



以上是1998年到2001年間的飼育經驗。當時所發表的狗食飼養法使用小型的飼養容器以及每7天一次的高換土頻率。在飼養少量幼蟲的情況下，此飼養法是可行的。但一旦飼養上百隻幼蟲，此飼養法便馬上遇到瓶頸：每個星期都要換上百盒的腐植物絕對是令人吃不消的，即使是把所有幼蟲分散換也要每天換14盒，而且這個動作要持續1年。總而言之，高頻率的換土是很難大量養殖幼蟲的。經過飼養方式這幾年來慢慢地改良，發現只要使用的腐植物營養足夠，經過充分地發酵，長戟大兜蟲的幼蟲對狗食並沒有絕對的依賴性。我現在使用的飼養容器是單隻雄性幼蟲可以直接在裡頭造正常蛹室的至少25 × 19 × 14 cm規格(但是要注意，如果雄蟲在角落做長度不足的蛹室，就要把前蛹移到人工蛹室)。一齡幼蟲10隻共養一箱。二齡幼蟲5隻共養一箱。雄性三齡幼蟲獨居一箱。雌性三齡幼蟲2隻共養一箱。三齡幼蟲換土頻率為1.5-3個月一次。每次換土時，舊腐植物全數丟棄，不再做任何養蟲上的利用。飼養容器充分用清水洗靜後放回幼蟲，新腐植物以稍微壓緊的方式完全裝到滿。每次更新食物時，我仍會於容器底部中央處放置大約5粒狗食，幼蟲吃完則到下一次換土前不再遞補，沒吃完則讓腐植物分解掉。但我還是要強調，餵食狗食前請先確認幼蟲身上沒有覆蓋著蟻。如果有，則建議完全不要餵食狗食，否則蟻的數量將暴增，其排泄物釋放出難聞的異味。個人亦認為含有異味的腐植物會降低幼蟲的食慾。

exposed to high humidity. In some individuals, aging also causes elytra to darken.

The above experience came from the period 1998-2001. The dog food rearing technique called for small containers and a high substrate-change frequency of once every seven days. It works well for the hobbyist who is only keeping a few larvae. However, for the hobbyist who is keeping one hundred larvae, this technique quickly runs into a bottleneck. Performing substrate change for one hundred rearing containers at once on a weekly basis quickly wears the hobbyist out. Even if substrate change is dispersed over a week, it would still mean 14 containers every day. And all the actions would have to continue for a year. Any method that calls for frequent substrate change is not suitable for large-scale operation. After years of technique refinement, it was discovered that *D. hercules* larvae are not as dependent on dog food as previously thought, as long as the substrate has been thoroughly fermented. Male third instar larvae are now kept individually in containers with dimensions of at least 25 by 19 by 14 cm (however, if a male makes a short pupal cell at the corner, the pre-pupa will have to be taken out to an artificial cell). First instar larvae are kept ten per container. Second instar larvae are kept five per container. Third instar female larvae are kept two per container. Substrate change is carried out once every 1.5-3 months for third instar larvae. All old substrate is discarded. Containers are thoroughly washed before returning larvae. New substrate is packed with slight pressure and filled all the way to the top.



有些蟲友認為幼蟲會偵測其週遭環境空間來決定往後要羽化成的體型，也因此要養出超大個體要用超大容器。其實到目前為止都沒有數據顯示鍬形蟲或是兜蟲的幼蟲有這種能力。許多巨扁

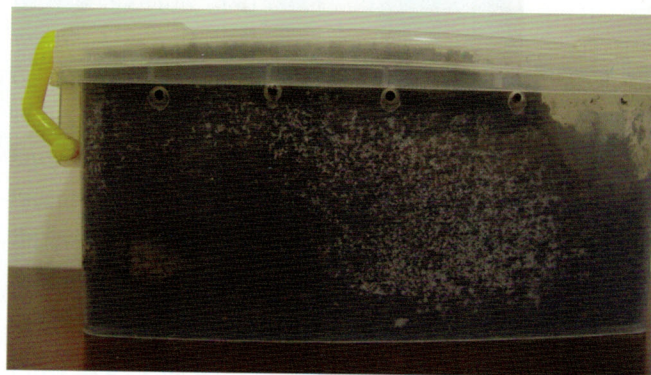


↗ 飼養幼蟲的情形。不織布可防蠶蠅和蟑螂仔。2007
Disposable table cloth prevents entry of fungus gnats and roach nymphs.

