DOWNLOAD PDF LIFE CYCLE OF A MOTH

Chapter 1 : Color the Life Cycle: Moth | Worksheet | www.nxgvision.com

The very first stage of the life cycle of a moth is the embryonic stage. This is the stage where the embryo develops inside of the egg. This is not unlike birds or fish embryos developing in their respective eggs.

It was introduced to the United States in when French artist, astronomer, and amateur entomologist Leopold Trouvelot imported some eggs of this species to Medford, Massachusetts, with the idea of breeding a silk-spinning caterpillar that was more resistant to disease than the domesticated silkworm. Unfortunately, the caterpillars escaped into his backyard. About 10 years later, they began to appear in large swarms, and by the late s they were causing severe defoliation in the area. Identification The gypsy moth caterpillar and the eastern tent caterpillar are often confused, but are readily distinguished by comparing the markings of the two species. The gypsy moth caterpillar has five pairs of bluish warts followed by six rows of red warts running down the length of its back; the eastern tent caterpillar has no warts but a prominent yellowish-white center stripe above. The latter also has intricate markings in blue, orange, and white and is actually quite beautiful. Gypsy moth larvae, on the other hand, are just beginning to emerge by May and are tiny and inconspicuous at that time. Hatching in May from buff-colored egg masses deposited on tree trunks or in more sheltered places, the tiny quarter-inch-long caterpillars almost immediately climb upward toward sunlight and the leaves on which they will begin to feed. Many of them then spin long silken threads on which they drop down from the foliage. The wind then helps disperse them to other trees, resulting in redistribution of the larvae. Once the caterpillars find a suitable tree oak, birch, and apple trees are favorites , they begin eating the leaves, growing rapidly, and molting their skins to accommodate their increasing size. After a few molts, the one-inch-long larvae avoid light by descending from their host tree just before daybreak and spending the day in dry, dark, sheltered spots under loose bark on trees, in leaf litter below trees, or on the undersides of objects such as picnic tables. It is at this stage that people usually begin to notice the caterpillars and the defoliation of trees. After passing through five or six larval stages, the caterpillars ultimately reach a length of 1. In July they pupate in sheltered locations, such as the undersides of tree limbs and lawn furniture, or inside the wheel wells of parked automobiles. After about two weeks the adult moths emerge. The flightless white-and-buff female moth gives off a chemical scent called a pheromone, which acts as an attractant to the smaller brown-colored males. After mating in July or August, each female deposits an egg mass of 75 to 1, eggs mixed with yellowish hairs from her abdomen on a tree trunk or other surface. The moths die after reproducing, but the egg masses survive the winter and renew the cycle in the spring. During a boom, or outbreak, they can cause massive defoliation most likely in uniform stands of tree species, particularly oaks. While a disheartening sight, the long-term effect of the phenomenon is not as disastrous as some commonly assume and may in some ways be beneficial. Thinning of forests by gypsy moths may produce a healthier, more diverse, and perhaps a more gypsy-moth resistant stand of trees. Moderate defoliation benefits forest wildlife by stimulating understory growth of shrubs and berry-producing thickets. The larval droppings frass fertilize the soil, the larvae provide food for birds and mammals, and the skeletal remains of trees that succumb provide habitat for wildlife, thus promoting diversity in the forest ecosystem. Yet, it might be comforting to know that there are some natural controls at work as well as some prevention techniques you can employ. Natural Controls Some native birds, such as cuckoos, downy woodpeckers, gray catbirds, and common grackles, will eat gypsy moth caterpillars but, unfortunately, not in large enough quantities to have an effect during an outbreak. White-footed mice, and occasionally gray squirrels, prey on gypsy moth larvae and pupae. In addition, there are a number of wasps and flies that parasitize the eggs, larvae, and pupae of the moth. There are also bacterial and mold parasites that attack this moth species. Several insect and disease controls have also been introduced. The insect predators that were brought here to function as biological controls on gypsy moth populations prey exclusively on these moths or other closely related species. One such insect control is a large, green, predacious beetle Calosoma sycophanta. The adult of this beetle eats gypsy moth larvae, and the larval beetles seek out and feed on the moth pupae. To kill them, scrape the eggs into a container and douse them with boiling water, being careful to avoid skin contact. Do not merely scrape the eggs onto the ground. They can

survive temperatures 20 to 30 degrees below zero Fahrenheit. Check Your Car Egg masses deposited in the wheel wells of cars or among stacked woodpiles may account for much of the spread of gypsy moths from state to state. You can avoid carrying the moths to new areas by checking for, and removing, egg masses before leaving an infested area. Wrapping tree trunks with aluminum foil covered in a sticky substance, recommended by some sources, has proven to be ineffective and is not good for the health of the trees; you may entrap large numbers of caterpillars, but not nearly enough to curtail the damage. Wrapping trees with burlap folded over a cord to entrap caterpillars seeking shelter during the day is also ineffective due to the scope of the problem. If you detect infestation of a favorite yard tree early on when the caterpillars are still small you could consider contacting a reputable pest management firm or arborist for advice. If spraying of pesticides is recommended, make sure the treatment uses B. Unfortunately, it can also kill many of our native butterflies and moths, the vast majority of which are either harmless or beneficial. Also, the mature caterpillars feeding on expanded leaves may be resistant to the bacillus. Plant Less Favored Trees When choosing new plants, try to select species less favored by gypsy moth caterpillars. Ash, locust, dogwood, sycamore, balsam fir, mountain laurel, and rhododendron are less susceptible to the gypsy moth. What Not to Do Do not use chemical pesticides. Despite extensive control programs using various insecticides - first DDT, now mainly carbaryl Sevin - the gypsy moth has steadily increased its range. Although these substances do kill the larvae and thereby protect the foliage in the year of application, the insects are never totally eliminated. Furthermore, insecticides also kill the insect predators and parasites of gypsy moths and interfere with other natural controls such as the virus that kills the caterpillars at high population densities. Applications of carbaryl or other pesticides may actually prolong or exacerbate outbreaks. Gathering and destroying the caterpillars by hand is a waste of time and effort. You will lose because you will be greatly outnumbered by larvae. Traps to catch and eliminate the gypsy moth chiefly benefit the seller. Traps are sometimes used by scientists to count numbers of larvae and predict outbreaks. Disparlure, a synthetic chemical that mimics the sex attractant of female gypsy moths, is used to lure male moths into traps. This will not control outbreaks, however, because there is no hope of trapping enough males to prevent females from mating. Allergic Reactions For those who may be allergic to gypsy moth caterpillars, you should minimize contact with the insect by wearing long-sleeved shirts and by drying clothes indoors during an outbreak. Wear gloves and protect exposed skin from the egg masses while removing them. Should you develop a rash, apply cold compresses and calamine lotion to the affected area. Hydrocortisone cream may also be used, but the rash usually goes away after two to three days without any treatment.

