Domestication changes the vocal expression of emotional arousal toward humans in the red fox *Vulpes vulpes*

Svetlana S. Gogoleva¹, Ilya A. Volodin¹,², Elena V. Volodina² & Lyudmila N. Trut³

¹ Dept. of Biology, Moscow State Univ., Vorobievi Gori, Russia; gogolevs@mail.ru
² Scientific Research Dept., Moscow Zoo, Russia; volodinaev@mail.ru
³ Institute of Cytology and Genetics, Siberian Branch, Russian Academy of Sciences, Russia; trut@bionet.nsc.ru

**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 behavior foxes (control group) are also kept at this farm. They represent a “wild” model of vocal behavior.
- During the long-term selection, following an outbreeding scheme, more than 50000 foxes were reared and tested for behavior toward humans.

**Idea of experiment**

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

**Human pressure**

Arousal level: “wild” model

- 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

**Subjects:** 75 adult female foxes

- 25 are afraid of humans
- 25 are not afraid of humans

**We made one test per fox**

**Results**

**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**

**Conclusion**

Selection for tame behavior resulted in great changes of vocal behavior in comparison with the “wild” model whereas the vocal behavior 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.

Supported by RFFR (06-04-48400)