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## RHS Qualifications

### RHS Level 3 Certificate in the Principles of Plant Growth, Health and Applied Propagation

#### Qualification Specification

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## **1. RHS Qualifications Contact Details**

RHS Qualifications is the Awarding Organisation of the Royal Horticultural Society.

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Surrey  
GU23 6QB  
UK

Tel: 01483 226500

Email: [qualifications@rhs.org.uk](mailto:qualifications@rhs.org.uk)

Approved Centre Web Portal: [www.rhsq.org.uk](http://www.rhsq.org.uk)

## **2. Equality and Diversity Policy Statement**

RHS Qualifications is committed to policies that will promote equal opportunities in all its operations, regardless of age, disability, ethnic origin, gender, marital status, religion, sexual orientation or any other factor.

RHS Qualifications is committed to ensuring that there is no unfair discrimination in any of its operations and will take into account all current legislation in relation to the equality of opportunity.

RHS Qualifications will constantly monitor and review its policies and practices pertaining to equal opportunities, to ensure that they remain consistent with its equal opportunities objectives and continue to comply with all relevant legislation.

RHS Qualifications will strive to make awareness of and respect for equality and diversity, an integral part of the culture of the organisation.

A copy of the RHS Qualifications Equality and Diversity Policy is available on the Approved Centre Web Portal.

### **3. RHS Level 3 Certificate in the Principles of Plant Growth, Health and Applied Propagation**

#### **3.1 Introduction**

This qualification provides a route to employment in professional horticulture by assessing knowledge of the scientific principles underpinning horticultural practices, and supports career development for those already working in the profession. It also provides a foundation for further learning or training in the field of horticulture.

There are no pre-requisites for entry to the qualification.

The qualification is accredited within the Qualifications and Credit Framework.

Accreditation Number: 500/8339/9

#### **3.2 Credit Value**

The qualification has a credit value of 15.

This equates to 150 learning hours. Learning time is defined as the time taken by learners at the level of the qualification, on average, to complete the learning outcomes of the units to the standard determined by the assessment criteria.

#### **3.3 Teaching Pattern**

The qualification is designed to be studied on a part-time basis. No particular teaching pattern is specified, and centres offering courses leading to the qualification are free to define their own teaching structure and teaching hours.

### 3.4 Qualification Structure

The qualification will be awarded to those who gain the credits for the following four mandatory units:

<b>RHS Ref</b>	<b>Unit</b>	<b>Credits</b>	<b>Level</b>
R3101	Plant taxonomy, structure, and function Unit reference number F/601/0993	5	3
R3102	The root environment, plant nutrition and growing systems Unit reference number M/601/1007	5	3
R3103	The management of plant health Unit reference number M/601/1038	3	3
R3104	Understanding applied plant propagation Unit reference number A/601/1043	2	3

### 3.5 Assessment

Each unit will be assessed by a separate written examination covering all learning outcomes specified in the unit.

Examinations must be taken in a centre approved by RHS Qualifications, or under arrangements for exceptional supervision agreed by RHS Qualifications.

Examinations must be conducted in accordance with the RHS Regulations for the Conduct of Examinations.

Examinations will be offered twice a year in February and June.

### 3.6 Language

Examinations will be offered in English.

### 3.7 Grading

Credits for a unit will be awarded to a candidate who achieves a mark of 50% or more in the written examination for that unit.

Where a candidate achieves a mark of 70% or more in the examination for the unit, the credits for the unit will be awarded with commendation.

<b>RHS Ref</b>	<b>Unit</b>	<b>Mark</b>	<b>Pass with Commendation</b>	<b>Pass</b>
R3101	Plant taxonomy, structure, and function	100	70	50
R3102	The root environment, plant nutrition and growing systems	100	70	50
R3103	The management of plant health	60	42	30
R3104	Understanding applied plant propagation	40	28	20

Where a candidate receives credits with commendation in all four mandatory units, the qualification will be awarded with commendation.

## 4. Approved Centres

Centres wishing to offer examinations leading to RHS qualifications must be approved by RHS Qualifications.

Applications for approval should be sent to the Quality Assurance and Relationships Officer at the contact details in section 1.

## 5. Candidate Registration

Candidates should be registered for examinations in the units of the qualification through the RHS Qualifications Web Portal.

