A brief description of the experiments

...
2. Model aggregation and crowding

The mathematical model of the interaction between two species can be described by the following equations:

\[ \frac{d x}{d t} = -\alpha x + \beta y \]

\[ \frac{d y}{d t} = -\alpha x + \beta y \]

where \( x \) and \( y \) represent the populations of species A and B, respectively, \( \alpha \) is the death rate of species A, and \( \beta \) is the growth rate of species B.

The equilibrium state of the system is given by:

\[ x = \frac{\beta}{\alpha + \beta}, \quad y = x \]

This equilibrium is stable if \( \alpha < \beta \), indicating that species A is more competitively superior to species B.

The model predicts that the populations of both species will approach this equilibrium state over time. However, if the death rate of species A becomes too high, the population of species B may outcompete species A, leading to the extinction of species A.

The model can be extended to include the effect of crowding, where the growth rate of species B is reduced as the population density increases. This can be modeled by adding a term for the crowding effect, \( -\gamma x^2 \), to the equation for the growth rate of species B:

\[ \frac{d y}{d t} = -\alpha x + \beta y - \gamma x^2 \]

The crowding effect reduces the growth rate of species B as the population density increases, leading to a decrease in the population of species B when the population density becomes too high.
The probability to leave the site for a new site is given by $p = \frac{e^{-\beta x}}{\sum_{i=1}^{N} e^{-\beta x_i}}$. For $g = 0$, it corresponds to two independent situations with transition of a state from $i$ to another state, where the number of individuals is lower than 1. In this case, the number of individuals in the state $i$ should decrease or increase, depending on the value of $g$. If $g > 0$, the number of individuals decreases, and vice versa. The proportion of individuals in state $i$ is given by $\frac{e^{-\beta x_i}}{\sum_{i=1}^{N} e^{-\beta x_i}}$. For $g = 0$, the number of individuals decreases, and vice versa. The proportion of individuals in state $i$ is given by $\frac{e^{-\beta x_i}}{\sum_{i=1}^{N} e^{-\beta x_i}}$.

When the fraction of individuals is equal to $1$, the proportion of individuals is equal to $\frac{1}{N}$. The proportion of individuals is equal to $\frac{1}{N}$.

For $g > 0$, the proportion of individuals decreases, and vice versa. The proportion of individuals in state $i$ is given by $\frac{e^{-\beta x_i}}{\sum_{i=1}^{N} e^{-\beta x_i}}$. For $g = 0$, the number of individuals decreases, and vice versa. The proportion of individuals in state $i$ is given by $\frac{e^{-\beta x_i}}{\sum_{i=1}^{N} e^{-\beta x_i}}$.

When the fraction of individuals is equal to $1$, the proportion of individuals is equal to $\frac{1}{N}$. The proportion of individuals is equal to $\frac{1}{N}$.
Discussion

The solutions correspond to the aggregation of the individuals of both strains on the site:

\[
\frac{(f+1)}{y_f} < \frac{N}{\gamma}
\]

These solutions are stable for \( y_f > \frac{N}{\gamma} \) and \( \frac{(f-1)}{y_f} < \frac{N}{\gamma} \), \( f \Delta + \frac{N}{\gamma} \Delta = \frac{0}{y_f} \)

The model has four solutions:

1. \( f = 1 \) and \( \Delta = 1 \) \( f = 1 \Delta = 1 \)

The populations of both strains. We discuss here the case with equal units.

\[
\frac{S}{\Delta (x f + x S)} \frac{y}{\Delta} = \frac{S}{\Delta (y f + y S)} \frac{y}{\Delta}
\]

We discuss here the case where the "infectivity" parameter is more important than the "delay" parameter.


References


Acknowledgments

The authors wish to thank the participants for their cooperation in the study and for their contribution to the research. The study was supported by grant no. 1ABC-001234 from the National Health Foundation. The authors also wish to thank the reviewers for their valuable comments and suggestions, which have helped to improve the manuscript. The study was supported by grant no. 1ABC-001234 from the National Health Foundation.

The authors also wish to thank the reviewers for their valuable comments and suggestions, which have helped to improve the manuscript. The study was supported by grant no. 1ABC-001234 from the National Health Foundation.

The authors also wish to thank the reviewers for their valuable comments and suggestions, which have helped to improve the manuscript. The study was supported by grant no. 1ABC-001234 from the National Health Foundation.

The authors also wish to thank the reviewers for their valuable comments and suggestions, which have helped to improve the manuscript. The study was supported by grant no. 1ABC-001234 from the National Health Foundation.