**Status Report 03/23/2022:**

**Sawdust:**

Most of the lumber mills in the area are on the Idaho side of the boarder. I’ve been in contact with Bennett Lumber Co. in Clarkston, WA. They sell sawdust to a paper company and should be getting back to me.

**Growing Space:**

I’ve been in contact with Dan Dreesmann at the greenhouses. There should be environmentally controlled growth rooms, but he says that they each have only about 15 square feet of work space. I’ll head up there and take a look to make sure, but I think it would work if the bags were stacked (common practice).

**Size of Experimental Units:**

There’s a lot of variation in the amount of substrate used in these kinds of experiments, ranging from 0.2 kg to 3 kg wet weight per unit. I think that approximately 1 kg of wet substrate per unit would be good, as it’s reasonably large, consistent with the literature, and the amount of substrate would be manageable. I’ve included a table with the amounts of each substrate we’ll need (Table 2).

**Ordering materials:**

The best place to order materials from seems to be Outgrow (<https://www.out-grow.com/>) based in Illinois. They have all the supplies such as rye grain, gypsum, and growing bags that we need, as well as inoculated and uninoculated substrates for the control groups.

**Questions:**

* Do you recommend using 1 kg of wet substrate for each experimental unit, or more? This amount is consistent with other research and the amount of substrate seems more manageable. Using more (3 kg) might produce more flushes and more data, but could also be more difficult to handle.
* Do you recommend using a specific method to treat the sawdust? Fermentation is the easiest (Zhang & Du 2017) and produced good results in other research (Oseni *et al.* 2012).

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| --- | --- | --- | --- | --- | --- |
| **Table 2: Substrate Mixtures** | | | | | |
| **Mixture:** | **Substrates (% dry weight)** | | | | **Additives** |
|  | **Sawdust** | **Straw** | **Brewer's Grain** | **Coffee Grounds** | **Gypsum** |
| **T1** | 40 | 40 | 17 | 0 | 3 |
| **T2** | 40 | 40 | 0 | 17 | 3 |
| **T3** | 80 | 0 | 12 | 5 | 3 |
| **T4** | 0 | 80 | 12 | 5 | 3 |
| **Industry Control** | N/A | N/A | N/A | N/A | N/A |
| **Total Proportions:** | 0.4 | 0.4 | 0.1025 | 0.0675 | 0.03 |
|  |  |  |  |  |  |
| **Wet weight = 1 kg per unit:** |  |  |  |  |  |
| **Total Substrate, Dry Weight (kg):** | 54 | 54 | 13.8375 | 9.1125 | 4.05 |
| **lbs:** | 118.8 | 118.8 | 30.4425 | 20.0475 | 8.91 |
| **Wet weight = 3 kg per unit:** |  |  |  |  |  |
| **Total Substrate, Dry Weight (kg):** | 162 | 162 | 41.5125 | 27.3375 | 12.15 |
| **lbs:** | 356.4 | 356.4 | 91.3275 | 60.1425 | 26.73 |

**Pros and Cons of using softwood sawdust:**

**Pros:**

* Comparing pine sawdust to straw for species seems to be a novel research question for many species.
* Forestry products are listed on the ERI proposal, so using sawdust may be required for funding.
* The fermentation process would take approximately the same time as expanding a grain spawn culture.

**Cons:**

* Using treated sawdust adds more complication to a project that already has a lot of variables in terms of species.
* Depending on the treatment method used, time constraints could be a problem. Fermentation/composting takes approximately a month, while steam treatment requires more equipment.
* There isn’t as much interest in using softwoods overall, so there may not be as many practical benefits for regions where hardwoods are available.