

**ENVIRONMENTAL INFLUENCE ON THE STRUCTURE
OF THE EUROPEAN BADGERS (*MELES MELES*) (MUSTELIDAE, MAMMALIA)
FAMILY GROUP ON THE OKA-DON PLAIN TERRITORY**

Oksana D. Bohina and Vladimir A. Boldyrev

*Saratov State University
83 Astrakhanskaya Str., Saratov 410012, Russia
E-mail: oksana@bokhina.ru*

Received 10 April 2018, revised 11 June 2018, accepted 6 July 2018

Bohina O. D., Boldyrev V. A. Environmental Influence on the Structure of the European Badgers (*Meles Meles*) (Mustelidae, Mammalia) Family Group on the Oka-Don Plain Territory. *Povolzhskiy Journal of Ecology*, 2018, no. 3, pp. 349–356 (in Russian). DOI: <https://doi.org/10.18500/1684-7318-2018-3-349-356>

The European badger (*Meles meles* L.) has various variants of its social organization in the populations in different parts of its habitat. The paper provides information on the impact of the environment on the structure of the family group of the European badger. The material was based on the data of our own observations conducted at ten model sites in 2011 – 2018. Model badger settlements on the territory of the Oka-Don Plain within the administrative borders of the Saratov region were studied. Based on the results of route surveys, photo-trap surveys and correlation dependence assessment, a direct and high relationship was found between such factors as the area of the family group, the size of its feeding territory, with the number of individuals in the group ($r = 0.875$ and $r = 0.715$, respectively); family groups of four types (group, polygynic, monogamous and incomplete families) were revealed. The group type of family is formed in the territorial conditions most suitable for the badger with a sufficient amount of feed. Large family groups live on such sites, forming a complex system of holes used by many generations of badgers. Polygynal families occupy territories similar to the first type, but with a small area of feeding areas. Due to the limiting factor of feed resource, such social relations do not develop up to large family groups and constitute a polygynical family of an alpha male and several females with their offspring. For the third-type social groups, a small area of family territories but a large feeding area are characteristic. Since small territorial resources are also a limiting factor, it does not allow animals to create large social groups more than a monogamous family. In the fourth type of family groups, which is characterized as an incomplete family, there are not enough suitable territories in combination with a small feeding area. Quantitatively, such a settlement consists of single individuals, and less often – a pair of animals. These types are not permanent structures, but replace each other under the influence of environmental factors. The development of a family group is limited by the total size of the area suitable for life activity, as well as the amount of available feed resources, which is a solution to the problem of resource allocation among animals of the given species.

Key words: *Meles meles*, Oka-Don plain, social behavior.

DOI: <https://doi.org/10.18500/1684-7318-2018-3-349-356>

REFERENCES

Belyachenko A. V., Shlyakhtin G. V., Filipechev A. O., Mosolova E. Yu., Melnikov E. Yu., Ermokhin M. V., Tabachishin V. G., Emelyanov A. V. *Methods of Quantitative Accounting and*

Morphological Studies of Terrestrial Vertebrates. Saratov, Izdatelstvo Saratovskogo universiteta, 2014. 145 p. (in Russian).

Bondarev A. I., Dezhkin A. V., Pavlov P. M. On the methods of accounting for the number of badgers. The Condition of the Habitat and Fauna of Game Animals of Russia and Adjacent Territories: Materials of the II International and VII All-Russian Scientific-Practical Conference. Balashikha, Izdatelstvo Rossiyskogo gosudarstvennogo agrarnogo zaochnogo universiteta, 2016, pp. 42–47 (in Russian).

Bohina O. D., Boldyrev V. A. Geoinformation model of the distribution of the European badger (*Meles meles* L., 1758) in the Saratov Right Bank. *Izvestiya of Saratov University. New Ser. Ser. Chemistry. Biology. Ecology*, 2017, vol. 17, iss. 3, pp. 363–364 (in Russian).