Chapter 2 : Gypsy Moth Biology & Life Cycle

Understanding the clothes moths life cycle is key to knowing how to best deal with moth problems in the home, in both eradicating and repelling these destructive domestic pests. www.nxgvision.coms Moth Eggs. The beginning of the Clothes moth lifecycle - adult female moths can lay eggs over their short life and these eggs are tiny, typically mm in length.

The true legs are segmented with joints and become the walking legs in the adult butterfly or moth. In most cases the number of prolegs varies from 2 to 5 but some leaf-mining caterpillars and Limacodidae species have none and some Zygaenoidea have more than 5 pairs. The number of prolegs and their size is often helpful in determining which family or families the caterpillar is likely to be part of and hence can help in identifying which species it is, examples from a few families can be found below. As a caterpillar grows in size it becomes too large for its skin which it sheds, typically 4 times, before it changes into a chrysalis. In some cases the number of prolegs which are visible increases as the caterpillar grows and changes its skin. One method that can be used to start the identification process is to try and work out which family grouping the caterpillar belongs to. The following gives some pointers to help decide which of the main family groups a caterpillar belongs to. The order in which the families are listed below is not taxonomic but is my own suggestion for working through some of the key identifying characteristics. This starts with caterpillars that only have two pairs of functional prolegs, then three pairs followed by the groups which, apart from a small number of exceptions, have five pairs of prolegs. In the following examples I have also included pictures of the caterpillars that enthusiasts in the UK are most often asked to identify. If you want to see the life history that has been recorded so far for any of the species listed below, click on the scientific name and it will appear on a separate frame. Geometridae This is a large family with around species either resident or regular migrants to the UK. Virtually all these species have only two pairs of prolegs, being without those on abdominal segments A3, A4 and A5. The photograph of a Pale Brindled Beauty Apocheima pilosaria caterpillar is shown below. Nolidae This is a small family with only 4 species resident in the UK and another an occasional migrant. The caterpillars of these 5 species are all missing a pair of prolegs on abdominal segment A3 and thus only have 4 pairs of prolegs. The picture below shows an example of the Least Black Arches Nola confusalis. Drepanidae There are six species in this family which are found in the UK. All have their anal claspers modified into a raised point and are therefore relatively easy to identify. Notodontidae In this family there are 22 species resident in the UK and a few other occasional migrants. A few species are fairly hairy such as the Buff and Chocolate-tips. The Buff-tip Phalera bucephala larvae are gregarious until their final instar and their presence is often noticed because they strip braches of all their leaves. The Chocolate-tip Clostera curtula larvae are seen less frequently. Four species, the Puss Moth Cerura vinula and three Kitten moths have their anal claspers modified by a pair of tails. Sphingidae In the UK this is a small group with only 9 resident species, another two that regularly migrate to the UK and a further 6 species which, in most years, are much rarer migrants. In the UK members of this family are known as Hawkmoths and their caterpillars grow to the largest sizes seen here. All have five pairs of prolegs but their most distinctive feature is a tail horn. Below these are two images of the Lime Hawkmoth Mimas tiliae , the example on the left shows the caterpillar in its final instar and on the right the colour it changes to when ready to change into a chrysalis pupate. At this stage the caterpillar descends from the tree and is probably the most frequently seen Hawkmoth species because the caterpillars are often spotted crawling over the ground looking for a suitable spot to pupate in. Another large caterpillar which is often seen feeding on the leaves of Fuchsia in gardens during the summer is the Elephant Hawkmoth Deilephila elpenor. The way the caterpillar is sitting in the example below illustrates the reason that it was given its English name! Noctuidae This is a large and varied family with around species either resident or regular migrants to the UK. Most Noctuid caterpillars have 5 pairs of prolegs but 3 families have some species with one or two pairs missing or under-developed. In the subfamily Plusiinae, 14 out of 16 species have only 3 pairs - they are missing those on abdominal segments A3 and A4 as in shown by the example of a Golden Twin-spot caterpillar Chrysodeixis chalcites below. In the subfamily Hypeninae out of

11 species the proleg is rudimentary or absent on segments A3 and A4 in 4 species and is only rudimentary on segment A3 in 3 species - one example of the latter, The Snout Hypena proboscidalis is shown below although the partial proleg on A3 is not visible in this photograph. In the subfamily Catocalinae out of 7 species 1 only has a rudimentary proleg on A3, the Clifden Nonpareil Catocala fraxini and 3 species have prolegs rudimentary or absent on A3 and A4, one example being the larvae of Mother Shipton Callistege mi. One caterpillar that is often seen in gardens feeding on buddleia is the Mullein Shargacucullia verbasci , shown above. It has five pairs of prolegs. The larvae of the vast majority of Noctuid species are hairless or have very few hairs. However, there are 9 Acronicta species resident in the UK which are fairly or very hairy. These include three caterpillars that are often seen, the spectacular Sycamore Acronicta aceris , the Grey Dagger Acronicta psi and the Knot Grass Acronicta runicis which are illustrated below. Lymantriidae There are 8 members of this family resident in the UK. All are hairy and have five pairs of prolegs. Two other species in this group are notorious for having extremely irritating hairs, the Yellow-tail Euproctis similis and the Brown-tail Euproctis chrysorrhoea. These four species are some of the most commonly seen caterpillars and are pictured below. Lasiocampidae There are 10 species of this family found in the UK, all are hairy and have five pairs of prolegs. Three of those most commonly seen here are the Lackey Malacosoma neustria , the Oak Eggar Lasiocampa quercus and the Drinker Euthrix potatoria. The Lackey used to be a relatively common caterpillar often seen in a group sunning themselves on fruit trees in gardens during May and June but are more often seen on hawthorn and blackthorn these days. The Oak Eggar caterpillars are one of the largest in this family at 65 to 80mm. The Drinker caterpillars are often seen on sitting on broad grass or reed stems in the autumn and spring and examples of this caterpillar before hibernation left and when fully grown are shown below. Another large hairy brown and black caterpillar which may be seen basking in the sun on open grassland in autumn and early spring, is the Fox Moth Macrothylacia rubi. Arctiidae Over 30 species of this family are found in the UK, all have five pairs of prolegs. Four examples are shown below. Those of the sub-family Lithosiinae are mainly feeders of algae and lichens and are all fairly or very hairy such as the Common Footman Eilema lurideola and the Four-dotted Footman Cybosia mesomella. The Buff Ermine caterpillar and a similar caterpillar the White Ermine Spilosoma lubricipeda are often seen walking along or across roads in September when ready to change into a chrysalis. The Buff Ermine is usually lighter in colour than the White Ermine and has a stripe on its side which is missing on the White Ermine. Another hairy member of this family which overwinters as a fully grown caterpillar is the Ruby Tiger Phragmatobia fuliginosa which is often seen in the late autumn and early spring. It is smaller than the two Ermines and its colour may be black as well as the brown example shown, in addition it may have a line running down its back - see the full set of pictures for examples. Saturniidae There is only one member of this family of silkmoths resident in the UK. It is the Emperor Moth Saturnia pavonia which has 5 pairs of prolegs. The caterpillars feed on on a range of foodplants and are sometimes spotted on heather in heathland, they are gregarious in their early stages. The examples below show a 2cm caterpillar left and a final instar 6cm caterpillar, with some caterpillars the yellow colouring of the tubercules is replaced by pink. Thyatiridae There are 9 species of this family found in the UK, all have five pairs of prolegs and have few hairs. They are a bit of a mixed bag, the only significant feature they have in common is that most hide or feed inside spun-up leaves. Two examples are the curiously shaped Peach Blossom Thyatira batis and the Yellow Horned Achlya flavicornis shown below. Limacodidae This is a very small and most unusual family with only 2 species resident in the UK. The picture below shows an underside view of The Festoon Apoda limacodes which has sucker-like structures in place of any prolegs. Nymphalidae There are 13 members of this family resident in the UK with 2 regular and 3 rare migrants. All have five pairs of prolegs and with the exception of the Purple Emperor Apatura iris they have spines of varying density. Those most often seen include the nettle feeding Small Tortoiseshell Aglais urticae and the Peacock Inachis io which are gregarious in their early stages and both resident in the UK. The Red Admiral Vanessa atalanta is also a nettle feeder and migrates to the UK every year, many adults also attempt to overwinter in the UK with varying success rates. The Red Admiral caterpillar feeds inside nettle leaves spun together. The other regular migrant to the UK is the Painted Lady Vanessa cardui whose larvae feed inside webs, their main foodplants being a range of thistles. Pieridae There are 6 members of this family

