Manor Woods Valley

Orchard Investigation

Grace Milner, Hannah Mathew-Richards, Niall Jukes, Christy Spring and Issy Urquhart

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University of BRISTOL

Introduction

Manor Woods Valley Orchard is situated in a site of previous industrial activity, specifically brick and tile works. This industrial activity has the potential to cause soil contamination (specifically of heavy metals such as nickel, cadmium, chromium, zinc and iron) which could lead to negative health implications from eating the fruit from the trees. Our task was to investigate the soil and trees to determine the level of contamination, if any, and to evaluate whether or not the fruit is safe to eat.

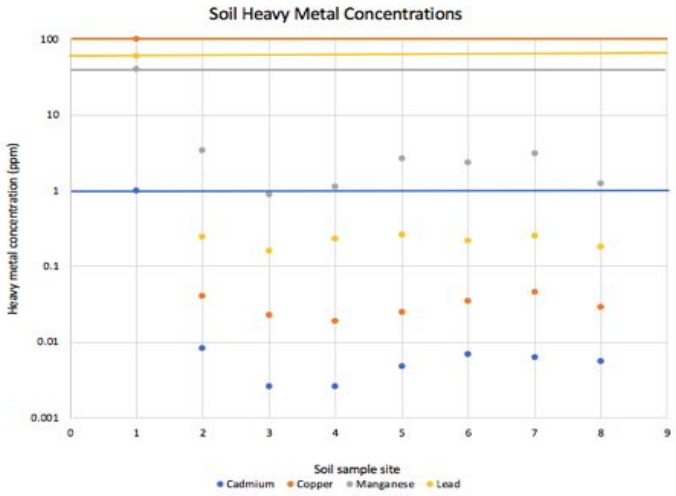
Method

We undertook fieldwork in the orchard to collect multiple samples of both the soil and the fruit trees, which we then took back to the laboratory for analysis. We were interested in looking directly at heavy metal levels, as well as the following factors which can impact the heavy metal uptake of vegetation:

pH - a low pH (acidic soil) can enhance heavy metal uptake
Carbonate content - high carbonate content can inhibit heavy metal transfer from soil to vegetation
Organic matter content - high absorption capacity of contaminants, so protects vegetation
Grain size - soils with high clay content have more heavy metal uptake by vegetation

Results

Soil: Although there is presence of soil contamination in terms of industrial debris (such as bricks) within the site, we can conclude that this activity has not resulted in heavy metal contamination within the soils here. All the values for heavy metals within the site lie well below EU guidelines for soil threshold values, as seen on this graph (the horizontal lines show the EU guidelines, and the y-axis is logarithmic).



Fruit: In relation to the four factors that could impact heavy metal uptake by vegetation: pH was neutral not acidic and so would not impact uptake, carbonate content was very high which could potentially inhibit uptake, organic matter was low meaning there isn't a protective barrier for contamination (however the low values of heavy metals in the soils means this wouldn't have made much difference anyway), and the clay content was very low hence would not have impacted uptake either. Due to these results the trees are unlikely to be taking up much, if any, heavy metal.

Overall: Direct measurements of the heavy metal content of the fruit trees confirms the trees are not taking up dangerous levels of heavy metal; the levels are well below guideline consumption amounts and so the fruit is safe to eat.

Recommendations

We recommend more fruit trees be planted in the orchard to make use of the open space and provide fruit for the benefit of the community.