

INFLUENCE OF BEAVER ACTIVITY ON THE FLORA OF THE KALUZHSKIYE ZASEKI NATURE RESERVE

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A sharp increase in the population of beavers in the mid-1990s allowed these animals to spread quickly throughout central Russia and, in particular, on the territory of the Kaluzhskiy Zaseki Nature Reserve. As a result of the activity of beavers, specific habitats are formed, where new plant species can settle, which contributes to the growth of biodiversity of the studied area. The species, first recorded in the reserve in the places where beavers live, are divided into three groups according to the degree of influence of the animals on their habitats. For each group, the number of new alien and native species, as well as those increasing their populations in the region, is given. Brief descriptions of unusual morphological forms of four species growing near beaver settlements are provided. A comparison of the influence of beavers and humans on the flora of the reserve is given.

Keywords: *Castor fiber* Linnaeus, flora, vascular plants, animal influence, plant habitats, Kaluzhskiy Zaseki Nature Reserve

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REFERENCES

- Aleynikov A.A. 2010. *Castor fiber* as an ecosystem engineer in “Bryanskiy les” reserve and its protective zone. — Vestnik TvGU. Seriya “Biologiya i ekologiya”. 18: 66–68. (In Russ.).
- [Bobry...] Bobry v zapovednikakh yevropeyskoy chasti Rossii [Beavers in the reserves of the European part of Russia]. 2018. Velikiye Luki. 538 p. (In Russ.).
- D'yakov Yu.V. 1975. Bobry yevropeyskoy chasti Sovetskogo Soyuza. [Beavers of the European part of the Soviet Union.]. Smolensk. 480 p. (In Russ.).
- European beaver (*Castor fiber* L.) as a key species of a small river ecosystem (Prioksko-terrasnyi nature biosphere reserve). 2012. Moscow. 150 p. (In Russ.).
- Filippova A.V. 2017. The influence of the special protection regime for change of biodiversity of cenoses of the reserve “Orenburg”. — Samarskaya Luka: problemy regional'noy i global'noy ekologii. 26 (3): 58–63 (In Russ.).
- Galchenkov Yu.D., Loktionov Ye.Yu. 2005. Rezul'taty uchetov bobra (*Castor fiber* L.) na yuzhnom uchastke zapovednika “Kaluzhskiy zaseki” v 2004 g. [Results of beaver (*Castor fiber* L.) surveys in the southern section of the Kaluga Zaseki nature reserve in 2004.]. — In: Materialy XI Vserossiyskoy nauchnoy konferentsii 5–7 aprelya 2005 g. Kaluga. P. 368–371 (In Russ.).
- Korablev N.P., Korablev P.N., Korablev M.P. 2018. Mikroevolyutsionnyye protsessy v populyatsiyakh translo-tirovannykh vidov: yevroaziatskiy bobr, yenotovidnaya sobaka, amerikanskaya norka. [Microevolution processes in populations of translocated species: Eurasian beaver, raccoon dog, American mink.]. Moscow. 402 p. (In Russ.).
- Krasnaya kniga Kaluzhskoy oblasti. T. 1. [Red book of the Kaluga region. Vol. 1.]. 2015. Kaluga. 536 p. (In Russ.).
- Mlekopitayushchiye. Bol'shoy entsiklopedicheskiy slovar'. [Mammals. Large encyclopedic dictionary]. 1999. Moscow. 416 p. (In Russ.).
- Radygina V.I., Shcherbakov A.V., Polevova S.V., Kiseleva L.L., Prigoryanu O.M. 2003. Sosudistyye rasteniya natsional'nogo parka “Orlovskoye Poles'ye”: (Annotirovanny spisok vidov) [Vascular plants of the Oryol Polesie national Park: (Annotated list of species)]. — Flora i fauna natsional'nykh parkov. 3: 91 (In Russ.).

