



Animal &
Plant Health
Agency

Annual Report (2021 to 2022)

The National Reference Laboratory for *Trichinella* and *Echinococcus*

1 April 2021 to 31 March 2022



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Contents

1. Introduction	1
1.1 The National Reference Laboratory (NRL) for <i>Trichinella</i> and <i>Echinococcus</i>	1
1.2 Core functions and duties of the NRL for <i>Trichinella</i> and <i>Echinococcus</i>	1
1.3 Proficiency Testing	3
1.4 Official Laboratories	6
2.0 Results for the <i>Trichinella</i> EQA PT scheme distribution between April 2021 to March 2022.....	8
2.1 Results of the <i>Trichinella</i> EQA PT scheme distribution in March 2021.....	8
2.2 Results of the <i>Trichinella</i> EQA PT scheme distribution in June 2021.....	10
2.3 Results for the <i>Trichinella</i> EQA PT scheme distribution in September 2021.....	12
2.4 Results for the <i>Trichinella</i> EQA PT scheme distribution in December 2021	14
2.6 Results for the <i>Trichinella</i> EQA PT scheme for a 12-month rolling period.....	16
3.0 NRL EQAs for 2021	18
3.1 <i>Trichinella</i> EQA March 2021	18
3.2 <i>Echinococcus</i> EQA March 2021	19
4. Other NRL Activities.....	20
4.1 NRL recruitment	20
4.2 Meetings Attended	20
5. References	20
Appendix 1	22
Additional <i>Trichinella</i> and <i>Echinococcus</i> Surveillance Contracts	22
1. <i>Trichinella</i> testing of wild boar (WB) in England and Wales (contract OG0236).....	22
2. <i>Trichinella</i> testing of wild boar in Scotland (Project OG0248)	23
3. <i>Echinococcus multilocularis</i> surveillance in UK foxes 2020 to 2021	24
4. <i>Echinococcus multilocularis</i> surveillance in UK foxes 2021 to 2022	24

1. Introduction

1.1 The National Reference Laboratory (NRL) for *Trichinella* and *Echinococcus*

The Food Standards Agency (FSA) is the Competent Authority (CA) for the purpose of retained Regulation (EU) 2017/625 on Official Feed and Food Controls in the UK and has a legal obligation to designate National Reference Laboratories (NRLs).

The Animal and Plant Health Agency (APHA) is an executive agency of Defra (Department for Environment, Food and Rural Affairs) and as such provides impartial advice and testing services (to government and other agencies) that may be used to inform and assist with policy decisions. With a wide range of experience in Parasitology, the APHA laboratories at York continue to maintain expertise and diagnostic capability and are consequently well placed to cover the UK for parasitic diseases particularly for *Trichinella* and *Echinococcus*.

The NRL supplies trichinae required for the Proficiency Testing (PT) scheme that assesses the performance of Official Laboratories (OLs) in the detection of *Trichinella* in meat. The York NRL was United Kingdom Accreditation Service (UKAS) accredited in March 2017 for the wild boar digest assay for the detection of *Trichinella* (SOP PARA 050) and for a Polymerase Chain Reaction (PCR) method for the detection of *Echinococcus multilocularis*, *Echinococcus granulosus* and other cestodes (PARA 026, PARA 027 and PARA 029). The NRL supports and participates in a Quality Assurance (QA) Scheme for *Trichinella* through collaboration with colleagues at APHA Sutton Bonington QA Unit (VetQas). Additionally, the York laboratory takes part in an annual External Quality Assurance EQA Scheme for *Trichinella* and *Echinococcus* run by the European Reference laboratory for Parasites (EURLP).

