Pollinator detection

We have mounted two surveillance cameras comprising of a Raspberry Pi (powered off the mains) fitted with a Pi camera and an SD card, inside a waterproof box. The cameras have been situated so that they point down towards the patches of salal and dull Oregon grape. By positioning the cameras about 25cm from the plants, we can film an area about the size of a laptop. The cameras are set to take a picture every 30s and the images are stored on the SD card.

[Pic of set-up, and test pics from the pi]

Weather monitoring

Our weather station is an Acurite Atlas equipped to measure wind speed and direction, temperature and humidity, pressure, rainfall, and UV and light intensity. Readings are dumped every 30s to an SD card.

A picture containing tree, outdoor, wooden, wood

Description automatically generated

Air quality monitoring

We have mounted an additional Raspberry Pi fitted with Enviro + Air Quality combined with a particulate matter sensor (which we are still waiting for Canada Post!). This lets us measure temperature, pressure, humidity, light, and noise level (bzzz), AND pollutant gases and particulates.

The major gases that our air quality sensor can detect are carbon monoxide (a reducing gas), nitrogen dioxide (an oxidising gas), and ammonia. By establishing baseline levels, we can see how the air quality changes over the growing season.

The particulate matter sensor will be able to detect concentrations of particles of different sizes (PM1, PM2.5 and PM10) as well as numbers of particles of different sizes >0.3, >0.5, >1.0, >2.5, >5, and >10 microns.

Wildfire smoke particles typically range from 0.4­–0.7 microns; dust is around 2.5 microns and pollen is generally 15 microns or more.

[pic of device]

Data analysis

We hope our cameras and weather station will collect millions of images. As it would take an overwhelming amount of time to look at all these individually to find the ones with insects, we are recruiting computers to do it for us. For this to work we first have to train the computer to recognise our pollinators and identify the images they are in, at which point we can then take a look. This requires training and running a neural network.

Handling the weather and air quality data is a bit more straightforward as they can be easily analysed and plotted in Microsoft Excel.

[pics of weather data]