

Green Beard with a nasty gene

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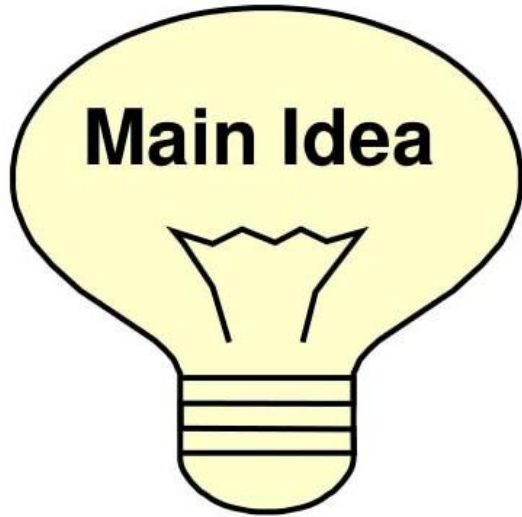
Athens 2021 project

Our reflection

A feature can be profitable but
still **not accepted by peers.**

Conditions for it to spread
anyway?





We added the **Nasty** gene

Our agents

There are three possible agents depending on their genes values:



Green Beard carriers: an agent with only the GreenBeard gene

Nasty carriers: an agent with only the Nasty gene

GreenBeard-Nasty carriers: an agent who has both genes

Our model

Green Beard carriers

- altruism among other green beard carriers
- Represented by the GreenBeard gene (1 bit)



DOs



DON'Ts

Nasty individuals

- hate the Green Beard carriers, so steal scores from them by attacking them
- they receive a penalty for being nasty
- Represented by the Nasty gene (1 bit)

GreenBeard-Nasty carriers

- they receive a penalty for have betrayed another agent of the same group

Segregation

We also added a parameter called “**Nasty_Segregation**” which can be used to decide either a nasty carrier can reproduce with a Green Beard carrier.

What will happen?



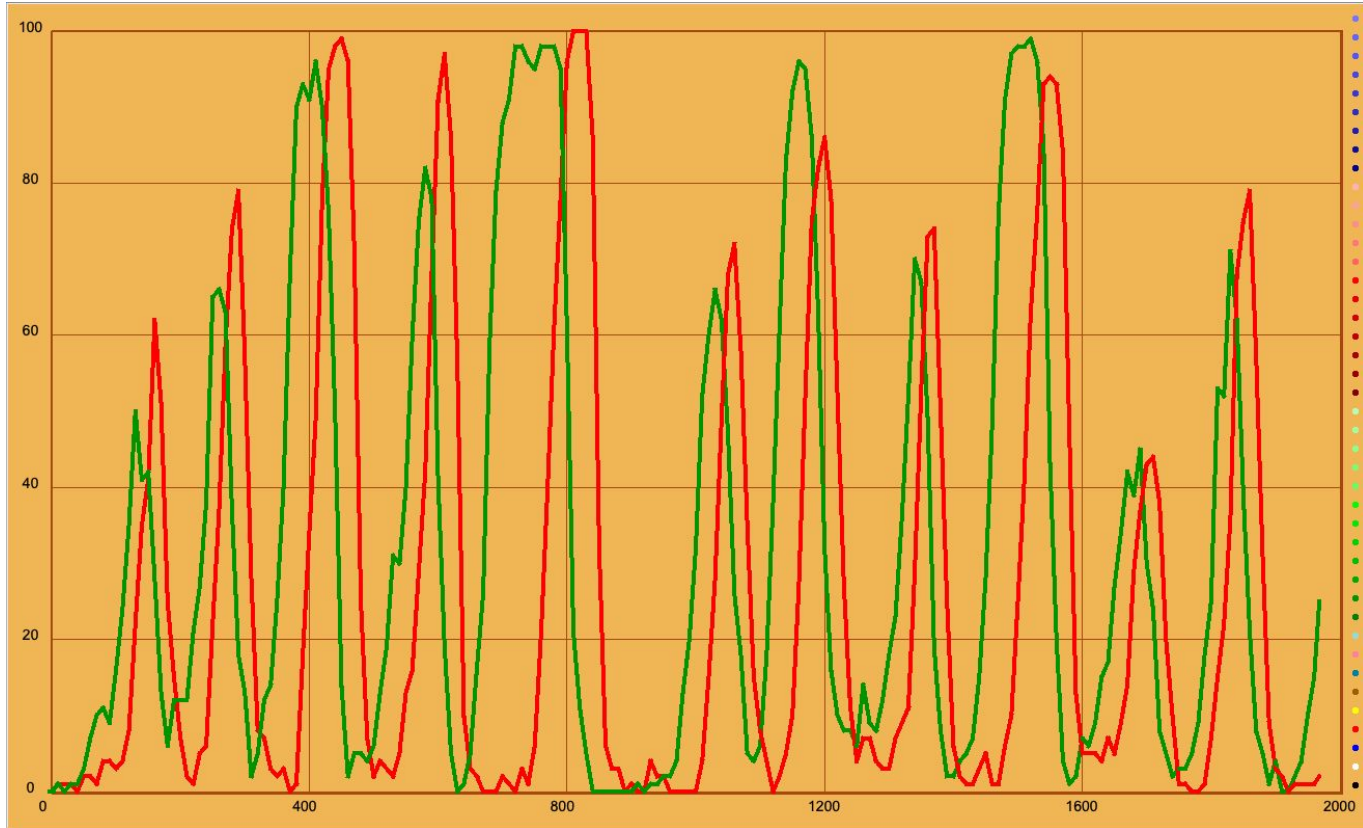
Which gene will prevail?