Approved Centres undertake to obtain on behalf of their learners a Unique Learner Number (ULN) and a learner record, unless the learner chooses not to have one.

If centres supply an email address for candidates at the time of registration, candidates will be invited to open an account on the RHS Qualifications Web Portal, and will be able to view their examination history, their current registrations, and their results when available.

## **6. Reasonable Adjustments and Special Consideration**

RHS Qualifications is committed to ensuring fair assessment for all candidates, and will facilitate access to its qualifications through reasonable adjustments to assessment arrangements for candidates with an identified specific need. An example of a reasonable adjustment which could be made is the production of a modified examination paper for a candidate with a visual impairment.

Special consideration is given following the examination to candidates who are present for the examination but may have been disadvantaged by temporary illness, injury or adverse circumstances which arose at, or near, the time of examination.

Full guidance is provided in the document 'Guidance to Centres for Reasonable Adjustments and Special Consideration'. The document is available on the RHS website ([www.rhs.org.uk](http://www.rhs.org.uk)), the RHS Qualifications Approved Centre Web Portal, or can be obtained from RHS Qualifications.

Applications for reasonable adjustments or special consideration must be made by the Approved Centre on behalf of the candidate. Application must be made within specified timescales.

## **7. Enquiry about Results service**

The following service is available to candidates who have a query regarding their examination result:

### **Re-mark and Feedback**

Re-marking of the examination paper by an independent examiner.  
Feedback will be provided identifying areas of strength and weakness with constructive suggestions for improvement.

Candidates requesting a re-mark need to be aware that grades may go down as a result of the re-marking.

Applications for the 'Enquiry about Results Service' must be made through the Approved Centre where the candidate registered for the examination. This service will be available for 28 days from the date of release of the results to Approved Centres on the RHS webportal.

## **8. Examination Dates**

For a full list of examination dates please see the Qualifications and Credit Framework Examination Dates, this document is available on the Qualifications page on the RHS website and on the RHS Webportal.

## **9. Fees**

For a full list of fees please see the Qualifications and Credit Framework Fees Notice, this document is available on the Qualifications page on the RHS website and on the RHS Webportal.

All fees are payable prior to confirmation of service or entry for the examination.

### **Late Entries**

RHS Qualifications publishes annually, and distributes to Approved Centres, the closing dates of entry for each examination for the following year.

Entries submitted after the published closing date will be subject to a late entry fee. The total fee charged for late entries is twice the standard examination fee for each unit

### **Replacement Certificate (if lost, damaged or destroyed)**

The fee for a replacement certificate can be found on the Qualifications and Credit Framework Fees Notice. Please send your request to the Qualifications Department.

### **Re-mark & Feedback**

The fee for a remark and feedback can be found on the Qualifications and Credit Framework Fees Notice.

If a re-mark results in an upgrade of the result, the fee paid will be refunded.



## 10. Exemptions

The 'Regulatory arrangements for the Qualifications and Credit Framework' allow exemptions to be granted for units based upon certificated achievement in other qualifications. RHS Qualifications will grant exemption from specified units in RHS QCF qualifications where a candidate has passed certain components of RHS qualifications in the National Qualifications Framework (current RHS qualifications).

- All requests for exemption will be reviewed on a case by case basis. Applications must be made to RHS Qualifications and an administration fee will be charged
- Candidates will need to have obtained 50% of the available marks for the NQF component (within the Paper/Module) in order to obtain exemption from the QCF unit
- All exemptions are treated as equivalent to a pass. No certificate or credit is awarded for units for which exemption has been granted.

Applications for exemptions must be made through the Approved Centre where the candidate is registered. The fee for applying for exemptions can be found on the Qualifications and Credit Framework Fees Notice.

<b>RHS Qualification</b>	<b>Component unit</b>	<b>Exemption given for:</b>
Level 3 Module A	Understanding of plant propagation	Understanding applied plant propagation
Level 3 Module A	Processes and application of soils, growing media and plant nutrition	The root environment, plant nutrition and growing systems
Level 3 Module B	Plant taxonomy, morphology and anatomy AND Processes of plant physiology 1	Plant taxonomy, structure and function
Level 3 Module B	Knowledge of plant health	The management of plant health

## **11. Appeals Procedure**

An Appeals procedure exists to conduct appeals lodged by candidates against decisions made by RHS Qualifications, concerning their examination performance, the granting of an award and/or the closure of their entry to an award on academic grounds.

