Answers to Exercise 25

Habitat Selection

1. If the density in habitat 1 is 3, the fourth individual will also settle in habitat 1. The suitability of habitat 2 does not exceed that of habitat 1 until 5 individuals have settled in habitat 1. As such, if the density is 8 individuals in habitat 1 and 0 in habitat 2, the next individual should select habitat 2. After all 10 individuals have settled, the suitability of the two habitats is similar. The two habitats should be similar in terms of per capita fitness.

2. In the ideal-free model, an increasing f magnifies the density-dependent effects on habitat suitability.

3. If each individual decreases suitability by a squared function of density, habitat quality deteriorates more quickly as new individuals enter the patch. Individuals begin to populate habitat 2 more quickly than in the previous model, and the suitability of both habitats declines rapidly.

4. When individuals in a habitat attempt to prevent others from entering, these "despots" reduce the apparent suitability of the habitat for subsequent colonizers.

5. Increasing the resistance to settling, t, has a negative effect on habitat suitability. By raising the value of t to 0.15, the suitability of habitat 1 approaches zero after only 6 individuals occupy the patch.

6. The ideal-despotic distribution does lead to a condition similar to the ideal-free distribution, where the per capita suitability of the two habitats is similar.

7. N/A