Does ruminant neonate anti-predator strategy influence mother and offspring vocal identity?

osibiryakova@bk.ru
http://www.bioacoustica.org

Olga Sibiryakova[1], Ilya Volodin[1,2], Roland Frey[3], Elena Volodina[2]

[1] Lomonosov Moscow State University, Russia
[2] Moscow Zoo, Russia
[3] IZW-Berlin, Germany

- Neonate ungulates have two main strategies against predation, "**hiding**" and "**following**"
- The **follower** neonates can **follow their mothers** and herd after 1-2 days after birth (reindeer, domestic sheep, saiga)
- 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)
- **Can differences in the anti-predator strategy influence acoustic communication?**

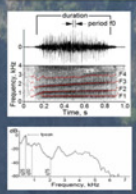
Materials and Methods

Data collection

Recorder Marantz PMD-660 with a AKG-C1000S microphone or a Sennheiser K6-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);
- Four formants (F1 – F4)

Call samples

Saiga
315 calls from 20 adult females and 434 calls from 91 neonates

Goitred gazelle
54 calls from 5 adult females and 388 calls from 21 neonates

Iberian red deer
625 calls from 28 adult females and 469 calls from 31 neonates

Siberian wapiti
134 calls from 9 adult females and 129 calls from 9 neonates

Results

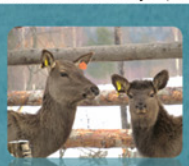
Followers

Actual value | Random value

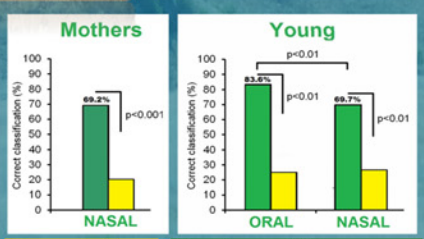
Discriminant function analysis (DFA): $\chi 2$ test

Goitred gazelle *(Gazella subgutturosa)*

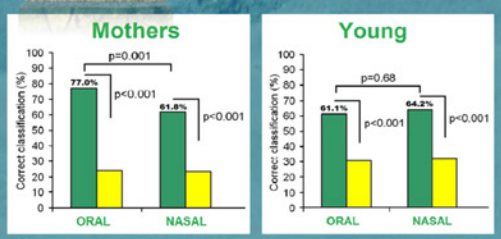
Iberian red deer *(Cervus elaphus hispanicus)*



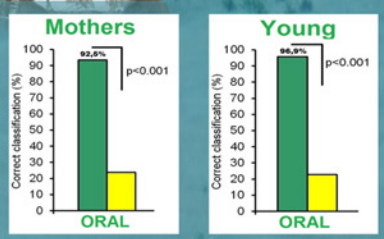
Siberian wapiti *(Cervus elaphus sibiricus)*



Key variables: Fundamental frequency; 3rd and 4th formants



Key variables: Fundamental frequency; Duration

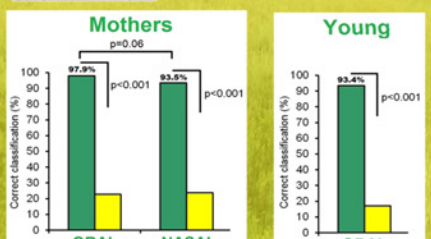


Key variables: Duration; Begin and Maximum fundamental frequency

Hiders

Saiga *(Saiga tatarica)*

Discriminant function analysis (DFA): $\chi 2$ test



Key variables: Fundamental frequency; 2nd and 3rd formants

- 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 the directionality of mother-young vocal communication – both mothers and young have well individualized contact calls
- Anti-predator strategy partly influences the degree of acoustic individuality: species with "hiding" strategy have less individualized calls, except Siberian wapiti

Supported by the RFBR, grant 16-34-01230