



↑被第一類蟎覆蓋的巨扁鍬形蟲。92 mm。2007
Dorcus titanus covered in first group mites.

蟎

Mites

飼育兜蟲和鍬形蟲時往往會在成蟲或是幼蟲身上發現0.5-1.0 mm的生物在爬行或是聚集。如果仔細看，這種小生物長有八隻腳。牠們叫做「蟎」，和蜘蛛屬於同一綱，和大家都有聽過的「塵蟎」屬於同一目。但是不用擔心，出現在兜蟲身上的蟎不會造成人類呼吸道的過敏，也從來沒有發生過叮咬人的情形。這些生物對人類

無害，只是看起來很礙眼。另外，有時候也會在腐植物中看見0.5-1.0 mm的白色或是灰色長條形生物，



↑被第一類蟎覆蓋的鍬形蟲成蟲。2003
Stag beetle adult covered in first group mites.

Round creatures between 0.5-1.0 mm are often seen crawling or congregating on beetles. If looked at closely, they have eight legs. They are called mites and are relatives of spiders. They are also in the same order with dust mites. However, mites associated with rhinoceros and stag beetles do not cause respiratory allergies, nor do they bite humans. Slander creatures between 0.5-1.0 mm are frequently seen in the substrate. When touched, they jump. These are called springtails (*Collembola*) and are totally harmless to both beetles and humans.

Mites must be prevented from the start. Once they appear, they are very difficult to get rid of. They come in different sizes and have varying degrees of mobility. Some are



這種生物被觸碰到時會彈跳，牠們是彈尾目的昆蟲，叫做「跳蟲」，對兜鍬完全無害。

蟎這種令飼育者討厭的不速之客一開始就要防範。等到發現牠們存在時才要開始擔心可能已經太慢了。飼育兜蟲、鍬形蟲，或是花金龜時會出現的種類不少，有的很小有的不太小，有的跑得很快有的似乎不太會動。最常出現的顏色有紅、白、黃。但不管長得怎麼樣或是跑得快不快，給人的感覺就是「很不舒服」。

從飼育的觀點上，我把蟎分為二類。第一類是爬行速度快而且看得見觸角的蟎。第二類是爬行速度慢而且看不見或幾乎看不見觸角的蟎。第一類的蟎四處爬行，有時棲身於成蟲或幼蟲身上。但由於這一類的蟎體型都比第二類的大、粘著力比第二類的小，因此用小鑷子或自來水便可以很容易地將牠們從成蟲或幼蟲身上清除。第一類的蟎對成蟲或幼蟲並不會造成傷害。這些蟎只寄

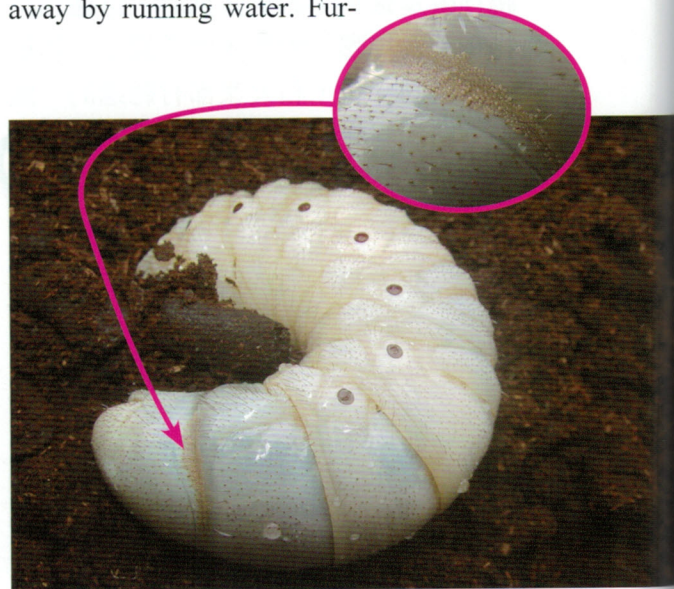
small; some are not so small; some move very slowly; some move rather quickly. Red, white, and yellow are frequently seen colors.

