



National Unit specification: general information

Unit title: Aquaculture: Salmonid Hatchery Operations

Unit code: H03F 11

Superclass: SJ

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Summary

The purpose of this Unit is to provide candidates with the basic knowledge and skills necessary to maintain a salmonid hatchery and conduct routine husbandry operations, including the legislation related to the movements of live fin fish and eyed ova. Candidates will be able to demonstrate practical competence in routine fin fish hatchery husbandry operations from eyed ova, through first feeding to transfer for on-growing. They will also record and maintain accurate hatchery records.

The Unit is suitable for candidates who are either new entrants or those already working in aquaculture. Candidates must have access to a fin fish farm to achieve the practical competences.

This is an optional Unit in the NPA in Fish Husbandry (SCQF level 5) and the NPA in Fish Health and Nutrition (SCQF level 5). It is also available as a freestanding Unit.

Outcomes

- 1 Describe the procedures for receiving eyed ova.
- 2 Describe salmonid hatchery fish rearing facilities and equipment.
- 3 Describe juvenile salmonid rearing techniques.
- 4 Conduct routine hatchery stock husbandry operations.

Recommended entry

Entry is at the discretion of the centre.

General information (cont)

Credit points and level

1 National Unit credit at SCQF level 5 (6 SCQF credit points at SCQF level 5*).

**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 Access 1 to Doctorates.*

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the support notes of this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

National Unit specification: statement of standards

Unit title: Aquaculture: Salmonid Hatchery Operations (SCQF level)

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

All activities must be carried out according to current legislation and recognised Standard Operating Procedures (SOP).

Outcome 1

Describe the procedures for receiving and incubating eyed ova in accordance with current legislation.

Performance Criteria

- (a) Describe the procedures for handling and receiving eyed ova.
- (b) Describe the procedure for counting and incubating eyed ova.
- (c) Describe the environmental requirements of eyed ova during incubation.
- (d) Identify the role of legislative authorities in the movement and receipt of fin fish and ova including reference to current legislation.

Outcome 2

Describe salmonid hatchery fish rearing facilities and equipment.

Performance Criteria

- (a) Describe the designs of the fin fish holding Units commonly used in salmonid hatcheries.
- (b) Describe equipment required for routine salmonid fry husbandry.
- (c) Describe equipment required for environmental control in salmonid hatcheries.

Outcome 3

Describe juvenile salmonid rearing techniques.

Performance Criteria

- (a) Identify the visual signs which indicate when fin fish are ready to first feed.
- (b) Describe salmonid first feeding techniques.
- (c) Describe the control of fin fish development.
- (d) Describe routine fin fish hatchery husbandry practices.
- (e) Describe procedures used to prepare salmonid juveniles for on-growing.

National Unit specification: statement of standards

Unit title: Aquaculture: Salmonid Hatchery Operations (SCQF level)

Outcome 4

Conduct routine hatchery stock husbandry operations.

Performance Criteria

- (a) Monitor and maintain the environmental conditions within the fin fish rearing Units in accordance with SOP.
- (b) Carry out fin fish feeding according to SOP and observe the feeding response.
- (c) Handle live fin fish safely according to SOP for the equipment used.
- (d) Record fin fish hatchery data in accordance with SOP.

National Unit specification: statement of standards (cont)

Unit title: Aquaculture: Salmonid Hatchery Operations
(SCQF level 5)

Evidence Requirements for this Unit

Written and/or recorded oral evidence and performance evidence is required to demonstrate that candidates have achieved all Outcomes and Performance Criteria.

All activities must be carried out in accordance with current legislation. Candidates must have access to a fin fish farm to achieve the practical competences.

Outcome 1 — Written and/or recorded oral evidence is required

The candidate must:

- ◆ describe a minimum of three procedures for handling and receiving eyed ova.
- ◆ describe one ova counting technique.
- ◆ describe one ova incubation method.
- ◆ describe three environmental requirements of eyed ova during incubation.
- ◆ identify one role of the legislative authorities in relation to fish and ova movements.
- ◆ identify one principal statute that can be implemented by legislative authorities for the control of fin fish and ova movements.

Evidence will be produced in closed-book conditions.

Outcome 2 — Written and/or recorded oral evidence

The candidate must:

- ◆ describe the design for a minimum of two fry holding units including reference to structural components.
- ◆ describe two items of equipment required for routine hatchery husbandry and state their use.
- ◆ describe two items of equipment used for environmental control in a salmonid hatchery and state their use.

