


Songs vs. Calls

- Songs
 - Loud, long duration, vocal display of males
 - Territorial
- Calls
 - Short, simple, from either sex
 - Distress, warning, feeding, nest, etc.



Calls

- Location or attraction
 - Short, broad frequency range
- Alarm
 - Long, narrow frequency range


Songs

Habitat Effects

- Long-distance Communication
 - Owls, doves, etc.
 - Low frequency
- Forest Birds
 - Simple
- Open-area Birds
 - Complex


Habitat Effects

- Birds sing louder to combat background noise
 - Great Tits in Holland sing at higher frequency in an urban area



Infrasound

- Low frequency sounds
- Long distance communication
- Felt as “strange vibrations” by humans



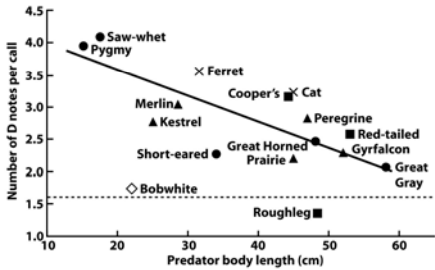
Vocabulary

- 5 to 14 distinct vocalizations/species
 - e.g., Chaffinch: 12 adult sounds
 - 7 only for breeding; 6 by male, 1 by female



Vocabulary

- Chickadee alarm calls indicate predator identity



Predator	Predator body length (cm)	Number of D notes per call
Saw-whet	18	4.0
Pygmy	18	3.8
Merlin	25	3.0
Kestrel	28	2.8
Short-eared	25	2.3
Great Horned Prairie	45	2.5
Peregrine	48	2.8
Red-tailed Gyr Falcon	55	2.5
Great Gray	60	2.0
Bobwhite	15	1.8
Roughleg	45	1.5
Ferret	35	3.5
Cooper's Cat	45	3.2

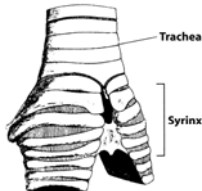
Vocabulary

- 1 Song
- Hundreds of Songs



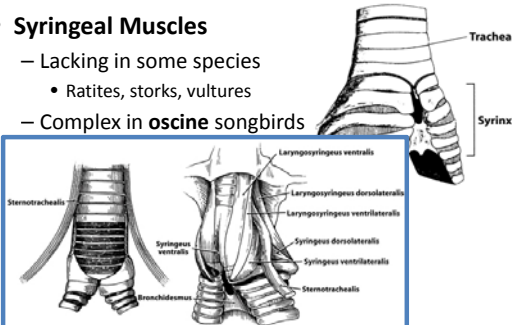
Syrinx

- **Efficient**
 - Nearly 100% of air used to produce sound (2% in humans)



Syrinx

- **Syringeal Muscles**
 - Lacking in some species
 - Ratites, storks, vultures
 - Complex in **oscine** songbirds



Sound Production

- Complex, involves other parts beside syrinx
- Respiratory muscles important
- Tracheal Length
- Opening/closing mouth

Learning

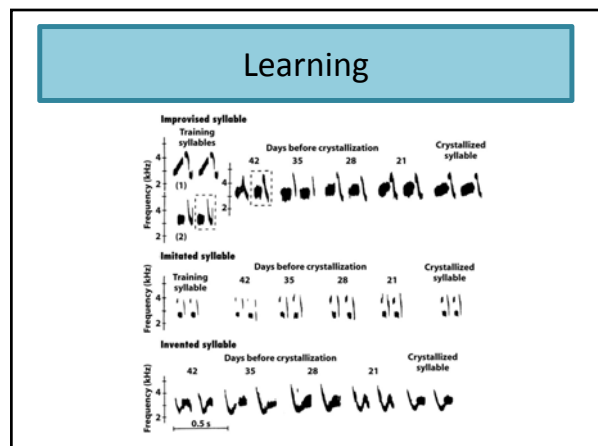
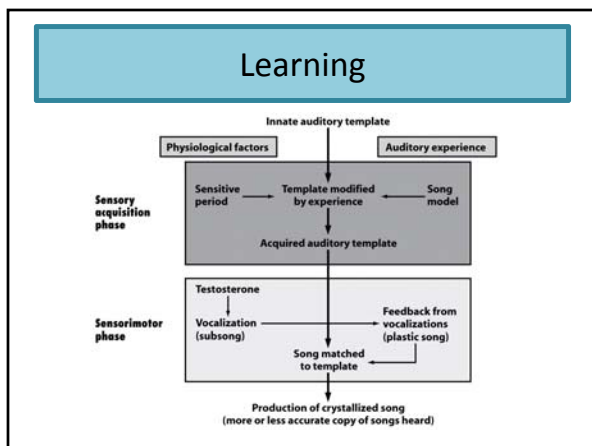
- Most birds and mammals cannot learn songs
- Birds
 - Hummingbirds
 - Parrots
 - Oscine Songbirds

Learning

- Some species can learn songs throughout their lives
 - Northern Mockingbird
- Others only learn during specific age periods
 - **Critical learning** (sensitive) period varies
 - White-crowned Sparrows: 10 to 50 days old
 - Chaffinches: up to 12 months into first breeding season

Learning

- Four Stages
 1. Critical Learning Period
 2. Silent Period
 3. Subsong Period
 4. Song Crystallization



Learning

- Only learn own species song
 - Neural controls filter sounds
 - Song Sparrows **hearts beat faster** when they first hear a song from their own species
 - **Song Sparrow** unable to learn temporal pattern
 - **Swamp Sparrow** unable to learn syllables



Programmed Songs

- Most birds songs are genetic
 - Suboscine Passerines
 - Most Non-Passerines
- Sing a normal song, even if raised away from all other birds



Mimicry

- 20% of passerine songbirds mimic
- More complex and varied songs preferred by females

Territoriality

- Removal of a Great Tit from its territory
 - New male will take over within 10 hours
- Countersinging
 - Adjacent males sing back-and-forth

Mate Choice

- Do songs convey **useful information** to females?
- Only dominant males sing best songs (despite all having the ability) in Brown-headed Cowbirds
 - Subdominant males will get attacked
- Long songs delivered at fast rates signal good energy reserves in House Finches
- Starlings with the best immune systems sing the longest songs at greatest frequency

Mate Choice.

- Do songs convey **useful information** to females?
- Generally, females tend to prefer males with more complex and varied songs
 - Well-fed birds can allocate more energy to the part of the brain responsible for song
 - Indicates the males had good nutrition and care during development