1.2 Core functions and duties of the NRL for *Trichinella* and *Echinococcus*

- (a) co-operate internationally in their area of competence, including collaborating and participating in training courses and inter-laboratory comparative tests organised by international laboratories (where appropriate)

- (b) co-ordinate, for their area of competence, the activities of OLs responsible for the analysis of official controls samples to ensure the verification of compliance with feed and food law
- (c) where appropriate, organise comparative tests between the official national laboratories and ensure an appropriate follow-up of such comparative testing; ensure the dissemination of any information required by the CA
- (d) provide scientific and technical assistance to the CA, especially for the implementation of Multi Annual National Control Plans
- (e) participate in relevant national and international workshops and training courses and, where necessary, conduct training courses for the staff of OLs
- (f) upon request by the appropriate authority, actively assist in relevant foodborne incident and outbreak situations, should be equipped with, or have access to, the necessary equipment to perform their tasks in emergency situations and in cases of non-compliance of consignments, by carrying out confirmatory analysis
- (g) carry out research, evaluation and development of new and existing methods for the analysis of UK regulated and officially monitored foods and feed and emerging new risks to UK food safety
- (h) provide advice and expertise on standardisation of methods at CEN and ISO
- (i) obtain and maintain accreditation for official reference and other relevant regulatory methods for food and feed within the NRL area of competence
- (j) be responsible for carrying out other specific duties as required by the CA, where appropriate and by prior agreement
- (k) assess the capability and suitability of *Trichinella* testing laboratories prior to their designation as official laboratories, and, through regular auditing to agreed schedules, to ensure required standards for *Trichinella* testing are in operation
- (l) be impartial, free from any conflict of interests, and in particular not be in a situation which may, directly or indirectly, affect the impartiality of their professional conduct as regards the exercise of their tasks as NRLs
- (m) have contractual access to, suitably qualified staff with adequate training in analytical, testing and diagnostic techniques in their area of competence, and support staff as appropriate

- (n) possess, or have access to, the infrastructure, equipment and products needed to carry out the tasks assigned to them
- (o) ensure that their staff and any contractually engaged staff have good knowledge of international standards and practices and that the latest developments in research at national and international level are taken into account in their work
- (p) where relevant, validate the reagents and lots of reagents, establish and maintain up-to-date lists of available reference substances and reagents and of manufacturers and suppliers of such substances and reagents and secure access to any reference materials required in order to fulfil their responsibilities and support the relevant OLs
- (q) be equipped with, or have access to, the necessary equipment to perform their tasks in emergency situations; and where appropriate, assist the CA in food incidents by carrying out diagnosis and/or testing of samples, when necessary
- (r) where relevant, be equipped to comply with relevant biosecurity standards
- (s) maintain a list of the accreditation for the relevant OLs
- (t) liaise with other CA-appointed NRLs (as and when required)
- (u) have experience of, and be able to operate in accordance with, the relevant sampling and analysis legislation, including maintaining specific UK Accreditation Service (UKAS) accreditation (or equivalent) for the relevant analytes, and satisfactory performance in proficiency test schemes
- (v) be familiar with the enforcement system in operation in the UK

1.3 Proficiency Testing

A significant part of the NRL function is to train, audit and monitor approved *Trichinella* testing facilities in the UK. The NRL is responsible for reporting to the FSA who grant and maintain designations and it is a requirement that all designated *Trichinella* testing laboratories to participate in a Proficiency Testing (PT) scheme, which is an External Quality Assurance EQA scheme to monitor performance. The PT scheme is run by APHA Quality Assurance Unit (QAU). This is an independent unit that prepares, distributes and collates the results from a wide range of PT schemes. The NRL provides the trichinae samples for the *Trichinella* PT (PT0111) scheme to order. Trichinae of *Trichinella spiralis* are harvested from an infected mouse.

Trained staff in designated laboratories are required to examine the samples and participation will test their ability to detect and discern the presence or absence of trichinae in the samples. Four distributions are sent to participating laboratories throughout the year in March, June, September and December when each laboratory is sent 4 test samples. Trichinae are spiked into each of the 4 formalised samples and the concentration of trichinae (sample target) is varied between distributions and samples (with the numbers determined by the VetQas QAU). Sample targets are the same for all laboratories at each distribution.

The sum of total number of trichinae spiked into each of the 4 samples is then used as the target result and the sum of the actual recovery for each sample is used to calculate the percentage recovery for each laboratory. The results of the distributions are made available to the NRL by Vetqas QAU for scrutiny, comment and feedback to laboratories each quarter. Specific advice is given if low recovery was achieved. The pass criteria for acceptable recovery rates are taken from the publication by Rossi and Pozio (2008) and Rossi et al. (2015). For samples spiked with 4 or more larvae, the detection of at least 50% is considered acceptable whereas for samples spiked with 1 to 3 larvae, the detection of at least 1 larva is considered acceptable. The UK *Trichinella* PT scheme is based on the use of formalized trichinae and the FSA stipulates that a result of at least 75% recovery rate is regarded as satisfactory. If this standard is not achieved, the NRL investigates the reasons why and if necessary, undertakes a reality check visit and makes a recommendation to the FSA on the course of action.

