Barn owls: why give a hoot?

by Kara Rosania

SCIENTIFIC NAME
Tyto alba

TAXONOMY
PHYLUM: Chordata
CLASS: Aves
ORDER: Strigiformes
FAMILY: Tytonidae

Physical description

The barn owl is known for its striking appearance: two almond-shaped black eyes with distinctive brown streaks in the inner corners are surrounded by a snowy white, heart-shaped face. The white feathers of the face and undersides of the body and wings contrast sharply with the orangey-brown color of the head, back, upper wings and tail. Their long, rounded wings and short tails give them a uniquely buoyant, loping flight style. This flight is noiseless, aided by the soft plumage that helps to muffle the sound of their feathers when flying, ensuring them a silent approach when honing in on their prey[1]. Measuring 29–44 cm in length and weighing 250–480 g, barn owls are short-lived, with an average life expectancy of 1–2 years in the wild. Females are often heavier than males and are somewhat showier, with a more reddish color and a more heavily spotted chest.

Research résumé

Strictly nocturnal, barn owls hunt by flying slowly over open fields at night or dusk. They specialize in hunting small ground mammals, and the vast majority of their food consists of small rodents such as voles, pocket gophers, shrews, mice and rats. The barn owl has excellent low-light vision and can easily find prey at night by sight, but these birds search for prey primarily using sound localization. The barn owl's ability to locate prey by sound alone is the best of any animal that has ever been tested and rivals that of humans[2]. Barn owls lack ear tufts, and their ears are asymmetrically positioned on their head, allowing them to use the interaural time difference, or the difference in the arrival time of the sound at each ear, to determine the position of a sound source in space[3]. Additionally, the satellite-dish shape of a barn owl's face helps it to gather and amplify sounds from its surroundings.

Neuroethologist Masazaku Konishi was the first to speculate that the owl brain might contain a map of auditory space, constructed on the basis of information about the arrival times, intensity and frequency of sounds perceived by each ear to construct a map of the location of sound sources. This would allow the owls to direct their strikes accurately towards prey making noise but hidden from sight[4]. In the late 1970s, Knudsen and Konishi localized this auditory space map to a region of the owl's brain called the inferior colliculus[5]. Further studies of the owl's inferior colliculus have shown that the development of the auditory space map is highly dependent on early auditory experiences[6] and that it shifts adaptively as the locations of sound sources move through space[7].

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The barn owl also provides an exceptional model to study stereovision, or the ability to see in three dimensions, because it displays one of the highest degrees of binocular specialization. Like humans, owls have two frontally placed eyes. As a result, owls can simultaneously compare images in the left and right eye in order to discriminate between objects and background[8]. Interestingly, the owl's visual experience also plays a crucial role in the formation and maintenance of the auditory space map by increasing auditory responses to sounds that are accompanied by visual information[9].

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