

生物策略表

類別	生物策略 (Strategy)
生物策略 STRATEGY	以紙張製造的巢穴 (Nests made of paper)
生物系統 LIVING SYSTEM	馬蜂屬 <i>Polistes</i> (Polistes)
功能類別 FUNCTIONS	#物理性組成結構 #Physically assemble structures
作用機制標題	造紙胡蜂巢是由像紙張的材料所製，原料為木頭及硬化的唾液 (Nests of paper wasps are made of paper-like material, created from wood and hardening saliva.)
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>「舉例來說，有三種動物已經獨立發展出造紙的能力。造紙胡蜂 (paper wasp) 使用從樹木或木柱啃下的木頭微粒作為原材料，然後將這些纖維與硬化的唾液混合。」 (Pallasmaa 1995: 20)</p> <p>「舉例來說，有三種動物已經獨立發展出造紙的能力… 某些白蟻也用木頭微粒來造紙，但牠們使用唾液或排泄物作為接合劑 (cement)，以製造出材質像紙箱 (carton) 的物體。」 (Pallasmaa 1995: 20)</p> <p>「樹棲型 (arboreal) 的新熱帶 (Neotropical) 白蟻 <i>Nasutitermes acajutlae</i> (Holmgren)</p>	

與 *N. nigriceps* (Haldeman) 的巢穴結構被描述，並特別提及在某些巢穴的網絡基質 (gallery matrix) 中發現巢穴內含物或小瘤 (nodule)。這些小瘤的營養分析顯示，相較於一般白蟻巢穴，小瘤的纖維素含量高，而角質含量低。這些數據支持以下假說：在這些白蟻物種的部分巢穴中，小瘤內容物可作為兼性食物儲備 (facultative food storage) 的一種形式。這些案例似乎代表了一種罕見的情況，即白蟻沒有儲存或養殖食物，而是將一些部分加工、咀嚼過的食物加入巢穴基質之中，以備將來食用... 與多數白蟻不同，許多 *Nasutitermes* 屬的白蟻物種會在樹上建造巢穴，它們是由木頭、唾液、和糞便液組成 (Light 1933)，並偶而加入例如沙粒等其他材料 (Thorne & Haverty, pers. obs.)。其他築巢性白蟻大多數在地面上建造蟻塚 (mounds) (e.g., Emerson 1938)，但在樹上築巢使 *Nasutitermes* 屬及幾個其他屬的白蟻物種得以在新的棲地定居並開發利用。」 (Thorne et al. 1996: 27-28)

“Three animals, for instance, have independently invented the making of paper. Paper wasps use small particles of wood gnawed off from trees and wood posts as their raw material, and they mix these fibres with their hardening saliva.” (Pallasmaa 1995: 20)

“Three animals, for instance, have independently invented the making of paper...Some termites also make paper from wood particles, but they use their saliva or excreta as a cement to make a substance that resembles carton.” (Pallasmaa 1995: 20)

“Nest architecture of the arboreal Neotropical termites *Nasutitermes acajutlae* (Holmgren) and *N. nigriceps* (Haldeman) is described, with special reference to carton inclusions or nodules found within the normal gallery matrix of some nests. Nutrient analyses of these nodules show that they have high cellulose and low cutin concentrations in comparison to normal nest carton. These data support the hypothesis that the nodule inclusions serve as a form of facultative food storage in some nests of these termite species. These cases appear to represent a rare situation in which food is not stockpiled or cultured by termites, but rather some partially processed, masticated food is incorporated into the nest matrix for future consumption...Unlike most termites, many species of *Nasutitermes* build arboreal carton nests composed of wood and salivary and fecal fluids (Light 1933), and occasionally other materials such as sand (Thorne & Haverty, pers. obs.). Most other nest-building termites build mounds on the ground (e.g., Emerson 1938), but nesting in trees has enabled species of *Nasutitermes* and several other genera to colonize and exploit a new habitat.” (Thorne et al. 1996: 27-28)

參考文獻清單與連結 (REFERENCE LIST)

Arndt, I. (2014). *Animal architecture*. Harry N. Abrams.

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/polistes>

<https://www.onezoom.org/life/@polistes>

<https://eol.org/pages/1032901>

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