Evidence will be produced in closed-book conditions

Outcome 3 — Written and/or recorded oral evidence

The candidate must:

- ◆ identify one visual sign that indicates readiness for first feed.
- ◆ describe two techniques for first feeding juvenile fin fish.
- ◆ accurately describe one environmental control that could be used to manipulate the development of juvenile fin fish.
- ◆ describe a minimum of two routine hatchery husbandry practices.
- ◆ describe one procedure that can be used to prepare salmonid juveniles for on-growing.

Evidence will be produced in closed-book conditions.

National Unit specification: statement of standards (cont)

Unit title: Aquaculture: Salmonid Hatchery Operations
(SCQF level 5)

Outcome 4 — Performance and written and/or recorded oral evidence

The candidate must be able to perform the following tasks during routine hatchery operations:

- ◆ monitor and maintain the rearing environment in accordance with SOP on a minimum of three separate occasions.
- ◆ feed stock according to SOP, and observe the response on a minimum of four separate occasions.
- ◆ safely handle live fin fish on a minimum of four occasions, according to SOP.
- ◆ record accurate information according to SOP for a minimum of four routine hatchery operations.

Evidence will be produced in supervised open-book conditions.

National Unit specification: support notes

Unit title: Aquaculture: Salmonid Hatchery Operations (SCQF level 5)

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

This Unit is an optional Unit in both the National Progression Award in Fish Husbandry at SCQF level 5 and the National Progression Award in Fish Health and Nutrition at SCQF level 5. It is also available as a freestanding Unit.

The Unit is aligned to the following LANTRA Sector Skills Council's National Occupational Standard (NOS):

- ◆ Aqu 1 Prepare holding Units to receive fish
- ◆ Aqu 2 Stock fish into holding Units
- ◆ Aqu 3 Gather fish
- ◆ Aqu 4 Grade fish
- ◆ Aqu 6 Prepare to and feed fish
- ◆ Aqu 7 Collect information of fish growth and development
- ◆ Aqu 12 Monitor the aquatic production environment
- ◆ Aqu 13 Maintain environmental conditions within holding Units
- ◆ Aqu 14 Treat health problems in fish
- ◆ Aqu 17 Prepare to and maintain fish eggs in a hatchery
- ◆ Aqu 18 Care for juvenile fish
- ◆ Aqu 19 Prepare for the transport of live fish
- ◆ Aqu 20 Transport live fish
- ◆ Aqu 37 Work safely in an aquatic environment

This Unit is designed for delivery in the context of salmonid fish. Candidates should have access to a fin fish hatchery to achieve the practical competencies.

Outcome 1 — The candidate should develop knowledge of the routine SOPs in relation to receiving and handling eyed ova. This should include procedures for counting and laying down eyed ova in incubators, and the environmental requirements of incubating ova. The importance of disinfection using approved chemicals and prophylactic treatments to prevent fungal growth should also be emphasised. An awareness of the importance of checking movement records to identify origin and that ova are of the required specification should be emphasised. Candidates should be made aware of the legal requirements controlling the movements of live fin fish and ova, especially in relation to imports from other countries, health certification for disease free status and the dangers of introducing notifiable diseases.

Outcome 2 — The candidates should develop their understanding of salmonid hatchery design and operation. The relative merits of the range of holding Units used in salmonid hatcheries should be demonstrated for tanks and raceways constructed using a variety of materials.

National Unit specification: support notes (cont)

Unit title: Aquaculture: Salmonid Hatchery Operations (SCQF level 5)

The techniques and equipment that could be used for routine husbandry and to control fin fish development from alevin through to transfer for on-growing should be discussed with reference to feeding systems and techniques, environmental controls including water quality, temperature and photoperiod.

Outcome 3 — The visual signs that indicate when fin fish are ready to first feed should be discussed with reference to yolk sac absorption and swim-up behaviour. The differences between trout and salmon characteristics should be emphasised. Manipulation of the hatchery rearing environment (water depth, flow rates, water temperature and day length) to encourage salmon appetite could be considered for each stage of the rearing cycle.

Routine fish husbandry practices including grading, feeding and stock density regimes could be discussed, emphasising the importance of constant vigilance, hygiene and attention to detail. Candidates should develop knowledge of the practices necessary to ensure that high standards of fish welfare are maintained during routine fin fish husbandry and handling operations in a hatchery environment.

Candidates should be made aware of the commercial benefits of techniques used to shorten the salmon smolt production cycle, including photo-period and water temperature control. The particular demands of salmon in relation to assessment of smoltification and preparation for transfer should also be considered.

