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The Scientific Classification of Wolves: *Canis lupus soupus*

L. David Mech
USGS Northern Prairie Wildlife Research Center, david_mech@usgs.gov

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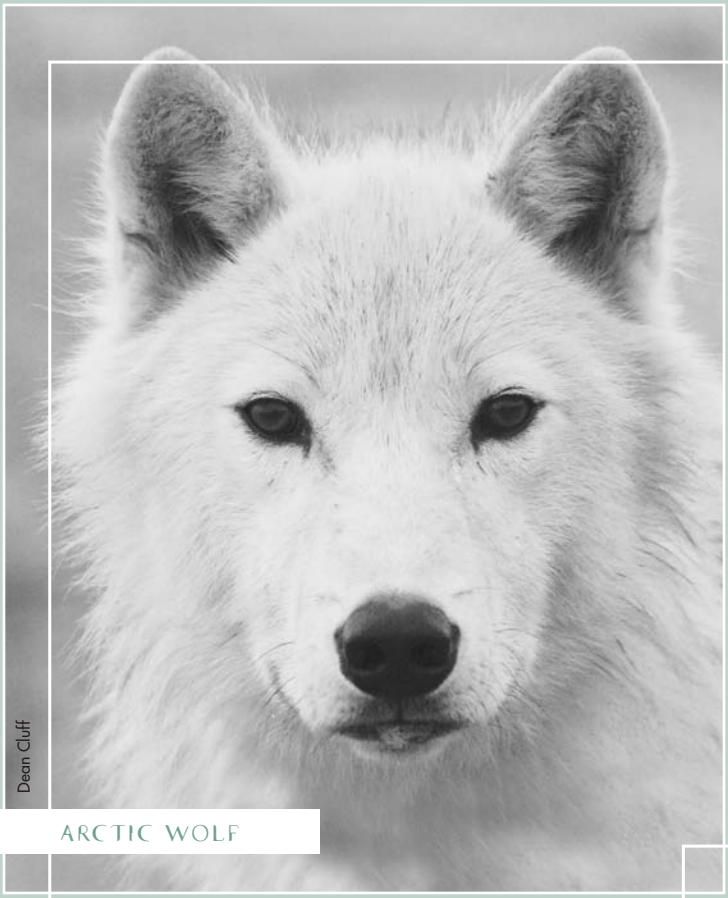

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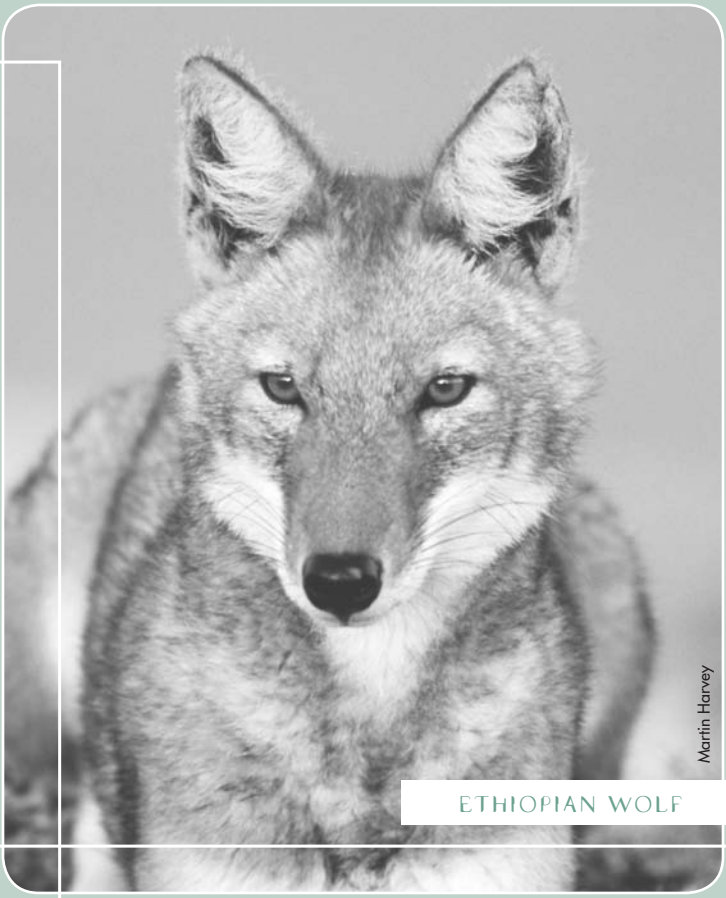
ARCTIC WOLF



