Peat investigation

Year 3

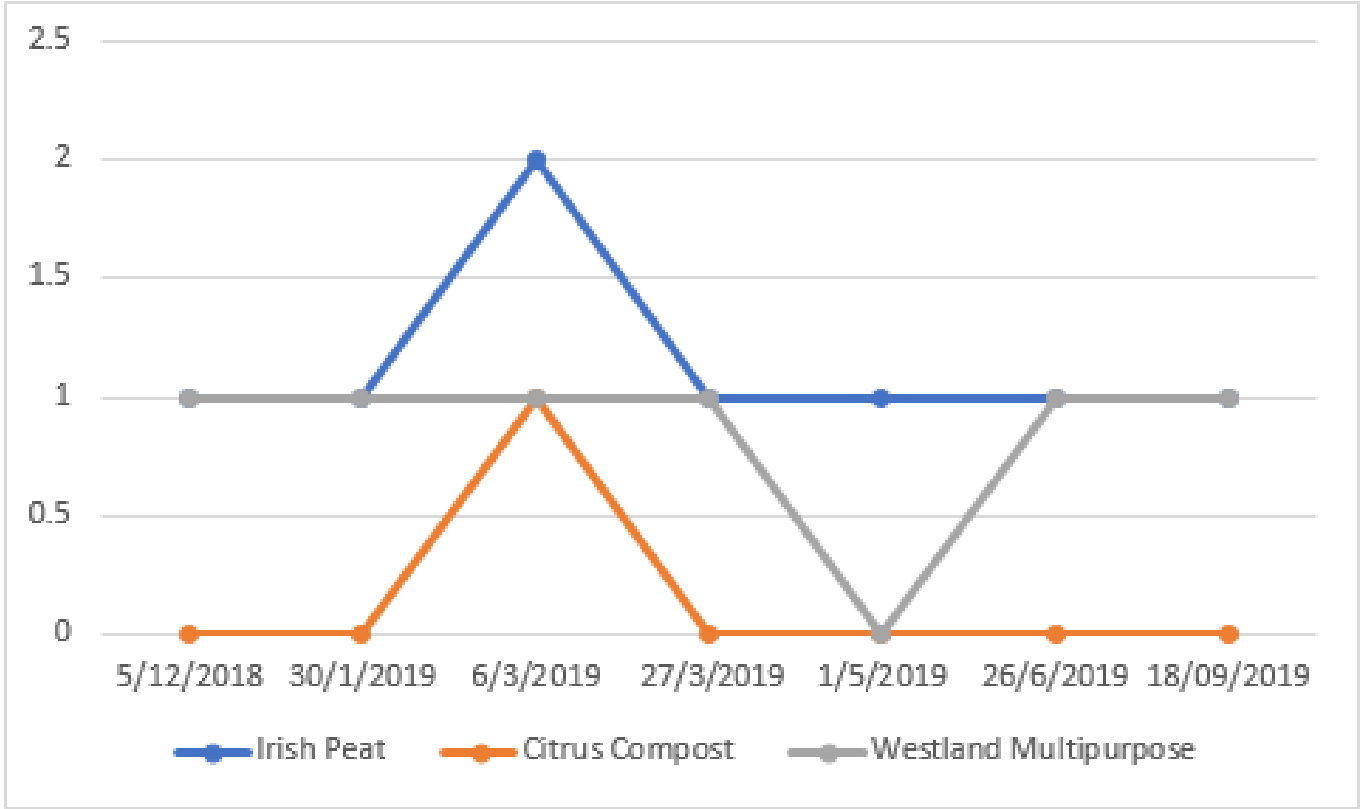
Xan McCollum/ Ruby Spratt – combustibility & weather trends
Yiling Looi – water loss and percentage mass
Olly Tomes – effect of pressure/ compaction
Rebecca Zand – future refinements

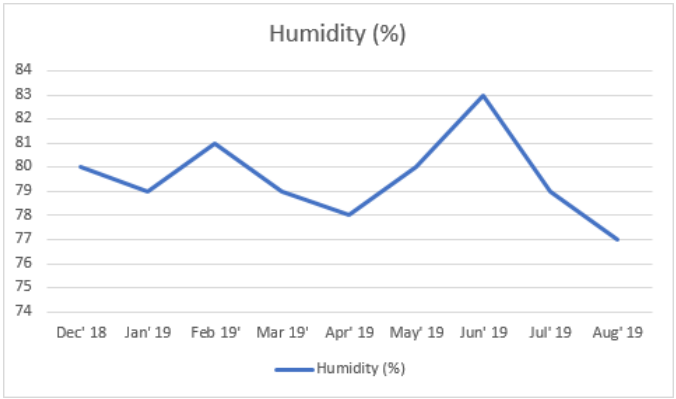
Combustibility and Weather Trends – Xan McCollum & Ruby Spratt

