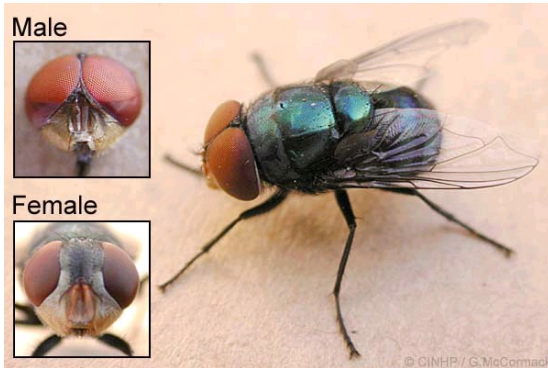


Chrysomya megacephala (Diptera: Calliphoridae) oriental latrine fly



Chrysomya rufifacies (Diptera: Calliphoridae)
hairy maggot blow fly



Sarcophaga dux (Diptera: Sarcophagidae) miser flesh fly



Forensic Entomology Research on Guam

Bohart, George E. and J. Linsley Gressitt 1951. Filth-inhabiting Flies Of Guam. Bishop Museum Bulletin 254. 152 pages.

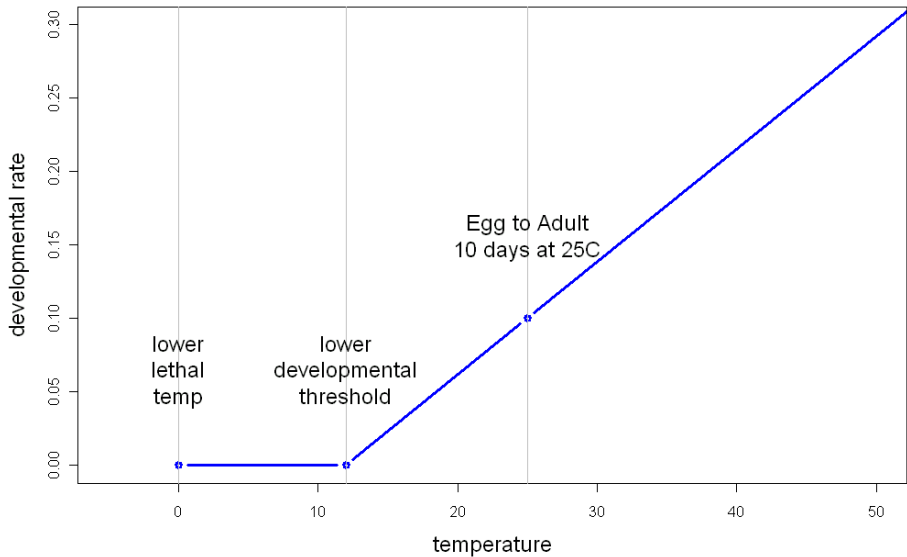
<http://hbs.bishopmuseum.org/pubs-online/pdf/bull204.pdf>

Jenson, Lynda M. and Ross H. Miller 2001. Estimating filth fly (Diptera: Calliphoridae) development in carrion in Guam. Micronesica 34(1) p. 11-25.

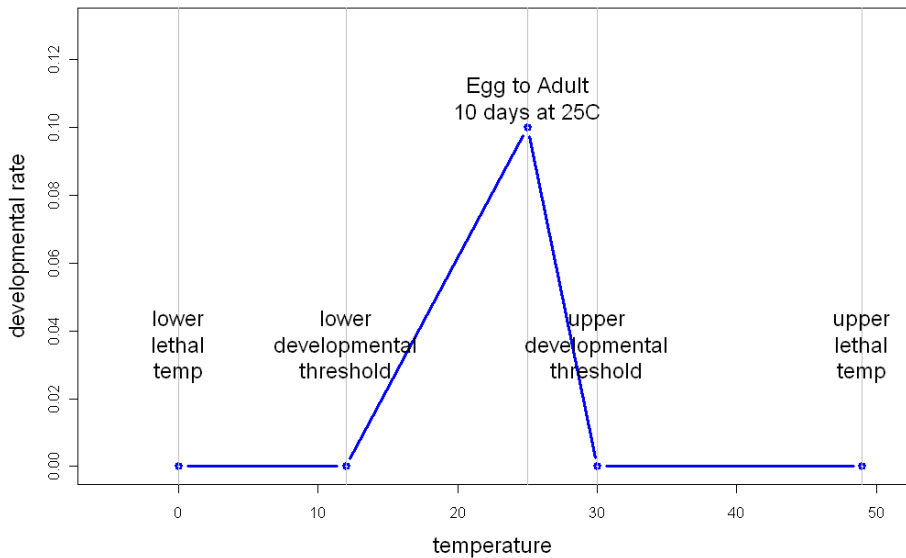
http://www.wptrc.org/userfiles/file/jensen_miller.pdf

