

Essay

The End of the Botany Degree in the UK

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Abstract

The last student enrolled in a pure “Botany” degree in the UK began in the University of Bristol this year, 2010. In recent years only the University of Reading also offered the Botany degree, before it was dropped there 3 years ago. This short article is written to draw attention to this fact and to a more general relative decline in the number of students pursuing degrees in plant science highlighted in a recent extensive report on the “Uptake of Plant Sciences in the UK” completed in 2009. We explore potential implications and causes by focusing on third level education, specifically full time degree courses as available through the UCAS application system. Findings are related to the preceding secondary school education and succeeding employment market that surround and influence the undergraduate experience.

Keywords: botany, plants, degree, biology, UCAS

Introduction

Lecturers in ‘Plant Biology’ and associated disciplines in the UK Higher Education system make efforts to pass on their fascination and interest in plants to the students they teach. Unfortunately, many higher education institutions around the country that house, or have housed, internationally renowned and enthusiastic plant scientists have lost their Botany Degrees (C200 in UCAS course code). Often in these cases, plant material is taught as parts of other modules in the Biological Sciences degree streams. It is acknowledged in several studies conducted in recent years that there is a worrying decline in the status of plant biology in the university system and this essay endeavours to illustrate this decline by highlighting some formidable facts and stark statistics; explanations and solutions are suggestive rather than conclusive and it is left to the reader to assess the severity of the situation or if it is rather just a sign of the times.

A prompt for this article was the observation that in recent lists of degrees available for entry into UK universities, there were only two entries for a C200 Botany Degree which were offered in the Universities of Reading and Bristol Universities. In the current UCAS (Universities and Colleges Admissions Service) course directory for 2011 entry, both have disappeared. It was encouraging for plant science when “The Independent” newspaper profiled “Botanist” as a featured career in their “Getting into University” section (Scott 2010), though only Bristol University was offering a pure botany degree course for new entrants at that time. Meanwhile, Reading University dropped their BSc Botany 3 years ago with the last cohort of Botanists graduating this summer. Bristol have just taken in their last student on their BSc Botany course this autumn, and so it seems that from 2011 you can no longer enrol for a Degree in “Botany” in the UK. It is still possible to obtain a Plant-based C200 degree and courses exist with other titles such as Plant Science and Plant Biology, perhaps in efforts to appeal to students interested in Science and Biology but not enticed by the image that the word Botany creates. Botany perhaps seems restricted to areas of specialisation such as taxonomy or breeding and more “classical” when juxtaposed with the jargon of today. However,

recent in depth analysis of the status of Plant Science education in the UK discusses examples of how even course titles containing such words as “Agriculture” or “Plant” can have adverse affects on the numbers of students taking up the course (Stagg et al. 2009).

However, whether as “Botany” or “Plant Science” the statistics available on the UCAS website for C200 courses are striking (Figure 1 summarises some of these statistics; UCAS, 2010): 19 out of 37 000 Biological Sciences students accepted Botany/Plant Science placements in 2009; 23 out of 30 000 in 2004. The difference in relative numbers taking Botany compared to other bioscience disciplines is stark (Figure 1). For example, the 19 students taking Botany in 2009 contrasts with over 15 000 taking Psychology. While there is not a huge absolute decrease in Botany uptake from year to year, the magnitude of current situation is highlighted by the possibility of being able to teach the entire country’s complement of aspiring botanists in a single tutorial group. This compares to an increase of 1100 to 1400 for Zoology making it unlikely that Zoology will lose status as a single subject degree. The only other two subjects showing a decrease in Group C Biological Sciences (JACS – Joint Academic Coding System - groupings) subjects were Genetics and Microbiology (466 to 432 and 394 to 373, respectively). CaSE (Campaign for Science and Engineering in the UK) commented positively in press releases (Khan 2010) on the Science A-level results published in August and indeed while overall 8.1% achieved the much-anticipated A* grade, it remained at average levels of 8% for Biology while reaching 9.2%, 10.3%, 17.2% and 29.9% for the other science subjects Chemistry, Physics, Maths and Further Maths. This illustrates that developments at school level may not be a source of salvation or huge encouragement for issues in the Biosciences at university level.