resident in the UK and one regular migrant, the Clouded Yellow Colias croceus , also a few other very rare migrants. The best known resident species are the cabbage feeding caterpillars of the Large White Pieris brassicae and the Small White Pieris rapae. The Green-veined White Pieris napi is another well known butterfly whose larvae feed on Garlick and Hedge Mustard and other closely related plants. Also the Orange-tip Anthocharis cardamines whose larvae feed on the seed pods of Garlic Mustard and related Cruciferae. Lycaenidae There are 15 members of this family currently resident in the UK, all with woodlouse shaped caterpillars. The caterpillars are relatively small 10 to 17mm fully grown and are usually only observed by those searching for them, or rearing them in captivity. Satyridae There are 11 species resident in the UK, the caterpillars all have five pairs of prolegs and feed on grasses mainly at night. The larvae are all green or brown, two examples being the Speckled Wood Pararge aegeria and the Marbled White Melanargia galathea. They can be distinguished from other caterpillars with five pairs of prolegs by the presence of twin anal points as illustrated by the examples below. Hesperiidae There are 8 resident species of this family in the UK. The caterpillars of 6 species, such as the Silver-spotted Skipper Hesperia comma feed on a few grasses specific to each species. In most cases sawfly larvae have 6 or more pairs of abdominal prolegs so if the total number of pairs of true legs and prolegs is 9 or more then they are sawfly larvae. The pictures below illustrate examples of the sawfly larvae Craesus septentrionalis left and Craesus alniastri. Apart from the difference in the number of pairs of prolegs the construction of caterpillar prolegs is significantly different from those of sawfly larvae. I think this is fairly obvious when comparing the examples from the two groups shown above. However another significant difference is that caterpillar prolegs have tiny hooks known as crochets on the underside of their claspers. The picture below illustrates the hooks which are visible on the last pair of prolegs of a Broad-bordered Bee Hawkmoth Hemaris fuciformis caterpillar. This stage marks one of the most dramatic changes in the development of the insect. The picture below shows a typical male Noctuid moth pupa and the areas where significant parts of the adult insect will form up within the pupa casing are clearly marked. The 3 pairs of legs the true legs are attached to the the thorax of the adult insect and from the front to the back of the head are named as follows: When they are ready to pupate caterpillars look for a suitable place to complete this part of their life cycle which may be on a plant or tree, under leaf and other litter on the ground or in many cases under the earth. Considering butterflies first, some butterfly caterpillars spin a silk pad on a leaf, plant stem or even a fence post. They then hold onto the silk pad with their hind anal claspers and hang, head down, waiting to change into a chrysalis. During the pupation process the skin of the caterpillar splits at the head end and the old skin is gradually worked up the body of the newly formed chrysalis until it is gathered at the top by the silk pad. At this stage hooks which have formed in the cremaster work their way outside the old skin and get a grip onto the silk pad. The chrysalis is now able to wriggle around until it has discarded the old skin and it remains hanging by the cremaster hooks whilst the chrysalis hardens and it remains suspended in this way until the butterfly eventually emerges.

Chapter 3 : Life Span of Brown House Moths | Animals - www.nxgvision.com

Pantry Moths Life Cycle - Larvae Stage. The Pantry moth larvae stage is the feeding stage. A pantry moth egg produces a caterpillar worm-like moth larvae that may be a 1/2 inch long and contains about 5 pair of legs.

Moth Life Cycle Stage 1: The Egg â€" Embryonic Stage The very first stage of the life cycle of a moth is the embryonic stage. This is the stage where the embryo develops inside of the egg. This is not unlike birds or fish embryos developing in their respective eggs. This all begins when a male and female moth mate. There is a fairly intense and complicated mating ritual that adult male and female moths go through, one that results in the fertilization of the eggs inside of the female moth. The female moth then looks for a place to lay her eggs. She will usually choose somewhere with a lot of plant matter. The plant matter will serve as a good food source for the moth larvae or caterpillars once they hatch from their eggs. On a side note, this is why many people find moths in their closets with their clothes. Caterpillars like to eat certain types of clothing fibers, which is also true for adult moths. Once the eggs are laid, they need some time to gestate. Moth eggs can take anywhere from 4 to 10 days to gestate, which means that they will usually always hatch within 10 days of being laid. It does take the right conditions to help the eggs gestate and for the embryos to mature. A fair bit of humidity and warm temperatures are essential to the gestation of caterpillar embryos. How long an egg takes to gestate does also depend on the exact species of moth in question, but generally speaking, 10 days is the longest that gestation will take. On an interesting side note, over a period of about 2 weeks, a female moth can lay about 40 or 50 eggs. After the eggs have been laid, the female moth will die shortly afterwards. That said, there are some species which can lay around to eggs in a lifetime. The embryo takes about 10 days to grow, absorb nutrients from the eggs, and finally hatch into a larva, which we commonly refer to as a caterpillar. As soon as the caterpillar hatches, in most cases, the first thing that it eats is the shell from which it just emerged. The shell contains a lot of proteins, vitamins, and other nutrients which the caterpillar needs to survive, develop, and grow. When the larva hatches at first, it is said to be in its first instar. The instars are stages of development for moth caterpillars. Moths go through a process of molting and shedding, just like spiders, snakes, and other animals do. This means that the skin or shell around them does not grow with the inside of their bodies; thus, it needs to be shed and a new one developed to match the increasing size of the animal. In technical terms, this shell or skin is called a cuticle. When the caterpillar first hatches, before it molts and sheds, it is said to be in its first instar. Need to hire an exterminator? Caterpillars will most often eat the cuticles which they shed, as they are usually full of proteins, nutrients, and other substances that are beneficial for growth. After a caterpillar sheds its cuticle for the first time, it is then in its second instar. Some caterpillars will look significantly different after each instar, while some just look bigger, but essentially the same. How many instars a caterpillar goes through depends on the food, climate, and type of moth that it is to turn into. Caterpillars will eat around 2, times their own body weight in order to get big and prepare for the next stage in its life, the pupal stage, where the miraculous transformation from caterpillar to moth occurs. The length of time a caterpillar stays in the larval stage varies from one species to another and it depends on the climate as well as the amount and quality of available food. The caterpillar will continue the cycle of eating and molting until it reaches its final instar, which means that it is time for pupation. When a caterpillar is ready to become a cocoon and transform into a moth, it will most often wander away from the plant it lives on in order to find a safe space transform, usually one that is warm, humid, and is safe from predators. Once this suitable pupation site is found, the caterpillar will shed its final cuticle, which is hard, in order to begin transformation. This is where the caterpillar transforms itself into a fully grown adult moth, wings and all. Now, what is interesting to note is that a moth in its pupal stage is referred to as being in its cocoon. On the other hand, when a butterfly is in its pupal stage, the structure which it builds around itself is called a chrysalis. Either way, the cocoon is where the larva will transform itself into the fully grown moth. A caterpillar has the ability to spin a type of silk made out of proteins which it produces. A caterpillar spins this silk into a protective shell called the cocoon, inside of which the transformation process will occur. The purpose of the cocoon is to offer protection for the vulnerable larva while it transforms, plus it keeps everything contained. Also, many people make the

