

## MITES and QUARANTINE

### 1) Mites

The single biggest threat to *Drosophila* stocks is a mite infestation. While some species of mite eat only the flies' food, others eat embryos and pupae, and can completely wipe out a fly lab. Even 'media' mites if left unchecked can increase in number so rapidly (often by parthenogenesis) that they destroy fly stocks. Mites are very small and therefore difficult to detect. The adults are smaller than *Drosophila* embryos and can most often be seen (under the dissecting microscope) walking on empty *Drosophila* pupal cases in older cultures. Mite embryos are even tinier and often are found in pearly strands of 10-20 eggs between the *Drosophila* pupal cases.

Mites are found ubiquitously in the environment, but many species thrive on the detritus that accumulates in fly trays and incubators and therefore keeping equipment clean is an essential part of fly husbandry. Since mites and their eggs can be killed by ethanol, wiping down your dissecting scope, bench, CO<sub>2</sub> pad and brushes with ethanol before or after you handle your flies is always a good idea. The life cycles of most species that cause problems in labs are slightly longer than that of the fly, so if flies are turned over as soon as they eclose mites will be unable to overcome a stock (well that's the theory anyway).

In summary, to prevent mite outbreaks:

- a) quarantine incoming stocks,
- b) turn over fly stocks regularly and
- c) keep the lab environment spotlessly clean.

If you find mites in a stock you should immediately discard the vial somewhere outside of the lab, wipe down everything with which the vial has come into contact, with ethanol, and carefully check all the stocks housed near it for mites. You should also inform the fly lab. If you need to rescue a mite infested stock you can select ~5 pairs of flies from it, making sure their bodies aren't carrying any mites or mite eggs and place them in a clean vial in quarantine. These should be transferred 3 times, once every 2 days, discarding the first 2 transfers.



## 2) Quarantine

To guard against mites ALL flies coming into the lab from other labs or stock centres must go directly to the quarantine room in the attic and remain there for 6 weeks. To be safe you should order stocks from reputable sources e.g. Bloomington Stock Center and never from a lab known to have endemic mite infestations e.g. Vienna (VDRC).

When handling quarantine stocks you should treat them as if there were mites present. Therefore all stocks should be kept in vials with mite-proof closures: tight cotton-wool bungs, Flugs or similar.

There are 2 incubators available for general use in the quarantine area, one of which is humidified and therefore preferable for most stocks, flies being very sensitive to dehydration.

### Recommended quarantine procedure

- 1) Write the date of arrival on the original tube. Transfer any adults that have survived the journey or the first few flies that eclose, into a fresh tube (G0).
- 2) Keep the original tube for about 3 weeks. Periodically inspect it under a dissecting microscope, looking for adult mites and/or mite eggs around the pupal cases.
- 3) When it is obvious that the G0 vial is going fine, discard the adults.
- 4) Keep the stock isolated for two more mite-free generations (F1 and F2). Inspect the flies weekly for the presence of mites and the general health of the stock.
- 5) At the end of 6 weeks, carefully inspect the recent stock tubes for adult mites and/or mite eggs. If no mites have been seen in the original tube or any of the subsequent tubes then the stock can be transferred for the final time and brought into the lab.
- 6) If mites are detected at any time you can rescue the stock as described above (select mite-free adults, then rapid transfer), but you will need to keep the flies in quarantine for a further 6 weeks (F3 and F4) following the attempted rescue and check them periodically as before.
- 7) Wipe down the microscope and all equipment and the bench around it with ethanol after every visit.
- 8) Autoclave directly any tubes that are known to contain mites.
- 9) Take autoclave and rubbish bags to the basement before they are full.
- 10) If you are anxious to work with a stock that is in quarantine, you can set up your crosses in the quarantine room. If at the end of 6 weeks the original stock vial and all subsequent cultures are mite free, you can move your entire experiment into the fly lab.

Finally: if you are unsure what mites look like or would like confirmation that your cultures are mite-free PLEASE ASK.

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