

Passerines with Deformed Bills

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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 | Shrap & 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 My 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 | Shrap & 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> | Montseratt, 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

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