

Plant science



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Plant scientists study plants, fungi and algae - including their structure, taxonomy, genetics, life cycle, distribution, and the diseases and pests that can affect them. The work of plant scientists is used in many areas such as conservation, forestry, medicine, agriculture, horticulture and the food industry. Most scientists have relevant degrees.

This leaflet is mainly aimed at those taking (or intending to take) A level biology, or equivalent, with a view to continuing this area of study at a higher level.

Where do plant scientists work?

Plant scientists work for a range of organisations. The main employers are:

- government-funded agencies and research institutes
- universities (research posts are generally offered as fixed-term contracts and may include some teaching)
- in the research and development departments of commercial concerns, such as plant breeding companies, and agrochemical, agricultural, horticultural, forestry and food/fresh produce companies
- plant conservation organisations.

What do plant scientists do?

The work done by plant scientists is very varied.

Research in plant science covers lots of different disciplines including plant ecology (how plants interact with each other and their environment), plant physiology (how they function), plant genetics and plant pathology (interactions with pests and diseases).

An important practical application of plant science is in plant breeding. Plant breeders make a practical contribution to the development of new varieties with, for example, improved yield, better disease resistance and resilience to environmental stresses. Techniques for developing new varieties are becoming increasingly sophisticated, e.g. using marker-assisted breeding, genomic selection and genome editing to deliver better varieties of crops, and ornamental and amenity plants.

Plant breeders often spend as much time in the laboratory as they do in the greenhouse or field. New entrants to a plant breeding company generally work with an experienced breeder for a period of time while developing a range of practical skills and increasing their knowledge of breeding, genetics, molecular genetics, variety testing and statistics.

Plant scientists also work in wider areas of research, e.g. related to biotechnology, biofuels and the medicinal uses of plants (e.g. in the pharmaceutical industry).

There are some opportunities for plant scientists to work in organisations where they may not be 'hands-on' plant scientists, but where their subject expertise is essential to their role, such as working for a body that funds plant science research, or in policy and advisory roles within the Civil Service.

Botanists

Scientists who are involved in plant surveys and classification (taxonomy) may be called botanists.

Botanists work for museums, local authorities, conservation organisations, botanic gardens and in the private sector, e.g. carrying out ecological surveys in relation to planning applications. There are also roles for botanists on archaeological teams and in forensic science. Botanists involved in research may, for example, concentrate on studying populations of an individual species in particular habitats. Their work may provide useful information about the effects on plant species of pollution, forest fires, drought, overgrazing etc.

The Royal Botanic Gardens at Kew is a major employer of scientists engaged in a wide range of plant research and conservation work; you can find out about opportunities at Kew at:

www.kew.org/about-our-organisation/jobs-and-volunteering

What it takes

Plant scientists need to be:

- careful, observant and methodical workers
- good with numbers
- able to use scientific techniques and sophisticated equipment
- good at problem solving
- interested in plants and science!

Choosing a degree

On a plant science undergraduate degree course, you may study topics such as:

- plant cell structure and function
- plant biochemistry and physiology
- plant genetics, molecular biology, genomics and breeding
- plant evolution and biodiversity
- plant pathology
- ecology - understanding how plants interrelate with each other and their environment.

You can study plant science (or plant biology) as a single subject, although there are only a small number of such specialist degree courses available. An alternative route is to take a broader-based biology degree, or similar, that offers options for studying various aspects of plant science. If you opt for a more general course, before applying check the content of courses carefully to ensure that they will offer options of interest to you.

You need A levels, or equivalent qualifications, for entry to an appropriate degree course. Biology A level is usually required; many degree courses also ask for another science or maths at A level. Qualifications equivalent to A levels, such as a BTEC Level 3 National in applied science, may be acceptable, but additional qualifications may be expected alongside. **Check entry requirements carefully with individual institutions.** Canterbury Christ Church University offers a degree course in plant science with a foundation year for those without the usual entry qualifications.

To improve their employment prospects, many graduates go on to take a relevant specialist **postgraduate** course; this is normally required for research positions.

Getting experience

A good way to get an insight into plant sciences and to make yourself more employable in the future is to do a relevant **work experience** placement or shadow someone working in the field. Contact potential employers to ask whether they'd be willing to give you an opportunity. A period of suitable **voluntary work** may also help when applying for courses or jobs. You could also attend a summer school; a few programmes that may be of interest are listed below, together with their websites where you can find out about eligibility; bear in mind that these may not run every year.

The University of Nottingham runs a three-day **Summer School in Food and Crop Sciences** for students in year 12.

www.nottingham.ac.uk/biosciences/community/summer-schools/summer-school.aspx

The John Innes Centre (JIC) runs a number of initiatives. For undergraduates interested in research, the JIC, along with The Sainsbury Laboratory and The Earlham Institute, runs an international **Undergraduate Summer School** in Norwich. Students undertake eight weeks of research training, and receive weekly spending money and free accommodation.

www.jic.ac.uk/training-careers/work-experience

The five-day **Gatsby Plant Science Summer School** is run by the Gatsby Plant Science Education Programme at the Sainsbury Laboratory, University of Cambridge. It is held in North Yorkshire and aimed at first-year undergraduates at certain universities.

www.slcu.cam.ac.uk/outreach/gatsbyplants

Finding work

Job vacancies are sometimes advertised in specialist journals such as *Nature*, *New Scientist* and *Farmers Weekly*, and on their respective websites:

www.nature.com/naturejobs/science

www.newscientist.com/jobs

www.fwi.co.uk/jobs

There are also specialist recruitment sites/agencies, such as:

www.delacyexecutive.co.uk

www.morepeople.co.uk

If you are interested in plant breeding, most companies involved in this area are members of the **British Society of Plant Breeders (BSPB)** and their details are listed on the BSPB website (see under further information). It may be worth contacting BSPB members directly to find out whether they have vacancies.

There may be opportunities for plant scientists to work abroad, especially with commercial growers.

N.B. Many plant science graduates find work in unrelated fields of employment that are open to people with a degree in any subject, such as education, general management and retail.

***Adults:** If you have considerable knowledge and experience of plants, perhaps in a particular habitat, normal job entry requirements may be relaxed. A science Access course can provide an entry route into higher education for those without traditional entry qualifications.*

Further Information

For information on relevant courses, see higher education prospectuses and websites and view:

wwwucas.com

Royal Society of Biology - tel: 020 7685 2400.

www.rsb.org.uk

Botanical Society of Britain & Ireland (BSBI) - tel: 07725 862957. Information on training can be found on:

www.bsbi.org

British Society of Plant Breeders (BSPB) - tel: 01353 653200. Information on careers and training in plant breeding, including a link to the video 'Plant Breeding Matters - the best job in the world', can be found at:

www.bspb.co.uk

The following BSPB website has useful background information on plant breeding:

www.plantbreedingmatters.com

Related Leaflets

HB 01 Nature conservation

HB 02 Forestry, arboriculture and tree surgery

HB 03 Horticulture

HB 06 Graduate-level careers in horticulture

TD 02 Careers using biological sciences

TD 09 Biotechnology

TD 11 Working for the environment

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TD 19 Zoology and animal science

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