

FRAUD CASES IN THE FIELD OF WOOD SCIENCE

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Abstract:

In recent years, there seems to be a significant increase of the cases of scientific fraud that are revealed in many scientific fields and in almost all the developed countries. In the specific work, an attempt is being made to present cases of serious evidence of research fraud in the field of wood science, in order to assist editors and reviewers in formulating appropriate quality principles to more effectively distinguish true research from false research. It is very difficult to determine if a research work is based on real experimental data, especially if there are not available basic information about the experiment carried out (place, laboratory, evidence of specimens or materials used etc.) and the respective authors (academic studies, scientific background, scientific cooperations etc.), and if there is no the contribution of all the scientists to this direction. The lack of specific information could lead the editors to accept an impressive fake investigation as real one and to encourage in that way, an increase in the number of such papers published. Offering the opportunity to be included in a publication as a co-author of someone that had not active participation in the research work should be always a matter of great concern, because it may conceal serious irregularities, fraud or even suspicious expectation of rewards in the future.

Key words: fraud; wood science; editors; reviewers.

INTRODUCTION

Generally, the fraud is widespread in all the human activities and it is mainly used for the acquisition of wealth and power. The first reference on fraud can be found in the Bible, where the "the Serpent" used lies to deceive Eve, while the first publication about the fraud was made by Lucian of Samosata in the 2nd century AD, which refers to Alexander of Abonoteichus, known as the false prophet. Lucian, in the introduction of his publication, stated that he feels shame to write such a work that it is dealing with the actions of a man, thrice cursed, who is not worthy to be read by educated people. This man, as Lucian says, excelled far beyond other people in cunning and intelligence. Furthermore, he had many other qualifications, but he used them for evil purposes. However, anybody who saw him for the first time had the impression that he was the most honest person. In fact, he apologizes to Pythagoras, for whom Lucian recognizes that he was wise and he had marvelous ideas, for his thought that if Pythagoras was contemporary of this Alexander, undoubtedly he would look inferior against him. Perhaps he is not totally unfair, since, as Xenophon mentions (4th century BC), most people usually agree with the bad guys and not with the remarkable people. According to Menander (4th century BC), this is because wicked men have the ability to use convincing and polite speech. It should be mentioned that Fraud comes from the Latin word *fraus-fraudis*, which derives from the Greek word *φραδής* (*fradis*), which means wise and shrewd (Liddell and Scott 1889).

Fraud in the science

Although scientists are considered to be the highest level of society and therefore, they should be an exemplar of honesty, they cannot escape their human nature and use often fraud tricks to increase and upgrade their published work. Perhaps, it would not be an overstatement to say, that scientist's familiarity with frauds begins from the period of their university studies with the "alleged" scientific education. A research based on 1800 students from 9 universities showed that 3/4 of them admitted cheating on tests or assignments (Fang and Casadevall 2013). The above research obviously emphasizes on the size of cheating by students. As it is in a race, where there is a winner, with the best qualities, and a loser with weaknesses, in the scientific fraud occasions, the responsibilities or reduced capabilities of these professors should not be ignored.

A year ago the professor Lucio Picci (2016) of the University of Bologna announced that students are free to copy, since professors use to do the same. In this way, he wanted to publish incidents of plagiarism, where some of his colleagues were involved and who not only remained unpunished, because of the system that prevails within the university according to his statements, but also they were rewarded by being placed in senior positions. Unfortunately, this fact is not an individual incident and of course, plagiarism is not the only form of fraud occurring in the scientific community.

Cases of scientific fraud have always been known, but have begun to seriously concern the general public towards the end of the 20th century, when published works on the extent of scientific fraud appeared, launching debates on what should be described as fraud (Hartemink 2000).

Generally, fraud cases encountered in scientific research are related to the fabrication of virtual-false work, falsification of existing publication results, dual publication and plagiarism by appropriating intellectual property of other authors (Rubin 2011).

A paper that have been reported as an example of fabrication (Hartemink 2000) is the "Petrol from plants", that was found that the results could not be reproduced. This paper was published on 1996 in the scientific journal "Nature" and it is still available to the audience at the price of 16€.

In 1998, after revealing that the data of at least one scientific paper of the Institute of Plant Breeding in Cologne was "fabrication", a team of scientists undertook an attempt to repeat the experiments described in more than 30 papers that started to be published from 1992 in some leading journals, such as Nature, Science, EMBO and PNAS. Already from the first test results, it appeared that many experiments were non-reproducible (Abbott 1998). A simple questioning on how ongoing fraud cases go unnoticed for so many years may not be enough, and apparently, such complaints may not have luck if it is to be examined by persons who may be involved in the specific or other fraud cases.

