**Keeping Insects**

Introduction

Insects make great pets! And a lot are really easy to take care of. Don’t be alarmed by the length of this handout – I am trying to address all the common problems that I have encountered in raising insects. Feel free to experiment. For instance, I haven’t tried keeping a lot of butterflies loose in a New York apartment (except by accident…) but it might work and you could try.

Have fun!

Containers

Some insects can be kept in **plastic Ziploc sandwich bags**. Having put the insect and its food in the bag, **inflate the bag** fully by zipping it closed, opening it slightly, blowing into the opening until the bag has swelled to full capacity, then zipping the entrance closed again. A lot of people worry that insects kept in sealed bags won’t have enough air. In fact, an inflated bag has enough air for days, if not weeks (I don’t really know, since one will always have to open the bag to put in more food before one must open the bag to put in more air). In fact, inflating the bag is not to provide the insect with more air, but to give it more space – the bag otherwise has deflated nooks that an insect can squeeze into and get stuck in.

Other insects must be kept in **terrariums/aquariums**. I particularly recommend something called “Lee's Rectangle Kritter Keeper.” These come in various different sizes and can be bought online (for instance, at PETCO) or in some stores.

If you keep a small insect in a terrarium, it may be able to squeeze through the grill on the lid if the lid has a grill. If it looks like the insect is small enough or the grill wide enough for that to happen (and insects are good are squeezing) then you should get a piece of fine **mosquito netting** or gauze or other fabric and clamp it down between the lid and the base of the terrarium. Make sure the gauze/netting is taut and not hanging loosely down into the terrarium, and also make sure that there aren’t holes in the netting so the insect can get through it and out through the lid above. Plastic wrap is probably not a good substitute for mosquito netting, since it would cause the terrarium to heat up like a greenhouse unless you kept it in extreme shade.

Mold

Mold is the enemy of insect-keepers. Anything wet (such as a leaf or the poop of a caterpillar) in a terrarium or bag will likely develop white or green furry mold sooner or later. **Keep an eye out for anything moldy** and take it out at once if you see it. If mold is growing on the bag or terrarium itself, change the bag or clean the terrarium since the mold could kill your insect if it spread too much.

And now for specific advice on different types of insect:

Caterpillars

It is really fun to keep a caterpillar. You can watch it eat, see it grow, and finally have it pupate and emerge as a butterfly or moth.

CONTAINER

You can keep your caterpillar in an inflated plastic sandwich bag (see the “Containers” section), but another container would work too. If the caterpillar is rather big, it might be able to chew its way out of a sandwich bag, so you might want to use another container or put the bag in some outer container. Regardless of the container, **keep it out of the sun** or else the bag will act like a greenhouse and the caterpillar will overheat.

It is often best to avoid keeping more than one caterpillar in a single container. Caterpillars in groups sometimes eat each other (even though they are normally vegetarian). And also diseases can spread between caterpillars, just as they can between humans, so keeping caterpillars separate keeps them safer.

FOOD

Almost all caterpillars eat leaves (even though there are some that are carnivorous and one species that feeds only on the shells of dead tortoises). When you find a caterpillar in the wild, **make a note of what sort of plant it is on**. That is likely what it eats (called the “foodplant”). Though some caterpillars, such as the Woolly Bear, will eat almost any leaf you give them, other caterpillars have very specific foodplant requirements. Some will eat only maple leaves, while others need a particular kind of maple. The caterpillar of the Sweetfern Geometer moth feeds only a strange plant called Sweetfern, and the caterpillar of the Baltimore Checkerspot butterfly eats only Turtlehead. Make sure you know what your caterpillar eats.

If your caterpillar wasn’t on a plant or doesn’t seem to want to eat the plant it was on – say, you found it crawling around on a lawn and there wasn’t any tree overhead that you think it fell from – then there are two possibilities:

1) If your caterpillar is large and looks about to pupate, it may need no food at all. Various full-grown caterpillars stop eating just before pupation and start wandering around looking for a place to pupate. During this wandering period they end up on lots of plants that they don’t eat, and indeed they won’t eat again until they emerge from pupation as butterflies or moths. In this case, you may just need to give your caterpillar a container and it will pupate there.

2) If your caterpillar does not look big and ready to pupate, you need to find something to feed it. In this case, you might try to identify it using a caterpillar guide (the best is Wagner’s “Caterpillars of Eastern North America”) and then find out its foodplants. But you might not have such a guide and anyway caterpillar identification can be very hard (most species of caterpillar aren’t even in Wagner’s guide and various species are impossible to identify until they turn into adult butterflies or moths). In this case, you should put in trial leaves of various very different species of plant. Give it whole leaves so that you can see which if any of the leaves it is eating (if you give it a leaf with lots of holes, you’ll probably not be able to work out whether or not it is eating the leaf and making more holes). Some good candidates would be maple, cherry/apple, dandelion, and goldenrod, though of course it might be one of those caterpillars that just feed on some really strange and special plant and therefore will ignore all the leaves you give it. In that case, you will have to release the caterpillar.

