



高品質台產菌絲瓶，內部所使用的不再是菇寮所使用的帶皮相思樹木屑，而是與日本同步的去皮櫟木屑，溼度也適中，是蟲友很好的選擇。

購買台菌時，偶爾會發現菌絲包還沒走菌完畢，也就是說，菌絲還沒完全擴散於木屑。這是ok的。只要買回家放個幾天便會完全走菌。如果不急的話，完全走菌以後再等一個月是最佳的入蟲時機，這個時候的菌包不會太生也不會太熟。如果很趕的話，只走完四分之三的菌瓶，其實也是可以放入一齡或是二齡幼蟲的（三齡幼蟲則不建議，因為大型幼蟲比較會吃又比較會鑽，一下便會鑽到尚無菌絲的地方，造成菌瓶的感染）。我本身其實很喜歡購買還沒完全走菌的菌包。如此一來，我可以很清楚地掌控菌包的年齡。如果販售的菌包已經走菌完畢，就很難從外觀判讀它的實際年齡，有的可能已經放了好幾個月。這個時候蟲店老闆的誠信就很重要了。另外還有一個依據，就是老舊的菌包通常



If in a hurry, a bottle 75% colonized can be used for a first or second instar larva. Third instar larvae are not recommended because they can dig to the bottom very quickly, contaminating the uncolonized portion. I personally like to buy bottles that have not finished colonization. This way you know that the bottles are very fresh. It would be much harder to tell the age of colonized bottles. One indicator is softness. Avoid bottles with very soft or mushy content. These bottles are more susceptible to kinshi breakdown. When this happens, the content becomes mud-like. Obviously, such kinshi cannot be used to rear larvae.

Kinshi bottles are easy to use. First wash your hands and a spoon with soap. Then open the lid. Use the spoon to make a little hole on the surface of the kinshi. Put the larva in. Stuff the hole back up with the larva's original flakes. Put the lid back on. Store the bottle in a dark and ventilated place between 20-25°C. In addition to kinshi bottles, beetle shops also sell kinshi blocks. The contents are the same. But a kinshi block is 3-5 times the size of a kinshi bottle. For large species like *D. curvidens*, a male larva can go directly into a kinshi block. For smaller species, it is best to divide the block up. Otherwise, a larva consumes only a small portion and pupates. Procedures are as follows:

← 還未走菌完畢的菌絲包。2006
Kinshi bags in various stages of colonization.



會很軟，儘量避免這一類的產品，因為突然敗壞的機會較高。而所謂的敗壞，是指菌絲瓶的內容物變得像爛泥巴一樣，當然也就無法飼養幼蟲。

菌絲瓶該怎麼使用呢？很簡單。首先用肥皂洗淨雙手和一根小湯匙。蓋子打開後，用湯匙在菌絲表面挖個放幼蟲的小洞。把幼蟲放入小洞後，用原產卵木的木屑輕輕地把洞口填起來，然後蓋回蓋子。接著把菌絲瓶放在20-25度的通風陰暗處。除了菌絲瓶以外，市面上也有販賣菌磚。菌磚和菌絲瓶的內容物是一模一樣的，只是份量不同。菌磚通常是菌絲瓶的3-5倍大。如何使用菌磚呢？中型到大型種類（比如說*curvidens*大锹形蟲）的雄性幼蟲可以直接投入菌磚中。如果是小型種類的幼蟲，則將菌磚的內容物分裝到其他大小適中的容器中，否則小型幼蟲根本還沒把菌磚吃完就化蛹了，造成浪費。以下為分裝的步驟：

1. 取得含有蓋子的玻璃或塑膠瓶、大湯匙、擠壓棒。
2. 容器和工具洗淨後用酒精消毒。
3. 打開菌磚。
4. 用湯匙將適量的菌絲移植到飼養容器內。
5. 用擠壓棒把菌絲壓緊（壓緊菌絲的用意是要模擬硬朽木的環境）。
6. 反覆動作4和5直到飼養容器填到八分滿。蓋回戳有呼吸孔的容器蓋子。
7. 新的菌絲瓶放10天後再養幼蟲。（剛填好時，菌絲是呈破裂狀的。但幾天



已經敗壞、化為泥狀的菌絲包。2006
Kinshi breakdown.