To ensure consistent action and to ensure that all self-testing laboratories are clear about the course of action, should their recovery drop below the required standard, a decision tree is used (Table 1).

Table 1: Action Decision Tree for assessing results from the quarterly PT exercises

First Instance

Result	Action
Nil Return	Not operational – NRL recommendation to FSA to revoke designation
Nil Return	Operational – NRL to investigate and make recommendation to FSA
Below 50%	NRL to investigate and make recommendation to FSA
Below 75%	NRL to investigate and make recommendation to FSA
75% or above	Satisfactory result received – No action by NRL

Second Instance (following an unsatisfactory first instance outcome)

Result	Action
Nil Return	Not operational – NRL recommendation to FSA to revoke designation
Nil Return	Operational – NRL recommendation to FSA to revoke designation
Below 50%	NRL recommendation to FSA to revoke designation
Below 75%	NRL to investigate and make recommendation on reason and course of action to FSA

Third Instance (following an unsatisfactory second instance outcome)

Result	Action
Below 75%	NRL recommendation to FSA to revoke designation. FSA to subsequently make the decision on removal of designation and send letter.

Reference material such as formalised trichinae, photographs of apparatus and videos of live trichinae are kept at the NRL and are readily available to testing laboratories for refresher training of staff. The laboratories continue to have the opportunity to request further interim QA samples from the NRL to assist with internal training and may request help with training or further inspection from the NRL to help identify problem areas at any time.

1.4 Official Laboratories

In March 2021, there were 12 designated *Trichinella* self-testing facilities and 3 contracted government laboratories in operation, including the NRL. Table 2 shows the list of all designated operational laboratories during 2021 to 2022 and a full list of contact details is maintained by the NRL.

Table 2: List of approved government contracted and self-testing official laboratories (OL) carrying out *Trichinella* testing in 2020 to 2021

OL ID	OL Type
1706	government
1787	government
1921	government
1150	self-tester
1443	self-tester
1447	self-tester
1620	self-tester
1632	self-tester
1824	self-tester
2475	self-tester
2658	self-tester
2993	self-tester
3145	self-tester
3323*	self-tester
3638	self-tester

* Official laboratory 3323 declared that they would no longer be receiving free range pigs from 13 December and therefore would not be carrying out *Trichinella* testing after this date.

2.0 Results for the *Trichinella* EQA PT scheme distribution between April 2021 to March 2022

Results of the *Trichinella* EQA PT scheme for this reporting period will cover the performance of 15 testing laboratories (12 self-testers and 3 government contracted labs).

2.1 Results of the *Trichinella* EQA PT scheme distribution in March 2021

A total of 14 *Trichinella* testing facilities participated in the March 2021 distribution (Table 3). Of the participating laboratories, 93% successfully passed the March 2021 distribution *Trichinella* PT distribution scoring between 76 to 100% in overall *trichinae* recovery rate. Testing facility 1620 failed the distribution scoring an overall recovery rate of 71%. No false positive or false negatives were recorded by any of the participating facilities.

Table 3: Individual sample results (raw data and %) from the March 2021 *Trichinella* EQA PT scheme for government contracted and self-testing laboratories

Note: any numbers marked as red denote a failure.

