How to make substrates' R&D greater? The results of the 2017 ISHS Working Group Growing Media survey

Jean-Charles Michel

Foreword from Professor Michael Raviv, Chair of ISHS Commission Plant Substrates and Soilless Culture, and Dr. Gerald Schmilewski, President of the International Peatland Society (IPS).

Cooperation between the Commission Plant Substrates and Soilless Culture of ISHS and the Peatlands and Economy (including horticulture) Commission of IPS has existed for over 30 years, and was formally recognised in an Agreement, initially signed at an ISHS symposium in Angers in 2005 and continued thereafter. Formal and informal contact between members of both societies has proved fruitful in terms of research, technical issues and indeed commercial developments, particularly in growing media. Links have also involved reciprocal visits of staff between laboratories and university/research institutes worldwide, and participation in international initiatives including the European Committee for Standardization (CEN) and the European Peat and Growing Media Association (EPAGMA). As Commission Chair and President of IPS respectively, we were delighted to support the proposal of Professor Jean-Charles Michel, from Agrocampus Ouest at Angers, France, and Chair of ISHS Working Group Growing Media, to develop a cross-society participative consultation via a questionnaire, with the aim of improving and developing contacts, as well as priming initiatives between members of both societies.

A questionnaire was drafted by the ISHS Working Group Growing Media and sent out to all members of the ISHS Commission Plant Substrates and Soilless Culture as well as members of the International Peatland Society (IPS) directly concerned with horticulture. The aim of the questionnaire was to propose and define some priority areas of work of the ISHS Working Group Growing Media in terms of improving and sharing knowledge and developing projects focused on growing media.
Four topics were covered by the survey: teaching and e-learning programs, publishing a book, a platform for sharing information, and international R&D projects.
Eighty-seven responses were obtained, highlighting the lack, but also the willingness, of respondents to develop and share common international activities on our topics. From these, definitive actions were proposed and potential avenues were suggested for future development.