Lopez, Joseph D. Sr., Ross H. Miller and Aubrey Moore [in preparation]. Decomposition of pigs on Guam.

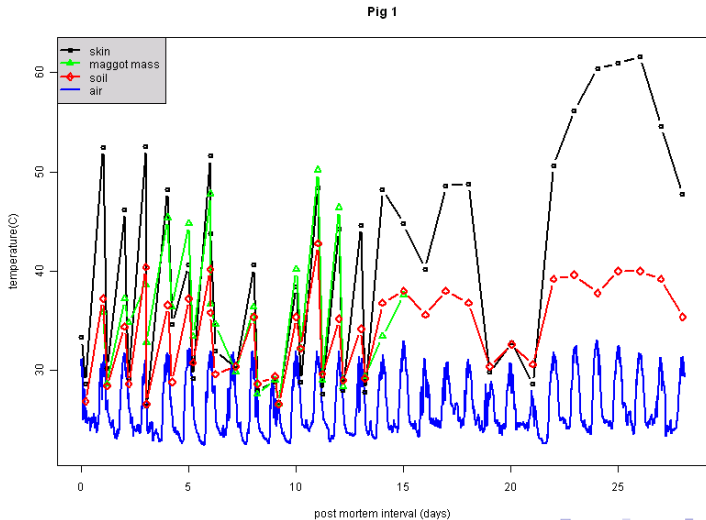
Simple model for Chrysomya sp.



Better model for Chrysomya sp.

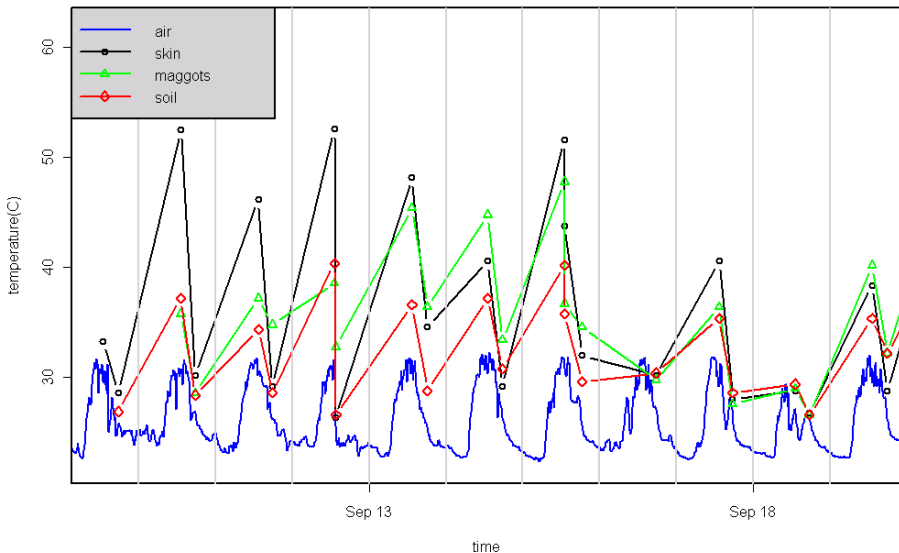


Data from Lopez Pig Study



Data from Lopez Pig Study

Fig 1 - first 10 days

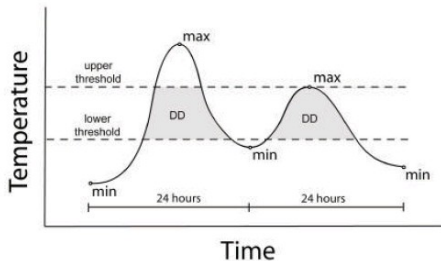


From Reiter, C. and M. Grassberger 2002. Post-mortem interval estimation using insect development data. Proceedings of the First European Forensic Entomology Seminar

Proceedings of the First European Forensic Entomology Seminar

Post Mortem Interval Estimation

Figure 4. Accumulated degree-days between lower and upper developmental threshold.
When calculating degree-days in forensic cases, the upper developmental threshold can usually be ignored.

