

2. znanstvena konferenca z mednarodno udeležbo

Konferenca VIVUS – s področja naravovarstva, kmetijstva, hortikulture in živilstva

»ZNANJE IN IZKUŠNJE ZA NOVE PODJETNIŠKE PRILOŽNOSTI«

24. in 25. april 2013, Biotehniški center Naklo, Strahinj 99, Naklo, Slovenija

2nd Scientific Conference with International Participation

Conference VIVUS – Environmentalism, Agriculture, Horticulture, Food Production and Processing

»KNOWLEDGE AND EXPERIENCE FOR NEW ENTREPRENEURIAL OPPORTUNITIES«

24th – 25th April 2013, Biotechnical Centre Naklo, Strahinj 99, Naklo, Slovenia

Horticulture higher education: appraisal of current approaches in Europe, UK, USA and Canada

Margaret E. Norton

SRUC (Scotland's Rural College), Scotland, margaret.norton@sruc.ac.uk

Colin R. Norton

SRUC (Scotland's Rural College), Scotland, colin.norton@sruc.ac.uk

Abstract

The future requirement for horticulturists is expected to increase in relation to rise in demand for food production and a healthy environment. Education for horticulture is critical to ensure that this requirement can be met. University higher education courses in horticulture at the Bachelor / Licence / 1st cycle level were evaluated for all countries in the EU, all states in the USA and all provinces in Canada. The number of universities offering horticulture has fluctuated recently, with an overall decline recorded. In Europe, most courses focus on food production but there has been a recent increase in courses with a landscape horticulture focus in a few countries. In the UK there is a strong emphasis on ornamental and landscape horticulture content, and less attention to food production. In the USA, horticulture is only offered as a minor at some locations, and there has been a swing towards landscape related courses. In Canada, only a few specifically horticulture courses exist. Throughout North America and Europe, horticulture continues to be offered primarily at agricultural universities. Horticulture degrees with named specialisations have largely been replaced by degrees with a broad content; this may increase the graduate's employment options. A marked increase in number of degrees at Masters / 2nd cycle level was noted in Europe and North America.

Key words: horticulture education, bachelor degree

1 Introduction

The future requirement for highly skilled university graduates in horticulture is expected to increase in relation to rise in demand for food production and food security, and a healthy environment (Global Food Security, 2011; ISHS, 2012). Additionally, there is an ageing horticultural work force in many countries and more highly skilled people will be needed in the very near future to replace these people (e.g. in Scotland - LANTRA, 2011). Education for horticulture is critical to ensure that this requirement can be met. However, horticulture degree

programmes have been cut in the UK, USA and parts of Europe (e.g. Germany) over the last few decades (ISHS, 2012).

On the other hand since the 1999 Bologna Declaration, there have been recent changes in degree structures in Europe with adoption of a system of comparable degrees and the European Credit Transfer and Accumulation System (ECTS) (European Commission, 2010). The number of higher education institutions has grown in most countries in Europe especially in vocational and professional subject areas (European Commission, 2010).

This paper investigates the current status of horticulture in universities in Europe, the UK, USA and Canada. It looks at the subject areas offered from the point of view of whether the current degrees address future needs.

2 Method

University higher education courses in horticulture at the Bachelor / Licence / 1st cycle level were evaluated for countries in Europe, all states in the USA and all provinces in Canada. Information was collected from university prospectuses and catalogues and individual university websites. European countries investigated included all countries in the EU and also Croatia (accessing to the EU in 2013), Iceland, Liechtenstein, Norway and Switzerland.

Country specific websites relating to higher education where available, for example from the Universities and Colleges Admissions Service in the UK (UCAS, 2013) and additional online sources - Study in Europe (Edalo, 2013) and University Directory worldwide (2013) were consulted initially to compile a list of universities offering horticulture degrees. However, although these were useful, the latter two contained some outdated information and did not list complete information for some countries investigated. These were therefore not used as the final source of information.

