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TWO EXAMPLES OF APPARENT AVIAN KERATIN DISORDER FROM CALIFORNIA

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Bill deformities in wild birds are normally very rare, so when concentrations of Black-capped Chickadees (*Poecile atricapillus*) and Northwestern Crows (*Corvus caurinus*) with malformed bills were detected in Alaska in the late 1990s and early 2000s, citizens and researchers became alarmed. An epizootic of bill deformities was documented and described as an emerging avian disease, coined “avian keratin disorder” (AKD) (Handel et al. 2010). Birds with this disorder had elongated, twisted bills caused by accelerated production of keratin in the rhamphotheca, the outer layer of a bird’s bill (Van Hemert et al. 2012b). Between 1999 and 2008, studies revealed that 6.5% of Alaska Black-capped Chickadees had bill deformities characteristic of AKD (Handel et al. 2010), and in 2007 and 2008 the prevalence of AKD in Alaska populations of the Northwestern Crow averaged nearly 17%, ranging as high as 36% in the Kenai Peninsula (Van Hemert and Handel 2010). These were by far the highest rates of bill deformities reported in wild bird populations. Although chickadees and corvids have had the largest number of reported cases, woodpeckers, nuthatches, and an increasingly wide variety of other species have also been affected (Handel et al. 2010, C. Van Hemert pers. comm.). Significant outbreaks of AKD-like deformities have also been reported in the United Kingdom, affecting similar taxa (www.bto.org/volunteer-surveys/gbw/about/background/projects/bgbw). Afflicted birds become handicapped in their ability to accomplish essential activities such as feeding and preening, and mortality rates appear high (Van Hemert et al. 2012a, Van Hemert et al. 2012b, Handel et al. 2010).

The underlying cause of AKD remained elusive for nearly 20 years. Researchers tested bacterial and fungal infections, environmental contaminants, nutritional deficiencies, and trauma, and were unsuccessful in identifying an underlying cause. However, this mystery may now be solved. A team of scientists from the California Academy of Sciences, the University of California San Francisco, and the U.S. Geological Survey (USGS) have identified a new virus, termed Poecivirus, which has been strongly associated with AKD in Alaska birds (Zylberberg et al. 2016). Studies to test if the Poecivirus is the agent causing AKD are currently underway. If this relationship is confirmed, sampling and surveillance across a much larger geographical area may be initiated. The virus is detectable in cloacal swabs from birds, so collaboration with bird-banding and other programs that handle wild birds could relatively easily screen for this virus, which has yet to be tested for or documented outside of Alaska.

AKD appears to be spreading both geographically and in the number and diversity of bird species affected. Because AKD is being monitored primarily through solicited reports, public awareness plays a key role in documenting the disorder’s prevalence and distribution. In North America outside of Alaska and the Pacific Northwest, reports of birds with AKD are fairly widespread, although in low densities.

In California, researchers with the U.S. Geological Survey (USGS) have received over 90 reports from a variety of species with bill deformities consistent with AKD (C. Van Hemert pers. comm.). Here, I present evidence from two additional species. The White-headed Woodpecker (*Picoides albolarvatus*) depicted on this issue’s back cover is presumably the same individual that visited a suet feeder and bird bath in Mammoth Lakes, Mono County (elevation 2400 m), over a period of about 6 weeks in the fall of 2015. Advancement in the overgrowth of its bill is apparent in these two photographs taken 22 days apart. The image above was taken 20 September

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Figure 1. Western Meadowlark with deformed bill, the deformation possibly arising from avian keratin disorder, near Calipatria, Imperial County, 23 December 2015.

Photo by Nancy Overholtz

2015. Here, the mandibles are aligned, and the upper mandible appears about 15% longer than the lower mandible. In the image below, taken 12 October, the bill has grown longer relative to the head size, and the mandibles have become misaligned and crossed. Such rapid growth must make this condition very difficult for the bird to adapt to. Studies of captive Black-capped Chickadees afflicted with AKD also recorded rapid abnormal bill development occurring within a few weeks, and that growth in the upper mandible tended to outpace that in the lower (Van Hemert et al. 2012b). Additionally, the right foot of this woodpecker was thickened or swollen. Lesions and keratinized tissues are sometimes found on the legs, feet, and claws of birds suffering from AKD (Van Hemert and Handel 2010). Although this is the first reported case of a White-headed Woodpecker with a bill deformity consistent with AKD, similar deformities have been reported in eleven other woodpecker species throughout North America, including the Downy (*P. pubescens*) and Hairy (*P. villosus*) woodpeckers in Alaska (C. Van Hemert pers. comm., Handel et al. 2012b).

The Western Meadowlark (*Sturnella neglecta*) in Figure 1 was photographed near Calipatria, Imperial County, 23 December 2015. USGS has reports of Western Meadowlarks with bill deformities typical of AKD from several locations; this is the first for California (C. Van Hemert pers. comm.).

In conclusion, AKD appears to be a rapidly spreading disease afflicting a wide variety of species and may be caused by a newly discovered virus. Further investigations are needed to confirm whether the virus is the causal agent of AKD, or if other factors are involved in its development and spread. If bird(s) with deformed bills are seen, please report them to USGS at https://alaska.usgs.gov/science/biology/land-birds/beak_deformity/observerreport.php, and practice equipment hygiene if such birds are observed at bird feeders.

I thank Caroline Van Hemert for her helpful correspondence and sharing information used in this note.

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WFO is looking forward to having you join us in Ventura for this year's conference. We have an excellent lineup of workshops and field trips, including two all-day pelagic trips to Santa Cruz Island (for the Island Scrub-Jay) and pelagic waters beyond. The banquet's keynote speaker is David Ainley, of H. T. Harvey & Associates, whose address will be "Population dynamics of seabirds in response to their prey in the Gulf of the Farallones, 1980s to the present." The plenary speaker at the science sessions will be Paul Collins from the Santa Barbara Museum of Natural History. You'll enjoy hearing and seeing Nathan Pieplow's sound quiz and Ed Harper's photographic quiz. Meeting this year's group of enthusiastic Youth Scholars is always heartwarming and fun!

A schedule of events will be posted at www.westernfieldornithologists.org in May. Registration will open in June, so please make sure your membership is up to date. The last day to register will be Monday 10 September 2018.

Most of you will want to enjoy the camaraderie of other participants by staying at our host hotel. The Ventura Beach Marriott has provided WFO with a group rate. If you book your stay at the Marriott hotel, there is a significant reduction of the parking fee to a \$10 flat fee. You can make your reservations now, mentioning Western Field Ornithologists, by calling toll-free to 800-391-6585, or by using the link at WFO's website, www.westernfieldornithologists.org.



“Featured Photos” by © Malcolm Clark of Mammoth Lakes, California: White-headed Woodpecker (*Picoides albolarvatus*) at Mammoth Lakes, Mono County, California, 20 September and 12 October 2015. The mandibles have grown rapidly far beyond their normal length, as seen in birds afflicted with avian keratin disorder, now frequent among some species in Alaska.