Supplementary material part 7

Information use during movement regulates how fragmentation and loss of habitat affect body size
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Individuals are larger when P equals 0.50 than when P equals 0.90 and movement is uninformed. This difference is largest when immigration from outside the landscape is deactivated (q=0). To find an explanation for this outcome, we decided to run two extra scenarios with q equaling 0.

Scenario1: the dimensions of the landscape are 100×100. Of the entire landscape, only a square in the center with dimensions 70×70 is assigned to be suitable. The total number of suitable cells resembles the scenario with P equaling 0.50.

The results of this scenario show that individuals are large.

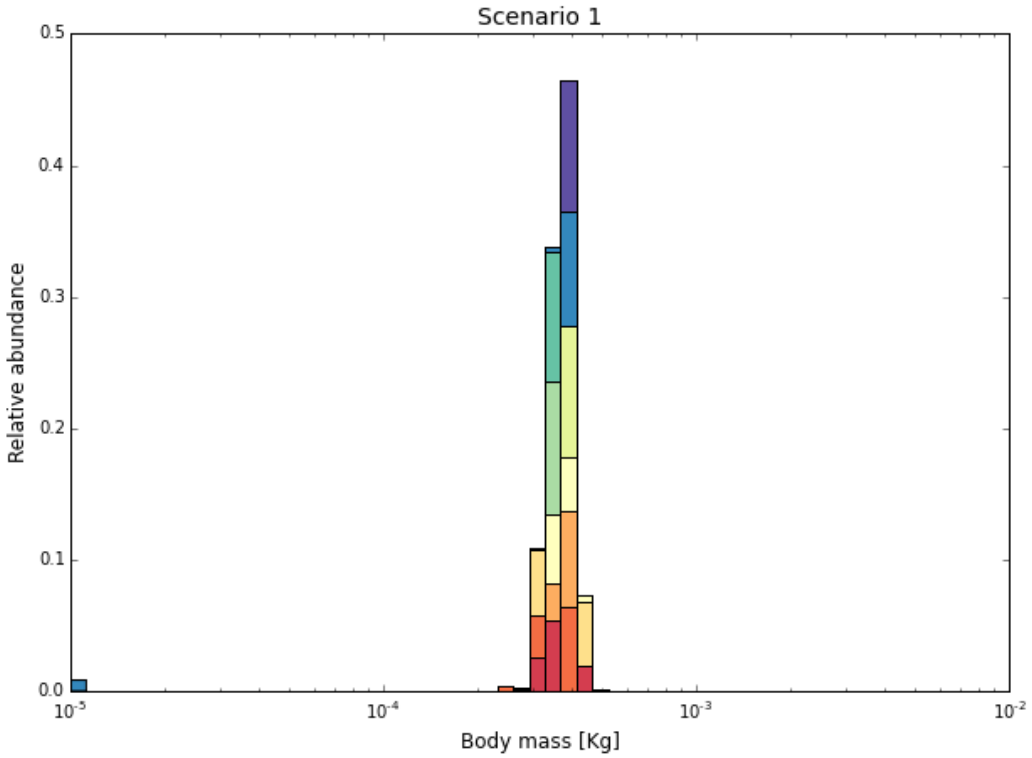

Figure S7.1: Body mass distribution in scenario 1. In this figure, total abundance is scaled to the sum of all ten simulations.

Scenario2: The dimensions of landscape are 70×70. All cells within the landscape are suitable. The total number of suitable cells resembles the scenario with *P* equaling 0.50. No cells are unsuitable.

The results of scenario 2 show that when unsuitable habitat is absent, individuals are smaller than when unsuitable habitat is present. This shows that the competitive advantage of smaller individuals is lower under the risk of moving to unsuitable habitat as small individuals starve more rapidly than larger individuals[1]. Also, as the foraging area of small individuals is smaller, they might need more time steps to return to suitable area and instead get trapped within unsuitable area. As large individuals have larger foraging areas they might cross the unsuitable area more rapidly and return faster to suitable conditions.

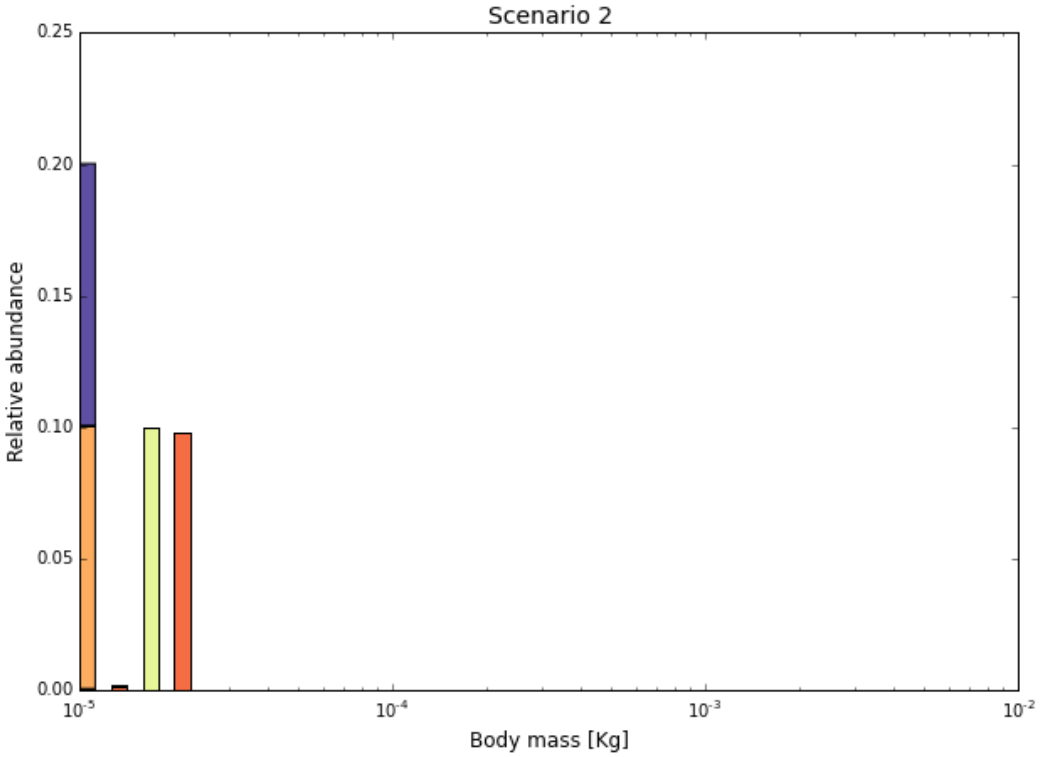

Figure 7.2: Body mass distribution in scenario 2. In this figure, total abundance is scaled to the sum of all ten simulations.

[11]Survival time of individual of 0.00001 kg after 8 days of optimal feeding while moving daily: 12.9 days
Survival time of individual of 0.003 kg after 8 days of optimal feeding while moving daily: 15.7 days
Survival time of individual of 0.003 kg after 14 days of optimal feeding while moving daily: 27.4 days
Large individuals do have longer lifetimes so especially when comparing large individuals with longer lifetimes with smaller individuals with shorter lifetimes, the effect of size on survival time is clear.