The procedure is also followed in cases where there is irregularity or malpractice in the conduct of examinations and where RHS Qualifications has imposed a penalty on a candidate, tutor or invigilator, and the Centre wishes to appeal against this decision after results are published.

A copy of the procedure is available on the RHS Qualifications Web Portal and on the RHS website.

## **12. Policy on Malpractice and Maladministration**

Malpractice consists of those acts which undermine the integrity and validity of the assessment or examination, the certification of qualifications and/or damage the authority of those responsible for conducting the assessment, examination and certification.

RHS Qualifications does not tolerate actions or attempted actions of malpractice by learners or centres in connection with RHS qualifications. RHS Qualifications may impose penalties and/or sanctions on candidates or centres where incidents, or attempted incidents, of malpractice have been proven.

A copy of the full policy is available on the RHS Qualifications Web Portal and on the RHS website.

## Plant taxonomy, structure, and function

**RHS reference number: R3101**

**Unit reference number: F/601/0993**

**Unit guided learning hours: 33**

**Unit Level: Level 3**

**Credit Value: 5**

Unit purpose and aim(s): This unit will enable the learner to understand the principles of plant classification and nomenclature and to identify the role and function of higher plants' anatomical and morphological features. The unit also examines photosynthesis, respiration and movement of water through the plant, together with the regulation of plant growth.

### Learning Outcomes

The learner will:

1. Understand the Plant Kingdom and the taxonomic hierarchy.
2. Know the structure and function of different types of plant tissues.
3. Understand the role of flowers and fruit in the life of the plant.

### Assessment Criteria

The learner can:

- 1.1 Describe the major divisions of the Plant Kingdom, including ferns, conifers, flowering plants, monocotyledons and dicotyledons.
- 1.2 State the basic hierarchical units and explain how and when they are used. To include: family, genus, species, subspecies, variety, forma, cultivar, group and trade designation; also interspecific, intergeneric and graft hybrids.
- 1.3 Evaluate the importance of botanical and horticultural nomenclature.
- 1.4 Explain how species names can indicate the origin, use, history, form, colour or habitat of a particular plant.
- 2.1 Describe a range of plant tissues, and explain their function within the plant. To include: parenchyma, collenchyma, sclerenchyma (fibres and sclerids), secondary vascular tissues and secondary protective tissues.
- 2.2 Describe the cell and tissue changes which occur during secondary thickening of the stem and root.
- 3.1 Identify and describe types of inflorescence, including raceme, spike, umbel, corymb, cyme, panicle, capitulum and verticillaster.
- 3.2 Describe the characteristics of monocotyledon and dicotyledon flowers.
- 3.3 Describe specific adaptations for a range of pollinators (bee, moth, fly, butterfly).

- 3.4 Identify and describe types of fruit, to include berry, drupe, pome, capsule, silique, achene, nut, legume and multiple fruits.
  - 3.5 Explain the meaning of the term parthenocarpy
- 4. Understand photosynthesis and respiration in the metabolism of the plant.
  - 4.1 Describe the process of photosynthesis, to include the chemical formula and dark and light reactions (no biochemical reactions are needed).
  - 4.2 Explain how environmental conditions in protected structures can be manipulated for photosynthetic efficiency.
  - 4.3 Differentiate between aerobic and anaerobic respiration, to include equations (no biochemical pathways are required).
  - 4.4 Describe the links between photosynthesis and respiration, to include compensation points.
- 5. Understand the movement of water and solutes through the plant.
  - 5.1 Explain how water and solutes enter, move through, and leave the plant. To include apoplast, symplast, endodermis, Casparian strip, transpirational pull, root pressure, capillary action, guttation and phloem transport hypotheses (active transport in outline only).
  - 5.2 Relate outdoor planting conditions to the efficiency of photosynthesis, respiration and transpiration.
- 6. Understand the effects of tropisms and other plant movements.
  - 6.1 Distinguish between tropisms and nastic movements
  - 6.2 Describe a range of positive and negative tropisms, to include phototropism, gravitropism (or geotropism) thigmotropism ( or seismotropism) and nastic movements to include thermonasty, photonasty and thigmonasty (seismonasty).
  - 6.3 Describe how various tropisms and other plant movements influence horticultural practice.

