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CS475 Project 4

Choice Quantity:

For my own-choice quantity I chose mold destruction as a percentage of the crop. If the temperature was warmer and the precipitation higher, the damage factor from the grain mold was higher. If the precipitation and temperature were lower, the damage factor was smaller. I chose to make the factor 2 distinct values because I didn't want to decimate the grain height (thereby decimating the deer population).

This change involved setting the mold factor to 20% if the precipitation was greater than 6 inches and the temperature greater than 45 degrees Fahrenheit. If these conditions were not met, the mold factor was set to 10%. This quantity also involved the grainGrowthfunc to modify the height of the grain (subtract height * factor), and to keep track of what this loss amount was.

Table:

Year-Month	Precipitation (cm)	Temperature (c)	Height (cm)	Deer	Mold Loss (cm)
2014-0	19.18440156	-0.7325088889	9.04753842	1	0.254
2014-1	26.0163056	2.1432577778	24.62978818	2	0.90475308
2014-2	29.9607097	7.1242333333	37.42676284	3	2.46297958
2014-3	29.9607097	12.8757666667	35.32903526	4	3.7426773
2014-4	26.0163056	17.8567422222	30.05479638	5	3.53290378
2014-5	19.1844041	20.7325111111	23.4543346	6	3.0054804
2014-6	11.2955959	20.7325111111	15.58309304	7	2.34543346
2014-7	4.4636944	17.8567422222	6.4694054	6	1.55831032
2014-8	0.5192903	12.8757666667	0	5	0.64694054
2014-9	0.5192903	7.1242333333	0	4	0
2014-10	4.46369186	2.14326	3.34253078	3	0
2014-11	11.29560098	-0.73251	5.54309788	2	0.33425384
2015-0	19.18440156	-0.7325088889	10.7806363	2	0.55430928
2015-1	26.0163056	2.1432577778	25.09288606	3	1.07806236
2015-2	29.9607097	7.1242333333	36.61986326	4	2.50928886
2015-3	29.9607097	12.8757666667	33.25213568	5	3.66198658
2015-4	26.0163056	17.8567422222	26.70789426	6	3.32521306
2015-5	19.1844041	20.7325111111	18.83743502	7	2.67078968
2015-6	11.2955959	20.7325111111	9.696196	7	1.88374274
2015-7	4.4636944	17.8567422222	0.58250582	6	0.9696196
2015-8	0.5192903	12.8757666667	0	5	0.05824982
2015-9	0.5192903	7.1242333333	0	4	0
2015-10	4.46369186	2.14326	3.34253078	3	0
2015-11	11.29560098	-0.73251	5.54309788	2	0.33425384
