



↗ 辛森兜蟲。印尼。60 mm。2003
Trichogomphus simson. Indonesia

介紹兜蟲、鍬形蟲

Introduction to Rhinoceros and Stag Beetles



↖ 米拉比里斯鍬形蟲。坦尚尼亞。66 mm。2003
Prosopocoilus mirabilis. Tanzania



↓ 犀牛叉角鍬形蟲。印尼。83 mm。2002
Hexarthrus rhinoceros. Indonesia



「沉醉兜鍬」2001年第一次出版時，台灣飼育兜蟲和鍬形蟲的人口相當有限。但是沒有幾年後，台灣養蟲人口激增，甲蟲專賣店也以十倍數成長。對許多兜鍬愛好者而言，這些昆蟲甚至是神聖的。到底為什麼兜蟲和鍬形蟲會如此受歡迎？我認為有五點讓兜鍬成為熱門的寵物。

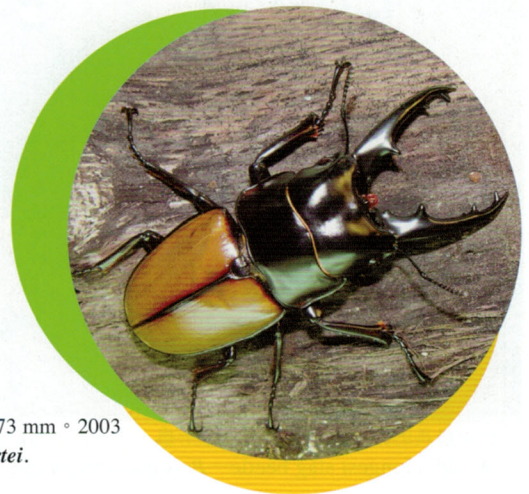
第一點肯定是牠們巨大的身軀。只要看過一眼，就是連對昆蟲沒有任何興趣的人都會對牠們印象深刻。當然了，並不是所有的兜蟲和鍬形蟲都巨大無比，有的種類也是相當嬌小。但大致上而言，這些甲蟲都比一般常見的昆蟲，例如蝴蝶、蚱蜢、瓢蟲，以及蜜蜂等等大上許多。有些熱帶的種類更是大到其重量可與小型的哺乳動物較量。不管是對標本收藏家或是飼育家，兜蟲和鍬形蟲的第一個迷人之處便是牠們那令人驚嘆的尺寸。

兜蟲和鍬形蟲的第二個迷人之處是牠們的外形。以兜蟲而言，牠們最能讓人眼睛一亮的本錢為頭上以及前胸背板上的犄角。有些種類的犄角不但巨大而且多樣化，從華麗的分枝到多數的犄角都有。至於鍬形蟲，牠們最引人注目的是那對有如夢境中才見得到的大顎。有些種類的大顎甚至比其頭、胸、體加起來還要長。兜蟲和鍬形蟲的外形真是大自然的奇觀。(雌性的鍬形蟲均沒有華麗的大顎；幾乎所有的雌性兜蟲也都沒有犄角。)

