

### **Penllywn: Notes from field visits for tensiometers and OLF**

Tips that occurred at the start of the monitoring process should be ignored as the systems were being tested. Please see comment boxes.

02/06/05	Tensiometers installed
14/06/05	Connected tensios to loggers and degassed
19/07/05	Downloaded data and on inspection noticed that all sensors were giving the same, non sensible, readings. This was attributed to a storm event that may have caused some sort of electrical surge in the logger. The same was observed in all manipulation plot loggers.
26/07/05	Degassed tensios and cut grass
01/09/05	Changed the wiring for OLF
09/10/05	Traps full of water and gutter blocked. Do not know for how long it was blocked. Ignore any data between collected in the afternoon of this day. The pump in trap 2 had to be rewired
1/11/05	Data was downloaded. All holes were full of water because the pump battery had run out. All gutters were blocked, mainly with dead worms.
9/11/05	All holes full of water, trap 2 pump required rewiring.
1/12/05	Ignore 9 tips recorded at trap 2 around <b>1100 GMT</b> . These were test runs
05/12/05	<p>All holes full of water – pumped out.</p> <p>Tiny tag in plot 1 had stopped logging just after last download 1/12/05 10:40. restarted 5/1/06 ~ 1200. It was also observed that there was some green stuff (algae) inside the connecting port of the tiny tag.</p> <p>Grass cut by tensios. Vents checked to make sure they were not covered. Tensio 3.30 degassed but there still appears to be a problem</p>
14/12/05	Bulk density samples taken from pits, so traps removed. Ignore any tips on this day as there was no rain.
4/1/06	All olf traps full of water. Pumped out. There was a problem with the pump in trap one. This was been replaced with another pump 5/1/06. The holes were checked on the 30/12/05 and they were all empty.

20/01/06	Traps all working correctly
01/02/06	Traps all working correctly. Batteries changed for OLF Delta T battery low (50%) stopped logging on 28/01/06 05.40am. Needs new desiccant
17/02/06	<p>Changed Delta T battery and desiccant  Degassed for plot 3, no obvious problems with 30cm tensiometer  Vents checked on all.</p> <p>Batteries changed for pumps.  Trap 1 was blocked, gutter was full of water.  Noticed that T1 and T2 are located across a flow pathway.  Water flows in a furrow by the drain, and stops at the edge of the OLF trap. It is possible that water will seep under. This is not so bad for T3. See book for diagram</p>
24/03/06	<p>Trap 1 T/B found to be 'sticky' in its movement as a result of the magnet rubbing against the reed switch. This has been fixed.</p> <p>Trap 3 had come off its rocker. Also the sump tube needs changing. It was not possible to do this at this time.</p>
30/03/06	<p>1230 ish Trap 1 full of water. Emptied, pump now working but tiny tag is not.</p> <p>Trap 3 blocked – unblocked and new sump fitted</p>
05/04/06	<p>~1520-1550GMT - Glued nuts on OLF tipping buckets. Tips at this time should be disregarded.</p> <p>Trap 3 tipping bucket was off its rocker.</p>
11/04/06	~1300GMT New tiny tag installed at OLF trap 1.
12/04/06	Tips between 10.30am and 3.30am can be discarded. Alex was working on the plots during this time.
20/04/06	<p>~1530-1730 GMT All tips should be disregarded at this time.</p> <p>Checked the glue on t.b. rocker nuts – all ok. Did calibration on OLF trap 3 (water draining very slowly – cleared blockage in L-shaped plastic connector on top of t.b. box). Degassed tensios. Changed big battery.</p>
02/05/06	~1154 GMT T/B plot1 removed for fixing as it did not appear to be working.
04/05/06	<p>Cut grass and checked vents – all OK</p> <p>Removed 30cm tensiometers from plot 3</p>
10/05/06	Pump in trap 1 not working therefore system removed. T2 T/B

