Green class
(Competition) Black-capped Chickadee and Eastern Gray Squirrel

Introduction: One day I was doing my science homework out on my patio and I noticed a Chickadee and a Gray Squirrel squabbling over some seeds at my bird feeder. This interested me because I have lived here for over seven years and I have overlooked this until we started studying symbiosis in science. I have not noticed this happening since then, being at school all day and most animals have started to retire to their the dens, nests etc.

Claim: I have observed a Black-capped Chickadee, *Poecile Atricapillus* interacting in a form of competition with an Eastern Gray Squirrel, *Sciurus Carolinensis*.

Image 1: *Notes and observations I have taken concerning the food and prey of my two organisms. Observed 9/23/18 - 9/24/18, recorded 9/25/18 Clam cove (Image by author)*

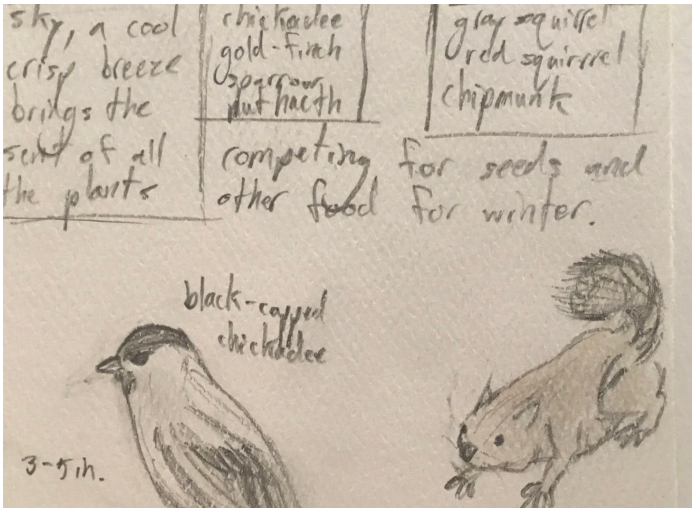

Image 2: *Observations of the symbiosis of my organisms. Observed and recorded 9/23/18 Clam cove (Image by author)*

Reasoning: The range maps below prove that both of the organisms are located in the area where they were observed. The map shows that that the Black-capped Chickadee and the Eastern Gray Squirrel cross paths. Also the evidence above shows that these two species eats the same and similar food and the both fit into the energy flow diagram on the same two levels, primary consumer and secondary consumers. They both inhabit forest ecosystems, which is the ecosystem around my house. Both of these organisms are

on the same two stages of the energy flow diagram (primary and secondary consumers) which causes them to compete with each other.

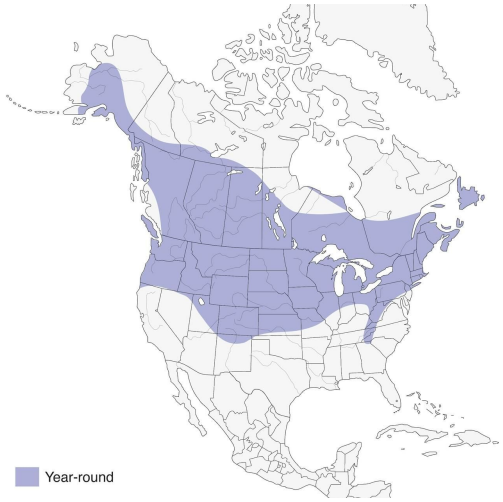

Image 3: Range of the Black-capped Chickadee, which includes the location observed. (.allaboutbirds.org/guide)