mistake of thinking that this is a resting stage for the larva. While the larva does not eat anything or actually move about during this stage, it is definitely not at rest. All of that food that the caterpillar ate during the larval stage is now being put to use. The food energy is being used for the most energy intensive process that the caterpillar or moth will ever go through. Yes, it takes a whole lot of energy for this transformation to occur. You might also be interested to know that this transformation is technically referred to as metamorphosis. What is really interesting is that the caterpillar does not actually grow into a moth per say; it goes through a process called histolysis. These cells break the caterpillar down until it is nothing more than a pile of cells, more or less an accumulation of goop. Now it is ready to reform itself into a moth. This reforming process is called histogenesis. We are not going to get too much into the scientific stuff here, but these special cells now begin to rearrange the DNA and cells inside of the cocoon, thus forming the adult moth. How long this process takes depends on the environment, the species and size of the moth. Most moths will take between 5 and 21 days to cocoon from a caterpillar into an adult moth. There are various signals which the pupa, or full grown moth, will receive which means that it is time to emerge from the cocoon. These can be environmental factors or it can also be a chemical signals from within itself, signaling that the transformation process is complete. Adult Moth â€" Imaginal Stage This is the final stage of the moth life cycle, the stage where it actually has wings and can fly around. It takes quite a while for the adult moth to emerge from the cocoon, as at this time it is soft, weak, and quite fragile. Getting out of that cocoon is a difficult process. When the moth first emerges from the cocoon, it will have a severely bloated abdomen and shriveled wings, rendering it unable to fly for the first few hours of its adult life. During the pupal stage where metamorphosis happens, there is a lot waste produced by the transformation process. This is called meconium, a reddish slimy liquid which the moth will defecate out of its anus once it is ready to do so. At the same time, moths are full of hemolymph, which is actually the equivalent to blood in invertebrates. In other words, invertebrates like moths have hemolymph, which is the equivalent to blood in mammals and other animals. The moth must take a few hours to pump this blood equivalent into its wings, thus getting them to full size, and enabling it to fly. An adult moth does not live for long, but once again, this does depend on the species. Some moths live for a few weeks, some live for a couple of months, and in some rare cases, some adults moths can live for 8, 9, or even 10 months. Moths usually are not that big, being somewhere between 1 and 3 cm in size, but there are indeed some larger ones out there. In all reality, the majority of moths out there will not reach old age. Most will be killed by weather or predators before they reach the end of their life cycle. When it comes to female moths, they usually die after laying eggs, thus completing the moth life cycle and starting a whole new cycle at the same time. Conclusion As you can see, the transformation from egg to larva to pupa to an adult moth is a very interesting one. There is a lot more involved here than people might think. So, next time you see a cocoon, let it be and wait until that beautiful moth emerges from it!

Chapter 4 : Moth Identification - Identify a Moth

Although the life cycle of the moth can be relatively short, moths are capable of doing significant damage to fabrics stored in attics, basements and closets. Some species are capable of producing more than eggs in one lifetime, and development periods are rapid.

The dark spots on the wings distinguish it from the webbing clothes moth. Casemaking clothes moth with its case attached. Cases from the casemaking clothes moth. Cases take on the color of the fabric being consumed. Webbing clothes moth larvae with particles of excrement frass and other debris. The webbing clothes moth, Tineola bisselliella, and casemaking clothes moth, Tinea pellionella, can be fabric pests in California. They tend to hide when disturbed, so you might not notice you have an infestation until after the moths have already damaged your fabric, fur, or feathered items. Close examination of the objects will reveal silken webs the larvae have spun. The adult is gold with reddish-golden hairs on the top of its head. Clothes moths usually fly around only the immediate area of the house where the infestation has occurred, and their flight pattern is distinctiveâ€"they tend to flutter about rather than fly in a direct, steady manner as do food-infesting moths. To confirm you have a clothes moth, catch one and examine its head with a magnifying glass or hand lens. The casemaking clothes moth is similar in size and appearance to the webbing clothes moth, although the wings of the casemaking clothes moth are more brownish and have faint dark-colored spots. Also, the hairs on its head are lighter colored than those of the webbing clothes moth. Larvae of both species are nearly identical, except the larvae of the casemaking clothes moth always carry a silken case with them as they feed. They never leave this silken case behind but enlarge it as they grow. They can feed from either end of the case and retreat into it when disturbed. This case takes on the color of the fabric the larvae have eaten. When webbing clothes moths move on to new feeding locations, they leave the feeding tubes and webbing behind. Excrement from both the webbing clothes moth and the casemaking clothes moth can contain dyes from the cloth fibers the moths have eaten, also making it the same color as the fabric. Males outlive females and continue to mate during the remainder of their lives. An adhesive secretion attaches the eggs to the fabric threads. Eggs hatch in 4 to 10 days during warm weather. Larvae molt 5 to 45 times, depending on indoor temperatures and the type of food available. Larvae are shiny white, and their head capsules are dark-colored. They spin webbing as they feed, with the webbing clothes moth creating a temporary silken feeding tube or tunnel and the casemaking clothes moth creating a permanent silken case that larvae carry with them as they move around. When larvae of the casemaking clothes moth are ready to pupate, they wander away from their food source to find crevices. With the webbing clothes moth, pupation takes place inside a silken cocoon, usually on the fabric. Pupation lasts 8 to 10 days in summer and 3 to 4 weeks in winter. Heated buildings enable clothes moths to continue developing during winter months. Generally, developmental time for the clothes moth from egg to egg is between four to six months, and there are usually two generations a year. The casemaking clothes moth is less common and also of far less economic importance than the webbing clothes moth. The larva is the damaging stage of the clothes moth. Both species feed on wool clothing, carpets, and rugs; upholstered furniture; furs; stored woolen items; animal bristles in brushes; wool felt pads in pianos; and fish meal in fish food. They will feed on synthetics or cotton blends if these fabrics also contain wool. Larvae might also use cotton fibers to make their pupal cases. Damage generally appears in hidden locations such as beneath collars or cuffs of clothing, in crevices of upholstered furniture, and in carpeted areas beneath furniture. Fabrics with food, perspiration, or urine stains are more subject to damage. Good housekeeping practices are important as well. It is also important to regularly monitor fabrics and closets for clothes moths and their damage so you can take action when infestations are still small. Although most people can manage clothes moth problems themselves, some infestations are best handled by a pest control applicator, who has the equipment, materials, and experience to deal with difficult control jobs. Monitoring To inspect for clothes moths, look to see if there are silken tubes in the hidden portions of clothes, such as under collars, or silken mats or patches on material. Both the silken tubes and mats often have fibers and feces incorporated into them. Check to see if you can find any sign of surface grazing of fibers, any holes, or both on the fabrics. With fur, look to see if you have some

