SQA Advanced Unit specification

General information for centres

Unit title: Plant Protection

Unit code: HX3C 47

Unit purpose: The aims of this Unit are to develop candidate skills in the recognition and identification of the main pest, disease, weed and abiotic problems affecting plant growth, and in the appropriate selection of control measures. Candidates will be made aware that it is essential within the land-based industries to be able to protect plants and crops from damage and loss due to plant protection problems. The Unit will also allow candidates to develop a knowledge and understanding of the restraints placed by legislation upon those carrying out appropriate control measures.

On completion of the Unit the candidate should be able to:

1 Identify key plant protection problems.
2 Describe the effects of common plant protection problems.
3 Select appropriate control measures.

Credit points and level: 1 SQA Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from National 1 to Doctorates.*

Recommended prior knowledge and skills: Prior knowledge or skills are not essential for this Unit. However, it would be beneficial if candidates have vocational experience in an appropriate discipline or had studied, or were studying, HW8J 47 *Pesticide Application*, or had gained certification in pesticide application, eg PA1A, PA2 or PA6A.

Core Skills: There are opportunities to develop the Core Skill(s) of Problem Solving at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Assessment: Outcome 1 could be assessed by an identification exercise under supervised conditions, where the candidates identify the nature and cause of key plant protection problems. Outcomes 2 and 3 could be assessed by a single instrument of assessment, and would require the candidates to produce a written report based on a case study or vocationally relevant plant protection scenarios. It would also be possible to break this Unit down into three separate assessment events that assess each Outcome separately. Assessments should be conducted in controlled conditions and, if taking place as a single event, it is suggested that this should last two and half-hours.

SQA Advanced Unit specification: statement of standards

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The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Identify key plant protection problems

Knowledge and/or Skills

- pest identification – common names
- disease identification – common names
- weed identification – botanical names
- recognition of abiotic factors (non-pathogenic disorders)

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis and should be generated through supervised practical tests. Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- identify a minimum of 25 plant protection problems correctly

Evidence could be generated using an identification test under supervised conditions in which candidates are asked to identify pest, disease and weed specimens or the damage/symptoms caused by pest and disease attack, and symptoms caused by abiotic factors (non-pathogenic disorders). Candidates should learn a minimum of 30 plant protection problems to include not fewer than 8 from each of pests, diseases and weeds, and a minimum of 3 non-pathogenic disorders.

Assessment Guidelines

This Outcome could be assessed by an identification exercise under supervised conditions, where the candidates identify the nature and cause of key plant protection problems. To ensure that the candidates will not be able to foresee what items may be presented, a minimum of 30 specimens must be taught and be available for assessment. Fresh, live material should be used wherever possible. Where it is not possible to provide fresh material, eg due to time of delivery, then appropriately preserved or photographic material may be substituted. Candidates may be provided with appropriate keys at the assessment. They may not bring textbooks, lecture notes/handouts or other material.

Assessment of this Outcome could be combined with Outcomes 2 and 3 as part of a single assessment of the Unit, details of which are given under Outcome 3 below. Alternatively, the assessment of this Outcome could be assessed alone or combined with Outcome 2 as detailed under Outcome 2 below.

Outcome 2

Describe the effects of common plant protection problems

Knowledge and/or Skills

- effects on plant growth and physiology
- effects on crop yield and quality
- economic losses
- life cycles of pests, diseases and weeds

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can for one pest, one disease and one weed:

- describe the effects on plant growth and physiology
- describe the effects on crop yield and quality
- explain the economic losses
- specify the important stages of the life cycle in causing crop damage and economic losses

Evidence for the knowledge and/or skills in this Outcome may be provided on a sample basis. Evidence could be generated through a supervised, closed-book assessment. Where the knowledge is sampled, the sample should comprise at least two of the bullet points in the knowledge and/or skills items listed above. In order to ensure that candidates will not be able to foresee the sample, the whole of the content listed must be taught and available for assessment, and a different sample is required each time the Outcome is assessed, to which candidates must give a satisfactory response.

Assessment Guidelines

This Outcome should be assessed in a vocational context relevant to the candidate or derived from a workplace situation, and should be drawn from problems identified and studied in Outcome 1.

If the assessment of this Outcome involves sampling knowledge, it may take the form of a supervised, closed-book, restricted response test of approximately 45 minutes, and could be combined with the assessment of Outcome 1 above, where examples within this Outcome are drawn from specimens presented in Outcome 1. Alternatively, evidence could be generated through an unsupervised assignment. It should cover all of the items listed in the knowledge and skills section for Outcome 2, and generate the evidence in the bullet points in the Evidence Requirements listed above.

Assessment of this Outcome may be combined with Outcome 3, and could take the form of a report or reports based on a case study, or an assignment, as detailed in Outcome 3 below.