OL ID	Sample 21/4008	Sample 21/4009	Sample 21/4010	Sample 21/4011	Overall score (%)
Intended result	7 (100%)	4 (100%)	0 (100%)	6 (100%)	17 (100%)
1150	7 (100%)	4 (100%)	0 (100%)	5 (83%)	16 (94%)
1443	7 (100%)	4 (100%)	0 (100%)	6 (100%)	17 (100%)
1447	5 (71%)	4 (100%)	0 (100%)	4 (67%)	13 (76%)
1620	5 (71%)	2 (50%)	0 (100%)	5 (83%)	12 (71%) failure
1632	7 (100%)	4 (100%)	0 (100%)	6 (100%)	17 (100%)
1706	7 (100%)	4 (100%)	0 (100%)	6 (100%)	17 (100%)
1787	7 (100%)	4 (100%)	0 (100%)	6 (100%)	17 (100%)
1824	7 (100%)	4 (100%)	0 (100%)	6 (100%)	17 (100%)
1921	7 (100%)	4 (100%)	0 (100%)	6 (100%)	17 (100%)
2475	7 (100%)	4 (100%)	0 (100%)	6 (100%)	17 (100%)
2993	7 (100%)	4 (100%)	0 (100%)	6 (100%)	17 (100%)
3145	7 (100%)	4 (100%)	0 (100%)	6 (100%)	17 (100%)
3323	6 (86%)	2 (50%)	0 (100%)	5 (83%)	13 (76%)
3638	7 (100%)	4 (100%)	0 (100%)	5 (83%)	16 (94%)

2.2 Results of the *Trichinella* EQA PT scheme distribution in June 2021

A total of 15 *Trichinella* testing facilities participated in the June 2021 distribution (Table 4). Of the participating laboratories 87% successfully passed this *Trichinella* PT distribution scoring between 77 to 100% in overall *trichinae* recovery rate. One lab (1447) over scored in one sample (4009) resulting in an overall recovery rate of 108%. Testing facilities 1632 and 2658 failed the distribution scoring overall recovery rates of 69% and 31% respectively.

Lab 2658 is a recently designated *Trichinella* facility (Dec, 2020) and these results represent their first participation within the VetQas *Trichinella* EQA PT scheme. Following an investigation, the NRL was informed samples had been refrigerated before being read. No false positive or false negatives were recorded by any of the participating facilities.

Table 4: Individual sample results (raw data and %) from the June 2021 *Trichinella* EQA PT scheme for government contracted and self-testing laboratories.

Note: any numbers marked as red denote a failure and any numbers in blue denote overcounting.

OL ID	Sample 21/4025	Sample 21/4026	Sample 21/4027	Sample 21/4028	Overall score (%)
Intended result	3 (100%)	6 (100%)	0 (100%)	4 (100%)	13 (100%)
1150	3 (100%)	6 (100%)	0 (100%)	4 (100%)	13 (100%)
1443	3 (100%)	6 (100%)	0 (100%)	4 (100%)	13 (100%)
1447	3 (100%)	7 (117%)	0 (100%)	4 (100%)	14 (108%) overcounting
1620	2 (67%)	6 (100%)	0 (100%)	3 (75%)	11 (85%)
1632	3 (100%)	4 (67%)	0 (100%)	2 (50%)	9 (69%) failure
1706	3 (100%)	6 (100%)	0 (100%)	4 (100%)	13 (100%)
1787	3 (100%)	6 (100%)	0 (100%)	4 (100%)	13 (100%)
1824	3 (100%)	6 (100%)	0 (100%)	4 (100%)	13 (100%)
1921	3 (100%)	6 (100%)	0 (100%)	4 (100%)	13 (100%)
2475	3 (100%)	6 (100%)	0 (100%)	4 (100%)	13 (100%)
2658	1 (33%)	2 (33%)	0 (100%)	1 (25%)	4 (31%) failure
2993	3 (100%)	6 (100%)	0 (100%)	4 (100%)	13 (100%)
3145	3 (100%)	5 (83%)	0 (100%)	2 (50%)	10 (77%)

3323	3 (100%)	5 (83%)	0 (100%)	3 (75%)	11 (85%)
3638	3 (100%)	4 (67%)	0 (100%)	3 (75%)	10 (77%)

2.3 Results for the *Trichinella* EQA PT scheme distribution in September 2021

A total of 14 *Trichinella* testing facilities participated in the September 2021 distribution (Table 5). All participating laboratories successfully passed this *Trichinella* PT distribution scoring between 75 to 100% in overall *trichinae* recovery rate.

One lab (1787) did not participate in this distribution. Following an investigation by the NRL, this was due to a breakdown in communication due to the QA manager self-isolating with COVID-19. As a result, the readings did not get past the QC stage. This facility confirmed it will subsequently conduct a CAPA follow-up to find a more rigorous procedure and avoid reoccurrence.