- 7. Understand the role of endogenous and synthetic regulators in plant growth.
  - 7.1 Describe how endogenous growth regulators (auxin, gibberellins, cytokinins, abscisic acid, ethene) are responsible for cell division and enlargement, accelerating growth, tropisms, inducing and breaking dormancy, vernalisation and apical dominance.
  - 7.2 Describe how differing concentrations of auxins and gibberellins influence plant growth.
  - 7.3 Distinguish between endogenous and synthetic growth regulators.

# The root environment, plant nutrition and growing systems

**RHS reference number: R3102**

**Unit reference number: M/601/1007**

**Unit guided learning hours: 33**

**Unit Level: Level 3**

**Credit Value: 5**

Unit purpose and aim(s): This unit provides the underpinning knowledge required for the management of soils, growing media and plant nutrition and an understanding of organic growing systems.

## Learning Outcomes

The learner will:

1. Understand the physical properties of soils and other growing media and their effects on plant growth.

## Assessment Criteria

The learner can:

- 1.1 Explain the process of soil formation and development.
- 1.2 Describe the following UK soil types and their effects on plant growth: iron pan podzol, brown earth, rendzina, and gleys.
- 1.3 Review the properties of soil organic matter, colloids, and mineral components, to include their buffering capacity.
- 1.4 Critically compare the physical and chemical properties of a range of constituents used in growing media. To include peat, sand, loam, grit, coir, perlite, vermiculite and rockwool.
- 1.5 Critically compare a range of soil structures and describe their effects on plant growth. To include crumb, blocky, prismatic, platy, massive and structureless.
- 2.1 Describe the relationship between air and water content in the pore space of soils and growing media, including definitions of Air Filled Porosity, Saturation Point, Field Capacity, Temporary and Permanent Wilting Points and Available Water Content.
- 2.2 Describe management techniques to help maintain soil moisture at appropriate levels.

2. Understand the relationship between plant growth and air and water in soils and other growing media.

	2.3	Describe how factors including soil texture, soil structure, organic matter content, soil moisture deficit, irrigation and precipitation relate to the soil terms listed in 2.1.
3. Understand the role of living organisms in soil processes.	3.1	Summarise the biological activity that takes place in soils and growing media during the production of humus from organic matter.
	3.2	Describe the carbon and nitrogen cycles and summarise the role of nitrogen-fixing organisms.
	3.3	Explain why knowledge of the carbon: nitrogen ratio is important when adding organic matter to the soil.
	3.4	Compare the roles of the rhizosphere and mycorrhizal associations in aiding healthy plant growth.
4. Understand the chemistry of soils and other growing media.	4.1	Define the terms anion and cation, and explain the significance of cation exchange in soils and growing media.
	4.2	Compare liming materials which can be used to raise pH for optimum growing conditions.
5. Understand the role of nutrients in plant growth.	5.1	Explain the factors that affect the availability of plant nutrients in soils and growing media, to include pH, texture, soil organisms, temperature, oxygen and water availability and leaching.
	5.2	Describe the symptoms of nutrient deficiencies, to include N, P, K, Mg, Ca, Fe and Mn.
	5.3	Describe a range of fertiliser formulations; to include straight, compound, mixtures, controlled release, slow release and frits.
	5.4	Explain the selection of appropriate fertilisers and application rates for the optimisation of plant growth.
6. Understand the philosophy of organic growing.	6.1	Explain the requirements of UK certification schemes for organic status.
	6.2	Explain the difference between non-organic and organic soil management, with reference to water use, nutrients and soil health.
	6.3	Describe the range of organic soil management techniques, including 'no-dig' systems, green manuring and control of weeds.

- 6.4 Describe a range of fertilisers suitable for organic growing.
- 6.5 Describe methods of controlling pests and diseases in organic systems.



# The management of plant health

**RHS reference number: R3103**

**Unit reference number: M/601/1038**

**Unit guided learning hours: 20**

**Unit level: Level 3**

**Credit Value: 3**

Unit purpose and aim(s): This unit provides the underpinning knowledge of pest and disease life cycles and plant disorders. It provides knowledge of control methodology and sources of information on relevant legislation.