1. Obtain glass or plastic jars of appropriate size with a lid, a large spoon, a compressor.
2. Wash everything with soap and water and disinfect with alcohol.
3. Open the kinshi block.
4. Use the spoon to transfer some kinshi to the jar.
5. Compress the kinshi in the jar with the compressor.
6. Repeat steps 4 and 5 until the jar is 80% full with kinshi.
7. Let the bottle sit for ten days before usage. (When the new bottle is first made, all the fungal mycelia are broken. However, a few days later, all the kinshi grow back.)

When rearing with kinshi bottle, the one absolute most important point is temperature control. Kinshi bottles should be stored below 26°C, though the ideal range



↗在菌絲表面挖個小洞。2006
Dig a small hole on the surface of kinshi.



↗放入幼蟲。2006
Put in the larva.

後菌絲便會重新長齊，再次呈現一片雪白的狀態)。

不管是用台菌或是日菌，我覺得最大的兩個重點就是溫控以及避免不必要的干擾。初學者最常犯的錯誤就是心急，一天要將菌瓶拿起來觀察好幾次，這些動作是幼蟲長不大的最大兇手。幼蟲對於震動相當敏感。在野外，這表示略食者接近了，幼蟲嚇都嚇死了，更遑論進食。另外一點就是溫控。菌絲瓶最好保持在26度以下。若環境許可的話，

is 20-22°C. Temperature as low as 0°C does not harm kinshi. However, temperatures below 15°C hinder larval growth. Temperatures above 30°C quickly kill kinshi, causing the content to become mud-like. If you are unable to provide a rearing environment below 26°C, avoid the “kinshi bottle method.”



↗大鍬形蟲專用菌磚。1999年攝於日本仙台
Kinshi blocks made specifically for *D. curvidens*.



↗擠壓棒使用情形。
Substrate compressor in action.



←菌磚可以分裝成菌杯。2002
Kinshi block can be transferred to smaller containers.

20-22度是最佳的環境。低於20度，甚至是零度，對菌絲並不會有影響，但幼蟲的生長會產生遲緩的現象。若溫度高於30度，菌絲便會開始死亡，整個菌絲瓶呈現爛泥狀態，當然了，幼蟲也會皮膚潰爛死去。我的忠實建議是，若您的飼養環境在夏天時會超過30度，就完全不要考慮菌絲瓶飼養法。

如果可以溫控又不去干擾幼蟲，想要不養出大型個體都難。對於初學者而言，最常問的問題可能就是「我已經好幾天沒看到幼蟲了，會不會是死掉了？」於是，趕緊把菌絲瓶挖遍，看到幼蟲才放心。但是這樣沒多久就挖一次，對幼蟲的心理與生理都會造成極大的負擔。其實初學者最重要的是定下心來，不要去理會幼蟲才是飼育的最高境界。其實好幾個星期看不見幼蟲是正常

It's also important to avoid unnecessary disturbance. Larvae are very sensitive to vibration. If the bottles are frequently moved, the larvae won't feed as well and consequently won't grow as well.

Patience is very important in beetle culturing. One of the most frequently asked questions by the beginner hobbyist is: "I haven't seen my larva for days. Could it be dead?" The beginner quickly digs through the substrate to make sure that the larva is still alive. Excessive disturbance is very stressful to the larvae. It is normal to not see the larva for days or even weeks. Generally, after I put a second instar larva into a 1,400 cc kinshi bottle, it does not show up by the



↗幼蟲吃過的部分是褐色的。2006
Brown represents area larva consumed.



↗發育良好的幼蟲。2006
Healthy larva.



↗三齡幼蟲頭幅遠大於二齡幼蟲。2006
L3 head capsules are much bigger than L2's.

的。一般而言，我的二齡幼蟲入菌絲包2個月之後，才首次出現在菌絲包邊緣是很正常的。這個時候，你會發現原本小小一隻的幼蟲現在已經擁有巨大的三齡頭殼，會有相當大的成就感。由於菌絲本身也是生物，因此牠也受到了傳宗接代的本能左右。一旦成熟之後便會開始發菇，傳播孢子。菇（專有名詞為「子實體」）在形成的過程中會從木屑吸取大量的營養和水分。這對幼蟲當然不是好的現象。因此菌絲瓶發菇時應立即將子實體摘除。

由於我用的菌絲大多是圓柱型的1400 cc標準菌包（又名太空包），雄性幼蟲大約3-4個月換一次菌包，雌性幼蟲通常一條吃到羽化都還有剩。雄性幼蟲通常吃2-3條就可以羽化。直接使用菌絲包有兩大優點。一是幼蟲可以自己決定牠要多少的氧氣。當幼蟲覺得含氧量不足時，會自己用大顎在塑膠膜上咬幾個小洞，但又不會跑出來，完全省去人為



↗發菇中的菌絲包。2008
Kinshi bag fruiting mushrooms.

side until two months later. At this time, it has become a third instar larva with a big head. Another thing to look out for is kinshi bottles fruit mushrooms. As mushrooms develop, water and nutrients are drawn out of the bottle. It is necessary to remove mushrooms as soon as they start to form.

