生物策略表

類別	生物策略 (Strategy)
生物策略 STRATEGY	芒刺促使自行播種 (Awns cause self-planting)
生物系統 LIVING SYSTEM	黃茅 *Heteropogon contortus* (Spear grass)
功能類別 FUNCTIONS	#獲得、吸收、或過濾固體 #分配液體 #在液體中/上移動 #在固體中/上移動 #在氣體中移動 #感應大氣條件 #Capture, absorb, or filter solids #Distribute liquids #Move in/on liquids #Move in/on solids #Move in/through gases #Sensing atmospheric conditions
作用機制標題	黃茅芒刺上的細毛透過親水性及疏水性變化使草能自行播種到土壤中 (Hairs on spear grass awn's result in the grass being able to self-plant into the soil by being hydrophilic and hydrophobic.)
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)

「很多植物被描述為自播種子 (self planting seed) (Zohary 1937)。帶有芒刺的種子 (awned seed)，它們幼苗的生存機率被證實高於去除芒刺的種子 (Simpson 1952; Peart 1979)。自播種子也比沒有附屬構造的種子有更高的拓殖，以在特定的微棲地 (microhabitat) 埋藏種子，例如因為火燒而缺乏落葉的地區 (Tothill 1968)…自播禾草類和牻牛兒苗屬 (*Erodium*) 的種子皆有著吸濕活化 (hygroscopically-active) 的芒刺（芒刺基部的細毛增加與環境接觸的表面積）。這些種子透過潮濕時張力下降使芒刺細毛張開，乾燥時失去水分增加芒刺的張力而移動。」(Stamp 1984: 611)

「這些種子的埋藏行為帶來的益處可能很多且複雜。Young, Evans & Kay (1975) 推測對於分佈在裸露地區的牻牛兒苗 (*Erodium botryx*) 種子來說，埋藏行為是躲避種子掠食者、夏天土表極端溫度以及晚秋發芽時土壤濕度變動的重要手段。Sheldon (1974) 發現埋藏行為確保了胚根的穿透，尤其是在被壓實的土壤 (compacted soil) 中。自播性的黃茅 (*Heteropogon contortus*) 種子比起其它種子更具優勢，包括會躲避燒掉地表落葉的

火災，以及儘早建立族群，因在火燒後會造成土表溫度上升，使火燒地區不適合種子發芽。」(Stamp 1984: 619)

"Many plants have been described as self planting seeds (Zohary 1937). Seedling survivorship of such awned seeds has been shown to be higher than that of de-awned seeds (Simpson 1952; Peart 1979). Also, self planting species have higher establishment than seeds without accessory structures for burial in particular microhabitats, such as areas devoid of litter due to burning (Tothill 1968) ... Both the self-planting grasses and *Erodium* seeds are characterised by hygroscopically-active awns [hairs at the base of the awn increase surface area in contact with the environment]. The seeds move by the decreasing tension (during wetting) [as the awn hairs swell] and increasing tension (during drying) of these awns [as the awn hairs lose moisture]." (Stamp 1984: 611)

"The advantages of burial for these seeds may be numerous and complex. Young, Evans & Kay (1975) suggested that for *Erodium botryx* seeds, which colonize bare areas, burial was important to avoid seed predators, extreme temperatures at the soil surface during the summer and fluctuations in soil moisture during germination in late autumn. Sheldon (1974) found that burial insured radicle penetration, especially in compacted soil. Self-planting *Heteropogon contortus* seeds had an advantage over other species by avoiding fire, which destroyed the ground litter, and by establishing themselves early, a consequence of increased soil surface temperature after the fire, which the temperature in other areas was unfavourable to germination (Tothill 1969)." (Stamp 1984: 619)

參考文獻清單與連結 (REFERENCE LIST)

Garnier, L. K. M. and I. Dajoz. (2001). Evolutionary significance of awn length variation in a clonal grass of fire-prone savannas. *Ecology* 82: 1720-1733. (https://doi.org/10.1890/0012-9658(2001)082[1720:ESOALV]2.0.CO;2)

Stamp, N. E. (1984). Self-burial behaviour of *Erodium cicutarium* seeds. *Journal of Ecology* 72: 611-620. (https://www.jstor.org/stable/2260070?origin=crossref&seq=1#metadata_info_tab_contents)

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/heteropogon_contortus
https://www.onezoom.org/life/@heteropogon_contortus
https://eol.org/pages/1114966

撰寫/翻譯/編修者與日期

譚國鎏翻譯 (2020/09/04)；許秋容編修 (2021/04/02)
AskNature 原文連結
https://asknature.org/strategy/awns-cause-self-planting/