirrored by the IF.

Table 1 (Cont.)

Country	Absolute No.	Relative %	Ranking	Pertinent comments (Question 12, open question)*, **
				On the other hand, I am sure that the system is warped, many times the editor presses the author to cite papers from their journal to build higher IF (I personally met with this in Czech Journals) or the IF of some scientific organizations (e.g. Universities) publish in some journals in which the majority of papers published by the Institution are in that Journal. It is just a question of money "to buy" the entrance to the IF. The problem is that there is no unbiased criterion to judge journals publishing serious (better or sufficient) scientific studies and journals publishing hardly reviewed studies.
Cameroon	3	1.85	12	I do support in strong terms, the peer review of manuscripts.
France	3	1.85	12	Some of the questions cannot be answered with simple Yes or No. Q5. They encourage us, but do not "make us" publish in IF journals. Q6/Q7. It does appear in performance evaluation and is one of the factors taken into account. But no direct reward or penalty system. Q8. I think it has some value, but the importance given to it is often too high. Q14/Q15. Nothing is "free". There probably should be a better balance between what the author pays and what the reader pays. I believe it is important to make sure that everyone can publish (i.e. either it is free or if there is a fee, authors can afford it) and that everyone can access publications (again, either publication is free or readers can afford it). This probably means a system with different prices (both for publishing and for accessing) for people from different countries/institutes.
Iran	2	1.23	19	IF is a factor for evaluation of the papers in my institution. The Scopus site is a system which is used for qualification of paper in my institution.
Argentina	2	1.23	19	
Hungary	2	1.23	19	IF vs research fund. Research Foundations provide grants in correlation with IF. IF also important to get PhD, DSc. IF alternatives: The # of citations is also used, but can not replace the IF completely.
Croatia	2	1.23	19	An evaluation process at my Institute, as well as promotion strongly asks for publications in journals with an IF, as high as possible. So any publication in a journal without an IF is practically lost. That is the reason that scientists in my institution mostly avoid to publish in non-IF journals.
The Netherlands	2	1.23	19	
Turkey	2	1.23	19	
Russia	2	1.23	19	
Vietnam	2	1.23	19	Scientists are able to broaden their insight.
Uzbekistan	1	0.62	27	
Mauritius	1	0.62	27	
Bangladesh	1	0.62	27	
Lebanon	1	0.62	27	
Germany	1	0.62	27	
New Zealand	1	0.62	27	
Bulgaria	1	0.62	27	
Taiwan	1	0.62	27	
Greece	1	0.62	27	IF is quite important as it's the main and crucial point for evaluation in academic position and/or research. Thus, the IF is a key factor that I am looking for my publications.
Sweden	1	0.62	27	I support IF because today it is the only (as I know of) system to get some guidance of the quality of a scientific journal.
Venezuela	1	0.62	27	Compensation system: <a href="http://www.oncti.gob.ve">http://www.oncti.gob.ve</a> (National) and <a href="http://www2.ula.ve/cdcht/index.php?option=content&amp;task=view&amp;id=281">http://www2.ula.ve/cdcht/index.php?option=content&amp;task=view&amp;id=281</a> (Universidad de Los Andes). Lack of support for IF: because many efforts are not acknowledged due to a system imposed for those who promote only IF the way it is.
Finland	1	0.62	27	
Portugal	1	0.62	27	IF allows some to evaluate the quality of a work. However, the number of citations is also important as it gives an idea of the impact of the work in the scientific community. These aspects are considered in the H-index.
Sri Lanka	1	0.62	27	I am a university academic. In our system, publications in indexed journals such as Science Citation Index Expanded®, Social Sciences Citation Index® and Arts and Humanities Citation Index® (all incidentally belonging to Thomson Reuters's Web of Science®****) journals are highly recognized and additional marks are given when considering promotions to Professor grade. A publication in an indexed journal will earn two more marks. Moreover, publication in journals published more than two issues per year has more marks than those of less than two issues per year. It is clearly written in Commission Circular no. 916, UNIVERSITY GRANTS COMMISSION, Sri Lanka. Therefore, my first attempt is to publish in an indexed journal.
Norway	1	0.62	27	
Serbia	1	0.62	27	Me and my colleagues in Serbia are currently paid according to the number of points scored in a relevant period (4 or 5 years). We get points only for papers published in journals that have an IF. Papers in journals without an IF are ignored - no points at all ( <i>nada</i> ). Thus I got no points for my <i>Brassica</i> review in TPJ, and only few points for reviews on potato - which were counted as book publications. No hard feelings, I knew in advance that I would get no points and I wrote these reviews for the love of science. My next door colleague, also Serbian, also had the same kind of trouble. IF seems to be used in many countries as the most suitable way to evaluate not only journals but also individual scientific achievements. But this way of comparison can be used only for people within the same science. Comparing Cytology and Zoology is nonsense because there are ca. 2.5X difference in the average IF values. Thus the whole botany, plant biology or plant physiology have very low IF scores in comparison to let's say immunology. That is the catch 22.

