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Preliminary Plant/Crop Disease Research Findings

Source: http://www.cdfa.ca.gov/statistics/  
<http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html#cropsP>

**Strawberries**

Why Strawberries?: They’re one of the top ten in California’s exports. They’re not even half as popular as almonds or grapes, but they’re still quite high.

*Angular Leaf Spot:* Not a good disease to try and use a UAV for. It’s mainly emphasized by watery spots, which are hard to highlight from an aerial image, especially on a simple color image. Disease progression is easy to highlight, but by that point, you could just be looking at it normally. Disease prevention is just using good soil and stuff, so unless we do some sort of soil discoloration, this isn’t viable.

*Anthracnose:* Again, management is soil based. It’s probably better to examine the soil than it is the actual plant.

*Botrytis Fruit Rot*: It’s basically moldy strawberries disease. It’s management method would be to plant or move berries to areas that are windy helps reduce this disease’s progression, but that’s not something we can really tell from a given camera image. However, an area where the UAV has trouble flying might help hint that a spot in a field is windy?

*Charcoal Rot:* It’s a disease where a plant dies due to overstress basically. The main signs that something may be in danger of this is extreme weather, certain soil conditions and water stress. So… basically nothing we could figure out from an aerial RGB image (unless soil gives a color sign that something is unhealthy?).

*Common Leaf Spot:* The most important of strawberry diseases apparently. Can be identified by watching the leaves of a plant, as spots will appear (going from brown to gray to white as the disease matures), the disease can cause interference with how the plant gets water, and also invite other pests to wreck the plant. It’s managed by a fungicide that apparently can almost certainly eliminate the disease. We could monitor this disease depending on how close the UAV flies to the crops, and if the image is clear enough for us to see leaves on a plant.

*Fusarium Wilt:* Takes a while for symptoms to show up, symptoms are not easily visible from an aerial view, and it’s management is based on putting crops where older crops (like broccoli) used to be via crop rotation. I don’t think it’s a good idea for our project.

Not all of the diseases listed, but these are the ones I came across. Since they mostly had the same kind of pattern, I’ll just give my overall impressions about what we ought to do.

**Overall Impressions**

Our decision on what to focus on will differ greatly depending on many factors. What kind of images does our current UAV flight plan give us (is it a really high up bird’s eye view image that’s hard for us to see? Is it a pretty close fly by one the plants?)? Are we going to stick to an RGB color camera? If we don’t stick to it, what kind of camera do we need/want?

1. We could look for discoloration and awkward appearances of various crops from an aerial image (depending on what our aerial images look like) and have farmers check a given area’s soil around it, rather than changing our imaging type and checking the soil itself. This idea allows us to use what we currently have, to some extent. The idea is just to highlight general trouble spots and to have farmers check trouble spots. We cannot ensure anything, but we can at least localize some obvious areas that have “something” wrong.
2. Or we could try figuring out how to check the soil itself. I think this is more helpful to a farmer, but it is also way more difficult to implement. Not only that, but we would likely have to backpedal on last year’s decision of a camera, buy a new camera, and also actually ensure that camera works. Doing this would require more research into finding out what kind of camera can give us results to analyze soil.

Either way, until we get our focus sorted out, image and data analysis seems like a waste of time. We would just be flailing about trying to hope we hit something pertinent without any real aim.