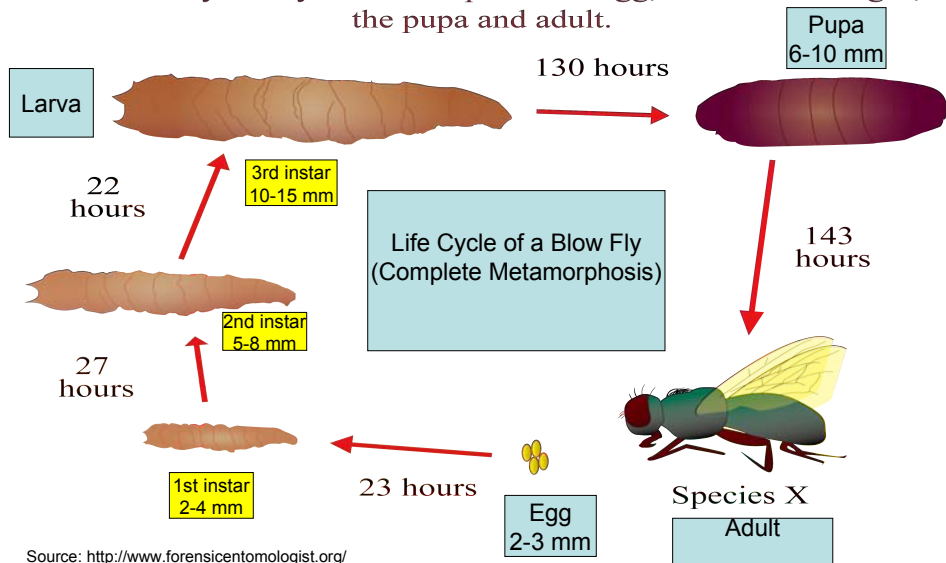


Guam Antonio B. Won Pat International Airport (GUM) Temperature Chart													
Guam GUM Airport Temperatures	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Guam - Maximum Celcius (°C)	29	29	30	31	31	31	30	30	30	30	30	29	30
Guam - Minimum Celcius (°C)	22	23	24	25	25	25	25	25	23	24	24	24	24

Guam GUM Airport Temperatures	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
Guam - Maximum Celcius (°C)	29	29	30	31	31	31	30	30	30	30	30	29	30
Guam - Minimum Celcius (°C)	22	23	24	25	25	25	25	25	23	24	24	24	24

NOT TO SCALE

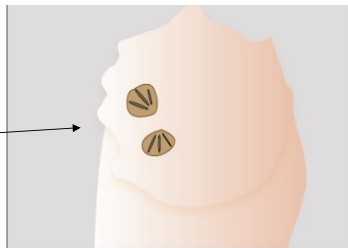
The blow fly life cycle has six parts: the egg, three larval stages, the pupa and adult.



A maggot (larval stage)

Posterior blunt part (spiracles for breathing)

Anterior pointed part (mouth for eating)



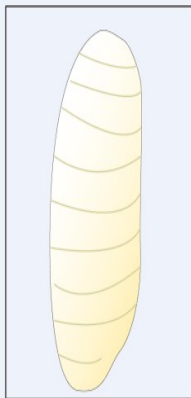
Two spiracles
(each with 3 slits)
→ 3rd instar

Remarks:

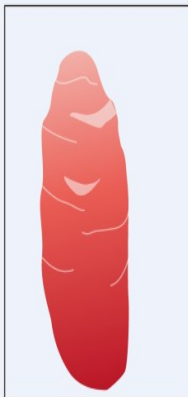
1st instar → 1 slit within each spiracle

