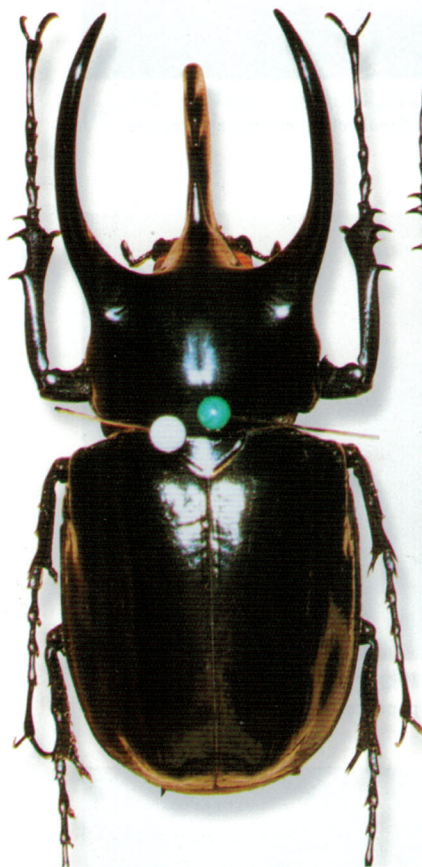




# 世界紀錄長戟大兜蟲

## World Record *Dynastes hercules*



左邊個體明顯比右邊個體大出許多，但右邊個體的犄角卻與左邊個體的同長。左者為中角型，右者為大角型。很明顯地，右者為小體系。高加索大兜蟲。2000

The left individual is considerably larger. Yet the horns of the right individual are as long as those of the left. The left is a medium and the right is a major. Clearly, the right belongs to the small strain. *Chalcosoma caucasus*

台灣目前養出來最大的原名亞種長戟大兜蟲。160.48 mm。2007  
Taiwan's largest known captive-bred. *D. h. h.*

經過了16年的經驗累積後，我們很確定要養出一隻世界紀錄蟲要符合三個條件：1.對的基因、2.對的環境、3.一點運氣。讓我來針對每一個條件稍做說明。其實要養出大蟲就好像在養神豬一樣。記得我很小的時候三姨丈帶我去他們龍潭老家參觀飼養神豬的過程。當時他指著一群豬仔對我說，從小就要挑骨架子夠大的小豬。如果小豬沒有那樣的先天條件，再怎麼餵、再怎麼灌，牠都不會大到哪裡去。養蟲也是一模一樣的情形。如果一隻幼蟲沒有大蟲的基因，再怎麼養也不會出現世界紀錄的體型。我們曾經遇到一批DHL長戟大兜蟲，100多隻幼蟲從一齡養到成蟲，結果每一隻雄蟲都在130 mm上下，而我們也決定不要再繼續累代這支血統。

第二個條件是「對的環境」。這一部分又分成四點：1.對的食物、2.對的空間、3.對的溫度、4.對的溼度。針對第一點，如果食物用錯了，再棒的基因也是枉然。而「對的食物」也包括了定期更換飼料。如果食物過分腐化，也就不再符合「對的食物」這個條件。針對第二點，如果空間出了問題，比如說腐植物太淺或是容器太小，導致幼蟲無法製作蛹室，最後化蛹或是羽化失敗，那再好的基因和食物也都枉然了。針對第三點，如果用30°C來飼養深山鍬形蟲的幼蟲，結果會如何不必我再多言。針對第四點，腐植物太乾或是太濕都不行，這些細節在之前的章節都有深入地探討過。

After sixteen years of intensive breeding, we are convinced that the production of a world-record beetle requires three conditions to be met. 1. the right gene. 2. the right environment. 3. a little luck. When I was young, an uncle of mine took me to a pig farm that raises giant pigs. He pointed to a group of piglets and said that only piglets with a broad body frame are chosen to begin with. He continued to say that if the piglets didn't have the right genes, even the most rigorous feeding cannot make them giants. Raising beetles is the same. If a larva does not have the genes to become gigantic, no amount of feeding can make them so. We once kept a brood of 100 *D. h. lichyi* larvae since L1. All the males became adults in the 130-mm vicinity. We decided to discontinue working with that bloodline.

The second condition is “the right environment,” which is composed of four elements. 1. the right food. 2. the right space. 3. the right temperature. 4. the right humidity. If the wrong kind of food is used, even the best genes are wasted. “The right kind of food” includes changing the substrate on time. Excessively decayed substrate does not meet “the right kind of food.” Spacing is also important. If the substrate is too shallow or the container too small that the larva fails to form a proper pupal cell, then even the best genes and food are useless. In regard to the third element, if 30°C is used to rear *Lucanus* larvae, failure is certain. In regard to the fourth element, the substrate cannot be too dry or moist.



兜蟲。

. h.



