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Passerines with Deformed Bills

Julie A. Craves
Natural Areas Department
University of Michigan-Dearborn
Dearborn, MI 48124

Pomeroy (1962) stated that abnormal bills—subjectively defined as being noticeably “different from the normal”—in wild birds are rare, with a frequency estimated at less than 0.5%. No doubt the degree of deformity affects individual survival and the resulting low frequency. For example, while some birds can adjust to their handicap and may feed by turning their heads to one side (Brown 1976; Sharp and Neill 1979; Steffee 1968), others apparently starve or are plagued by numerous parasites, such as body lice (Thompson and Terkanian 1991; Arendt and Arendt 1986). Deformed bills can take many forms. Mandibles may be crossed, upper and/or lower mandibles curved downwards, upper and/or lower mandibles curved upwards, or mandibles elongated (nearly always also curved downward as well).

I searched the literature for reports of bill abnormalities in passerines. Table 1 summarizes a number of these reports. I noticed that bill deformities seemed more prevalent in certain groups. The families Icteridae and Mimidae as well as abundant species (such as European Starlings [*Sturnus vulgaris*] and House Sparrows [*Passer domesticus*]) seem over represented with a high incidence of reported deformities. This paper offers a review of my research.

As an example of multiple reports for common species, Pomeroy (1962) cited more than 60 cases of European Starlings with bill deformities, but concluded that deformities are probably no more prevalent in starlings than among other species. Corroborating this conclusion is the 0.038% frequency of abnormal bills in starlings found by Hicks (1934) in a large (about 10,000), U.S. sample. The high number of reports for these species is very likely due, simply, to their abundant numbers.

Table 1. Passerines with deformed bills. See Tables 2 and 3 for mimids and icterids.

Species		Reference
Barn Swallow	<i>Hirundo rustica</i>	Pomeroy 1962
House Martin	<i>Delichon urbica</i>	Pomeroy 1962
Hooded Crow	<i>Corvus corone</i>	Pomeroy 1962
Rook	<i>Corvus frugilegus</i>	Pomeroy 1962
Blue Jay	<i>Cyanositta cristata</i>	Johnson 1929
Scrub Jay	<i>Aphelocoma coerulescens</i>	Fox 1952
European Nuthatch	<i>Sitta europaea</i>	Pomeroy 1962
Great Tit	<i>Parus major</i>	Pomeroy 1962
Blue Tit	<i>Parus caeruleus</i>	Pomeroy 1962
European Robin	<i>Erithacus rubecula</i>	Pomeroy 1962
American Robin	<i>Turdus migratorius</i>	Hodges 1952
Song Thrush	<i>Turdus philmelos</i>	Pomeroy 1962
European Starling	<i>Sturnus vulgaris</i>	Pomeroy 1962
Common Yellowthroat	<i>Geothlypis trichas</i>	Flanigan 1976, Riggins 1976
Phyrrhuloxia	<i>Cardinalis sinuatus</i>	Easterla & Wauer 1972
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	Fox 1952
Corn Bunting	<i>Emberiza calandra</i>	Pomeroy 1962
Snow Bunting	<i>Plectrophenax nivalis</i>	Pomeroy 1962
Savannah Sparrow	<i>Passerculus sandwichensis</i>	Flanigan 1976
White-throated Sparrow	<i>Zonotrichia albicollis</i>	Craves, pers. obs.
Song Sparrow	<i>Melospiza melodia</i>	Flanigan 1976
Linnet	<i>Carduelis cannabina</i>	Pomeroy 1962
House Sparrow	<i>Passer domesticus</i>	Pomeroy 1962
European Tree Sparrow	<i>Passer montanus</i>	Barlow 1967

Multiple reports of bill deformities in the family Icteridae were also found. Sharp and Neill (1979) studied populations of wintering blackbirds, most of which were Red-winged Blackbirds (*Agelaius phoeniceus*). They found a frequency of bill deformity of 0.6% (18 cases). A search of the literature and the collection of study skins at the Museum of Zoology, University of Michigan (UMMZ) revealed reports of bill deformities in 9 species of icterids (see Table 2).

