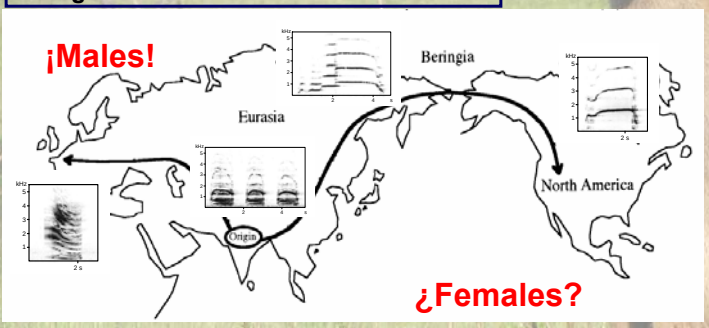
Sex differences in calls of Iberian red deer

Ilya Volodin[1,2], Vera Matrosova[3], Elena Volodina[2], Andrés Garcia[4], Laureano Gallego[4], Rafael Márquez[5], Diego Llusia[5], Juan Beltrán[6], Tomás Landete-Castillejos[4] http://www.bioacoustica.org volodinsvoc@gmail.com

[1] *Department of Biology, Lomonosov Moscow State University, Moscow, Russia.*
[2] *Scientific Research Department, Moscow Zoo, Moscow, Russia.*
[3] *Engelhardt Institute of Molecular Biology RAS, Moscow, Russia.*
[4] *IREC (UCLM-CSIC-JCCM), IDR, Universidad de Castilla-La Mancha, Spain.*
[5] *Fonoteca Zoológica, Museo Nacional de Ciencias Naturales (CSIC), Madrid, Spain.*
[6] *Departamento de Zoología, Universidad de Sevilla, Spain.*

Idea:

Male rutting roars strongly changed with radiation of red deer *Cervus elaphus* from centre of origin in Central Asia in two opposite directions, to the East and to the West. What about females? Did their calls changed as in males?



We compare the acoustics of Iberian red deer stags, hinds and calves during the rut period. Aims: 1) compare the acoustics of stags, hinds and calves 2) estimate the effect of nasal versus oral vocal emission in hinds and calves and 3) compare roar acoustics between farmed and wild stags.

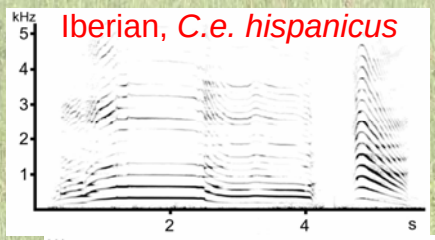
Call collection and analysis:

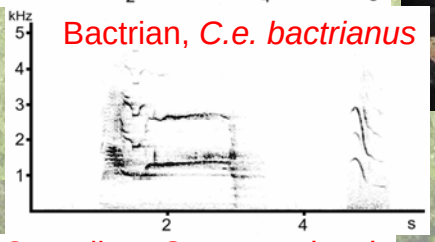
University of Castilla-La Mancha (Albacete, Spain) Farm
1-9 September 2010. 3 males, 20 females, 20 calves.
7.4 hours of recordings from males and 3.7 hours of recordings from hinds and calves.
We analyzed 300 common roars from males, 335 female calls (81 oral and 254 nasal) and 157 calf calls (101 oral and 56 nasal).

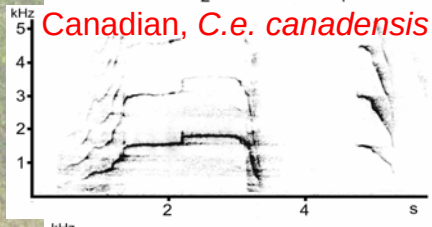
Parque Natural de la Sierra Norte de Sevilla (Andalucía, Spain)
11 September - 23 October 2009
Automated recording system Song Meter SM1, 50 hours of recordings.
We analyzed 286 common roars from wild males. Wild

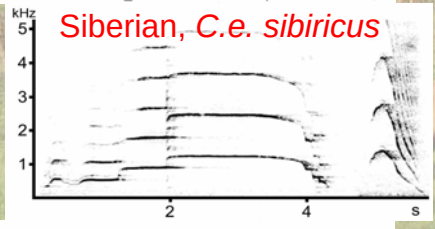
Avisoft-SASLab Pro — **duration, f0min, f0max, f0mean, Δf0** — PRAAT

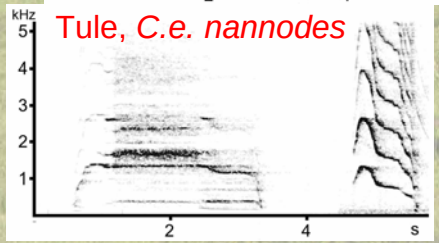
Male and female f0 similarity across subspecies







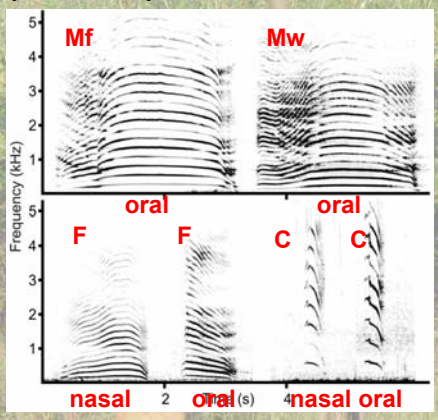




Results: nasal and oral calls

Male produced only oral rutting roars, although many of the roars had a short nasal onset. Females produced more nasal (75.8%, *N*=335) than oral (24.2%) contact calls, calves produced more oral (64.3%, *N*=157) than nasal (35.7%) calls.

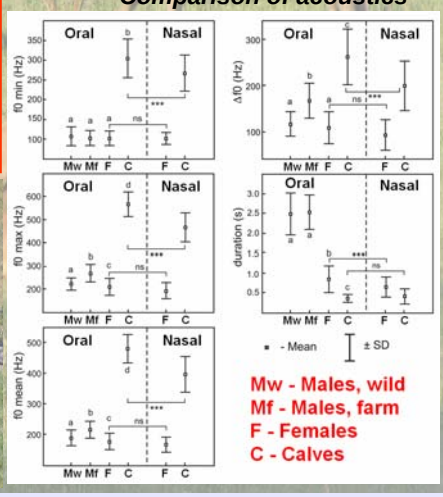
Male (farm & wild), female and calf calls



Results: sex and age differences

1. **The calls of females (95.2±13.3 kg) were lower in f0max and f0mean than calls of males (235.5±15.0 kg). Reversed sex dimorphism!**
2. **The calls of farmed males had higher f0max and f0mean than wild males. The f0min did not differ between sexes or between farmed and wild stags.**
3. **The calls of calves were higher in f0max, f0mean and f0min than calls of adults.**
4. **Oral calls were higher in f0max and f0mean than nasal calls in calves, but not in females.**
5. **The call duration was shortest in calves, intermediate in females, and longest in males.**

Comparison of acoustics



¿If male rutting calls are sexually selected, what acts on female calls?

Financial support: RFBR grant 12-04-00260, AGL2012-38898, TATANKA CGL2011-25062, CGL2010-09700, ACOURA CGL2008-04814.