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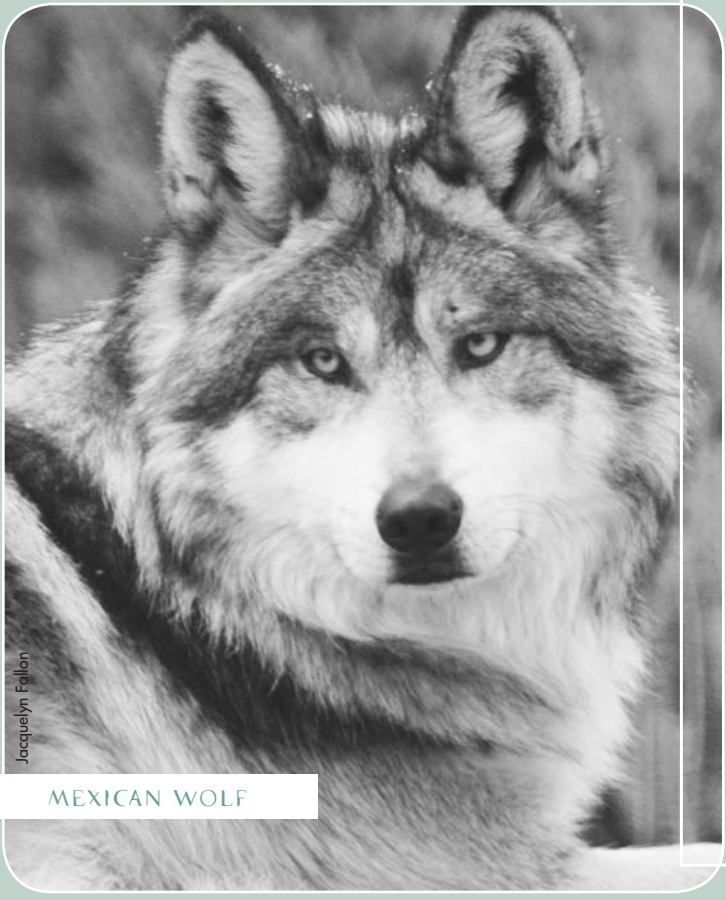

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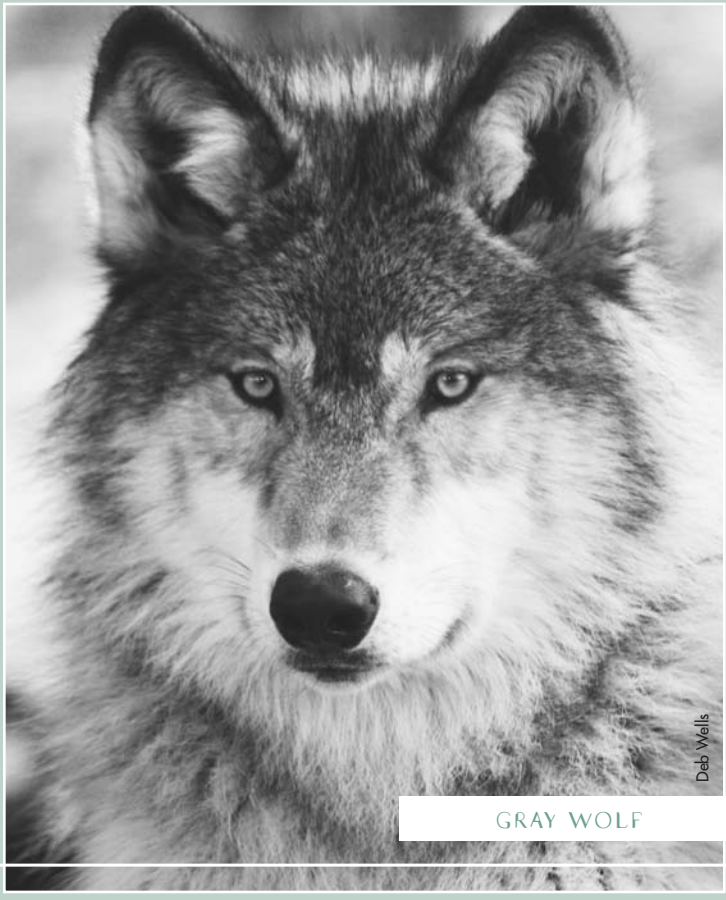


Deb Wells

GRAY WOLF

The Scientific Classification of Wolves:

Canis lupus soupus

by L. DAVID MECH

Gray wolf, timber wolf, red wolf, eastern wolf, brush wolf, arctic wolf, Mexican wolf, maned wolf, Ethiopian wolf, etc., etc. How many kinds of wolves are there? And what are the differences? This is a really good question, and the answer is getting more complicated all the time.

Let us start by going back a few years to the way science looked at wolves more traditionally— before the days of the new field of molecular genetics. Molecular genetics examines the actual DNA of animals and tries to classify them according to genetic similarities.

Before the advent of molecular genetics, scientists classified wolves (and other animals) based on their physical traits (morphology). With wolves, it was primarily coat color and skull measurements. These characteristics, of course, basically reflect the animal's genetics but only indirectly.

