

Courtship and Domain: An Exploration into Bird Song

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Bird vocalizations are almost universally regarded as the highest and most natural expression of 'song'.

- Why do they sing and when?
- How do they learn their songs and calls?
- How can their voices be so loud?
- Do females sing?
- Who are the anomalies or exceptional singers?

Baltimore Oriole



Yellow Warbler



Dawn Chorus

Birds sing more vigorously and more frequently in the early morning than at any other time of the day. It's a worldwide avian phenomenon.

American Redstart



American Robin



There are ~ 10,000 bird species in the world, divided into ~40 orders (i.e. groups that share similar traits such as loons, gulls, woodpeckers, owls, etc.). One-third of these species – spread among 37 orders- are born with their songs hard-wired into their DNA.



Common Loon



One order – the passerines or ‘songbirds’ – has more species than all the other orders combined. Songbirds are unique because for many, their songs are not instinctive but have to be learned, similar to the way in which humans learn how to speak.

**American
Goldfinch**



Only two other orders of birds – hummingbirds and parrots – learn their own sounds by listening, imitation and much practice.

Ruby-throated Hummingbird



Brown-headed Parrot



Social learning of vocalization is rare among animals, a behavioral trait shared by only a few groups of birds and a handful of mammals: whales/dolphins, bats, elephants, and humans. Among almost all mammal species – including the primates and the most socially sophisticated terrestrial predators – sound-making is innate and not learned.



**Spotted Hyena: 28
vocalizations**



Birds communicate in creative ways and not just through vocalizations: Woodpeckers drum



Yellow-bellied Sapsucker



Red-headed Woodpecker



Hairy Woodpecker

Ruffed Grouse march
to a different drum



Birds communicate vocally in two ways: through calls and songs

Calls are brief, simple vocalizations (with exceptions)

- Made year-round by all members of a species
- Innate rather than learned
- Can be as distinctive as songs



Two calls of the Wood Thrush



Songs likely evolved for reasons of mate attraction and territory establishment/defence: usually delivered only by males during the breeding season.



**Prothonotary
Warbler**



**Rose-
breasted
Grosbeak**

Songs cont.



Scarlet Tanager

80% of Canada's breeding birds spend >6 months of the year in the USA, Mexico, the Caribbean, and Central and South America:

- Their songs are mostly confined to the short breeding season back here.
- Peak breeding season for many migratory birds in southern Ontario from late May to end of June
- Singing most intense early in the breeding season and drops off once territories are formed and birds are paired off.

Dawn Chorus cont.

Why is this the peak time for avian song?

Atmospheric conditions are especially conducive to transmitting sound over longer distances, and to preserving its tonal quality,

Birds lose 10% of their body weight overnight, every night! Early morning is thus a good time to gauge a singer's mettle because singing is hard work: uses 10-25% of a Carolina's Wren's daily energy budget.

The song – its volume, consistency, complexity, and variation – advertises the quality of the male.



Carolina Wren

The repertoire of many birds is more varied and delivered at a much faster rate during the dawn chorus than later in the day.

Eastern Wood-Pewee: 12-second span, early and then late morning



Chipping Sparrow: Pre-dawn and mid-morning.



Males sing differently, depending on the audience.

For males



For females



For females, a male's voice may be an even more powerful aphrodisiac than his colours.

Her nesting season is short and making the right selection is critical to successfully raising young.

Veery

Rose-breasted Grosbeak



What do females learn by listening to a male sing?

She might be discovering valuable clues as to his

- age
- genes
- fitness and health
- the quality of his territory.

Females do the choosing!

Females are the silent composers because they have come to demand a certain level of singing. Kroodsma

Pine Warbler



What do males learn by listening to a male sing?

- This area is taken: Go away!
- Learn who their neighbours are and avoid skirmishes (fighting is demanding and risky).



Black-throated Blue Warbler

In NA, singing is almost done exclusively by males. But there are exceptions: Scarlet Tanager, Baltimore Oriole, Rose-breasted Grosbeak, Northern Cardinal and more.



