



# Follower and hider neonate ungulates: Whether anti-predatory strategy in first days of life influences mother-offspring acoustic communication?

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Predator



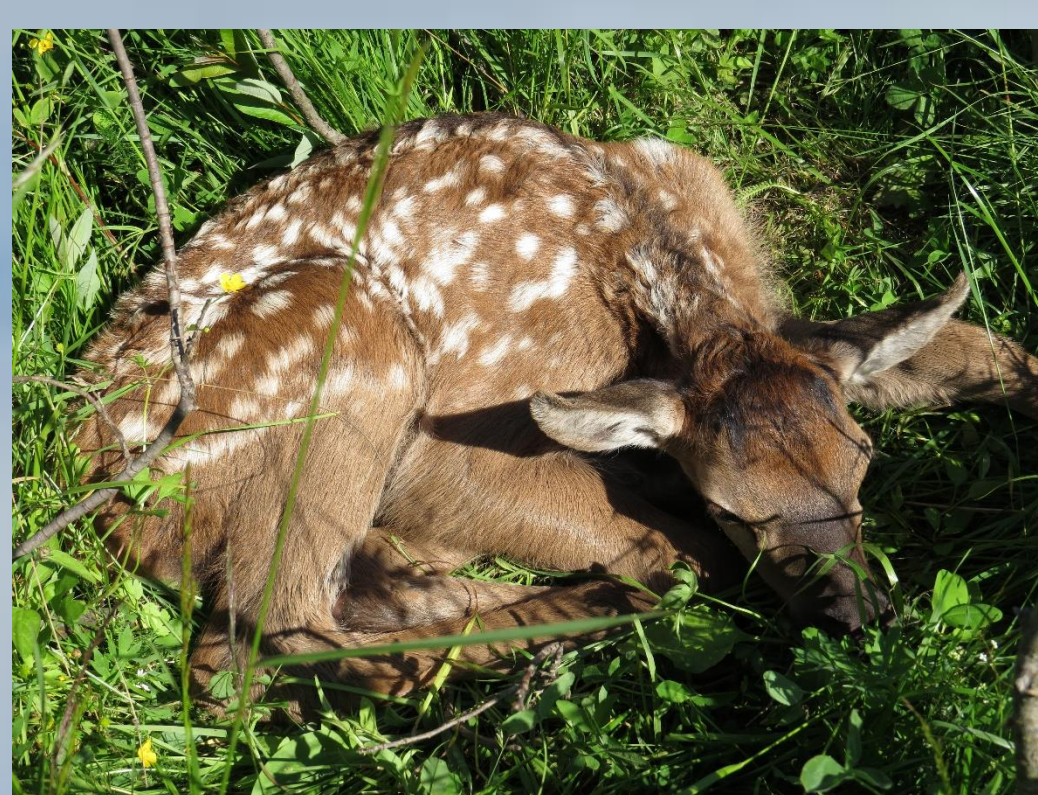
Neonate ungulate

How to avoid  
predator's  
attacks?



Predator

➤ Neonate ungulates have two main strategies against predation, “**hiding**” and “**following**”



- The **hider** neonates
- **stay hidden** in vegetation for the first **1-3 weeks** after birth, and are approached by their mothers only for feeding
- Goitred gazelles, fallow deer, red deer, domestic goats



- The **follower** neonates
- can **follow** their mothers and herd after **1-2 days after birth**
- Reindeer, domestic sheep, saiga