The survey was conducted over January and February 2013. Data collected included title of degree and subject content of the degree programme for each university. Additional information gathered (where available) included teaching methods, opportunities for work experience and international exchanges, employability and year in which the degree programme started. The survey was restricted to horticulture and the results do not include landscape and garden design courses or plant science courses unless they include substantial horticulture content.

A similar survey was conducted in 2005 using the same methodology and results compared with 2013 data.

3 Results

The main subject themes within horticulture degrees are given in Figure 1. At one end are botany and plant science and at the other is landscape architecture; these were considered to be outside the scope of the current paper. Within the horticulture degrees, the focus ranged from production horticulture to landscape horticulture. There was frequently some overlap in these areas. Many universities offer a degree with broad content including both production horticulture and landscape horticulture – these are denoted as ‘general horticulture courses’ in Figures 1 and 2.

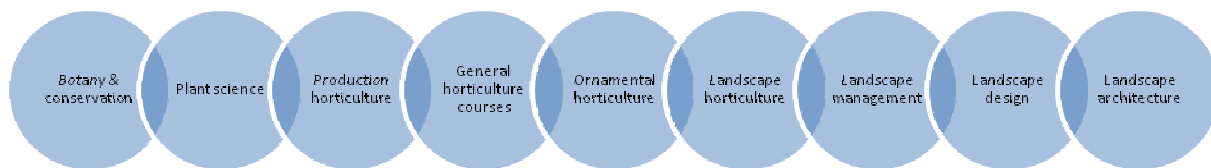


Figure 1: Subject focus for horticulture degrees

Areas of horticulture included in Figure 2 as 'other' include business, postharvest, international horticulture & marketing, Mediterranean agriculture / horticulture, tropical horticulture, agro-ecology, restoration ecology & environmental horticulture, therapeutic horticulture and public horticulture.

Figure 2 shows the number of degree programmes on each subject theme for each geographic area.