Outcome 3

Select appropriate control measures

Knowledge and/or Skills

- non-chemical control
- chemical control
- effectiveness of control
- selection of control measures
- legislative constraints

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can for two pests, two diseases and two weeds in specific situations:

- identify a range of potential control options
- describe the effectiveness of each potential option
- select one control strategy that could be used for each situation and justify the choice
- specify the legislative constraints upon those carrying out the control options

Assessment Guidelines

The Outcome should be assessed in a vocational context relevant to the candidate or derived from a workplace situation, and should be drawn from selected problems identified and studied in Outcome 1. Two different pests, disease and weed scenarios are required each time the Outcome is assessed.

The Outcome may be assessed alone. If the assessment of this Outcome involves sampling knowledge, it may take the form of a supervised, closed-book restricted response test. It could be combined with the assessment of Outcome 2. Alternatively, evidence could be generated through an unsupervised assignment, and could take the form of a report or reports based on a case study. It should cover all of the items listed in the knowledge and skills section for Outcome 3, and generate the Evidence Requirements listed above. Reports can be supplemented with additional questions to ensure all aspects of the Evidence Requirements are covered.

Administrative Information

Unit code: HX3C 47

Unit title: Plant Protection

Superclass category: SC

Original date of publication: November 2017

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History of changes:

Version	Description of change	Date

Source: SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

FURTHER INFORMATION: Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our Centre Feedback Form.

SQA Advanced Unit specification: support notes

Unit title: Plant Protection

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

The aims of this Unit are to develop skills in the recognition of plant and crop protection problems and, in particular, the losses caused by pests, diseases and weeds, and to develop an understanding of strategies that may be adopted for their prevention or control. The Unit also provides knowledge required by candidates intending to seek more advanced studies in agriculture or horticulture. It is suitable for delivery within the contexts of all land-based industries, and the emphasis in delivery should be with regard to the vocational group or groups being taught. The Unit primarily intends to develop candidates' skills in the correct identification of plant and crop protection problems, and to provide an appreciation of the potential control or preventative measures that could be adopted. Candidates should be encouraged to develop identification skills by being exposed to a wide range of material relevant to the particular Group Award. Whilst emphasis may be placed on specimens or problems prevalent in distinct geographic regions, problems of national significance should not be ignored. Lectures and tutorials should be supported by practical classes and field visits, resource materials, preserved specimens, photographs, and by use of computer-based learning packages to develop skills and knowledge.

Outcome 1 should introduce the use of recognised common and scientific names for weeds, pests and diseases. Practical classes and field visits should be used to enable students to recognise and identify a range of plant protection problems, including pests, diseases, weeds and non-pathogenic disorders (caused by poor light, high/low humidity, lack of water/waterlogging, mineral deficiencies, physical damage etc). Fresh, live material should be used wherever possible. Where it is not possible to provide fresh material, eg due to time of delivery, then appropriately preserved or photographic material may be substituted. Candidates should become familiar with using recognised field guides for identification of problems appropriate to their vocational area, and become competent in the terminology and language of plant/crop protection.

Outcome 2 should outline the economic losses caused by pests, diseases and weeds in agriculture and horticulture (production and amenity) situations as appropriate. It should also develop the candidates' knowledge and understanding of the effects of pests, diseases and weeds on plant growth (eg interference with photosynthesis, roots, translocation; competition for nutrients and space), crop yield, quality and aesthetic value. Candidates should be introduced to the basic life-cycles of pests, diseases and weeds, and the stages of importance in causing damage and/or for the control identified.

Outcome 3 considers appropriate preventative and/or curative measures for plant/crop protection problems. This should be achieved through the appraisal of a range of potential options, including non-chemical and chemical control. It should take due regard of personal, public and environmental safety. Current legislation should be covered with respect to the use of pesticides.

This Unit complements professional certification or training in pesticide use and articulates with the Unit HW8J 47 '*Pesticide Application*'.

Guidance on the delivery and assessment of this Unit

This Unit is primarily designed to provide candidates with technical or professional knowledge and skills related to occupations in agriculture and amenity/production horticulture. It can be delivered as a freestanding Unit or as part of a Group Award. Candidates will need to relate information learnt in this Unit to the requirements of the Graded Unit.

When the Unit is delivered as part of a Group Award, it would be beneficial to deliver it after or in conjunction with complimentary Units (eg crop production Units in agriculture or horticulture, amenity/landscape maintenance Units in amenity horticulture or landscape or, turf care Units in greenkeeping). In these circumstances, candidates would more easily appreciate the integration of the material. It should also allow the Unit to be delivered in such a way that enables candidates to appreciate its relevance to the vocational area concerned. Wherever possible, links should be drawn to situations that candidates understand, for example, control strategies in relation to crop growth stages.

