Supplementary material part 3

Information use during movement regulates how fragmentation and loss of habitat affect body size
Jasmijn Hillaert, Martijn L. Vandegehuchte, Thomas Hovestadt, Dries Bonte
Proceedings of the Royal Society B
DOI: 10.1098/rspb.2018.0953

Table S3.1: Overview of parameters implemented in sensitivity analyses and their effect.

Parameter	*Figure*	*Default setting*	*Extra tested values or functions*	Does general pattern remain?	Remarks
Immigration rate (q)	S3.2	0.01	0.1	yes	General pattern remains
Immigration rate (q)	S3.3	0.01	0	yes	General pattern remains
Perceptual range (d_{per})	S3.4	301 *W* + 0.097	331.104*W* +0.00669	yes	The smallest individuals have a perceptual range of 0.01m instead of 1m. As the foraging area of smaller individuals is decreased, the selective advantage of large individuals is increased, resulting in generally larger individuals.
Perceptual range (d_{per})	S3.5	301 *W* + 0.097	133.779*W* + 0.0987	yes	The largest individuals have a perceptual range of 0.5m instead of 1m. Although the foraging area of larger individuals is decreased, the general pattern remains.
Carrying capacity resource (K)	S3.6	2000 J	1000 J	yes	Due to the lower carrying capacity, it is more difficult for large individuals to survive. This explains why relatively less individuals are large in the scenaria with P equalling 0.05 and H 0 when movement in informed. On the other hand, small individuals are prevented from dominating the population when P equals 0.90 and H1 when movement in uninformed. Nevertheless, the general pattern remains.
Carrying capacity resource (K)	S3.7	2000 J	3000 J	yes	The general pattern remains.
Number of eggs per clutch (N)	S3.8	15	2	yes	As large individuals do have a longer generation time than small individuals, they do increase in number at a much slower rate. As the number of eggs per clutch in decreased from 15 to 2, large individuals do need even more time to reach a stable number. Therefore, they are less abundant within the simulations having partially informed movement. Still, the general pattern remains.

Number of eggs per clutch (N)	S3.9	15	50	yes	As the number of eggs per clutch is increased from 15 to 50, large individuals do increase in number at a much higher rate. Therefore, they do dominate a simulation more easily than within the original simulation when movement is partially informed or uninformed. In the simulation with P0.05 and H1, the increased clutch size results in stronger competition and as such, increased chances of extinction. When P equaling 0.05, H equaling 0 and movement is informed, the increased clutch size of the smaller individuals increases strength of competition. This results in fewer large individuals in this scenario. The general pattern remains.
Growth speed resource (r)	S3.10	0.5	0.1	No	Due to the very low growth speed of the resource, large individuals are unable to survive. Only those simulations in which small individuals were selected, survival is possible. Globally, extinction rate is very high. The general pattern is no longer observed due to the high extinction rates.
Growth speed resource (r)	S3.11	0.5	0.9	yes	The increased growth speed increases the abundance of the smaller indivuals when movement is informed (P 0.05 and H 0) or increases the abundance of the large individuals when movement is partially informed or uninformed. The general pattern remains.
Maximum consumption time per day (t_f)	S3.12	52 000 s	36 000 s	yes	By lowering maximum consumption time, competition is weakened. The general pattern remains.
Maximum consumption time per day (t_f)	S3.13	52 000 s	72 000 s	yes	Increased consumption results in stronger competition. The general pattern remains.
Maximum value for movement time per day (t_m)	S3.14	3600 s	1800 s	yes	The foraging area is decreased for all individuals. This results in the selection of larger individuals when P 0.05 and H 0.The general pattern remains.
Maximum value for movement time per day (t_m)	S3.15	3600 s	7200 s	yes	The general pattern remains.

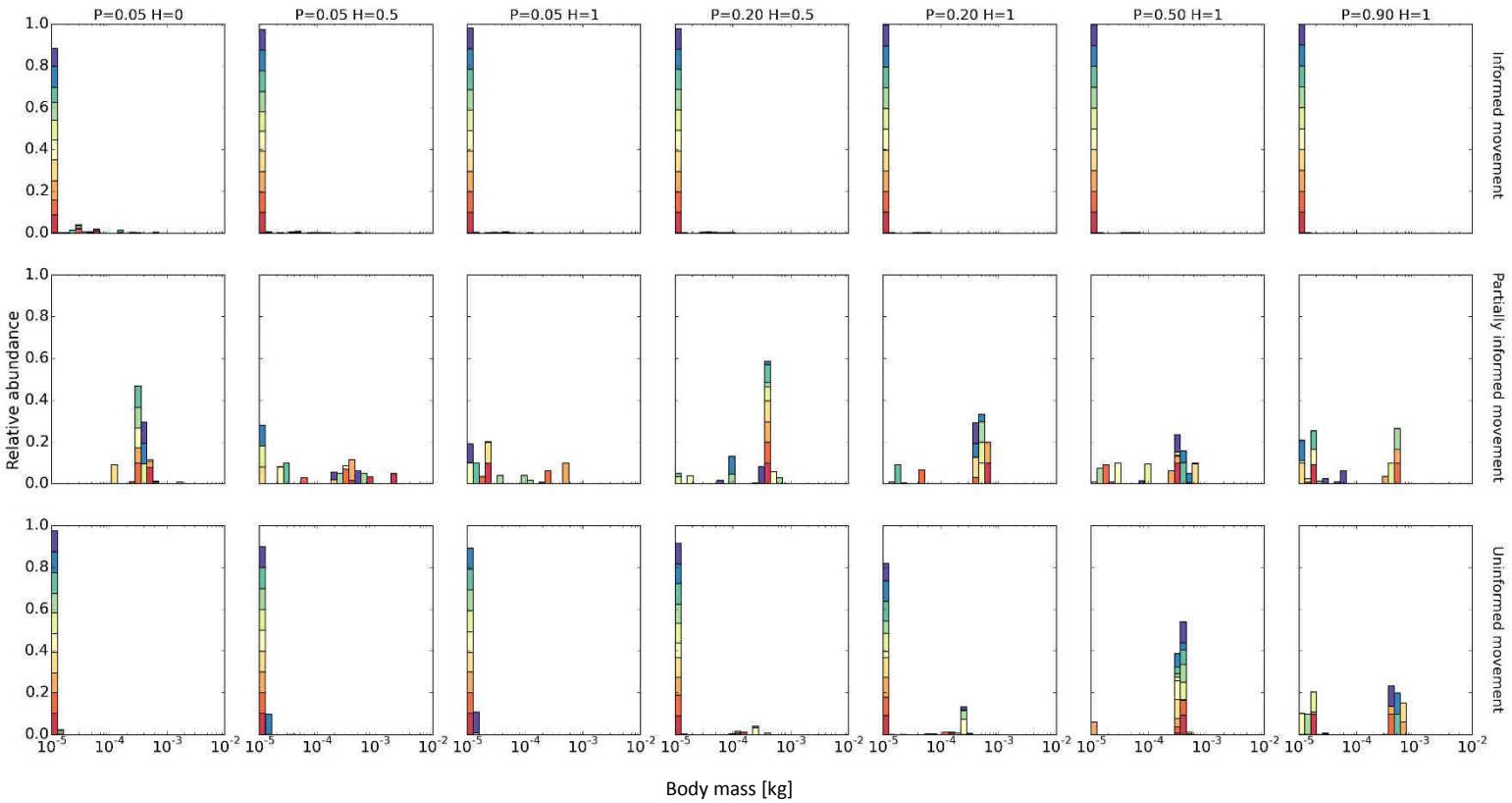

Figure S3.1: Results of original simulations. Assigned parameters are summarized in table S1.1. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.

