

Prairie Babies: Studying the Growth and Development of Prairie Songbirds

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Tucked within a grassy nest in one of the last patches of tallgrass prairie in the world, a tiny hatching sparrow pecks its first hole out of its fragile egg. Over the next few hours the bird will work tirelessly to free itself from the eggshells. Exhausted, featherless, and blind, this bird is completely dependent on its parents for food and protection. Yet in the next week, this tiny sparrow will undergo a miraculous transformation from helpless hatchling to an independent young fledgling ready to leave the nest. Within those short seven days, this sparrow will grow all of its feathers, open its eyes, become nine times heavier, gain the ability to regulate its own body temperature, and be capable of short flights. If a human infant grew as quickly as this baby bird, the child would be four feet tall and would weigh seventy pounds one week after birth!



A recently hatched Grasshopper Sparrow rests next to his siblings' eggs



A seven-day-old Grasshopper Sparrow ready to leave the nest

Not all birds develop as quickly as these grassland sparrows—in fact, the speed at which baby birds grow and develop into adults can be very different between different species of birds. Baby bluebirds, tucked in a hole in a tree in the same pasture as the sparrows, will take twice as long to grow up and reach independence. Other species, such as a Bald Eagle, require months of growing rather than mere weeks. Incredibly, even birds of the same species can grow at different speeds—a sparrow baby in one location may take longer to grow up than a sparrow baby in a different location. The speed at which birds develop varies greatly!

Birds grow up at different speeds and, it turns out, the way in which they grow can be different. One species may develop feathers first, before they put on a lot of muscle. Another species may gain a lot of muscle and fat first, before they grow in all their feathers. The end result of their growth is the same—all adult birds need muscles, fat, and feathers—but the order in which this growth occurs can be different!

Why does this variation in growth and development matter? Well, being a bird is not an easy task. Many of these nestlings unfortunately die before they can reach adulthood. The speed at which they grow and the body parts that they grow first may determine whether they live or die. Understanding the interaction between the environment, the birds' growth and development, and their fate will help scientists predict the effect of environmental change on birds' survival, and may even help save endangered species.

We understand some of the relationships between environment, growth, and survival. Birds in areas with many nest predators tend to develop more quickly, which allows them to leave the nest earlier and avoid being eaten. When the numbers of predators are particularly high, the birds may grow and develop their wings faster so they can leave the nest earlier, even if it means that other parts of their body are not as developed (they may have less fat or fewer body feathers). Baby birds that receive more food can grow faster than birds in areas with less food. However, predators and food are not the only environmental factors affecting baby birds.



A Plains Milksnake eats a young Grasshopper Sparrow



Spotted cowbird eggs fill this Dickcissel nest

Brown-headed Cowbirds are a species of bird known as a brood parasite—instead of building their own nest and raising their own nestlings, the cowbirds lay their eggs in other birds' nests and force the hosts to raise baby cowbirds. These baby cowbirds grow quickly and end up larger than the host birds' nestlings. Sometimes the cowbird babies will keep the other nestlings from receiving food, killing the host nestlings. When cowbirds are present, they certainly affect the lives of other nestlings, yet few scientists have looked at how cowbirds could affect the growth and development of the host nestlings.

I study the growth and development of three grassland songbird species—Grasshopper Sparrows, Dickcissels, and Eastern Meadowlarks. Every day I take a crew of trained technicians to Konza Prairie, a research site in Northeast Kansas. We watch the adult birds and find their nests. Every other day, we return to the nest to measure the nestlings' weight, feather lengths, muscle growth, fat accumulation, beak length, and leg length. We can link the differences in nestling growth to the environmental characteristics at the nest—how much food is available, how cold the nest becomes, how many storms occur, the risk of predators finding the nest, and more. Finally, we look for links between the growth of the nestlings and any cowbirds that share the nest with them. I am very much looking forward to understanding the relationships between the environment, cowbird parasitism, and nestling growth and development!



Konza Prairie