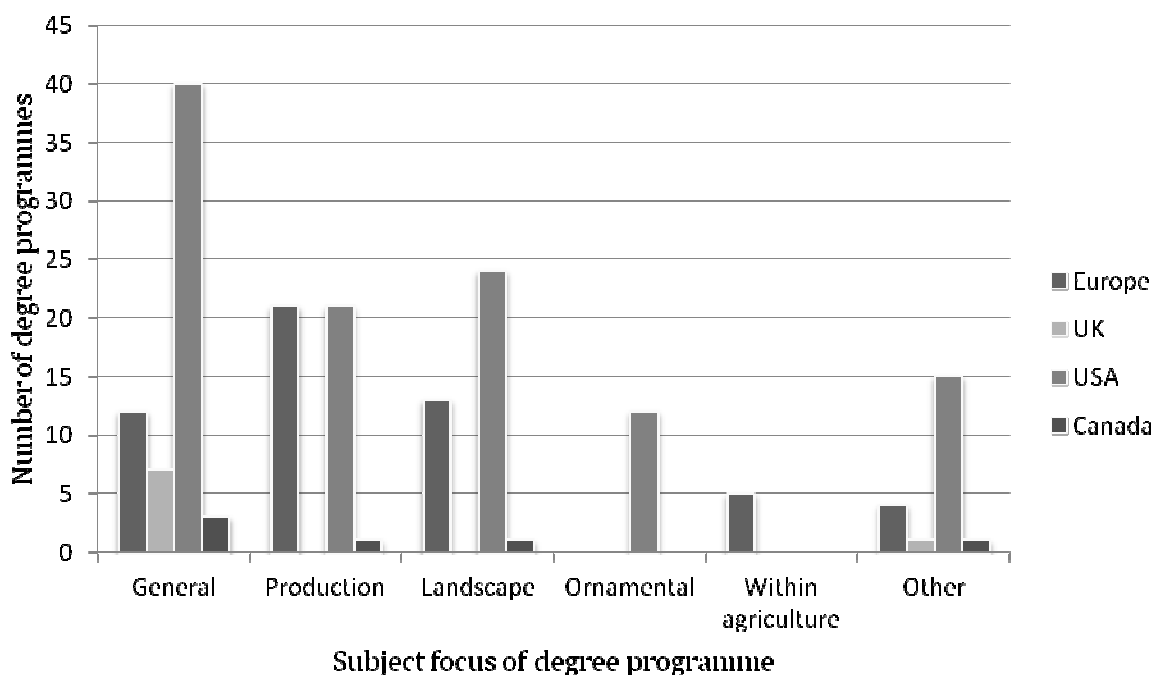


Figure 2: Number of horticulture degrees in each subject area in Europe, United Kingdom, United States of America and Canada in 2013

The number of universities offering horticulture has fluctuated recently, with an overall decline recorded in some countries, for example UK and USA. In Europe, the data collected showed that most programmes focus on food production but there has been a recent increase in courses with a landscape horticulture focus. In the UK there is a strong emphasis on ornamental and landscape horticulture with less attention to food production. In the USA, horticulture is only

offered as a minor at some locations, and there has been a strong swing towards landscape, ornamental and public horticulture related courses. In Canada, only a few specifically horticulture courses exist. Throughout North America and Europe, horticulture continues to be offered primarily at agricultural universities.

3.1 Europe

In addition to programmes with a general content and those with a production or landscape focus, one course in the Netherlands is on international horticulture and marketing, and one course in Slovenia is on Mediterranean agriculture / horticulture.

Most degree programmes are at agricultural universities, and these have a strong focus towards production which is usually related to local production, for example fruit production or viticulture. A few programmes consist of a degree in agriculture with horticulture options.

Otherwise, landscape architecture is strong but these programmes usually contain very little horticulture. There has however been a recent increase in separate degree programmes with a landscape horticulture focus.

Most universities award BSc degrees and follow the European Higher Education Area norm of six semesters, although some require eight semesters.

There has been a recent increase in degrees at the Masters level (several of these are taught in English). Students may therefore be increasingly encouraged to progress from a degree with general horticulture content to a more focused Masters degree. It was noted however, that a Bachelor's level horticulture degree gained from a polytechnic / applied science university, for example in Finland, may not be a sufficient qualification to allow progression to Masters degree at a non-applied university.

3.2 United Kingdom

Most degree programmes in the UK have broad subject content and include modules on both production and landscape horticulture; students may be able to choose some elective modules to concentrate on one area. This is a recent change; previously, degree titles reflected a focus on a specific area of horticulture. One course, Horticulture with Plantsmanship offered in Scotland, has a botanic garden subject focus.

Universities no longer offer horticulture degrees at their own campuses. All horticulture degree programmes are validated by universities but taught at agricultural colleges which are either Higher Education Institutions (SRUC, Writtle College) or colleges which primarily teach at Further Education level, for example Askham Bryan College, Myerscough College. Traditional universities may offer related higher degrees.

Degree programmes for BSc with Honours normally take 6 semesters (3 years) in England and 8 semesters (4 years) in Scotland.

Foundation degree (FdSc) and Higher National Diploma (HND) are two-year higher education qualifications which are offered at the seven colleges which also offer BSc and also at six additional colleges. A large number of students leave with these qualifications and do not progress to BSc.

There are very few Masters degrees in horticulture in the UK.

3.3 United States of America

In addition to programmes with a general content and those with a production or landscape focus, in the United States there are programmes on horticultural business (several), postharvest, tropical horticulture, restoration ecology & environmental horticulture, therapeutic horticulture and public horticulture.

Some universities no longer offer horticulture degrees at Bachelor's level but may still have strong research and may offer Masters and PhD degrees. In some universities, horticulture is offered as a minor subject in Bachelor's degrees – the horticulture content of these degrees is therefore low. Some universities until very recently had many differently named horticulture degrees. Mostly these have disappeared over the last five years and there is a trend towards degrees with broad content. Some degree programmes have been cut very recently (apparently for reasons such as faculty members with particular strengths moving away).