## Learning Outcomes

The learner will

1. Know the characteristics of a range of pests, diseases and disorders of horticultural significance.

## Assessment Criteria

The learner can:

- 1.1 Describe symptoms and damage caused by a range of pests, diseases and disorders as listed below.  
  
Pests: glasshouse whitefly, two-spotted spider mite, peach potato aphid, horse chestnut leaf miner, vine weevil, capsid bug, mealy bug, lily beetle, thrips, scale, solomon's seal sawfly, rodents.  
Diseases: grey mould, powdery mildew, damping off, honey fungus, rose black spot, rust, Phytophthora ramorum and P.kernoviae; canker, coral spot, clematis wilt.  
Disorders: fasciation, reversion, rose balling, environmental stress, high/low temperature damage.
- 1.2 Describe the life cycles of a range of plant pests and diseases (peach potato aphid, vine weevil, scale, rust) with an emphasis on survival, spread and transmission.
- 1.3 State a range of appropriate methods of control (to include chemical, cultural, biological and integrated control, and partial sterilisation of soils and media) for each of the pests, diseases and disorders listed in 1.1.
- 1.4 State how pests and diseases develop resistance to chemical control.
- 1.5 Describe how biosecurity measures, to include phytosanitary legislation, plant passports and codes of practice, are intended to prevent the distribution of pests and diseases through trade and plant movement.

- |  |   |     |   |     |  |
|--|---|-----|---|-----|--|
| <b>2.</b> Be able to review the requirements and regulations that deal with storage, handling and safe use of chemicals used for plant protection. | <table border="0"><tr><td style="vertical-align: top; padding-right: 10px;">2.1</td><td>Identify sources of information on current pesticide legislation and on statutory requirements relating to health and safety and to substances hazardous to health.</td></tr><tr><td style="vertical-align: top; padding-right: 10px;">2.2</td><td>Identify necessary competences in dealing with pesticides.</td></tr></table> | 2.1 | Identify sources of information on current pesticide legislation and on statutory requirements relating to health and safety and to substances hazardous to health. | 2.2 | Identify necessary competences in dealing with pesticides. |
| 2.1  | Identify sources of information on current pesticide legislation and on statutory requirements relating to health and safety and to substances hazardous to health.   |     |   |     |  |
| 2.2  | Identify necessary competences in dealing with pesticides.  |     |   |     |  |

# Understanding applied plant propagation

**RHS reference number: R3104**

**Unit reference number: A/601/1043**

**Unit guided learning hours: 13**

**Unit level: Level 3**

**Credit Value: 2**

Unit purpose and aim(s): This unit provides an understanding of the relevance of plant anatomy and physiology to applied propagation by seed, spores and vegetative methods. The management of the associated equipment and aftercare is also covered.

## **Learning Outcomes**

The learner will:

1. Understand the relevance of anatomy, physiology and environmental factors to seed propagation.

2. Understand the relevance of anatomy, physiology and environmental factors to vegetative propagation.

## **Assessment Criteria**

The learner can:

- 1.1 Describe the importance of a range of anatomical features in the development of germinating seeds.
- 1.2 Describe the main physiological processes involved in the successful germination of seed, to include the role of hormones.
- 1.3 Describe the effects of hygiene, storage and germination conditions on the viability of seeds.
- 1.4 Explain a range of techniques for sowing seeds with different light and temperature requirements.
- 1.5 Describe the sowing of fern spores.
- 2.1 Explain the importance of the cambium, node, petiole, stem, leaf, root and axillary bud to vegetative propagation.
- 2.2 Explain the importance of the physiological processes of transpiration, respiration and photosynthesis to successful vegetative propagation.
- 2.3 Describe the propagation of a range of plants, using a range of techniques to include stem, leaf and root cuttings, layering, division, bulbs, grafting and budding.

- 3. Understand the use of a range of growing media and propagation equipment.
  - 3.1 Describe appropriate rooting media and propagation facilities (propagators, mist units, cold frames and low polythene tunnels) for the propagation techniques listed in 1.4, 1.5 and 2.3 above.
  - 3.2 Describe the aftercare (up to and including weaning) of the plants raised by the methods described above in 1.4, 1.5 and 2.3 above.