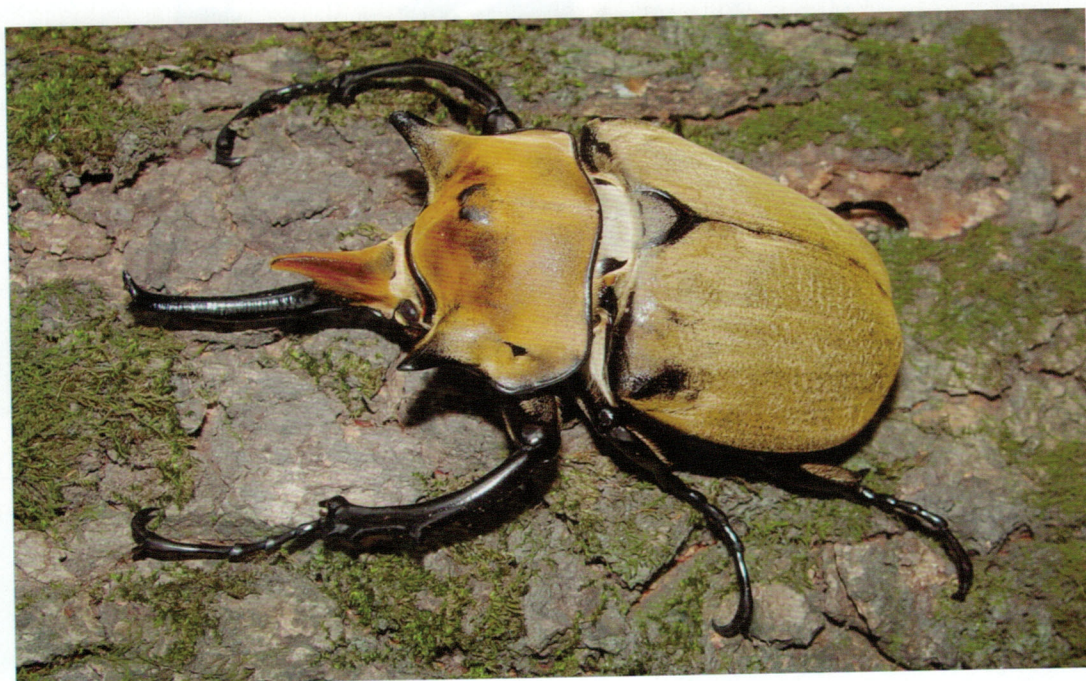
Rhinoceros and stag beetles are so popular in Japan and Taiwan and rapidly gaining recognition worldwide because they possess five charming qualities.

Rhinoceros and stag beetles are simply gigantic. Even people who have no interest whatsoever in insects will remember them after just one glance. Of course, not all of these beetles are enormous, as some species are rather small, but overall, these beetles are much larger than the average insects, such as butterflies, grasshoppers, ladybeetles, bees, etc. In fact, some tropical species are so large that they can outweigh small mammals!

Rhinoceros and stag beetles have unique shapes. As their name suggests, rhinoceros beetles have horns. Many species have multiple horns or well-decorated horns. As for the stag beetles, they have fantastic jaws. Some of which can be longer than the length of their head, thorax, and abdomen combined! However, female stag beetles do not have enlarged mandibles and almost all female rhinoceros beetles lack horns.



♂拉法鐵鋸鍬形蟲。73 mm。2003
Protoparce lafertei.



♂毛大象大兜蟲。中、南美洲。115 mm。2002
Megasoma elephas. Central and South America



♂世界最長的鍬形蟲—長頸鹿鋸鍬形蟲。東南亞。116 mm。2003
World's longest stag beetle—*Prosopocoilus giraffa*. Southeast Asia



♂世界上最長的兜蟲—長戟大兜蟲。中、南美洲。136 mm。2006
World's longest rhinoceros beetle—*Dynastes hercules*. Central and South America