Table 5: Individual sample results (raw data and %) from the September 2021 *Trichinella* EQA PT scheme for government contracted and self-testing laboratories.

OL ID	Sample 21/4025	Sample 21/4026	Sample 21/4027	Sample 21/4028	Overall score (%)
Intended result	5 (100%)	0 (100%)	4 (100%)	3 (100%)	12 (100%)
1150	5 (100%)	0 (100%)	4 (100%)	3 (100%)	12 (100%)
1443	5 (100%)	0 (100%)	4 (100%)	3 (100%)	12 (100%)
1447	5 (100%)	0 (100%)	4 (100%)	2 (67%)	11 (92%)
1620	5 (100%)	0 (100%)	4 (100%)	2 (67%)	11 (92%)
1632	5 (100%)	0 (100%)	3 (75%)	3 (100%)	11 (92%)
1706	5 (100%)	0 (100%)	4 (100%)	3 (100%)	12 (100%)
1787					Nil Return
1824	5 (100%)	0 (100%)	4 (100%)	3 (100%)	12 (100%)
1921	5 (100%)	0 (100%)	4 (100%)	3 (100%)	12 (100%)
2475	5 (100%)	0 (100%)	4 (100%)	3 (100%)	12 (100%)
2658	2 (40%)	0 (100%)	4 (100%)	3 (100%)	9 (75%)
2993	5 (100%)	0 (100%)	4 (100%)	3 (100%)	12 (100%)
3145	5 (100%)	0 (100%)	3 (75%)	3 (100%)	11 (92%)
3323	4 (80%)	0 (100%)	4 (100%)	3 (100%)	11 (92%)
3638	2 (40%)	0 (100%)	4 (100%)	3 (100%)	10 (77%)

2.4 Results for the *Trichinella* EQA PT scheme distribution in December 2021

A total of 13 *Trichinella* testing facilities participated in the December 2021 distribution (Table 7). Of the participating laboratories 85% successfully passed this *Trichinella* PT distribution scoring between 88 to 100% in overall *trichinae* recovery rate.

Testing facilities 1443 and 1632 failed the distribution by scoring false positives in sample 21/4028. Following an investigation by the NRL, testing facility 1443 confirmed that this was a result of a clerical error. After consultation with the FSA, this result should be considered as a 'rogue' result (extenuating circumstances) and providing this facility scores >75% in the next PT round, there should be no question about their competence to carry out the testing. There was no underlying reason for the false positive scored by facility 1632 however, there has been a recent change in QA manager. It was recommended that staff from this facility attend training, and an audit of this lab has subsequently been carried out.

Two other labs (1447 and 2993) did not participate in this distribution. In the case of facility 2993, the reason behind the non-submission of results was human error. This lab will subsequently implement a more rigorous procedure to avoid any similar future reoccurrence – specifically a second responsible member of staff to ensure the submission of results is completed. Following an investigation by the NRL, facility 1447 was unable to submit reset their readings for this distribution due to no staff member being aware of their username and password following the QA manager's maternity leave.

Table 6: Individual sample results (raw data and %) from the December 2021 *Trichinella* EQA PT scheme for government contracted and self-testing laboratories.

Note: any numbers marked as red denote a failure.

OL ID	Sample 21/4025	Sample 21/4026	Sample 21/4027	Sample 21/4028	Overall score (%)
Intended result	0 (100%)	3 (100%)	5 (100%)	0 (100%)	8 (100%)
1150	0 (100%)	3 (100%)	5 (100%)	0 (100%)	8 (100%)
1443	0 (100%)	3 (100%)	0 (0%)	5 (0%)	3 (38%) failure
1447					Nil Return
1620	0 (100%)	3 (100%)	4 (80%)	0 (100%)	7 (88%)
1632	0 (100%)	3 (100%)	4 (80%)	1 (0%)	7 (88%) failure
1706	0 (100%)	3 (100%)	5 (100%)	0 (100%)	8 (100%)
1787	0 (100%)	3 (100%)	4 (80%)	0 (100%)	7 (88%)
1824	0 (100%)	3 (100%)	5 (100%)	0 (100%)	8 (100%)
1921	0 (100%)	3 (100%)	5 (100%)	0 (100%)	8 (100%)
2475	0 (100%)	3 (100%)	5 (100%)	0 (100%)	8 (100%)
2658	0 (100%)	3 (100%)	5 (100%)	0 (100%)	8 (100%)
2993					Nil Return
3145	0 (100%)	3 (100%)	4 (80%)	0 (100%)	7 (88%)
3323	0 (100%)	3 (100%)	5 (100%)	0 (100%)	8 (100%)
3638	0 (100%)	3 (100%)	5 (100%)	0 (100%)	8 (100%)

