

A Look Beyond

Coywolf: A New Species in Our Midst?

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You may see one trotting down a neighborhood street or hear a pack howling anywhere in New England, from rural areas to urban centers. It looks bigger than a coyote but smaller than a wolf—and that's because the "coyotes" in northeastern North America are hybrids between coyotes and wolves. A paper I recently co-authored states that

they should be called coywolves and that they warrant new species status—*Canis oriens*—"eastern canid" in Latin.

This conclusion is based on the fact that these animals are distinct physically (in form and structure) and genetically from their parent species of mainly western coyotes (*Canis latrans*) and eastern wolves (*Canis lycaon* or *Canis lupus lycaon* depending on which school of genetics one favors). However, they also include smaller amounts of genetic material from the gray wolf (*Canis lupus*) and domestic dog (*Canis familiaris*). Despite the mixed-species background that created it, there is no ongoing hybridization in most of this creature's range, which centers around New England—and that means we have a new species in our midst.

The coywolf: a biographical sketch

Before explaining the unique characteristics of the coywolf, let's take a quick snapshot of this animal. The coywolf colonized northeastern North America 50 to 75 years ago. The emerging picture of the coywolf is that it has a larger home range than most western coyotes, but a smaller one than wolves, at about 11.5 square miles or 29 square kilometers. It also travels long distances (10 to 15 miles or 15 to 25 kilometers) daily and eats a variety of food including white-tailed deer, medium-sized prey such as rabbits and woodchucks, and small prey such as voles and mice.

Coywolves are social, often living in families of three to five members. The coywolf has ecological and physical characteristics that can be seen on a continuum of coyote-like to wolf-like. Overall, though, the coywolf seems to occupy an ecological niche that is closer to coyotes than to wolves, which are typically predators of hoofed animals like deer.

Some scholars claim that because this animal is predominantly coyote it should be called a coyote, and not a coywolf. In analyzing this claim, it is



Wolf Coywolf Eastern Coyote



important to remember the difference between a numerical (e.g., voting where the majority wins) versus statistical difference. Research has found coywolves to be significantly independent from western coyotes and eastern wolves in both body size and genetics. This means that they classify differently from both of their parent species. Yet they are numerically closer to coyotes (just 35-37 percent larger) than they are to wolves (which are 61-71 percent larger than coywolves) which gives some scholars the inaccurate perception that they are just coyotes, based on the fact that they have always been called coyotes in the Northeast. But it is important to remember that nearly 40 percent of this animal is NOT coyote.

Given the relatively small amounts of dog in the coywolf's genome, and the fact that dogs are very closely related to wolves, it seems reasonable to keep 'coywolf' rather than 'coywolfdog' as this creature's name.

The term *coywolf* does not suggest that this animal is equally or more wolf than coyote. However, the terms coyote, eastern coyote and northeastern coyote undervalue the importance of the eastern wolf in the ancestry of this canid, effectively ignoring these facts:

1. One-third of the population's mitochondrial DNA (mother-inherited DNA) is derived from the eastern wolf.
2. Another one-third of that DNA is not found in most western coyote populations, but is found in eastern wolves.
3. A different type of DNA used for genetic profiling of individuals indicates that coywolves are unique and separate from western coyotes and eastern wolves.
4. Coywolves share father-inherited genes with eastern wolves.
5. In body size, coywolves are unlike either of their parent species.

Coywolves would be more closely related to coyotes than wolves on a *continuum* of gray wolf-to-western coyote, but the eastern wolf constitutes an intermediate species that blurs species differences among all canids. Recent research has concluded that eastern wolves form a bridge that facilitates wolf-coyote hybridization.

New Family Member Golden, Not Gray

Recent reports suggested that some African golden jackals were more genetically aligned with gray wolves (*Canis lupus*) than with the more obvious golden jackal (*Canis aureus*). This finding was surprising to canid genetics researchers Wayne and Koepfli, given the absence of gray wolves in Africa. After extensive genetic testing, they came to this conclusion:

"To our surprise, the small, golden-like jackal from eastern African was actually a small variety of a new species, distinct from the gray wolf, that has a distribution across North and East Africa," Wayne says.