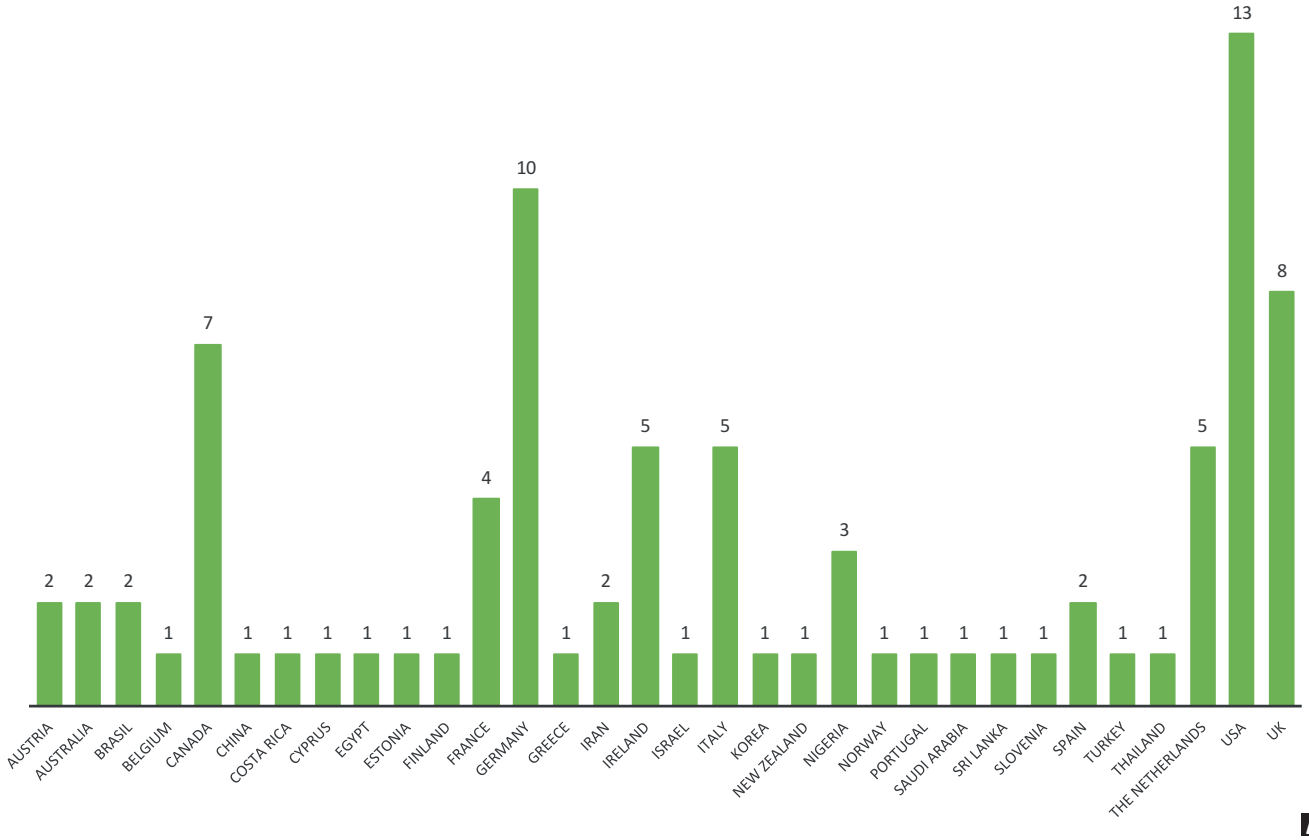
Introduction

As defined by ISHS, the role of ISHS Sections, Commissions and Working Groups is to achieve a range of activities that are relevant to horticultural science, with the main objectives of further improving scientific publications, developing means of communication for dissemination of information (electronic newsletters, websites, etc.), and increasing attendance at symposia.
Some actions have already been conducted by the ISHS Commission Plant Substrates and Soilless Culture to meet some of these expectations, including: (1) reviewing each paper proposed for publication in *Acta Horticulturae*, (2) signing an Agreement between ISHS and IPS to jointly organize symposia every two years (since 2005 at the symposium in Angers), and (3) more recently in Portland in August 2017, promoting and honouring scientific activities developed by students during the symposium.

In addition to these actions, which have been mainly focused on the biennial symposium and managed by relatively few people (Organizing Committee, Chairs of the Commission and Working Groups), the Working Group Growing Media recently suggested a participative consultation, with the aim of allowing the development of some common activities within the Working Group by the involvement of its members. The first step of this initiative was to build and disseminate a questionnaire to all people potentially involved in substrates' R&D, in order to propose and define priorities of the Working Group in terms of improving and sharing knowledge and developing projects.
The objective of this article is to present the results of this questionnaire, to outline positive actions already implemented and to suggest potential avenues of work for future actions.

Questionnaire

The questionnaire can be found (including a completed version) at the following link: https://docs.google.com/forms/d/e/1FAIpQLSeJLT34FPE0yUMLKQonALkm_FeBBH8AfzVr9TW-vvYvodWmRA/viewform#responses. It consisted of 35 items grouped in four main categories which are: teaching and e-learning programs, writing of a collective book, a platform for sharing information, and formulation of proposals for international R&D projects. Each category was similarly approached, questioning the state of knowledge of respondents, their interest and potential contribution in further development of activities, and the audiences targeted for these actions. Finally, from the respondents' point of view, the importance rating of suggested activities was requested.
The questionnaire was sent out in March 2017 to all 912 effective members of the four Working Groups of ISHS Commission Plant