I usually use 1,400 cc cylindrical kinshi bags to rear *D. curvidens* larvae. I perform a kinshi change every three to four months. Females usually become adults before finishing a bag. Using kinshi bags has two advantages. One is that the larva can decide how much oxygen it needs. When the larva feels that it's short on oxygen, it will puncture a few holes on the bag. But it won't escape. The second advantage is that kinshi bags allow easy kinshi change. When using kinshi with a hard bottle, the only way to retrieve the larva is to dig it out. Sometimes the larva is hurt during the digging process. With a cylindrical kinshi bag, all you have to do is locate where the larva is and lightly



戳太多洞或太少洞的問題。二是換食物時，非常地簡便、省時。使用菌絲瓶時必須小心翼翼地將幼蟲挖出來，如果使用的是窄口瓶，而幼蟲又在最底部，那就真的挖得很辛苦。挖傷幼蟲也是時有耳聞的事。菌絲包就不一樣了。只要先確認幼蟲的所在位置，然後用刀片輕輕地在菌絲包上劃一圈，就可以輕鬆地將菌絲條折成兩半，取出幼蟲。甚至有時候如果折開菌包後，發現內部狀況還良好，食物還很充足，不想立刻換包，還可以用寬型透明膠帶把兩半菌包對準後黏回去。

直接使用太空包飼養幼蟲時，要特別注意的一點為切勿將菌絲包靠在一起，否則幼蟲會咬破菌包彼此入侵、互相殘殺。同時也不要將菌絲包放在木製的桌子或是櫃子上，因為幼蟲有時會將傢俱啃壞。

在所有兜蟲和鍬形蟲的飼育法中，

make a circle with a razor. Then you can easily break the tube in half and retrieve that larva. If there is still a lot of food left and the content is still fresh, you can even tape the tube back.

When rearing larvae with kinshi bags, make sure the bags do not touch, or the larvae will be able to invade each other's bag and possibly kill each other. Do not put kinshi bags on wooden furniture either, or the larvae may chew on it.

Of all the methods in this book, the "kinshi method" is the easiest. All you have to do is buy the kinshi, put the larva in, and leave it alone. Kinshi does not require any watering as it is not water-absorbent once it is made. Because kinshi is nutritious and sterilized, it also allows the fastest larval growth. Female larvae become adults in 4-6 months. Males in 6-10 months. However, pupal cells in kinshi require special atten-



↑ 輕輕用刀片劃破塑膠袋。
Gently slice open the plastic.



↗ 折開菌絲。
Break open the kinshi.



↗ 用膠帶貼回。
Tape back.



菌絲飼養法可以說是最輕鬆的。它不需要任何的前置作業，只要買菌、入蟲、不要干擾，就萬事ok，也不用任何的灑水（菌絲瓶灑水也沒用，水珠只會聚集在菌絲表面，不會滲入）。再加上菌絲瓶營養多，雜菌少，它也是所有飼育法中能夠讓幼蟲最快羽化的。雌性幼蟲期4-6個月，雄性6-10個月。但是用菌飼養時，在蛹期需要格外地注意。菌偶爾會在蛹室內發菇。這種情形發生時就務必要將前蛹或是蛹取出置入人工蛹室內，否則一定會發生化蛹或是羽化失敗的情形。會導致發菇的因素之一為溫度的動盪，也因此使用菌絲飼養時，儘量保持環境的恆溫。每天視檢蛹室是否發菇勢必造成某個程度上的不便，也因此許多飼育家乾脆都把前蛹或是蛹移入人工蛹室，以免稍不留神便發生遺憾。