2.5 Results for the *Trichinella* EQA PT scheme distribution in March 2022

The NRL and other OLs will participate in the March 2022 *Trichinella* EQA distribution on 22 March 2022. Results on the performance of the NRL as well as that of all the *Trichinella* OL facilities will be received from VetQas in May 2022.

2.6 Results for the *Trichinella* EQA PT scheme for a 12-month rolling period

To summarise the performance of the contracted government (1706, 1787 and 1921) and self-testing laboratories in the *Trichinella* EQA exercises, the average trichinae recovery rates have been calculated for each EQA distribution over the last 12 months (Table 7). All false positives, nil returns and over scoring was removed during this calculation.

On average, the contracted government laboratories performed better than the self-testing laboratories, averaging a 99% recovery for over the last 4 PT distributions that they have participated in. Over the last 12 months however, self-testing laboratories have also performed well and achieved an average recovery rate of 90% for this period.

Table 7: Overall trichinae recovery rate (%) recovered by government contracted and self-testing laboratories over a 12-month rolling period.

Note: any numbers marked as red denote a failure and any numbers in blue denote overcounting.

OL ID	March 2021	June 2021	September 2021	December 2021
1150	94	100	100	100
1443	100	100	100	38 (failure)
1447	77	108 (overcounting)	92	N/A
1620	71 (failure)	85	92	88
1632	100	69	92	88
1706	100	100	100	100
1787	100	100	N/A	88
1824	100	100	100	100
1921	100	100	100	100
2475	100	100	100	100
2658	Designated in December 2020 and not due to participate	31 (failure)	75	100
2993	100	100	100	N/A
3145	100	77	92	88
3323	77	85	92	100
3638	94	77	75	100

Overall, the NRL is pleased with the results achieved over the last 12-month rolling period of *Trichinella* PT's. However, lab 1632 has under-performed during *Trichinella* PT's over the last 12 months, failing to score the required $\geq 75\%$ *trichinae* recovery rate during one of the distributions, and also recording a false positive during this period. They have been invited for NRL training date in April TBC and have been audited which revealed no major faults with the facility.

3.0 NRL EQAs for 2021

3.1 *Trichinella* EQA March 2021

The NRL participated in the EURLP led International Proficiency Testing in March 2021 (15 to 19 March 2021). Meatballs inoculated with live *Trichinella* larvae and *Echinococcus* (worms for sedimentation and DNA for molecular diagnosis and speciation) were received at the NRL on 16 March 2021 and processed by the NRL technical staff at York. Three samples were received for each test and results were reported within the deadline submission date. The live *Trichinella* digests were conducted on 16 March 2021 and reported onto the EURLP website using the provided logon details. The result of the EURLP led International Trichinella Proficiency Testing Scheme (PT-01) from March 2021 was obtained in July and is shown in Table 8.

Table 8: EURLP PT-01 testing distribution from March 2021 showing trichinae recovery rate (raw data and %), and the difference between observed and reported result (Δ).

Meat	Weight (g)	Code	Spiked Larvae	Recovered Larvae (Raw data and %)	Δ (Delta)
Pork	100	7289	4	4 (100%)	0
Pork	100	5132	4	2 (50%)	2
Pork	100	6056	4	4 (100%)	0

3.2 *Echinococcus* EQA March 2021

The *Echinococcus* Sedimentation and Counting Technique (SCT) for the detection of adult worms in the mucosa (PT-05) was conducted and reported on 17 March 2021. The NRL received a final evaluation of “positive”, as one or more *Echinococcus* spp. adult worms were recovered in spiked samples and no worm was recovered in the samples which were not spiked (Table 9).

Table 9: Results from the EURLP PT-05 showing the recovery of *Echinococcus* spp. adult worms from each sample.