From the rearing perspective, I categorize mites into two groups. Mites in the first group move quickly and have visible antennae. Those in the second group move slowly and have antennae that are barely visible or not visible at all. Mites in the first group wander around, occasionally taking rides on larvae or adults. Mites in the first group are bigger than those in the second group and do not have a strong attaching ability. They can be easily removed from an adult or larva with running tap water or a pair of small forceps. Mites in the first group don't tend to harm adults or larvae.

Mites in the second group really give hobbyists a headache. They cling tightly to larvae and adults, impossible to be washed away by running water. Fur-



↑ 被第二類蟎覆蓋的長戟大兜蟲。68 mm。2007
D. hercules covered in second group mites.



↗ 被第二類蟎覆蓋的三齡長戟大兜蟲幼蟲。2007
L3 *D. hercules* larva covered in second group mites.

居、不寄生。

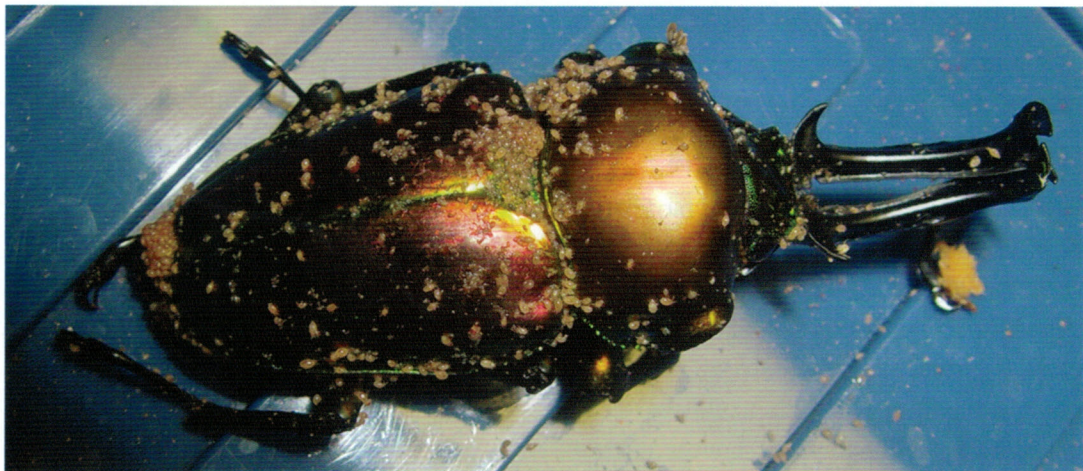
真正讓飼育者頭痛的是第二類的蟎。牠們每一種都可以將成蟲和幼蟲粘得緊緊的，用水怎麼沖都沖不掉。有些種類更是不但體型小還超會繁殖，使得飼育者用牙籤再怎麼挑都挑不完。雖然此類的成員絕大部分也只寄居而已，但由於趕不走又可以成千上萬地繁殖，因此常常讓飼育者很懊惱。我最討厭的蟎也在這一類中。這種白色的蟎，寄生在幼蟲或成蟲身上時大約只有一粒細沙那麼小。但只要一有狗食或是其他營養物，有部分便會離開寄主，在營養物上瘋狂地進食和繁殖。原本只有一粒細沙那麼小的身軀在狂吃營養物後變得比原來大上好幾倍。再加上牠們驚人的繁殖能力，狗食或是其他營養物可在2、3天內被掩蓋得密密麻麻。第二類的蟎中也有對幼蟲有傷害的。我曾經遇過一種外殼圓滑、顏色暗紅、喜歡在幼蟲身上聚成一塊一塊的蟎。這種蟎用牙籤挑開後會發現，幼蟲表皮呈黑色，有如乾掉的傷口一般。

