

Dry beaver ponds as habitats attracting large mammals

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ABSTRACT. In this study we tried to research attractiveness of dry beaver ponds for large mammals. We used data of the frequency of visits of different species of mammals from beaver ponds and from dry marsh that was not inhabited by beavers but had similar conditions like a dry beaver pond. Camera traps (192 trap-nights) took pictures of 674 individuals of large mammals of eight species. It found the predominance of visits to the dry beaver ponds by the predatory mammals. Ungulates, except wild boar, visited the beaver ponds more often than the control marsh.

KEY WORDS: beaver pond, habitat, large mammals.

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Пересыхающие бобровые пруды как привлекательные биотопы для крупных млекопитающих

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РЕЗЮМЕ. Исследована привлекательность пересыхающих бобровых прудов для крупных млекопитающих. Для этого была проанализирована частота посещений разными видами млекопитающих бобровых прудов и, для сравнения, сходного по условиям пересыхающего болота, не заселённого бобрами. При помощи фотокамер (отработано 192 ловушко-суток) зафиксировано 674 особи восьми видов крупных млекопитающих. Обнаружено преобладание посещений пересохших бобровых прудов хищными млекопитающими. Копытные, за исключением кабана, посещали бобровые пруды чаще, чем контрольную территорию.

КЛЮЧЕВЫЕ СЛОВА: бобровый пруд, биотоп, крупные млекопитающие.

Introduction

It is a well-known fact that the beaver plays a role as an ecosystem engineer. Beavers create new habitats — ponds by stemming riverbeds and flooding the riparian ecosystems. Various mammals use these habitats permanently or temporarily. Beaver ponds provide semi-aquatic mammals with an abundant supply of prey and den sites (Rosell *et al.*, 2005). The beaver buildings can be an important survival station for small mammals, especially during winter (Samas & Ulevičius, 2015). Small mammals can be a prey for predators. Sometimes red foxes and badgers use top parts of beaver burrows (Dyakov, 1975). Beaver has positive ecological consequences on roe deer and elk habitat (Rosell *et al.*, 2005). We attempted to study attractiveness of beaver settlement for large mammals in drought conditions of 2014.

Material and methods

Studies were carried out in the Voronezhsky State Nature Biosphere Reserve which is located in the Vor-

onezh and Lipetsk provinces, 450 km south-south-east of Moscow (51°55' N, 39°38' E) (Fig. 1). The Reserve is in the forest steppe nature zone, and covers 31,053 hectares of the northern part of a large forest “island” surrounded by agricultural landscapes (fields and meadows) and settlements. Two small rivers, the Usman and Ivnitsa, flow through the Reserve. The south-west corner of the reserve borders the large River Voronezh (Lavrov *et al.*, 1989).

The climate is moderately continental (Vengerov *et al.*, 2001). The average yearly temperature is 5.6°C. Average monthly temperature varies from –8.7°C (January) to +19.5°C (July). The mean annual precipitation is 638 mm (Sapelnikova & Basilsкая, 2015).

Our research was conducted from 10 June to 6 November 2014. We surveyed two inhabited beaver settlements using camera traps. One of the surveyed beaver settlements is located on the small river called Ivnitsa, the second settlement is located on the stream Usmansky, a tributary of the Ivnitsa River. There is an alder forest (*Alnus glutinosa*) in their floodplains and a pine (*Pinus sylvestris*) forest above the floodplains which is about 100 years old. Distance between these settlements is 7.7 km. Beaver ponds have small water

