

生物策略表

類別	生物策略 (Strategy)
生物策略 STRATEGY	花瓣打開 (Petals peel open)
生物系統 LIVING SYSTEM	百合 <i>Lilium</i> (Lily)
功能類別 FUNCTIONS	#改變位置 #改變大小/形狀/質量/體積 #Modify position #Modify size/shape/mass/volume
作用機制標題	百合花瓣從頂部往下打開是因為花瓣外緣的生長速率較快 (Petals of the lily peel open from the top down due to faster growth rates of the outer edge of the petal.)
生物系統/作用機制 示意圖	<p>A</p> <p>tip</p> <p>leafy</p> <p>woody</p> <p>petal base</p> <p>midrib cross section</p> <p>woody part alone</p> <p>B</p> <p>midribs removed</p> <p>C</p> <p>rippled petals</p>
作用機制摘要說明 (SUMMARY OF FUNCTIONING MECHANISMS)	
文獻引用 (REFERENCES)	
<p>「我們研究了東方型百合 ‘Casablanca’ 開花的物理過程。觀察發現花瓣的邊緣會隨著花朵綻開而產生皺褶，此結果顯示差別生長 (differential growth) 主導著花瓣薄殼狀構造的發育…藉由突顯花瓣邊緣生長的角色 (the role of edge growth)，我們的實驗及理論提供了一個定性上不同的範例，推翻了以往認為開花過程是由花瓣與中肋的內層 (the inner layer of the petals and in the midrib) 的差別生長所主導的假說。這種功能形態 (functional morphology) 為可展開的結構 (deployable structures) 提供了新的仿生設計法，以邊界或邊緣驅動 (boundary or edge actuation) 取代一般的整體驅動或表面驅動，讓構造展開。」</p> <p>(Liang et al. 2011: 5516).</p>	

“Here we study the physical process of blooming in the oriental lily *Lilium* ‘Casa Blanca’. Our observations show that the edges of the petals wrinkle as the flower opens, suggesting that differential growth drives the deployment of these laminar shell-like structures...Our experiments and theory overturn previous hypotheses that suggest that blooming is driven by differential growth of the inner layer of the petals and in the midrib by providing a qualitatively different paradigm that highlights the role of edge growth. This functional morphology suggests new biomimetic designs for deployable structures using boundary or edge actuation rather than the usual bulk or surface actuation” (Liang et al. 2011: 5516).

參考文獻清單與連結 (REFERENCE LIST)

Liang, H. and L. Mahadevan. (2011). Growth, geometry, and mechanics of a blooming lily. *PNAS* 108: 5516-5521. (<https://doi.org/10.1073/pnas.1007808108>)

Victoria Gill. (22 March, 2011). Time-lapse footage reveals how lily flowers bloom. *Science and nature reporter, BBC News*. Retrieved from: (http://news.bbc.co.uk/earth/hi/earth_news/newsid_9429000/9429516.stm)

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/Lilium>
<https://www.onezoom.org/life/@lilium>

撰寫/翻譯/編修者與日期

譚國銜翻譯/編修 (2021/01/04)；許秋容編修 (2021/03/04)；洪麗分編修 (2021/04/10)

AskNature 原文連結

<https://asknature.org/strategy/petals-peel-open/>