Make sure your caterpillar doesn’t run out of food – check it to make sure there is always some uneaten leaf in the container. And dried-out or moldy leaves don’t count – always replace these with fresh leaves. If you let old leaves pile up in the container, the caterpillar will eventually disappear among the leaves and you won’t be able to see it as easily. And also the container may develop mold. Keep a few fresh leaves in the container at any one time.

It’s a good idea to collect extra leaves so you have more to give your caterpillar when you find it has no food at 3 AM when it’s pouring with rain outside! As caterpillars grow, so generally do their appetites.

POOP

Caterpillars eat a lot and therefore poop a lot. Caterpillar poop is technically called “frass” and it normally comes in tiny, dry pellets. These are comparatively clean, since caterpillars are herbivorous. I don’t mind handling them, though I wash my hands afterwards. There should be a lot of frass in the container. That is fine, but when it builds up too much, or if it gets moldy, clean it out (since the frass is dry pellets, you can normally just tip all the pellets out).

MOLTING AND PUPATION

Every so often your caterpillar will shed its skin. This is called molting. The caterpillar will eat each old skin (the molt), so you are unlikely ever to see one. A day or so before each molt, the caterpillar will stop eating, move away from the leaves, and become inactive. Its skin may look a little wrinkled or discolored at this point. Don’t worry! This is normal. Also, try not to disturb the caterpillar during this period.

A caterpillar stays a caterpillar for a few weeks before becoming a pupa. With the final molt, the caterpillar will emerge clad, not in a caterpillar’s skin, but in a pupal covering. The molt into the pupa is a long one (up to several days long), and the caterpillar will often change color gradually during this period. It may become a dingy brown and become floppy and wrinkled-looking, as if it were dead. Don’t worry! And **don’t touch or disturb the caterpillar**! It is a difficult thing to rearrange your body into primordial ooze covered with a pupal shell, and the caterpillar should not be bothered while it is doing this or the resulting pupa could have malformations in it.

Some caterpillars, particularly butterfly caterpillars, need to hang their pupa, which is called a chrysalis. If your caterpillar is big, then you should, as it nears pupation, put it in some container other than a bag, with a flat lid on top from which it can hang its chrysalis, if it needs to form one. The chrysalis is connected to the lid by a little stalk called the cremaster. Don’t detach the cremaster and don’t joggle the chrysalis very much, since it needs to hang for the butterfly to develop.

Other caterpillars don’t hang their pupae but merely lay them on the ground. Some of these, particularly the hairy ones, spin a cocoon around themselves before they pupate, sometimes using some of the surrounding leaves in the construction of the cocoon. The pupa is then formed inside this protective cocoon. Other pupae are just loose, without a cocoon, and not attached to anything. In both these cases, it is fine to let your caterpillar pupate in the bag.

Once a pupa has formed, clear everything else out of the container so mold doesn’t develop. After a few weeks, a butterfly or moth will hopefully emerge from your pupa. However, some pupae never emerge.

**IMPORTANT – ONSET OF WINTER**

If winter approaches and your caterpillar is still not a butterfly or moth **you will have to release it**. This is because it is not possible to replicate inside one’s house the conditions of winter – the particular amounts of humidity and cold – and the caterpillar is extremely sensitive to these conditions. Just putting it in the freezer would almost certainly kill it with cold and desiccation (I haven’t even tried). And even if it didn’t kill it, you would need to wake the caterpillar up in the spring and just thawing it might kill it as well.

**You must release your caterpillar** when it gets cold, since it needs to find a suitable overwintering spot outside for itself and then get ready for the winter. Try to plan beforehand so that you have released the caterpillar before it pupates. Some caterpillars overwinter as caterpillars, but most pupate first. It is much more difficult to release a pupa than a caterpillar, since the caterpillar can find its own overwintering spot. If you are stuck with a pupa or cocoon, bury it under some dead leaves and hope that it survives. If you have a chrysalis hanging from the top of a container, you might try putting the whole container outside (making sure it won’t tip over during the winter) and checking it in the spring to let the butterfly out when it emerges.

DEATH

It is possible, however, that your caterpillar may really die and not just be molting. This needn’t be your fault or the result of bad care. It could have been parasitized before you found it by a wasp or fly that laid an egg on or in the caterpillar – when the egg hatched, the wasp larva ate your caterpillar from the inside out. This happens to a lot of caterpillars in the wild, and, for many species, bringing a caterpillar inside greatly increases its chances of survival. Only a tiny fraction of the caterpillars in the wild survive even to the pupal stage. On the other hand, survival rates for captive caterpillars are very high – your caterpillar will probably remain absolutely fine if you take care of it somewhat attentively.

Katydids and Grasshoppers

Katydids are among my favorite insects to keep. They are large, bright green relatives of grasshoppers and look very much like leaves, which can make them hard to find; but they are quite common, even in city parks. They eat plants and are very simple to look after, and various species will even make chirruping or cricking noises at night.

Put them in terrariums. You might want to put only one in each terrarium. I haven’t tried putting several in the same container – I feel it is possible that, like some caterpillars and grasshoppers, they might, even though they are normally vegetarian, have a tendency to become cannibalistic when in groups.

