



↗產卵木直徑至少要有7 cm。
Diameter of decayed wood should be at least 7 cm.



↗產卵木長度至少要有10 cm。
Length of decayed wood should be at least 10 cm.

適合飼育*D. curvidens*以及其他鍬形蟲的容器尺寸如下：

1. 如果單養1隻雌蟲，尺寸應至少有雌蟲體長的6倍長、4倍寬，以及4倍高。
2. 如果是1對成蟲應至少有2隻加起的體長的4倍長、3倍寬，以及2倍高。

接下來在容器底部壓緊5 cm深的朽木屑。木屑的溼度和飼育兜蟲的相同，也就是雙指擠壓時會看到水跡但不

Decayed wood for *curvidens* has to be at least 7 cm in diameter, though preferably over 12 cm. The length has to be at least 10 cm, preferably over 20 cm. Completely dry decayed wood should be soaked for 12 hours and air dried for 24 hours before use. As dry decayed wood has high buoyancy, it needs to be soaked in a container with lid. When air drying, place a towel or thick layer of newspaper beneath the wood to absorb excessive moisture.



↑乾燥產卵木浮力強。
Dry decayed wood has high buoyancy.



↗加蓋後完全泡水。
Complete submergence with lid.



會滴下來。接著在木屑上方橫放1-3根產卵木。產卵木有無靠在一起無所謂。最後用木屑將產卵木覆蓋至三分之二處，並在表面放置一些防止翻倒的攀抓物。一切就緒後放入一隻已交配過的雌蟲或是一對種蟲。最後把飼育箱擺置於22-28°C的陰暗處。每3、4天更換一次食物。除了更換食物以外，儘量不要觸碰飼育箱，因為產卵中的雌蟲對震動很敏感，更是千萬不要翻動產卵木，否則雌蟲一定會暫時停止產卵。

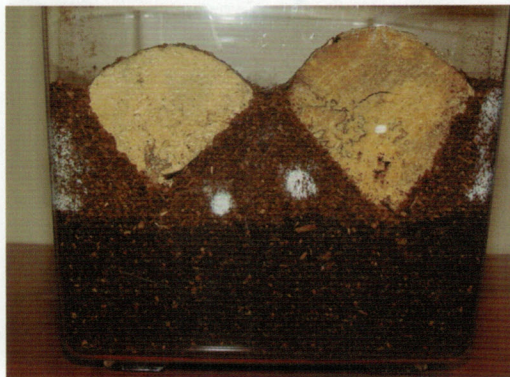
雌蟲鑽入朽木屑後開始啃咬產卵木。如果小心地把耳朵靠過去，還會聽見雌蟲咬朽木的卡卡聲。*Curvidens*大锹形蟲的典型產卵方式為先用大顎在產卵木表面咬出一個深5-10 mm的小洞、在裡頭產1粒卵，然後再用大顎把咬下的朽木屑填回洞裡。雌蟲有時也會整隻鑽入產卵木中產卵。

孵化後有四種方式可以飼養幼蟲。要用那一種方法飼養要看對幼蟲有什麼期望。如果對於幼蟲成蟲時的體型完全

Container dimensions for breeding *curvidens* and all other stag beetles:

1. If keeping one female, the dimensions should have a length that is at least 6 times, a width and height at least 4 times the length of the female.
2. If keeping one pair, the dimensions should have a length that is at least 4 times, a width that is at least 3 times, and a height that is at least 2 times the combined length of the two beetles.

Compress 5 cm of decayed wood flakes at the bottom of the container. The humidity of the flakes should be the same as that used for rhinoceros beetles, which is trace of water can be seen but does not drip when squeezed. Then place one to three pieces of hard decayed wood on top of the compressed flakes. Finally, add more flakes until the decayed wood are 2/3rd covered. When everything is ready, put a mated female or a pair of *curvidens* into the breeding container. Store the container in a dark and ventilated place



繁殖箱剖面圖。
Cross section of breeding tank.



飼育箱一景。容器中為印度產彎角大锹形蟲。75 mm。2005
View of breeding tank. Pictured is *D. c. curvidens* from India.



♣ 雌蟲已經鑽入朽木中產卵。朽木上的規則圓孔為菇農植菌時鑽的洞。2006
Female has burrowed into the wood to oviposit. Symmetric holes are inoculation holes drilled by mushroom farmer.



