



Jules Janick

The Tyranny of the Impact Factor

Jules Janick, ISHS Board Member and Director of Publications

To: Abbot Franz Cyrill Napp, Augustinian Monastery of Brno
From: Bishop A.E. Schaffgotsche, Brno
Re: Gregor Mendel

February 1, 1868

The Archbishop of Prague has determined that monastery funds for the construction of a greenhouse have been used to support a research project concerning peas of Gregor Mendel, a member of your order, that may reflect on the effects of the study of science on the spiritual calling of the monastery. As a consequence, we have opened up an investigation to determine the value and impact of this research in two ways: peer review and a citation evaluation. We sent a paper entitled *Versuche über Pflanzen-Hybriden* (Experiments on Plant Hybrids) published in *Verhandlungen des naturforschenden Vereines in Brünn* 4:3-47, 1866 to the eminent Botany Professor Karl Wilhelm von Nägeli, who informed us that he had already received correspondence with Mendel about this topic. Professor Nägeli was unimpressed with the research but admitted he could not spare the time to read the entire document. He had suggested that Mendel should cease working with horticultural crops and investigate *Hieracium* (hawkweed), a truly botanical species.

We further tested the significance of the pea work through a two year citation analysis and found that the impact factor (derived from number of citations of the paper) had a value of zero. It has never been cited at all. We conclude that the lack of citations confirms the opinion of Professor Nägeli. In view of the poor review and low impact statement we suggest that Dr. Mendel ceases all research in this area. We strongly urge Father Mendel to find a better use of his time and we suggest administration.¹

¹ Mendel assumed the position of Abbot on March 30, 1868.

Eugene Garfield, a linguist, is the remarkable founder of the Institute for Scientific Information (ISI). In the 1960s, Garfield came up with an intriguing concept that has become indispensable to the scientific community, one that he has bankrolled into an influential publishing industry. The concept is that citations in a scientific paper can be used to determine the importance of not only scientific research but also researchers and research journals (Garfield, 1979). The way it works is that ISI, using a *prescribed list of journals*, computerizes the citations of *each paper* of each issue and from this source of information extrapolates a number of intriguing statistics such as how many times a work is cited and who cites it. The basic assumption is that the importance and impact of a scientific work is directly related to the number of times it is cited. The current dogma is that if a paper is frequently cited it has

high impact and is therefore important. The converse follows: if it is infrequently cited it has low impact and is unimportant. (There are some famous exceptions: see box above regarding Gregor Mendel, the author of the most famous paper in biology and horticulture.)

Based on this information, the concept of impact of a journal or a paper has been developed. Furthermore, journals can be rated on their importance by the number of times they are cited in their own journal and in other journals. (Of course, it is a bit depressing when you find that no one cites your paper but yourself.) Indeed, journals develop strategies to improve their impact factor by rejecting papers that they deem unworthy. A related H-index (Hirsch-index but often called the Heat Factor) integrates productivity and impact over a career (Vinkler, 2007). Introduced in 2005 by Jorge Hirsch, the index is a metric for estimating "the

importance, significance and broad impact of a scientist's cumulative contributions" and takes into account both the number of an individual's publications and their impact on peers, as indicated by citation counts.

The impact factor concept has been bought, hook-line-and-sinker, by administrators worldwide. After all, what could be simpler than finding a specific number, like IQ, to evaluate performance. The mere quantity of publications is no longer of interest, but rather it is their impact vis-a-vis the impact factor. (Of course, many administrators are more interested in how much funding you can garner.) More and more the careers of young researchers appear to be dependent on this statistic. As a result some young, ambitious scientists are reluctant to publish in low impact journals. Even scientists from undeveloped countries have succumbed to this concept and they increasingly want to know the impact factor of journals chosen for submission. Sadly, the impact factor can be gamed: to increase your impact factor: make sure you are included as coauthors and cited in your colleagues' papers by promising to include them in yours; self citation will help you directly; avoid anything that will prevent you from publishing in a less prestigious journal lest it ruins your chances for acceptance in a higher impact journal.

Clearly, the concept of impact has merit in some areas, molecular biology for example, but works less well in others. In many fields of applied science such as engineering where research is often published from proceedings, technical reports, and patents, the impact factor is clearly not as appropriate. And, it cannot be denied that we in horticultural science and particularly ISHS, are suffering from this statistic. Horticulture journals deal with a small (and decreasing) specialized audience and so citations as measured by ISI will be low, even for the most outstanding papers. ISHS is in the unfortunate position of being subject to the fact that ISI, a *private organization*, determines what journals are to be considered science in their world. *Acta Horticulturae*, because it does not meet ISI's criterion of a journal (it is not published in regular installments, for example), is excluded (although some "selected" issues are included in the "book citation index"), and thus, its citations are not considered. This is despite the fact that there are currently almost

800 *Actas* with more than 40,000 articles available on line with a consistent pattern of over 28,000 daily page views. In essence, ISI by choosing the journals that it considers worthy of counting citations, determines what is to be considered science and undervalues what is excluded. For example, review articles published in scientific journals are highly cited, and authors get a large impact factor, while review journals such as *Horticultural Reviews* and *Plant Breeding Reviews*, are not counted because they come out annually and are not considered journals. ISI also does not include journals from less developed countries.