Feed your katydids on – any of a lot of different things. Leaves work fine; katydids aren’t particularly picky about what sort of plant they are eating. Change the leaves fairly frequently so they don’t develop mold or dry out. Berries are fabulous – put in a blueberry or grape if you want to give your katydid a treat. Though you should make sure to take the remains out if they become moldy, which they probably will, since berries are prone to do that and the katydid won’t be able to eat all of the berry before it molders.

If you want to avoid berries and leaves so as to escape mold, you can feed your katydid on Cheerios. Really! Ordinary cheerios (I imagine multigrain would work too, though I’m not sure about honey-nut). And cheerios don’t molder unless they get wet. On the other hand, if you give your katydid just cheerios, then it will need a separate source of water, since Cheerios are so dry. Put in something like a small plastic lid (concave side up) and put in it a bit of tissue of paper toweling soaked in water (use a paper towel that is free from chemicals that might harm the katydid). Add water to the tissue when it gets dry, and change it if it gets dirty. The tissue acts as a sponge that the katydid can drink from, and the plastic lid prevents the water getting out and making the container moldy.

Grasshoppers and crickets are relatives of katydids and can be kept in about the same way.

Mantises

There are a few species of mantis in the U.S., of which the praying mantis is only one. They eat other insects, including each other. But they are harmless to us and I often let them climb on me.

Mantises are really fun to keep, especially since then you get to watch them catch their prey. Give them a terrarium if you have one (and don’t put several in together or they will eat each other), but they will manage with a bag. If they are in a terrarium, they will clamber immediately up to the lid and hang there upside-down. Put in a little stick reaching diagonally from ground to lid, so that the mantis will be able to climb up the stick to the lid, since otherwise it will try to clamber up the plastic walls to the lid and will keep falling since, unlike a katydid, it can’t really climb a smooth vertical wall.

Put in prey for the mantis. House flies or other flies of that size are fine – the mantis will catch them. So are grasshoppers – unless they are really big. Moths and butterflies, except really large ones, are also fine – the mantis will eat the body and not the wings. Watching a mantis nibble its prey, which is still alive as it is being eaten, is fascinating to some people and horrific to others.

**The prey must be alive**. A mantis will not touch a dead insect. It is very common, for instance, for a mantis to catch a butterfly, hold it by the wings and nibble carelessly through the bases of the wings. Of course, then the body falls to the ground and the mantis is left holding the wings. Since it doesn’t eat the wings, it will drop them too, leaving all the food on the ground. But it will not retrieve it. Even if a dead insect has just been dropped by the mantis, it will never eat any more of it, since it is dead.

A single live insect in with the mantis is fine – the prey will probably be caught very swiftly. (You do not need to put in food for the prey.) And one insect per day is fine, unless the prey is really small. Don’t worry if the mantis doesn’t eat for a couple of days, but if the prey that you have put it seems to have eluded the mantis for many days, do put in a different insect.

Assassin Bugs

Assassin bugs are carnivorous “true bugs” that catch their prey, liquefy the innards, and then suck out the soup through a straw (really, the straw is a mouthpart called the “rostrum” which is folded under the body when not in use). Don’t handle them if you can help it (and you can help it, since they move very slowly) since a jab of a rostrum is probably somewhat painful.

You can keep them in sandwich bags and it is fascinating to watch them catch prey, stick in the rostrum, and leave a shriveled lump of exoskeleton behind, having eaten the nutritious innards. Give them small prey like flies and plant bugs. As with mantises, **the prey must be alive** or else the assassin bug will not eat it.

Butterflies and Moths

It is possible, but not an especially good idea, to keep butterflies and moths. If you do keep some, follow the directions under “Katydids” on putting a tissue soaked in water on a plastic lid (or something similar to a lid). Only for butterflies and moths, the water that you soak the tissue in must be sugar-water – a mixture of sugar in water. About 1 spoonful of sugar to 4 spoonfuls of water gives a good mixture. You need to change the sugar-water-soaked tissue every two days, since otherwise the sugar will ferment and the butterfly could die of alcohol poisoning. No other food is necessary to keep a butterfly alive – it only feeds on sugar-water.

The reason not to keep butterflies is that they need a lot of space – they are liable to fly around a lot, so a small bag is out of the question and a terrarium not much better. Then, they could hurt themselves by getting their wings stuck in the sugar-water. Because of these issues, I normally release, instead of keeping, all the butterflies and moths I catch and all those that develop from the caterpillars I keep.

Plant Bugs

Unfortunately, I don’t know of an easy way to keep plant bugs, leafhoppers, treehoppers, and cicadas. All of these insects feed in the wild upon plant juices – their mouth looks like a straw and they stick this straw into a plant and drink the sugary phloem sap. The juices of the plant need to be flowing. If you take a plant bug inside and give it leaves, then however fresh the leaves are, the bug will not be able to feed. The only option might be to take a whole plant inside alive, put it in a pot, and allow your bug to feed from it (provided it is a sort of plant the bug will feed from). Then there is the problem of how to contain the plant so the bug doesn’t get out. All in all, this is rather difficult, and I would not recommend keeping plant bugs.

Bees and Wasps

**Don’t try!**