Table 1 (Cont.)

Country	Absolute No.	Relative %	Ranking	Pertinent comments (Question 12, open question)*, **
				Anyhow, I suggest you to try to get IF at least for some of your major journals like TPJ, to it attracts people to publish. My co-authors are at present not interested to publish in GSB but they would change their minds as soon as the IF reappears. Yet another possibility is to go for books instead of journals, in your position I would publish as journals only those that could get IF in a year or two all other things would be books. And I would stick to the famous American saying " if you can't beat them - then join them".
Tunisia	1	0.62	27	
South Africa	1	0.62	27	
Mexico	1	0.62	27	Here in Mexico, if the journal has no IF, it is as if the manuscript did not count for anything. I suggest that Plant Stress make strategies as they did for the journal Plant Signaling and Behavior, whereby addendas, the first numbers are reaching the quota to publish 4 times per year, although that system is transitory, and so to achieve an IF. I think that with the great effort made by Plant Stress, soon it would have an IF, with both invitations to addendas and revisions, and also could include genes report notes.
Colombia	1	0.62	27	The IF is important because the manuscript is visible for many people. In Colombia, in Colciencias and in my university a paper is highly valued if it is published in an IF journal.
Burundi	1	0.62	27	I support the IF, if it can improve the time between abstract submission and publication.
Democratic Republic of Congo	1	0.62	27	I propose to GSB to open other domains of science in agriculture and environment.
Burkina Faso	1	0.62	27	The evaluation of researchers like me requires publications in journals with an IF to obtain a higher degree. The IF is a necessary criterion that needs to be re-examined. The cost of publications can also give place to unhealthy speculations within the community scientific, unfortunately.

\* Comments have been used, wherever possible, exactly as written by respondents. Only grammar, spelling, etc. have been corrected to provide clarity to the reader.

\*\* Different numbers indicate specific responses given by different scientists. So, for example, in India, 10 responses were given by 10 different scientists, as indicated by 1. to 12.

\*\*\* Comment inserted by the first author.

two using the IF.

There are some serious gaps and loop-holes that underlie the effectiveness and credibility of the IF that must be considered and which need to be maintained in the back of our minds as science moves forward, brought to light by the results of this study.

This survey goes some way into elucidating the role that the IF is playing in plant scientists' careers, both in research and publishing. It exposes some deep rifts in what the role of the IF should be and also points towards extremely worrying signs that the IF is no longer an impartial system, but an effective marketing tool that is now being used to manipulate policy, sway the direction of science based on the IF of a journal which inherently reflects the thematic focus of a research field. Such a close and critical scrutiny had not yet been clearly quantified except for internal reports conducted by Thomson Reuters or by disperse critiques dotting the literature. It is the objective of this survey and allied papers currently being written and published elsewhere to draw the attention of scientists from all fields to the weaknesses and direct impact that the IF is having on our fields of research, to show that science is no longer a

passive by-stander to the process of quantification and selection, and that as scientists we have the moral responsibility to ensure a balance in science qualification through the implementation of new and alternative systems to counter the monopolistic system, the IF. Clearly, for marketing and possibly even political reasons, these issues are often skirted or ignored by the leading players of the international publishing arena. This survey thus serves not only to expand the awareness among plant scientists, but to stimulate them to question and challenge the IF and Thomson Reuters further.

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## REFERENCES

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## Appendix

All questions were a simple YES/NO choice.

### Question 1

Have you ever published in IF journals?

**Sub-question:** What percentage of total papers published have been in IF journals?

### Question 2

Does your Department, Institute, Funding Agency or Government **make you** publish in IF journals?

### Question 3

Does your Institute have a compensation or bonus system (such as increased research funding, salary, or improved position) to reward scientists who publish in IF journals?

### Question 4

If you do not publish in an IF journal, is there any negative consequence, reprimand or penalty handed out by your Department, Institute, Funding Agency or Government?

### Question 5

Do you support the IF?

### Question 6

Do you think that the IF should be in the hands of a publishing or media company?

### Question 7

Should it be open to know how an IF was assigned and calculated and free to request the IF of any publication from any year?

### Question 8

Do you feel that an alternative system to measuring the quality of science and science publishing is necessary?

### Question 9

Are you aware of any other alternative system of quantifying the quality of a journal, science publishing or science?

### Question 10

Are print journals and paper reprints important for your publishing curriculum?

### Question 11

Should submission and publication of a manuscript be free?

### Question 12

Should manuscripts be open access, i.e. free for all to view?