- Reshetnikova N.M. 2015. Additions to the flora of Kaluga province based on records of 2014. – Byul. MOIP. Otd. biol. 120 (6):69–74 (In Russ.).
- Reshetnikova N.M. 2016. Dinamika flory sredney polosy yevropeyskoy chasti Rossii za posledniye 100 let na primere Kaluzhskoy oblasti. [Dynamics of the flora of the middle zone of the European part of Russia over the past 100 years on the example of the Kaluga region.]. Dis. ... dokt. biol. nauk. Moscow. 599 p. (In Russ.).
- Reshetnikova N.M. 2018. Additions to the flora of Kaluga province based on records of 2015–16. – Byul. MOIP. Otd. biol. 123 (3): 64–70 (In Russ.).
- Reshetnikova N.M., Mayorov S.R., Skvortsov A.K. et al. 2010. Kaluzhskaya flora: annotirovanny spisok sosudistykh rasteniy Kaluzhskoy oblasti. [Kaluga flora: an annotated list of vascular plants of the Kaluga region.]. Moscow. 764 p. (In Russ.).
- Reshetnikova N.M., Bobrovskiy M.V. 2016. Multiyear changes of the vascular flora in the Kaluzhskie zaseki reserve. – Bot. zhurn. 101 (11): 1321–1344 (In Russ.).
- Reshetnikova N.M., Krylov A.V. 2013. Additions to the flora of Kaluga province based on records of 2010. – Byul. MOIP. Otd. biol. 118 (3): 67–69 (In Russ.).
- Reshetnikova N.M., Yagodovskaya M.P. 2020. Dopolneniya k flore Kaluzhskoy oblasti (po materialam iz zapovednika “Kaluzhskiye zaseki” v 2018–19 gg.). [Additions to the flora of the Kaluga region (based on materials from the Kaluga Zaseki nature reserve in 2018–19)]. – Byul. MOIP. Otd. biol. 125 (4): 25–27 (In Russ.).
- Shcherbakov A.V. 2011. Gidrofil'naya flora sosudistykh rasteniy kak model'nyy ob'yekt dlya inventarizatsii i analiza flory (na primere Tul'skoy i sopredel'nykh oblastey). [Hydrophilic flora of vascular plants as a model object for inventory and analysis of flora (on the example of Tula and neighboring regions)]. Dis. ... dokt. biol. nauk. Moscow. 552 p. (In Russ.).
- Shovkun M.M., Yanitskaya T.O. 1999. Sosudistyye rasteniya zapovednika “Kaluzhskiye zaseki”: annotirovanny spisok vidov. [Vascular plants of the Kaluga Zaseki nature reserve: annotated list of species.]. – Flora i fauna zapovednikov. Vyp. 77. Moscow. 52 p. (In Russ.).
- Skvortsov A.K., Reshetnikova N.M. 2018. Onagraceae Juss. – Kipreynyye [Onagraceae Juss. – Onagraceae]. – In: Flora Nizhnego Povolzh'ya. T. 2. Ch. 2. Moscow. P. 386–402 (In Russ.).
- Sommer R., Ziarnetzky V., Messlinger U., Zahner V. 2019. The influence of beaver on the biodiversity of semi-aquatic habitats – current situation and meta-analysis for Europe and North America. – Naturschutz und Landschaftsplanung. 51: 108–115.
- Stringer A., Gaywood M. 2016. The impacts of beavers *Castor* spp. on biodiversity and the ecological basis for their reintroduction to Scotland, UK. – Mammal Review. In Press. <https://doi.org/10.1111/mam.12068>
- Tzsvlev N.N. 2007. O rode *Epilobium* L. (Onagraceae) v Vostochnoy Evrope. [About the genus *Epilobium* L. (Onagraceae) in Eastern Europe.]. – Novosti sist. vyssh. rast. 39: 241–259 (In Russ.).
- Vasil'chenko I.T. 1959. Rod Chereda – *Bidens* L. [The Genus *Sereda* – *Bidens* L.]. – In: Flora SSSR. T. 25. P. 551–561 (In Russ.).
- Wright J., Jones C., Flecker A. 2002. 2002. An ecosystem engineer, the beaver, increases species richness at the landscape scale. – Oecologia. 132: 96–101. <https://doi.org/10.1007/s00442-002-0929-1>
- Zapovednik “Kaluzhskiye Zaseki”. 2020. <http://zaseki.ru>. (last changed: 04.05.2020) (In Russ.).