GET YOUR groove on

GRANT ATKINSON (3)

The fine grooves on skimmers' lower mandibles (above) are thought to reduce their wake while feeding (above, left), but not all birds have well-defined grooves (top).

The three species of skimmers are renowned for their unique foraging action. They capture fish and other aquatic prey by flying just above the water with their bill open, pushing their elongated lower jaw through the surface of the water. When it touches a fish, the bill snaps shut.

Although their prognathous lower mandible steals the show, skimmers have several other structural adaptations to their peculiar lifestyle. They are unique among birds in having slitted pupils, which are thought to be an adaptation to allow their pupils to expand massively, allowing them sufficient vision to fly – and thus feed – at night. They don't need to be able to see well enough to locate prey, just to avoid hitting obstacles.

The lower mandible is laterally compressed to allow it to cut smoothly through the water, reducing drag to a minimum. Despite this, skimmers have relatively massive heads, presumably resulting from the muscles needed to hold the bill steady as it ploughs through the water (as well as to grasp their slippery prey, a task made more difficult by the flattened bill). They also have slightly longer necks than the terns and gulls, allowing them to keep their bodies well away from the water while feeding.

Skimmers also have disproportionately long and broad wings, which gives them an exceptionally low wing loading. This is essential because they can't flap too deeply while feeding, otherwise their wings would hit the water surface and cause them to crash. Their low wing loading also allows them to fly slowly, further reducing drag from the bill and giving them enough time to react to tactile stimuli.

One feature that is often overlooked, however, is the presence of fine grooves running at 45 degrees across either side of the lower mandible. Grant Atkinson's stunning pictures show how these grooves are aligned with the water's surface as the bird feeds. It has been suggested that the grooves serve to minimise the wake caused by the bill cutting through the water, reducing drag and importantly decreasing the likelihood of the wake hitting the bird's body. It would be interesting to test this hypothesis, and to assess whether we can use this principle in designing watercraft. However, Grant's photographs indicate differences in the extent of these grooves among adults, which raises intriguing questions about their importance.

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