使用「木材飼養法」、「發酵木屑飼養法」、或是「菌絲瓶飼養法」都會遇到的一個問題是到底應該準備多少段木或是菌絲瓶，因為實在無法預測雌蟲到底生了幾隻幼蟲。以菌絲瓶而言，準備得太少不夠用，準備得太多又浪費。這個問題有兩個應對方式。一個是一次只剝出一隻幼蟲。當準備的段木或是菌絲瓶不夠時，就先暫停取出幼蟲，並把產卵木埋回木屑中。另外一個方式則是先購買數十個迷你型布丁杯。幼蟲取出後用原產卵木磨成的屑先暫時養於布丁杯內，之後再準備確切數量的段木或菌絲瓶。

包括大锹形蟲在內，所有的锹形蟲

tion. It is possible that mushrooms fruit in the pupal cell. Should this happen, the prepupa or pupa must be removed. Or it will become deformed. One of the reasons that contribute to mushroom formation is temperature fluctuation.

When using the “chunk wood method,” “flour fermentation method,” or “kinshi bottle method,” one problem is bound to occur. And that is just how many chunks of wood or kinshi bottles to prepare prior to retrieving the larvae. If too few kinshi bottles are prepared, not every larva can get one. On the other hand, if too many are prepared, it would be a waste of money. There are two solutions. One is to retrieve only one larva at a time. Bury the original wood back if you run out of bottles. The other solution is to buy a few dozen small containers. After the larvae are retrieved, temporarily keep them in these containers with flakes ground from the original decayed wood. Then prepare the necessary kinshi bottles or chunks of wood.

Stag beetles too will continue to stay in their pupal cells for an extended period after becoming an adult. Some *curvidens* stay for less than two months while others stay for over three months. As long as a new adult remains in its pupal cell, no feeding is necessary. If you dig it out to observe, remember to bury it back. Start feeding when it crawls out of the wood flakes and wanders on the surface. It's best not to mate an individual until it's been active for a full year. Mating of premature adults may result in early death.



羽化後，都會繼續在蛹室內蟄伏一段不等的時間。以*D. curvidens*而言，有的蟄伏不到2個月、有些卻不止3個月。但不論蟄伏期有多長，只要新成蟲仍然靜靜地待在蛹室中則都不用餵食。如果實在是等不及把玩，可以小心地將新成蟲從蛹室中取出，之後再將其埋於10 cm深的微濕朽木屑。當某天新成蟲爬至地面開始活動時再餵食即可。開始活動後的大鍬形蟲最好是飼養1年後再進行交配繁殖。讓尚未完全成熟的個體進行交配，有可能導致個體短時間內死亡。

大鍬形蟲很迷人的一點便是成蟲的壽命是鍬形蟲中最長的。在20-26°C的持續飼養下，*curvidens*大鍬形蟲的成蟲大部分都可以活超過兩年。如果冬天有讓牠們冬眠則可以活得更久，有時超過3年。讓大鍬形蟲成蟲冬眠的方法如下：在30 cm長 × 20 cm寬 × 20 cm高的飼養箱中裝大約10 cm厚的微濕、任何腐度的木屑。當環境溫度夠低時，成蟲便會鑽到木屑底層然後停止活動，直到溫度再次升高。當然了，冬眠時的大鍬形蟲不需餵食。不過由於台灣為亞熱帶，冬天溫度時常高於18°C，因此在冬天若有看見爬出表面活動的個體仍需餵食。

如果把溫度控在22°C以上，*curvidens*大鍬形蟲，以及所有開始活動後可越冬的鍬形蟲，都會終年繁殖，不受到季節的限制。也就是說，任何月份都會有剛孵化的幼蟲或是剛羽化的新成蟲。*Curvidens*大鍬形蟲一生可產大



↗可先將幼蟲安置在布丁盒內。2006

Larvae can be temporarily kept in small containers.

One of the reasons why *D. curvidens* is so popular is that its adults can live for a very long time. Most adults kept between 20 and 26°C can live over two years. If hibernation is allowed, some individuals can even live over three years. To hibernate an adult, fill a container that's approximately 30 cm by 20 cm by 20 cm with 10 cm of moist wood flakes. When the temperature is cold enough, the adult will burrow into the flakes and become inactive. When you no longer see the adult, discontinue feeding. If the area you live in does not get below 18°C during winter, an adult may not hibernate. In that case, you will have to feed it year round.