大家最想知道的一定是要怎麼樣才能清除這些令人懊惱的生物。如果是第一類的蟎，幼蟲和成蟲身上的可以用小鑷子夾除或是用自來水沖除；在腐植物中的可以將腐植物裝入垃圾袋內然後冷凍或是用微波爐高溫撲殺（使用微波爐時，只要腐植物夠熱即可，不要過分加熱，否則腐植物會產生怪味道，造成幼蟲拒食）。如果罹患的是第二類的蟎就麻煩多了。有兩種方法可以用來消除第二類的蟎。第一種方法可用於一齡和二齡幼蟲身上。第二種方法可用於一齡、二

thermore, because they are small and prolific, forceps cannot finish removing them. Although most of these mites are also harmless, their ability to resist termination and reproduce into the thousands in just a few days makes them very unwelcome. The mite variety that I dislike the most is also in this group. These mites are white in color and when found on larvae or adults, each is no bigger than the smallest grain of sand. However, as soon as there are dog food pellets or other nutrients around, some leave the hosts and gorge on the food. After feeding for just a few hours they expand to many times their original size. With their ability to expand and reproduce quickly, a piece of dog food can be grotesquely covered by them. The second group of mites also contains varieties that are harmful to larvae, but not adults. One type is dark red and very smooth in texture. If you use a toothpick or a pair of forceps to remove them, you will notice that the areas where they resided have turned black and look like scabs.

Again, mites in the first group can be removed by running water or a pair of forceps. The substrate can be bagged and frozen or microwaved to rid of mites (stop as soon as the substrate gets hot. Extended microwaving will cause the substrate to undergo change and produce an unpleasant odor. Larvae will refuse such substrate). There are two ways to get rid of mites from the second group. The first method can be applied to first and second instar larvae. The second method can be applied to L1, L2, L3 larvae, and adults. However, it is more risky.





被第二類蟎覆蓋的彩虹锹屍體。蟎並沒有殺死這隻锹形蟲，而是腐爛的屍體導致蟎的數量爆增。60 mm。2007
Phalacrognathus muelleri corpse covered in second group mites. The mites didn't kill the stag beetle. The rotting corpse facilitated mite growth.

齡、三齡，以及成蟲身上，但此方法風險較高，能不用則不用。

使用第一種方法時，時機是一切。首先必需知道幼蟲何時會脫皮。幼蟲脫皮之前會先造一個跟蛹室相同的小空間；在很接近脫皮時，幼蟲的表皮會呈現紅色或褐色。幼蟲一旦脫皮就要在最短的時間內把幼蟲很小心地從腐植物中取出。如此一來蟎都還留在舊皮上。若是沒有在脫皮後的半小時內將幼蟲取出，蟎很有可能從舊皮再爬到幼蟲身上。接著把幼蟲養於有用微波爐或是冷凍庫滅過蟎的腐植物。剛脫皮的幼蟲非常脆弱。先在腐植物表面挖一個幼蟲厚度3倍深的洞。幼蟲放入後，輕輕地用腐植物覆蓋，切勿施壓。

第二種方法可以將成蟲和幼蟲身體上的第二類蟎在短時間內殺得一乾二淨。但是此方法一不小心就會造成幼蟲

When applying the first method, timing is everything. The hobbyist needs to know when a larva will molt. Before molting, a larva constructs a cell just like a pupal cell. When a larva is very close to molting, its skin becomes brownish to reddish. Remove the larva from the substrate within thirty minutes of molting. This way, all the mites are left on the old skin. Newly molted larvae are very delicate. First dig a hole on clean substrate. The depth of the hole should be three times the thickness of the larva. After the larva is put in, very gently cover it with substrate. Do not pack with pressure.

As previously mentioned, the second-method is risky. There is the risk of dehydration for both the larvae and adults. If you live in a dry area, this method is easy to execute. If you live in a humid area, like Taiwan, you will need a humidity-controlled space. Simply leave the affected adult or



↗即將脫皮的二齡利奇氏長戟大兜幼蟲。可見舊表皮為紅褐色。新氣孔也已經看得見。1999

L2 *D. h. lichyi* about to molt. Old skin is reddish brown. New spiracles visible.



↗正在脫皮的幼蟲。此時蟎都還在舊表皮上。圖為阿特拉斯大兜蟲二齡幼蟲。1999

Larva molting. Mites are still on the old skin. Pictured is L2 *Chalcosoma atlas*.