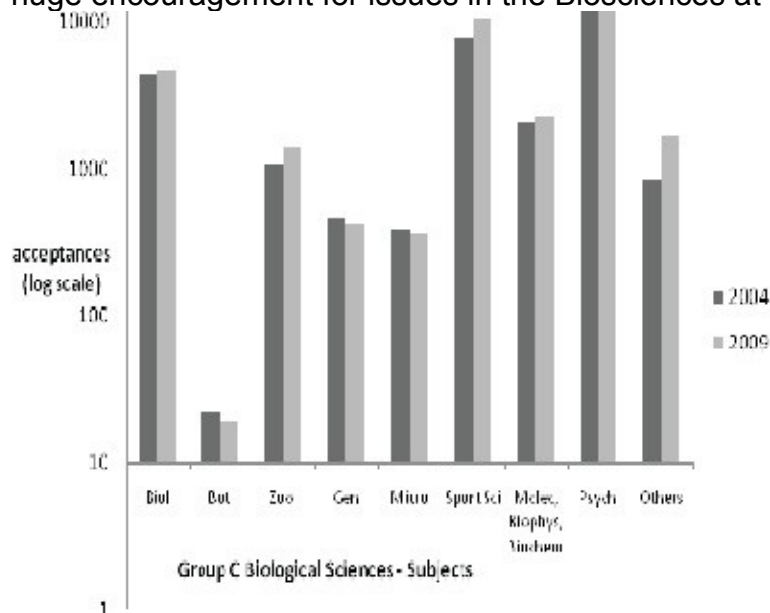


Figure 1 Summary of selected data available on UCAS website (UCAS 2010) summarising the numbers of students accepting places on Group C Biological Sciences courses in 2004 and 2009. Biol, Biology; Bot, Botany; Zoo, Zoology; Gen, Genetics; Micro, Microbiology; Sport Sci, Sports Science; Molec Biophys Biochem, Molecular Biology Biophysics and Biochemistry; Psych, Psychology.

Statistics are one way of assessing the popularity of courses and the interests of students but much of my concern stems from the anecdotal reports of colleagues who struggle to find applicants for PhD positions in plant research. Reflecting on the impact of the word “plant” in course titles mentioned above, it might be effective to try and bait students’ interest by talking more generally about genes, mutants and developmental mechanisms. If this is done without using the ‘p’ word, disappointment may follow when it is inevitably revealed that the genes are found in plants. However, a strong and considered integration with other bioscience subjects is certainly to be encouraged (Stagg et al., 2009). This struggle is not universal perhaps as in more specialised research environments associated with Botanical Gardens, for instance, there is more consistent interest among students in carrying out research work on plants.

Being part of the University Plant Science community in the UK in general, it is striking that there are no Botany or Plant Science Degrees in some universities with exceptionally strong groupings of internationally-renowned plant scientists, notably Oxford, Leeds and York Universities (options may exist here to study plants within the Biological Sciences degree streams but Plant Science Degrees are not listed explicitly on UCAS course listings). Lecturers in these universities have been proactive in pushing the case for plant science education, among them Dr. Celia Knight in the University of Leeds spearheaded the establishment of the Gatsby Plant Science initiative, now running for 6 years promoting interest in, and awareness of, plant science amongst undergraduates in the UK (Gatsby Plants, 2010). Other renowned plant science academics have also played key roles in promoting this unique scheme using funding from the Gatsby Charitable Foundation (Gatsby, 2010). At the school level, SAPS (Science and Plant in Schools) endeavours to promote interest in these topics and to explore the basis of the general lack of interest in plant science among students (SAPS, 2010). So then, what is the basis for the apparent lack of interest in studying plants?

Lack of clear career prospects?