Another serious fraud case of several scientific papers falsification drew the attention of the German medical science from 1997 to 2005. A professor along with his female collaborator were accused for systematic falsification of data in many of their publications. The examination of 347 of his publications showed that the 94 of them contained false data, and only 132 were free from any fraud. For this scientific work the Professor had received grants of hundreds of thousands euros, while the justice decided to stop the inquiry after an agreement of a 8000 euro penalty payment by the professor (Tuffs 2004).

Technological development facilitated to a great extent the access and processing of electronic data resources, consequently another form of fraud, the one of plagiarism, becomes much easier. The fact of the information databases and sources increase that are available online make the detection of this fraud even more difficult. Although, techniques and software to facilitate plagiarism detection is in constant evolution-improvement, the intervention of a competent person is still required. Also, it would not be an exaggeration to be said that the discovery of a plagiarism case is usually a matter of chance (Clough 2000).

Although it is accepted that the negative impact of plagiarism and dual publication in science is not as important as the fabrication, such practices should be totally discouraged (Fang et al. 2012).

The examination of the withdrawal reasons for 2047 research articles on biomedical and life-science as indexed by PubMed revealed that 43.4% of withdrawals referred to fraud or suspected fraud, 14.2% were due to duplicate publication and 9.8% due to plagiarism. Referring to the geographical origin of the above research articles, most of them were in USA, Germany, Japan, China, UK, India and S. Korea with a slight variation in the order of the country depending in the type of fraud (Fang et al. 2012).

Several researchers have examined various cases of scientific frauds and have published works in order to highlight the existed problem and to contribute to the prevalence of genuine science. These publications cover various scientific fields, but the field of medical science, according to numerous publications, seems to have been more of a concern to the scientific community. Among these publications indicatively can be mentioned the books entitled: «Research fraud in the behavioral and biomedical sciences» (Miller and Hersen 1992) and «Fraud and misconduct in biomedical research» (Wells and Farthing 2008), the publications «Fraud in science» (Altman and Melcher 1983) and «Fraud and deceit in medical research» (Sarwar and Nicolaou 2012).

Similar publications, in a smaller extent, refer to fraud in different scientific fields such as organic chemistry (Rubin 2011) and archaeology (Griffin et al. 1988). In all the fields of science there is the possibility some research fraud to have been committed. In some research areas, where experimental data are used, this possibility of fraud is more likely to be offered because of the obvious difficulty of immediate verification of the presented results. Theoretically, in some areas, such as computer programming, where there is a direct control of the proposed implementation the possibility of fraud may be significantly limited.

The main aim of publishing several works on fraud, apart from highlighting its extent and significance for the scientific credibility, is also to present proposals for a more effective control of scientific works before publication and the reduction of this phenomenon, which, as mentioned above, in recent years it is observed to continually increase. This impression may be partly subjective and attributed probably to the ability of the easy access to Internet, as well the transmission speed of information, but it is evident that the abundant funding and widespread corruption usually stimulate scientific fraud to ease achievement of various personal ambitions. Based on the data published, the general opinion is that scientific fraud is carried out mainly by repeatedly infringers (Triggle and Triggle 2007).

OBJECTIVE

This paper aims to present, based on about 40 years of academic experience, cases that show serious research frauds in the field of wood science, in order to assist the work of reviewers and scientific journals editors in developing appropriate quality principles and standards for a more effective discrimination of actual research against false or fraud research.

RESEARCH ON WOOD SCIENCE

Difficulties of Scientific Experiment

The research in wood science presents several difficulties. It is quite time-consuming, requires a lot of effort, it involves risks and there must be the appropriate equipment to carry out each test.

As an example of difficulty, it could be mentioned the relatively simple procedure of determination of the ultimate strength in static bending for a wood species according to ISO 3133:1975. The process generally should include the following steps: selection and harvesting of wood material selected, transfer to the laboratory, sawing with band saw the plates, drying (time depends on the equipment and ranges between a few weeks to several months), resawing - planing shaping the final specimens to cross-sections of 2cmx2cm, with length along the grain of 300 to 380mm, thickness-width measurement of the specimens at the point where the pressure will be applied, determination of resistance to at least 10 defects free specimens in a testing machine, calculation of the static bending strength for each sample, calculation of the mean value of static bending strength and other statistical factors, cutting test pieces 25±5mm long from the point of rupture to determine the moisture content according to ISO 3130:1975, weighing the test pieces and placing them in an oven at 103±2°C, cooling the test pieces in a desiccator, calculation of the moisture content for each sample and finally the mean value of moisture content. Even with the most up-to-date equipment, it is difficult for the whole process to end in less than 2 months, while the result will finally correspond to just one value. It is obvious that a single value cannot express the overall effort that has been paid, nor can sustain itself a research work published. Many similar procedures are required to enable a work that can be accepted at a conference or a journal of not so high requirements. Also, the weight of the material, the cutting machines and the chemical reagents involve an increased risk of causing serious accidents, especially during the preparation stages of the experimental material. As an example of such an accident, it can be referred the crush of a foot toe of the writer of this work, caused by the drop of a relatively small piece of plane tree wood of the following dimensions: 5x10x50cm during the mechanical processing of the experimental material. Additionally, damages or unpredictable breakdowns of the laboratory equipment may seriously delay the completion of an experiment. Consequently, there are numerous difficulties in completing a scientific experiment and the results of the research may not be each time impressive, especially to the eyes of the journal editors, who look usually for very innovative, impressive and breaking-through results.