hairs clipped at their base, causing loose fur and exposed hide. The case containing a live larva is often attached to the infested material at on end. Pheromone traps, discussed below in Trapping, are also very useful for detecting clothes moths. Preventing or Reducing Infestations Periodically cleaning areas in your home that can harbor clothes moths can prevent or control infestations. These areas include seldom-cleaned spots such as beneath heavy pieces of furniture; along baseboards and in cracks where hair and debris accumulate; in closets, especially those in which woolens and furs are kept; and inside and behind heaters and inside vents. The vacuum cleaner is the best tool for most of this cleaning. Clothes moths might initially establish themselves on woolen garments or scraps stored for long periods. In addition to properly storing woolen items See Protecting Items in Storage. Brushing destroys eggs and exposes larvae. If the infestation is in a closet, be sure to remove and clean all clothes and fabric that were stored inside and thoroughly vacuum and wash the inside of the closet, especially all cracks and crevices, before returning the cleaned clothes. Dust insecticides containing pyrethroids or pyrethrin e. Always follow the label requirements when applying these dusts. Keeping fabrics clean has another advantageâ€”insects are less likely to feed on clean fabrics than on heavily soiled ones. Protecting Items in Storage Clothes moths often damage improperly stored articles. When storing susceptible items, be sure they are clean and pest free, and place them in an airtight container. You can place insect repellents such as herbal oils into the storage container, but little is known about their effectiveness. Moth balls, flakes, or crystals containing 1,4-dichlorobenzene also called paradichlorobenzene also are available for protecting clothes in storage. Because these materials are toxic, be sure to keep them away from children and pets. These products have other shortcomings as well. They leave an unpleasant odor on clothes and other cloth objects, and if these products come into contact with plastic buttons, hangers, or garment bags, they can cause the plastic to soften and melt into the fabric. As these chemicals evaporate, they produce vapors that, in sufficient concentration, will slowly kill insects. The vapors build up to the required concentration only in an airtight container. The effectiveness of cedar chests and closet floors made of cedar is debatable. After several years, however, cedar loses this quality. Having a tightly constructed chest is more important in the long run than the type of wood used to make it. Before using any of these methods, consider if cold or heat will damage the fabric. For more information, see the Household Furnishings section. Trapping Trapping is a relatively easy-to-use technique that helps to detect and reduce a webbing clothes moth infestation. Pheromone traps are available to trap both the webbing clothes moth and the casemaking clothes moth. The sex pheromone attracts male moths into the trap where they get stuck on the sticky sides. Pheromone traps for clothes moths are available at major hardware stores. Place traps in closets and other clothes-storage areas. However, if you trap moths, you should also take other measures, such as dry cleaning or laundering, to protect clothes exposed to moths. Find a product that lists clothes moths on its label, and follow the directions exactly. Insecticides for clothes moths usually contain pyrethrins, which provide quick knockdown of clothes moths. You can spray most of these products directly onto fabrics. Always follow the instructions in the product label. For surfaces you suspect might stain, first spray a small, inconspicuous area and let it dry to see if staining occurs. Widespread or heavy infestations often require the services of a professional pest control applicator. Special Situations Rugs, carpets, furs, and household furnishings require special attention to protect them from clothes moths. You can dry clean area rugs or hang them out in the sun and then vacuum them. Pull back the edges of infested wall-to-wall carpets, so you can apply an insecticide to both sides. Spray the upper surface of the carpet lightly to reduce the possibility of staining. It is better to wait until the rug has dried before putting any weight on it. If you store furs at home during the summer, protect them with moth crystals, flakes, or balls, or frequently shake and air the items. Furs in commercial cold storage receive professional care, and you can insure them against damage. Household Furnishings Some furniture, mattresses, and pillows are stuffed with animal products such as hair or feathers. The best way to eliminate the moths is to fumigate the item with dry ice or have a pest control or storage firm treat the infested item with lethal gas in a fumigation vault. To fumigate an object with dry ice, place the item and the ice into a thick 4 mil plastic bag. Seal the bag loosely at the top until all of the dry ice has vaporized; this will allow the air to escape and keep the bag from bursting. When the dry ice is gone, tighten the seal, and let the bag sit for three or four days. Sometimes felts and hammers in pianos become infested and so badly damaged that it seriously affects the

tone and action of the instrument. Contact a piano technician, who might recommend synthetic felt replacements. Handbook of Pest Control, 10th ed. Carpet Beetles and Clothes Moths. Residential, Industrial, and Institutional Pest Control , 2nd ed.

Chapter 5 : Hummingbird Moth (Clearwing Moth)

All members of the order Lepidoptera, the butterflies and moths, progress through a four-stage life cycle, or complete www.nxgvision.com stage - egg, larva, pupa, and adult - serves a purpose in the insect's development and life.