♂大象(鹿)細身赤楸形蟲。蘇門達臘。96 mm。2003
Cyclommatus elaphus. Sumatra



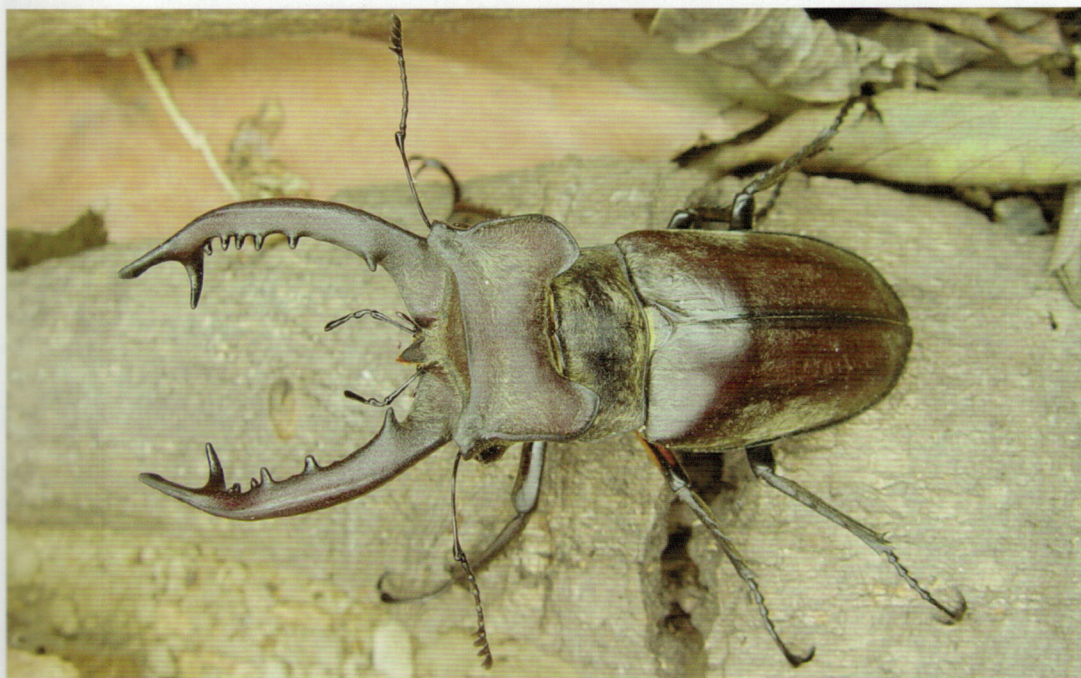
↗ 亞洲最大的兜蟲—南洋大兜蟲。105 mm。2003
Asia's longest rhinoceros beetle—*Chalcosoma caucasus*



↗ 世界上最重的甲蟲—亞克提恩大兜蟲。南美洲。107 mm。2003
World's heaviest rhinoceros beetle—*Megasoma actaeon*. South America



海神大兜蟲。南美洲。125 mm。2005
Dynastes neptunus. South America



高砂深山锹形蟲。台灣。77 mm。2003
Lucanus maculifemoratus. Taiwan



♂兩點鋸鍬形蟲。台灣。67 mm。2003
Prosopocoilus astacoides. Taiwan



♂鹿角鍬形蟲。台灣。55 mm。2003
Rhaetulus crenatus. Taiwan



♂雞冠細身赤锹形蟲。台灣。55 mm。2003
Cyclommatus mniszehi. Taiwan.



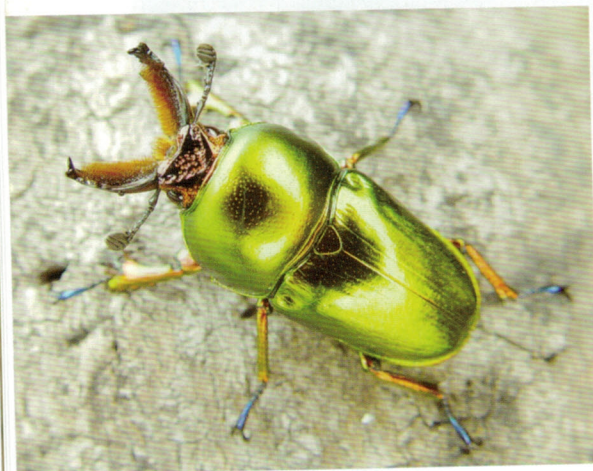
♂獨角仙。台灣。80 mm。2003
Allomyrina dichotoma. Taiwan