第三個條件是「一點運氣」。有時候即使前面兩個條件都做到完美，但是偏偏幼蟲化蛹時頭殼卡住了，或是冷氣剛好在主人出差時壞掉，那一切也都白費了。

如果目標是養出最大型的個體，在挑選公蟲當作種公的時候有一個小技巧。那就是在一樣體長的個體群中，選擇犄角或是大顎最短的個體當種公。這樣聽起來或許很矛盾，但是犄角對身體比例（或是大顎對身體比例）越小的個體，後代成長的空間就越大。舉例而言，一隻80 mm的美西白兜蟲，牠的後代要長到90 mm幾乎是不可能的事。但是一隻80 mm的*D. h. hercules*，後代要長成130 mm是輕而易舉的事情。換句話說，誇張的犄角對身體比例（或是大顎對犄角比例）代表一隻蟲的體型的極限。如果有兩隻一樣都是100 mm的高加索大兜蟲，一隻是中角型，一隻是長角型，那麼中角型個體的後代會比長角型個體的後代還更有機會長到120 mm。當然了，有時候還是會有例外。比如說，有些血統天生最大就是中角型或是中齒型。

育種是一門很深的學問，不管是哪一種生物，要培育出夢幻個體往往要投入大量的時間和精力。有時候花上一輩子都還達不到目標。長戟大兜蟲的夢幻體型就是傳說不斷，但是卻從來沒有任何證據的180 mm。以DHL而言，170 mm個體確實存在。但是最受歡迎的DHH卻是連170 mm的證據都沒有。目前公認最大的DHH人工飼育個體是日

The third condition is “a little luck.” Even if the previous two conditions are met, but the larva’s head capsule fails to split during pupation, or the air conditioner breaks down while the hobbyist is away on a business trip, then everything goes down the drain.

If the goal is the produce the largest specimen possible, there is a little tip to picking the breeder male. In a group of males of similar size, pick the one with the shortest horn or the shortest mandibles. This sounds contradicting, but the smaller the horn-to-body ratio (or mandibles-to-body ratio), the more room there is for the offspring to develop. For example, for the offspring of an 80-mm *D. granti* to become 90 mm would be nearly impossible, but it would be exceptionally easy for a *D. h. hercules*. In other words, lavishly developed horns or mandibles represent the growth limit of a beetle. If two *Chalcosoma caucasus* are both 100 mm, but one has long horns and the other has medium horns, the offspring of the beetle with medium horns have more chance to reach 120 mm. However, exceptions exist. Some bloodlines develop medium horns or mandibles at best.

Selective breeding is a sophisticated branch of science. It often takes an enormous amount of time and energy to produce the desired specimen. When it comes to *Dynastes hercules*, the dream size is 180 mm, a length that bares no proof. For *D. h. lichyi*, 170-mm individuals really exist. But for the most popular *D. h. hercules*, evidence



世界上目前已知最重的長戟大兜蟲幼蟲。2007  
World's heaviest known *Dynastes hercules* larva.

本的163.6 mm，而台灣最大的紀錄是PSK的160.48 mm。日本的那隻DHH幼蟲期最高體重為138公克。我們這隻的最高體重為125公克。但是體重並不能保證大蟲。我們另外有3隻最高體重為135公克、130公克，以及128公克的DHH。理論上牠們羽化後都要破160 mm，但是卻分別為145 mm、146 mm，以及145 mm。我們也有一隻最高體重達139公克的DHE羽化後只有144 mm。能不能跨過160 mm，除了幼蟲要有一定的體重水準外，運氣非常重要。我們完全投入長戟大兜蟲的育種，過去10年來花費了大量的成本和時間精力，把數千隻長戟大兜蟲從一齡幼蟲養到羽化。唯有飼育極大量的個體，才不會錯過最頂級的基因組合。每一代再讓最傑出的個體繁殖，就會距離夢幻體型越來越近。我們的收藏終於在2007年末，出現了一隻取名為「米腸」的165.3公克DHH。這隻蟲也是世

of 170 mm has yet to appear. The largest known captive-bred *D. h. h.* comes from Japan at 163.6 mm. Ko Hsin-ping's 160.48 mm is Taiwan's current record. The one from Japan had a maximum larval weight of 138 g. Ours weighed in at 125 g. However, weight cannot guarantee long adults. We had three *D. h. h.* larvae that weighed 135 g, 130 g, and 128 g. Theoretically speaking, they should all have exceeded 16 cm. But they became 145 mm, 146 mm, and 145 mm, respectively. We also had one *D. h. e.* larva that weighed 139 g, but he became 144 mm. For an individual to cross the 160-mm mark, luck is also crucial. For the past ten years, we have raised a few thousand *D. hercules* from first instar to adult. This is the only way to make sure that the best genetic combinations are not missed. Finally, in the fall of 2007, a *D. h. h.* larva named "Bratwurst" weighed in at 165.3 g. He is currently world's heaviest known *Dynastes*



界上目前已知最重的長戟大兜蟲幼蟲。但是相當可惜地，「米腸」雖然無比巨大，卻化蛹成中角型個體。此外，由於體重實在過重，「米腸」無法抵抗地心引力，導致翅鞘往外攤開，蛹體也過於扁平。如何讓超巨型幼蟲順利化蛹將是養出世界紀錄長戟大兜蟲最大的考驗。查詢「米腸」的最新發展，可以上我們的「安妮的昆蟲世界」