Wild silkmoth Bombyx mandarina Eggs take about 14 days to hatch into larvae, which eat continuously. They have a preference for white mulberry , having an attraction to the mulberry odorant cis-jasmone. They are not monophagous since they can eat other species of Morus , as well as some other Moraceae , mostly Osage orange. They are covered with tiny black hairs. When the color of their heads turns darker, it indicates they are about to molt. After molting, the instar phase of the silkworms emerge white, naked, and with little horns on their backs. After they have molted four times, their bodies become slightly yellow and the skin becomes tighter. The larvae then prepare to enter the pupal phase of their lifecycle, and enclose themselves in a cocoon made up of raw silk produced by the salivary glands. The final molt from larva to pupa takes place within the cocoon, which provides a vital layer of protection during the vulnerable, almost motionless pupal state. Many other Lepidoptera produce cocoons, but only a fewâ€”the Bombycidae , in particular the genus Bombyx , and the Saturniidae , in particular the genus Antheraea â€”have been exploited for fabric production. If the animal is allowed to survive after spinning its cocoon and through the pupal phase of its lifecycle, it releases proteolytic enzymes to make a hole in the cocoon so it can emerge as an adult moth. These enzymes are destructive to the silk and can cause the silk fibers to break down from over a mile in length to segments of random length, which seriously reduces the value of the silk threads , but not silk cocoons used as "stuffing" available in China and elsewhere for doonas, jackets etc. To prevent this, silkworm cocoons are boiled. The heat kills the silkworms and the water makes the cocoons easier to unravel. Often, the silkworm itself is eaten. As the process of harvesting the silk from the cocoon kills the larva, sericulture has been criticized by animal welfare and rights activists. Mahatma Gandhi was critical of silk production based on the Ahimsa philosophy "not to hurt any living thing". He also promoted Ahimsa silk , wild silk made from the cocoons of wild and semiwild silkmoths. Some may emerge with the ability to lift off and stay airborne, but sustained flight cannot be achieved. This is because their bodies are too big and heavy for their small wings. However, some silkmoths can still fly. Females are about two to three times bulkier than males for they are carrying many eggs , but are similarly colored. Adult Bombycidae have reduced mouth parts and do not feed, though a human caretaker can feed them. Cocoon[edit] Cocoon of B. About 2, to 3, cocoons are required to make a pound of silk 0. At least 70 million pounds of raw silk are produced each year, requiring nearly 10 billion cocoons. Due to its small size and ease of culture, the silkworm has become a model organism in the study of lepidopteran and arthropod biology. Fundamental findings on pheromones , hormones , brain structures, and physiology have been made with the silkworm. Many hundreds of strains are maintained, and over Mendelian mutations have been described. Bombyx mori females are also one of the few organisms with homologous chromosomes held together only by the synaptonemal complex and not crossovers during meiosis. In September , the effort was announced as successful. They are implanted during reconstructive surgery to support or restructure damaged ligaments, tendons, and other tissue. They also created implants made of silk and drug compounds which can be implanted under the skin for steady and gradual time release of medications. They found that on particularly straight webs of lines, the worms would connect neighboring lines with silk, weaving directly onto the given shape. Using this knowledge they built a silk pavilion with 6, silkworms over a number of days. Silkworms have been used in antibiotics discovery as they have several advantageous traits compared to other invertebrate models. RH [17] and GPI [18] are among the notable antibiotics discovered using silkworms. Domestication[edit] The domesticated form, compared to the wild form, has increased cocoon size, body size, growth rate, and efficiency of its digestion. It has gained tolerance to human presence and handling, and also to living in crowded conditions. The domesticated moth cannot fly, so it needs human assistance in finding a mate, and it lacks fear of potential predators. These changes have made the domesticated strains entirely dependent upon humans for survival. The silkworm is one of the few organisms wherein the principles of genetics and breeding were applied to harvest maximum output[citation

needed]. It is second only to maize in exploiting the principles of heterosis and cross breeding. The major objectives are improving fecundity the egg-laying capacity of a breed , the health of larvae, quantity of cocoon and silk production, and disease resistance. Healthy larvae lead to a healthy cocoon crop. Health is dependent on factors such as better pupation rate, fewer dead larvae in the mountage, [22] shorter larval duration shorter larval duration lessens the chance of infection and bluish-tinged fifth-instar larvae which are healthier than the reddish-brown ones. Quantity of cocoon and silk produced are directly related to the pupation rate and larval weight. Healthier larvae have greater pupation rates and cocoon weights. Quality of cocoon and silk depends on a number of factors including genetics. Hobby raising and school projects[edit] In the US, teachers may sometimes introduce the insect life cycle to their students by raising silkworms in the classroom as a science project. Students have a chance to observe complete life cycles of insect from egg stage to larvae, pupa, moth. The silkworm has been raised as a hobby in countries such as China, South Africa, Zimbabwe, and Iran. Children often pass on the eggs, creating a non-commercial population. The experience provides children with the opportunity to witness the life cycle of silkworms. The practice of raising silkworms by children as pets has, in non-silk farming South Africa, led to the development of extremely hardy landraces of silkworms, because they are invariably subjected to hardships not encountered by commercially farmed members of the species. Genome[edit] The full genome of the silkworm was published in by the International Silkworm Genome Consortium. High genetic variability has been found in domestic lines of silkworms, though this is less than that among wild silkmoths about 83 percent of wild genetic variation. This suggests a single event of domestication, and that it happened over a short period of time, with a large number of wild worms having been collected for domestication. Research also has yet to identify the area in China where domestication arose. In Assam , they are boiled for extracting silk and the boiled pupae are eaten directly with salt or fried with chilli pepper or herbs as a snack or dish. In China, street vendors sell roasted silkworm pupae. Silkworms have also been proposed for cultivation by astronauts as space food on long-term missions. She was drinking tea under a tree when a silk cocoon fell into her tea. As she picked it out and started to wrap the silk thread around her finger, she slowly felt a warm sensation. When the silk ran out, she saw a small larva. In an instant, she realized this caterpillar larva was the source of the silk. She taught this to the people and it became widespread. Many more legends about the silkworm are told. The Chinese guarded their knowledge of silk, but, according to one story, a Chinese princess given in marriage to a Khotan prince brought to the oasis the secret of silk manufacture, "hiding silkworms in her hair as part of her dowry", probably in the first half of the first century AD. Silkworm diseases[edit] Beauveria bassiana , a fungus, destroys the entire silkworm body. This fungus usually appears when silkworms are raised under cold conditions with high humidity. This disease is not passed on to the eggs from moths, as the infected silkworms cannot survive to the moth stage. This fungus can spread to other insects. Grasserie , also known as nuclear polyhedrosis, milky disease, or hanging disease, is caused by infection with the Bombyx mori nuclear polyhedrosis virus. If grasserie is observed in the chawkie stage, then the chawkie larvae must have been infected while hatching or during chawkie rearing. Infected eggs can be disinfected by cleaning their surfaces prior to hatching. Infections can occur as a result of improper hygiene in the chawkie rearing house. This disease develops faster in early instar rearing. Pebrine is a disease caused by a parasitic microsporidian, Nosema bombycis Nageli. Diseased larvae show slow growth, undersized, pale and flaccid bodies, and poor appetite. Tiny black spots appear on larval integument. Additionally, dead larvae remain rubbery and do not undergo putrefaction after death. This disease can be carried over from worms to moths, then eggs and worms again. This microsporidium comes from the food the silkworms eat. If silkworms get this disease in their worm stage, no visible symptoms occur. Traditional Chinese medicine[edit] In traditional Chinese medicine , silkworm is the source of the "stiff silkworm", which is made from dried fourth- or fifth-instar larvae which have died of "white muscardine disease", the Beauveria bassiana fungal infection mentioned above. It is believed to dispel flatulence , dissolve phlegm , and relieve spasms.