♂ 高砂鋸鍬形蟲。台灣。61 mm。2003
Prosopocoilus motschulskii. Taiwan



♂ 彩虹鍬形蟲。澳大利亞。左 58 mm 右 63 mm。2002
Phalacrognathus muelleri. Australia



♂ 澳洲金鍬形蟲。澳大利亞。28 mm。2002
Lamprima aurata. Australia

兜蟲和鍬形蟲第三個迷人之處為其豔麗的色彩。這些甲蟲真的是什麼顏色和光澤都有，有些種類更是以顏色和光澤聞名全球。澳大利亞的彩虹鍬 (*Phalacrognathus muelleri*) 就是絕佳的例子。牠的色彩和光澤都是萬中選一。唯相當可惜的是，有些兜蟲和鍬形蟲的特殊彩豔無法透過書本完整呈現，因為它們要透過兩個聚焦點才體會得出來，然而照片都是由只有一個聚焦點的單眼相機拍攝的。也因此，各種兜蟲和鍬形蟲的顏色和光澤更是值得任何人去親自體會的。

以上所談到的大小、外形，以及顏色和光澤都同時吸引標本收藏家和飼育家。但兜蟲和鍬形蟲接下來的迷人之處只吸引後者。這些甲蟲的第四個迷人之處為牠們很容易飼育。這一點是相當難在別的昆蟲中找到的。就以蝴蝶而言，雖然其幼蟲可像家蠶般地被豢養在一個不占空間的小盒子內，但一旦變為蝴蝶後則需要大量的活動空間。不僅如此，還需要有特別的寄主植物才得以繁殖下一代。除了蓋一座蝴蝶園以及在裡頭種植所需的寄主植物以外，是很難一代接一代地飼育蝴蝶的。但兜蟲和鍬形蟲就不一樣了。由於牠們不論是成蟲或是幼蟲都不需太大的空間或是某特定的植物，因此非常容易一代接一代不中斷地飼育下去。

除了容易飼育以外，兜鍬還有一點非常吸引飼育家。牠們天生既不怕生也不好動，極適合被拿在手上把玩。更棒的是，玩賞時也完全不用怕牠們會像蝴蝶一樣掉鱗粉、像蚱蜢、蟋蟀一樣自割後腿、或是像椿象一樣發出惡臭等等。兜蟲和鍬形蟲因為體型巨大、外形特殊、色澤美麗、容易飼育，以及



Rhinoceros and stag beetles have amazing colors and shines; there is not a single color or degree of shine that cannot be found among these groups. Incidentally, some stag and rhinoceros beetles are more known for their colors and shines than their sizes or shapes. One excellent example is the Australian *Phalacrognathus muelleri*, or the Rainbow Stag Beetle. The combination of its extreme luster and multiple bright colors makes it one of the most spectacular beetles in the world. Unfortunately, the colors and shines of many rhinoceros and stag beetles, including those of *P. muelleri*, cannot be totally revealed through photographs because they can only be experienced directly through bifocal eyes (all cameras are uni-focal). And for this reason, these beetles are even more worth the time to experience in person.

Rhinoceros and stag beetles can be easily cultured in any household. This is very difficult to find in other insects. Take the butterflies for example. Although many species of caterpillars can be kept like silk worms in a small container, once they emerge as adults they need a very spacious enclosure. Furthermore, many species require specific host plants to both feed and reproduce. Other than building a large green house and planting host plants within, it is very difficult to culture butterflies generation after generation. But rhinoceros and stag beetles are very different. Because both their larvae and adults do not require much space or any host plant, they are relatively easy to culture.

Rhinoceros and stag beetles are neither shy nor overly active, which makes them very suitable for handling. Better yet, when played with a keeper does not have to worry about them losing scales like butterflies, self-amputating their



↗澳洲金鍬形蟲雌蟲。20 mm。2002
Lamprima aurata female.