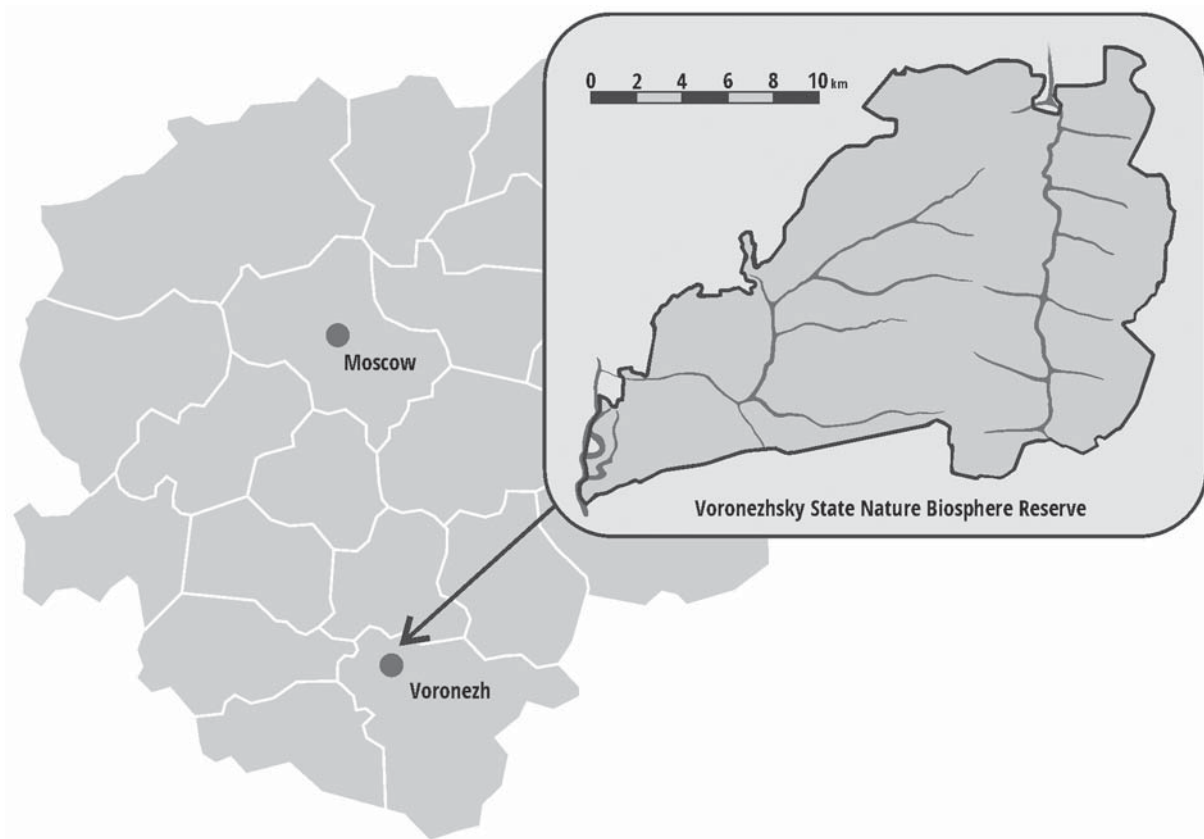


Fig. 1. Location of the Voronezhsky State Nature Biosphere Reserve.

table and a network of channels among thickets of grey willow (*Salix cinerea*).

For control, we surveyed dry marsh that was not inhabited by beavers. It is located on the watershed between tributaries of the river Ivnitsa. There is a pine and oak (*Quercus robur*) forest around the marsh aged more than 100 years. Distances between this marsh and beaver settlements are 3.5 and 8.0 km. The marsh has the same area as the beaver settlements.

In 2014 we observed a long period of drought. The general amount of precipitation during the period of our work (June–November) was 195.8 mm, whereas amount of precipitation average monthly indicators is 353.6 mm. The beaver ponds and the marsh dried up in the middle of summer. Residue of water persisted only under the vaults of entrances of beaver lodges. The marsh dried up totally.

We used camera traps (Bushnell Trophy Cam HD Max) to register the visit of research places by large mammals. Camera traps (192 trap-days) took pictures of 674 individuals of large mammals of eight species. We employed the frequency of visits (individuals per day) as a relative measure of using study areas by large mammals.

Results

At the beaver settlements the frequency of visits was for wild boar (*Sus scrofa*) — 0.76, elk (*Alces alces*) — 0.5, European roe deer (*Capreolus capreolus*) — 0.25, red fox (*Vulpes vulpes*) — 0.7 and pine marten (*Martes martes*) — 0.07 (Fig. 2). Stray dogs visited the beaver settlement six times, European badger (*Meles meles*) and western polecat (*Mustela putorius*) were observed once. Also we registered small mammals at beaver settlement, but we could determine only bank vole (*Clethrionomys glareolus*) and mice (*Apodemus* sp.) in some pictures. At the control marsh we registered wild boar (3.12), elk (0.07), European roe deer (0.11), and red fox (0.02).