類的幼蟲成長過大，無法在太空包內順利化蛹。若幼蟲有能力事先評估週遭環境再決定自己往後的體型，便不會有體型超越棲身環境可負荷的現象發生。反之，到目前為止也沒有數據指出在有限空間中幼蟲不會長成超大個體。將幼蟲養於過大的容器中一來浪費空間，二來浪費食物；之前提過，含有水分又暴露在氧氣中的腐植土4-6個月後會變成沒有營養價值的土壤。如果將幼蟲飼養在過大的容器內，遠在幼蟲把食物吃完前，腐植土就已經變成土壤了。

繼沉醉兜鍬第一次出版至今，可以從網路昆蟲留言版看見有些許的蟲友對狗食有負面的評價，不外乎是：1.幼蟲不吃。2.把土弄得很髒很臭。3.蟻數

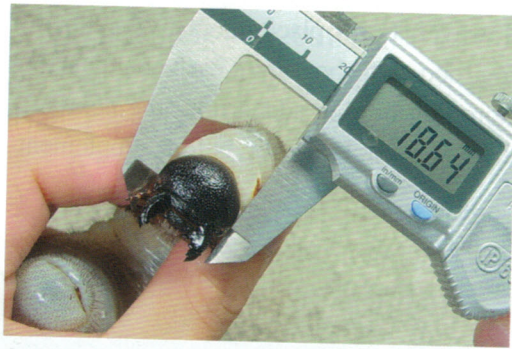
However, I still place about five pellets of dog food at the bottom of each container. No more dog food is added until the next substrate change. However, before supplement-



↗ 幼蟲做蛹室時力大無窮，可以把蓋子推彎。使用牢固的蓋子是必須的。2007
Larvae are capable of bending the cover when making pupal cell. A secure lid is must.

ing with dog food, first make sure that the larvae are-mite free. If they are not, dog food is not recommended at all. Otherwise, mite population will explode and generate a foul odor. I personally believe that this odor discourages larvae from feeding.

Some hobbyists believe that larvae have the ability to calculate the space around them and decide just how big they should become as an adult. They believe the only way to grow giant beetles is to keep larvae in giant containers. However, no data has been able to prove that either rhinoceros or stag beetle larvae have this ability. In fact, larvae of many large species of stag beetles grow too big in their containers that they could not pupate in them. If larvae had the ability to evaluate the space around them and



↑頭幅超巨大的利奇氏亞種幼蟲。2008
D. h. lichyi. larva with exceptional head capsule.

量暴增。的確，狗食的使用需要精準地拿捏。如何讓幼蟲在最短的時間內吃完狗食成為了一門藝術。首先，確實是有幼蟲不吃的狗食。很奇怪地，這一類的狗食沒有油質，幼蟲喜歡的狗食都有厚厚的一層油脂，手指接觸後會留下一層亮亮的油光。再者，狗食高蛋白的成分的確會在接觸水氣後在短時間內腐敗，但是只要不過量，即使幼蟲不吃也不至於導致腐植土敗壞。第三，如果幼蟲身上有蟎，而幼蟲又無法在短時間內攝取所有的狗食，蟎的數量將會迅速暴增到令人起雞皮疙瘩的地步。基於以上的種種原因，使用狗食餵食時，儘量不要使用過大的飼養容器，好讓幼蟲在短時間內找到狗食。狗食，寧可少餵，多餵則百害而無一利。它就好像維他命一樣，少量攝取對身體是很有幫助的，大量使用反而會傷害身體。很多初學者求好心切，結果一口氣用太多狗食，導致最後對狗食產生誤解。所幸的是，現在市面上有許多不論是台製或是日製的兜蟲幼蟲飼料都已經添加了動物性蛋白質配方，可以獨立使用，讓飼育者飼全程不必動用到狗食。



↑巨大的原名亞種人工飼育個體。2006
Gigantic captive-bred *D. h. h.* female.

decide just how big to become, they would not have outgrown their containers. There is really no need to keep larvae in excessively large containers. Otherwise, space and substrate are wasted.

Since the publication of the first edition, there have been some negative comments about dog food: 1. Larvae don't eat it. 2. Dog food stinks up the substrate. 3. Dog food leads to mite explosion. Dog food usage needs to be controlled. It is important to have larvae finish the dog food quickly. Dog food spoils quickly upon contact with moisture. However, if the amount used is small, even if the larva does not eat it, it will be disintegrated promptly by the bacteria in the substrate. Mite explosion happens only if there is a large amount of uneaten dog food. Supplementing with dog food is analogous to taking vitamins. A little bit does wonders. Too much becomes detrimental to health. Many beginners got overzealous and overdosed with dog food, leading to negative results. Luckily, commercial substrates today come fortified with animal proteins. Hobbyists can use them without dog food.