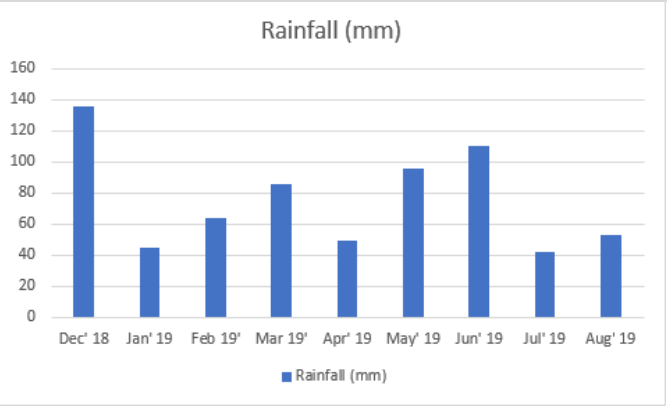
Combustibility and Weather Trends

Combustibility graph key
2: smoldered more noticeably
1: smoldered with a lit splint
0: didn't smolder

Xan McCollum & Ruby Spratt



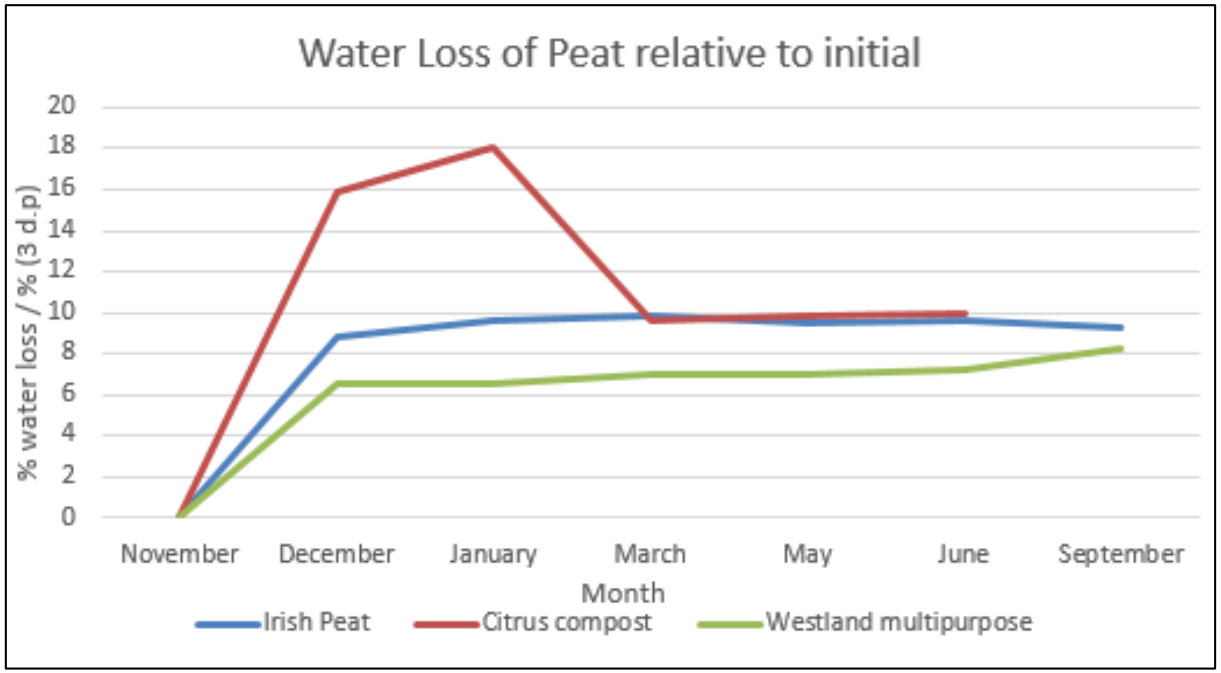


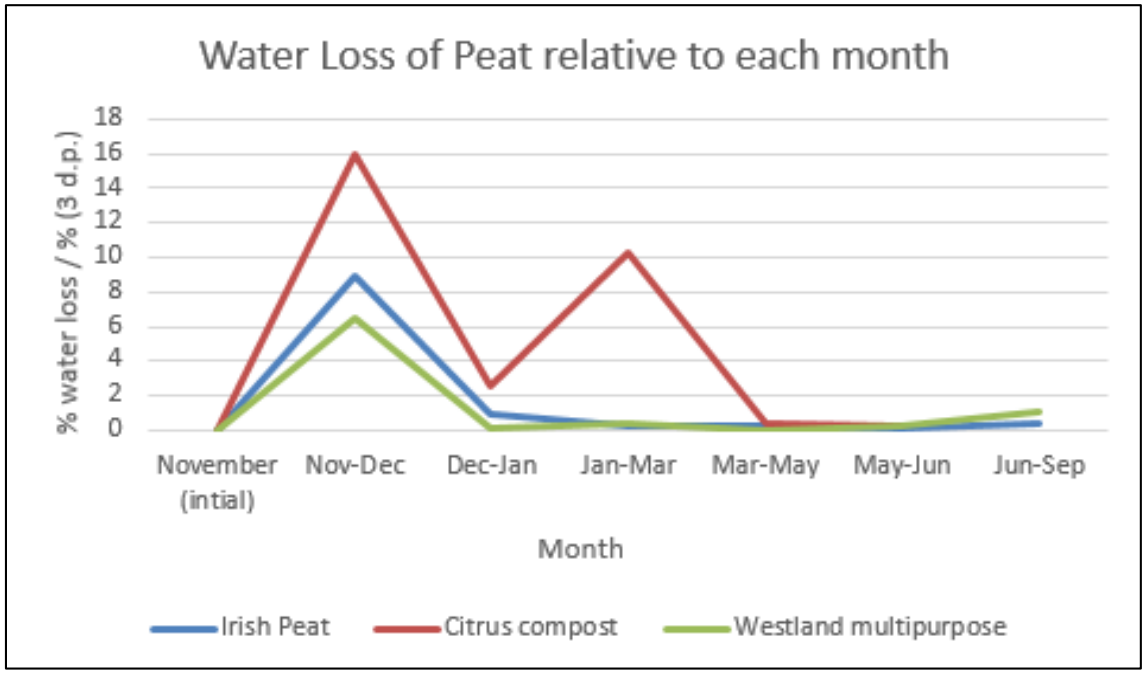


Trends

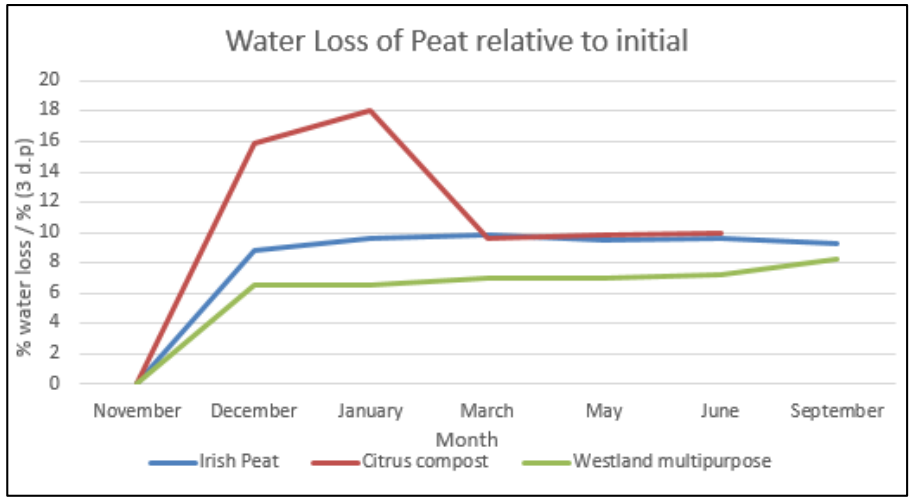
- Overall, the compost that had the highest combustibility was the Irish Peat, and the compost with the lowest combustibility was the Citrus Compost.
- In March 2019, the humidity decreased, coinciding with a general spike in combustibility for both the Citrus Compost and the Irish peat.
- During May 2019, the combustibility of the Westland Multipurpose decreased, while both the rainfall and the humidity were increasing.
- Both the humidity and rainfall were at their highest level, towards the start and end of the 2018-19 academic year, where both the Citrus Compost and the Irish Peat had their lowest combustibility.