White-throated Sparrow



White striped



Tan striped

Southern Ground-Hornbill



Antiphonal Duets: Africa



Black-collared Barbet



Role reversal: females are the primary singer



Burchell's Coucal



Birds perceive their environments in ways that are sometimes radically different than our own. E.g., sight and sound.

- Birds have high visual acuity that allow them to see details that we cannot.

Red-breasted Nuthatch



Birds' ears are much more sensitive than ours: discern 10x more details in sound than we do. Their hearing does not deteriorate over time.

- Winter Wren regarded as one of the finest singers in NA.

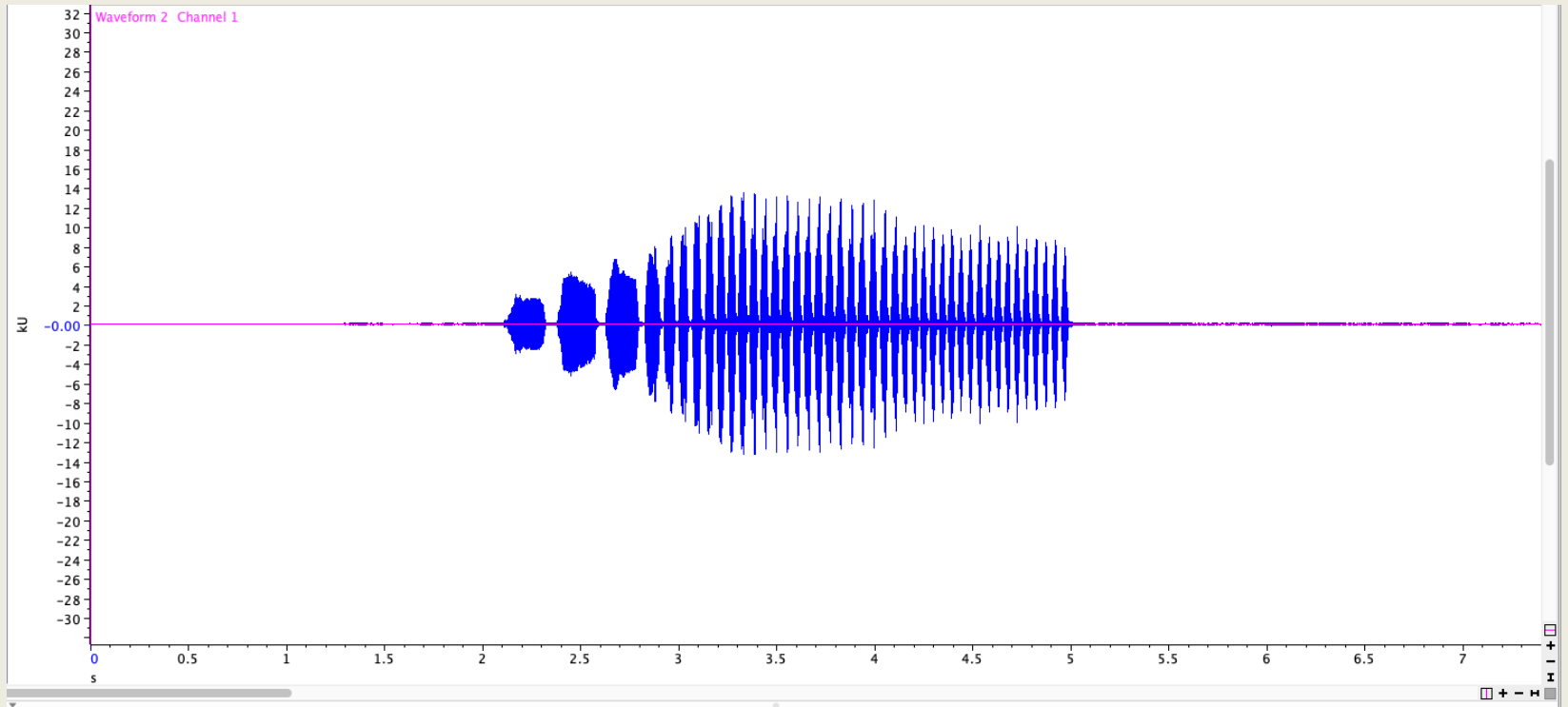


What it might sound like to a wren, played at 1/6 speed



Sonograms/Spectograms





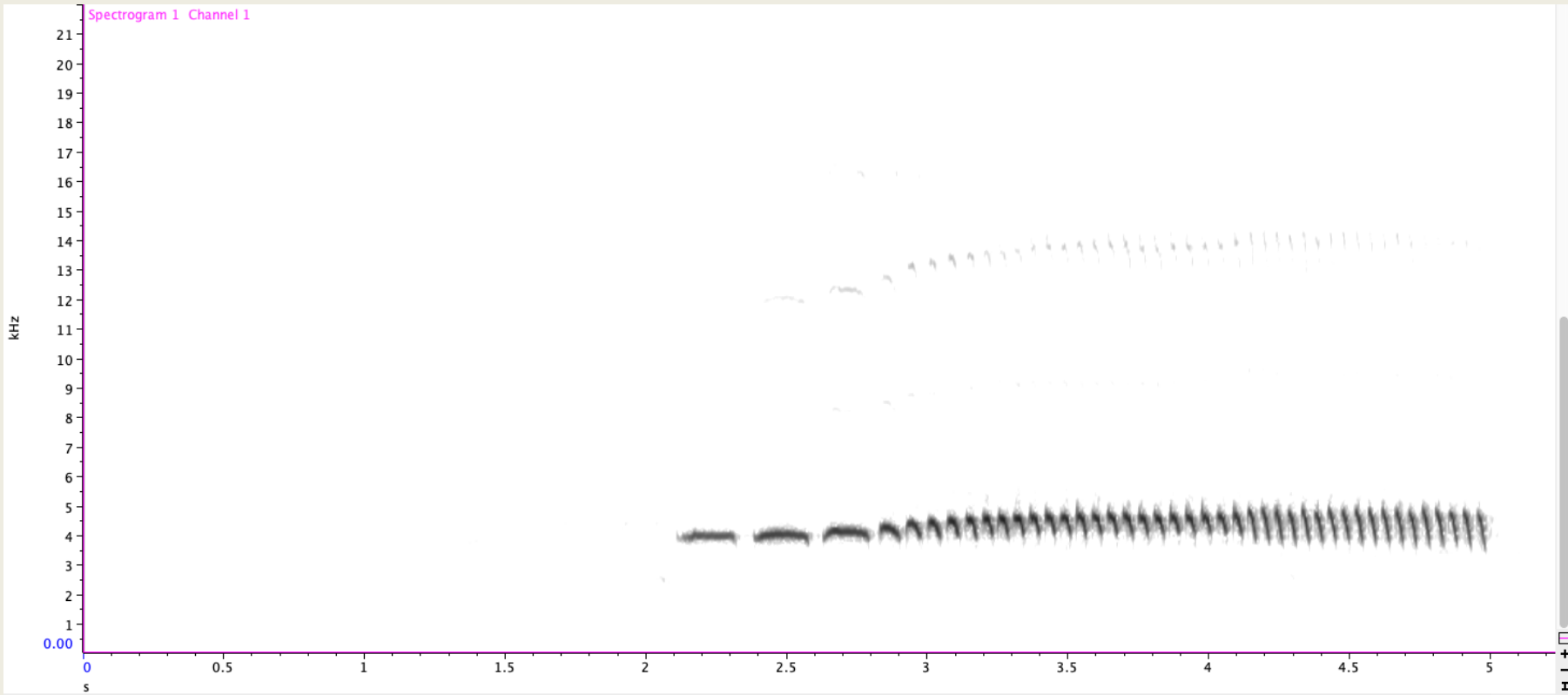


Table 1



How can a little bird be so loud?



Secret lies with the **Syrinx**

Ruby-crowned Kinglet

- Principal apparatus for producing avian sound – an organ unique to birds (but not every species has one e.g. ostriches, storks, vultures)
- is unusually efficient at converting air into sound. Gives even small birds huge sound production capacity.
- is most highly developed among passerines (i.e. songbirds), one of the most familiar group of birds to humans.