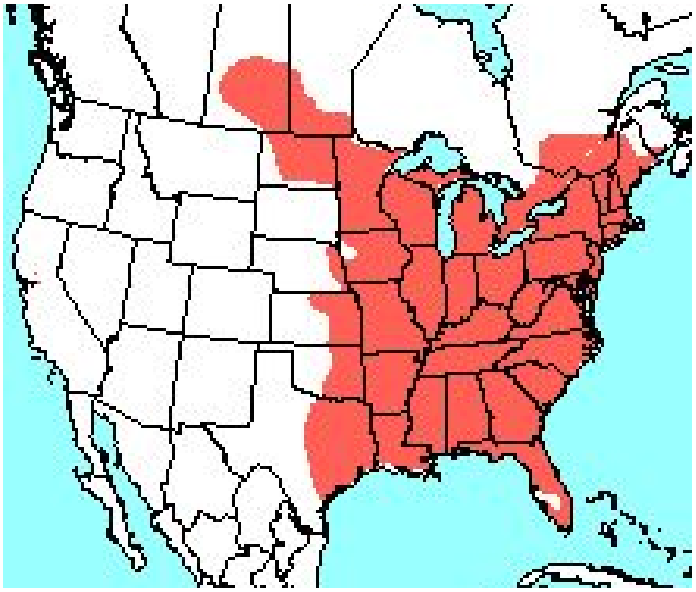

Image 4: Range of the Eastern Gray Squirrel, including the location observed. (naturalhistory.si.edu)

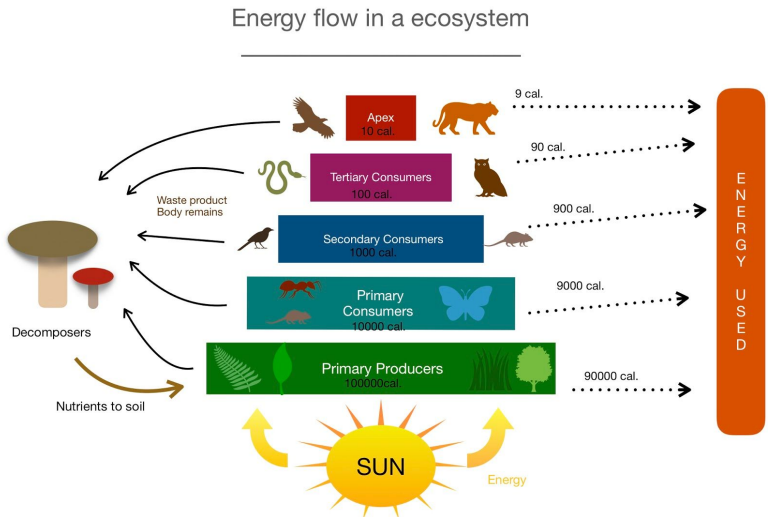

Image 4: *Energy flow in the forest ecosystem. In this image, the plants (producers) provide all the energy that is available to the Chickadees and the Squirrels(consumers). (Image by author)*

Energy flow in ecosystems, including my own

All of the energy in an ecosystem comes from the sun. The sun's energy goes directly to the primary producers because no other organisms can harness the energy. All of the energy goes through the primary producers and then up through the pyramid. The primary producers make their own energy from the

sunlight. The primary Consumers are usually represented by small mammals, small birds and insects. Cows and horses and other herbivores are also primary Consumers. The energy transferred from stage to stage decreases 90% because of the laws of thermodynamics, that state, “energy cannot be created or destroyed”, and, “no energy transfer is 100% efficient”. The energy lost is lost by waste and the activities and physical exertion of the organism. An animal’s waste and body remains are decomposed by fungi(mushrooms etc.) the decomposers contribute some nutrients back to the soil which is used by the primary producers. The energy used is unable to be taken up by any other organisms except by kinetic energy transfer.

Throughout the pyramid the energy transfer stays the same, 10% is passed on. The transfers of energy can go on forever until it reaches the ecosystem’s apex predator which has no natural enemies except it’s own species. The only energy that cycles back through the system from the apex predator is from it’s waste product and when it dies, the remains of its body. The system can have as many stages as needed in an ecosystem. Example: phytoplankton, zooplankton, mackerel, seal, orca. You would most commonly see a four to five stage system in an ecosystem. It is more likely to see an ecosystem with less stages than more. Every ecosystem in the world has a food chain.

Conclusion: In this paper I showed you that I have observed the Black-capped Chickadee in the symbiotic relationship of competition with an Eastern Gray Squirrel. The two organisms both eats seeds, nuts and berries which cause them to compete for food. I find this symbiotic relationship is interesting because it has been occurring all around this area and I have never noticed it. This relationship has changed somewhat with the boom this year in the Squirrel population. I hope you look to your backyard to find this symbiotic relationship.

Works Cited

https://www.allaboutbirds.org/guide/Black-capped_Chickadee/maps-range

https://naturalhistory.si.edu/mna/image_info.cfm?species_id=298