One major problem with this older approach is that there is a certain amount of judgment in assessing physical characteristics. Thus some classification scientists (taxonomists) were "splitters" and others "lumpers." Splitters tended to separate groups more finely, whereas lumpers tended to lump smaller groups into larger clusters. However, there was no objective basis for determining which approach might be correct or more informative.

Scientists who classified wolves in North America were splitters. Old World scientists had pretty well recognized that there were 8 geographically distinct races, or subspecies of wolves in Europe and Asia. However, North American scientists split New World wolves into 24 subspecies. This is how there came to be so many common names for North American wolves, for example, the eastern timber wolf, the arctic wolf, the Mexican wolf, the great plains wolf, etc. Scientifically, the subspecies or races have three parts to their name (Example: *Canis lupus baileyi*, the Mexican wolf), but all the subspecies are of the same basic gray-wolf species, *C. lupus*.

However, wolves are great travelers. Ear-tagged or radio-tagged wolves have dispersed from the natal packs in the range of one subspecies across the ranges of two or three other races. The current record is a wolf in Finland that traveled a straight-line distance of 655 miles, or 1,092 kilometers. This potential to travel calls into question the existence of so many subspecies with small ranges.

Thus it made good biological sense when in 1995 the eminent canid taxonomist, Ron Nowak, published a reclassification of North American wolves. He lumped the 24 originally recognized subspecies of North American wolves into 5. In reality, whether one recognizes 24, 5 or 3 North American races of wolves, a wolf is a wolf is a wolf. Science has not demonstrated any basic behavioral differences among any of these races,

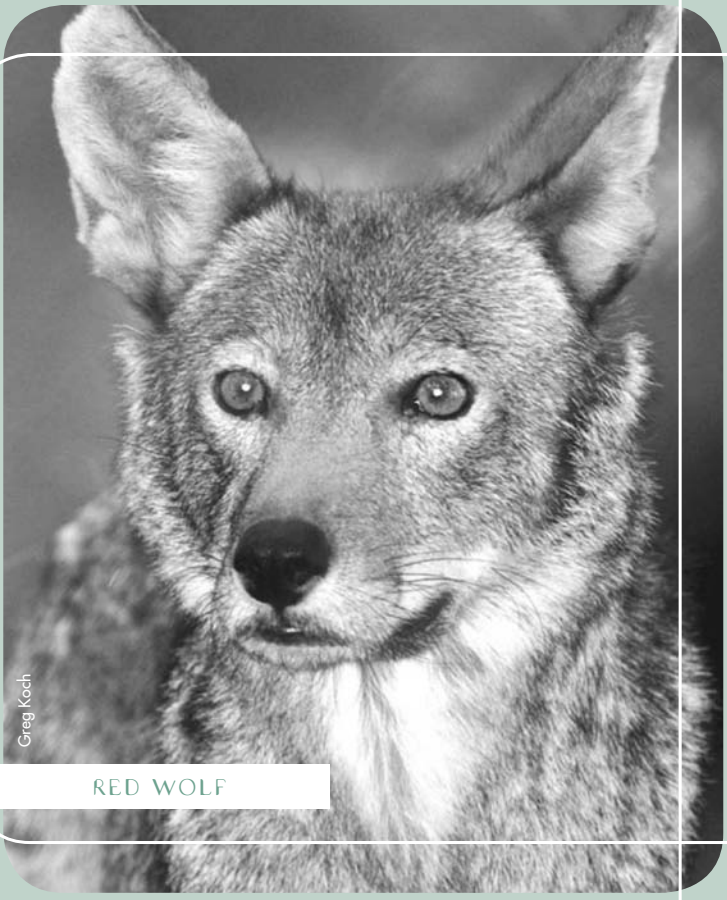
nor has any scientist even proposed that such behavioral differences exist among wolf races.

So far I have only been discussing the gray wolf, *Canis lupus,* which is the most widespread wolf worldwide. The other type of North American wolf that has traditionally been recognized is the red wolf, *Canis rufus,* of the southeastern United States. Scientists still disagree about the true identity of the red wolf. Some think the red wolf is a cross between the gray wolf and the coyote (*Canis latrans*—also called the "brush wolf" in some places). Others have proposed that the red wolf is just another race of gray wolf, while still others believe the red wolf is a valid entity of its own.

From a worldwide perspective, we must also consider both the maned wolf and the Ethiopian wolf. The maned wolf (*Chrysocyon brachyurus*) of South America is not really a wolf; it is still a member of the Canidae, or dog family, but it is not part of the wolf branch of that family, despite its common name. The Ethiopian wolf (*Canis simensis*), on the other hand, may actually be a wolf. Traditionally scientists thought the animal was a jackal (similar to a coyote), but recent genetic study seems to indicate it is a wolf. Some scientists, however, still think it is a type of jackal.