In the USA, most degrees now have broad content and include production of food crops, ornamental production and landscape horticulture. The number of degrees which are solely focused on production has declined, and horticultural production usually reflects the geographical area and crops grown locally. However, some universities give students strong international opportunities, for example Texas A & M University and Pennsylvania State University. There has been an upsurge in landscape related programmes, for example at Pennsylvania State University (Pennsylvania State University, 2009) and those with a public horticulture focus. There are several degrees in Ornamental Horticulture; these usually include production of ornamentals, landscape horticulture and may include some design. For many degrees, the major may be Horticulture, and Concentrations, Options, or Specialisations may be possible in specific areas of horticulture.

Bachelor of Science (BS) normally takes 8 semesters (4 years). Some degrees are bachelor of Technology or Bachelor of Agriculture.

Many universities also offer Associate Degrees (2 years). Some have progression from these to BS Horticulture, some have progression to BS in another subject e.g. Business with Horticulture as a minor, and some stop at Associate. The Associate level is also offered at community colleges.

There are many Masters degree programmes and students may progress from a BS with broad content to a more focused subject for Masters.

Horticulture was traditionally taught at Land Grant Universities. Table 1 shows the types of institutions where horticulture is currently offered. Other universities offering horticulture may be private universities or universities which have a non-agriculture focus; many of these programmes have an urban or a landscape focus.

Table 1: Horticulture in Land Grant Universities in the United States of America 2013

	Number of universities
Land grant universities with horticulture programmes	54
Land grant universities without horticulture programmes	17
Other universities with horticulture programmes	26

3.4 Canada

There are very few horticulture degree programmes in Canada. These all cover horticulture or horticultural science in a general manner. At the University of British Columbia, the degree focuses on agro-ecology with a specialisation in horticulture.

Lower qualifications are offered at community colleges and students may progress from these to an advanced entry point on a university programme.

3.5 Type of teaching on horticulture programmes

Teaching at most universities stresses the applied nature of the subject. Some universities include hands-on practical work, whereas in some countries this is not done at degree level and the focus is on science. Work experience, work placements or internships are encouraged and may be required parts of the degree programme. This varies more with institution than with country.

Students are normally taken on visits to horticultural businesses as part of their degree programme and some may have opportunities for study tours to another region or country. Study abroad is encouraged by some universities in North America and Europe.

Oregon State University teaches BS Horticulture online. This has a more general content than the campus-based courses there. Texas Tech offers an online degree in horticulture and turf grass. No other online degrees were recorded.

Employability was noted to be high in all areas. The practically orientated teaching methods and opportunities for work experience helped with employability. Also, work in horticulture is available in all countries evaluated.

4 Discussion

This paper reviews horticulture courses in Europe, the UK, USA and Canada. In addition to providing education for their own countries, universities in these areas have also provided education for other countries. Increasingly, horticulture courses are being offered in other countries and continents, for example in Africa. Kehane and Pillot (2012) conducted a questionnaire survey of educational institutions in Africa. Although there were some gaps in the data collected, the survey showed that there are now a large number of horticulture higher education courses in Africa, most offering BSc degrees and following the European system. This may indicate that Europe & North American universities will in future solely be educating students from their own countries for their own benefit, apart from student exchanges.

This paper did not specifically examine student numbers on Bachelors degree programmes. However, reductions in numbers of students choosing to study horticulture have been a concern (ISHS, 2012). This drop in student numbers has been apparent in other parts of the world too, for example, in Australia and New Zealand (Aldous & McEvelly, 2010), and South Africa (University of Stellenbosch, 2012). Increasing enrolments in developing countries appears to only partly account for the reduction in numbers of students in developed countries.

