

Birds of a feather flock—and sing—together

by Dustin M. Graham

SCIENTIFIC NAME

Sturnus vulgaris

TAXONOMY

PHYLUM: Chordata

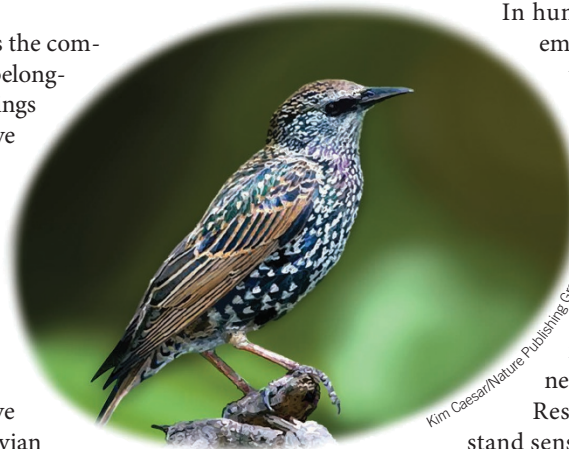
CLASS: Aves

ORDER: Passeriformes

FAMILY: Sturnidae

General description

The European starling, also known as the common starling, is a medium-sized bird belonging to the broader starling family. Starlings can reach up to 36 cm in length and have colorful plumage that is derived not from any pigment, but instead from the structure of their feathers¹ which creates a metallic sheen. Although native to Europe and western Asia, starlings can now be found in countries throughout the world¹. Owing to their social nature and ability to learn new tasks quickly, starlings have become one of the most widely used avian species for scientists studying neuroecology and social behaviors².



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Husbandry

Wild starlings are highly social and travel several kilometers per day from their nesting site^{1,2}. Starlings housed for research require adequate space of about 1 cubic meter for a singly housed bird, with multiple birds per room at sufficient density to maintain normal social behaviors². Enrichment strategies for starlings can include providing them with natural branches, woodchips, water baths, enclosures and invertebrate prey such as mealworms^{1,2}.

Research résumé

Starlings are well known for their impressive aerial displays while flying in large groups, known as flocks or murmurations^{3–5}. Flocks of starlings, which can be as large as thousands of birds, are able to maneuver as a group with precise fluidity. Although the exact mechanisms of this ability remain unknown, flocking starlings provide an excellent example of collective animal behavior⁴, and what some scientists call ‘emergent properties’⁵. Emergent properties arise in many complex systems but scientists rarely understand their origin. In the case of starlings, it is clear how one bird turning

affects the movement of an adjacent bird; but in a flock, it is far less clear how one bird’s movements can affect another when they are separated by thousands of other birds. By studying the flocking behavior of starlings, researchers hope to better understand how other systems with emergent properties, like the billions of neurons making up a human brain, are able to operate⁵.

Recent studies have also used starlings to study language and vocal communication—behavioral characteristics that were historically considered to be uniquely human. Starlings are very vocal and unsurprisingly, they have become one of the most popular animal models for studying the neural basis of language^{6–8}.

In human language information is typically embedded in words and grammatical structure. Starlings use patterns of vocalization referred to as ‘songs,’ and several quantitative studies have shown that the patterns of these songs have repeating motifs that are similar in structure to the syntactic rules used in human language⁶. Further, starlings have an innate ability to learn new songs, which makes them a potentially useful model organism for understanding the neural mechanism of language learning⁶.

Research on language also aims to understand sensory feedback, which occurs, for example, when a bird’s auditory system receives the sound of the bird’s own singing. Scientists have studied this in starlings by recording neural activity from specific auditory neurons while playing back the bird’s own song⁸. By comparing the bird’s neural responses to its own song and that of a conspecific bird, researchers hope to understand how a bird’s behaviors, such as song production, affect ongoing sensory processing.

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