


生物策略表

類別	生物策略 (Strategy)	
生物策略 STRATEGY	集水冷卻蜂巢 (Water collection cools hive)	
生物系統 LIVING SYSTEM	西方蜂 <i>Apis mellifera</i> (Western honeybee)	
功能類別 FUNCTIONS	#保護免受溫度危害 # Protect from temperature	
作用機制標題	蜜蜂透過收集、散佈水分，並以煽動加強蒸發作用來冷卻蜂巢 (Honeybees cool the hive by collecting water, spreading it, and fanning to increase evaporation.)	
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>「蜜蜂群落收集水分有兩個原因，而這與不同類型的天氣有關：在炎熱的日子中透過蒸發作用 (evaporation) 使育幼區 (brood area) 冷卻，而在寒冷的日子，覓食受到限制時用於哺育 (Lindauer, 1955; Seeley, 1995)。Lindauer的研究展示了蜜蜂在炎熱條件下如何調節蜂巢溫度 (Lindauer, 1955)。負責吸水的外勤蜂 (water forager) 收集水分，然後散佈到蜂巢周圍及容納卵和幼蟲的巢室 (cell) 中；煽風 (fanning) 如同反芻 (regurgitation) 到舌頭上蒸發一樣，都會加速水分蒸發。Visscher和其研究成員測量了在沙漠環境中收集水的蜜蜂，其平均水分負重為44 mg。胡蜂 (paper wasp) 與黃蜂 (hornet) 也會使用水來冷卻巢穴，但高度社會化的無螫蜂 (stingless bee) 卻不會 (Jones and Oldroyd, 2007; Roubik, 2006)。」(Nicholson 2009: 430-431)</p> <p>“Honeybee colonies collect water for two reasons, related to different types of weather: for cooling of the brood area by evaporation on hot days, and for feeding the larval brood when foraging is limited on cool days (Lindauer, 1955; Seeley, 1995). The classic studies of Lindauer showed how bees regulate the hive temperature in hot conditions (Lindauer, 1955). Water is collected by water foragers, then distributed around the hive and in cells containing eggs and larvae; fanning accelerates its evaporation, as does regurgitation and evaporation on the tongue (Lindauer, 1955). Visscher and colleagues measured mean water loads of 44 mg in honeybees collecting water under desert conditions (Visscher et al., 1996). Paper wasps and hornets also</p>		

use water for cooling their nests, but the highly social stingless bees do not (Jones and Oldroyd, 2007; Roubik, 2006).” (Nicholson 2009: 430-431)

參考文獻清單與連結 (REFERENCE LIST)

Nicolson, S. W. (2009). Water homeostasis in bees, with the emphasis on sociality. *Journal of Experimental Biology*. 212: 429-434. (<https://jeb.biologists.org/content/212/3/429>)

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