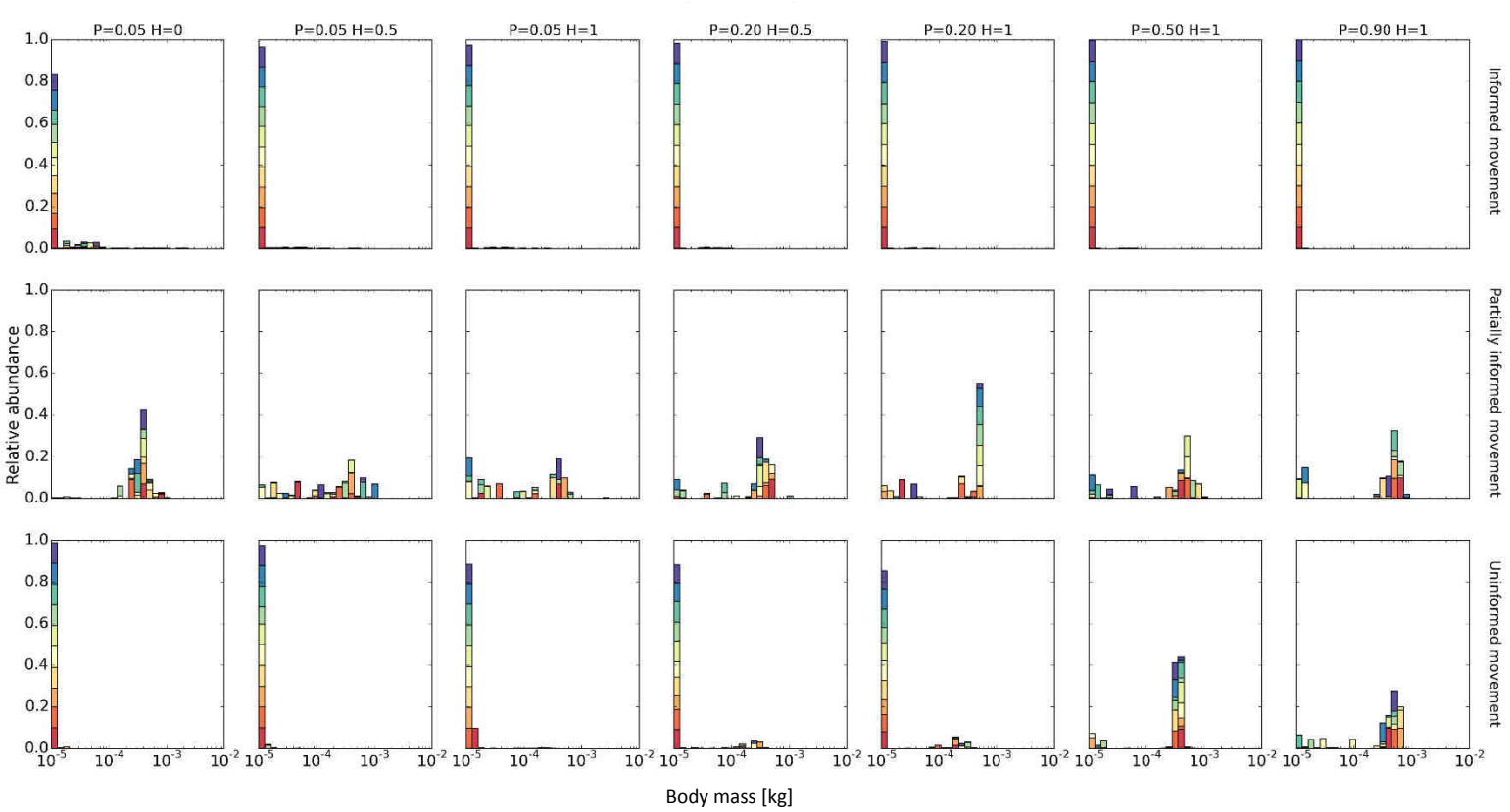

Figure S3.2: Immigration rate fixed at 0.1 (q=0.1). The general pattern remains. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.

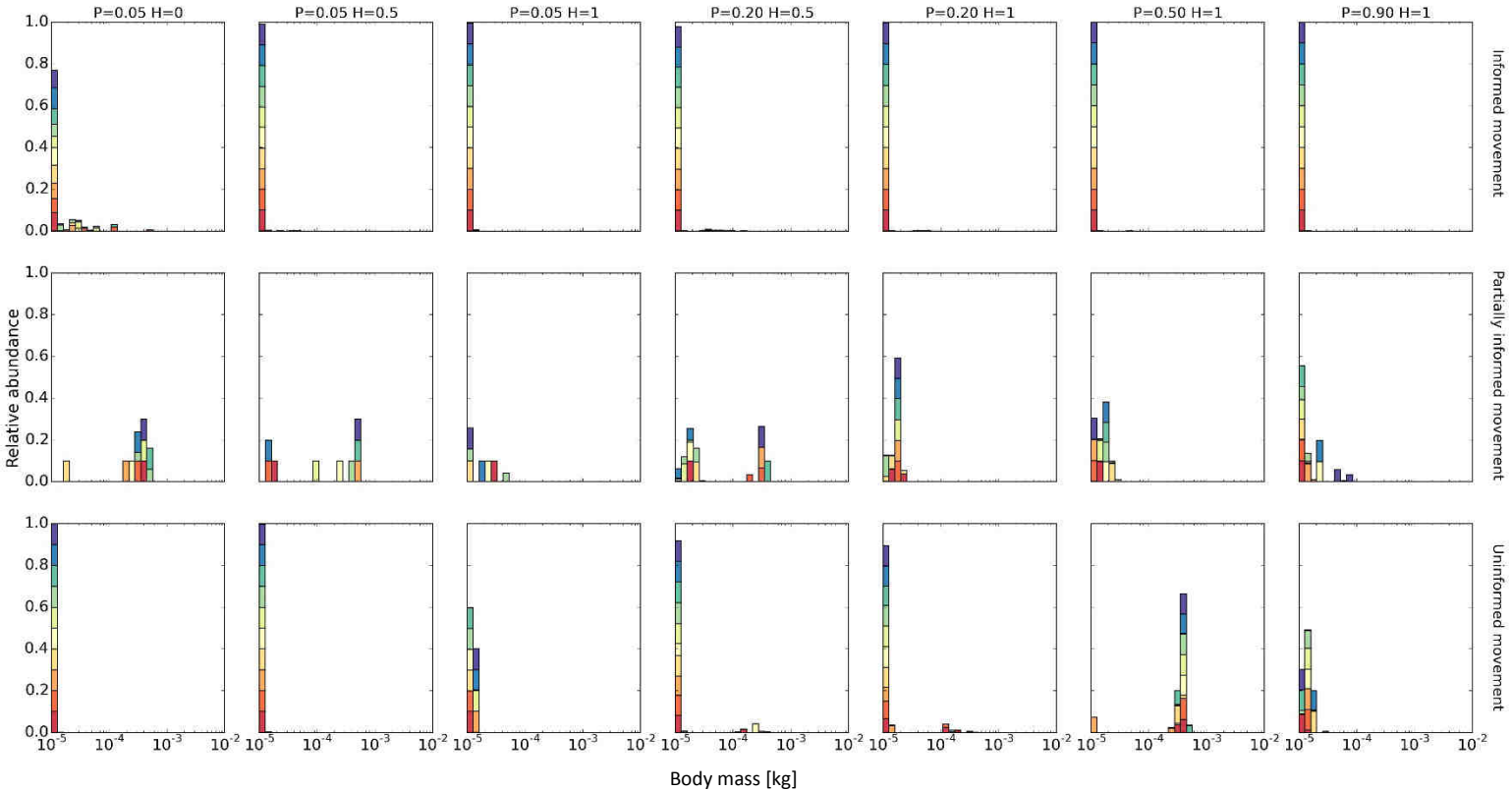

Figure S3.3: No immigration rate (q=0). The general pattern remains. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.

