

生物策略表

類別	生物策略 (Strategy)	
生物策略 STRATEGY	修飾的鬍鬚處理食物 (Modified whiskers handle food)	
生物系統 LIVING SYSTEM	佛羅里達海牛 <i>Trichechus manatus latirostris</i> (Florida manatee)	
功能類別 FUNCTIONS	#獲取、吸收、或過濾固體 #分配固體 #Capture, absorb, or filter solids #Distribute solids	
作用機制標題	佛羅里達海牛的修飾鬍鬚在嘴唇精準控制的幫助下，可捕獲和處理食物 (Modified whiskers of the Florida manatee capture and handle food with the help of finely controlled lips.)	
生物系統/作用機制 示意圖		
作用機制摘要說明 (SUMMARY OF FUNCTIONING MECHANISMS)		
<p>哺乳類的鬍鬚 (whisker) 是我們熟悉的樣貌，也被稱為觸鬚 (vibrissae)，常長在臉上，用於感應哺乳動物周圍實體世界傳來的觸覺線索。佛羅里達海牛 (Florida manatee) 是一種全身長滿觸鬚的水生哺乳類，但特別集中在臉上和嘴巴附近。其唇部上的觸鬚被整理成短而硬的粗毛 (bristle)，顯然在哺乳類中具有獨特的功能：主要用於捕捉和處理食物和其他物體。</p> <p>佛羅里達海牛的肌肉質嘴唇具有特殊的形狀，能有精細控制的動作。上唇形狀像一個圓胖的 U 形，其末端往後指向嘴部，並帶有一簇堅硬的觸鬚。下唇是圓形的，也有粗毛。當取食沈水植物 (submerged plant) (海牛是草食性生物) 時，海牛將其上唇兩端合併，並延伸粗毛，將植物抓住並將其導向口腔。然後上唇向後展開，下顎閉合，將植物推入更深的口中。當取食浮水植物 (floating plant) 時，會先將上唇像耙子般使用。海牛將其上唇延伸過浮水植物，並使用唇部的粗毛反覆將其耙進嘴裡。</p> <p>佛羅里達海牛口鼻部的其他部分，覆蓋著觸感敏銳的觸鬚。這使得海牛能夠在用觸鬚抓住食物及物體之前，就先感應和探索它們。這種針對收集食物的敏感且精細控制的系統，或許有助於海牛能有效地取食水體中不同位置的多樣水生植物。</p> <p>Whiskers are a familiar sight on mammals. Also called vibrissae, they' re commonly found</p>		

on the face and used to sense tactile cues from the physical world around a mammal. The Florida manatee is an aquatic mammal that has vibrissae all over its body, but especially concentrated on the face and near the mouth. The vibrissae on its lips are modified into short, stiff bristles that appear to have a unique function among mammals: they're primarily used to capture and handle food and other objects.

The Florida manatee's muscular lips have a special shape and are capable of fine controlled movements. The upper lip is shaped like a plump U, with the ends pointing back toward the mouth and bearing tufts of stiff vibrissae. The bottom lip is round and also bears bristles. When feeding on submerged plants (manatees are herbivores), the manatee brings the ends of its upper lip together and extends the bristles, which grab the plant and direct it toward the mouth. The upper lip then spreads back out and the lower jaw closes, pushing the plant farther into the mouth. When feeding on floating plants, the upper lip is first used like a rake. The manatee extends its upper lip over the floating plant and repeatedly rakes it towards its mouth using the lip's bristles.

Other parts of the Florida manatee's snout are covered in vibrissae that are highly sensitive to touch. These enable the manatee to sense and explore food and objects before using its bristly vibrissae to grasp them. Having such a sensitive and finely controlled system for gathering food likely helps manatees efficiently feed on a variety of aquatic plants at different locations in the water column.

文獻引用 (REFERENCES)

「佛羅里達海牛的口鼻部和口周粗毛，具有異常大程度的精細動作控制力。在進食期間，上唇大而強壯的口周粗毛區，會以捲握方式來使用。海牛使用粗毛取食沉水植群的方式，發現與用於取食浮水植群時的方式不同。其他使用口周粗毛 (perioral bristle) 的行為，會依遇到的情況而有所變異。口周粗毛使用的可塑程度，支持了我們的假說，即佛羅里達海牛的觸鬚-肌肉複合體 (vibrissal-muscular complex) 已經演化出提高咬食和嚼食水生植物的效率，並充分發揮海牛作為廣食性者的潛力。」 (Marshall et al. 1998a: 274)

“Florida manatees possess an unusually large degree of fine motor control of the snout and perioral bristles. The large and robust perioral bristle fields of the upper lip were used in a prehensile manner during feeding. Bristle use by manatees feeding on submerged vegetation differed from that seen during feeding on floating vegetation. Other behavioral use of the perioral bristles shows variation depending upon the situation encountered. The degree of plasticity of perioral bristle use supports our hypothesis that the vibrissal-muscular complex of the Florida manatee has evolved to increase the efficiency of grazing and browsing on aquatic vegetation and to fully maximize the potential of the manatee as a generalist feeder.” (Marshall et al. 1998a: 274)

參考文獻清單與連結 (REFERENCE LIST)

Marshall, C. D., G. D. Huth, V. M. Edmonds, D. L. Halin, and R. L. Reep. (1998). Prehensile use of perioral bristles during feeding and associated behaviors of the Florida manatee (*Trichechus manatus latirostris*). *Marine Mammal Science* 14: 274-289.

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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/Trichechus_manatus_latirostris

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AskNature 原文連結

<https://asknature.org/strategy/modified-whiskers-handle-food/>