


# 生物策略表

類別	生物策略 (Strategy)
生物策略 STRATEGY	產生虹光現象的薄層 (Layers produce iridescence)
生物系統 LIVING SYSTEM	土蜂科 Scoliidae (Scoliid wasps)
功能類別 FUNCTIONS	#改變光線/顏色 #Modify light/color
作用機制標題	大黃蜂的翅膀由於簡易的干涉濾鏡而產生虹光現象 (The wing of the giant wasp produces iridescence due to a simple interference filter.)
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)	
<p>「我們說明了爪哇青帶巨蜂 (<i>Megascolia procer javanensis</i>) 翅膀的虹光現象 (iridescence) 可合理清楚地理解為虹光是來自於一層薄幾丁質光學層覆蓋幾丁質-黑色素 (chitin-melanin) 吸收結構層的光線干擾 (interference) 所導致。…這種幾丁質-黑色素構造所形成的黑色背景容許以非常簡單的方法，並用最少數量的干涉波段，來產生格外強烈的藍綠可見光的結構色 (visible structural blue-green coloration)：在所有的四片翅膀上都有著厚度維持一致的覆蓋層。這是一種最基本的干涉濾鏡，儘管它很簡單，卻非常有效。」 (Sarrazin et al. 2008: 5)</p> <p>「爪哇青帶巨蜂這種大黃蜂的翅膀為不透明 (opaque) 並帶有虹光色彩…造成虹光現象的結構是一單層均質的透明幾丁質層完全覆蓋著每片翅膀的表面而成。不透明的特性 (opacity) 主要是由於形成翅膀物理性核心 (mechanical core) 的分層介質 (stratified medium) 中有黑色素的存在。」 (Sarrazin et al. 2008: 1)</p> <p>“We have shown that the iridescence of the wings of <i>Megascolia procer javanensis</i> can be reasonably well understood as resulting from the interference of light in a thin optical chitin layer covering a chitin-melanin absorbing structure...The black background defined by this</p>	

chitin-melanin structure allows for a particularly highly visible structural blue-green coloration, generated by an extremely simple device, using a minimal number of interfering waves: a constant-thickness overlayer covering all four wings. This is among the most elementary interference filters and, in spite of its simplicity, it turns out to be very effective.” (Sarrazin et al. 2008: 5)

“The wings of the giant wasp *Megascolia procer javanensis* are opaque and iridescent...the structure responsible for the iridescence is a single homogeneous transparent chitin layer covering the whole surface of each wing. The opacity is essentially due to the presence of melanin in the stratified medium which forms the mechanical core of the wing.” (Sarrazin et al. 2008: 1)

#### 參考文獻清單與連結 (REFERENCE LIST)

Sarrazin, M., J. P. Vigneron, V. Welch, and M. Rassart. (2008). Nanomorphology of the blue iridescent wings of a giant tropical wasp, “*Megascolia procer javanensis*” (Hymenoptera). *Phys. Rev. E* 78: 051902.

(<https://arxiv.org/ct?url=https%3A%2F%2Fdx.doi.org%2F10.1103%2FPhysRevE.78.051902&v=fd61565e>)

#### 延伸閱讀

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

<https://en.wikipedia.org/wiki/scoliidae>  
<https://www.onezoom.org/life/@scoliidae>  
<https://eol.org/pages/724>

#### 撰寫/翻譯/編修者與日期

譚國銓翻譯 (2020/08/28)；許秋容編修 (2021/04/09)

#### AskNature 原文連結

<https://asknature.org/strategy/layers-produce-iridescence/>