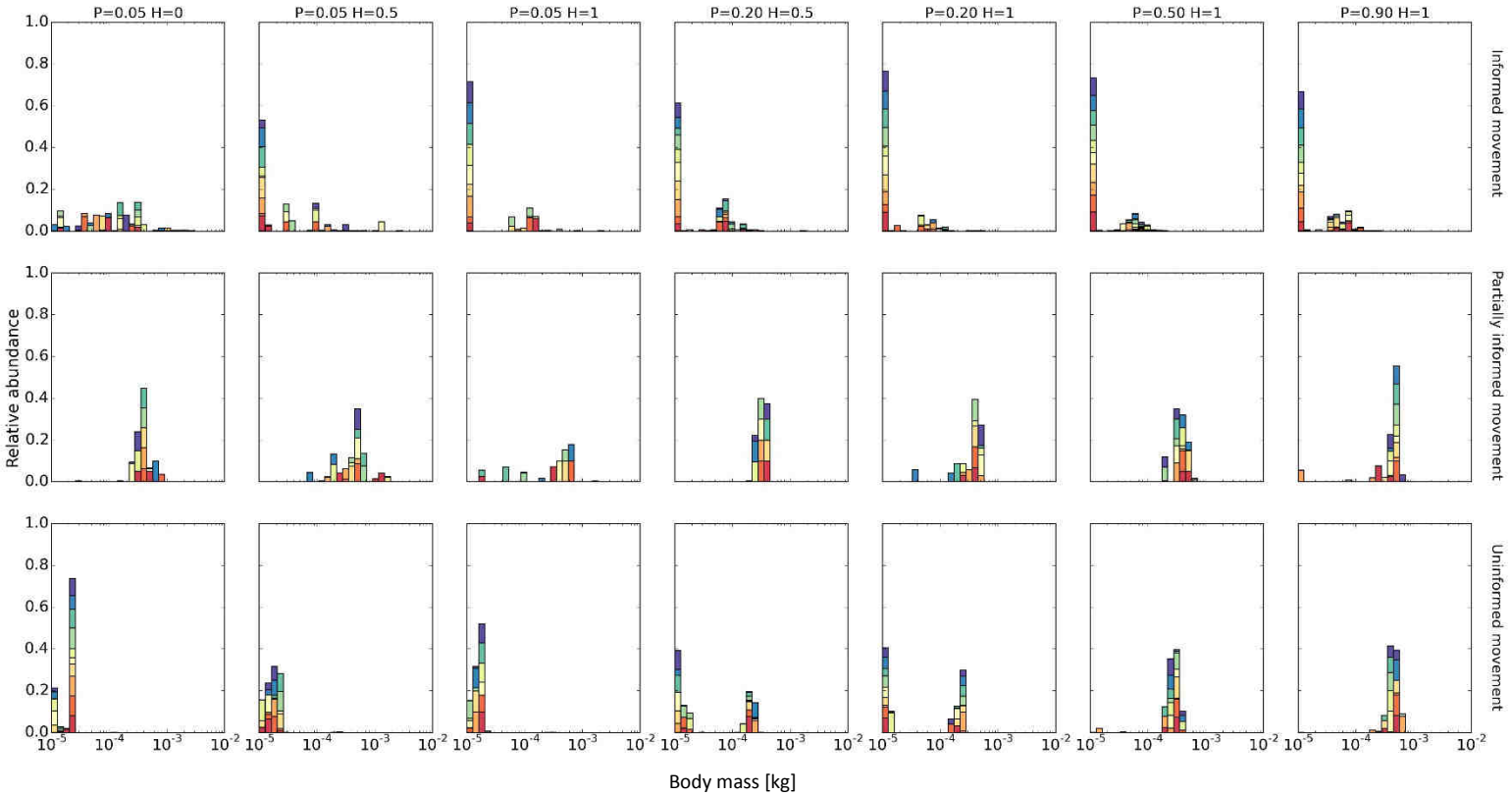

Figure S3.4: The smallest individuals have a perceptual range of 0.01m instead of 1m (dper= 331.104*W* +0.00669). The general pattern remains. As the foraging area of smaller individuals is decreased, the selective advantage of large individuals is increased. This results in generally larger individuals in all simulations. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.

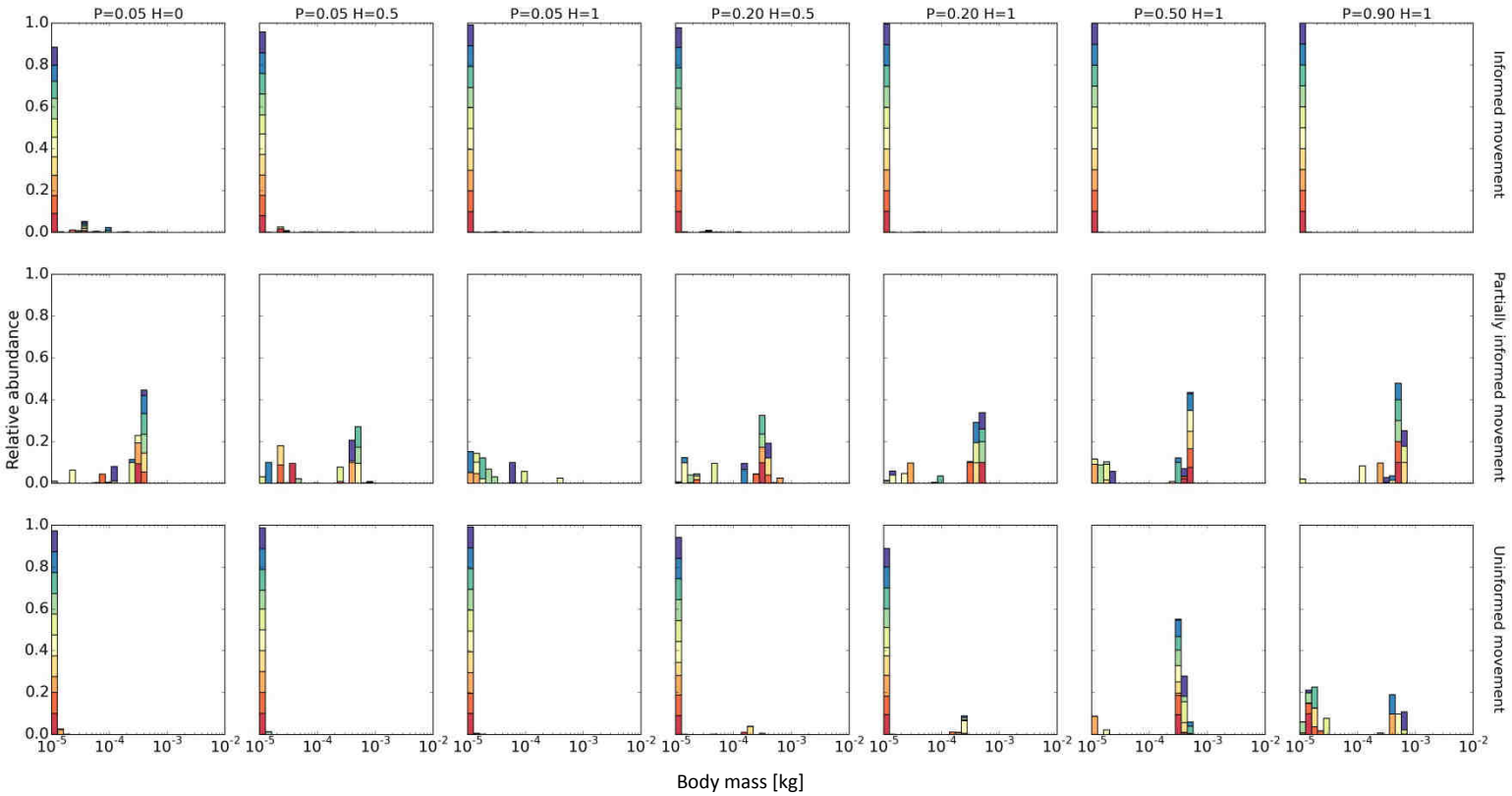

Figure S3.4: The largest individuals have a perceptual range of 0.5m instead of 1m (d_{per}=133.779*W* + 0.0987). Although the foraging area of larger individuals is decreased, the general pattern remains. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.

