Photos, Drawing, and Text by Heidi Meier
meierdvm@hotmail.com
March 31, 2022

Spring Bird Notes

***Regulus satraps* (Golden-crowned Kinglet)**

ORDER: Passeriformes (140 Families)
FAMILY: Regulidae (6 Species)

This year March came in like a lamb and is going out like a lion. The cold, snowy, but, peacefully quiet day has kept many people indoors to stay warm. However, outside, many spring migrants are starting to arrive. Today I saw a tail wagging Eastern Phoebe (*Sayornis phoebe*) who is one of the earliest spring migrants. These flycatchers will perch on an outer, low-hanging branch and periodically fly out to catch insects. Hopefully, more insects will be coming out to feed these hungry birds. In addition to seeing a Phoebe, I saw many Fox Sparrows (*Passerella iliaca*) scratching the soil with one or both feet at once to find seeds and insects. While walking by some conifers, I heard a familiar high, brief call and spotted a golden flick of color. It was a Golden-crowned Kinglet (*Regulus satraps*)! These small birds move very quickly and can be difficult to photograph. They hastily jump from branch to branch catching and consuming insects. Watch out non-biting midges!

Golden-crowned Kinglets are small, grayish-yellow birds with a thin, short beak, and a notched tail. Sexual dimorphism is present in this species and the male has the notable golden crown on the top of his head. Oftentimes, only the yellow-colored crown feathers are seen. However, when other males are nearby, or when birders are making “pishing” sounds, males will raise their crown feathers and you will be able to see a striking, central, orange-colored crown. The orange feathers are usually covered by other crown feathers when he is not threatened.

Golden-crowned Kinglets have a remarkable ability to withstand very cold temperatures. Thermoregulation in birds is accomplished by a combination of feather insulation and by the ability of some birds to change basal metabolic rates which enhances heat produced during respiration. The feather type responsible for the most insulating properties is the downy feather. Studies have found that small birds, like the kinglets, have ***longer*** contour, or outer, feathers and ***more downy***

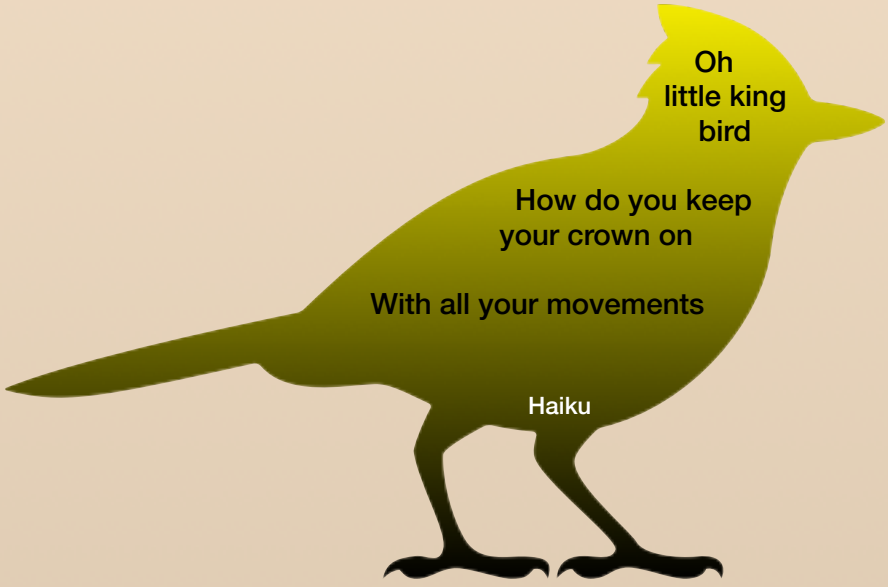
feathers when compared to larger birds. To simplify this feather thermoregulation principle, I would like to define some anatomical terms.

- Contour feathers are the outer body feathers and have a ***plumulaceous*** or a fluffy, formless downy portion that is closest to the body. Some birds have greater proportions of plumulaceous length on the contour feather, like the kinglet. Downy feathers are completely plumulaceous.

- Barbs are like teeth from a comb branching off the feather shaft. Barbs on downy feathers are much longer than the shaft and can trap large amounts of warm body air.

So, how can Golden-crowned Kinglets keep their body AND feathers at a warm 104^0F? This is accomplished by having longer, overlapping contour feathers which increases the distance from the skin to the outside air. Additionally, there is more downy segmental length on the contour feathers. And finally, there is less barb density in the downy feathers which provides better preservation of heat by trapping larger warm body air.

The breeding season begins in April to June in northern regions. The pair will typically select dense spruce woodland areas to mate and nest. The *suspended* cup nest is constructed by the female in about 5-10 days. She will use spiders' webs, moss, lichen, dried grasses, pine needles and even hair to build the nest. Then, she will line the 3-4 inch diameter nest with small roots, feathers and hair. The female will provide all the incubation and both parents will tend to the nestlings until they fledge in 2-3 weeks. This process will repeat for a second brood before they migrate back to their wintering habitat.



References:

1. The Birder's Handbook. A Field Guide to the Natural History of North American Birds. Paul R. Ehrlich, D. S. Dobkin, D. Wheye. 1988. Simon and Schuster Inc., New York, NY.
2. The Cornell Lab of Ornithology Handbook of Bird Biology, 3rd Ed. Irby J. Lovette and J. W. Fitzpatrick. 2016. John Wiley and Sons, Ltd., Chichester, West Sussex.
3. Walsberg, G. E. 1988. Heat flow through avian plumages: the relative importance of conduction, convection, and radiation. *J. Thermal Bio.* 13:89-92.
4. Sahas Barve, V. Ramesh, T. M. Dotterer, C. J. Dove. 2021. Elevation and body size drive convergent variation in thermo-insulation feather structure of Himalayan birds. *Ecography*. 44(5):680-689.
5. Swanson, D. L., L. Liknes. 2006. A comparative analysis of thermogenic capacity and cold tolerance in small birds. *J. Exp. Biol*. 209:466-474
6. Wolf, B., Walsberg, O. 2000. The role of the plumage in heat transfer processes of birds. *Am Zool*. 40:575-584.
7. Pap, P. L., et al. 2020. Down feather morphology reflects adaptation to habitat and thermal conditions across the avian phylogeny. *Evolution* 74:2365-2376.
8. Pap, P. L., et al. 2016. A phylogenetic comparative analysis reveals correlations between body feather structure and habitat. *Func. Eco*. 31(6):1241-1251.
9. Stettenheim, P. R. 2000. The integumentary morphology of modern birds - an overview. *Am. Zool.* 40:461-477.
10. The Sibley Guide to Bird Life and Behavior. David Allen Sibley. 2001. Andrew Stewart Publishing, Inc., NY and Toronto.
11. Peterson Reference Guide to Bird Behavior. John Kricher. 2020. Houghton Mifflin Harcourt Publishing Company, New York, NY.
12. Nests, Eggs, and Nestlings of North American Birds. Paul J. Baicich and Colin J. O. Harrison. 2005. Princeton University Press, Princeton's, NJ.