Grishin P. N., Kravchenko V. V., Boldyrev V. A. *Soils of the Saratov region, Their Origin, Composition and Agrochemical Properties*. Saratov, Izdatelstvo Saratovskogo universiteta, 2011. 176 p. (in Russian).

Zolotukhin A. I., Ovcharenko A. A. *Floodplains of the Forests: State, Ecology-Cenotic Structure, Applicability*. Balashov, Nikolaev Publ., 2007. 152 p. (in Russian).

Zolotukhin A. I., Shapovalova A. A., Ovcharenko A. A., Zanina M. A. Anthropogenic Dynamics of Structures and Areas of Visible Oak Forests of the Middle Prihopere. Balashov, Nikolaev Publ., 2010. 164 p. (in Russian).

Novikov G. A. *Field Studies on Ecology of Terrestrial Vertebrates*. Moscow and Leningrad, Izdatelstvo AN SSSR, 1953. 499 p. (in Russian).

Pryakhina S. I. The Climate of the Saratov Region. In: *Entsiklopediya Saratovskogo kraya (v ocherkakh, sobyitiyakh, faktakh, imenakh)* [Encyclopedia of Saratov Region (in essays, events, facts, names)]. 2nd ed. Saratov, Privolzhskoye knizhnoye izdatelstvo, 2011, pp. 23–25 (in Russian).

Sidorchuk N. V., Volchenko A. Ye., Rozhnov V. V. Daily activity of the European badger (*Meles meles* Linnaeus, 1758) (Mustelidae, Mammalia) in settlements in different populations of the European part of Russia. *Povolzhskiy J. of Ecology*, 2014, no. 4, pp. 601–610 (in Russian).

Shilina M. V., Musatova O. V., Ivanovskii V. V. *Biometrics: Textbook. method. Complex*. Vitebsk, Izdatelstvo Vitebskogo gosudarstvennogo universiteta imeni P. M. Masherova, 2011. 182 p. (in Russian).

Doncaster C. P., Woodroffe R. Den site can determine shape and size of badger territories: implications for group living. *Oikos*, 1993, vol. 66, no. 1, pp. 88–93.

Gaughran A., Kelly D. J., MacWhite T., Mullen E., Maher P., Good M., Marples N. M. Super-ranging. A new ranging strategy in European badgers. *PLoS ONE*, 2018, vol. 13, no. 2, pp. e0191818. DOI: <https://doi.org/10.1371/journal.pone.0191818>

Johnson D. P., Macdonald D. W., Newman C., Morecroft M. D. Group size versus territory size in group-living badgers: a large-sample field test of the Resource Dispersion Hypothesis. *Oikos*, 2001, vol. 95, no. 2, pp. 265–274.

Johnson D. P., Kays R., Blackwell P., Macdonald D. W. Does the resource dispersion hypothesis explain group living?. *Trends in Ecology and Evolution*, 2002 a, vol. 17, no. 12, pp. 563–570.

Johnson D. P., Jetz W., Macdonald D. W. Environmental correlates of badger social spacing across Europe. *J. of Biogeography*, 2002 b, vol. 29, iss. 3, pp. 411–425.

Kruuk H. Spatial organization and territorial behaviour of the European badger *Meles meles*. *J. Zoology*, 1978, vol. 184, iss. 1, pp. 1–19.

Macdonald D. W. The Ecology of Carnivore Social Behaviour. *Nature*, 1983, vol. 301, pp. 379–384

Stopka P., Johnson D. P. Badger (*Meles meles*) as a model species for the development of ecological and behavioural research. *Lynx*, 2000, vol. 31, no. 2, pp. 125–131.

Von Schantz T. Carnivore social behavior – does it need patches?. *Nature*, 1984, vol. 307, pp. 389–390.

Woodroffe R., Macdonald D. W. Helpers provide no detectable benefits in the European badger (*Meles meles*). *J. Zoology*, 2000, vol. 250, iss. 1, pp. 113–119.