♣ 朽木中的卵粒。2006
Egg in decayed wood.

不在意，可以用「原木飼養法」。如果想要幼蟲長成大型個體應該用「木材飼養法」或是「發酵木屑飼養法」。若是希望幼蟲長大後成為超大個體最適合的方法為「菌絲瓶飼養法」。我從四種方法中最簡單的「原木飼養法」開始介紹。

「原木飼養法」就是讓幼蟲自然地

between 22 and 28 degrees Celsius. Change food every three to four days.

Oviposition begins after the female burrows into the substrate. If you put your ear close to the container, you can hear the female chewing on the wood. The female chews out a small hole that is about 5-10 mm deep and lays one egg inside. Then she uses her mandibles to pick up the flakes that she has chewed off and stuffs the hole back.



♣ 硬朽木上的產卵痕跡。1997
Oviposition hole on hard decayed wood.



在產卵木中生長，完全不干擾牠們。做法很簡單。如果雌蟲之前體內有足夠的動物性蛋白質而用的產卵木也沒錯，雌蟲入產卵箱兩個月後應該都已經產了不少卵，此時將親蟲取出，另外養於別的容器。接著在產卵箱內加入舊產卵木3倍的新產卵木，並讓所有的新舊木頭都靠在一起，最後用微濕朽木屑將產卵木全部埋沒。如果原先的飼育容器無法容納新增的產卵木則換一個更大的容器。接下來每個星期稍微在朽木屑表面噴霧保持溼度即可。第一批新成蟲會在隔年夏初從產卵木中爬出，而有些幼蟲會拖到後年才羽化。以上便是「原木飼養法」，簡單輕鬆。但缺點是此方式無法觀察幼蟲的成長情形以及養出來的成蟲一般都不大，雄蟲在30-50 mm之間。剛剛提到，除了原有的產卵木以外還必需加入一些新的產卵木。這是因為雌蟲產卵時一般都會產比朽木可容納的還多一些。這麼做可能是因為在野外天敵眾多，雌蟲為了確保朽木的所有空間都被幼蟲利用到，才多產一些卵。不過由於在人為環境下沒有天敵，那些多產出來的卵到最後將變成沒有食物以及空間的可憐幼蟲。當空間以及食物都不足時，幼蟲便會鑽離原本的棲身朽木尋找新的容身之地。這也正是為什麼必需在飼育箱內多加一些新的朽木，好提供多產出來的幼蟲生存空間。

接下來要介紹的飼養方式都必須先將幼蟲從產卵木中取出。取出幼蟲的時機為雌蟲入產卵箱2個月後，此時幼蟲大約是一齡末，二齡初，不會太脆弱，

Females sometimes burrow into the wood to oviposit.

There are four ways to rear larvae. Which method to use depends on what expectations you have for the larvae. If you don't care about how big they become, you can use the "original wood method." If you want the larvae to become major adults, you should use either the "chunk wood method" or "flour fermentation method." If you want the larvae to become extra major adults, the most suitable method is the "kinshi bottle method."

The "original wood method" leaves the larvae to develop in the wood. This method is the easiest to execute. Remove the female two months after she was placed in the tank. Then, put more hard decayed wood into the tank. The amount should be three times the original. Switch to a bigger container if the original cannot fit all the new wood. Finally, cover all the wood with decayed wood flakes. Mist weekly to maintain humidity. New adults will emerge next summer. Some larvae will take two years to become adults. The disadvantage of this method is larval development cannot be observed and most larvae become minor adults, with males between 30 and 50 mm. It is necessary to add new decayed wood to the tank because females usually oviposit more eggs than the wood can feed. The reason may be that there are many predators in the wild, and by laying more eggs she can ensure that no part of the decayed wood is wasted. However, in captivity, there are no predators. The result



↑ 雌蟲產下的幼蟲量往往超過產卵木所能負荷。2006
Females often produce more offspring than the decayed wood can sustain.

