Ratnasingham, S., and P. D. N. Hebert. 2007. BOLD: The Barcode of Life Data System (www.barcodinglife.org). Molecular Ecology Notes **7**:355–364. doi:10.1111/j.1471-8286.2007.01678.x.

Ratnasingham, S., and P. D. N. Hebert. 2013. A DNA-Based Registry for All Animal Species: The Barcode Index Number (BIN) System. PLoS ONE **8**:e66213. doi:10.1371/journal.pone.0066213.

Rea, R. V. 2012. The influence of willow *Salix* sp. rose insect galls on moose *Alces alces* winter browsing. The Canadian Field-Naturalist **126**:189–193. doi:10.22621/cfn.v126i3.1350.

Samsone, I., U. Andersone, and G. Ievinsh. 2011. Gall midge *Rhabdophaga rosaria*-induced rosette galls on *Salix*: morphology, photochemistry of photosynthesis and defense enzyme activity. Environmental and Experimental Biology **9**:29–36. URL `http://eeb.lu.lv/EEB/201108/EEB_9_Samsone.pdf`.

Sato, S., and J. Yukawa. 2006. Resurrection of *Rabdophaga salicivora* Shinji (Diptera: Cecidomyiidae), a Japanese gall midge formerly misidentified as a North American species, *Rabdophaga rigidae* (Osten Sacken), with observations on the phylogenetic relationships of its populations in Japan and the Russian Far East. Entomological Science **9**:423–434. doi:10.1111/j.1479-8298.2006.00188.x.

Sievers, F., A. Wilm, D. Dineen, T. J. Gibson, K. Karplus, W. Li, R. Lopez, H. McWilliam, M. Remmert, J. Söding, J. D. Thompson, and D. G. Higgins. 2011. Fast, scalable generation of high-quality protein multiple sequence alignments using Clustal Omega. Molecular Systems Biology **7**:539. doi:10.1038/msb.2011.75.

Skuhravá, M., and C. Thuróczy. 2007. Parasitic Hymenoptera reared from galls of Cecidomyiidae (Diptera) in Europe. Acta Zoologica Universitatis Comenianae **47**:203–221.

Van Hezewijk, B. H., and J. Roland. 2003. Gall size determines the structure of the *Rabdophaga strobiloides* host-parasitoid community. Ecological Entomology **28**:593–603. doi:10.1046/j.1365-2311.2003.00553.x.

Walsh, B. D. 1864. On the insects, coleopterous, hymenopterous, and dipterous, inhabiting the galls of certain species of willow. Proceedings of the Entomological Society of Philadelphia **3**:543–641. URL `https://www.biodiversitylibrary.org/part/15908`.

Wilson, L. F. 1968. Life history and habits of the pine willow gall midge, *Rhabdophaga strobiloides* (Diptera: Cecidomyiidae), in Michigan. The Canadian Entomologist **100**:430–433. doi:10.4039/Ent100430-4.

How heating affects growth rate of Dubia roaches

by Fionn D. Pietsch

Introduction

I have always loved entomology. My favorite insects are cockroaches. I currently am raising two colonies of cockroaches: one colony of Madagascar Hissing cockroaches (*Gromphadorhina portentosa*), and the other of Dubia Roaches (*Blaptica dubia*). Dubia roaches live in central and south America. Madagascar hissing cockroaches live in Madagascar. Both of these areas are in the tropics and have warm climates but the Madagascar Hissing cockroaches prefer cooler habitats relative to the Dubia roaches. The only cockroaches that live in Alaska are non-native species that live in warm buildings.

You may wonder why you usually only see insects in the warmer months of the year. You may think it is because there is less food and water in the winter, which may be partially true. However, the primary reason is because of heat. Heat is one of the most important things for insect growth. I formed a hypothesis that supplementary heating would increase the growth rate of Dubia roaches compared to their growth rate at room temperature.

Methods

This spring, for the Interior Alaska Science Fair, I performed an experiment where I used Dubia Roaches. I had four groups which were in plastic container with air holes in them. Three of the groups sat on a 17 watt seedling heating mat (Hydrofarm Seedling Heat Mat) and the control group did not. The heated enclosures went from 23.9 °C to 26.1 °C. The unheated enclosure was 16.1 °C to 21.1 °C. All groups had the same amount of food (Nature Zones bites for Roaches) and water (Fluker's cricket quenchers calcium fortified). In each group there were about 16 juvenile cockroaches, weighing between 1.5–2 grams per group. All the groups had similar enclosures (newspaper bedding with egg crate hides).

At the beginning I weighed all of the groups. I weighed them weekly for three more weeks. At the end I calculated how much the groups grew in percentages.