Individuals can be both GB carriers and nasty!?

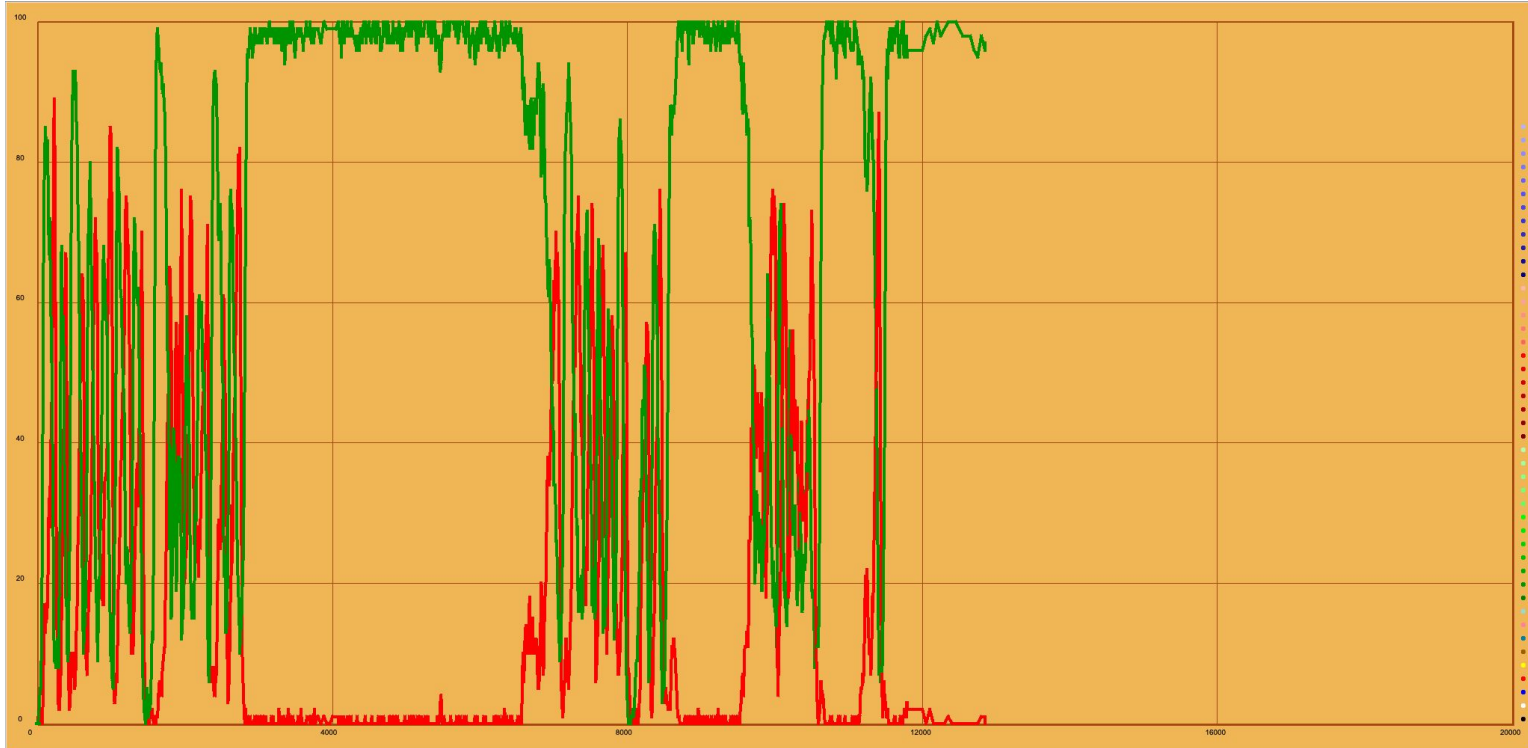
Notations

- Altruism between green beard carriers:
 - Interactions: $S(\text{GBa}) = -C$; $S(\text{GBb}) = +G$
- Hate of the nasty individuals:
 - Interaction with GB carriers: $S(\text{N}) = P - \alpha$; $S(\text{GB}) = -A$
 - interaction with non GB carriers $S(\text{N}) = -\alpha$; $S(?) = 0$
- Both nasty and green beard carriers: no segregation
 - Interaction with GB carriers: $S(\text{N+GB}) = P - \alpha - \beta$; $S(\text{GB}) = -A$
 - interaction with non GB carriers $S(\text{N+GB}) = -\alpha$; $S(?) = 0$