Botanists are readily associated with being taxonomists in organisations such as Botanic Gardens or plant breeders in agricultural establishments and perhaps other options have not been as readily identified or highlighted. Stagg et al. (2009) pointed out that school career listings for Plant Scientists were restricted to a single entry for “Botanist” and the job description referred mostly to ecology and conservation neglecting whole areas of Plant Genetics and Molecular Biology for example. However, even within the listed career options, it has been noted that the dearth in qualified Botanists has serious implications in providing professional Ecologists and Conservationists (O’Reilly 2009). A lack of botanical education could certainly have worrying implications for the widely-reported threat to biodiversity. Work in these areas may be seen more as a vocation than as a serious means to a lucrative career. Habitat Surveying is an indispensable foundation for conservation programs and a preliminary requirement for large-scale planning projects and an area where botanical knowledge is essential. The ROSE report (Jenkins and Pell, 2006) found that while school students often aspired to a career in conservation, the aspiration was to save endangered animals.

Career considerations are inevitably influenced by issues of personal development and socioeconomic factors. Issues such as fulfilment, status and security will be considered by some but not all students. If the student believes that a science degree, any science degree, is the aim then are they sensible to presume that a Botany degree is more risky and provides fewer options than a more general Biosciences degree (after Rodrigues et al. 2007)? The grade achieved, and at what institution it was achieved, may be more important than the specific subject (Wolf, 2001) and the importance of general “key skills” to employability is a major preoccupation in undergraduate education (Atkins, 1999). Shortfalls in career guidance at second and third level education was mentioned by Stagg et al. (2009), noting that the majority of career advisors in schools have backgrounds in humanities and social sciences; though if the majority of graduate employers are not specifying Plant Science as a requirement or even desirable, career counsellors may not prioritise it.

Is Botany relevant and in what form?

Any perceived irrelevance to the issues of today’s society seem almost incredible given the extreme importance of food security and biodiversity issues in recent years. Steve Jones, renowned Professor of Genetics in University College London, wrote an article in the Telegraph asking “Where have all the British Botanists gone?” (Jones 2010) citing a 500-to-one ratio in UCL researchers working on animals compared to plants. Perhaps if this pressing issue of food security was to attract students to studying plants, it might be in a more applied capacity (e.g., biotechnology, crop science, horticulture) and adversely affect more academic courses such as Botany. Horticulture Week positively reported on the career potential in applied plant sciences such as Sports Surface Technologists or Forensic Ecologists (McEwan 2010), though it remains to be seen if students will be convinced of the value in specialised training. Courses in what are seen as “technical” or “vocational” skills have not enjoyed a successful history in the UK educational system (Wolf, 2001), though certainly providing them with full degree status should help. If we intend to reach the 50% mark in terms of proportion of the under-30 population in universities (Blair, 1999), students can ill-afford to try for anything less than a degree (even if affording it financially looks ever more challenging).

Blame the schools or blame biology itself?

In terms of any pre-tertiary education biases, there are discussions on what value or emphasis is given to plants in school teaching curricula. Botany disappeared from A-level studies over twenty years ago and lack of interest in plants is well-documented (Stagg et al. 2004). American educationalists have quantified school textbook contents and stated that 14% of chapters are dedicated to plants compared with 42% for animals and humans (Wandersee and Schussler 1999). They have even coined terms such as zoochauvinism and plant blindness in efforts to describe and characterise an apparent lack of interest in plants, at least when compared to animals (Flannery 1991; Wandersee and Schussler, 2001), though whether the sometimes aggressive tone is of any help is questionable (Hershey 2002). Is it simply a case of “loveable” mammals and “lifeless” plants? (Lindemann-Matthies 2005). There is an apparent scientific basis for plant blindness involving the human’s innate visual information processing limitations, more readily adapting to views of animals than plants (Wandersee and Schussler 2001). In

addition there may be a developmental basis: if children and adults of all ages are more interested in animals compared to plants, probably because they have more obvious behavioural similarities, it may be inevitably propagated from generation to generation. But does it follow then that we have to teach only what the students (and their parents) have a natural interest in? While student-centred teaching is becoming the predominant approach to teaching endorsed in third level institutions (Trigwell et al., 1994; Barr and Tagg 1995), this approach may not be suitable for school-level teaching.

Do all students want to treat and cure disease?