The researchers (Robert K.) Wayne and (Klaus-Peter) Koepfli have named this previously unrecognized species the African golden wolf.

Note: The above is an edited version of the summary of Bob Wayne's 2015 study with Koepfli (lead author) and many others in Current Biology showing that the African golden jackal, which some geneticists had recently said were gray wolves, were not.

Hybridization is a natural process that can be accelerated by human modifications to the environment like hunting and habitat destruction. Even most humans have a hybrid genome with Neanderthals, although considerably less (~3-to-5 percent) than coywolves have of wolf genome input. Where there are permanent alterations to the environment (as in southern New England), there could be benefits to hybridization—like allowing coywolves to use the genes from all the species that created it, and evolve into an "appropriate" canid for the landscape.

One challenge to preserving the unique coywolf genome is the possibility of these animals becoming swamped by "western" coyote genes from the southern and western United States. The other flank of colonizing "eastern" coyotes (from the mid-Atlantic and southeast U.S.), which has fewer wolf genes, has just recently contacted the western part of the coywolf range. Thus, it remains to be seen whether this animal will remain distinct as opportunities increase for hybridization, which may alter the percentages of coyote and wolf in this hybrid. Eastern *Canis* genomics should be monitored now and in the future.

Why does it matter?

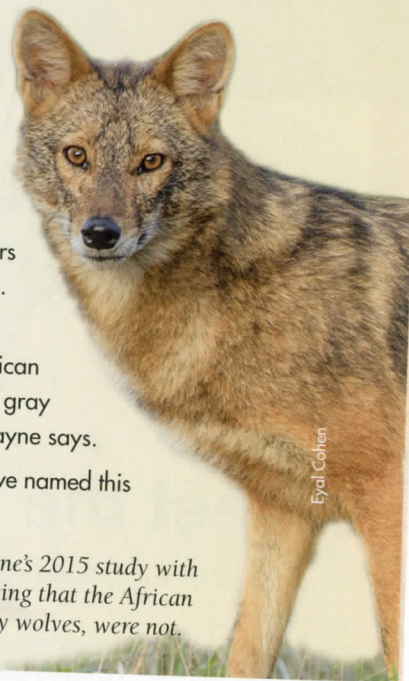
In the long run, does it really matter what we call this animal? In the course of this creature's less than 100-year his-

tory, it has been called coyote, eastern coyote, coydog, Tweed wolf, brush wolf, new wolf, northeastern coyote—and now coywolf. But as scientists, we are charged with accurately describing natural systems, and for this reason alone it is important that we precisely debate and characterize the systems we are studying. Since science is inherently self-correcting, it leads one in new directions by its very nature. While there may be continued controversy over this animal's designation, based on available evidence, *coywolf* does appear to be the very best name for the canid inhabiting northeastern North America. ■

Additional reading:

- Way, J.G. 2013. Taxonomic Implications of Morphological and Genetic Differences in Northeastern Coyotes (Coywolves) (*Canis latrans* × *C. lycaon*), Western Coyotes (*C. latrans*), and Eastern Wolves (*C. lycaon* or *C. lupus lycaon*). *Canadian Field-Naturalist* 127(1): 1-16.
- Way, J.G. and Lynn, W.S. 2016. Northeastern coyote/coywolf taxonomy and admixture: A meta-analysis. *Canid Biology & Conservation* 19(1): 1-8. URL: http://www.canids.org/CBC/19/northeastern_coyote_taxonomy.pdf.

Jonathan Way is the author of two books: *Suburban Howls and My Yellowstone Experience*, and the founder of *Eastern Coyote/Coywolf Research* (www.EasternCoyoteResearch.com).



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