Syrinx cont.

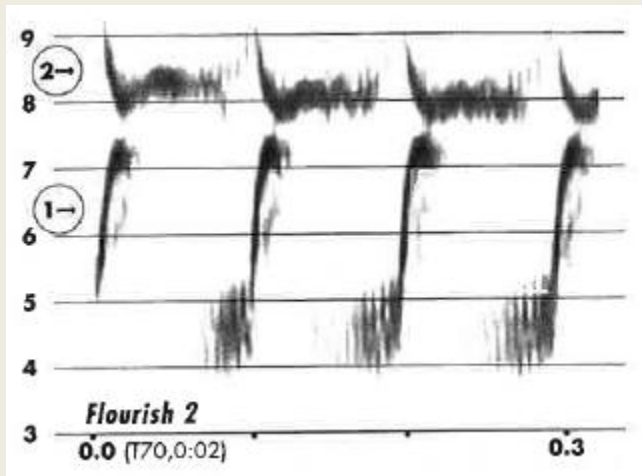
Independent sound can be produced at each side of the syrinx, allowing for the emission of two sounds at one time. This allows thrushes to produce rich, ethereal songs

Wood Thrush

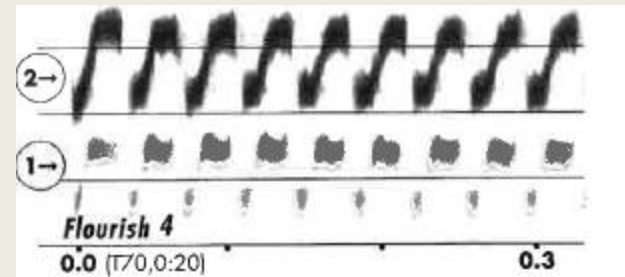


Birds hear things much differently than humans: Wood Thrush song at one-tenth speed

First part



Second part



From Kroodsma 2007



Passerines are divided into two groups

Sub-oscines (the flycatchers)

- Flycatchers have simpler voice boxes and less developed neural song centers and consequently sing simpler and less complex songs.
- Their songs are innate, like calls, and do not have to be learned.

All individuals of a flycatcher species sing the very same songs in the very same way no matter where they live.



**Eastern
Phoebe**



Oscines ('true' songbirds)

Songs are more musical and complex than the flycatchers'.

- Must be learned (from parents and neighbours as nestlings and fledglings, then from other adults later on) and only after much practice.
- Some species learn them in their first 50 days, or in a year, or throughout life.
- Hearing and vocal production often separated in time and space



White-throated Sparrow





Black-capped Chickadee



Some species learn just one song

(but there may be variations and dialects).

Common Yellowthroat



Some species learn multiple songs and once learned may change their order but not the structure.



Others, like the Brown Thrasher, may have as many as 3000 songs! Why so many for some, and for others just one?



Superb mimic: Red-capped Robin Chat



Songbirds without a 'song'.



Common Raven: vocal repertoire may be virtually limitless



Brown-headed Cowbird: Brood Parasite











||



Cowbird chatter call



Who sings the most songs in a day?
22,000!!



Red-eyed Vireo



Who has the fastest singing rate?
20,000/night!



Eastern Whip-poor-will



There is less bird song today. North America has lost 30% of its bird population since 1970! What can we do to reverse the trend?

Birds need food: keep your yard looking a little wild.



Our cities and suburbs are filled with exotic plants: add native plants (i.e. bird feeders!!) to your yard or balcony



Books

- The Singing Life of Birds: Donald Kroodsma
- Sounds Wild and Broken: David Haskell

Listening

- Carol Ann Weaver:
<https://carolannweaver.com/audio/>
- Nature Instruct: www.natureinstruct.org
- Xeno-Canto: xeno-canto.org/explore
- www.allaboutbirds.org/news/how-to-learn-bird-songs-and-calls/
- Merlin Bird ID

The magic of bird song surrounds us: all we have to do is listen.