## How does the anti-predator strategy influence on acoustic communication between mother and neonates?

### Materials and methods

#### Data collection



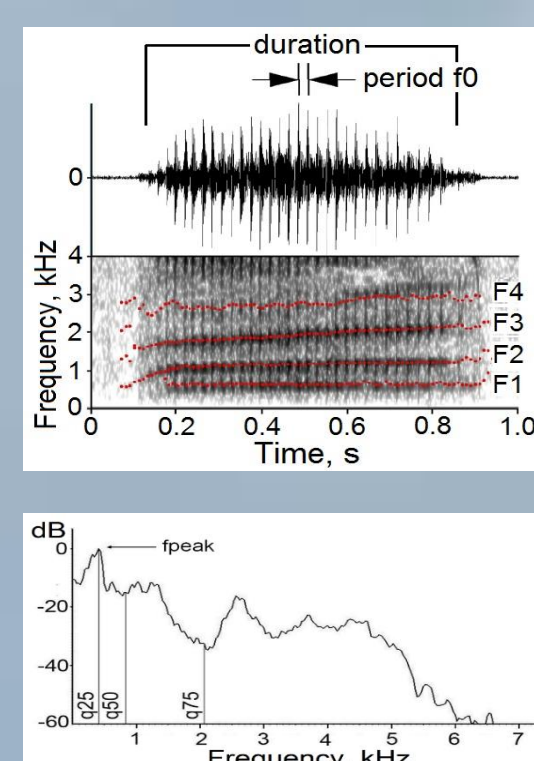
Recorder Marantz PMD-660 with a  
AKG-C1000S microphone or a  
Sennheiser K6- 170 ME66  
microphone



automated recording systems  
SongMeter SM2+



#### Acoustic analysis



- Temporal variables;
- Fundamental frequency (f0) variables (min, max, mean, start, end),
- Power variables (peak frequency (fpeak) and 3 quartiles (q25, q50, q75));
- The four formants (F1 – F4)