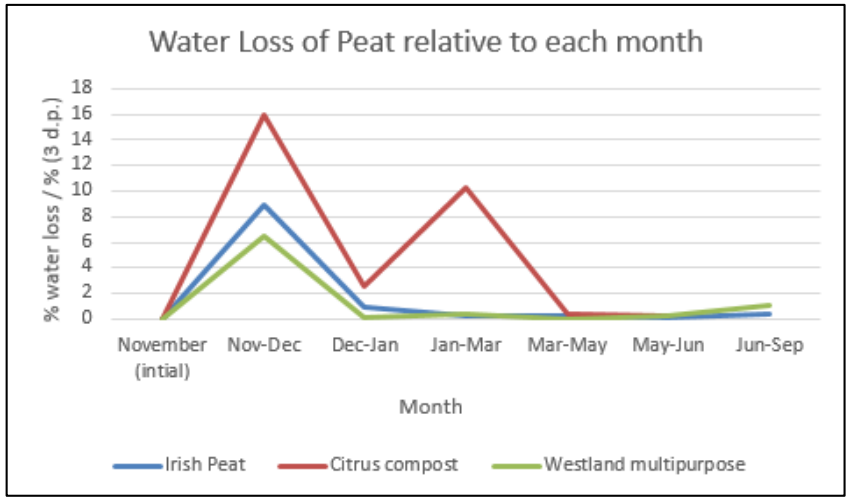
Water Loss – Yiling Looi

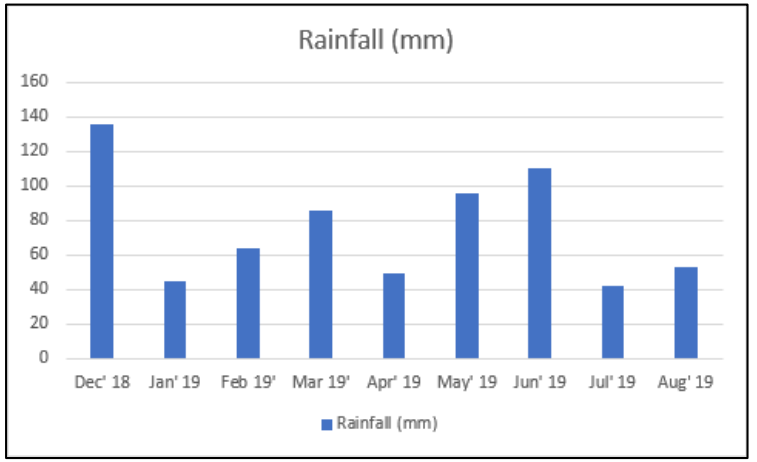


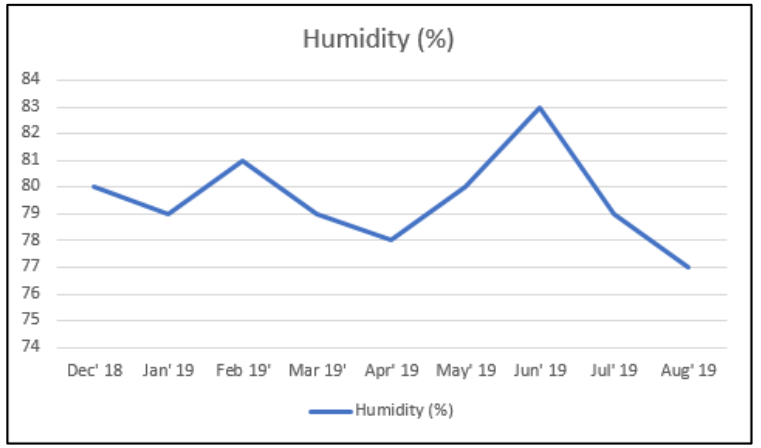


The data shows us that Citrus compost lost the most water, followed by the Irish Peat and then the Westland multipurpose, from November to September.



