

Beak Deformity in the Endangered Black-capped Vireo

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ABSTRACT

A Black-capped Vireo (*Vireo atricapilla*), originally banded in 2005, possessed a crossed bill when recaptured in 2006.

DISCUSSION

The Black-capped Vireo (*Vireo atricapilla*), a migratory songbird, is listed federally as an endangered species in the United States (Ratzlaff 1987). One of the largest breeding populations for this species currently exists on the Fort Hood Military Reservation (Cimprich 2006). Since the listing of the Black-capped Vireo, a variety of research and monitoring activities aimed at conservation of the vireo have been conducted on this 35,800 ha military installation in central Texas (Tazik 1988). The Nature Conservancy, in cooperation with the Department of Defense, has conducted intensive monitoring of this population since 1997. In an ongoing mark-recapture effort, individual adult birds are captured and marked with unique color combinations.

On 5 Jun 2005, during a target mist-netting attempt, we captured and banded a Black-capped Vireo on Fort Hood (31°17'26"N, 97°48'2" W). Using Pyle's (1997) guidelines, we determined this individual as an after-hatch-year male. At this time, the individual's upper mandible extended slightly past the lower mandible but both were straight. On 8 May 2006, this bird was recaptured approximately 275 m from the original capture location. We noticed that the beak of this bird was now obviously abnormal and crossed (Fig. 1). The lower mandible was deflected to the right of its original

position by approximately 20°. The tip of the upper mandible was bent downward. Although beak deformities have been reported for a number of families and species (Craves 1994), to our knowledge this is the first documented beak deformity in a Black-capped Vireo.

Frequency of deformities in beak structure in the wild is estimated at less than 0.05% (Pomeroy 1962). This low frequency could be due to the low fitness of birds with deformed beaks. Deformities in the structure of the beak may affect individual survival negatively through inefficient foraging or preening (Benkman and Lindholm 1991). As of 17 Apr 2007, this individual had not been observed on Fort Hood. We can not know the fate of this individual.

We did document this individual's breeding success for two consecutive years. In 2005, we observed this male with a female in early April and in mid-May constructing a nest resulting in only one egg being laid before abandonment. After this nesting attempt, the male was unsuccessful in attracting another female for the remainder of the breeding season. In 2006, this male attempted a nest on three separate occasions; all were unsuccessful in producing offspring. In the first attempt, the nest was depredated during the incubation stage. The second attempt was abandoned during the egg laying stage, and the third was depredated during the nestling stage. The nestlings were approximately eight days old. Overall, this individual's four nesting attempts in two years resulted in the production of 10 eggs (2.5 eggs/clutch) and zero offspring. For comparison, 50% of territorial males under observation produced at least one fledgling in 2006 (Cimprich 2006).

Male Black-capped Vireos share incubation and feeding responsibilities of rearing young. We will not speculate on the ability of this particular individual to feed and care for his young properly; however, individuals whom can not forage efficiently due to a bill deformity may not be able to provide sufficiently for young.

Causes of beak deformities are not well understood but have gained more attention recently (Rintoul 2005). Possible mechanisms for abnormal beak formation include trauma to the beak (Flammer and Clubb 1994), diseases

(Pass and Perry 1984), infections (Gartrell et al. 2003), nutritional deficiencies (Stevens et al. 1984), genetic defects (Muller and Mousseau 2001) and exposure to various contaminants (Bardai et al. 2005, Fernie et al. 2003, Hoffman et al. 1998). Although the cause of this individual vireo's beak deformity cannot currently be determined, documentation will help elevate awareness for abnormalities in this and other species. If deformities in Texas begin to appear more often, as in Alaska (Handel et al. 2006), this may become a serious conservation and environmental issue that requires attention.

Fig. 1. First documented beak deformity in a Black-capped Vireo.



LITERATURE CITED

- Bardai, G., G. I. Sunahara, P. A. Spear, M. Martel, P. Gong, and J. Hawari. 2005. Effects of dietary administration of CL-20 on Japanese Quail *Coturnix coturnix japonica*. *Arch. Environ. Contam. Toxicol.* 49:215-222.
- Benkman, C. W. and A. K. Lindholm. 1991. The advantages and evolution of a morphological novelty. *Nature* 349:519-520.
- Cimprich, D. A. 2006. Monitoring of the Black-capped Vireo during 2006 on Fort Hood, Texas. In *Endangered species monitoring and management at Fort Hood, Texas: 2006 annual report*. The Nature Conservancy, Fort Hood Project, Fort Hood, TX.
- Craves, J. A. 1994. Passerines with deformed bills. *N. Amer. Bird Bander* 19:14-18.
- Fernie, K., G. Bortoloti, and J. Smits. 2003. Reproductive abnormalities, teratogenicity, and developmental problems in American Kestrels (*Falco sparverius*) exposed to polychlorinated biphenyls. *J. Toxicol. Environ. Health, Part A66* (22):2089-2103.
- Flammer, K. and S. Clubb. 1994. Neonatology. In Ritchie, B., G. Harrison, and L. Harrison (eds.), *Avian medicine: principles and applications*. Wingers Publishing, Lake Worth, FL.
- Gartrell, B. D., M. R. Alley, and T. Kelly. 2003. Bacterial sinusitis as a cause of beak deformity in an Anipodes Island Parakeet (*Cyanoramphus unicolor*). *New Zealand Vet. J.* 51:196-198.
- Handel, C. M., L. M. Pajot, S. M. Matsuoka, K. A. Trust, J. M. Stotts, J. Terenzi, and S. L. Talbot. 2006. Potential role of environmental contaminants in the pathology of beak deformities among Black-capped Chickadees in south-central Alaska. Unpublished final report. Project ID: 1130-7F22. U. S. Geol. Surv., Alaska Science Center, Anchorage, AK.
- Hoffman, D. J., M. J. Melancon, P. N. Klein, J. D. Eisemann, and J. W. Spann. 1998. Comparative developmental toxicity of planar polychlorinated biphenyl congeners in chickens, American Kestrels and Common Terns. *Environ. Toxicol. Chem.* 17:747-757.
- Moller, A.P. and T.A. Mousseau. 2001. Albinism and phenotype of Barn Swallows (*Hirundo rustica*) from Chernobyl. *Evolution.* 55:2097-2104.
- Pass, D. A. and R. A. Perry. 1984. The pathology of psittacine beak and feather disease. *Australian Vet. J.* 61:69-74.
- Pomeroy, D. E. 1962. Birds with abnormal bills. *British Birds* 55:49-72.
- Pyle, P. 1997. Identification guide to North American birds: Part I: Columbidae to Ploceidae. Slate Creek Press, Bolinas, CA.
- Ratzlaff, A. 1987. Endangered and threatened wildlife and plants: determination of the Black-capped Vireo to be an endangered species. *Federal Register* 52:37420-37423.
- Rintoul, D. 2005. Beak deformity in a Brown-headed Cowbird, with notes on causes of beak deformities in birds. *Kansas Ornithol. Soc. Bull.* 56:29-32.
- Stevens V. I., R. Blair, R. E. Salmon, and J. P. Stevens. 1984. Effect of varying levels of dietary Vitamin-D3 on turkey hen egg-production, fertility and hatchability, embryo mortality and incidence of embryo beak malformations. *Poultry Science* 63:760-764.
- Tazik, D. J. 1988. The Black-capped Vireo on the lands of Fort Hood, Texas: a summary of research conducted during 1987 and 1988. U.S. Army Corps Engineers, Construct. Engineer. Res. Lab., Champaign, IL.