If the temperature is kept above 22°C, stag beetle females will reproduce year round. *D. curvidens* oviposits up to 60 eggs. According to experience, if a female is allowed to rest for two months between each egg-laying session of two months, then she will be able to live for two years. On the



約60粒卵。根據過去十多年來的經驗，如果雌蟲每次放入產卵環境2個月後取出，並養在一個沒有產卵木的環境，提供充分的食物讓其「坐月子」2個月，之後再放入產卵環境，以這種交替式的產卵方式，讓母蟲得以休息，雌蟲可以存活2年。反之，如果將母蟲從一個產卵環境取出後，立刻又放入另外一個產卵環境，完全不讓其休息，母蟲大約在連續產完第4個產卵環境時，精疲力竭地死去。連續不停產卵的母蟲壽命大約只有6個月。但不管是採用哪種方式採卵，最終的產卵數卻是一樣的，差別只在於你要把60隻幼蟲分成2年的時間收成，或是在短短半年內收成60隻。雌蟲2個月平均產15粒卵。

other hand, if a female is taken out of one breeding container and immediately placed into another, she will most likely die in the fourth breeding container. Females not allowed resting period die within 6 months. When letting a female recuperate, supply her with high protein foods such as banana. Make sure the container does not contain decayed wood or she will begin chewing again. However, whether a female is allowed to rest does not affect her final egg count. The only difference is retrieving 60 larvae over a period of two years or six months. For each egg-laying session of two months, a female oviposits about 15 eggs.



北印度DA。可見齒突遠離基部。76 mm。2006
D. antaeus from northeast India. Denticles are far away from the base.



泰國DA。79 mm。活體戴為愚 (Gekko) 提供。2008
D. antaeus from Thailand. Live specimen provided by Dai Wei-yu.

安達佑實大鍬形蟲

Dorcus antaeus

俗稱DA或是安達佑實（音譯）的 *Dorcus antaeus* 大鍬形蟲不管在日本或是台灣都是超人氣的品種，主因不外乎是牠巨大又厚實的外表。此種雖然稱為大鍬形蟲，但是牠的齒突並沒有 *D. curvidens* 一般立體，也不會出現中國大鍬 (*hopei*) 常表現的所謂的「疊齒」現象。除此之外，DA的雌蟲翅鞘並沒有 *D. curvidens* 雌蟲的明顯縱向刻點，長相反而和扁鍬及長角大鍬極為相似，也因此日本有許多飼育家認為長角大鍬是 DA 最近的親戚；大型的DA雄蟲和長角

Dorcus antaeus is extremely popular in both Japan and Taiwan due to its massive build. Males are capable of exceeding 9 cm. However, its mandibles are not as three dimensional as those of *D. curvidens*. Although males of both species look somewhat similar, *D. antaeus* females lack vertical stripes on the elytra. *D. antaeus* has an extensive distribution. It is categorized into four systems: the Himalayan System, the East Inida/West Myanmar System, the East Myanmar/Indo-China Peninsula System, and the Malay Peninsula System. The Hi-



越南DA，大顎最彎也最短。73 mm。2003
D. antaeus from Vietnam has shortest and curvi-
est mandibles.



尼泊爾DA。76 mm。1999。活體鈴木貴夫提供
D. antaeus from Nepal. Live specimen provided
by Takao Suzuki

大锹的交叉比對更是突顯了這個論點。DA的分佈非常廣泛，總共有四大系統：「喜馬拉雅系統」、「東印度、西緬甸系統」、「東緬甸、中南半島系統」，以及「馬來半島系統」。「喜馬拉雅系統」的產地包括印度東北部、尼泊爾、不丹、孟加拉。「東印度、西緬甸系統」的產地包括印度東部和緬甸西部。「東緬甸、中南半島系統」的產地包括緬甸東部、泰國、寮國、越南、中國。「馬來半島系統」的產地則是泰國南部和馬來西亞。在四大系統當中，最受歡迎的就是「喜馬拉雅系統」，因為這一區域的個體大顎最長、齒突距離大顎基部最遠。不過所謂的「大顎最長、齒突距離大顎基部最遠」的特徵幾乎只有在

malayan System lives in northeastern India, Nepal, Bhutan, and Bangladesh. The East India/West Myanmar System lives in those two countries. The East Myanmar/Indo-China Peninsula system lives in East Myanmar, Thailand, Laos, Vietnam, and China. The Malay Peninsula System lives in southern Thailand and Malaysia. Of the four systems, the Himalayan System is the most popular, because males have the longest mandibles and the denticles are placed far away from the base. However, this trait only applies to major males over 75 mm. Small Himalayan males only develop short and curvy mandibles.