和成蟲脫水。在乾燥的國家不需要有特別的準備，但在台灣則需要用到乾燥箱。將成蟲或是幼蟲放在碗中或是盤子中，然後放入乾燥箱中不到10個小時。在無濕氣的空氣中蟎會全部脫水死亡！此方法要完美地執行並不容易。主要難在每一隻蟲體的大小都不一，很難掌握幾個小時的乾燥才能將蟎乾死但又不曾使成蟲或幼蟲脫水。在美國，我一般讓小型種類乾5個小時、讓大型種乾8個小時。（幼蟲在乾燥的過程中會因受驚而排出大量極濕的糞便。將大便立即清除乾淨是很重要的，否則糞便會提高週遭的濕氣，增長殺死蟎所需的時間。）

如果發現狗食上有蟎則立刻丟棄，接著把幼蟲取出，然後腐植物用微波爐或冷凍庫滅蟎。幼蟲身上的蟎最好也進行處理。最怕的就是有用狗食但又不滅蟎。在這種情況下蟎會繁殖到幾乎整個腐植物表面都變成白色的；任何人看了都會起雞皮疙瘩。

larva in a dry environment for under 10 hours. The mites simply dehydrate and die. However, many variables make this method difficult to execute perfectly. A small beetle is going to dehydrate a lot faster than a large beetle. Typically, I leave small species out for 5 hours and 8 hours for larger species. (When treating larvae, it is typical that they pass wet excrement because of nervousness. Remove the excrement promptly because it increases ambient humidity).

Throw away all dog food contaminated with mites. Take out the larva and freeze or microwave the substrate. Terminate the mites before using dog food again. If you do nothing, mites will grow to an extent where the entire surface of the substrate turns white!

Some mites specialize on beetle eggs. They can cause great losses. They usually come with wild females. As a female ovisposits, egg mites jump off the female and be-



↗身體多出許多節的畸形幼蟲。2007
Deformed larva with extra segments.



↗吸飽之後的蛋蟎。可看見卵粒已經扁掉了。2006
Fully gorged egg mite. The egg is deflated.

蟎裡頭還有一類被稱為「蛋蟎」的類群，牠們專門吸食兜鍬的卵，往往給飼育者帶來不小的損失。蛋蟎通常來自於野生蟲。當雌蟲產卵時，牠們就會跳離母蟲，然後用尖銳的口器刺破卵殼，吸食裡頭的汁液。蛋蟎原本很小隻，大約只有一粒細沙那麼大，但是吸飽了之後體型會是原來的數十倍，並且開始繁殖。很快地，腐植物便不能夠再使用，必須先滅蟎。如果採卵時發現卵粒上有蛋蟎，把蛋蟎拔除後會發現，卵粒被叮咬處有個小黑點或是小紅點。如果發現得早，並且把蛋蟎拔除，即使卵粒已經被叮咬過，還是有孵化的機會，不過孵化出畸形幼蟲的機率偏高。我們曾經特別把被叮咬過的卵收集起來孵化，結果發現，有許多幼蟲身上都多出了許多節。

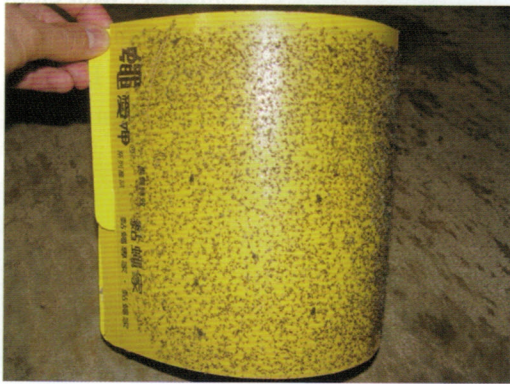
gin sucking on the eggs by piercing through the eggshell with their needle-like mouthpart. Egg mites are only the size of a sand grain in the beginning, but become many times bigger after gorging on an egg. Then they reproduce. Very quickly, the substrate becomes unusable and must be frozen or microwaved. When an egg mite is removed from an egg, a tiny black or red spot can be seen on the egg. If the mite is removed early, even if the egg has already been bitten, there is a good chance that the egg will hatch. However, the egg will have a higher chance of hatching a deformed larva.