I also found multiple reports of bill abnormalities among the Mimidae. My encounter with a deformed Gray Catbird (*Dumetella carolinensis*) prompted my interest to review bill deformities and I found 25 references in the literature of bill deformities in this family, and one other instance at UMMZ (see Table 3). Unfortunately, authors did not give samples sizes and a frequency rate cannot be determined. Mimids do not gather in large flocks nor are they considered abundant if compared to starlings, House Sparrows, or blackbirds. The high number of reports suggest a higher than "normal" frequency of deformities for the Mimidae.

Table 2. Icterids with deformed bills. T=top mandible (maxilla); B = lower mandible.

Species	Location	Description	Reference
Western Meadowlark <i>Sturnella neglecta</i>	Yavapai Co, AZ	AHY-M; 15 Apr 1966; T=77.5 mm, B=64 mm, downcurved	Carothers & Balda 1970
Chestnut-capped Blackbird <i>Agelaius ruficapillus</i>	Paraguay	M; 22 Feb 1935; T 2 mm beyond B	UMMZ 96148
Red-winged Blackbird <i>Agelaius phoeniceus</i>	Ft Worth, TX	18 M with various deformities, mostly elongated bills	Sharp & Neill 1979
	Fresno Co, CA	AHY-M; 24 May 1963; T curved to right, tongue dry; partial albino	Morton 1963
Yellow-headed Blackbird <i>Xanthocephalus xanthocephalus</i>	Clay Co, MO	AHY-M; 3 May 1968; T=49 mm, flared at tip	Easterla & Todd 1971
Great-tailed Grackle <i>Quiscalus mexicanus</i>	Ft Worth, TX	2 F, one elongated B; one with crossed bill	Sharp & Neill 1979
Common Grackle <i>Quiscalus quiscula</i>	Pennsylvania	AHY-F; T,B downcurved, 3 mm gap between T & B	Mutchler 1976
	Ft. Worth, TX	M with T elongated	Sharp & Neill 1979
	Washtenaw Co, MI	M; 25 May 1936; T elongated & decurved 4.5 mm beyond B	UMMZ 90316
Bronzed Cowbird <i>Molothrus aeneus</i>	Brewster Co, TX	AHY-M; crossed bill infested with lice	Easterla & Wauer 1972
Brown-headed Cowbird <i>Molothrus ater</i>	Ft Worth, TX	4 F; elongated bills	Sharp & Neill 1979
	Washtenaw Co, MI	HY-M; 18 Jul 1944; T curve to left B curved to right, 5 mm apart	UMMZ 199990
Hooded Oriole <i>Icterus cucullatus</i>	Port Rowan, Ontario	AHY-M; May 1992; crossed bill	LPBO 1992

Table 3. Mimids with deformed bills. T=top mandible (maxilla); B = lower mandible.			
Species	Location	Description	Reference
Gray Catbird <i>Dumetella carolinensis</i>	Wayne Co, MI	HY; 15 Sep 1993; T to right, B to left, 16 mm apart	Craves pers. obs.
	Livingston Co, MI	HY-M; Sep 1949; crossed at tip	UMMZ 116428
	Claredon, VA	T decurved upwards at 45 degrees	Allard 1930
Brown Thrasher <i>Toxostoma rufum</i>	central Florida	6 individuals with "sickle-shaped" bills	Steffee 1968
	Seminole Co, FL	F; T=40 mm	Taylor & Anderson 1972
	Tampa, FL	26 Apr 1975; T=70 mm; also 10 other individuals with deformities	Brown 1976
	Ruston, LA	15 Dec 1967; T=29.5 mm and decurved	Goertz & Mowbray 1969
	Sumpter Co, SC	15 Jan 1979; T=105 mm decurved, B=66 mm twisted to left	Post 1985
	Island Beach, NJ	HY, 24 Sep 1967; bill strongly curved to right	Prescott 1968
Curved-billed Thrasher <i>Toxostoma curvirostre</i>	Tempe, AZ	HY-M; T=107 mm, B=62.5 mm decurved; lice infestation	Thompson & Terkanian 1991
California Thrasher <i>Toxostoma redivivum</i>	Westwood Village, CA	T=69 mm, broken; B=112 mm	Fox 1952
Pearly-eyed Thrasher <i>Margarops fuscatus</i>	Montserrat, West Indies	SY; long T curved downward, B broken; lice infestation	Arendt & Arendt 1986