	<p>not working therefore replaced (on a tinytag) – requires recalibration.</p> <p>Prob. With pit 3 t/b – fixed but requires recalibration.</p> <p>Pumps – cleaned.</p>
18/05/06	Changed batteries for OLF, trap 2 and 3 working OK
31/05/06	<p>Changed batteries for OLF</p> <p>Reinstalled T/B for trap 1 (18:00)</p> <p>Degassed tensiometers and cut grass in cages.</p>
13/06/06	<p>Dug trenches above and to the side of plots 4.2 and 4.3.</p> <p>Pumps checked, 4.1 dodgy pump. Ignore tips from 4.1 b/w 2-5pm BST.</p>
22/06/06	<p>Dug trench for 4.1. Cracking around lawn edging- filled in for plots 4.1 and 4.2. Checked battery- OK</p> <p>Enlarged and lined pits, ignore tips during this time</p>
28/06/06	<p>Cage knocked off plot 4.3, 10cm tensiometer pulled out. Needs reinstalling. 50cm OK (30cm not installed). Need to degass.</p> <p>Plot 4.2 grey pipe into T/B blocked and water in the gutter, cleared. Pump on plot 4.1 needs looking at.</p> <p>Degassed and cut grass.</p> <p>Filled in edge of OLF for plot 4.3.</p> <p>Ignore tips from T/B from 2 - 6.45 as pits being enlarged.</p>
29/06/06	<p>Battery for delta T very low, stopped logging 12<sup>th</sup> June.</p> <p>Replaced battery.</p> <p>Installed 10cm and 30cm tension for plot 4.3</p>
04/07/06	<p>Repaired pump for plot 4.1 – dodgy wiring.</p> <p>Lined pits. Sump for 4.1 broken off, re-glued but need to take down a new end piece. Tipping bucket calibration for all plots.</p> <p>Ignore tips from 12-16.00 BST.</p> <p>Some problems with sediment in the gutter and blocking the tubing.</p>
07/07/06	Degassed tensios
18/07/06	<p>Downloaded- problem with data- reset clock. Loose wires- problem fixed. Downloaded t/t plot 2, last record 11/06/06 (checked download file- this is not correct, data still being recorded)- need to check data more thoroughly- restarted.</p> <p>Downloaded t/t plot 1- ignore tips. Timing out by one hour- need to adjust. Degassed and fitted sump covers.- ignore tips</p>
27/07/06	Permeameter. Degassed. Reinstalled plot 1 10cm tension

01/08/06	Gutter cover trap 2 askew a little. 1.1 ten reading 7. battery changed. Downloaded tiny tag plots 1 and 2 and RG. Cage for plot one needs pegs.
03/08/06	Degassed and pegged down plot one cage.
08/08/06	Degassed 4.1 and 4.2. permeameter
09/08/06	Degassed 4.3. permeameter readings done. Tiny tag OLF plot 1 not working- x5approx the number of tips. Trap 2 and 3 ok. Netting on trap 3 pulling water up. Ignore tips all tips
16/08/06	Degassed. Cage at 4.3 found overturned. 2 tensiometers with tubing off. Replaced tubing on 10cm and reattached tubing on 50cm. permeameter on plot 3
17/08/06	Permeameter on plot 3
23/08/06	Degassed. Wired t/b 2 to delta T and wired t/b 1 to tiny tag from t/b 2. downloaded from t/b 2 before rewiring. Ignore tips between 1-4pm. Changed big battery.
30/08/06	Cage 4.3 found upturned. All 3 tensiometer tubing replaced and degassed. New sump covers fitted. Replaced broken bits of lawn edging. Changed delta t. Cleared the cut juncos from ditches around plots. Traps all OK.
28/09/06	All tensios degassed and grass cut. Big battery replaced. Pump mounted badly in trap 2 and yellow outflow tube has a kink in it which might affect the water flow through it. Float switch sticking.
12/10/06	840 GMT Pump Batt. Changed. All pumps working apart from sticky switches
18/10/06	Traps and gutters all clear. Took bulk density samples during the day, ground is very dry and cracked. Cracks visible at 13cm depth.
26/10/06	Trap 1 hole full of water
27/10/06	Grass in cages cut
02/11/06	OLF trap 1 float switch replaced but connection from water pipe to tipping bucket accidentally broke
09/11/06	OLF trap 1 water pipe to tipping bucket connection repaired OLF trap 2 and 3 float switches replaced