Documentation of research experiment

An essential prerequisite, however, for carrying out a research experiment on wood science is, as mentioned, the existence or accessibility and use of appropriate specialized equipment and, of course, the know-how of its operation. The absence of these basic operational research tools is obviously deprived of the possibility of anyone doing the research. The detailed description of the place where a research experiment was carried out and the equipment used for this purpose is a particularly important element that should be included in each work, because it provides the possibility of directly or indirectly verifying their existence. Including photographs from the conduct an experiment should be pursued as part of documentation of its implementation. The publication of a research paper based on non-existent equipment should concern us not only for its validity, but also the reliability of the authors. The regular publishing of "Short Papers" type of manuscripts, which does not present in much extent the method and materials chapter should draw our attention. After a remark made to a very well-known journal of our field, commenting the tactics followed by an author, the journal reported the following: "*It is of course hard to evaluate whether the papers of an author are based on real experiments or just smartly fabricated. Moreover, the peer-review process can only evaluate the plausibility of results, but not their actual origin. They will certainly consider it seriously if or when the same author submits a new paper*".

Check of the publication reliability

The results of research in the wood sector contribute to the development of wood utilization but are generally not directly applicable and are not intended to meet particularly urgent human needs such as medical science. In general, the verification of their correctness is not regarded as an immediate imperative, nor their reliability can easily be denied especially when the results shown may range within reasonable limits, corresponding known results and thus appear to be plausible. Furthermore, it is obvious that it is practically impossible or at least very difficult to carry out the verification process, because it is essentially

necessary to repeat the whole of a survey which, as mentioned above, generally presents several difficulties, and of course we could not have at our disposal material identical to what was investigated. However, wood as a biological material has a variable structure and quality, the characteristics and properties are influenced by many factors and therefore, a comparison even between the results of two experiments where similar conditions were used is very difficult. Generally, in all scientific fields, the check of the reliability of a publication is a difficult and time-consuming process, and the finding of whether it is the product of fraud, as mentioned earlier or not, occurs usually after several decades (Griffin et al. 1988) or accidentally (Clough 2000). In some cases, in wood science, photographic documentation of the experiment process and material could make a significant contribution to assessing the reliability of the research work. As an example of that, it could be referred a paper submitted to be published in a well-known journal dealing with particleboards manufactured from tree leaves and the only photograph included in the submitted manuscript was a simple tree leaf. As a reviewer, I asked a photo from particleboards constructed to be added. The answer was *"there are no available images from the produced particleboards and their tests"*. The manuscript was rejected as suspected fraud, but it was published elsewhere, in 2 other journals, after minor changes in the title and different composition of authors.

The inconsistency of the results is a serious reason that should also draw the attention of the reviewers. For example, "author X" reports in at least 3 different papers in peer reviewed journals with a high impact factor, that he has determined sorption curves of wood specimens using different saturated salts for controlling relative humidity. The author reports the relative humidity for each of the six saturated salts he used (12, 23, 44, 55, 76 and 93%) but for the construction of the sorption curves he uses the RH values of: 10, 20, 30, 40, 50, 60, 70, 80, 90 and 100. These values are not only different from the climates that correspond to the used saturated salts, but also they are even more different climates than climates the author reports that has used. The author goes further and produces models using these "findings" which seem almost perfectly fitted to the graph points.

Referring to a Higher Educational Technological Institute of Greece, related to Wood Science, the usual tactic that is followed, is to avoid choosing evaluators of their professors' work from the field of wood science, based on their specialization and knowledge, and instead, they prefer to choose evaluators from other scientific fields depending on which is the easier way to achieve better evaluation.