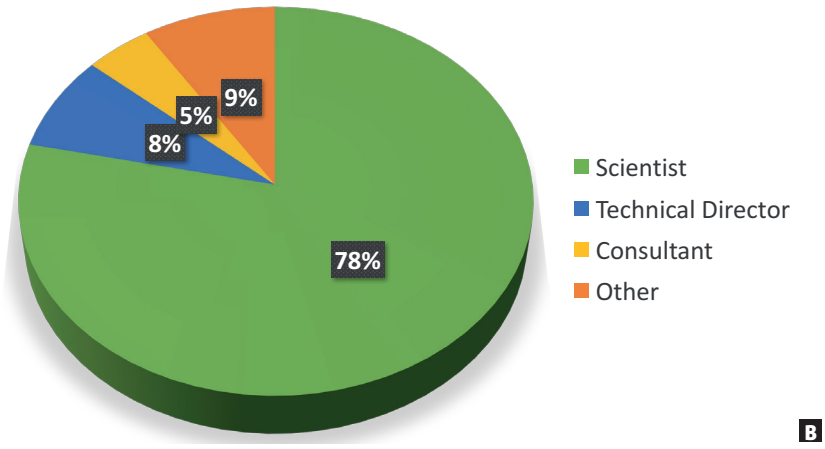


Figure 1. A) Country of residence and B) job positions of the 87 respondents of the questionnaire.

Substrates and Soilless Culture (Growing Media, Composting for Horticultural Applications, Substrate Analysis, Hydroponics and Aquaponics) as well as members of IPS directly concerned with horticultural purposes by the way of Gerald Schmilewski, President of IPS.

Results

Who responded?

Eighty-seven responses (from 31 countries) were recorded by August 20, 2017 (when the ISHS symposium in Portland started) (Figure 1A). They included those working in the public (56%) and the private sector (44%), mainly as scientists (78%) (Figure 1B). Most respondents were ISHS members (91%), with only 16% being IPS members.

Teaching and e-learning programs

Sixty-nine percent of respondents indicated that they have participated in specific training courses about growing media; 23 and 28% of them have regularly taught more than 20 h and between 4 and 20 h per year, respectively; whereas the other 49% have occasionally participated in such teachings. The targeted audiences were very diversified with 68% of respondents indicating audiences had included growers, 65% had taught technicians and/or engineers of private companies and/or universities, 67% had taught Bachelor or Licence students (or equivalent level) and 52% had taught Master and PhD students.

Until now, e-learning programs, considering all aspects of growing media and soilless culture, have not been developed to any great extent, except for a few (and mainly unknown by 87% of respondents) webinars proposed in North America or in Europe. However, 86% of respondents would be interested by such e-learning programs and 40% would be willing to actively participate in the creation of an e-learning program (Figure 2A). The main identified audience would be growers for 79% of all respondents, but the other targeted audiences were also considered important: close to 55% of respondents identified students (whatever the levels), and a similar percentage identified technicians or engineers working in private companies, universities, research institutes, etc.

Writing of a collective book

Sixty-four percent of respondents were aware of many books about growing media. Regarding the number of respondents naming specific books, two of them could be considered as main reference books, with 16 and 10 citations for *Soilless Culture: Theory and Practice* (Raviv and Lieth, 2007) and *Media and Mixes for Container-Grown Plants* (Bunt, 1988), respectively.

With a large interest in having a reference book, 41% of respondents indicated that they would also be willing to actively participate in the writing of a collective book focused on growing media (Figure 2B), again mainly targeted towards growers for 81% of