#### Subjects and call samples

##### Saiga

315 calls from 20 adult females and 434 calls from 91 juvenal

##### Goitred gazelle

54 calls from 5 adult females and 388 calls from 21 juvenal

##### Red deer

625 calls from 28 adult females and 469 calls from 31 juvenal

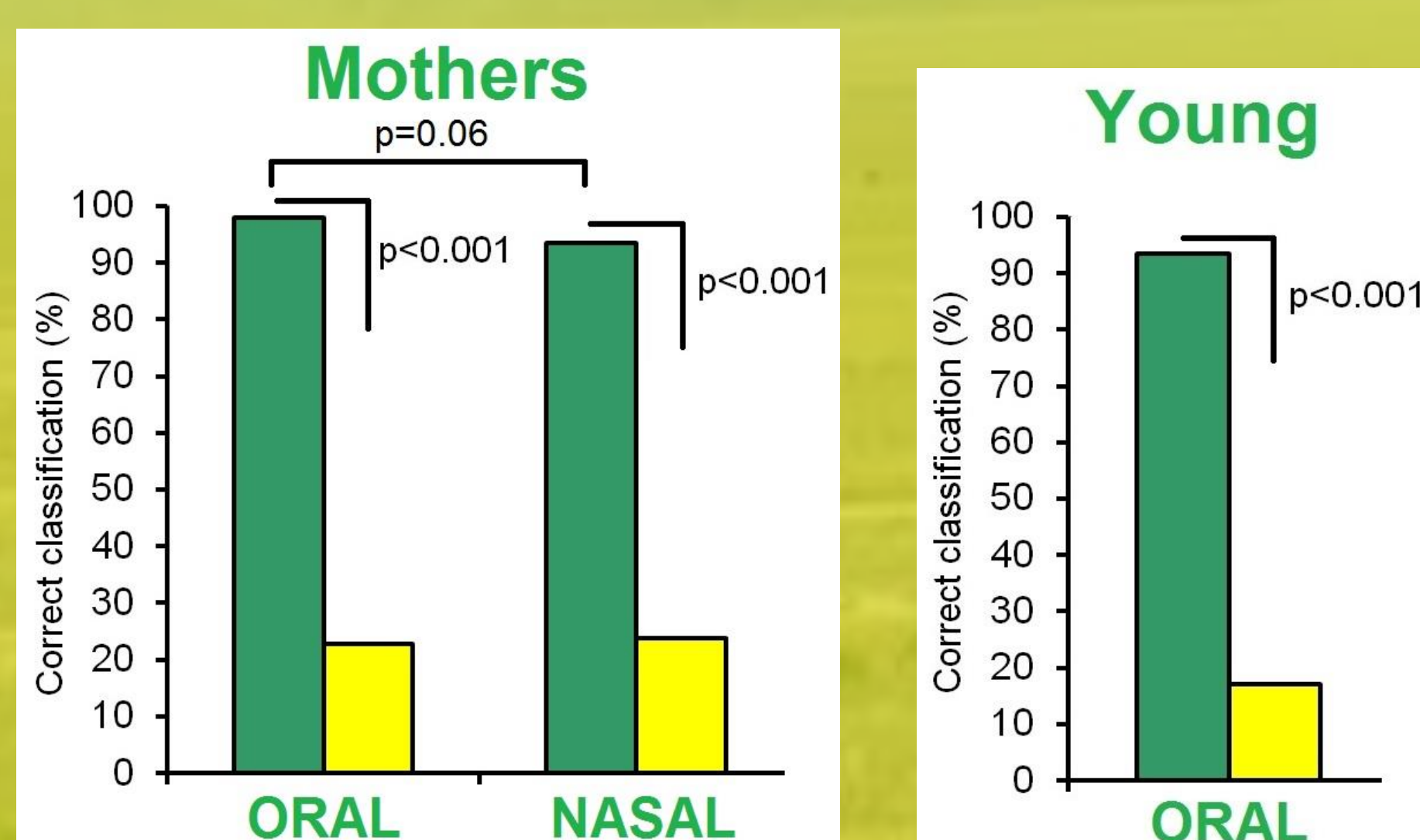
### Results

#### Hiders



Saiga  
(*Saiga tatarica*)

Discriminant function analysis (DFA);  $\chi^2$  test



Key variables:

Fundamental frequency  
2<sup>nd</sup> and 3<sup>rd</sup> formants

#### Followers

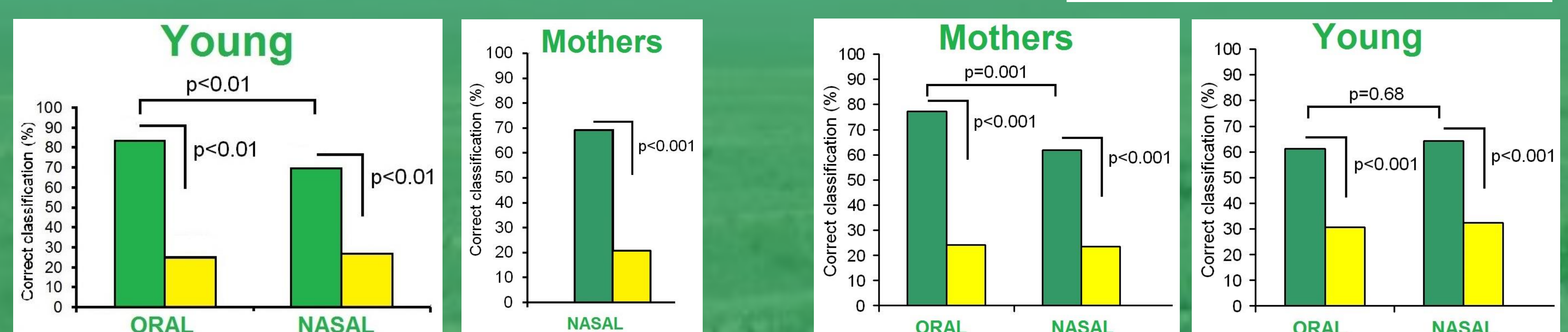


Goitred gazelle  
(*Gazella subgutturosa*)



Red deer  
(*Elaphus hispanicus*)

Discriminant function analysis (DFA);  $\chi^2$  test

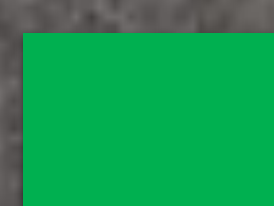


Key variables:

Fundamental frequency  
3<sup>rd</sup> and 4<sup>th</sup> formants

Key variables:

Fundamental frequency  
Duration



Actual value



Random value

- Mothers and neonates of all three species produced two types of contact calls: oral (emitted with an opened mouth) and nasal (emitted through the nose with a closed mouth)
- The individual identity was well expressed in both types of contact calls and exceeded two-to-three times the random value
- Anti-predator strategy does not influence on directionality of mother-young vocal communication – both mothers and young have well individualized contact calls
- Anti-predator strategy influence on the degree of acoustic individuality - species with “following” strategy have more individualized calls