Outcome 4 — It is recommended candidates are involved in the routine monitoring and maintenance of a salmonid hatchery. Candidates should receive instruction in the routine husbandry operations in the hatchery before being encouraged to carry out a range of husbandry operations under supervision including; feeding stock, fin fish capture, sample weighing, grading and transportation. This should allow the candidates experience to develop over time.

The relationship between feeding, hatchery hygiene and fin fish welfare should be described, with candidates being made aware of the potential problems that can occur if hygiene standards are low. Emphasis should also be placed on the importance of maintaining accurate hatchery records.

The importance of carrying out all routine hatchery husbandry activities in line with current health and safety legislation should be emphasised including reference to SOP and the requirements for appropriate personal protective equipment (PPE).

National Unit specification: support notes (cont)

Unit title: Aquaculture: Salmonid Hatchery Operations
(SCQF level 5)

Guidance on learning and teaching approaches for this Unit

This Unit lends itself to a range of teaching and learning approaches that give consideration to the Curriculum for Excellence capacities and Equalities legislation, through reasonable adjustment for all candidates. Some formal teaching may be required to introduce the practices necessary to maintain a salmonid hatchery.

There is scope for candidate centred learning based on workbooks, web based resources and interactive ICT based learning objects presented within a virtual learning environment (VLE).

Interactive exercises and regular formative assessment, incorporating online multiple-choice is recommended, in order to develop the candidates understanding of the procedures required to receive ova and conduct routine husbandry operations from eyed ova to transfer, whilst remaining compliant with current legislation.

The candidate should be given the opportunity to become familiar with routine hatchery operations before becoming involved in those activities as part of the routine farm procedures.

Practical instruction in egg counting, administering treatments and feeding stock should also be given until candidates become familiar with the process.

The main delivery of this Unit should be based on a commercial scale salmonid hatchery. Practical tasks should be demonstrated before candidates are encouraged to become involved with regular husbandry routines which will allow their skills and experience to develop over an extended period. This will enable the candidate to observe and experience the seasonal changes in fin fish behaviour and appetite, improve their husbandry skills and become familiar with the practices necessary to maintain a salmonid hatchery.

It would be advantageous to have learning packages for both Atlantic salmon and trout. Although both species will share the same basic concepts in relation to routine hatchery operations, feeding and husbandry, there are differences in relation to stock manipulation and preparation for transfer to an on growing site.

Guidance on approaches to assessment for this Unit

Outcomes–3 could be assessed using restricted response questioning or oral examination. Assessment could also be gathered using online assessments in a VLE, or through candidate portfolios.

National Unit specification: support notes (cont)

Unit title: Aquaculture: Salmonid Hatchery Operations (SCQF level 5)

Outcome 4 requires the observation of practical activity with the results recorded on checklists to satisfy the Performance Criteria. Additional knowledge evidence is required to satisfy the requirements of this Outcome. This can be provided orally or written. Where the evidence is given orally, it is recommended that there should be written evidence in the form of farm records or a diary. Candidates could maintain their own ongoing log of hatchery activities, containing the associated records and calculations. This could be stored in a candidate portfolio, either paper based or e-portfolio.

Centres must be satisfied that the evidence submitted is the work of individual candidates. Assessor observation checklists and other assessment records should be maintained and kept up to date to keep track of candidate progress and to provide evidence for internal and external verification purposes.

Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

Opportunities for developing Core Skills

In this Unit candidates will develop skills in routine fin fish hatchery husbandry operations.

Candidates will:

- ◆ describe the procedures for receiving and handling eyed ova including counting and laying down eyed ova in incubators, environmental requirements of incubating ova and the importance of disinfection to prevent fungal growth.
- ◆ describe the legal requirements controlling the movements of live fin fish and ova.
- ◆ describe the merits of a range of salmonid hatchery design and operation.
- ◆ describe the techniques and equipment used for routine husbandry and controlling fin fish development.
- ◆ describe the visual signs that indicate fin fish are ready to first feed.
- ◆ describe process for manipulating the hatchery rearing environment to influence development of juvenile fin fish.
- ◆ carry out a range of husbandry operations under supervision including; feeding stock, fin fish capture, sample weighing, grading and transportation in line with current health and safety legislation and standard operating procedures.
- ◆ maintain accurate hatchery records.

This means that as candidates are doing this Unit they will be developing aspects of the Core Skills of *Communication* and *Numeracy*.

National Unit specification: support notes (cont)

Unit title: Aquaculture: Salmonid Hatchery Operations

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website www.sqa.org.uk/assessmentarrangements

History of changes to Unit

Version	Description of change	Date

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