Sample	Number of Spiked Worms	Number of Recovered Worms	Evaluation
EG7	0	0	Correct
EG8	15	5	Correct
EG9	15	9	Correct

The results for the molecular identification of *Echinococcus* at the species level (PT-08) were completed and reported on 19 March 2021. The NRL received a final evaluation of “positive” as all species were correctly identified (Table 10).

Table 10: Results from the EURLP PT-08 showing the recovery of *Echinococcus* spp. adult worms from each sample.

Item Code	Result Observed	Result Expected	Evaluation
EGM7	<i>E. multilocularis</i>	<i>E. multilocularis</i>	Correct
EGM8	Negative	<i>Negative</i>	Correct
EGM9	<i>E. granulosus sensu lato</i>	<i>E. granulosus s.l.</i>	Correct

4. Other NRL Activities

4.1 NRL recruitment

The NRL successfully recruited a new Parasitology Lead (Senior Executive Officer) who joined the team on 1 June. The NRL has also recruited an Assistant Parasitologist (Administrative Officer) who joined on 17 January, and a laboratory manager (Higher Executive Officer) to provide maternity cover for 12 months, who has assumed his duties on 14 March. Two further Assistant Parasitologist vacancies are currently live, with staff expected to join the team in April.

4.2 Meetings Attended

The 16th Annual Workshop of the National Reference Laboratories for Parasites hosted by the EURLP was held on 14 November 2021. The UK NRL was represented by 3 members of staff.

5. References

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Date: 11/05/2022

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Appendix 1 - Additional *Trichinella* and *Echinococcus* Surveillance Contracts

1. *Trichinella* testing of wild boar (WB) in England and Wales (contract OG0236)

Summaries detailing wild boar sample ID, collection date, sample origin, kill date, test date, report date, digest number and results are provided to FSA operations on a monthly basis. Numbers of wild boar samples submitted per month from April to August have consistent throughout the year to date (Table 11). Numbers of wild boar samples submitted per month from April 2021 to March 2022 are shown in Table 11. No *Trichinella* species were isolated from any of the submitted samples.

Table 11: Monthly figures for *Trichinella* Testing of Wild Boar from April 2021 to March 2022

Month	Sample Number	Cumulative Samples
April 2021	73	73
May 2021	77	150
June 2021	58	208
July 2021	86	294
August 2021	121	415
September 2021	96	511
October 2021	69	580
November 2021	84	664
December 2021	72	736
January 2022	47	783
February 2022	38	821
March 2022	32	853

2. *Trichinella* testing of wild boar in Scotland (Project OG0248)

The Service Level Agreement (SLA) for monitoring *Trichinella* in Feral Wild Boar in Scotland signed between APHA and Food Standards Scotland (FSS) remains ongoing. Summaries detailing wild boar sample ID, collection date, sample origin, kill date, test date, report date, digest number and results are provided to FSS operations on a monthly basis. Between April 2021 and March 2022, the NRL received a total of 35 samples. No *Trichinella* species were isolated from any of the submitted samples.

3. *Echinococcus multilocularis* surveillance in UK foxes 2020 to 2021

For the 2020 to 2021 surveillance, the NRL collected a total of 843 foxes provided by a network of pest controllers between March 2020 to February 2021. Foxes underwent post-mortem and NRL technical staff retrieved faecal samples which were frozen for subsequent analysis. A total of 500 faecal samples retrieved from foxes across the UK were spatially selected to be included in the 2020 to 2021 surveillance and tested for *E. multilocularis* using the methodology described by Learmount et al. (2012). The final report was sent on 27 May 2021 with the conclusion that no positive result for *E. multilocularis* was observed.

4. *Echinococcus multilocularis* surveillance in UK foxes 2021 to 2022

For the 2021 to 2022 surveillance, the NRL collected a total of 868 foxes provided by a network of pest controllers between March 2021 to February 2022. Foxes underwent post-mortem and NRL technical staff retrieved faecal samples which were frozen for subsequent analysis. A total of 500 faecal samples retrieved from foxes across the UK were spatially selected to be included in the 2021 to 2022 surveillance and tested for *E. multilocularis* using the methodology described by Learmount et al. (2012).