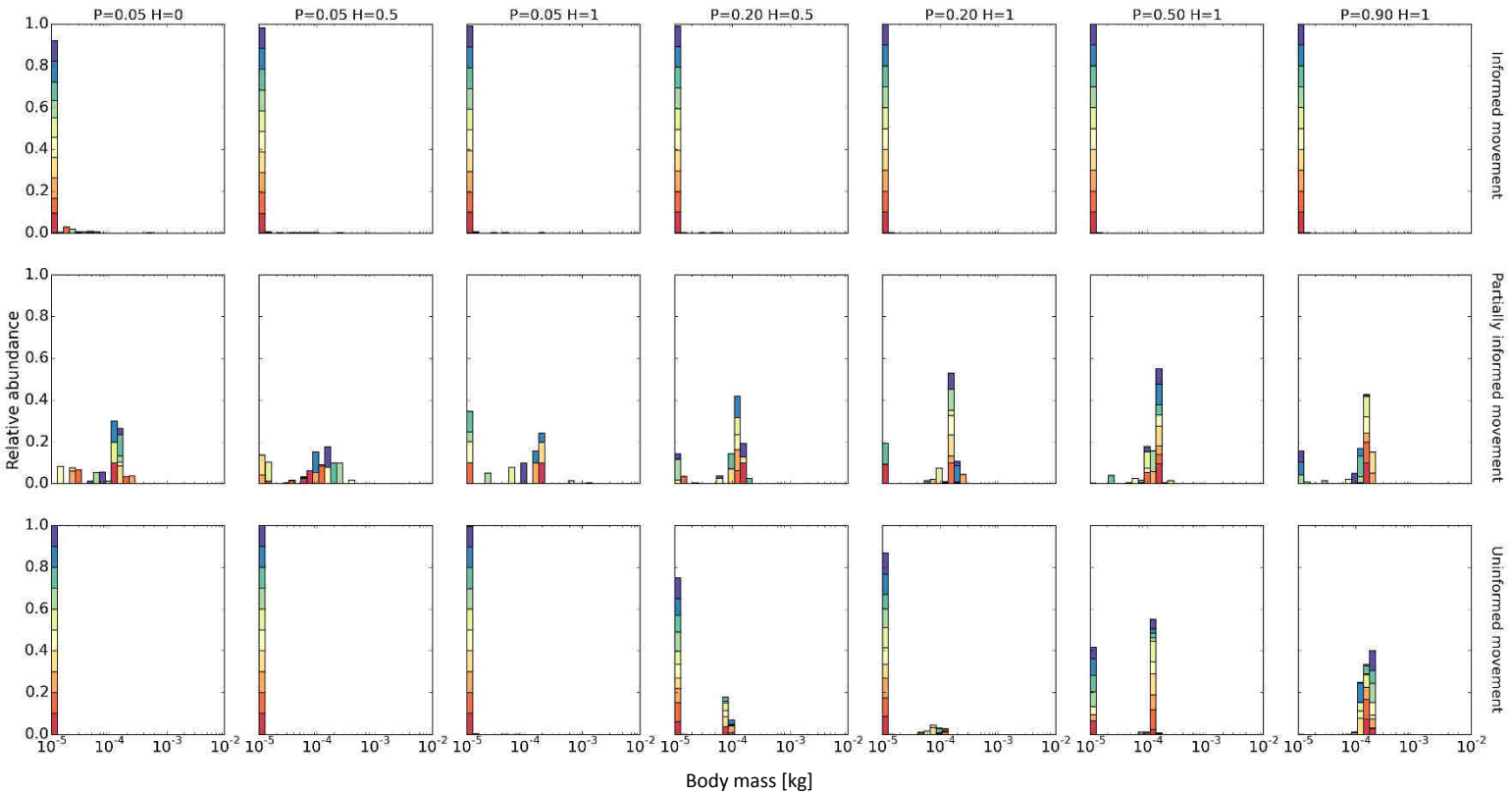

Figure S3.5: Carrying capacity of resource equals 1000 J (K=1000). Due to the lower carrying capacity, it is more difficult for large individuals to survive. This explains why relatively less individuals are large in the scenaria with P equalling 0.05 and H 0 when movement in informed. On the other hand, small individuals are prevented from dominating the population when P equals 0.90 and H1 when movement in uninformed. Nevertheless, the general pattern remains. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.

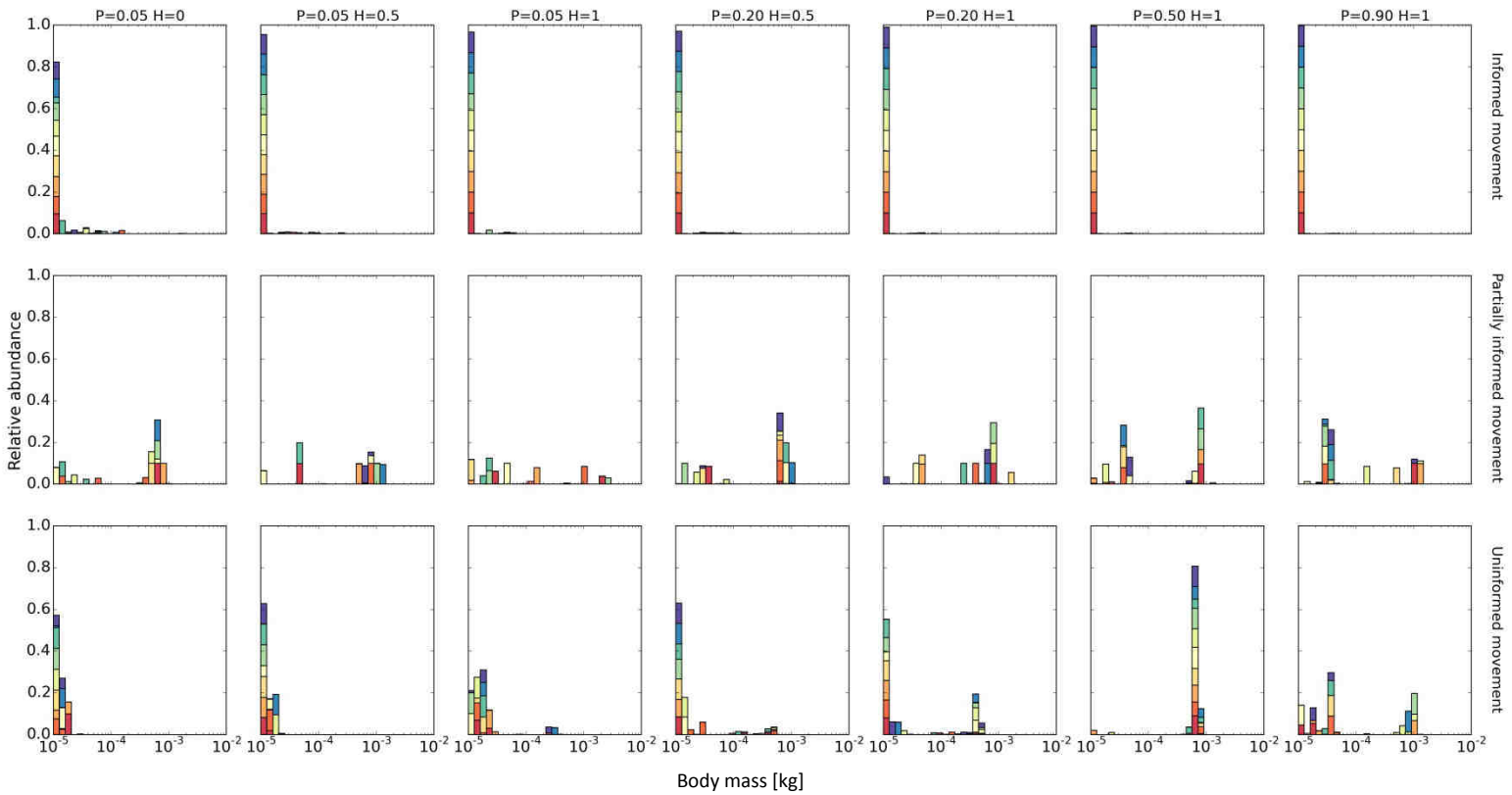

Figure S3.6: Carrying capacity of resource equals 3000 J (K=3000). The general pattern remains. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.

