**Temporal patterns of activity and social behaviour under predation**

April 24, 2015

**Predictions**:

1. Higher nocturnal activity and lower diurnal activity in the populations evolved under predation than in the control populations. Logic: both predators are visual, so hunting is probably diurnal, making nocturnal activity safer. Logic for starting with a quantification of activity: we should quantify aggregation during the most relevant times of day.

2. Higher aggregation in the populations evolved under predation than in the control populations. Logic: see below.

3. Higher aggregation in the populations evolved under ambush than mobile predator? Logic: with an ambush predator, it is important to locate away from the predator, so one should join others who are presumably in a safe location. For both predators, being in the center of the group is beneficial (Hamilton 1971).

**1. Temporal activity**

Measure:

1. Overall activity in the activity monitor.

2. Egg laying.

3. Eclosion.

**1. Activity monitor**

Clear before 8 AM, aspirate (no CO2) at noon 1 male + 1 female into each short vial containing 5 ml food medium + a sprinkle of live yeast. Place monitor upside up in an undisturbed location at 25oC and high humidity and leave for 3 days.

Remove at noon. Note dead flies and omit these vials. Place a new batch of 32 pairs.

We will have either 32 or 64 spots for 12 populations. Start with 3 replicates for the 8 predation populations + 2 replicates for each of the 4 control populations per monitor. Continue by alternating the population with the 2 replicates.

Fly needs per session with 1 monitor:

3 (or 2) pairs per population.

**Logistics**: learn how to use the monitor – we need power supply, USB cable and a laptop.

Install software on a laptop.

Prep Tupperware and platform in B132.

**Relevant references**

Mss from Ian’s lab

(Howlader & Sharma 2006): circadian rhythm in egg laying

(De et al. 2012) Temporal pattern of adult emergence

(Sheeba et al. 2001) circadian rhythm

**De, J., Varma, V. & Sharma, V. K.** 2012. Adult emergence rhythm of fruit flies *Drosophila melanogaster* under seminatural conditions. *Journal of biological rhythms*, 27, 280-286.

**Hamilton, W. D.** 1971. Geometry for the selfish herd. *Journal of Theoretical Biology*, 31, 295-311.

**Howlader, G. & Sharma, V. K.** 2006. Circadian regulation of egg-laying behavior in fruit flies *Drosophila melanogaster*. *Journal of Insect Physiology*, 52, 779-785.

**Sheeba, V., Chandrashekaran, M. K., Joshi, A. & Kumar Sharma, V.** 2001. A case for multiple oscillators controlling different circadian rhythms in *Drosophila melanogaster*. *Journal of Insect Physiology*, 47, 1217-1225.