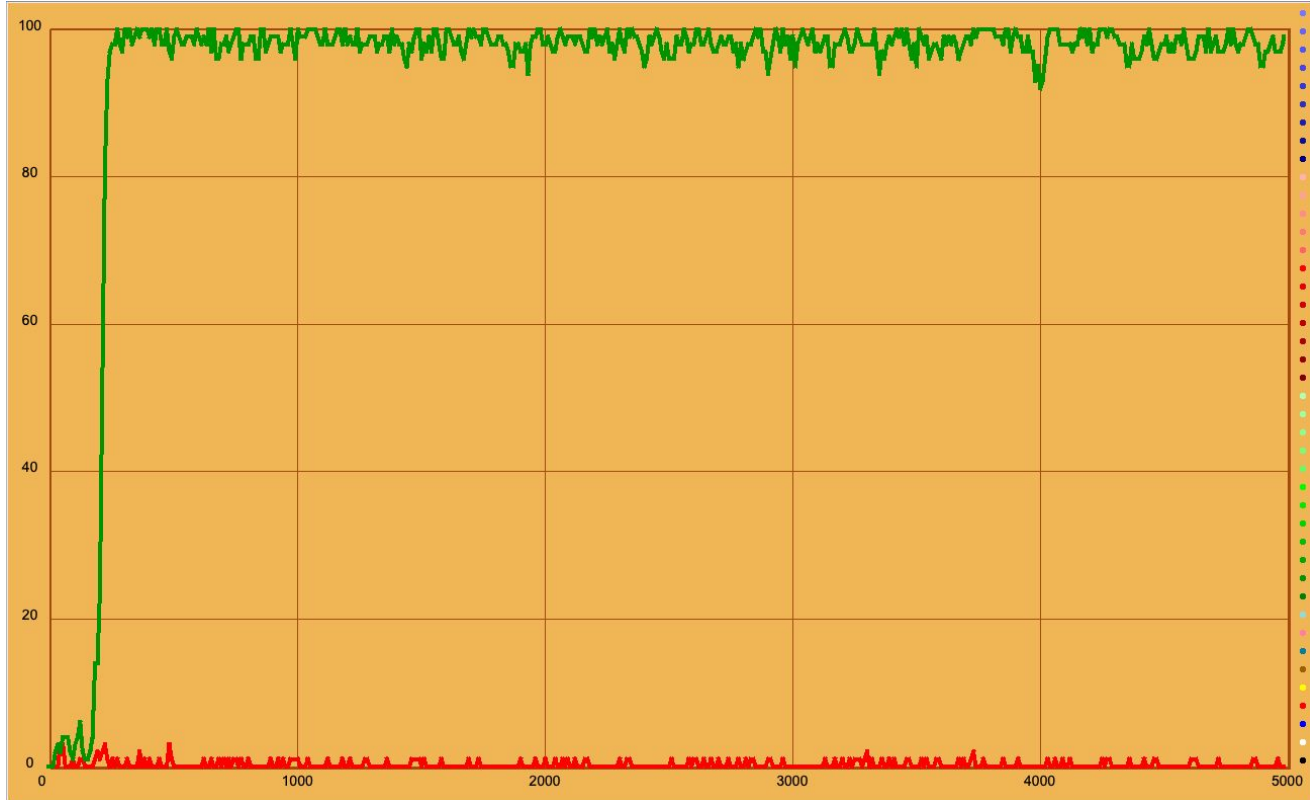
Without segregation



With segregation



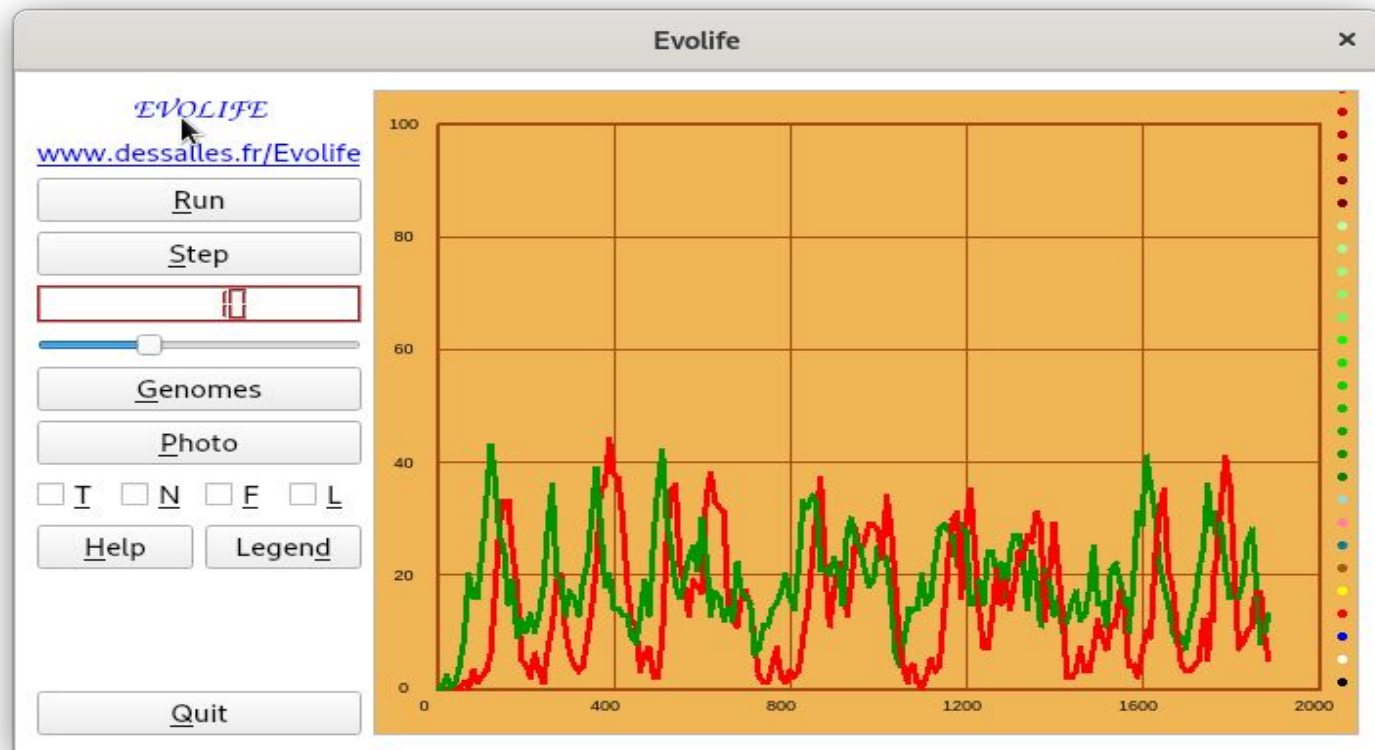
With a low payback



Selectivity without nasty stealing, $\text{Cost} > \text{Gift}$



Selectivity with a bit of nasty stealing



Thank you for your attention!