2016-0	19.18440156	-0.7325088889	10.7806363	2	0.55430928
2016-1	26.0163056	2.1432577778	25.09288606	3	1.07806236
2016-2	29.9607097	7.1242333333	36.61986326	4	2.50928886
2016-3	29.9607097	12.8757666667	33.25213568	5	3.66198658
2016-4	26.0163056	17.8567422222	26.70789426	6	3.32521306
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2016-6	11.2955959	20.7325111111	9.696196	7	1.88374274
2016-7	4.4636944	17.8567422222	0.58250582	6	0.9696196
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2017-11	11.29560098	-0.73251	5.54309788	2	0.33425384
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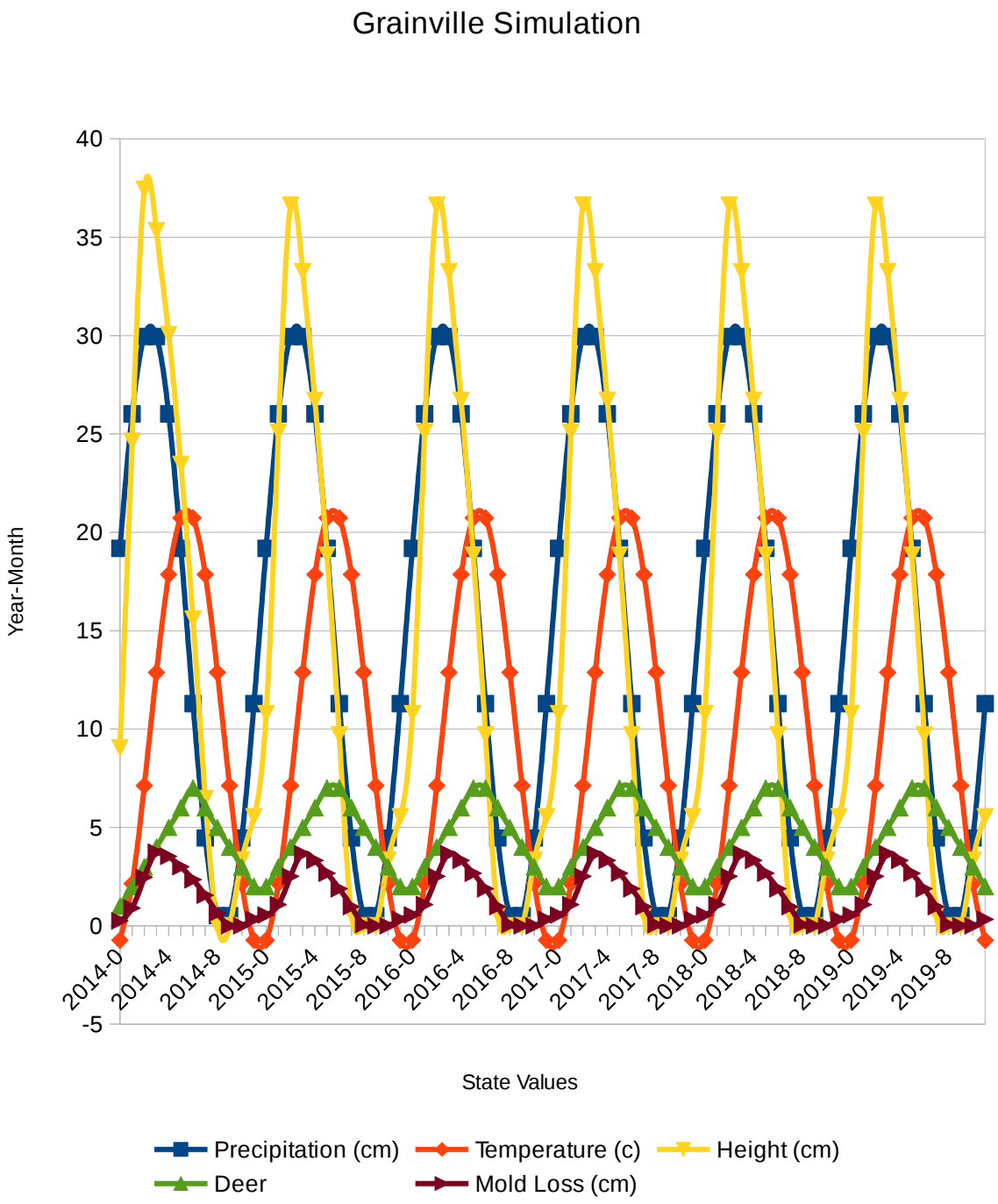
2019-6	11.2955959	20.7325111111	9.696196	7	1.88374274
2019-7	4.4636944	17.8567422222	0.58250582	6	0.9696196
2019-8	0.5192903	12.8757666667	0	5	0.05824982
2019-9	0.5192903	7.1242333333	0	4	0
2019-10	4.46369186	2.14326	3.34253078	3	0
2019-11	11.29560098	-0.73251	5.54309788	2	0.33425384

Graph:


Grainville Simulation
Year-Month
State Values
40
35
30
25
20
15
10
5
0
-5
2014-0
2014-4
2014-8
2015-0
2015-4
2015-8
2016-0
2016-4
2016-8
2017-0
2017-4
2017-8
2018-0
2018-4
2018-8
2019-0
2019-4
2019-8
Precipitation (cm)
Temperature (c)
Height (cm)
Deer
Mold Loss (cm)

Patterns:

Once noticeable pattern is that of my choice quantity, grain mold. The sinusoidal wave rises sharper during the beginning of the year, and then drops at a much slower rate towards the end of the year where as most of the value in the graph have a roughly symmetric sinusoidal wave. This can be attributed to the use of a differing factor based upon the temperature and precipitation.

The mold factor also adheres more closely the the period and offset of the height and precipitation plot than the period of the deer and temperature plot. However, there is still a slight difference from the height and precipitation period because the mold factor does depend upon the temperature as well.

The other pattern that stands out is how closely related the period of the grain height and the period of the precipitation are tied. There is only a slight horizontal offset between the two plots and this offset is due to the fact that the deer feed off the grain as well as the mold which can be seen towards the last quarter of the year.