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Evolution of Webbed-Feet in Birds

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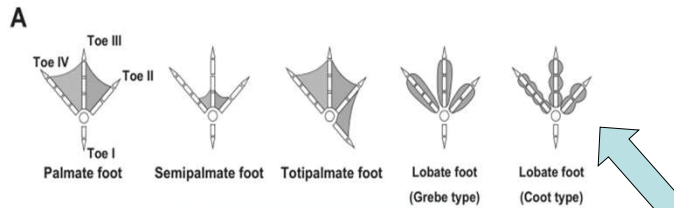


(cc) K.-S. Baek
Fossilized webbed-foot tracks in South

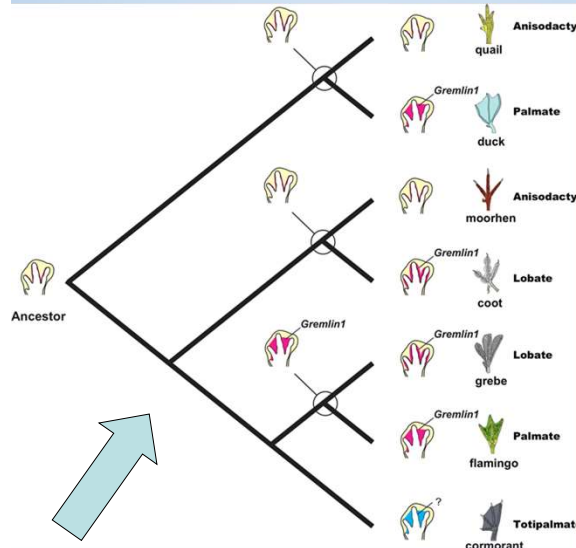
The first known web-footed fossil of birds dates back to the Early Cretaceous.

In Yang et al's "Preliminary report on the Cretaceous bird tracks of the Lower Haman Formation" (qtd. in Lim et al., 2000)

Figure 1



Credit: Tokita, M., Matsushita, H. & Asakura Y. (2020)



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Pictured is a potential phylogenetic tree proposing how webbed-feet may have evolved. Land relatives of species give insight on the type of webbed-feet when coupled with the *Gremlin1* gene.

Morphologically, there are different kinds of webbed-feet. Webbed-feet was independently acquired at least fourteen times in modern birds. (Tokita, M., Matsushita, H. & Asakura Y., 2020)

Now, of course, **why** webbed-feet?

Webbed-feet provide waterbird species with the means to survive in aquatic environments. The shape and way it is moved allows the birds a combination of lift and drag based movements to propel the birds so that they can move and hunt efficiently. (Johansson, L., Norberg, R. 2003)

Sources:

- Johansson, L., Norberg, R. Delta-wing function of webbed feet gives hydrodynamic lift for swimming propulsion in birds. Nature 424, 65–68 (2003). <https://doi.org/10.1038/nature01695>
- Lim, JD., Zhou, Z., Martin, L. et al. The oldest known tracks of web-footed birds from the Lower Cretaceous of South Korea. Naturwissenschaften 87, 256–259 (2000). <https://doi.org/10.1007/s001140050715>
- Tokita, M., Matsushita, H. & Asakura, Y. Developmental mechanisms underlying webbed foot morphological diversity in waterbirds. Sci Rep 10, 8028 (2020). <https://doi.org/10.1038/s41598-020-64786-8>