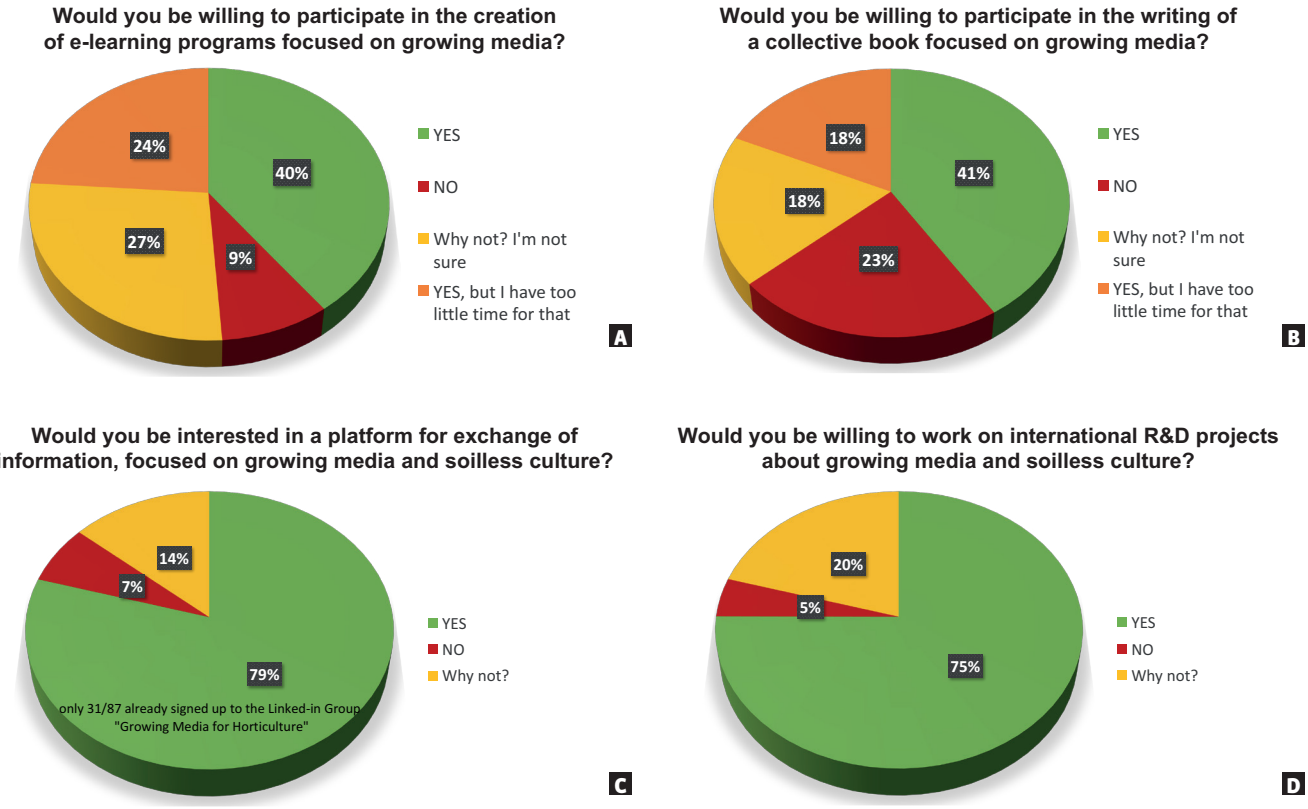


Figure 2. Interest of questionnaire respondents in proposed activities (87 responses for each question).

respondents, then technicians and/or engineers for 71% of them, and students for 56% of them.

Platform for sharing information and publications

The questions about sharing of information were subdivided into two parts; the first one strictly focused on a publication-sharing platform, and the second one referred to a platform for exchange of information in general, the information needed and/or which could be potentially shared by the users (Figure 3).

Fifty-nine percent of respondents were aware of publication-sharing platforms. Among all respondents, 53% have already signed up to such platforms (Figure 3A). For the remaining 47%, 46% were willing to sign -up to a publication-sharing platform and 39% might possibly do it (Figure 3B).

The large majority of respondents (79%) expressed their interest in having a platform for the exchange of information specially focused on growing media; whereas 14% were undecided (Figure 2C). This validated the creation of the LinkedIn group "Growing Media for Horticulture" on the web (since December 2016) and which is accessible for free at https://www.linkedin.com/groups/8568066. However, this newly-created platform remains until now relatively unknown by respondents, with only 36% of respondents already registered as members of the LinkedIn group. Even so, this group is increasing, with 180 members in September 2017.