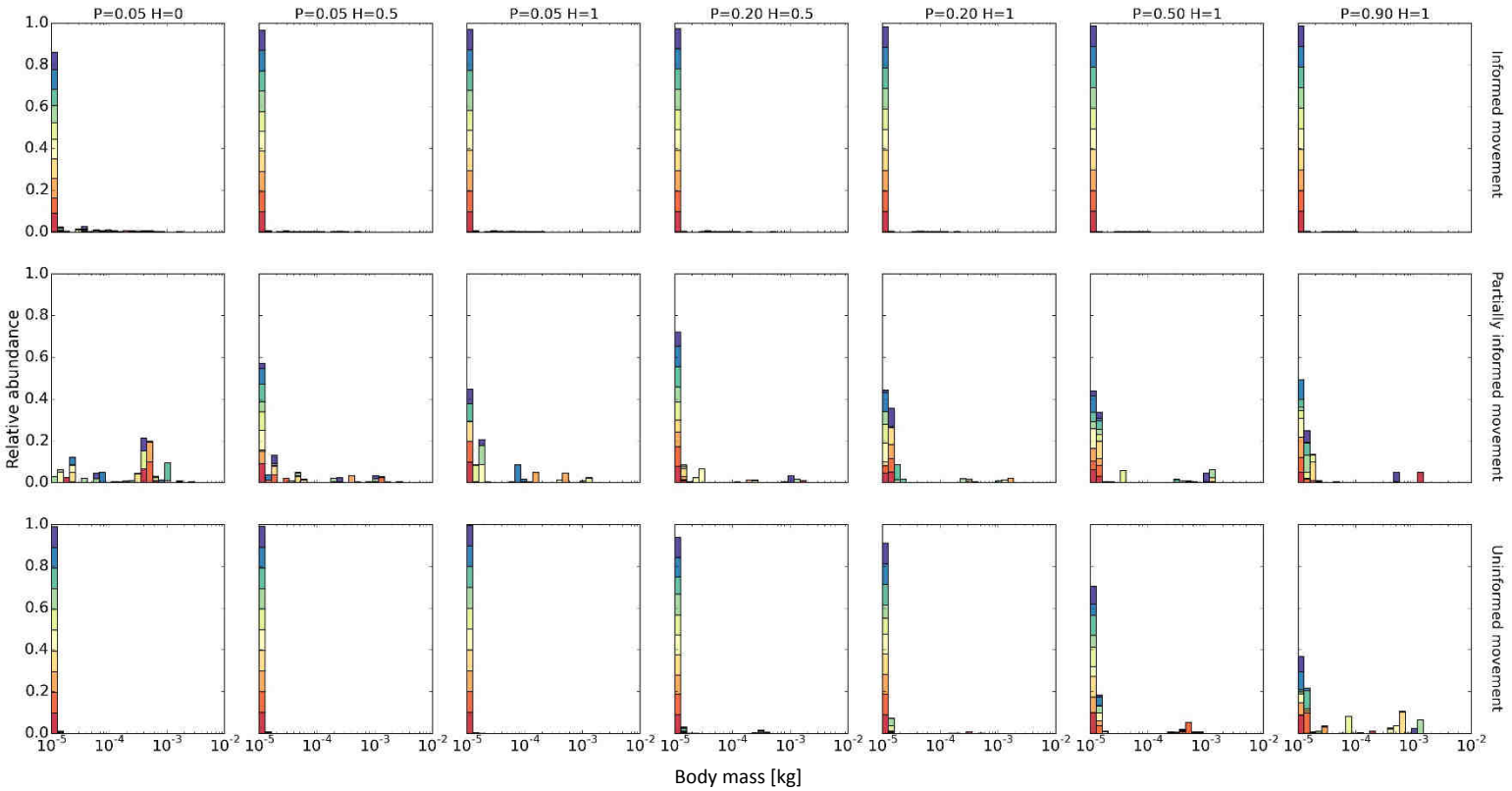

Figure S3.7: Two eggs per clutch (N=2). As large individuals do have a longer generation time than small individuals, they do increase in number at a much slower rate. As the number of eggs per clutch in decreased from 15 to 2, large individuals do need even more time to reach a stable number. Therefore, they are less abundant within the simulations having partially informed movement. Still, the general pattern remains. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.

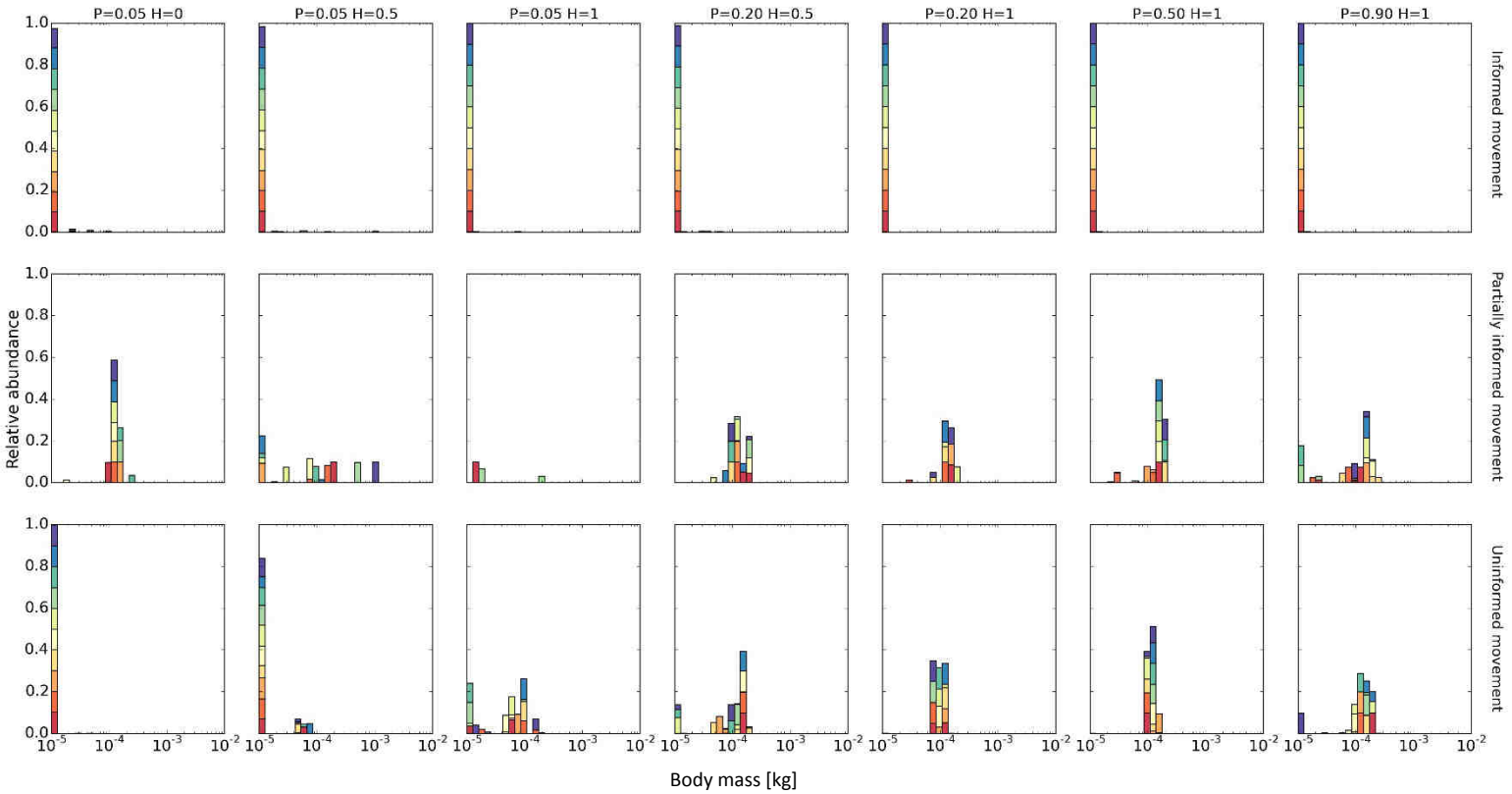

Figure S3.9: 50 eggs per clutch (N=50). As the number of eggs per clutch is increased from 15 to 50, large individuals do increase in number at a much higher rate. Therefore, they do dominate a simulation more easily than within the original simulation when movement is partially informed or uninformed. In the simulation with P0.05 and H1, the increased clutch size results in stronger competition and as such, increased chances of extinction. When P equaling 0.05, H equaling 0 and movement is informed, the increased clutch size of the smaller individuals increases strength of competition. This results in fewer large individuals in this scenario. The general pattern remains. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.

