BIO 320 Project on Population Dynamics

1. *Due* Friday, 8 December 2008, the last class meeting.

2. *Length*: approximately 10 pages plus references.

3. *Objective*: gain deeper understanding of the conceptual basis of population biology. Project should examine a quantitative question (or questions) about the growth, decline or interactions of ecological populations. Grading will reflect the extent to which this objective is achieved.

4. *Methods*: Most students investigate properties of an existing model via numerical evaluation of a hypothesis. One could develop new model.

   Populus: software offers opportunities for numerical investigation of single populations, and interacting species.

   Project will report behavior of model(s), and interpret behavior.

5. Example (assume *Populus*)

   Select topic: discrete logistic, age-structured growth, infectious disease, or other population-dynamic process. You may choose to write your own equations in Populus' "Interaction Engine."

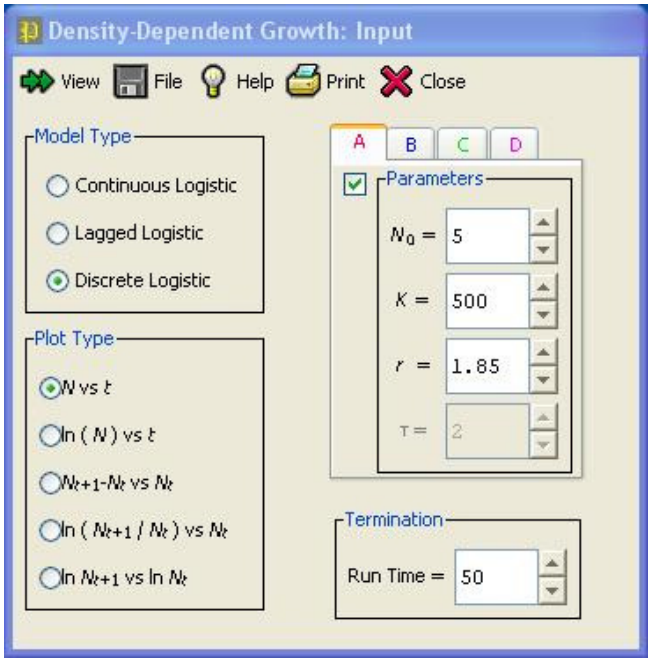
   Ask question of the model; be specific, effects of parameter(s)

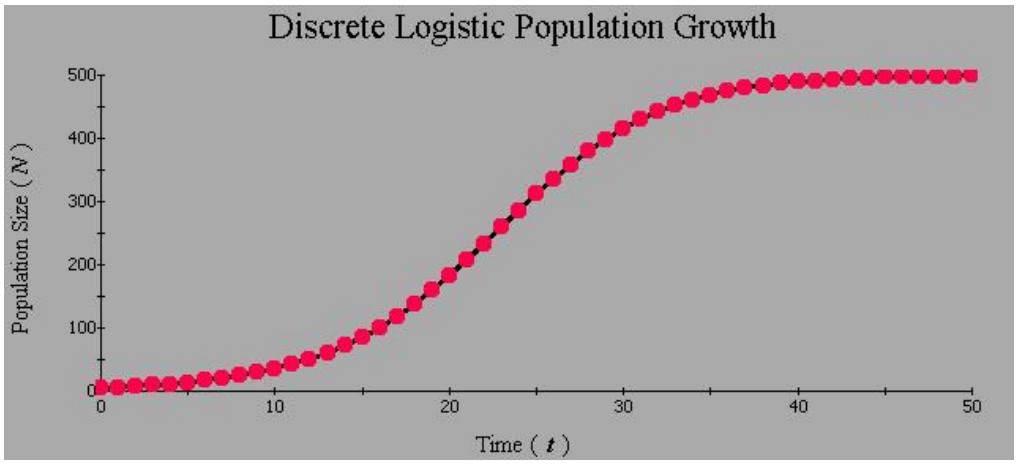
   Run model repeatedly, using different parameter values