↗澳洲金鍬形蟲雌蟲。紅色型。20 mm。2003
Lamprima aurata female. Red morph



↗澳洲金鍬形蟲雌蟲。藍色型。20 mm。2003
Lamprima aurata female. Blue morph



大黑鍬形蟲。非洲。82mm。2006。活體
林琨芳提供
Mesotopus tarandus. Africa. Live specimen provided by Ralf Lin

適合把玩，因此相當迷人。正也是因為以上的原因，兜蟲和鍬形蟲的飼育在日本已經風行了有好幾十年的歷史。就是此時此刻，他們的兜、鍬熱都還在持續發酵。

兜蟲在生物界的完整分類地位如下：動物界 (Kingdom Animalia)、節肢動物門 (Phylum Arthropoda)、昆蟲綱 (Class Insecta)、鞘翅目 (Order Coleoptera)、金龜科 (Family Scarabaeidae)、兜蟲亞科 (Subfamily Dynastinae)。由於金龜科內成員繁多、長相多樣化，因此分類學者們又用亞科將牠們再分類。除了兜蟲亞科以外，此書往後還會談到花金龜亞科 (Subfamily Cetoniinae) 和麗金龜亞科 (Subfamily Rutelinae)。就外形上而言，可以說只要不是糞金龜或是翅鞘扁平的有角金龜都是「兜蟲」。接下來

legs like grasshoppers and crickets, or producing unbearable odors like stinkbugs. It is because rhinoceros and stag beetles are enormously built, unbelievably shaped, gorgeously pigmented, easily cultured, and effortlessly handled that they have so many die-hard fans.

Rhinoceros beetles belong to the Kingdom Animalia, Phylum Arthropoda, Class Insecta, Order Coleoptera, Family Scarabaeidae, and Subfamily Dynastinae (some people use an alternative classification, which is equally acceptable: Kingdom Animalia, Phylum Arthropoda, Class Insecta, Order Coleoptera, Superfamily Scarabaeoidea, and Family Dynastidae). Because members of the Family Scarabaeidae are great in number and therefore rich in different morphologies, taxonomists use Subfamilies to further categorize them. Other than the Subfamily Dynastinae, the other subfamilies in the Family



↗圖中雄蟲雖長有醒目的犄角，但由於翅鞘扁平因此並非兜蟲，為花金龜。波麗菲夢斯花金龜。左65 mm右50 mm。標本陳俊秀提供

Chelorrhina polyphemus. Although the male has a conspicuous horn, because their elytra are flat, they are not rhinoceros beetles; they are flower beetles. Dried specimens provided by Jason Chen

談锹形蟲的分類地位。锹形蟲一直到「目」分類都和兜蟲相同。之後牠們屬於锹形蟲科 (Family Lucanidae)。所有锹形蟲的外觀都還算相近，很少有人再將牠們分類為亞科。

兜蟲和锹形蟲為「完全變態」的昆蟲，意謂牠們一生經歷卵、幼蟲、蛹，以及成蟲等階段。反之「不完全變態」的昆蟲只經歷卵、若蟲，以及成蟲等階段，蚱蜢、蟬，以及蟋蟀等等皆屬於這一類的昆蟲。兜蟲和锹形蟲的幼蟲期又分為三個階段，分別為一齡幼蟲 (L1)、二齡幼蟲 (L2)，以及三齡幼蟲或是終齡幼蟲 (L3)。所有的昆蟲一旦變為成蟲，體型便不會再改變。換句話說，如果今天撿到一隻50 mm的锹形蟲成蟲，一個月後牠還是50 mm，不長也不縮。完全變態的昆蟲，成長期全部都集中在幼蟲期。若想要養出大型的成蟲，在幼蟲時期便一定要提供充足又高品質的飼料。

Scarabaeidae this book touches on at the end are Rutelinae (or Rutelidae according to the alternative classification) and Cetoniinae (or Cetonidae according to the alternative classification). For the stag beetles, their classification up till the Order is the same as that of the rhinoceros beetles. They then belong to the Family Lucanidae. Because all stag beetles appear rather uniform, most taxonomists do not recognize different subfamilies within this group.

