

# 11<sup>th</sup> International Symposium of Integrative Zoology



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as lying down and sleeping. The six individuals were compared using Mann Whitney U tests, Chi Square tests and Spread of Participation Indices to determine similarities and differences in behaviour. Results showed that, between the adult and juvenile males, cheek rubbing, climbing and playing were significantly different. Between adult and juvenile females there were no statistically significant differences in behaviour. When examining how visitor numbers affected behaviour there were ten associations seen, five positive and five negative. The test performed on data examining how time of day affects behaviour found six associations, two positive and four negative. Results also showed that each individual lion used the different areas of their enclosure in an uneven way. The reasons for the uneven usage warrant further investigation. The study showed a wide variety of behaviours and a low percentage of abnormal or stereotypic behaviours, indicating positive welfare amongst the six lions. Understanding their behaviour is key to ensuring their continued breeding success and contribution to the European Endangered Species Programme.

S3-P9

### **Effect of signal aggressiveness on individual male blackbird behaviour**

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Singing behaviour in male birds has a critical role in female attraction and territorial defence. Song type switching, frequency matching, low- amplitude 'soft song' and overlapping song have been suggested as types of aggressive signals in birds. As singing behaviour can act as an aggressive signal, birds may use the aggressive context of song to assess the fighting, attack and escape and invasion behaviour of conspecifics (Bard et al., 2002). Play back experiments can be a practical approach to investigate how different individuals behave in response to a sender's aggressiveness. In this study, we investigated the response of an urban population of male blackbirds to varying playback song. Our aim was to determine if blackbird individuals have different responses to playback songs from males of varying levels of aggressiveness. Additionally, we investigated the effect of anthropogenic disturbance on the response of blackbirds to the playback. Our findings demonstrate that individuals show the same response to the different levels of aggressive song playbacks. Interestingly, male blackbirds whose territories were close to a major road exhibited a significantly stronger aggressive response towards all playbacks. These results indicate that while male blackbirds may not be responding differentially to varying levels of song aggressiveness, human modification of the environment has a strong impact on individual behavioural variation.

S3-P10

### **High-frequency calls as a potential tool for population monitoring in nature of an endangered canid, the dhole *Cuon alpinus***

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The dholes *Cuon alpinus* live in large packs and are very vocal throughout a year and especially during the breeding and pup rising seasons. These animals produce high rates of high-frequency and biphonic calls, which are presented in both sexes and at all ages. The high-frequency squeaks and the biphonic yap-squeaks are species-specific and well distinctive from the similar high-frequency and biphonic whines of any dog-like canid sympatric to the dholes: domestic dogs *Canis domesticus*, the timber wolves *Canis lupus* and jackals *Canis aureus*. The high-frequency and biphonic calls are lacking in all fox-like canid species, so cannot be confused with such species as *Vulpes vulpes*, *Vulpes bengalensis* or *Vulpes ferrilata*. The squeaks and especially yap-squeaks of the dhole are extremely individualistic (97% correct assignment of calls to individual). This enables identifying different packs by calls of focal individuals, the method, already developed and applied for identifying packs of timber wolves. Dhole packs can be monitored by using arrays of modern inexpensive devices for automatic audio recording, such as AudioMoth, SongMeter, BAR, etc., allowing call collection at any weather and at wide range of temperature. The recorded calls are stored as audio files and can be analysed spectrographically at any time by using professional or free software. Data collection is possible season by season and year by year, for documenting the presence of packs at different places. In additional, monitoring of some focal individuals for scientific purposes is possible. Supported by RNF grant 19-14-0037.

S3-P11

### **Passive acoustic monitoring of male rutting vocal activity in five Russian populations of red deer and wapiti**

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Passive acoustic monitoring is an actual tool for population monitoring at conservation and tourist areas. In polyginous red deer *Cervus elaphus*, a prolonged rutting vocal activity represents a prominent part of male reproductive behaviour. Rut duration as well as the overall vocal activity differ between populations and between years. This study investigates red deer stag roaring activity in ten recording points for the five populations distributed from the most western to most the eastern areas of Russia. Stag rutting calls were recorded in 2015-2018 for 5 min/hour, 24 h/day, for 52-60 days of rutting period, by using 10 automated recording devices, two recording sites per population, with simultaneous registration of temperature, once per hour. The devices recorded in total 111,824 rutting calls: 78,023 calls at Belgorod (Central-European red deer *C.e. hippelaphus*), 12,223 at Bryansk (*C.e. hippelaphus*), 17,955 at Kostroma (Siberian wapiti *C.e. sibiricus*), 926 at Ussuri (Far-East wapiti *C.e. xanthopygus*) and 2,697 at Khabarovsk (*C.e. xanthopygus*). The roaring activity in all recording sites and all populations peaked between hours 03:00 and 06:00, nearly lacked between 10:00 and 18:00, steadily increased from 20:00 to 03:00 to maximum and then rapidly decreased from 06:00 to 09:00 to minimum. Effects of time of day on roaring activity prevailed on the effects of temperature and were related to rut phase (start, active, fading). This study reveals that geographically distant populations of red deer and wapiti living under different climate condition may be surprisingly similar in the overall dynamics of roaring activity in the course of rutting period. At the same time, the absolute values of roaring activity could differ substantially between populations and recording sites