防止蟎的方法如下：

1. 碰過野生個體後一定要洗手。
2. 養野生個體的容器一定要遠離養人工飼育個體的容器。
3. 買來或是人家送的幼蟲不要和自己繁殖出來的養在一起，除非100%確定其身上沒有帶蟎。
4. 不確定是否乾淨的腐植物，使用前先用冷凍庫或微波瀟處理。如果時間不是問題，我絕對偏好冷凍除蟲的方式。冷凍並不會把對幼蟲有益的共生菌殺死。

Ways to prevent mites:

1. Wash hands thoroughly after handling wild beetles.
2. Containers keeping wild individuals must be placed far away from those keeping captive-bred individuals.
3. Keep newly acquired larvae far away from those already established.
4. If unsure if substrate is mite free, freeze or microwave it. If not in a hurry, freezing is always the preferred method to sanitize substrate. Freezing does not kill beneficial bacteria.



↗ 蕈蠅可以在短時間內數量暴增。2007
Fungus gnat population can explode quickly.



↗ 飼養容器的透氣孔用不織布封起來可以有效阻絕蕈蠅。2007
Ventilation holes covered thin cloth effectively prevents fungus gnats.

蕈蠅（木蚋）也是另外一群擾人的生物。不管你住在哪裡，飼養兜鍬一定會引來蕈蠅。這是一種幼生期以朽木屑為食的雙翅目昆蟲，而且常見種類至少兩種。牠們對人類完全無害，成蟲也不會取食人類食物，但是若不加以防範，可在幾個星期內大爆發，使得你連呼吸都會吸到牠。由於成蟲的壽命不長，很快地，家裡的角落、窗台、電視機、電風扇、電腦鍵盤等，也都會卡滿牠們的屍體。如果還是不採取措施，每一次的爆發都會以倍數增長，很多器材都會被牠們的屍體給塞滿，且兜鍬幼蟲的食物也會被牠們吃成粉末狀，無法再繼續使用。最可怕的是，蕈蠅可以傳播幼蟲之間的傳染病。

其實要防止蕈蠅很簡單，只要將飼養容器的呼吸孔用不織布蓋住並用膠帶或是橡皮筋固定即可。備用的腐植物也務必做到防蠅。由於市售的腐植物包裝幾乎都有戳洞，蕈蠅很有可能已經產卵於其中，再加上許多腐植物買來時都有蟻和跳蟲等微生物，因此我都會先將其冷凍兩天，之後立刻放入有做到防蠅的置物箱內。如果打從一開始就有做好防蠅工作，往後的飼育環境將會很乾淨舒適。蕈蠅爆發後才要開始處理勢必花費更多的精力。而許多家人反對養蟲的原因之一也是「小蚊子滿天飛」。



Another group of annoying organisms is fungus gnats. Regardless where you live, keeping rhinoceros and stag beetle larvae attracts fungus gnats. Fungus gnats are harmless flying insets from the Order Diptera. There are at least two common species. They are completely harmless to humans. However, if no measures are taken to prevent them, their population will explode in just a few weeks to the extent where you can even inhale them. As adults do not live long, very soon, your floor, window frames, television, fans, and computer keyboard will be loaded with them. Their larvae feed on the exact same food as rhinoceros and stag beetle larvae. If you leave fungus gnats alone, they will powderize the substrate pretty quickly, which renders it inedible to beetle larvae. Perhaps most horrific of all, fungus gnats transfer fungal diseases as they enter and exit different larval containers.

In reality, fungus gnats are easily prevented. All you have to do is cover the ventilation holes of rearing containers with cloth securely. I also make sure I keep all my stock substrate in gnat-proof containers. Before I add any new substrate to the stock substrate, I always make sure to freeze it for a couple of days. Make sure the substrate is thawed in a gnat-proof container as well. It is way easier to prevent fungus gnats from the start than to get rid of them.

透氣孔也可以用水族用過濾棉來阻絕蕈蠅。2007
Ventilation holes can also be stuffed with aquarium filter wool to exclude fungus gnats.