Papers manufacturing

Taking into account the long time that is required to conduct a research in wood science, it is clear that the number of research works a researcher can publish in a year is quite limited. Moreover, the required time for the writing and revision of the work according to the corresponding instructions provided in each case should be taken into account. A number of publications 2-6 per year, depending on the active participation of co-authors, perhaps could be considered reasonable by those who have conducted research in wood science. If it was stated that "author X" has managed within a period of 3 years (2006-2008) to publish 45 papers (which corresponds to 1 paper per 24 days), in most of which as the first author, we may suppose that it is about journals or conferences proceedings without reviews. Adding the information that all the publications or presentations were peer-reviewed, and indeed many of them were in highly reputable journals such as Holz als Roh-und Werkstoff (8 publications) and Bioresources (3 publications), might well have led to the view that he is a scientist of extraordinary genius or perhaps something else may be happening here.

The motivation for writing and publishing a research work, like almost all the human activities, mainly comes from the need to meet some indirect or direct financial goals. Young scientists seek to publish their work in order to enrich their curriculum vitae so that they can earn or improve a job with the best possible financial gain. Also, a good resume can significantly increase the chances of approving and funding a research proposal.

Who is who

Each author's main goal is to publish his research work in a well-known international journal with the highest possible impact factor in order his work to be considered of better quality. However, the success of publishing in a good journal, as has been shown in scientific fraud cases, should not guarantee the validity of the content of the publication paper. By publishing a paper, everyone can access its content, but usually there is very little or no information on the contributors of work, which is a very important criterion for assessing the quality and authenticity of the research being carried out. For example, a young writer is expected to be personally known, only to few scientists in the industry or academic world, but with the development of electronic media, it is likely through his published works, his name to become known very fast to many scientists all around the world, but only as a name, not personally. By increasing the number of his publications, his name will begin to gain prestige in the scientific field and improve his circle of acquaintances. However, substantial information about the level and type of studies, education, workplace,

collaborators, and other curriculum data that can outline the personality of the authors and assess their contribution to the completion of a scientific work are generally proved to be not enough. It should not be considered an exaggeration the thought that, despite the widespread dissemination of information technology and the possibility of getting information even for the most insignificant things, there are instances where we cannot have fundamental information about what we believe to be the elite society. Of course, the lack of specific information for an author makes us not to have reasons to consider him unreliable. As an example, it could be mentioned the absence, until a while ago of an English-language Curriculum Vitae of "author X", one of the most well-known international Greek writers in the field of wood science, with more than 700 international bibliographic references, with a total impact factor of 62.65 and h index 15, his CV was only available in the Greek language. Reading his CV reveals that his total time spent in higher education (not university) up to his doctoral degree, was around 6 years. Perhaps, it is a unique phenomenon not only in the field of wood science, but in the whole scientific world. A more detailed examination of his resume shows that most of the period of the 2 years he needed to obtain his doctorate, he was working at the same time on a different subject in another country. In addition, there is the possibility that some of the information mentioned in his CV not to correspond to reality. In Greece, it is widely known the phrase "you are, what you state that you are" and this should not be considered as an exaggeration, as there were often known cases of people who have been selected in important public positions with false education documents. But in a period of globalization and commercialization of education, the responsibilities extend beyond the national boundaries of a country. In a question at a University of Great Britain about the legality of granting a doctorate to an author, based on the data he presents in his resume, the answer was that «*We are unable to confirm any further details with you regarding this matter*». A similar question posed to the highest competent Greek audit services regarding the legality of recognition of the above doctorate diploma was never answered, probably because of the participation of a high-ranking political person in this case. It should be noted that "author X" already works as a professor in Greece and in addition, several of his co-authors, have taken advantage of this works to improve their academic status.

According to the scientific ethics, as well as simple logic, it is legitimate and expected that each scientist should deal with the subject he has specialized on, since scientists should not talk on matters that are not enough aware of and specialized on, such as the example of a doctor that cannot give lectures and analyse topics of Astronomy. As mentioned previously, a publication only mentions the name of the author and does not refer to all of his scientific background, which should constitute the most important indicator of scientific competence and qualitative assessment of a research work. Presenting this information may overturn the expectations and reliability of a publication. In a paper recently presented at a conference in Zagreb entitled "Particleboards with Wood in Various Forms", participated as a co-author a professor with specialization in: "Semiconductor Electronic Properties, Semiconductor Devices and Thermal Analysis of Materials". Of course, his specialization could possibly be of interest to the participants in various ways.

A professor in the field of Wood Science at Higher Educational Technological Institute of Greece, justified the suitability of a candidate, with a Doctoral Degree in genetic diseases in humans, to a position of wood science declaring the following: "*His doctoral dissertation deals with organic substances and since wood is also an organic substance, the dissertation has relevance to the subject "Chemical wood treatments*".