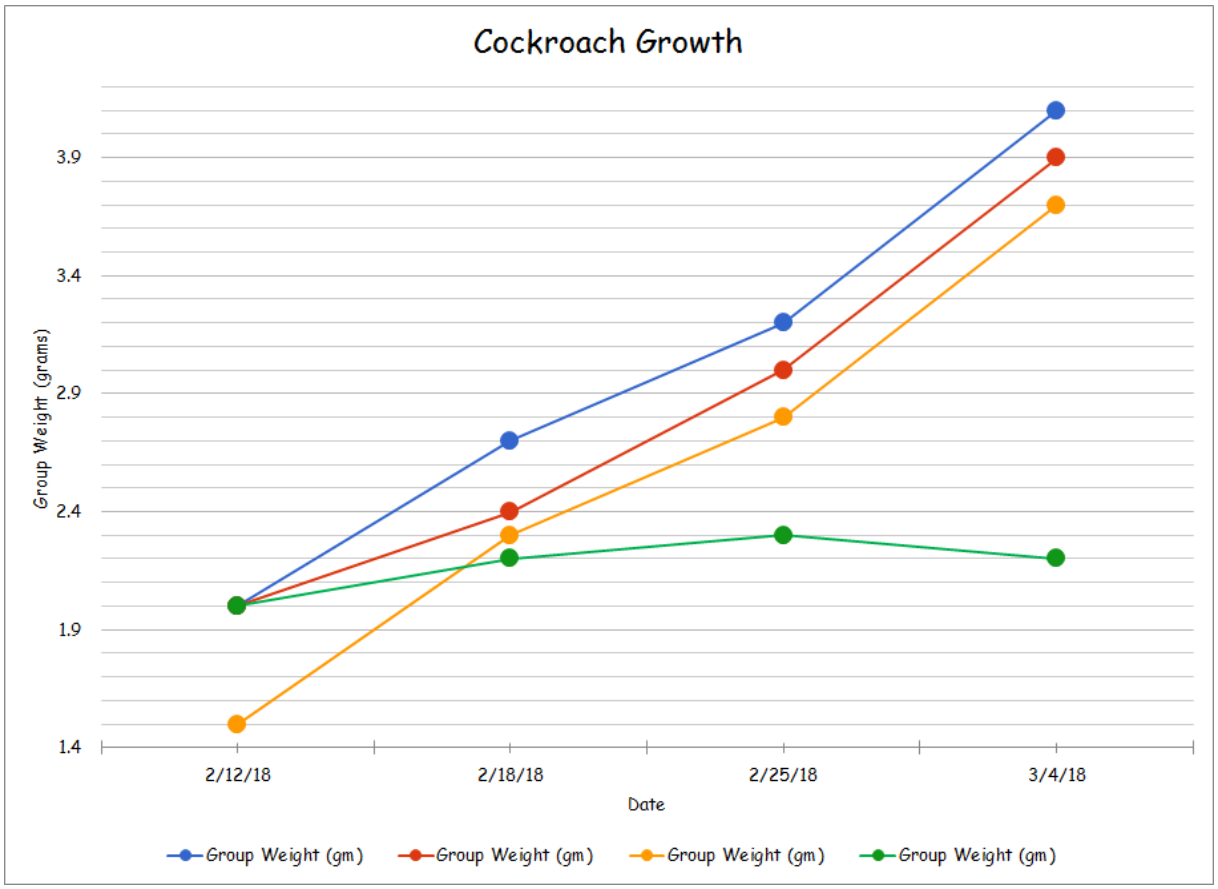

Figure 1: Weights of cockroach groups over time.

Table 1: Temperature and weight measuremtns over time of cockroaches in four treatment groups: treatments groups A–C (16 individuals each) and the control group (18 individuals).

Group	Date	Temperature (°C)	Group Weight (g)
A	2/12/18	26.1	2.0
A	2/18/18	26.1	2.7
A	2/25/18	26.1	3.2
A	3/4/18	23.9	4.1
B	2/12/18	26.1	2.0
B	2/18/18	26.1	2.4
B	2/25/18	26.1	3.0
B	3/4/18	23.9	3.9
C	2/12/18	26.1	1.5
C	2/18/18	26.1	2.3
C	2/25/18	26.1	2.8
C	3/4/18	23.9	3.7
Control	2/12/18	21.1	2.0
Control	2/18/18	20.6	2.2
Control	2/25/18	18.9	2.3
Control	3/4/18	16.1	2.2

Results and Discussion

My hypothesis was correct. In just three weeks the heated groups grew 112.73% compared to the unheated group which only grew 10% (Figure 1, Table 1). That means that the heated groups grew over eleven times more than the unheated group.

My conclusion is that heat is one of the most important things to an insect's growth. This is why you usually see insects during the summer in Alaska, they have to hibernate or migrate to survive the winter. The closer you get to the equator the more insects you will see. To have a successful breeding colony of cockroaches you should keep them warm, which I do by keeping them on heating pad. I am not worried about the Dubia roaches breeding in my house if they escape from their tank, because they do not grow well at room temperature.

You may be wondering why I chose Dubia roaches for the growth project over other insects. One reason is Dubia roaches are super hard to kill. They are easier to keep than other insects. Another reason is because they are one of the easiest insects to get. Finally, I picked them because they grow fast enough to see a difference while we did this experiment. Also, they make a good example insect, even for Alaskan insects.

Review of the eleventh annual meeting

by Adam Haberski[1]

Figure 1: Members present at the end of the meeting. Back row, from left: Stephen Burr, Isaac Davis, Garret Dubois, Jason Moan, Michael Baldwin, Alexandria Wenninger and Mary Wyatt . Front row, from left: Derek Sikes, Matt Bowser, Kathryn Daly, Jacquelyn Schade, Roger Burnside, Renee Nowicki, Jessie Moan, Dan Bogan, Adam Haberski and Robin Andrews.

The eleventh annual meeting of the Alaska Entomological society was held at the Anchorage Cooperative Extension office on February 3rd, 2018. We are grateful to Jessie Moan for offering us this space.

Presentations

Jacquelyn Shade began with an update on the Alaska CAPS program. Matt Bowser then serenaded us with his musical presentation "Biomonitoring bugs by molecules: Slikok Creek." Matt not only sang his presentation but accompanied himself on guitar. Derek Sikes followed with an overview of the staphylinids of Alaska. Jason Moan then presented "Spruce beetle status in Southcentral Alaska," and Stephen Burr presented "Forest Health Conditions Report 2017."

We were fortunate to have five student presentations this year. Alexandria Wenninger presented her master's

[1]University of Alaska Faribanks, Fairbanks, Alaskaahaberski@gmail.com