



UK Plant Sciences Federation
Training and Skills Working Group
Implementation plan

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This report was produced by an independent working group convened under the UK Plant Sciences Federation. All views, unless otherwise noted, are those expressed at the working group meetings, and are not necessarily those of the convening groups.

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Background

The UKPSF report identifies skills shortages and the need for improved training in strategically important areas including general plant science, crop science, horticultural science, plant pathology, taxonomy, plant identification, physiology, ecology, entomology, nematology, genetics, soil science, weed science and field studies. It also recognises an uneven distribution of expertise across UK research institutions whereby, in some specialist fields, the majority of skilled scientists are based at non-teaching organisations.

Plant science is under-represented in school biology curricula, providing teachers with little incentive to invest time in plant science education, and few opportunities to gain professional development in the subject. Consequently, university lecturers report that most students beginning bioscience degree courses show little interest in, or knowledge of plant science.

At a time when all school-leavers hope for rewarding career opportunities, whether they involve university or not, and professional opinions identify an urgent need for plant science skills, we have a responsibility to question where the pipeline is broken and recommend initiatives for repair.

Our work here aligns with Target 14 of the Global Strategy for Plant Conservation (GSPC) for the importance of plant diversity and the need for its conservation to be incorporated into communication, education and public awareness programmes.

Key recommendations from UKPSF report:

1. We must inspire a new generation of plant scientists

Organisations responsible for developing biology qualifications must actively involve plant scientists to ensure the content of their qualifications and associated materials support high quality plant science learning in schools and colleges. Trainee and qualified biology teachers must have greater access to opportunities to enhance their knowledge in plant science and develop strategies to teach it at secondary level. Universities must respond by encouraging and supporting teachers of bioscience undergraduates – potentially through teaching fellowships – to incorporate plant science more effectively into their courses.

2. Education and training must meet the needs of employers

Employers and educators should provide more and better-targeted apprenticeships, employee training, industrial studentships, degree content, further education and postgraduate courses. Training should be a core requisite of the Centres for Agricultural Innovation created through the UK Strategy for Agricultural Technologies. Education and training opportunities must be directed to fill skills gaps in plant taxonomy, plant identification, field botany, crop science, horticultural science, plant pathology, plant ecology and plant physiology.

Our vision

- Every young person to have engaged in plant-based scientific enquiry at each stage of their compulsory science education.
- Every post-16 learner of biology, environmental or land-based studies to have been introduced to the range of opportunities that studying plants can bring them.
- Primary, secondary and further education science teachers to be better supported and more confident in their teaching of plant science, enabling them to provide their pupils with relevant and inspirational practical experiences and exemplars.
- More plant scientists going into professional teaching, and researchers engaging in outreach with schools.
- Careers involving plant science seen as attractive and attainable to young people, with the provision of clear, high quality education and training.
- Every plant science employer and research organisation to participate in outreach activities with young people and those who influence them.
- Higher Education Institutions (HEIs) to establish a clear thread of plant science in biology degrees, leading to skills that are valued and sought after by employers internationally.
- Funded places available for higher education provision covering key and vulnerable skills in plant sciences.
- Higher education, further education and vocational training provisions to be fit for purpose in industry and to meet current and future market demand.
- Plants and plant science to have high visibility in the media and online, with plant science news, information and interactive web resources available and tailored to different age groups and sectors.

A better future for plant science – wider awareness, deeper engagement, greater impact

Proposed actions

(1) Produce a review of the UK's plant science training and skills capabilities and requirements:

- Commission a survey to gain a comprehensive understanding of the plant science training and skills requirements of UK employers.¹ Complementary data could also be derived from other relevant research in this area.²
- Identify existing UK plant science training capabilities including further and higher education courses that have substantial plant science components and courses and training opportunities in vulnerable plant science topics.
- Identify training gaps by comparing current training provisions with employers' needs. Encourage funding agencies, relevant industries and other potential funders to provide support for high-quality, specialist courses in vulnerable subjects. A minimum aim would be to secure at least one funded place on every Masters course serving a vulnerable discipline.

Timescale: Within one year.

(2) Develop an interactive education and training resource on the UKPSF website and disseminate information to professional bodies and careers and employability networks:

- List courses and activities that a) train teachers in plant science, b) have a strong plant science thread at degree level³ and c) train for specific, vulnerable plant science skills.
- Provide employment statistics and case studies to help potential students understand the concept of accredited degrees and the employability value of training in plant science, including vocational training at further education and MSc level.

Timescale: Within one year (and ongoing to ensure that information is kept up to date).

¹ This work would build on the UKPSF report by mapping the plant science skills within different UK organisations and quantifying the skills requirements across different sectors.