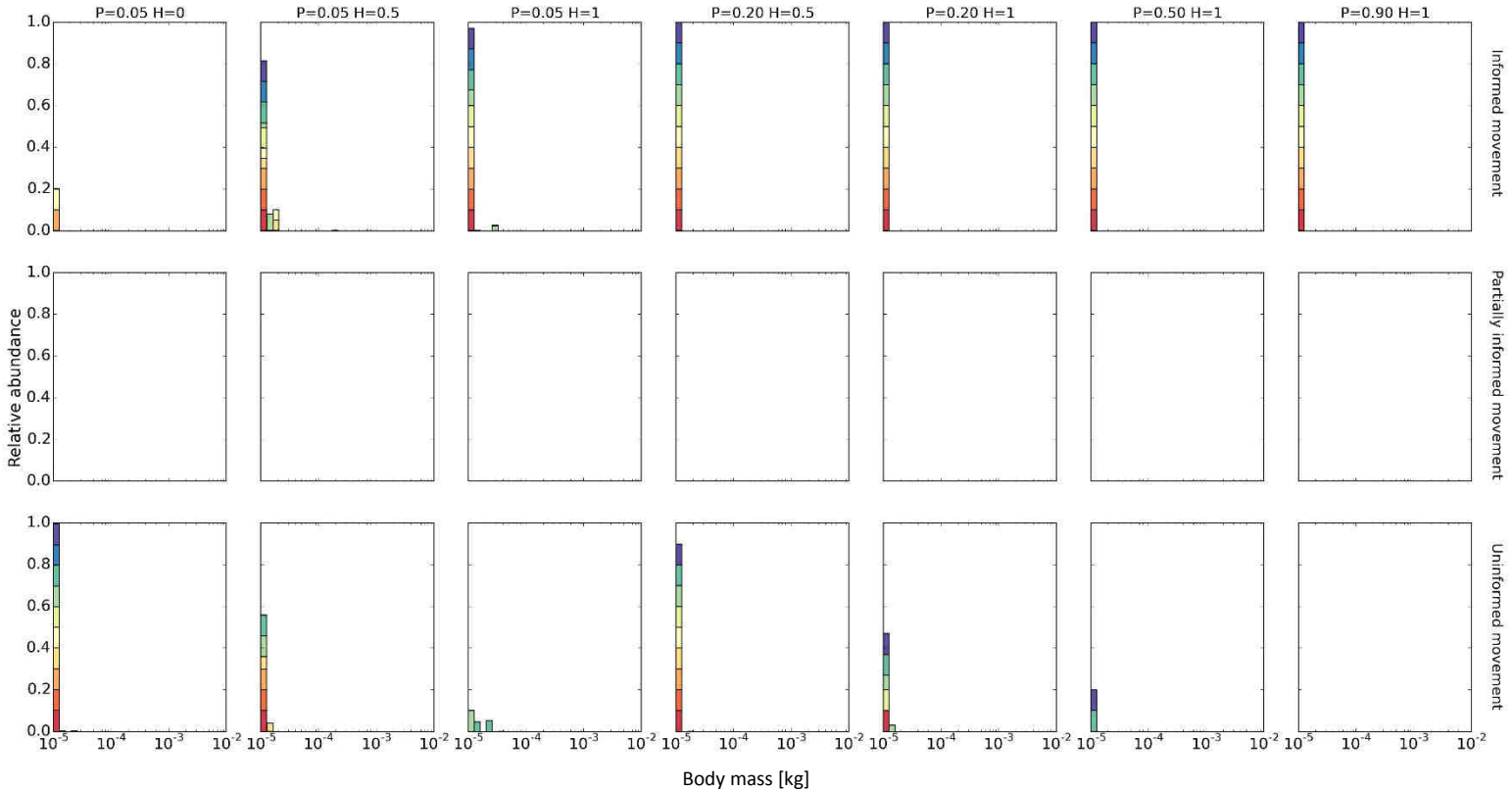

Figure S3.10: Growth speed of the resource equals 0.1 (r=0.1). Due to the very low growth speed of the resource, large individuals are unable to survive. Only those simulations in which small individuals were selected, survival is possible. Globally, extinction rate is very high. The general pattern is no longer observed due to the high extinction rates. Total abundance is scaled to the sum of all ten simulations.

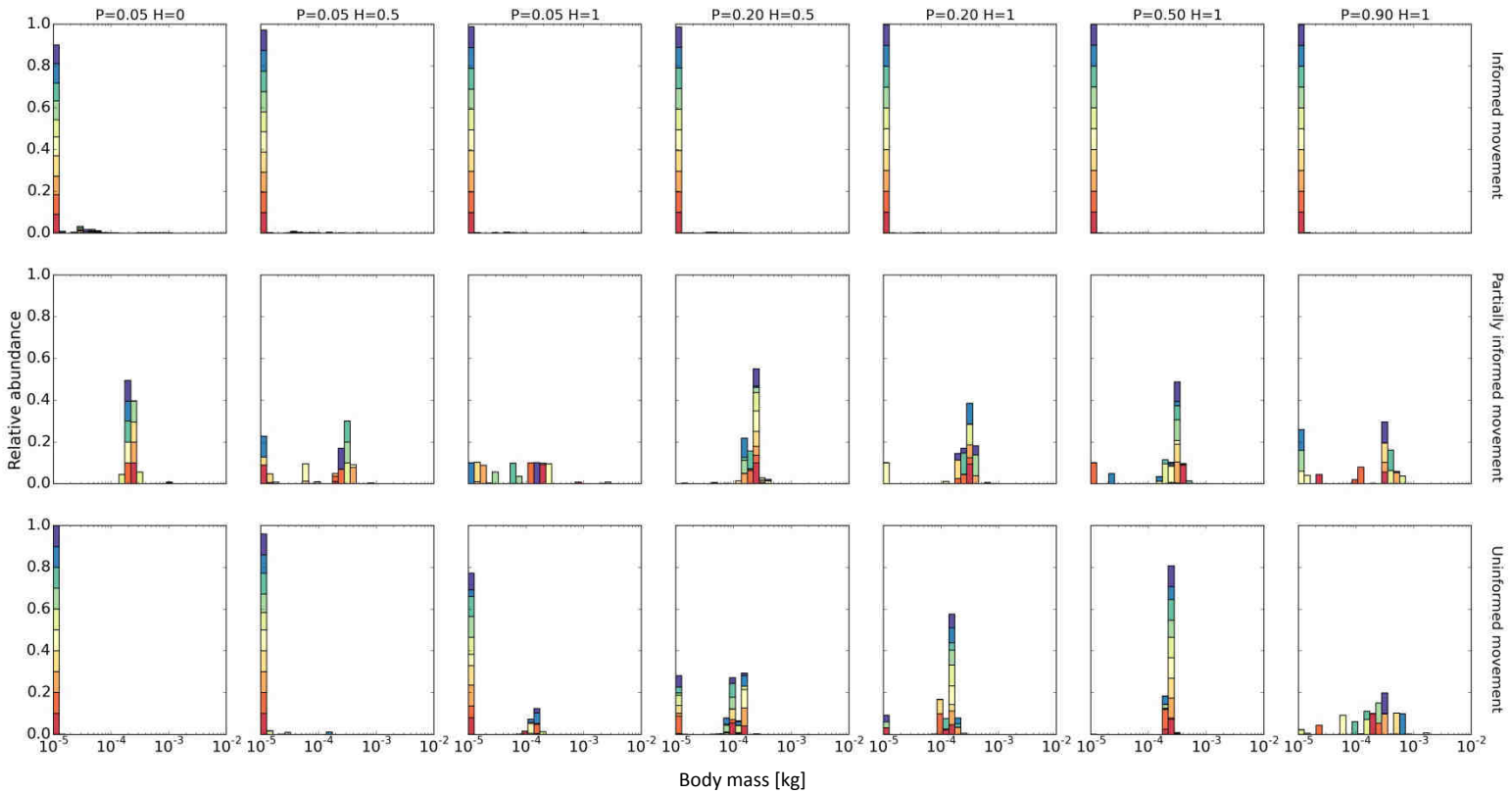

Figure S3.11: Growth speed of the resource equals 0.9 (r=0.9). The increased growth speed increases the abundance of the smaller indivuals when movement is informed (P 0.05 and H 0) or increases the abundance of the large individuals when movement is partially informed or uninformed. The general pattern remains. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.