There are some other strange things. The citation does not discriminate between first names. Thus, Jules Janick is cited as J. Janick. Thus I am pleased that my citation index is increased because ISI mixes up Jules Janick and John Janick. I suspect the Parks, Kims, Lees and Wus

will be pleased to see their citations increasing. The citation index does not distinguish self-citation (hint to authors: do not be bashful, cite yourself).

We can agree that the Impact Factor is a serious threat to horticultural science in general and to ISHS in particular, since its main publication, *Acta Horticulturae*, despite its usefulness, is not a prescribed journal of ISI where citations are enumerated. Can anything be done about it? Probably not much. We have tried pleading with ISI to include *Acta Horticulturae*, probably the most cited horticultural publication ever, but we have not been successful. Suing ISI does not seem to be a logical approach. We have attempted to determine our own impact factor by keeping records of downloads on our website but it is doubtful if they will be accepted by those in other fields or will influence administrators. Perhaps we should just be stoic and accept

the fact that life is just not fair, that we need to believe in ourselves and in the fact that horticulture is important, that we serve a useful function, and stop worrying about something that we cannot control.

REFERENCES

Garfield, E. 1979. *Citation Indexing, Its Theory and Application in Science, Technology and Humanities*. Wiley, New York.

Vinkler, P. 2007. Eminence of scientists in the light of the h-index and other scientometric indicators. *J. Information. Science* 33(4):481-391.



ISSUES

Orchard Tourism in China

Zhou Wu-zhong and Chen Xiao-yan

Fruits are among the earliest plants cultivated in China and are beloved because of their diversity, their delectable flavors, their beauty, and their place in the landscape. Visiting orchards for recreation has become an important tourist activity in large metropolitan areas such as Beijing, Shanghai, Guangzhou, and Shenzhen. Although a huge market for tourist sites exists in China, only 20 of 203 "National Agricultural Tourism Demonstration Plots" recognized by the National Tourism Bureau involve orchards. The planning and construction of orchards specifically designed for tourists is now underway.

THE TOURIST ORCHARD

The tourist orchard, as the name suggests, is a combination of tourism and orchard culture. This comprehensive concept integrates sightseeing, recreation, ecology, the local economy, and science popularization. The development of tourist orchards combines improvement of the fruit industry, expansion of leisure time activities in rural areas for urban citizens, and the promotion of the local tourist industry. With its tremendous multiplier effect, it can boost the prosperity of local economies.

Tourist fruit picking in China has become an important recreational activity in many metropolitan areas such as Beijing, Shanghai, Guangzhou, Xiamen, and Shenzhen. Data from the Beijing Fruit Tree Association indicates 533 public tourism and picking orchards in Beijing, with a total area of 19 thousand hectares. In 2002, the total income of farmers in suburbs of Beijing was 97.3 million yuans (1 yuan = US\$ 0.14), producing 3.4 kg of fruit per capita. In the same year, the income from public harvest of cherries was more than 5 million yuans, about a third of the total return for cherries. At present, the average profit of some tourist orchards is 2882 to 3293 yuans per hectare; the highest could be 12,000 yuans per hectare. Tourist orchards have become a new cash crop for farmers in Beijing.

The National Tourism Bureau in China advocated the development of industrial and agricultural tourism in 2001 and developed *Inspection Standards of National Industry and Agriculture Tourism Demonstration Tests* in 2002. By the end of March 2004, more than 340 departments in 31 provinces underwent self-examination, provincial preliminary inspection, and applied for national inspection. Based on the results of this national inspection, 203 attractions were named "National Agricultural Tourist Orchards" by the National Tourism Bureau,

although less than 20 included the word "orchard" in their names. Examples include the Taoyuan World Eco-Agricultural Tourist Attraction in Feicheng, Turfan Grape Ditch, Xinglong Town Ten Thousand Mu Tourist Orchard in Chengdu, Hongyang Chinese Gooseberry and Green Tea Base in Du Jiangyan, Mengzi County Ten Thousand Guava Orchard in Yunnan, Nanfeng Luoli Sweet Oranges Eco-orchard in Jiangxi.

Although sightseeing combined with fruit picking has been increasing in China with considerable physical and financial resources expended, many orchards are still not built up to standard, with poor accessibility, incomplete infrastructures and facilities, lack of diversity in products and programs, substandard service, and poor management. Some orchard managers appear to be unaware of the national inspection, or if they knew, paid little attention to it.

TOURIST ORCHARD CONSTRUCTION AND MANAGEMENT

Currently most of Chinese tourist orchards are developing on the basis of traditional orchards. Although the ownership of some tourist orchards has been transferred to individuals,