Delivery should place emphasis on the practical aspects of plant protection. It should include a range of approaches from formal lectures to discussions and library sessions, giving access to plant protection publications and appropriate websites. Computer-based learning packages could also be used. Field guides and current agrochemical product guides should be made available. Practical sessions on the identification of key pests, diseases, weeds and physiological disorders should be carried out using fresh, live material, preserved specimens and/or photographic material.

The following texts may be helpful in the delivery of this Unit:

- Adams, C.R. & Early M.P. (2004), '*Principles of Horticulture'* (4th Edition). Elsevier
- Agrios, G.N. (2005),'*Plant Pathology'* (5th Edn) Academic Press
- Alford, D.F. (1999), '*A Textbook of Agricultural Entomology*' Blackwell Science
- Alford, D.F. (2000),'*Pest and Disease Management Handbook*' Blackwell Science
- Buczacki, S. & Harris, K. (2005), '*Pests, Diseases & Disorders of Garden Plants' (Collins Photoguide*) Collins
- Finch, H.J.S., Samuel, A.M.& Lane, G.P.F. (2002), '*Lockhart & Wiseman's Crop Husbandry including Grassland'* (8th Edn) Woodhead Publishing Ltd
- Gwynne,D.C. & Murray R.B. (1985),'*Weed Biology and Control in Agriculture and Horticulture'* Batsford Academic and Educational
- Helyer, N., Brown, K. & Cattlin, N.D. (2003), '*Biological Control in Plant Protection*' Manson Publishing
- Lucas, J.A. (1998), '*Plant Pathology and Plant Pathogens'* (3rd Edn) *Blackwell Science*
- Malais, M. & Ravensburg, W.J. (1992), '*Knowing and Recognizing – The Biology of Glasshouse Pests and their Natural Enemies'* Koppert Biological Systems
- Matthews, G.A. (2000), '*Pesticide Application Methods'* (3rd Edn) *Blackwell Science*
- Naylor, R.E.L. (2003), '*Crop Health – responding to Weeds, Diseases and Pests*, in *The Agricultural Notebook*' (20th Edn) Soffe, R.J., Ed.). Blackwell Science, pp. 213-230
- Readman, J. (2000), '*Controlling Weeds without using Chemicals*'HDRA/Search Press
- Walker, J. (2003), '*Weeds – an earth-friendly guide to their Identification, Use and Control'* Cassell Illustrated
- Whitehead, R. (Ed.) (2006), '*The UK Pesticide Guide 2006'* BCPC/CABI
- Appropriate commercial material and current websites

Opportunities for developing Core Skills

There may be opportunities to develop the Core Skill(s) of Problem Solving at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Open learning

This Unit could be delivered by distance learning. It is probable that candidates would need to attend the centre for assessment of Outcome 1, though this could be done in other locations under approved supervision. Arrangements would have to be made to ensure that the practical identification test of Outcome 1 is supervised by a responsible person and clearly recorded (using an assessment checklist) for the assessor. It is also recommended that a single assessment for Outcomes 2 and 3 is conducted in a supervised environment under controlled conditions.

For information on open learning, please refer to the SQA guide, *Assessment and Quality Assurance of Open and Distance Learning* (**www.sqa.org.uk**).

Equality and inclusion

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

General information for candidates

Unit title: Plant Protection

This Unit is designed to enable you to develop skills in the recognition and control of pests, diseases, weeds and disorders affecting UK agricultural and horticultural plants/crops. It is intended to prepare you to become a practical agriculturist or horticulturist, able to recognise key plant protection problems and to select appropriate control measures. It covers three main areas:

1 The identification of common pests, diseases, weeds and disorders.
2 Their effects on plant growth, crop yield and quality.
3 The identification of appropriate control measures.

Upon completion of the Unit, you should be able to assess growing crops for plant/crop protection problems and recommend appropriate control strategies. In order to complete the Unit, you will be expected to achieve a satisfactory level of competence in the recognition and identification of a range of important pests, diseases, weeds and disorders appropriate to your vocational area. In addition, you will be required to know the impact that these problems have on growth, crop yield and quality, and the economic losses that they may cause. Finally, you will be expected to select and state the effectiveness of control strategies for these problems.

Assessment may take the form of three individual linked assessments, with each set at a different time during the delivery of the Unit. Alternatively, assessment may be by two linked assessments or by one holistic assessment covering all the Outcomes. The selection of assessment will depend on the mode of delivery and is most likely to consist of a practical identification test, a written test and a written report based on a case study. In each case, assessments will be based on vocationally relevant examples and, whenever possible, should relate to practical work experiences or industry visits.