**EEB/ANTH 4329: Primate Ecology and Social Behavior**

**Lab: Computer Models of Primate Behavior**

In this lab we will explore the role of group size and predation rate in survival and reproduction. By combining two levels of group size and two levels of predation rate we will explore how these factors interact to influence survival and reproduction. As before, primates will go about searching for food and mates and males will transfer between groups. In addition to these behaviors, the primates will also interact with predators. When a primate perceives a predator it will strive to avoid it. If it comes into direct contact with the predator it will receive a predation cost (in terms of energy). If this predation cost exceeds the level of energy the primate currently has it will die. The goal of this lab is to have you think about the costs and benefits of living in different types of social groups and how these costs/benefits might vary in different environments.

New Definitions

**Predation rate**- the rate at which new predators appear in the environment

**Predation duration**- the number of ticks in which a given predator remains in the environment

**Predation cost**- the total energy cost of interacting with a predator

Instructions

1. Open the Primate Ecology Lab Model from last week in NetLogo.

2. Set Fixed settings to the values listed below.

3. Set Variable settings to the values associated with each of your four models

4. Run each of the four models twice for 200 ticks each

5. Record your results for each model on your datasheet

6. Share your data with the class and record class averages

Fixed Settings

|  |  |  |  |
| --- | --- | --- | --- |
| **Patch Settings** |  | Perception range | 2 |
| patch abundance | 0.5 | *Life History* |  |
| patch patchiness | 0.5 | age-at-maturity | 25 |
| Patch growth rate | 5.04 | life-expectancy | 400 |
| Patch-max energy | 50 | *Dispersal* |  |
| **Primate Settings** |  | female-transfer? | Off |
| *Energy Costs & Gains* |  | male-transfer? | On |
| max-energy | 660 | *Weighted Strategies* |  |
| birth-cost | 240 | home-weightedness | 4 |
| food-eaten-per-step | 32 | food-weightedness | 5 |
| energy-cost-per-step | 6 | conspecific-weightedness | 6 |
| aggression-cost | 18 | male-weightedness | 6 |
| *Evolving Traits* |  | predation-weightedness | 7 |
| avg-fighting-ability | 0.5 |
| avg-intragroup-tolerance | 0.5 |
| avg-intergroup-tolerance | 0.5 |
| female-female-tolerance | 0.5 |
| female-male-tolerance | 0.5 |
| male-male-tolerance | 0.3 |
| male-female-tolerance | 0.9 |
| **Predator Settings** |  |
| Play alarm calls | Off |
| Predation duration | 10 |
| Predation cost | 50 |

Variable Settings

Predator Settings

|  |  |  |
| --- | --- | --- |
|  | Low Rate | High Rate |
| Predation rate | .25 | .75 |

Group Settings

|  |  |  |
| --- | --- | --- |
|  | Small Group Size | Large Group Size |
| Initial group count | 5 | 2 |
| Initial number males | 10 | 25 |
| Initial number females | 10 | 25 |

Results

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Rep |  | Low Rate/  Low Size | Low Rate/  High Size | High Rate/  Low Size | High Rate/  High Size |
| 1 | # of Primates |  |  |  |  |
| 2 | # of Primates |  |  |  |  |
|  | Class Average |  |  |  |  |

Questions

1. Describe two costs and two benefits of large group size in primates
2. Graph your expected results for the interaction between group size and predation risk and explain the rationale for your predictions in the space below
3. Graph the actual results for the interaction between group size and predation risk
4. Explain how the results differed from your predictions
5. How might you verify the results of the model with real data?