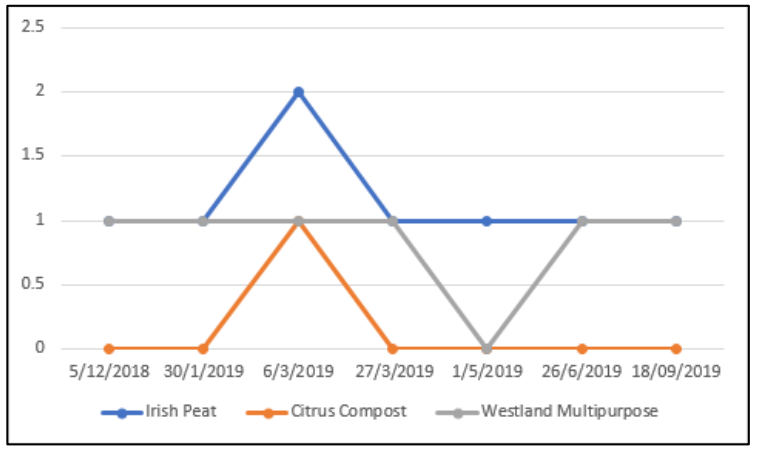






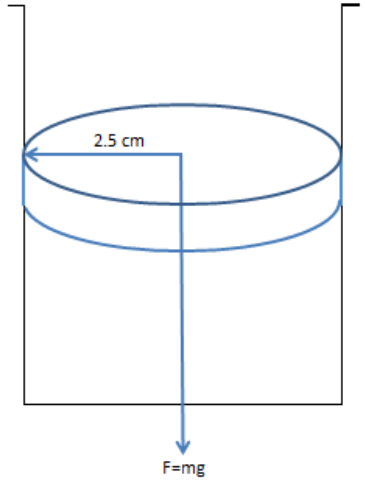
Conclusions

- From December to January there was a decrease in humidity and rainfall but an increase in water loss. This is because the water in soil loses moisture in a drier air environment.
- We expected the driest peat to light the easiest, however the data contradicted this as Citrus compost lost the most water but had the lowest combustibility. This seems to just be an anomaly.
- Results from last year as well as this year, led to a further investigation on the effect of additional masses on Citrus compost's ability to light.



Effect of compaction – Olly Tomes

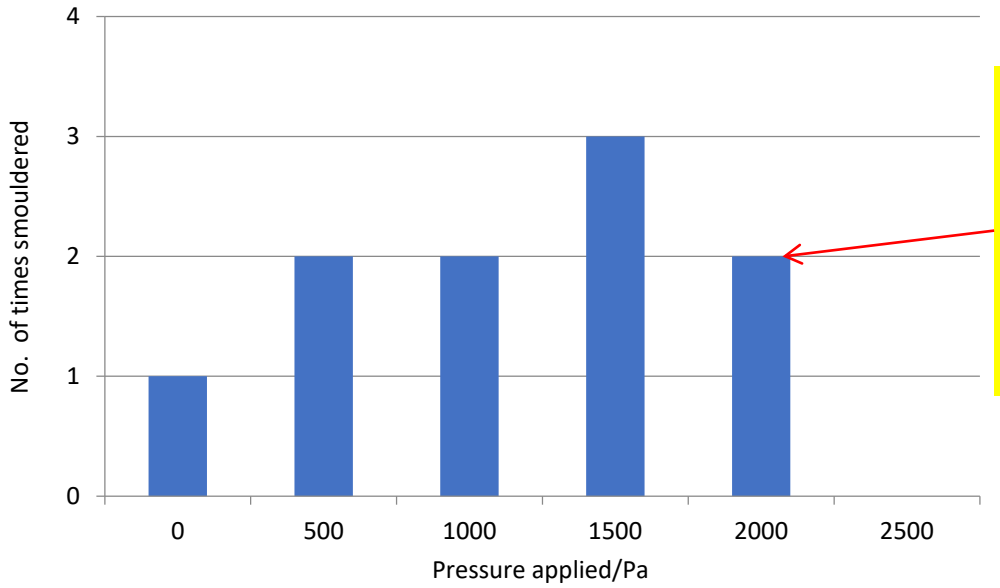
- We used six cylindrical containers of peat which could be tested. Each had a different amount of masses on them to simulate the compaction.
- Our experiment had one control which was tested with no masses.



$$P = \frac{F}{A}$$

$$P = \frac{m \times 9.81}{\pi(0.025)^2}$$

No. of Masses	Mass applied (kg)	Pressure (Pa)
0	0.00	0.00
1	0.10	500
2	0.20	1000
3	0.30	1500
4	0.40	2000
5	0.50	2500



On two occasions the peat appeared to spark and create a popping noise

Inferences

- From the results its clear to see that as we increase the pressure on the peat, it's flammability increases.
- However it also suggests there may a be a critical point where flammability begins to decrease which is evident from the results of the 400g and 500g pot. The peat in this appeared a lot finer than the others possibly meaning it had broken down.

Evaluations and Future Refinements – Rebecca Zand

Evaluations

Strengths

- Mostly kept consistent values for taking a certain amount of grams from the live sample to test.
- Controlled environment, limiting extraneous/confounding variables.
- Can see if independent variable directly affects the dependent variable.
- Controlled amount of time control was exposed to the environment, minimally.

Limitations

- At times we had some data missing from.
- Smouldering can depend heavily on personal interpretation.
- May not have ecological validity as there could have been other factors such as dead plant matter.

Refinement

- To have a specific definition to what counts as smouldering.
- Consistency in data recording.

Proposals – Rebecca Zand

- Temperature of the soil using a temperature probe
- Density of the soil using a pentrometer
- Soil pH/phosphate test kits