Furthermore, even in our Faculty, there is a case of a scientist with an official scientific specialization on "Mountainous Water Management and Control", who was considered to be suitable to work on the field of Wood Science.

Co-Authors

Although the completion of a scientific publication, in the majority of fields of wood science, for an intelligent and knowledgeable scientist of the field, is possible to be implemented by individual effort, partners' involvement can make a significant contribution to reducing the time required and improving the quality of work or provide higher prestige. Since, the presentation of the field or the degree of participation of each partner is not required to complete the publication, it is therefore logical that all participants have the opportunity to enjoy almost equally the benefits of a publication even if not they were not actively involved in it. An author has presented in at least 12 papers his wife as a co-author, a graduate of a technical institute, without any specialization in the science of wood. But a real researcher, like any worker, apparently would not wish to share the results of painful efforts with someone who has not had the slightest involvement in a task. Honorary participation in a publication as authors of people who did not have an active participation in it, should raise reasonable questions about its credibility, correlating it to the phrase of Virgil "timeo Danaos et dona ferentes" (Beware of Danae and bearing gifts). This is because the basic problem that a pseudo-researcher is concerned with is not whether he will share his non-existent effort with others, but how he can best document his work as true. Adding one or more names as co-authors makes the research work appear as a result of a research team collaboration, while helping the paper to be highly evaluated and be exploited

in various ways, especially when it is possible to involve well-known scientists or high-ranking individuals. It could be compared with a brilliant package that has the ability to upgrade the aesthetic value of a gift of very low value. In a question I posed to a co-author of "author X" about the level of his participation in the work referring to "bonding behavior of wood particles", which was published in Holz als Roh- und Werkstoff journal, I received the much honest answer, that his name was included only "as an honour (*honoris causa*)" (not at all working). Co-authors from different countries may theoretically increase the importance and prestige of a work, but should raise questions about how active such a research cooperation could be. For example, in a work on the experimental measurement of Soil Compaction and Porosity Changes in a forest of Northern Iran, it is certain that at least one of the co-authors never visited Iran. The excellent knowledge of the English language or the literary skills that one has and contributes to the writing of a work should not be a reason for accepting him as a researcher.

CONCLUSIONS- Proposals

Cases of scientific fraud are constantly revealed, especially in scientific fields where the interest is attracted and of course where there can be achieved ample funding. Most cases seem to come from the most developed countries and from scientists who were considered highly successful in their field. It would be unrealistic to argue that there are no cases of fraud in the field of wood science. But the extent of it may be difficult to be assessed. Most, if not all wood scientists, may have encountered cases of scientific fraud. Some of them have already accepted to engage in a work as co-authors "*honoris causa*". It is very difficult to determine if a research work is based on real experimental data or not, especially if basic information for the author, the cooperation and the experiment are not available or if there is not the subscription of all scientists to that. By staying inactive or maintaining opaque procedures we contribute to the increase of this phenomenon or perpetuating false impressions.

For a more qualitative and valid assessment of a research work and the ensuring of the good fame of the scientific world, it would be useful to introduce, in addition to the rules already applied, some additional simple requirements that could contribute to the safer traceability of a work's, as well as the author's credibility. For this purpose, it is useful to highlight the following:

- The authors should refer to their specialty, their workplace and the site from which more information can be obtained.
- To justify the role of participation of each co-author.
- A more detailed description is required in the experimental methods and materials used and emphasis should be placed also on the equipment used and the place where this equipment was available.
- It would be particularly important, the presentation of the experiments to be accompanied by relevant evidence, such as photographs of them.
- Educational and research institutions should contribute to information sharing and meritocracy, avoiding mysticism.
- Journals should cooperate in order to establish a common open information base-system for authors, universities and research centers accused of scientific fraud.
- The reviewers should look for and focus more on evidence that proves the credibility of a research work, but the editors should also pay more attention to the selection of the reviewers.
- Remember that, offering the chance of participation of our name as co-author in a scientific publication without any active participation, may hide fraud case and may conceal serious irregularities or reward expectations.

It is obvious that we do not live in an angelically made world, and therefore fraud undoubtedly will continue to exist. However, this does not mean that the constant improvement of practices for the discovery and elimination of scientific fraud should stop. It is disheartening, especially for young researchers, when the scientific work based on laborious experimental research is being overshadowed by publications based on fraud methods.

It should be taken into consideration that a scientist who possess fake diplomas or has achieved possessing them through the use of fraudulent means, is expected that he will not have reliable scientific research work, neither could consist a meritocratic reviewer.

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