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### SUBLINGUAL ORAL FISTULA IN A FRANKLIN'S GULL (*Leucophaeus pipixcan*)

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#### ABSTRACT

Sublingual oral fistulas have been documented in seven species of free-living wild birds. Here, we report the first observations of a Franklin's Gull (*Leucophaeus pipixcan*) with an oral fistula, photographed in Pottawatomie County, Kansas, on April 29, 2019. The bird appeared to be healthy, was vocal, and capable of flight.

#### INTRODUCTION

Free-living wild birds with injuries, diseases, or other pathologies often fail to reproduce and survive. This might be particularly true if the pathology impacts structures involved in feeding, such as the talons of raptors or the bill and mouth of any bird. Interestingly, however, there are now multiple reports of sublingual oral fistulas in various species of birds; many of these species seem to be able to reproduce normally in the wild despite this abnormality. A fistula is a "pathologic passage through tissues connecting two body cavities or a body cavity to the outside of the body" (Hughes et al. 2013). A sublingual oral fistula in a bird is an opening in the buccal (oral) cavity, below the tongue, through which the tongue can protrude. At later stages of the condition's development the tongue can fuse with peripheral tissues of the fistula (Low et al. 2007). Such lesions were first documented in Stitchbirds (*Notiomystis cincta*), an endangered species of honeyeater from New Zealand (Castro and Taylor 2001). Subsequent research by Low et al. (2007) determined that this abnormality did not reduce survival or fecundity of Stitchbirds.

Oral fistulas have recently been documented in other species with a wide variety of feeding strategies and life histories, including Sooty Tern (*Onychoprion fuscatus*; Reynolds et al. 2009), Swinhoe's Snipe (*Gallinago megala*; Melville et al. 2019), Masked Booby (*Sula dactylatra*; Hughes et al. 2013), Griffon Vulture (*Gyps fulvus*; Camiña et al. 2013), and Audouin's Gull (*Larus audouinii*; Greno et al. 2017). Our report of a Franklin's Gull with an oral fistula adds to that list of free-living species exhibiting the condition.

## OBSERVATIONS

At approximately 9:15 AM on 29 April 2019, one of the authors (DAR) photographed a Franklin's Gull in Pottawatomie County, Kansas (39.252725N, 96.580438W), with an apparent oral fistula (Figures 1 and 2). The bird was perched on a floating barrier offshore from a swimming beach, and near a large flock of other Franklin's Gulls, but did not seem to associate closely with that group, although it did call in response to another gull flying overhead once or twice. As can be seen from the photographs, the tongue appeared to be normal in color (bright red) and could retract somewhat (Figure 2), although it never seemed to retract completely into the buccal cavity. The bird appeared to be healthy, based on plumage appearance and behavior, and eventually flew off in a similar manner to others.

## DISCUSSION

The diet of Franklin's Gulls is diverse and the role of the tongue in capturing and/or securing food may vary with food type. According to Burger et al. (2009), this species consumes mainly insects (midges, dragonflies, and other flying insects), during breeding season, although earthworms (Lumbricidae) and grain also make up a substantial fraction of the diet fed to nestlings. One of the authors (DAR) has observed Franklin's Gulls feeding on unknown species of cicadas (Cicadoidea) and grasshoppers (Acrididae) captured in low-altitude flight over the prairies during fall migration through Kansas. On the wintering grounds on the coast of Chile and Peru, Franklin's Gulls consume fish, fish offal from fertilized fields, crustaceans such as mole crabs (*Emerita analoga*), and earthworms found in inland plowed fields (Burger et al. 2009). It is clear from these observations that Franklin's Gulls are opportunistic (or at least variable) in their foraging strategies. Observations of color-banded Audouin's Gulls (Greno et al. 2017) suggest that birds with oral fistulas do not generally suffer from reduced survival; the minimum survival period was 999 days. According to Ruiz et al. (2009), Audouin's Gulls are highly specialized pelagic predators, feeding mostly on small fish that they capture while skimming over the water. It seems likely that a more generalist feeder, such as the Franklin's Gull, should also be able to survive even if handicapped by an oral fistula.

Compared with other anatomical structures of birds, the structure and functions of their tongues are under-researched. In the vast majority of avian species tongues are either nonexistent or very short indeed (Voss and Pavia 2018), suggesting that they play little or no functional role in foraging and digestion. However, in species with diverse diets, including Franklin's Gulls, tongues tend to be longer (Figures 1

and 2) and to possess elaborate structures that support feeding modalities (Erdoğan and Iwasaki 2014). Thus, one might predict that sublingual oral fistulas might markedly disrupt foraging efficiency of more generalist feeders such as gulls with resultant negative impacts on their body condition and survival. However, no research to date has directly addressed this hypothesis.

The etiology of sublingual oral fistulas remains unknown. Some of the hypotheses advanced to date include genetic defects due to inbreeding, nutritional shortages, injury during nestling feeding, parasites, infection, or some combination of the above (Low et al. 2007; Hughes et al. 2013). None of these hypotheses adequately explains the presence of these fistulas in such a diversity of bird species with different feeding strategies, life histories, and exposures to parasites. For example, Swinhoe's Snipe are precocial and so feeding injuries and/or nest parasites are probably not the main cause of its fistulas (Melville et al. 2019). Similarly, genetic defects and nutritional deficiencies have been ruled out as causes of this pathology in Stitchbirds (Low et al. 2007). Thus, it seems possible that there are multiple causes of the condition given the wide variety of species in which they have been documented to date. One of the authors (SJR) maintains a global database documenting cases of oral fistulas in avian species, and the number of species contained therein at the time of writing (August 2019) is 58. Birders, photographers and researchers are encouraged to submit their observations and documentation of oral fistulas in free-living birds at <https://www.birmingham.ac.uk/research/activity/ornithology/Oral-fistula-project.aspx>.



**Figure 1: A Franklin's Gull with an oral fistula., photographed on 29 April 2019 in Pottawatomie County Kansas. Inset image is contrast-enhanced to show that the tongue is protruding through the oral fistula below the closed bill. (Photographs by DAR).**



**Figure 2: A Franklin's Gull (same as in Figure 1) with an oral fistula calling. Note the tongue that has partially retracted into the buccal cavity. (Photograph by DAR).**

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