**Liver Fluke Diagnostics and Detection**

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| **Test** | **Application /limitations** | **Additional comments** |
| **Post-mortem examination** | The definitive diagnostic test for liver fluke.  | Abattoir data also very useful. Sheep (lambs) are the best sentinels.Farmers may have to ask (push) for this information  |
| **Fluke Egg Detection****Individual or composite samples**  | The standard sedimentation test can lead to false negatives because:* It is too early – no egg laying adult fluke present
* In 70% of cases the sample size submitted is too small 40/50g is essential to improve sensitivity.
* The faeces are too dilute in scouring animals
* Cattle have low egg outputs and there are large variations between individual animals
 | Most labs do not count fluke eggs, they simply report a positive or negative according to whether or not they see any fluke eggs in the sample.For a follow up to a drench test failure an FECRT would require finding a lab to do a count rather than simple detection. |
| **Blood Chemistry – liver enzymes** | Liver enzyme (AST; GLDH ) activity due to damage by fluke will begin to rise (3-4 x normal) from 13 days after infection. GGT levels rise 40 days after infection.  | Interpretation can be difficult and generally raised activity of these enzymes is only a tool supportive of other diagnostics. |
| **Serology** | This test is available for cattle throughout the UK but labs in Scotland and N Ireland offer it fro sheep. It detects antibodies from 2-4 weeks post infection but levels may rise and fall over time. Also used in goats. | Sensitivity can be improved by sampling animals that are most likely to be naïve i.e. young animals with lambs being better than calves. |
| **Bulk Milk Tests**  | Positive detection when the prevalence in the sample herd is >25%. BMT should only be used as a monitoring tool to inform farmers if further investigation is required. Some labs categorise as low , medium or high as guidance | Care required – BMT only indicates exposure of the herd to liver fluke. BMT should **Not** be used to determine the need to treat, it is only a guide to the need for testing individual animals.  |
|  | **Under development / validation** |  |
| **Coproantigen**  | Detects liver fluke proteins in the faeces before and during egg laying which means it should be possible to detect infection earlier (up to 3 weeks earlier). Individual rather than composite samples are giving more reliable results. | Results from NI system are promising; GB results less so but further work is being undertaken. |
| **PCR technology** | One for the future. Various research groups are looking for candidates, some report progress but still a long way of a commercial test.  |  |

**Detecting Anthelmintic Resistance in Liver Fluke**

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| **Drench Check** | Faeces sample positive for fluke pre-treatment followed by a second sample 21 days after treatment  | Simple test to indicate the need for further investigation.Not applicable if no adult fluke present (i.e. negative FEC at treatment). |
| **FECRT** | This requires a count of fluke eggs rather than simply detection. Resistance said to be present with reduction of <80% after 3 weeks. | Note: TCBZ only. There are no validated tests for either closantel or nitroxynil |
|  | **Under development / validation** |  |
| **Histology** | Distinct changes in the histology of resistant fluke have been identified. Requires the recovery of live fluke which poses a practical issue but results are promising. | Fairweather and Hanna group NI |
| **Egg Hatch Assay**  | May have potential but currently nothing validated.  |  |
| **Molecular markers** | Under investigation for candidates |  |