Experiment protocol:

- .cf slide “experiments” & document

#xp00
The gestation period together with availability of food has great impact, you need less food if GP is shorter. Population stabilises at around 40 individuals (30-50).

#xp01
The gestation period together with availability of food has great impact, you need less food if GP is shorter. Population stabilises at around 40 individuals (30-50).

#xp02
Striking to note that in the same setting as the others, altruists died. => chemical trapped them in places where food had been and wasn’t anymore. Died again many times. Their survival, all other params kept as for the other population, was very closely based on the chemical evaporation/diffusion. Also chemical cost/eating rate are related since if they eat slowly it’s more costly to keep signalling. xp02a : same settings as before with untweaked chemical cost / evaporation rate / diffusion rate. xp02b : cc=0.0, er=30, dr=100 they stabilise around 110, with chemical cost of 0, they stabilised around 110 individuals => they exploit all food resources available. xp02c : cc=0.3, max cc at which they still survive in those conditions without changing er for instance. cc tipping point for those fixed conditions: 0.3 still ok, 0.4 die.

#xp03
cc=0.3, evr=30, dr=100, er=10 : G win, A die first! => they attract the G while standards are left alone even with cc=0.1 they die… even with starting population double altruists than greedy, they die…

finally found one setting where they survive!!!!!!
it's the number of food sources that does the trick… => because the emmit chemical, there are more chances that some G will come, so with more food sources, then there are more chances that one place will not be assaulted by G.

also greatly depends on the value of the tick_energy, the harder life is for everyone, the less it makes a difference that your life is slightly harder!

xp03a cc=0.4, te=0.7 : altruists survive last after long oscillation!

#xp04

The bigger the size of the food patch, the more likely it is for S to overpower G&A => if it's easy to find food, it's not very important to have another technique, and the gradient just makes them stick where there was food before and there is none anymore , slows them down.

#xp04a Tipping point for S > G&A : food_surface = 9

A big amount of food (8+) makes G survive longer (A also survive longer but die before greedy)
a small amount of food (2) makes A survive longer most of the time

Fewer food sources don't let A survive.

Below a food surface of 4, nobody survives, from 4, A are better.

#xp4b longest oscillation between 2 pop observed! with nbfs=10, fa=2, fs=6

#xp05

The higher the eating cooldown, the more likely it is for the population to die. 11 seems to be a tipping point above which everybody dies and below which profiteers survive. With eating_cooldown=11 profiteers survived 2 out of 5 simulations

If we continue lowering the eating cooldown, we increase the time that the altruistics stay alive. Another tipping point occurs with eating_cooldown=4, in which altruistics survived 1 out of 5 simulations. Above this value The altruistics die and below they live, coexisting with the profiteers.

Finally, with eating_cooldown=1, the altruistics outlived the others in 2 out of 5 simulations.

#xp06

#xp07
10/10/10 A win ⅘ , G ⅕ 50/50/50 A win 5/5 100/100/100 A ⅖ G ⅗ 200/200/200 A ⅘, G ⅕ 10-50-100 A ½ G ⅗ => 10-100-50 A ⅘ G ⅕ The initial numbers of the population doesn't seem to bear significant impact since the population still increases/decreases until reaching it's stable cohort. Altruists do better when their initial numbers are the same as those of profiteers, but they also manage to survive when they start being only half of the profiteers population 4/10!!!

#xp08
#xp08a with probability of mutation 0.2, A & G oscillate, the only reason B survive is because they keep being born from the others. Approximately half/half, little difference between numbers for A and G. #xp08b with probability of mutation 0.1, A & G oscillate, the only reason B survive is because they keep being born from the others. The ratios A/G varies more widely than with a prob 0.2. a mutation prob as small as 0.05 already makes the population oscillate

#xp09
One population starting with more altruists: one with more greedy: who wins? pop1 B=100, A=200, G=100 pop2 B=100, A=100, G=200 with fso=8 and fa=fsu=4, G never win over 10 runs, pop2A win 6/10 and pop1A win 4/10 with fso=6 and fa=fsu=5, G win 6/10 and A 4/10, with pop2 winning twice as often as pop1. pop1 200-200-100 #xp9a pop2 200-100 #xp9b Population with more altruists survive longer than pop with more profiteers! Even profiteers survive for longer.

30 trials	Pop1	Pop2
Altruists	22 = 0.73	5 = 0.17
Greedy	3 = 0.1	0