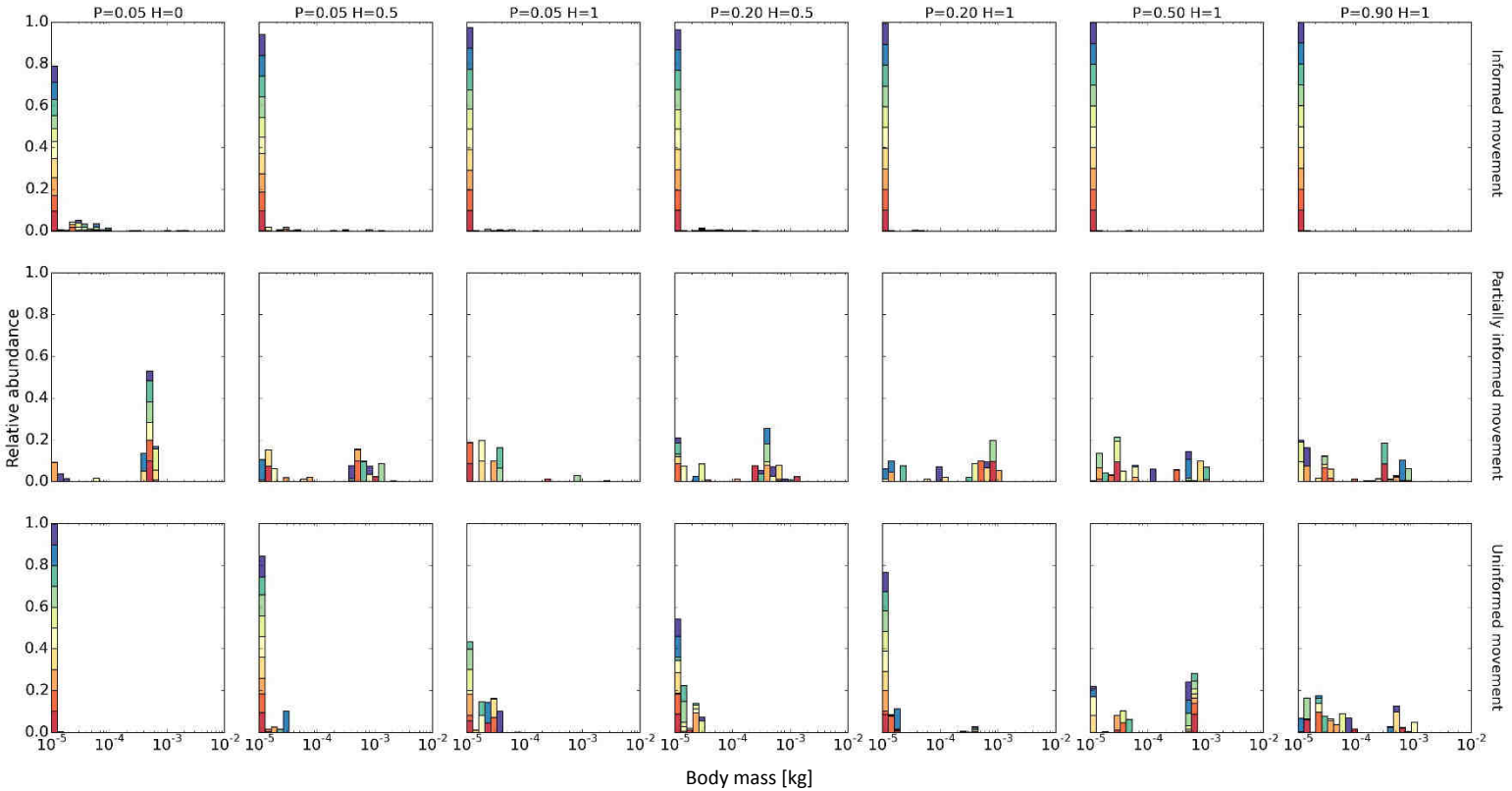

Figure S3.12: Consuming maximally 10 hours per day (t_f = 36000 s). By lowering maximum consumption time, competition is weakened. The general pattern remains. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.

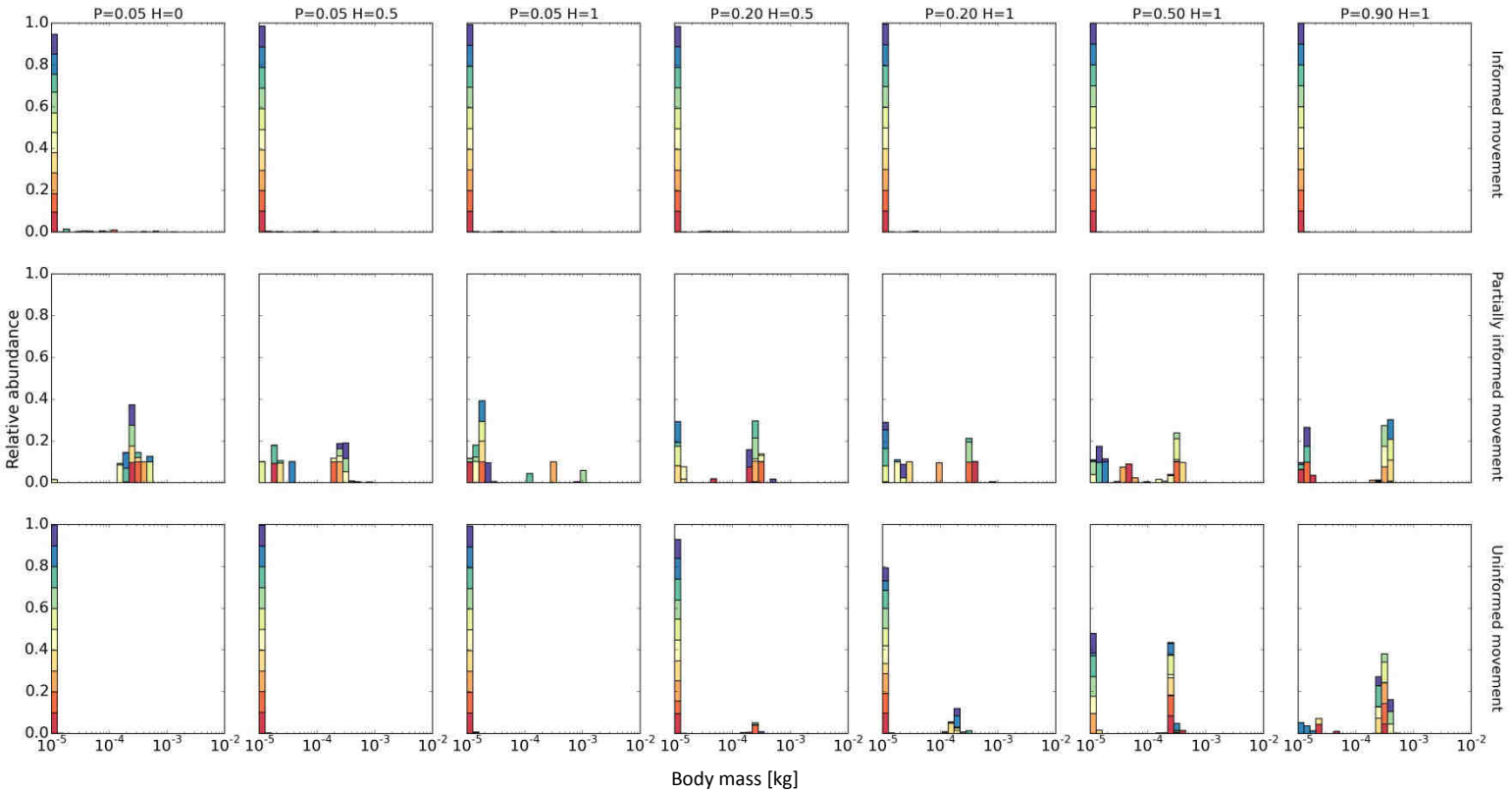

Figure S3.13: Consuming maximally 20 hours per day (t_f = 72 000 s). Increased consumption results in stronger competition. The general pattern remains. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.