Rhinoceros and stag beetles are holometabolous, meaning they have a “complete metamorphosis” life cycle consisting of egg, larva, pupa, and adult stages. On the other hand, insects that are hemimetabolous go through only egg, nymph, and adult stages; such insects include grasshoppers, cicadas, true bugs, cockroaches, etc. The larvae of rhinoceros and stag beetles go through three



↗二齡及三齡利奇氏長戟大兜蟲幼蟲。所有幼蟲的頭部、氣孔，以及六肢每一齡都是固定大小，不像柔軟的表皮可像氣球一般慢慢地膨脹。1998

Second and third instar *Dynastes herules lichyi* larvae. Unlike the skin, which can be stretched, the head, spiracles, and legs of a larva only have one size in each instar.

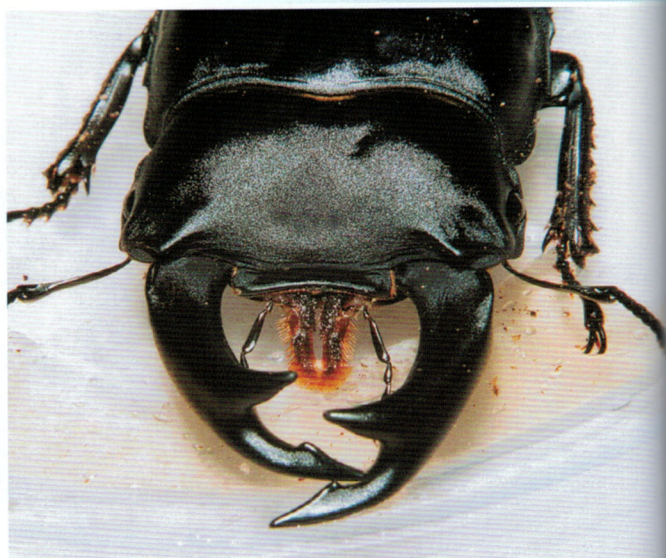


↗兜蟲和鍬形蟲都有發達的後翅，只是平時都折疊於翅鞘內。圖為剛羽化正在展翅的日本大鍬形蟲。1998

Rhinoceros and stag beetle adults have well-developed hind wings, although they are invisible when not flying. Pictured is a young *Dorcus curvidens binodulosus* adult spreading wings.

所有的昆蟲都一樣，其表皮並不會跟著身體成長。當舊表皮已經被成長中的身體撐到極限時，昆蟲們便製造新表皮，然後把舊的脫掉。這個過程稱為「脫皮」。當新的表皮又被撐到極限時，昆蟲們便再一次地脫皮。若是不能夠脫皮，牠們的身體將無法充分增大。之前所提到的一齡、二齡，以及三齡便是依據脫皮的次數而訂。從卵孵化後，還未脫過皮的幼蟲為一齡幼蟲；脫過一次皮的幼蟲為二齡幼蟲；脫過兩次皮的幼蟲為三齡或是終齡幼蟲。所有兜蟲和鍬形蟲的幼蟲期均只有三齡。第三次的脫皮稱為「化蛹」。但是有很多完全變態的昆蟲幼蟲期並不只三齡。例如，許多蝴蝶和飛蛾的幼蟲期都有五齡；第五次的脫皮才是化蛹。

由於兜蟲和鍬形蟲的幼蟲都生活在暗無天日的環境中，因此牠們複眼退



↗正在用伸長的口器吸食楓樹汁液的日本大鍬形蟲。1998

Dorcus curvidens binodulosus adult drinking diluted maple syrup with extended mouthparts.

different stages of development, which are first instar, second instar, and third instar, denoted L1, L2, and L3, respectively. All holometabolous insects stop growing in size upon reaching the pupa stage. In other words, if you collect a rhinoceros or stag beetle adult that is 50 mm in length today, a month later it will still be exactly 50 mm, without growing or shrinking a bit in size. As all these beetles gain tissue mass only in their larval stages, it is very important that the larvae be fed with plenty of nutritious food if you expect them to become giant adults.