2nd instar → 2 slits within each spiracle

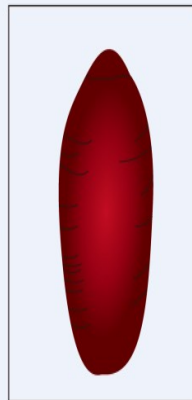
3rd instar → 3 slits within each spiracle



0 Hour Puparium



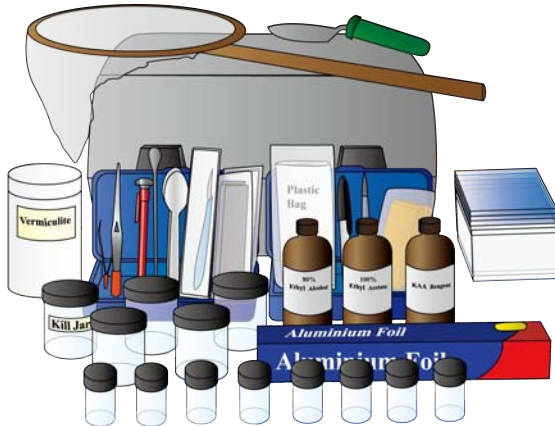
3 Hour Puparium



20 Hour Puparium

The puparial case is usually oval in shape and changes colour over time. The colour of the puparial case of different blow fly species varies.

Forensic Entomology Kit



Forensic Entomology Kit Contents:

- Butterfly Net, collapsible
- Specimen Bags
- Evidence Labels
- Plain Labels
- Kill Jar
- Forceps
- Thermometer
- Molded Paint Brush
- Spoonula (Stainless Steel)
- Plastic Spoons
- Disposable Scalpel
- Plastic Maggot Container
- Aluminium Foil
- 100% Ethyl Acetate
- 80% Ethyl Alcohol Solution
- Marker
- Plastic toolbox Case

Source: <http://store.sirchie.com/Search.aspx?k=Forensic+entomology+kit>

(SIRCHIE)

PMI (Post Mortem Interval)

- PMI – the time elapsed since death
- PMI usually correlates with the age of the oldest immature blow fly stage developing on the corpse.
- Depending on the species of the blow flies and the environment such as ambient air temperature the development of the blow flies may take several weeks or months.

- A dead body is a rich source for carrion animals which include insects and other arthropods such as beetles.

Effect of temperature on the rate of development of insects

- Insects (e.g. blow flies) are cold-blooded animals and their level of activity including the growth rate depends on the temperature of the surrounding environment.
- Insects require a certain amount of heat energy to develop from one stage in their life cycle to another stage.
- The heat energy is required for the enzyme-controlled biochemical reactions of insects

Basic Assumptions in using ADH to calculate PMI

- Blow flies will lay eggs on the corpse as soon as they discover the dead body.
- Weather conditions (e.g. temperature) recorded at a site distant from the crime scene reflect the conditions at the crime scene.
- Surrounding air temperatures are the major factors affecting the rate of the development of the blow flies.

Why do forensic entomologists need to collect and rear blow flies?

- A forensic entomologist will collect several specimens of blow fly species found at the crime scene for later identification at a laboratory because the larvae of many blow flies look much alike.
- The larvae will be raised in a temperature-controlled chamber until the flies emerged as adults (for the exact species identification)

Many factors other than temp. may affect development of blow flies:

- Buried bodies
- Bodies found in enclosed spaces (e.g. a room, a wardrobe)
- Bodies exposed to sun
- Bodies in water
- Bodies in a car
- Bodies wrapped with a carpet, etc.

- Seasons
- Urban vs rural scenes



Pig 1, 3 days Post Mortem



Pig 2, 3 days Post Mortem



Pig 3, 3 days Post Mortem

Figure 8, Pigs 1, 2 & 3, 12, September 2010.



Pig 1, 5 days Post Mortem



Pig 2, 5 days Post Mortem



Pig 3, 5 days Post Mortem

Figure 9, Pigs 1, 2 & 3, 14, September 2010.



Pig 1, 14 days Post Mortem



Pig 2, 14 days Post Mortem



Pig 3, 14 days Post Mortem

Figure 10, Pigs 1, 2 & 3. 23, September 2010.