Chapter 6 : The Children's Butterfly Site

NOTE: The life history available so far for each species can be seen by clicking on the scientific name in the above list. Examples of the eggs of eighteen moth species are shown below. Several of these are quite fragile such as the top left egg which is soft and rather like a small blob of jelly.

By gregclarke February 28, No Comments When you have problems with moth infestation, you should learn about the life cycle of a clothes moth. This knowledge can help you get rid of cloth moths from your house easily. This cycle can help you choose the best treatment method for removing these insects from your house. It is important that you choose the right moth removal product that is suitable for your targeted cloth moths. There are some important things that can help you understand the importance of this life cycle of moths for most people. Here are some stages of these cloth moths. Important Life Cycle of a Clothes Moth 1. Moth larvae This is the first stage of most moths, including these cloth moths. You can find some of these moth larvae in your closet easily. You can eliminate these moth larvae by using hot steam. Most larvae are very sensitive to hot temperature. Most of them can be killed immediately. You can also use vacuum cleaner to remove some of these moth larvae. Moth Pupa Not many people know about this stage. You can find some of these pupas in your closet. They usually live for about 50 days before they become adult moths. There are some useful tips that you can use, so you can remove these pupas completely. You can use broom for removing these pupas immediately. Some people also use pesticides for removing these moth pupas from their closets. It is important to choose the right pesticides that are made from safe ingredients. Adult moths This is the most common stage of the clothes moths. Adult moths are very common to cause some problems in your closet. You can get a lot of clothes that are damaged by these adult moths. These moths should be removed from your house immediately. They can cause some health problems in some people when they are not eliminated quickly. You can use moth traps when you want to catch some of these moths. These traps are very useful to reduce the population of clothes moths in your house. These moths should be eliminated before they can breed some eggs in your closet. You can also use some electric traps for killing some clothes moths easily.

Chapter 7 : Life Cycle of Butterflies and Moths

When you have problems with moth infestation, you should learn about the life cycle of a clothes moth. This knowledge can help you get rid of cloth moths from your house easily. This cycle can help you choose the best treatment method for removing these insects from your house.

Description Back to Top Adults: The adult wingspan is 75 to mm Covell Adult luna moths are large green moths with a long tail on each hind wing and discal eyespots on both the fore and hind wings Figures 2 and 3. The luna moth is univoltine one generation from Michigan northward, bivoltine throughout the Ohio Valley, and trivoltine southward Tuskes et al. In Louisiana and Florida, adults may be found during every month of the year Also, reared specimens often differ in coloration from those in nature Ferguson Adult male luna moth, Actias luna Linnaeus. Photograph by Donald W. Adult female luna moth, Actias luna Linnaeus. Photograph by Lyle J. Adults of the spring brood in multivoltine two or more generations populations are typically a deeper green with reddish-purple wing margins while those of later broods are more yellowish with yellowish margins Packard , Tuskes et al. Moths from southern populations tend to be smaller. Luna antennae are quadripectinate comb-like on four sides with those of males being larger than those of females. Males are more yellowish-green while females are more blue-green in color Packard The slightly oval eggs are white, mottled with the brown adhesive Figure 4. Maximum reported dimensions in millimeters are 1. Eggs of the luna moth, Actias luna Linnaeus. The bright green full-grown caterpillars are 55 to 70 mm in length Godfrey et al. There is a yellowish-white sub-spiracular line on abdominal segments one through seven and posterior yellow lines extending across the dorsum of segments one through seven to just above the level of the spiracles. A mid-segmental transverse band of setae-bearing scoli occurs on all thoracic segments and abdominal segments one through eight. The body is sparsely covered with short, white, spatulate setae. The head varies from green to brown. Just prior to pupation, caterpillars turn a reddish color. Early instars Figures differ considerably in appearance from the later instars. Packard provides color drawings and detailed descriptions of each of the five larval instars, but it should be noted that there is some variation in larvae from the same egg batch as well as considerable variation in larvae from different populations. Larvae of all instars reared by the author differ markedly in appearance from those illustrated by Packard. Some fifth instars are considerably more setiferous hairy than others even among siblings Figures 9 and Packard gave the following lengths for the five instars: First instar larva of the luna moth, Actias luna Linnaeus. Second instar larva of the luna moth, Actias luna Linnaeus. Third instar larva of the luna moth, Actias luna Linnaeus. Fourth instar larva of the luna moth, Actias luna Linnaeus. Fifth last instar larva of the luna moth, Actias luna Linnaeus. Fifth last instar larva more sertiferous of the luna moth, Actias luna Linnaeus. The single-layered cocoon is wrapped in leaves Figure The dark brown, posterior end of the obtect wings and appendages are appressed to the body - most abdominal segments are immovable pupa Figure 12 is anchored to a pad of silk at the rear of the cocoon by a cremaster hooked spines Figure 13 which allows the adult to emerge from the pupal exoskeleton. Cocoon of the luna moth, Actias luna Linnaeus. Pupa of the luna moth, Actias luna Linnaeus. Female pupae Figure 14 may be distinguished from males Figure 15 by the presence of two longitudinal notches on the ventral surface of the fourth and fifth totally exposed abdominal segments. These notches are lacking in males. Female pupa of the luna moth, Actias luna Linnaeus. Note the two longitudinal notches on the ventral surface of the fourth and fifth totally exposed abdominal segments. Male pupa of the luna moth, Actias luna Linnaeus. Life Cycle and Biology Back to Top The adult moth escapes the pupal case by splitting it at the anterior end and pushing the top up Figure It then cuts its way from the cocoon Figure 17 by the use of serrated, chitinous spurs on its thorax near the bases of the front wings Hilton , Priddle Cut away of cocoon with split pupal exuvium of the luna moth, Actias luna Linnaeus. Emergence exit hole in cocoon of the luna moth, Actias luna Linnaeus. Adult eclosion emergence from pupa typically occurs in the morning with males usually beginning emergence several days before females. Morning emergence allows time for expansion and drying of the wings prior to the evening flight period. Also, during the first day after emergence, the moth voids the reddish-colored, liquid meconium which is composed of the breakdown waste products of the old larval tissues. The adults are