27/11/06	OLF Trap sump 2 full of water. This is probably as a result of the kink in the exit pipe from the pump. Problem resolved.
06/12/06	Cut grass
13/12/06	Ignore tips between 12-13.30 Marked out plots. Checked OLF working OK. Cleared out trenches of leaves. Grass starting to grow in these ones.
09/01/07	Looking at download data the delta t is an hour behind. The download time should have read 8.30 not 7.30
17/01/07	Lawn edging repaired on all plots. Approx 8.30-9.30am tried to work out why no tips being recorded by delta-T. Tensios being logged but neither of tipping buckets working. Trap 3 is communicating tips to the logger but they are not being logged. Trap 2 is not communicating tips to logger so something wrong with reed switch or connection.
23/01/07	Had a play around with delta-T to see if could be sorted- still not recording tips.
24/01/07	From around 14:30-16:30 installed new delta-T logger. Still not working right!
29/01/07	Relay channel and count channels not plugged in to logger. Also, trip switch was switched off. This means that there is no external power. Channel 61 count switch (T2) had been broken, probably sheep damage. This was reconnected and is now working. Not sure about channel 62 (T3), requires further investigation.
31/01/07	Checked and all working fine.
28/03/07	Logger had stopped logging on 02/02/07 because of low battery. Found that was actually because of dodgy connections. Replaced these.
14/03/07	Carried out ring infiltration experiment in the afternoon.
15/03/07	Placed pink mesh over leaf collectors.
20/03/07	Found that battery had run flat again with good connections so there is another problem. Logger stopped logging 11/03/07. Trap 3 hole was full of water.
22/03/07	Replaced battery. Changed jumper so that it was connected to external rather than internal although this shouldn't have been cause of problem. All other connections seemed OK but re-inserted them to be sure they were secure. Logger was

	receiving tensio and TB data OK. Started logging at 17:00. Cut grass
29/03/07	Had stopped logging because battery run out. Re-wired and battery replaced.
30/03/07	~ 8:00GMT tested tipping buckets 2 and 3. Ignore tips (~3). Delta T recorded correctly. Changed internal AA batteries and noticed there had been some leakage.
03/04/07	Battery low!! But delta T still logging OK. Downloaded then replaced battery for one with lots of charge. Tested all 3 traps for tips, all recording OK. Ignore tips ~16:00-19:00 GMT. The stilling well pipe on trap 1 though seemed too high above gutter therefore leaving standing water which couldn't flow into tipping bucket. This could cause gutter to overflow in high flows. Took this off. Also trap 1 showed evidence of how blockages can occur. 10cm tensios in plots 2 and 3 were loose so re-inserted them.
13/04/07	Delta T still logging OK but battery had less charge than should do. Downloaded and replaced battery ~9:20GMT. Replaced stilling well pipe in gutter in trap 1 with slightly shorter one. Downloaded trap 1 tinytag then replaced battery, seal and desiccant ~ 10:10GMT.
23/04/07	Degassed all tensios. Cut grass in plot 2 ~ 1500 – 1530
30/04/07	Logger had run out of battery again - fortunately on day of download so not much data lost. Suggestion that we download from here on a biweekly basis
15/05/07	Logger had run out of battery on 11/05/07. Replaced battery.
17/05/07	Downloaded. Checked tensiometer connections, one was wet. Re-wired delta-T. Hopefully this will rectify problem. Check in few weeks.
31/05/07	Big battery had run out but no holes were full of water. Replaced this.
13/06/07	Removed tensios 1.10, 2.30 and 3.10 as not working properly.
15/06/07	Re-inserted removed tensios with ones that were working.
20/06/07	Discovered holes were full of water

21/06/07	Replaced big battery, trap 1 and 2 holes drained OK but trap 3 hole pump was making a noise but wasn't pumping water out.
27/06/07	13:30 GMT: installed new pump in trap 3. All working OK. Downloaded DT as battery low. Grass cut in control tensio cage
24/07/07	Pump battery voltage 10.07 V – should be changed soon. Kink in tube between OLF trap and tipping bucket. Delta-T logger – trip switch had gone. Because there were apparent problems with T1.10 and T3.30. These tensiometers signal output wires were swapped from channels 1 and 8 to channels 10 and 11 respectively.
31/07/07	Delta T battery had run out on 30/07/07. Replaced. Got rid of kink in tube of OLF trap 1 by cutting tube shorter
16/08/07	Battery low but still logging. Downloaded. Checked for double tipping. Occasionally double tipped (4.2). Altered so that didn't double tip- NEEDS RE-CALIBRATING Maybe use rubber or tape to stop bucket bouncing as much. Problem with TB 2 recording 1,2 or 3 tips when shouldn't do. Changed channel and stopped doing it suggesting a problem with channel. Re-dug trenches around plots 1 and 2.
22/08/07	Changed logger. Not working correctly when using external power so left on internal power
23/08/07	Changed wiring so same as Rhos 2 and seemed to be working on external power OK.
30/08/07	All traps OK although trap 3 had vole and nest material in gutter and some of the OLF material had come out at end.
03/09/07	Dug trench around plot 3. Marked out survey quadrats.
18/09/07	Destructive harvest in buffer strip of plots
25/09/07	Pit 4.1 full of water, lifting float switch did nothing
02/10/07	Float switches cleaned and sprayed with WD40. Cleared gutters. Cut grass in cage in control plot. Checked pump for pit 4.1 – working fine. Needs to be checked on. Re calibrated tipping bucket for 4.2
09/10/07	All OLF traps OK. Battery changed but still reading 99% over 10v on logger box.
12/10/07	De-gassed all tensios