With a national (or international) emphasis on biomedical research it sometimes feels that today's students are primarily interested in finding cures or treatments for diseases (e.g., cancer, HIV/AIDS) - at least to those involved in fundamental biological or non-medical disciplines. The ROSE report (Jenkins and Pell, 2006) showed that in a list of the most popular topics in Biology, understanding and curing cancer was at number 2 for 15-year old girls while plant-related issues comprised the top 3 least popular topics (also featuring in the boys top 10 least popular). Medical study and research is a very worthy and not at all a dishonourable path to take of course, but one whose hegemony might counter more fundamental biology course uptake, particularly botany. Group B subjects (those allied to Medicine) showed a 100% increase in UCAS acceptances between 2004 and 2009, from 24 000 to 48 000. Career choice models have stressed the importance that status and security play in choosing courses of study and this would suggest that plant science lacks such prestige and certainty. There was always the cachet of having a doctor in the family – a medical doctor, that is. In addition to more practical considerations of being able to get a job of stature and stability, there are also the issues of following natural interests and fulfilment; and if there is a general lack of interest in plants it makes it difficult to promote it.

Is there anything we can do?

From my own perspective it seems that Plant Science lecturers make the most of what is available to them. In situations where the institution has no Botany or Plant Science Degree it is important that we maintain the teaching we have access to and make sure that plants are always included in the more general bioscience modules that are not restricted by organism type. Fundamental concepts and technologies in biology teaching are common to all or many organisms and so when illustrating these concepts with examples we can ensure we include examples from the plant kingdom. Stagg et al. (2009) report an opinion that fighting to maintain a distinct degree stream for botany may actually be more detrimental than integration. In some way we can perhaps harness and exploit the topicality of food security and biodiversity threats to highlight the relevance of plant science to humanity's survival. Certainly in terms of biodiversity and conservation it can be stressed that a habitat or ecosystem is inextricably composed of flora and fauna; and without the crops to maintain food security, humanity would struggle to sustain itself. Bioscience graduates will be the school-teachers of the future so if plant science can be inculcated into the teaching at the school level it will eventually feed into the higher education system more consistently perhaps.

Conclusion

Does this matter? Perhaps not to anyone other than those generally interested in, or with a vested interest in, plant-based education but it should surely concern anyone with an interest in Bioscience education and teaching in general. There has also been a decline in students taking on subjects such as Genetics and in combination with a decline in Botany uptake, this may impact on areas of Plant Molecular Genetics which feed directly into GM research and development and molecular plant breeding – essential knowledge and tools required to deal with current and future food security crises. The disappearance of “Botany” primary degrees does not have to translate proportionally into a decline in plant scientists engaged in research. There is always room for change and flexibility at postgraduate levels, and undergraduate-trained zoologists, biochemists and geneticists have been known to become top plant researchers. However, even if students prefer not to pursue plant-based employment as a career choice, some education in the field is essential for them to fully appreciate the relevance and value of plants in general, a basic level of “botanical literacy” (Uno, 2009). A lack of basic plant education in early stages could bias general opinions on controversial issues such as GM-technology for instance.

The situation that we have at least for the time being ‘lost’ BSc Botany may be seen as a bad indicator for the plant sciences in general terms. However, given that there are Degrees in Plant Science still available, “Botany” is but a word after all and we have been aware of the decline in interest in plant science for some time. The ROSE Project highlighted this problem (Jenkins and Pell 2006) and, it would seem that Shakespeare may have over-generalised when he said that “a rose by any other name would smell as sweet”. Perhaps “Botany” is not as sweet as “Plant Science” and “Plant Science” is not as sweet as “Bioscience”! Hopefully, this essay has highlighted the current scenario, raise debate about its importance and serve as another stark reminder for us to question the basis of the seeming disinterest in studying plants, and ideally then a means to deal with it. This may either seek to explain and then tackle the situation, or perhaps accept it and adapt to it. Wilkins (1988) said that “Plants are the most important, least understood, and most taken for granted of all living things” but in causality, though that might clearly be the effect, there is less certainty and more debate about the cause and how to deal with it.

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