² [AgriFood Advanced Training Partnership](#) (ATP); [Agri-Tech Strategy](#) work streams on skills; and the National Centre for Universities and Business (NCUB) [Food Economy Task Force](#) work stream on Talent.

³ Compulsory modules containing core plant science materials and effective practical work in the lab and field, delivered by inspiring teachers and researchers.

(3) Promote appropriate representation of plant science in biology degree courses and recognition of those courses that contain suitable threads of plant science:

- Respond to the forthcoming Quality Assurance Agency for Higher Education (QAA) consultation on its review of the benchmarks for bioscience degree programmes and encourage other organisations to do so, using the plant science status report as a communication tool for inclusion of plant science in all biology degrees.

Timescale: The QAA consultation is expected to open by March 2015.

- Work with the Society of Biology's accreditation scheme to encourage courses with a strong plant science content to apply for accreditation.

Timescale: Immediate and ongoing.

(4) Enhance communication between plant science experts and exam boards, publishers and resource developers to ensure that those creating support for teachers and young people receive the best advice on plant science content and pedagogical approaches:

- Identify a diverse group of plant scientists to work with curriculum and resource developers, including the Society of Biology's Curriculum Committee, in order to develop a 4 to 19 curriculum which sets out a clear expectation for inspirational, relevant and engaging plant-based teaching and learning and delivers the means to support this expectation.⁴

Timescale: Immediately, for completion within three to five years.

- Work with the Society of Biology's Biology Education Research Group to review the evidence base on plant science pedagogy for 4 to 19 year-old students and engage educational publishers with the findings.

Timescale: Within one to three years.

(5) Develop an online plant science outreach toolkit to encourage and equip plant scientists to engage in outreach activities:⁵

- Providing examples of the types of outreach opportunity available and guidance on how to get involved.

⁴ The Society's Curriculum Committee is working to develop a 4 to 19 biology curriculum so the UKPSF has an opportunity to assist them in this.

⁵ The UKPSF has already begun work towards the outreach toolkit, including (a) conducting a survey of 132 plant scientists who had either taken part in outreach activities previously or were interested in doing so, and (b) collecting tried and tested material to deposit in the toolkit.

- Highlighting existing esteemed plant science outreach, mentoring and ambassador schemes.
- Providing high quality materials to enable scientists to talk positively and accurately about plant science and plant science careers, including detailed protocols for conducting hands-on plant science activities.
- Providing information on public engagement training opportunities, outreach grants and guidance on planning and evaluation.

Timescale: Within 6 months..

(6) Plan and run a plant sciences training and skills symposium targeted at schools, colleges, universities and industry – “Plant sciences 21: raising the profile, delivering the benefits”:

- The aim of the symposium would be to report on the progress and results from the actions recommended by this Working Group. The symposium would include presentations from inspirational speakers from the different sectors including schools, further and higher education institutions, research, consultancy and industry. Workshops would provide opportunities for discussion and development of new ideas and innovations in plant sciences education and training for the 21st century.

Timescale: Within two to three years.

Appendix: Medium to long term goals to consider for the future

(7) Establish an ‘idea development’ session at the UK PlantSci conference and a social media blitz to create clear channels of communication between plant scientists, broadcasters and other cultural programmers:

- So much of what the world takes for granted is plant based and yet the visibility of plants and the plant sciences remains under-valued and narrow. Opportunities and visibility can be investigated by taking a fresh, open-minded and creative perspective on the plant sciences past, present and future. Groups would work to explore new ideas for promotion of plant sciences from whatever quarter and in whatever guise – arts and science can be blended, innovation and blue skies thinking championed. Three possible areas for initial discussions are (a) the development of a popular TV series based on living botanists, (b) the development of board and computer games with plant science angles, and (c) the development of plant science tools such as identification aids and virtual field courses using Web 2.0 technologies. The work could link into existing events such as Fascination of Plants day etc.

Timescale: Within three years.

(8) Establish a young scientist network and award scheme:

- Develop a *Young Plant Science Voices* initiative aimed at college and university students and apprentices, including achievement awards for young plant scientists and dedicated sessions at conferences.

Timescale: Within three years.

(9) Establish an effective dissemination strategy for information relating to plant science careers and employment, both via the web and by promotion in person. E.g.:

- Develop an interactive web resource to host careers information including:
 - Plant science careers case studies highlighting the breadth of opportunities for graduate employability in studying plant science.
 - Links to quality established plant science careers resources and signposting to where relevant jobs are advertised.
- Distribute relevant careers information to established, successful careers websites and networks for pre-19 year olds and their teachers.
- Establish a UKPSF presence at the annual Life Science Careers Conferences.

Timescale: Within five years.