23/10/07	Took N cores and checked all traps clear. No obvious problems.
24/10/07	8 – 9 am. Looked at Delta-T box and channel 62 (trap 4.3) giving values of 1 and 2 for periods of time – not constant. Every time the readme button was pressed on the laptop the tips went up by a value of 1. Swapped channels around but trap 4.3 still doing the same thing. Ignore tips during this time.
30/10/07	9:00 am. Checking tipping buckets. Ignore tips during this time. Plot 4.2 working OK, 4.3 double tipping, adjusted height of tipping bucket WILL NEED RECALBRATING. Plot 4.1 working OK. Cleared outlet pipes for OLF pumps. Took third negative out of 61- and put in into 62- (to avoid having three in one connection). Installed Plot 4.2 30cm tensiometer with no quartz powder.
27/11/07	All pits OK
09/01/08	All pits OK Cleared some debris out of gutters. Plot 2 OLF gutter needs new pink mesh on down pipe to TB Re-inserted 10cm tensio in plot 1 but seemed OK. (no.227, had sticker on it saying it was duff!?) All other tensios seemed OK although vary slightly in height above the ground. Carried out calibration on plot 2 TB: 5,6,5,5,5,5. Ignore tips around 13:00 – 13:30.
18/01/08	Pits full of water when arrived. Drained and all seemed OK. 4.1: detached OLF pipe from TB to sample 10:30-15:30. 4.2: detached OLF pipe from TB to sample 10:30-15:30. 4.3: detached OLF pipe from TB to sample 10:30-15:50.
23/01/08	Pits full of water, changed big battery and all drained OK.
30/01/08	Water in pits just above TB height due to pit 2 pump not working. Replaced this at around 13:00, replaced big battery and all then OK. Pit 1 Tinytag wouldn't communicate with computer, connections were wet, brought back. After Tinytag dried out offloaded data but couldn't convert it to txt file as error message kept on appearing.
06/02/08	Pits full of water! Changed big battery, pits 1 and 3 emptied. Pit 2 pump wasn't working, weighted down float switch with stone to hopefully save battery. Put new Tinytag on pit 1 TB, dried connection, should be OK but maybe changed connecting wire.



11/02/08	Replaced pump in 4.2, working correctly. Checked big battery – OK. Traps 4.1 and 4.3 OK. Checked tiny tag in 4.1- OK. Enlarged ends of trenches above plots.
20/02/08	Tipping bucket calibrations: 4.1: 09:45: 26 (4,6,5,6,5) (spilt little bit on third lot) 4.2: 09:30: 24 (4,5,5,5,5) 4.3: 08:40: 53 (actual calibration: 7,7,8,8,7,8)
04/03/08	Pits all full of water. Big battery was flat but pits did not empty when new one connected? <b>NEED TO INSPECT</b> . Also looking back at data trap 2 did not seem to record correct number of tips made when carrying out the calibration.
13/03/08	Pits still full of water and big battery had loads of charge. Fiddled with connections and all pumps started to work. All pits drained and working OK. Had a look at 4.3 50cm tensio and nothing obviously wrong, de-gassed all tensios in this plot.
18/03/08	Pits full of water! Must have been connection to big battery again, hopefully fixed this time – all drained and working OK when left.
27/03/08	All pits OK
02/04/08	All pits OK, although fair amount of vole damage to soil and material at top of OLF gutter in trap 1. Also delta T had stopped on 22/03/08 for no obvious reason as started again OK.
08/04/08	Pits 1 and 3 OK. Pit 2 full of water. Emptied and found float switch and pump to be OK. Only 5v ish was coming through the power cables. No obvious damage to the cable under the gutter or anywhere it was not buried.  Replaced plot 3 30cm tensio (removed 250 and installed 389) Used same hole which was deepened, was full of compressed quartz!
17/04/08	Installed separate battery for plot 2 pump at around 16:30 GMT so all plots working OK. Cut grass in tensio cage.
29/04/08	Delta T had stopped on 06/04/08 for unknown reason. Started again OK.
01/05/08	Downloaded delta T to check – was OK. Some vole damage to material and soil above OLF gutter trap 1 – repaired this. Tested trap 2 tips – all OK – ignore tips.
06/05/08	Drains installed in all pits.