strongly attracted to light â€" particularly UV wavelengths. There has been some concern that light pollution from man-made sources particularly mercury vapor street lights may deter lunas and other silk moths from mating and have a negative impact on their populations in urban areas Worth and Muller Males are strong fliers and may disperse over relatively long distances. Females release a sex-attractant pheromone and may attract males from a distance. Mating usually takes place during the first couple of hours after midnight. Adults have vestigial mouthparts and do not feed. Therefore, they are short-lived. Females begin laying eggs the following evening after mating and continue for several nights Tuskes et al. At least in captivity and probably also in nature, the eggs may be laid either singly or in small clusters. Caterpillars are solitary Tuskes et al. Caterpillars exposed to short photoperiods produce diapausing pupae while those exposed to long photoperiods produce non-diapausing pupae Wright When caterpillars are full-grown, they may begin to wander. The cocoon is spun among the leaves of the deciduous host plants but is not anchored to a twig as is the case with many polyphemus moth cocoons. Therefore, they fall to the ground in autumn Holland as the leaves fall and are not commonly seen. Development from hatching to pupation takes a month or longer depending on temperature. Luna moth caterpillars are never sufficiently common to cause significant damage to their host trees. Host Plants Back to Top Broadleaf host plants belonging to a large number of genera have been reported as hosts for luna moths Godfrey et al. However, some of the reported host plants may not be suitable for all populations of lunas. It appears that different geographical populations of luna moths are adapted to different host plants Lindroth et al. Northernmost populations most often utilize white birch, Betula papyrifera Marsh, as a host. More southerly populations use a variety of host plants particularly members of the walnut family Juglandaceae walnuts [Juglans] and hickories, [Carya] [Figure 18] ; sumacs Rhus Figure 19 ; sweetgum, Liquidambar styraciflua L. Figure 20 ; and persimmon, Diospyros virginiana L. Figure 21 Tuskes et al. Villard lists hickory as the preferred host, but recommends that rearing be done in sleeves or cages on living plants since most hickories wilt rapidly when cut. This obstacle can be overcome by diligently supplying fresh food. Sweetgum works well for captive rearing. Pignut hickory, Carya glabra Mill. Sweet, a host of the luna moth, Actias luna Linnaeus. Winged sumac, Rhus copallinum L. Sweetgum, Liquidambar styraciflua L. Persimmon, Diospyros virginiana L. Natural Enemies Back to Top Luna caterpillars are hosts for a number of insect parasitoids in the families Tachinidae, Ichneumonidae, and Pteromalidae Tuskes et al. The adults are not even safe at night. Defenses Back to Top Luna caterpillars gain protection from predators by their cryptic green coloration. When threatened they often rear the front part of the body in a "sphinx" pose â€" possibly to make them less caterpillar-like to a predator. If attacked, luna caterpillars as well as those of many other bombycoid moths make a clicking noise with the mandibles â€" sometimes as a prelude to or accompanied by defensive regurgitation of distasteful fluids. When the adults are in flight, the twisted long tails are believed to interfere with echo-location by hunting bats Barber et al. Moth tails divert bat attack: Proceedings of the National Academy of Sciences The Journal of Experimental Biology Special Publication Number Virginia Museum of Natural History. The Moths of America North of Mexico, fasc. Pupal escape mechanism of certain saturniid moths. A Guide to the Moths of North America. First published in by Doubleday, Page and Company. New York pp. Parasitism of native luna moths, Actias luna L. Saturniidae by the introduced Compsilura concinnata Meigen Diptera: Tachinidae in central Virginia, and their hyperparasitism by trigonalid wasps Hymenoptera:

Chapter 8 : Clothes Moths Management Guidelines--UC IPM

Adult sphinx moths are medium to large moths. The tomato hornworm adult has a wingspan of approximately 4 to 5 inches; the whitelined sphinx adult has a wingspan of 2 1/2 to 3 1/2 inches. These moths are sometimes referred to as hummingbird moths due to the way they hover in midair to feed, and flutter from flower to flower, much like a hummingbird.

These small, brown, darkly-marked moths have a voracious appetite for a variety of items found in the home, and therefore may constitute a problem if infestation occurs. Their life cycle and lifespan closely mimic those of other moths. Life Cycle Like other moths, brown house moths have a complete metamorphosis that includes egg, larva, pupa and adult. Adults lay eggs -- up to -- on open, rough surfaces near a food source. Upon hatching, the larvae begin to search out food sources which, unfortunately for you, can be seemingly limitless inside a home. Once the larvae have fed, they burrow into their food source and spin silken tubes in which to pupate; they subsequently emerge from their cocoons as adults and begin the cycle again. The life cycle can last 12 months. Larval Moths Depending on the environment, eggs may take anywhere between eight and days to hatch into small, white larvae. Like many other house pest moth species, the larval form of the brown house moth is the destructive stage. Like most moths and butterflies, the larval stage of these moths is the feeding stage; caterpillars feed voraciously on anything suitable until they have gained enough nutrition to pupate and become adults. The larval stage can last from between 71 and days. The wings are dark buff to bronze-brown and riddled with black, tan and buff markings. Adults breed and subsequently lay eggs; there is typically only one generation per year. Food Sources The availability of food and other environmental factors plays a role in how long each life stage takes to complete. In most cases, however, there is more than enough food to go around for an emerging infestation. Larvae feed on both organic and inorganic materials. Animal materials such as furs, wool, hides, horsehair and lepidopteran cocoons are all on the menu. In the pantry, these small pests will feed on grains, cereals, seeds, fish meal and more. They will also feed on book bindings and clothing, making it nearly impossible to completely wipe out a food source. Crumbs that fall behind wall baseboards and similar food items often lend to a population boom.

Chapter 9 : luna moth - Actias luna (Linnaeus)

Life Cycle of Butterflies and Moths As advanced insects, butterflies and moths have a "complete" life cycle. This means that there are four separate stages, each of which looks completely different and serves a different purpose in the life of the insect.

Gypsy moth females lay between to 1, eggs in sheltered areas such as underneath the bark of trees. The eggs are covered with a dense mass of tan or buff-colored hairs. The egg mass is approximately 1. The eggs are the overwintering stage of the insect. Eggs are attached to trees, houses, or any outdoor objects. The eggs hatch in spring April into caterpillars. Caterpillar Larval Stage Gypsy moth caterpillars are easy to identify, because they possess characteristics not found on other leaf-feeding caterpillars. They have five pairs of blue dots followed by six pairs of red dots lining the back. In addition, they are dark-colored and covered with hairs. Young caterpillars primarily feed during the day whereas the older caterpillars feed at night. When present in large numbers, the older caterpillars feed day and night. Young caterpillars spread to new locations by crawling to the tops of trees, where they spin a silken thread and are caught on wind currents. Older caterpillars are approximately 1. Gypsy moth caterpillars do not produce a web, which distinguishes it from web-making caterpillars such as the Eastern tent caterpillar, Malacosoma americanum and the fall webworm, Hyphantria cunea. The Gypsy moth larval stage lasts approximately seven weeks. The pupae are dark brown, shell-like cases approximately two inches long and covered with hairs. They are primarily located in sheltered areas such as tree bark crevices or leaf litter. Adult Gypsy moths emerge from the pupae in 10 to 14 days. They are present from July into August. Females have white to cream-colored wings, a tan body, and a two-inch wingspan. Female Gypsy moths cannot fly. Males, which are smaller than females, with a 1. Both the adult female and male can be identified by the inverted V-shape that points to a dot on the wings. Gypsy moth has only one generation per year. Gypsy moth populations will go through cycles in which the populations will increase for several years then decline, and then increase again. Area-wide outbreaks can occur for up to ten years, but generally population densities in localized areas remain high for two to three years. Cloyd and Philip L. This site is for use by municipal forestry departments, park districts, the green industry and other concerned agencies to report gypsy moth findings in NortheasternIllinois. The site will be monitored by University of Illinois Extension staff and the Illinois Department of Agriculture to assist in the effort to suppress the spread of gypsy moth.