也不會老到已經錯過了成長的黃金時期。我的建議是，雌蟲入產卵箱1個月後便可以將雌蟲取出。(當然了，如果母蟲躲在產卵木中不能硬把她挖出來，必須等到某天她自己爬出來吃果凍或其他食物時再將她取出。)再經過1個月以後再取出幼蟲。這種做法可以確保收成時，產卵木內不會有卵粒。而不要有卵粒是因為一來锹卵比兜卵小很多，相當不容易發現，二來锹卵很脆弱，一旦取出之後孵化率通常遠遠比兜卵低。收成

is too many larvae and too little food. When this happens, some larvae will leave the original wood in search of new ones. This is precisely why it is necessary to add more hard decayed wood to the tank.

The remaining methods require larvae to be removed from the original wood. The time to do so is two months after the female was placed in the tank. At this time, most larvae are either late first instar or early sec-



幼蟲的時機也不宜等太久，否則收出的幼蟲都已三齡，已經錯過了生長的黃金時期，而有些幼蟲也因為空間不足而開始互相殘殺。要將幼蟲從產卵木中取出並不困難。由於幼蟲已把產卵木內部蛀空許多，因此應該不難用雙手把產卵木從末端剝開。只要有耐性地一層一層剝到底，便可以找出所有幼蟲。如果朽木硬度高，不好用手剝開，可用螺絲起子插入朽木末端慢慢剝，但要特別小心不要挖傷幼蟲。

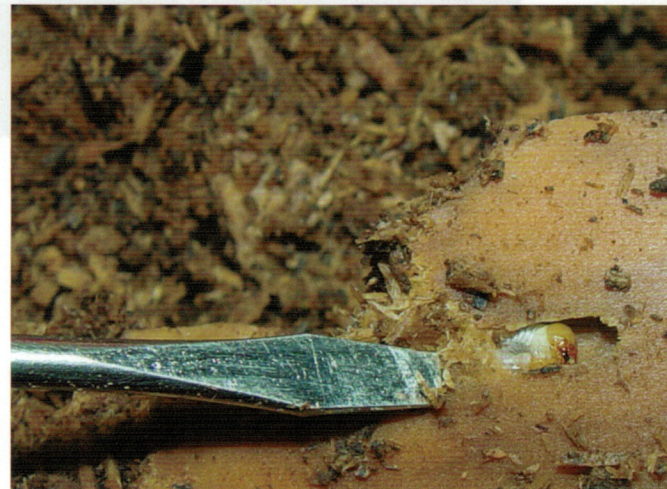
雌蟲入產卵箱2個月後，務必將雌蟲取出，否則雌蟲會開始捕食幼蟲。或許有蟲友會問：「雌蟲為什麼要吃自己的小孩呢？」其實雌蟲並不知道那是自己的骨肉。在野外，雌蟲在一段朽木產完卵以後便會飛走，之後再也不會遇到自己的小孩。並且雌蟲有個天性，就是如果在即將產卵的朽木內遇見其他昆蟲的

ond instar. My recommendation is remove the female one month after she was placed in the tank. (Of course, don't dig her out if she is hiding in the decayed wood. Wait until she comes out to feed someday.) Wait one more month before retrieving larvae. This method makes sure that there will be no eggs during the retrieval process. Stag beetle eggs are much smaller and more delicate than rhinoceros beetle eggs. Don't wait too long before retrieving larvae either. Third instar larvae have passed the prime growth period and may kill each other due to lack of space. It is not difficult to retrieve larvae. As larvae have already hollowed out the interior, you should have no problem taking the wood apart. If necessary, insert the head of a flat-headed screwdriver and pry. Be extra careful not to crush a larva.

It is important to remove the female no



剥開產卵木後發現幼蟲。2003
Larvae inside decayed wood.



螺絲起子可以撬開硬朽木。2006
Screwdriver can help open hard decayed wood.



幼蟲便會把牠吃掉。一來可以讓自己進補，二來可以讓自己的孩子不要有競爭者。由於鍬形蟲並沒有長期記憶，因此在人為環境中，母蟲並不知道朽木內的是自己的小孩。

接下來介紹「木材飼養法」。這種飼養法和「原木飼養法」所用的食材是一樣的，最主要的差別是先將幼蟲從產卵木中取出，然後個別植入一段硬朽木內。起先每一段朽木不必太大，直徑10 cm，長度10 cm (體積約800 cc) 就夠了。植入幼蟲前，先在朽木表面挖個小

later than two months after she was placed in the tank. Otherwise, she will begin feeding on the larvae. Some hobbyists ask: "Why would a female kill her own offspring?" In the wild, after a female oviposits, she flies away. Chances are she will never see her offspring again. Females also have another instinct: they kill larvae that they come across while ovipositing. This is to eliminate competition for her offspring. As beetles don't have long-term memories, females don't know the larvae are their own.