15/05/08	Replaced elbows and tubing in pits 2 and 3. Plot 2 gutter stilling well came off, attached on temporarily with tape. Plot 1 elbow was stuck onto down pipe, couldn't remove and elbow currently in place broke so system not working at the moment.
05/06/08	Put out new gutter covers in fenced off plots.
17/06/08	Replaced gutter down pipe in plot 1 with larger elbows and tubing. All working OK. Ignore tips. Replaced broken stilling well in plot 2, poured down water to check, ignore tips. Dried plot 1 10cm tensio.
30/06/08	After downloading discovered strange data. Ignore this data.
10/07/08	10:00 (BST I think!) Plot 1: OK Plot 2: Not working Plot 3: OK
18/07/08	Sorted plot 2 TB – new reed switch. Working OK. Ignore tips 13:30 – 15:30 and 1 set of 3 tips on trap 3 TB.
23/07/08	Installed plywood boxes in TB pits to shore up sides. Early afternoon – ignore any tips at this time.
31/07/08	Put new leaf collector on plot 1 OLF gutter downpipe.
04/08/07	Cut grass in cage
14/08/08	Delta T had stopped on 9/08/08. Started again OK. Could this be sheep knocking the box? This only seems to happen here and Tyn Fron where the delta T's are located in the control plots. Tipping bucket 3 working – ignore tips mid afternoon. Some vole damage on OLF trap in plot 3 – repaired. Tidied delta T box Enlarged control pit cover.
28/08/08	Logger stopped working on the 17/08/08
09/09/08	11:40 GMT. Checked calibration on all TB and that correct number of tips was recorded by the loggers. Trap had approx 3 seconds between each tip for 1 litre of water. All were recording correct. Trap 3 had a lot of soil in the gutter, possibly causing a blockage. The grass was cut in the tensiometer cage.
10/09/08	09:00 GMT Tensiometers were all replaced, trenches were enlarged down the sides of the plots and along the top above the overland flow trap.

01/10/08	Noticed that the covers for the OLF gutter are becoming damaged. Repaired a rip in 4.3, both will need replacing
16/10/08	4.3.30 (tree plot) removed (serial no. 381) and replaced with a 50 cm tensio. (serial no. 209) in its place.
24/10/08	Changed Delta-T logger
25/11/08	Replaced the covering on the OLF gutters for the treatment plots, dug the pits out and reset the frames for the tipping buckets. Ignore tips from 12-13:00. The cable from the battery into the logger box had become loose, this was fixed and battery was reading OK. Due to bad connection the logger had stopped recording on the 8/11/08. Trenches all seemed OK.
08/12/08	Covers removed from the tipping bucket holes at plots 4.1 and 4.3 to help stop vole damage to wires.
21/01/09	Changed battery and noticed that Delta T had not been recording since 09/01/09 – 2 days after the last download. Recording fine when we left.
10/03/09	Changed the reed switch on T/B of trap 3 (Trees). Ignore tips that occurred around this time
17/03/09	Tensiometers T1.10 not working so swapped with a 50 cm tensiometer. It did not appear to work after change but need some time to check properly. It maybe a wire issue.
24/03/09	Degassed tensios. Swapped T1.10 from channel 10 – channel 12. No change in response therefore suspect there is an issue with the wire. Cut the grass in the control plot.
23/04/09	Tensiometer 1.10 still not working. It is assumed that it is not the tension that is at fault but possibly a cable issue. <u>2.30</u> Tensiometer removed from 1.10 (50 cm depth) and installed Out serial 197 <u>1.30</u> Installed a 50 cm tensio
13/05/09	Swapped the wiring round of tensiometers 2.30 & 2.50 as it appeared that they may have been wrongly rewired previously. Cut the grass in the tensiometers cage in the control plot
19/05/09	Swapped tensiometers cables back 2.30 and 2.50
18/08/09	M4.1 10cm 133 30 cm -* 50 cm 251 * 50 cm tension installed

---

M4.2 10cm 30? 30 cm 261\*\* 50 cm 206

\*\* No rubber tubing and totally dry

M4.3 10cm - 30 cm 209\* 50 cm 208

\* 50 cm tension installed

---