So much for the less complex aspects of wolf taxonomy. The complications have arisen because of the relatively new field of molecular genetics. Molecular-genetic studies are a powerful and valuable tool to add incisive information about the relatedness of one group of wolves to others. Mere appearances can be deceiving as the similarities between fish and whales attest. Molecular-genetics studies, however, examine the actual DNA of animals and thus potentially reveal their true genetic relatedness. These genetic studies use chemicals to amplify the DNA found in blood, hair, skin or even intestinal cells that slough off in feces. A special, high-tech machine then presents a sort of photo of parts of the DNA that can be examined.

Problems with the molecular-genetics approach arise, however, from several sources. First the field is relatively new and thus still being tested by the usual scientific processes like replication, competing interpretation and the continuing addition of new information. In addition, the issue of subjectivity or personal interpretation of the data is still a problem. Relatedness itself is a matter of degree. Except for twins or other multiple individuals arising from the same egg and sperm, every individual is genetically unique.



Greg Koch

RED WOLF

David Cartier

COYOTE

Every wolf pack is genetically distinct on a larger scale, and every wolf population is distinct on a still larger scale, etc. Thus where does one draw a line to group genetically similar entities as special enough to call them different?

Furthermore, how much weight should be given to results of various genetic tests relative to physical traits such as skull measurements that have a genetic basis but whose genetics have not been examined? For example, with one genetic test, some 38 percent of 88 Minnesota wolves tested have a kind of DNA the same as, or similar to, that of coyotes. This particular type of DNA has nothing to do with any physical or behavioral trait. Wolves with this coyote-like DNA mate with those having wolf DNA and form packs like all the other wolves in the population. They look and act like all the other wolves. Are the wolves with the two types of DNA the same species? What if other genetics tests show they differ, but the animals show no physical or behavioral differences and can freely interbreed? What if the two types also inhabit different but overlapping areas?

Are the wolves with the two types of DNA the same species?

What if other genetics tests show they differ, but the animals show no physical or behavioral differences and can freely interbreed?

The last is precisely the case with a proposed new species of wolf called the eastern wolf (*Canis lycaon*). This wolf lives from far southeastern Canada west to southwestern Ontario, northern Minnesota and Manitoba and is currently referred to as the "eastern wolf." In northern Minnesota and in adjacent Ontario, those wolves live closely and mate with wolves whose DNA (on this particular test) is the same as those in Alaska and northwest Canada. However, the eastern wolf has been proposed as a separate species. Not only that, but also some of the genetic tests indicate that the eastern wolf evolved in North America, along with the coyote, whereas the gray wolf evolved in Asia. Furthermore, the eastern wolf genetics examined were identical to those of the red wolf.

So is the eastern wolf the same as the red wolf? If so, does the red wolf cross with the gray wolf in Minnesota? That's what this reasoning and those tests imply. There is a hitch, however. The hitch is that the red wolf does not look like Minnesota wolves, and skulls of red wolves can be distinguished from those of eastern wolves and of Minnesota wolves.

If this all seems confusing, that's because it is. And adding to this confusion is the fact that both the red wolf and the eastern wolf can and do hybridize with coyotes, but there's no record of the gray wolf of western Canada and Alaska interbreeding with coyotes. (The experiment has never been tried in captivity.) The much larger size of the eastern coyote compared to all other coyotes is a reflection of these interactions. Also the fact that the eastern wolf and the red wolf can hybridize with coyotes may be further evidence the three evolved together in North America or at least are closely related.

Recently geneticists in India discovered that three genetically distinct populations of wolves lived adjacent to each other with no physical barriers and no apparent interbreeding. The geneticists proposed that two of these types be considered new species. However, the scientists presented no data or claim that these animals differed physically or behaviorally. Before the scientific community accepts new species designations, it usually requires additional research and information.

What does all this mean in terms of understanding basic wolf biology and behavior? Actually not much. The aphorism "a wolf is a wolf is a wolf" is highly appropriate in this regard to anyone except the taxonomist.

Regardless of what they are called or what differences the current genetic testing shows, wolves throughout the world are pretty much the same in basic appearance and behavior. The strong implication here is that when it comes to the great majority of the wolf genome that codes for basic wolf appearance and behavior—the DNA that has not been tested—gray wolves are essentially all the same. As to the races or subspecies of gray wolves, or the proposed new species, time and much more study will tell. Meanwhile, the classification of wolves to most members of the public will remain a mystery and an enigma probably best embodied in the not-so-scientific name, *Canis lupus soupus*. ■

L. David Mech is a senior research scientist for the U.S. Geological Survey and founder and vice chair of the International Wolf Center. He has studied wolves for 50 years and published several books and many articles on them. He is also a member of the International Wolf *Advisory Committee.*