Overall:

- No longer any complete plants listed as “error” when R-script is run

- I’ve now combined all other error issues into this file, a file with a summary of negative investment problems (very few), and a file “Error summary” which shows all my various cross checks, indicating which ones don’t work. I’ve tried to described actual issues below.

- Remaining negative investment issues that I think I can fix pasted into a single file. I’ll work my way through this. At this point mostly PUTU.

- Lots of small problems with the implementation of “survival of the fittest”, mostly across stages where a large number of parts are shed – for instance between finished\_flower\_stigma and fruit\_just\_starting. Then for individuals that legitimately jump from the bud stage straight to a young fruit stage are assumed, the fruiting part is assumed to be a derivation of a previously appeared flower/finished flower stigma, and the count of petals does not match up with “sum of fruiting parts”. For GRSP and GRBU I’ve solved most (all?) of them, by sometimes shifting the census where a part appears by 1. For HEPU I have not at this point, because I’d be changing the progressions of items too much. See below under “HEPU” for more.

Otherwise (in addition) wondering if we could create a look-up table, saying how many progression steps a given species\*part combination can “exist” before being counted as lost. Then parts that always progress could be coded as “1”, while others (like the BAER cones creating problems) can be coded as “6”.

COER, EPMI, GRSP, HATE, LEES, PELA, PILI

* ALL CORRECT

BAER

* cone\_green\_01 not correctly progressing to cone\_brown or cone\_brown\_DEF because 6 censuses between stages (BAER\_005, 803, 806, 902, 905, 907)
* Minor issues with one cone – see error spreadsheet

BOLE

* need new weights for Late\_finished\_flower (Lizzy to fix)
* Finished\_flower has 2044 too many (see Error\_summary file). Checked repro spreadsheet and #2140 is correct for total number that “pass through”. I’m at a loss to explain this.
* Otherwise ALL CORRECT

GRBU

* Finished\_flower\_stigma has negative “lost” counts in many cases, causing me to stop looking in more detail. I am wondering if something has been mistyped in the plant map that skips some part of the pathway leading to or from “finished\_flower\_stigma”.
* Infl\_bud\_small weighs more than infl\_stalk (Lizzy to fix)

HEPU

* With HEPU there are many individuals where Fin\_Dev calyx\_fruit does not add up to the sum of Fin\_Dev for (fruit\_young + fruit\_large\_immature + fruit\_mature). In most of these cases it is a “survival of the fittest” problem, where some of the previous censuses fruit\_young + fruit\_large\_immature have shed, and there are new fruit\_young + fruit\_large\_immature (+ calyx\_fruit) that have developed. However the exact development pattern means that the program assumes it is the previous ones developing further. The problem is that it knows the calyx\_fruit are new, so the number of calyx\_fruit exceeds the number of fruit\_young + fruit\_large\_immature, the latter of which are incorrect. I think a possible fix would be to use fruit\_young02, fruit\_large\_immature02, fruit\_large\_immature03 to clarify progression. Is this a big mess for you to implement on the plant map? If you can make the changes, I’d like to figure out exactly what added categories are needed first and then have you change things.
* There is also a problem, shown on the excel error summary, that for HEPU001,002,003 and 004, a number of the bits that are on the plant at the beginning of the experiment are not correctly being acknowledged as “errors”. I assume this means these individuals have too high a total investment number.

PEPU

* Remove “bud\_aborted” from plant map; never used
* Can’t check for negative investment problems until after I collect remaining parts
* Otherwise ALL CORRECT

PHPH

* The number of flower petals does not equal the sum of (flower\_stigma + finished\_flower\_stigma + fruit\_just\_starting + fruit\_young + fruit\_large\_immature + fruit\_aborted + seed\_pod). It does equal if seed + seed\_aborted is substituted for seed pod. I think this is because the plant map is following backwards from the seed/aborted seed, rather than the seed pod. Since seed pods have variable seed number (0,1,2), but map assumes there are always 2, it makes the assumption that there are some fruit\_young and fruit\_large\_immature that have been "lost" when in reality they have turned into empty seed pods. However, if you consider "seed pod" the end of the developmental trajectory, then the numbers should add up. I'm guessing this is a change to the plant map.
* Otherwise ALL CORRECT

PUTU

* Quite a few “seed pods” are very lightweight, creating lots of negative investment issues. I’m tempted to leave this. Same issue for “fruit\_aborted”.
* Also quite a few negative investment issues with the lightest weight “bract\_flower\_or\_finished\_flower” and “flower\_calyx”, but these values are all high enough that they shouldn’t result in negative investment from the “big\_bud” stage. There is also an instance of this for PHPH. The individual based mechanism for dividing investment is now included, right?
* Still an error with too many “Finished\_flower\_stigma” ended up as a “Fin\_Dev” part. I’ve gone through many of the individuals and can’t find any mistakes in the repro spreadsheet but also can’t find any pattern that would explain the error. This may be the same sort of error as arises with PHPH. With both species, “seed pod” is the numerically accurate final development of the stigma 🡪 fruit progression, not “seed”

Mistakes are in:

(parts are 2x numbers in repro spreadsheet)

|  |  |  |  |
| --- | --- | --- | --- |
| Individual | petals | derived parts | diff |
| PUTU\_004 | 186 | 236 | -50 |
| PUTU\_005 | 136 | 168 | -32 |
| PUTU\_805 | 238 | 264 | -26 |
| PUTU\_003 | 106 | 116 | -10 |
| PUTU\_908 | 40 | 46 | -6 |
| PUTU\_902 | 296 | 300 | -4 |
| PUTU\_903 | 166 | 170 | -4 |
| PUTU\_403 | 94 | 96 | -2 |
| PUTU\_405 | 186 | 188 | -2 |
| PUTU\_804 | 30 | 32 | -2 |
| PUTU\_906 | 86 | 88 | -2 |