To understand bill abnormalities, it is useful to review the anatomy of a bird's bill. The structure of a bird's bill, from the inside out, is as follows: 1) an underlying bony structure, 2) the dermotheca, a thin, cutaneous layer containing blood vessels and nerves, and 3) the rhamphotheca, the visible horny sheath. The rhamphotheca is formed when cells from the dermotheca are produced, move outward, and become keratinized and hard.

Possible reasons for bill deformities include genetic or developmental causes, injury, or disease. Several researchers (Fox 1952, Pomeroy 1962, Sharp and Neill 1979) could not produce conclusive evidence to support any of these causes. In fact, some evidence seems contradictory. For example, if bill deformity were genetic in nature, some

abnormality in bony structure might be expected. Yet typically (Thompson and Terkanian 1991; Fox 1952; Taylor and Anderson 1972; Easterla and Todd 1971), the abnormality was due to the excessive growth of the dermotheca and rhamphotheca; the underlying bony structure was normal. Bill deformities due to injuries might be expected to produce scars on the underlying bony structure, but again, bone has appeared normal. Additionally, if injury was the cause, then uniform, correlated growth to each mandible would not be expected (Fox 1952).

The idea that bill deformities may be due to chemical pollutants such as pesticides is worth exploring. Birds such as gulls, cormorants, and some raptors with malformities stemming from chemicals

are well-documented. The dietary habits of these birds, high on food chains, make them recipients of concentrating environmental mutagens, a possible cause for deformities. Since passerines tend to be lower in the food chain, the possible connection between environmental causes and bill deformities is not as strong.

Still, some researchers have offered chemical pollutants as a potential explanation for bill deformities in the birds they studied. Sharp and Neill (1979) felt that the deformities they found among blackbirds may have resulted from avicidal chemicals. Brown (1976) also mentioned this possibility as the cause of the numerous deformed Brown Thrashers (*Toxostoma rufum*) in central Florida, a prime agricultural area. The high incidence of specimens of Brown Thrashers from the late 1960s to the early 1970s — the era of widespread DDT use — also lends credence to this theory.

Gochfeld (1972) urged monitoring of bill deformities to detect if the incidence of and distribution of defects was changed, especially considering the potential mutagenic, teratogenic, and carcinogenic effects of chemical pollutants. Yet fewer reports of birds with deformed bills are appearing in the literature; whether this is due to a real decline in occurrence or a lack of interest in reporting is not known (see Parkes 1969).

It appears that bill deformity rates may vary. Banders keeping appropriate records can provide basic data on frequency of deformities. Changes in the frequency or degree of morphological deformities suggest concerns for closer looks for possible causes. It may be worthwhile to secure blood and tissue samples from badly deformed birds for analysis, since it is likely these birds would not survive in the wild. Banders examining birds will likely be the first to be aware of potential environmental concerns.

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News, Notes, Comments

Sighting of a Color-Banded House Finch in Tallahassee, Florida

For about one week during the last third of November 1993, a color-banded House Finch (*Carpodacus mexicanus*) visited a feeder in Tallahassee, Florida. According to the information given, it was a male finch wearing two yellow bands on the left foot, and a blue band over the aluminum band on the right. The bird had disappeared when we were ready to set up a trap.

Further information can be obtained from:
**Mr. W. Adolph, 579 Fernando Dr.,
Tallahassee, FL 32303.**

Peter H. Homann
117 Ridgeland Road
Tallahassee, FL 32312

A Note of Thanks

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