



# Domestication changes the vocal expression of emotional arousal toward humans in the red fox

*Vulpes vulpes*

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## Introduction

Our study was conducted at the experimental farm of the Institute of Cytology and Genetics, Novosibirsk, Russia.

• Since 1960, under a direction D.K. Belyaev and L.N. Trut foxes at this farm are under strictly selection for tame behavior toward humans.

• Also, since 1970, previously unselected foxes are under strict selection for aggression toward humans.

• Unselected for behaviour foxes (control group) are also kept at this farm. They represent a “wild” model of vocal behaviour.

• During the long-term selection, following an outbreeding scheme, more than 50000 foxes were reared and tested for behaviour toward humans.



Unselected fox



Tame fox



Aggressive fox

These foxes provide an opportunity to estimate the vocal behaviour in animals with known sign of emotion toward a human at standard test situation.

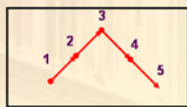


batteries

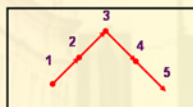
Housing

## Idea of experiment

Human pressure



Arousal level: “wild” model



We made one test per fox

Subjects: 75 adult female foxes

are afraid of humans



are not afraid of humans

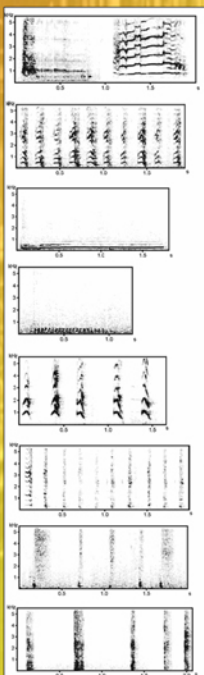


- For the group of unselected foxes, we confronted arousal rates with vocal characteristics
- For the groups of tame and aggressive foxes, we evaluated through the vocal characteristics the arousal level

## Results

Total 24174 calls were analyzed

### Vocal repertoire



Whine

Cackle

Moo

Growl

Bark

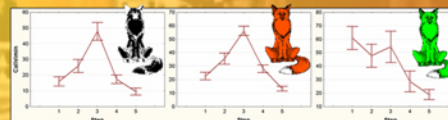
Pant

Snort

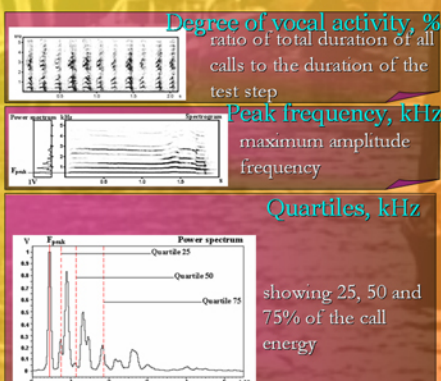
Cough

### Calling rate – number of calls per minute

Dynamics of average calling rates for each fox group throughout the five steps of the test



### Dynamics of “poured” calls (with cutten pauses) parameters values during the tests



showing 25, 50 and 75% of the call energy

## Conclusion

Selection for tame behaviour resulted in great changes of vocal behaviour in comparison with the “wild” model whereas the vocal behaviour of aggressive foxes remained nearly untouched. The changes in tame foxes were related both with vocal types used toward humans and with vocal dynamics in response to human pressure.