<http://www.insectweb.com.tw/forum/>

由於我們對自己的長戟大兜蟲血統非常有信心，特別製作了含有防偽雷射標籤的血統證明書，是有心飼養超大型個體的蟲友的絕佳選擇。

*hercules* larva. Unfortunately, as big as he was, "Bratwurst" pupated to become a medium-horn pupa. In addition, because he was just too heavy, he wasn't able to fight gravity and his elytra dropped. How to ensure successful pupation for mammoth larvae has become the biggest obstacle in the quest for world-record *Dynastes hercules*. For the latest updates on "Bratwurst," please log onto Annie's Insect World at <http://www.insectweb.com.tw/forum/>

We are very confident in our *D. hercules* pedigree. We have created pedigree certificates with counterfeit-proof laser stickers. Our beetles are the best choice for those who want to grow giants.



「米腸」非常巨大。實物大小。2007  
 "Bratwurst" is gigantic. Shown actual size



✓ 實物大小的「米腸」。2008  
“Bratwurst” in actual size.



“Titan” is the result of ten years of rigorous selection. This stable strain allows easy production of giants over 150 mm. This 160-mm breeder male is the biggest Taiwan has ever recorded. His offspring have endless potential.

<b>Species :</b>	<i>Dynastes hercules hercules</i>
<b>Strain :</b>	Titan
<b>Breeder M :</b>	160 mm
<b>Breeder F :</b>	74 mm
<b>Stage :</b>	L1
<b>Date :</b>	2007.12.25



<http://www.titanmonster.com>

*Titan Monster Co.*

P.S.K



Breeder Male



Breeder Male

✓ PSK的雷射防偽血統證明書，是血統純正、大個體的保證。  
PSK pedigree certificates guarantee premium quality beetles.



↗米腸的蛹重145公克。2008  
Bratwurst's pupa weighs 145 grams.



↗米腸的翅鞘被地心引力拉開。  
Bratwurst's elytra are pulled open by gravity.



↗米腸的蛹過於扁平。  
Bratwurst's pupa is a bit too flat.



↗米腸的蛹背面。  
Dorsal of Bratwurst's pupa



↗米腸和一般長戟大兜蟲蛹比較。米腸180 mm。  
Bratwurst next to regular *D. hercules* pupa.

# 交配與產卵

## Mating and Oviposition

常常聽到初學者問「一隻公兜蟲可以配幾隻母蟲？」其實一隻公兜蟲可以配上至少5隻母兜蟲。以長戟大兜蟲而言的話，目前我們的最高紀錄是12隻。我們相信長戟大兜蟲可以配上更多的母蟲，只是我們當時的血統計畫只需要配到12隻。雖然一隻公蟲可以配上多隻母蟲，但是我們從來不一口氣讓牠配完。每交配完一次，我們就會讓雄蟲休息3-4天，並且期間提供充足的食物。

也常常聽到初學者問「交配時間需要多久？」這個問題沒有絕對的答案。兜蟲的交配時間一般在20-40分鐘，不過也有些個體會交配長達數小時。鍬形蟲的交配時間通常比較短，約3-10分鐘。不過所謂的「交配時間」，是指雄蟲的交配器有確實插入雌蟲洩殖孔的時間。雄蟲只是抱住雌蟲不能算是交配，只能算是求偶。求偶的時間也不一定。有些個體抱住雌蟲沒有幾分鐘後就開始交配。有些個體則抱住雌蟲好幾個小時以後才開始交配。這個現象和個體的年紀沒有關係，但是和體型卻有一些關聯。整體上而言，大型個體的求偶時間會比小型個體長。這個現象在大鍬身上尤其明顯。大型的個體往往不是很喜歡交配，但是小型個體只要有機會接近雌蟲就會馬上交配。這可能是因為小型個體知道，自己絲毫沒有戰鬥的能力，因此不能浪費任何的時間。

Beginners often ask, “How many females can a male rhinoceros beetle mate with?” Each male can mate with at least five females. In our record, one *D. hercules* male mated with 12 females. We believe the number could go higher, but our breeding plan then only called for 12 females. Although each male can mate with multiple females, we allow the male to rest for 3-4 days between mating and supply him with plenty of food.

Another frequently asked question is “How long does mating last?” There is no definite answer. Rhinoceros beetles usually take 20-40 minutes, but some individuals take hours. Stag beetles usually take 3-10 minutes. “Mating” refers to the actual penetration of the male’s genitalia into the female’s body. The male merely holding onto the female does not constitute mating. This time also varies. Some individuals mate almost immediately while others hold onto the female for hours before mating. This time is independent of the male’s age and has more to do with the male’s size. This is especially evident in *Dorcus* stag beetles. Small individuals tend to mate as soon as they find the female; large individuals tend to take their time. This may be because small males know that they don’t have any chance of winning combats so they do not waste any time.