飼育兜鍬有時候會遇到雌蟲羽化了，但是雄性幼蟲還在進食的情形。等到好幾個月後雄蟲羽化了，但是雌蟲卻死了。因為雌、雄蟲羽化日期相差過大而導致斷種的情形，7、8年前時有所聞。但是在飼育兜鍬風氣盛行的今天，要遇到斷種的機率幾乎是零，因為隨時可以和其他蟲友交流活體。另外一個方法就是先購買一批幼蟲；幾個月後再購買第二批幼蟲。同時飼育兩個世代可以確保會有成蟲能夠配上。如果飼育的是兜蟲，有些蟲友會把1隻雄性幼蟲和1隻雌性幼蟲養在同一個容器內。這個方法的理論是，當雌性幼蟲製作蛹室，並且準備化蛹時，她所釋放出來的化學訊號會引誘雄性幼蟲也跟著化蛹。經過多年來的觀察，這個方法有時候有效，有時候沒效。曾經有過一個容器內飼養著兩隻年紀相同的DHE長戟大兜雌性幼蟲。孵化9個月後，有一隻已經變得很黃，但是另外一隻卻還很白。孵化11個月後，黃色的那一隻化蛹了，但是另外一隻還是很白，並且繼續進食。這隻雌蟲再經過6個月後才化蛹。再舉一個例子，有一個容器內養了一隻DHL長戟大兜雌性幼蟲，後來這隻母蟲化蛹了。我把蛹從容器內取出，但是並沒有把腐植物丟掉。接著我把一隻老熟的DHE長戟大兜雌蟲放入這隻DHL的容器中，並且讓她吃DHL的舊食物，但是這隻DHE也是好幾個月後才化蛹。第三個例子，有一個25 × 19 × 14 cm的容器內養了2隻從一齡就開始混養的DHE三齡雄性幼蟲。有一天換腐植物時，其中一隻縮到整隻都

Sometimes hobbyists encounter the phenomenon of females elosing way ahead of males. By the time males eclose, females have died. This was a serious problem a decade ago when obtaining exotic specimens was difficult. Today, losing an entire stock to sex eclosion discrepancy is no longer a threat, as trading of specimens can easily be done among hobbyists. Another solution is first obtain a stock of larvae; few months later, obtain another stock. Keeping two different generations usually ensures successful mating. Some hobbyists keep a pair of rhinoceros beetle larvae together. The theory is when the female pupates, the chemicals she releases induce the male to pupate as well. However, this method doesn't always work. For instance, I once kept two female *Dynastes hercules ecuatorianus* larvae of same age in one container. Nine months after hatching, one of them had turned yellow and the other was still white. Eleven months after hatching, the yellow one pupated and the white one continued to feed; she didn't pupate until six months later. Another example, a *D. h. lichyi* larva was kept in a container. One day she pupated and I took her out. I immediately put into her old container and substrate a mature female *D. h. ecuatorianus* larva. This *D. h. e.* larva didn't pupate until few months later. The third example, two L3 male *D. h. ecuatorianus* larvae had been kept together in a 25 by 19 by 14 cm container since first instar. During a substrate change, it was discovered that one of them had shrunk 20 grams. I thought something was wrong with the substrate. But the other larva was fat and well. I



失去了光澤，總共掉了20幾公克。我嚇了一跳，以為食材出了問題，但是同居的另外一隻幼蟲卻還是又肥又光亮。於是我把兩隻分開飼養。結果變輕的那隻3天後就壓出蛹室。因為之前共養的關係，導致變輕的那隻一直受到干擾，無法製作蛹室。由於嚴重縮水，羽化後牠也小了20 mm，而羽化時牠的哥哥卻還再吃。

10年前，在種源取得還是非常困難的年代，想盡辦法讓幼蟲能夠同時期內羽化並且繁殖才是首要目標，會不會造成兄弟姊妹間的近親繁殖倒還是其次考量。在種源取得容易的今天，如果可以避免近親交配則儘量避免，除非要刻意培育特定品系。

separated the two and the one that had lost weight made a pupal cell three days later. I was furious. Because of cohabitation, the one that had lost weight was constantly interrupted and could not make a pupal cell. Because of severe weight loss, he became 20 mm shorter as an adult. And his brother was still feeding at the time of his eclosion. Evidently, cohabitation does not guarantee synchronized pupation.

A decade ago, all priority was put on getting larvae to eclose at around the same time so propagation could be done. Inbreeding was of second concern. However, exotic specimens can now be easily acquired; inbreeding should be avoided, unless the goal is to create specific strains.

