Sex and age-class acoustic variation of Pannonian red deer (*Cervus elaphus hippelaphus*) from South Hungary

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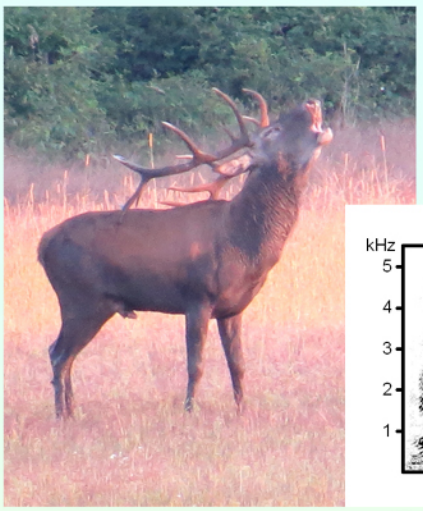
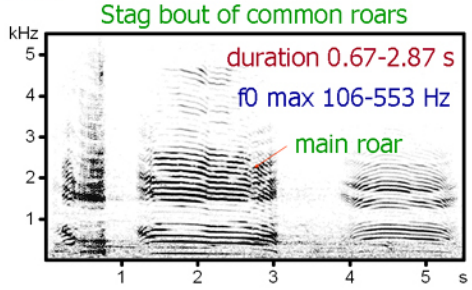


AIM

The Pannonian red deer represent a largest native population of *Cervus elaphus hippelaphus* in Central Europe, but their vocalization has not been studied so far. Here we compare the acoustics of the Pannonian red deer stag, hind and calf vocalizations.

Stag bout of common roars



main roar is the longest roar within bout

METHODS

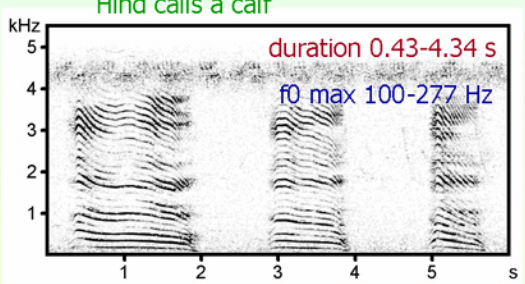
South Hungary (46.07 N, 17.49 E)

SongMeter SM2+

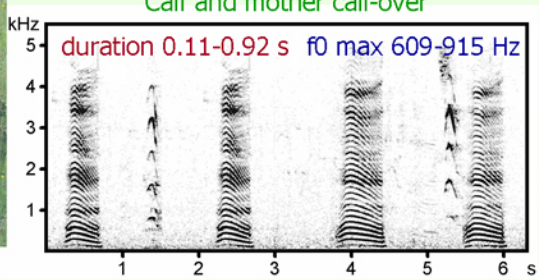
September 2015 (free-ranging stags)
May 2016 (farm hinds & calf)

We analysed 71 stag longest roars within bouts, 58 hind contact calls and 55 calf contact calls

Hind calls a calf



Calf and mother call-over



No sex differences

Pannonian stag roars and hind contact calls do not differ in fundamental frequency between sexes, as in Iberian red deer *C.e. hispanicus* (Volodin et al. 2015, Acta Ethol. 18:19-29) and Siberian wapiti *C.e. sibiricus* (Volodin et al. 2016, Mam Biol. 81:10-20).

Call acoustics

Acoustics	Calves *n*=55	Hinds *n*=58	Stags *n*=71	Hinds-Stags (*t* test)
duration (s)	0.29±0.14	1.64±0.96	1.62±0.53	*p*=0.90
f0 max (Hz)	827±54	172±32	163±65	*p*=0.31
f0 min (Hz)	538±72	99±17	81±16	*p*<0.001
f0 mean (Hz)	717±50	143±19	131±29	*p*<0.05
f0 beg (Hz)	795±66	128±31	73±15	*p*<0.001
f0 end (Hz)	502±71	93±18	79±19	*p*<0.001
f peak (Hz)	1615±967	762±611	610±596	*p*=0.16
q25 (Hz)	1306±506	789±370	482±236	*p*<0.001
q50 (Hz)	2422±708	1603±579	1259±567	*p*<0.001
q75 (Hz)	4016±1127	2792±841	2161±512	*p*<0.001

f0 descending ontogeny

Pannonian calves have a descending ontogeny of fundamental frequency that is typical for other studied European subspecies of red deer *C. e. corsicanus* and *C. e. hispanicus* in opposite to the non-descending ontogeny of fundamental frequency in Siberian wapiti *C. e. sibiricus* and North American wapiti *C. canadensis*.

Support: Russian Science Foundation, grant 14-14-00237