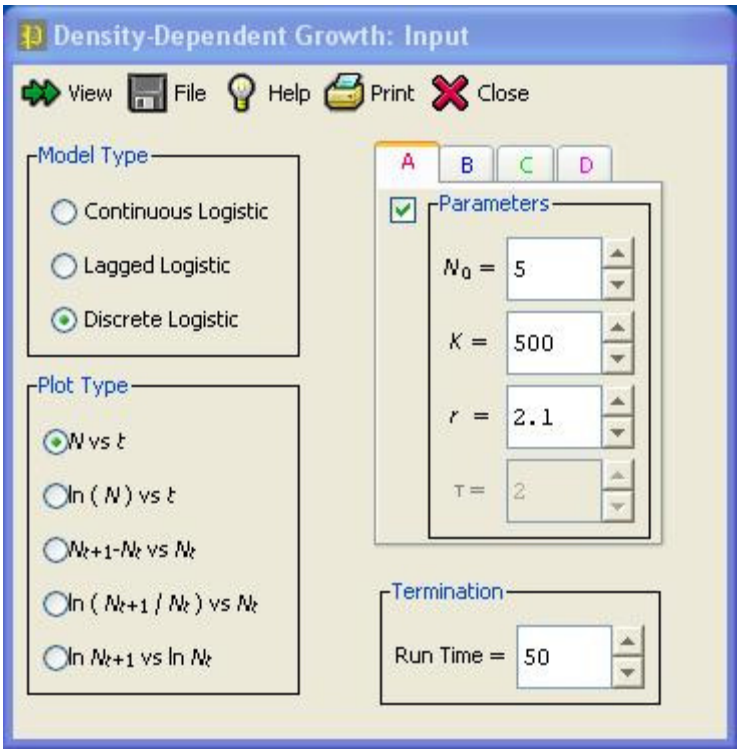
   Save plots (to *Populus* folder)

   Analyze results; answer your question(s)

   Write the paper; include plots saved to validate interpretation


Density-Dependent Growth: Input
View
File
Help
Print
Close
Model Type
Continuous Logistic
Lagged Logistic
Discrete Logistic
Plot Type
N vs t
ln (N) vs t
Nt+1-Nt vs Nt
ln (Nt+1 / Nt) vs Nt
ln Nt+1 vs ln Nt
A
B
C
D
Parameters
N0 = 5
K = 500
r = 1.85
T = 2
Termination
Run Time = 50


Discrete Logistic Population Growth
Population Size (N)
Time (t)
0
100
200
300
400
500
0
10
20
30
40
50