Discussion

There is a noticeable predominance of visits to the dry beaver ponds by the predatory mammals. Apparently, predators are attracted by plentiful amphibians that are escaping from drought in the entrances of the beaver lodges and by micromammals. Presumably, predators are also attracted by the smell of castoreum. Semi-aquatic mammals did not occur in the study areas due to lack of water.

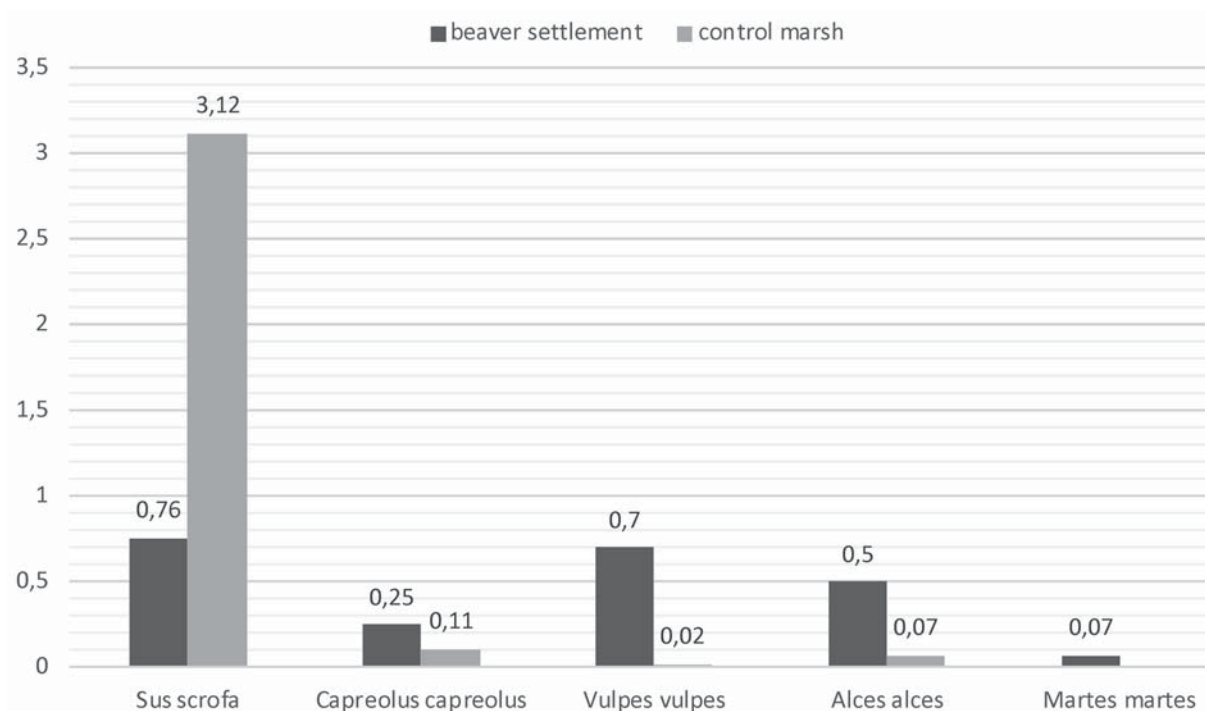


Fig. 2. Frequency of visits (individuals per day) in the study areas by large mammals.

Ungulates, except wild boar, visited the beaver ponds more often, than the control marsh. Elk and European roe deer were attracted to the beaver settlements by plentiful thickets of grey willow. This food was more available during the drought. Wild boars visited settlements and marsh for taking a mud bath and obtaining invertebrates and rhizomes in the soft ground. During the drought, beaver ponds saved some residue of water, which attracted animals. They could find water to drink only there, because the river and streams dried up.

Dry beaver ponds are attractive habitats for various mammals, who find favorable conditions here.

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