生物策略表

類別	生物策略 (Strategy)
生物策略 STRATEGY	追隨太陽的花朵 (Flowers follow sun)
生物系統 LIVING SYSTEM	雪毛茛 *Ranunculus adoneus* (Alpine buttercup)
功能類別 FUNCTIONS	#從環境中感應光訊號（可見光譜） #Sense light (visible spectrum) from the environment
作用機制標題	雪毛茛透過花梗細胞的差別生長來追隨太陽 (Flower stalks of snow buttercups track the sun by differential cell growth.)
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)

我們利用會追隨太陽的雪毛茛 (*Ranunculus adoneus*) 花朵設計田間實驗，決定光感受作用 (photoreception) 發生的位置、哪些器官會產生反應，以及追日運動如何達成。早上花梗朝向東方彎曲，在一天的過程中逐漸伸直。位於花朵下方 1-3 公分，也就是靠近花朵苞片 (floral bracts) 的花梗中段，比花梗的其它部位明顯較常彎曲。因為去除花朵之後，花梗末端依然會追隨太陽運動，所以我們的實驗專注於遮蔽（或相反地露出）不同部分的花梗讓它們不受光照（或接受光照）。光感受作用主要出現在緊鄰著花托的莖部。根據在莖部做的標記，我們發現和光照側相比，彎曲花梗陰影側的生長增加了 40%。相反地，頂端被遮蔽的花梗追隨太陽的表現不佳，與光照側相比，陰影側的生長只增加了 25%。這種生長差異性與彎曲花梗中兩側細胞的長度差異符合，陰影側比光照側具有顯著較長的表皮細胞。」(Sherry and Galen 1998: 983)

"We designed field experiments using solar-tracking *Ranunculus adoneus* flowers to determine where photoreception occurred, which organs responded, and how movement was achieved. Flower peduncles bend eastward in the morning and gradually unbend over the course of the day. Peduncles were found to bend significantly more frequently in the middle region near the floral bracts, 1–3 cm below the flower, than elsewhere on the peduncle. Because the

peduncle tip continued to track the sun even after the flower itself was removed, our experiments concentrated on shielding (or conversely, exposing) various portions of peduncles from (or to) sunlight. Photoreception occurred primarily in the portion of the stem just beneath the floral receptacle. By following the position of landmarks applied to the stem, we found that 40% more growth occurred on the shaded side of bent peduncles, compared to the sunlit side. In contrast, top-shielded peduncles did not solar track well and grew only 25% more on the shaded side than on the sunlit side. This growth differential corresponded to differences in cell length on the two sides of bent peduncles, with significantly longer epidermal cells occurring on the shaded side than on the sunlit side." (Sherry and Galen 1998: 983)

參考文獻清單與連結 (REFERENCE LIST)

Sherry, R. A. and C. Galen. (2002). The mechanism of floral heliotropism in the snow buttercup, *Ranunculus adoneus*. *Plant, Cell & Environment* 21:983-993. (https://doi.org/10.1046/j.1365-3040.1998.00336.x)

延伸閱讀

AskNature Team. (1 October, 2016). Heliotrope sun-tracking system. *AskNature*. Retrieved from: https://asknature.org/idea/heliotrope-sun-tracking-system/

AskNature Team. (1 October, 2016). SunPoint Technologies Inc solar tracker. *AskNature*. Retrieved from: https://asknature.org/idea/sunpoint-technologies-inc-solar-tracker/

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

https://www.onezoom.org/life/@ranunculus_adoneus
https://eol.org/pages/473797

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AskNature 原文連結

https://asknature.org/strategy/flowers-follow-sun/#content_life_forms_grid