正在捕食自己幼蟲的中國大鍬形蟲雌蟲。可見圖中的二齡幼蟲已經被吸乾。2006
D. c. hopei female feeding on L2 larva. Notice the larva is already sucked dry.

洞，幼蟲放入後用原產卵木的木屑輕輕地把洞口填起來。(使用原產卵木的木屑是提供幼蟲一個緩衝的區域，讓牠有時間慢慢適應新的食材。) 每一段朽木單獨埋入裝有微濕木屑的容器中，直埋橫埋都無所謂。接著注意保濕。4個月後便可將幼蟲取出，進行第一次的朽木更新。此時比較小型的幼蟲 (通常是雌蟲) 植入直徑約10 cm，長度約12 cm (體積約1,000 cc) 的硬朽木。較大型的幼蟲植

For the "chunk wood method," larvae are retrieved from the original wood and individually implanted into a chunk of hard decayed wood. Each larva's first chunk does not have to be too big. A diameter of 10 cm and a length of 10 cm (about 800 cc) will do. First, dig out a small hole on the wood. Second, put the larva in and stuff the hole back up with the larva's original flakes. (Old flakes give the larva a buffer zone so that it can get used to the new food.) Third, bury



入直徑約12 cm，長度約20 cm (體積約2,200 cc) 的硬朽木。之後每4個月換一次木頭，直到幼蟲化蛹為止。「木材飼養法」的優點是，飼育者可以清楚記錄雌蟲到底產下了幾隻幼蟲，而幼蟲也不會發生互相殘殺的現象。但缺點還是無法觀察幼蟲的成長情形。「木材飼養法」養出70 mm以上的雄蟲的機率很高。

接下來介紹可輕易養出大型個體的「發酵木屑飼養法」。此方法所用的食材與飼養美西白兜蟲的相同，一樣是打



↗各種大小的養蠶容器。

Containers for stag beetle larvae.

成屑的朽木和麵粉發酵後所產生的高腐腐植物。說起來很有趣，*curvidens*雌蟲只肯產卵於內部還是淡色的硬朽木。而在野外也都是只有在這些朽木中才能見到*curvidens*大鍬形蟲的幼蟲。但是其幼蟲在人工環境中卻可以用發酵過、顏色幾乎為深褐的腐植物，不但養活，還養成大型個體。「發酵木屑飼養法」將幼蟲養在塑膠或是玻璃製的透明容器中，飼育者可以清楚地觀察幼蟲的發育情形。這一類的容器可以到昆蟲專賣店購買或是使用洗淨後的大型醬菜罐。如果蓋子是金屬做的，可用鐵釘和榔頭打出

each chunk in an individual container with moist decayed wood flakes. Then maintain humidity for the next four months. When four months is up, retrieve the larva for the first wood change. At this time smaller larvae (usually females) should be implanted into a piece of hard decayed wood 10 cm in diameter and 12 cm long (about 1,000 cc). Larger larvae should be implanted into a piece 12 cm in diameter and 20 cm long (about 2,200 cc). Perform a wood change every 4 months until pupation. The advantage of this method is it prevents cannibalism. The “chunk wood method” often produces adult males over 70 mm.

The “flour fermentation method” also produces major adults. The substrate used is fermented hard decayed wood flakes. It’s an interesting phenomenon. *Curvidens* only oviposits in hard decayed wood with a light color. In the wild, its larvae can only be found in such decayed wood. Yet in captivity, its larvae not only can survive on dark-colored flour-fermented substrate, but also become major adults. The “flour fermentation method” keeps the larva in a plastic or glass jar. The hobbyist gets to watch the larva grow. Canning jars work wonderfully. If the lid is made of metal, ventilation holes can be made with a hammer and nail. The first jar does not have to be too big. A diameter of 8 cm and a height of 10 cm (500 cc) will do. Compress fermented flakes into the jar with a compressor until 80% full. Place a towel beneath the jar to prevent shattering. Make a small hole on the surface of the substrate. Put the larva in and stuff the hole back up with the larva’s original flakes. Put the