Three main kinds of information are considered to be absolutely essential by respondents: knowledge of national and international scientific events and trade shows/exhibitions for 99 and 97% of them, respectively, as well as the opportunity to find partners for R&D projects for 89% of respondents.

Other suggested topics considered important for dissemination included internship position (PhD, MSc, postdoctoral, etc.) offers, job position offers, and an updated list of publications about growing media, by 51, 57 and 53% of respondents, respectively.

Formulation of proposals for international R&D projects

International projects were not usual for many respondents (75%), or were mainly only bilateral. However, 75% of respondents indicated that they would be interested in building and contributing to international and collaborative R&D projects (20% remained undecided).

Among proposals to respondents as for their own contribution, none were completely ignored, even if only 17% could contribute to socio-economic studies (current state, benefits of the projects), probably due to the scientific job sectors of respondents. For other

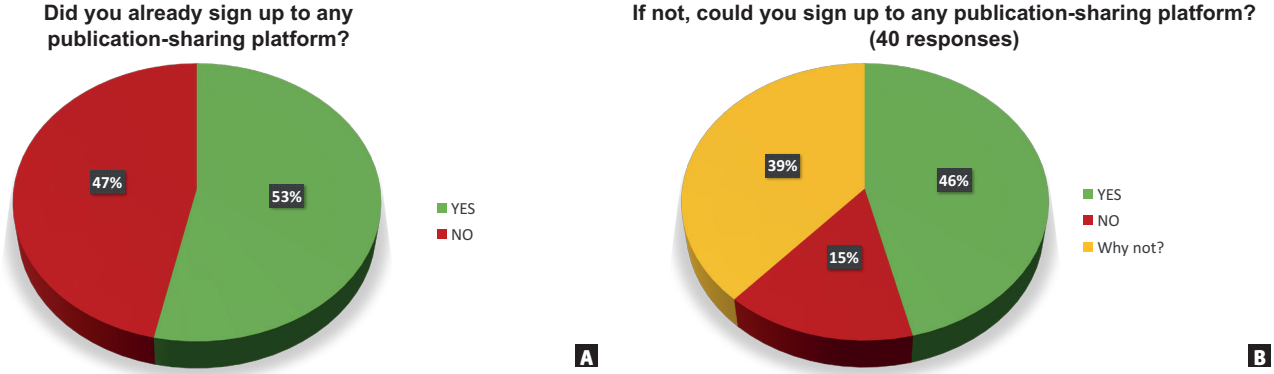


Figure 3. A) Use and B) potential use of publication-sharing platforms by the 87 questionnaire respondents.