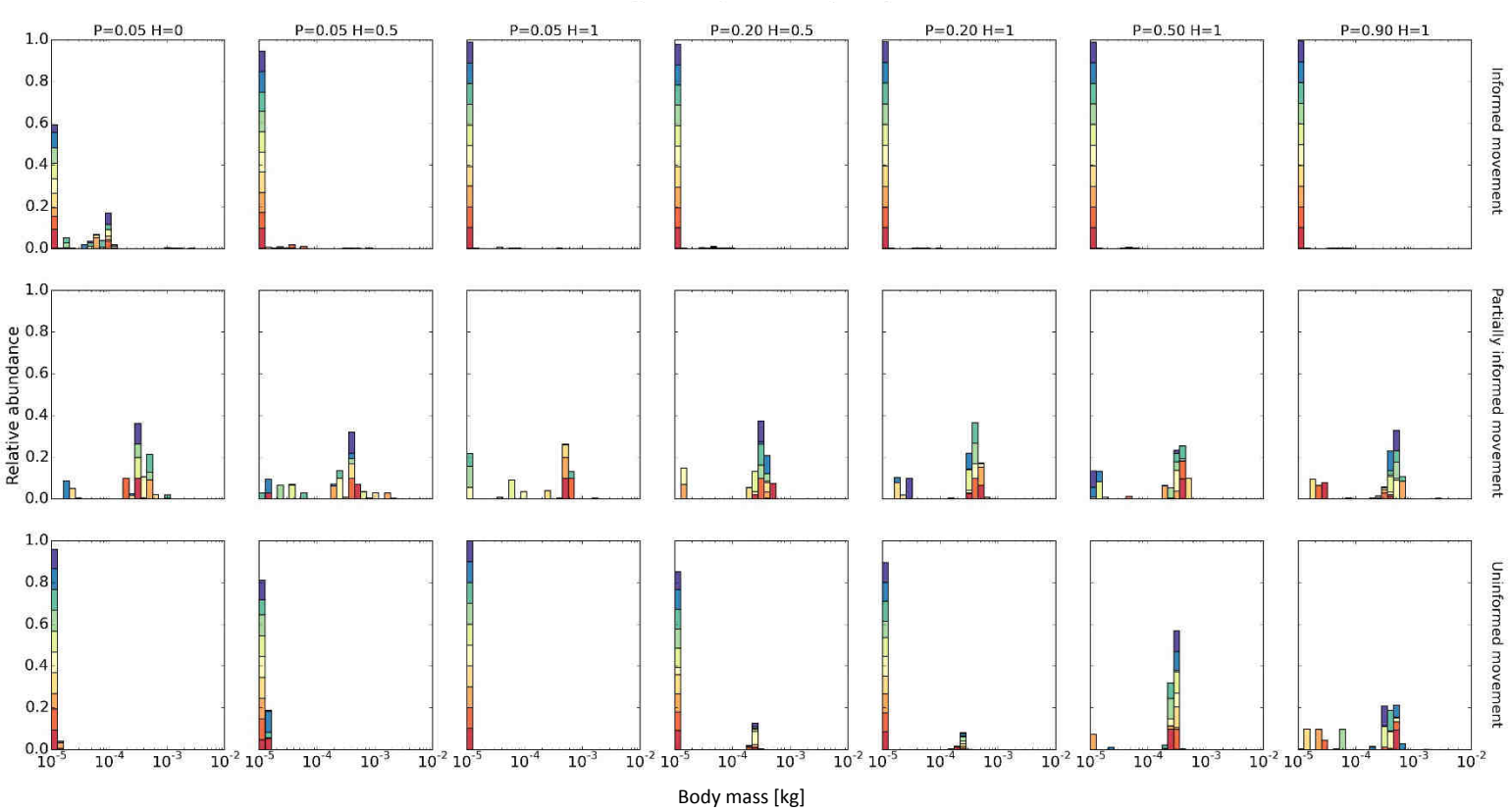

Figure S3.14: Moving maximally 30 minutes per day (maximum value t_m= 1800 s). The foraging area is decreased for all individuals. This results in the selection of larger individuals when P=0.05 and H=0.The general pattern remains. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.

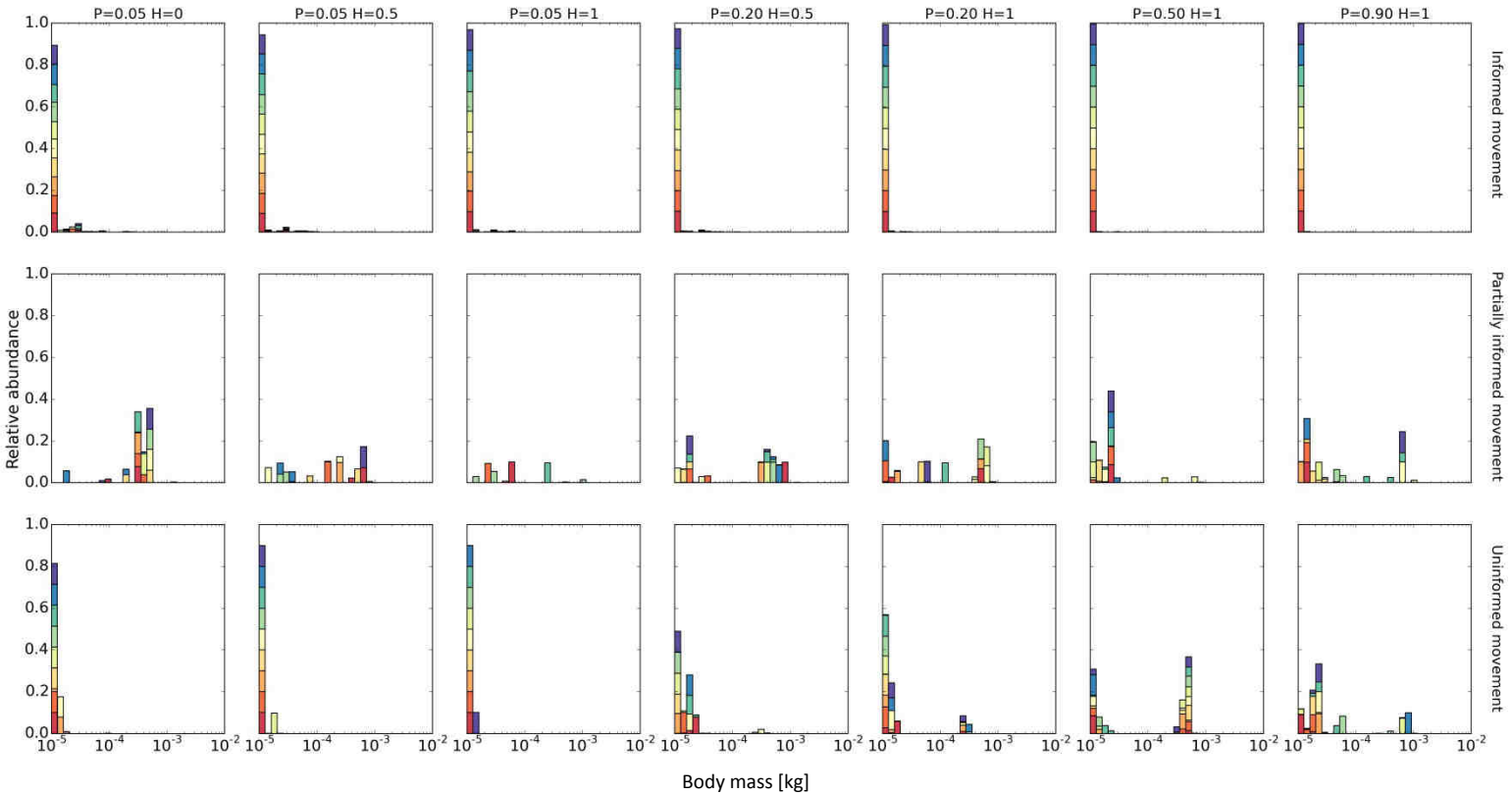

Figure S3.15: Moving maximally 2 hours per day (maximum value t_m = 7200 s): The general pattern remains. *P* refers to the percentage of suitable habitat and *H* to the level of spatial autocorrelation. Total abundance is scaled to the sum of all ten simulations.