

Adenovirus Associated with Long-Tailed Duck Mortality in Alaska

Scientists at the US Geological Survey are studying a virus isolated from long-tailed ducks (*Clangula hyemalis*) that died in the Beaufort Sea in 2000. Research has been initiated to evaluate the significance of the virus as a mortality factor and its prevalence in long-tailed duck populations.

Breeding populations of long-tailed ducks have been on the decline in Alaska since the 1970s, but little is known about the causes of mortality in this species. During the summer of 2000, biologists from the USGS Alaska Biological Science Center observed many dead long-tailed ducks in the Beaufort Sea near Prudhoe Bay, Alaska, where tens of thousands of molting long-tailed ducks congregate. Most of the dead birds were heavily scavenged by gulls, but a sample of intact carcasses was sent to the USGS National Wildlife Health Center for diagnostic evaluation. A virus was isolated from intestinal tissues, and ultrastructural examination by electron microscopy revealed characteristics of



Long-tailed ducks group together for late summer migration to molting areas, where diseases can be easily transmitted.

the virus family Adenoviridae.

At approximately the same time the die-off was discovered, serum samples and cloacal swabs were collected from long-tailed ducks in conjunction with studies conducted by the USGS Alaska Biological Science Center and the USGS Alabama Cooperative Fisheries and Wildlife Research Unit. Ducks were sampled in the vicinity of the mortality event and at a location about 100 km away, where no carcasses were found. Examination of these samples revealed that live virus was present in cloacas of about 50 percent of the long-tailed ducks from the mortality site, but was present in only 6 percent of the birds from the area where no carcasses were found. Furthermore, 86 percent of the long-tailed ducks at the mortality site had antibodies to the adenovirus in their serum, compared with 10 percent of the ducks from the reference area. The finding of a much greater prevalence of live virus and antibodies in ducks at the mortality site provides strong evidence that the virus was either directly responsible, or was a contributing factor, to the die-off of long-tailed ducks. Adenoviruses have been associated with illness and death in several avian spe-



Long-tailed ducks prefer to nest in tundra habitat, including regions of coastal and interior Alaska.

cies, including sea ducks in northern Europe.

The significance of this adenovirus will be evaluated with a series of field and laboratory studies. Long-tailed ducks molting in the Beaufort Sea will be captured, sampled for the virus, and fitted with radio transmitters. The virus status (presence of antibodies and live virus) will be compared with movement patterns as determined by radio telemetry. Nesting female long-tailed ducks will be sampled at a study site in the Yukon-Kuskokwim Delta, Alaska, and their virus status will be compared with reproductive parameters. In the laboratory, the virus will be characterized and its pathogenicity will be evaluated. A genetic test, based on the detection of viral DNA, will be developed to screen for the adenovirus in archived samples and in samples that can be easily collected and stored in the field.

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