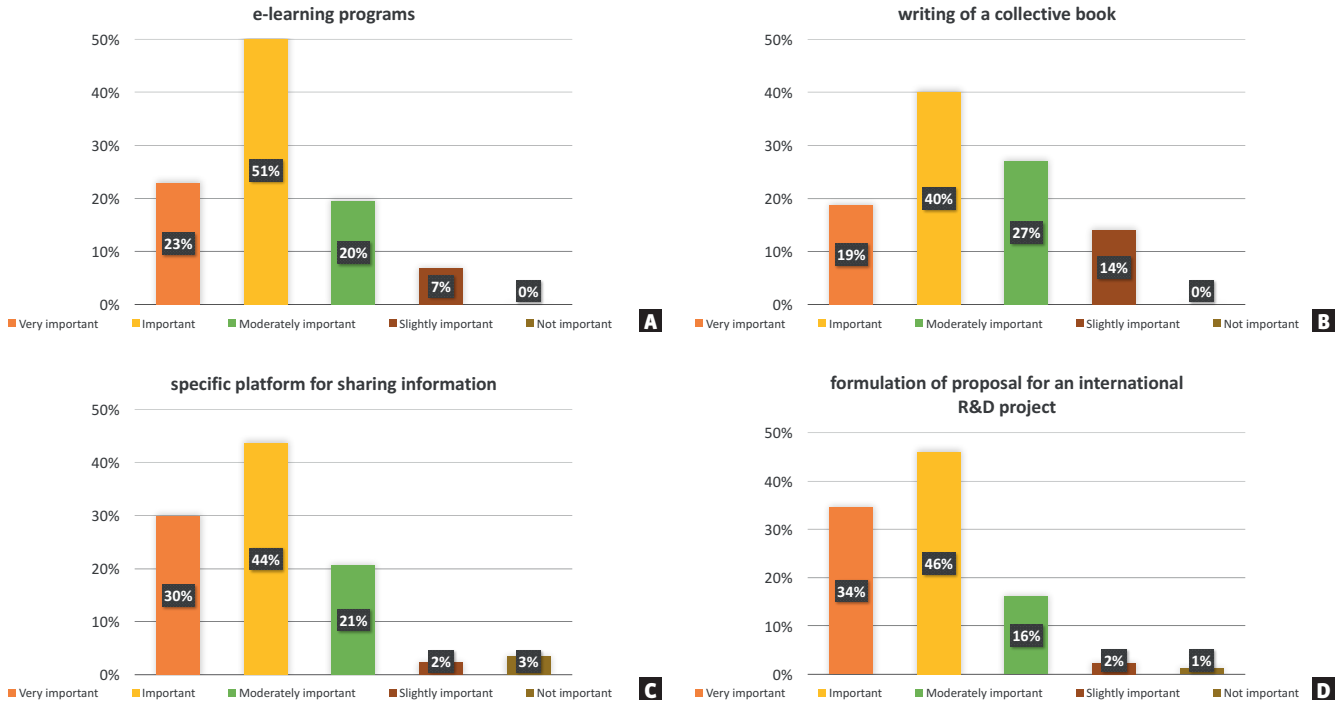


Figure 4. Importance rating of potential work focus for the Working Group Growing Media, as judged by the 87 questionnaire respondents.

actions, the rates reach 40% for supplying materials (growing media, additives, sensors, etc.), 49% for developing operational tools for end-users, 53% for developing scientific activities in laboratory and up to 72% for implementing growing tests in greenhouses and/or outside. Nutrient management (cited 9 times), peat alternatives (9), additives in growing media (8) and water-relations (7) were the main open proposals suggested by respondents, but other keywords were also mentioned, such as aqua/hydroponics (5), root growth and development (4), organic fertilizers (3), composts and their properties (3), and different materials potentially used as substrates (wood, biochars, wastes) (twice for each).

Importance level of topics mentioned

The answer to the last question, referring to the importance rating of topics mentioned, is presented in Figure 4. Regarding topics considered as "very important" by respondents, results clearly showed their main interest was in the formulation of international R&D projects (34%) then the use of a specific platform for exchange of information (30%), whereas the creation of an e-learning program and the writing of a collective book collected 23 and 19% of answers.

Discussion and conclusion

The results of the survey have shown the dynamism and high motivation of respondents to be actively involved in new activities (Figure 2) that would assist them in their achievements. From the results of this survey and the discussions held at the last ISHS Commission Symposium in Portland, some proposals and suggestions were highlighted, in particular:

- The invitation to sign-up to the LinkedIn group "Growing Media for Horticulture" https://www.linkedin.com/groups/8568066, with the absolute necessity for members to share information and have open discussions;
- The opportunity to publish a handbook compiling methods of analysis (standardized or not); knowing also that a second version of the book by Raviv and Lieth is in progress;
- The identification of main issues and associated R&D questions that could be suitable for collaborative project proposals, potential partners and their level of involvement.

Working methods and tasks will soon be proposed to respondents. The progress in the achievement of tasks will be presented at the next symposium in 2019, http://www.ishs.org/symposium/630.

Acknowledgments

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