As with all insects, their skin does not grow with their body. When an old layer of skin can no longer be stretched by the growing tissues inside, the larva starts to produce a new layer and sheds the old one. This process is also known as molting, or ecdysis. If insects lack the ability to molt, they would never be able to expand much in size. The



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圖中的小型雄蟲不但大顎對頭部的比例明顯縮小，就是連頭部都變得比前胸背板窄、耳突也幾乎完全消失。標本陳俊秀提供。1998

Not only is the mandible-to-head ratio of the small male much reduced, its head is also narrower than its thorax. Also, its head protrusions are barely visible. Dried specimens provided by Jason Chen

化，只有簡單的感光功能，但是牠們的嗅覺相當靈敏。

兜蟲和鍬形蟲的幼蟲主要以腐朽的植物組織維生。除了極為少數的肉食性種類以外，兜蟲和鍬形蟲的成蟲主要以植物的汁液維生，雌性鍬形蟲產卵前亦會捕食其他昆蟲以攝取動物性蛋白質。

雖然外觀看起來有些笨重而且看不到飛行的工具，但兜蟲和鍬形蟲卻都可以騰雲駕霧（除了少數幾種後翅退化的種類）！牠們其實都有一對不算小的翅膀，只是沒有飛行時都摺疊於翅鞘內，從外面一點都看不見。牠們飛翔前會先將堅硬的翅鞘張開，然後伸出翅膀以每秒大約30次的振翅頻率起飛。

previously mentioned instars are also a reference to the number of ecdysis a larva has gone through; a first instar larva has gone through no ecdysis, a second instar larva has gone through one ecdysis, and a third instar larva has gone through two ecdysis. As the larvae of rhinoceros and stag beetles have only three instars, the third ecdysis is called pupation, where the larva metamorphoses into a pupa.

Although all rhinoceros and stag beetle larvae are blind because they live in totally dark environment, they all have excellent scent organs (antennae) to make up for what they lack in sight.

The larvae of rhinoceros and stag beetles feed mainly on decayed vegetation. Other than a few carnivorous species, rhinoceros and stag beetle adults feed mainly on tree sap or the liquid of fallen fruits, although female stag beetles will prey upon other insects to satisfy their protein needs before oviposition, or egg laying.

As bulky and wingless as rhinoceros and stag beetles may seem, even the largest of them can fly quite well! The reason is that they actually have a pair of very developed wings hidden under their wing covers, or elytra. When they are ready to fly, they open their elytra, unfold their inner wings, and take off into the air with the wings beating at a rate of about 30 times per second.

In almost all rhinoceros and stag beetles, big males and small males of the same species look drastically different from one another. A small male does not simply look



↗圖中的小型雄蟲的犄角對身體比例比大型者的小得多。大型者為161 mm的利奇氏長戟大兜蟲。1999
The horn-to-body ratio of the small male is much smaller than that of the large male. The large male is a 161-mm *Dynastes hercules lichyi*.

在絕大部分的兜蟲和鍬形蟲種類中，雄蟲又分為大角(齒)型、中角(齒)型、及小角(齒)型。一般而言，體型越大者，犄角或大顎就越發達。超小個體一定都是超小角(齒)型：犄角小到幾乎消失或是大顎小到像雌蟲的。

在簡單介紹過兜蟲和鍬形蟲的迷人之處、分類、生活史、食物、飛行能力，以及體型差異後，現在開始正式踏入各種飼育上的細節。

like the miniature of a large one. In these insects, the larger a male is, the more developed its horns or mandibles become; extra small males on the other hand have almost no horns or have such small mandibles that they look like females! Males with superb horn or mandible formation, males with medium horn or mandible formation, and males with minor horn or mandible formation are also called “majors,” “mediums,” and “minors,” respectively.

After having very briefly discussed the charms, classifications, life stages, diet, flying ability, and size variations of rhinoceros and stag beetles, it is now time to focus on the culturing details of these fabulous insects.



↑ ↗大型與小型的鬼黠鍬形蟲。大者 88 mm，小者 52 mm。1994
Major and minor *Odontolabis siva*. Major 88 mm, minor 52 mm.