Although there are jobs available in all areas of horticulture and therefore a need for degrees covering all areas, the decline in degrees in production horticulture in some regions may not be compatible with future needs. Because of declining student numbers there has been a need by universities to only provide subjects which attract students; recently landscape subjects have

attracted more students than production-oriented programmes. Production programmes have therefore been reduced, and in some cases the science content of degrees has also been reduced. This may have to be addressed to answer future needs. However, the recent switch towards degrees with a broad content may be helpful at this point. World concerns about food security and environmental issues may attract more students to horticulture programmes. These general programmes may generate an interest in parts of horticulture which the student did not know they had an interest in. In our own horticulture degree programmes at SRUC, students have reported becoming very interested in science and / or crop production by the end of their degree, when previously a career in these areas was not what they intended.

Horticulture will continue to be a very diverse subject (ISHS, 2012). Graduates will continue to be required in all areas of horticulture, and therefore holding a degree with a broad content may increase the graduate's employment options. Masters degrees can provide more specialist knowledge, and during the research for this paper a marked increase in number of degrees at Masters / 2nd cycle level was noted in North America and Europe (but not in the UK).

Horticulture programmes attract students looking for a career change, and for this group particularly, the standard format of teaching hours may not be suitable. Some universities offer part-time study options, for example, SRUC, and online degree options such as that offered by Oregon State University are likely to be popular with this group and with people already in employment. One possible concern relates to whether students taking online courses will be sufficiently familiar with practical horticulture.

Students in North America and Europe are frequently encouraged to study abroad for a period. In Europe, there is trend for students from eastern Europe to study abroad in western or northern Europe but there are fewer students going from west to east. A stated objective for 2020 for the European Higher Education Area is to ensure that at least 20% of those graduating in the European HE area have had a study or training period abroad, and the European commission has investigated reasons for the current imbalance in mobility (European Commission, 2012). Obstacles include financial considerations and also university validation and accreditation systems which may be rather inflexible. The European Commission attention to this should be helpful in encouraging student interchange between countries and helping them to gain an understanding of world issues.

Cited literature

Aldous, D. E. & McEvelly, G. 2010. Horticultural education and training futures in Australia and New Zealand. In: *Acta Horticulturae* 920. XXVIII International Horticultural Congress on Science and Horticulture for People (IHC2010): VI International Symposium on Horticultural Education, Research Training and Consultancy.

Edalo Promotion Services Ltd. (online) 2013. Study in Europe (Quoted: January, February & March 2013.) Accessible: <http://www.studyineurope.eu>.

European Commission. 2010. Focus on higher education in Europe 2010: The impact of the Bologna process. EACEA P9 Eurydice, European Commission. Brussels.

European Commission. 2012. The European Area in 2012: Bologna Process Implementation Report. EACEA P9 Eurydice, European Commission. Brussels.

Global Food Security (online). 2011. Strategic Plan 2011 to 2016. (Quoted: March 2013.) Accessible: www.foodsecurity.ac.uk.

Kehane, R. and Pillot, D. 2012. Tertiary agricultural education capacities in Africa – a case study on horticulture. *Chronica Horticulturae* 52(2): 8-11.

ISHS. 2012. Harvesting the sun. *Scripta Horticulturae* 14, 1-74. International Society for Horticultural Science.

LANTRA (online). 2011. Scotland factsheet: landbased industries. LANTRA, UK. (Quoted: March 2013.) Accessible: www.lantra.co.uk

Pennsylvania State University. 2009. Department of Horticulture, Strategic Plan 2009 to 2013.

UCAS (online), 2013. (Quoted March 2013). Accessible: <http://www.ucas.ac.uk>.

University Directory Worldwide (online). 2013. (Quoted: January, February & March 2013). Accessible: www.university-directory.eu.

University of Stellenbosch (online). 2012. Department of Horticultural Science report. (Quoted: March 2013.) Accessible: <http://academic.sun.ac.za/horticulture/>