Density-Dependent Growth: Input
View
File
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Print
Close
Model Type
Continuous Logistic
Lagged Logistic
Discrete Logistic
Plot Type
N vs t
ln (N) vs t
Nt+1-Nt vs Nt
ln (Nt+1 / Nt) vs Nt
ln Nt+1 vs ln Nt
A
B
C
D
Parameters
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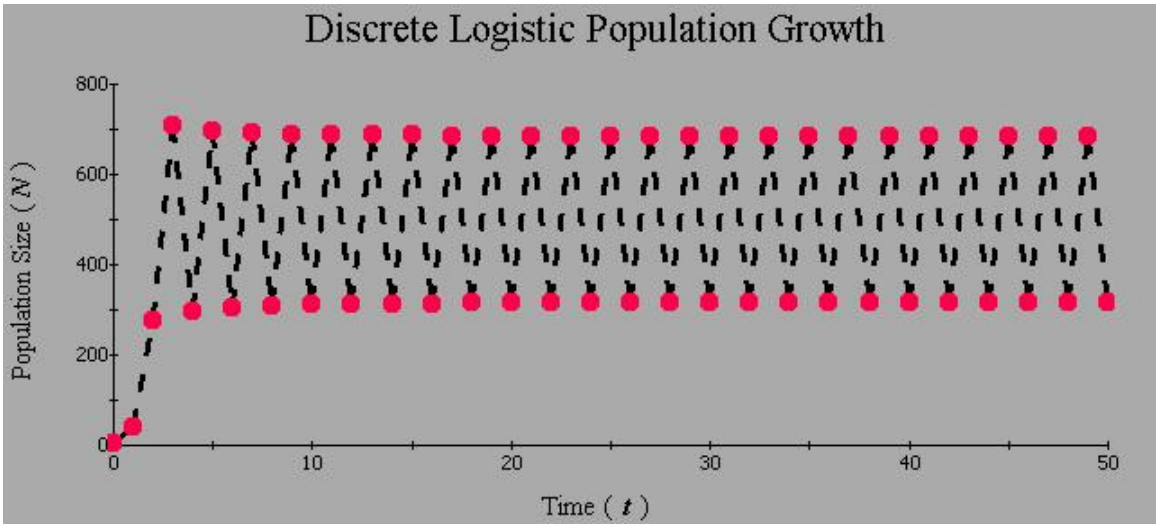
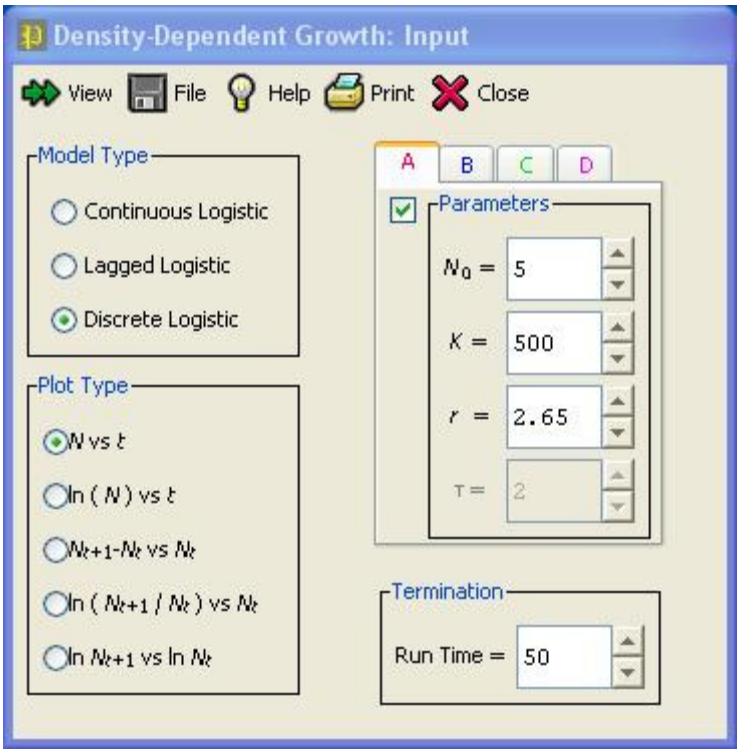
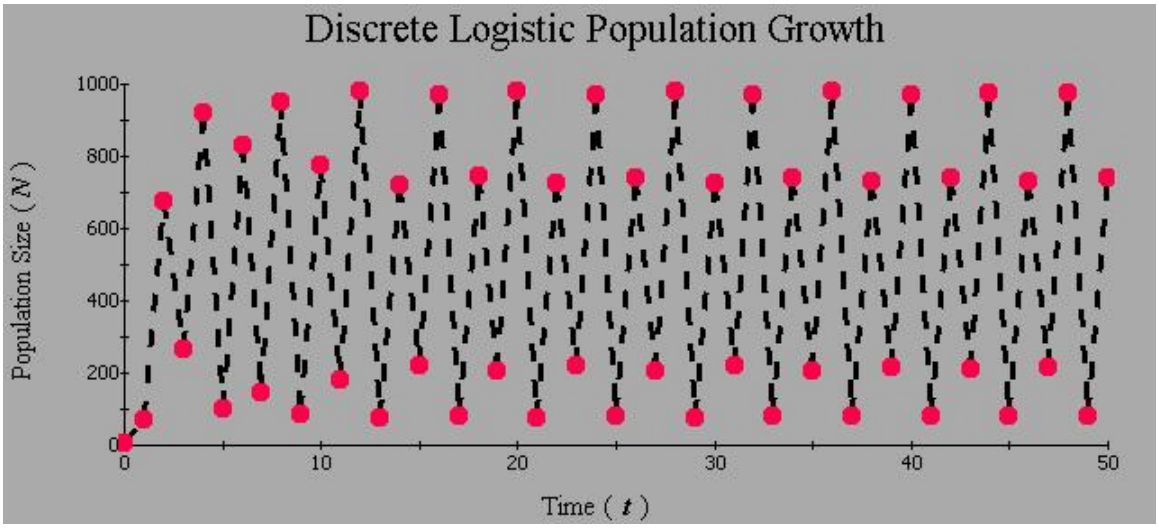
K = 500
r = 2.1
T = 2
Termination
Run Time = 50


Discrete Logistic Population Growth
Population Size (N)
800
600
400
200
0
0
10
20
30
40
50
Time (t)


Density-Dependent Growth: Input
View
File
Help
Print
Close
Model Type
Continuous Logistic
Lagged Logistic
Discrete Logistic
Plot Type
N vs t
ln (N) vs t
Nt+1-Nt vs Nt
ln (Nt+1 / Nt) vs Nt
ln Nt+1 vs ln Nt
A
B
C
D
Parameters
N0 = 5
K = 500
r = 2.65
T = 2
Termination
Run Time = 50


Discrete Logistic Population Growth
Population Size (N)
Time (t)
0
200
400
600
800
1000
0
10
20
30
40
50