生物策略表

類別	生物策略 (Strategy)
生物策略 STRATEGY	翅膀是可展開的 (Wings are deployable)
生物系統 LIVING SYSTEM	甲蟲 (Beetles)
功能類別 FUNCTIONS	#改變大小/形狀/質量/體積 #Modify size/shape/mass/volume
作用機制標題	得益於彈性的翅膀關節，甲蟲的翅膀能折疊起來放置在前翅下，也能展開飛行 (The wings of beetles are folded and stored under forewings and deploy for flight thanks to sprung wing joints.)
生物系統/作用機制示意圖	

作用機制摘要說明 (SUMMARY OF FUNCTIONING MECHANISMS)

文獻引用 (REFERENCES)

甲蟲可將其前翅用於完全不同的目的。這些生物是昆蟲世界中的重型裝甲坦克，牠們在地面上花費大量時間，從植被落葉中穿過，在土壤中探索或啃蝕進入木頭。這些活動很容易損壞其精密細緻的翅膀。甲蟲透過將前端的一對翅膀變成堅硬而厚實的護鞘（鞘翅），適巧合身地覆蓋在腹部上方以保護翅膀（後翅）。翅膀整齊地安置在其下方，被小心且巧妙的折疊著。翅脈中有彈性的關節。當護鞘被抬起時，關節解開並將翅膀彈開。當甲蟲笨拙緩慢地起飛升空時，堅硬的翅膀護鞘通常會向側面伸出，這種姿勢必會阻礙最有效率的飛行。然而，花甲蟲已經設法解決了這個問題。牠們在護鞘側面靠近樞紐位置處有凹口，能使腹部上方的護鞘放回原位，進而讓翅膀伸展及拍動。
(Attenborough 1979: 79)

Beetles use their fore-wings for a different purpose altogether. These creatures are the heavy armoured tanks of the insect world and they spend a great deal of their time on the ground, barging their way through the vegetable litter, scrabbling in the soil or gnawing into wood. Such activities could easily damage delicate wings. The beetles protect theirs by turning the front pair into stiff thick covers which fit neatly over the top of the abdomen. The wings are stowed neatly beneath, carefully and ingeniously folded. The wing veins have sprung joints in

them. When the wing covers are lifted, the joints unlock and the wings spring open. As the beetle lumbers into the air, the stiff wing covers are usually held out to the side, a posture that inevitably hampers efficient flight. Flower beetles, however, have managed to deal with this problem. They have notches at the sides of the wing covers near the hinges so that the covers can be replaced over the abdomen leaving the wings extended and beating. (Attenborough 1979: 79)

參考文獻清單與連結 (REFERENCE LIST) **Harvard 或 APA 格式**

Attenborough, D. (1981). *Life on earth: a natural history*. Little Brown & Co.

延伸閱讀: Harvard 或 APA 格式

生物系統延伸資訊連結 (LEARN MORE ABOUT THE LIVING SYSTEM/S)

https://en.wikipedia.org/wiki/Beetle
https://asknature.org/strategy/wings-are-deployable/
https://www.onezoom.org/life/@Holometabola=1082885#x118,y-55,w0.9379

撰寫/翻譯/編修者與日期

張詠翎翻譯 (2020/04/22)；譚國鎏編修 (2020/06/03)；許秋容編修 (2020/006/09)

AskNature 原文連結

https://asknature.org/strategy/wings-are-deployable/