Wind turbines and hamsters: conservation programmes of dwarf hamsters (*Nothocricetulus migratorius*) in Ukraine

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The grey dwarf hamster *Nothocricetulus migratorius* is one of the closest relatives to the European hamster *Cricetus cricetus* (Lebedev et al., 2018). The species has a wide range from Balkans on the west to China and Mongolia in the East. In European part it is considered threatened and is a protected species in Bulgaria (Nedyalkov, 2016), Romania (Sandor, 2018), Ukraine (Mezhzherin, 2009) and in Greece (Legakis & Maragos, 2009). In Ukraine the species is distributed in steppe zone, from Odesa in the west to Sumy in the East. Most of the recent localities are close to coastal areas of Black and Azov Seas. While the natural habitats are dry grasslands, as most of these are transformed to croplands, dwarf hamsters may be recorded on different cultures. Due to our observations, tree-lines (often degraded to just lines of grass and bush vegetation) between the fields may serve as preservation habitats for hamsters.

In the past years, wind power plants (WPP) rapidly spread throughout most of Europe, including Ukraine. The European Green Deal also popularized these facilities as important to reduce carbon emission. While there are some concerns regarding influence of wind power plants on bats and birds (Choice et al., 2020; Gaultier et al., 2020 and lots of other studies and practical guidelines), the effect on ground-dwelling vertebrate fauna is not only understudied, but simply ignored.

During three seasons (2019-2021) our group performed a series of field studies to verify whether there is any impact of wind-turbine construction on small mammals. We focused on two construction sites located in Kherson and Zaporizhia Oblasts of Ukraine. On both sites a single protected mammal species was found and it was a grey dwarf hamster.

The construction activities of wind power plants are followed by the construction of large road network. Most of these roads are built within the above-mentioned tree-lines (or grass-lines), which may serve as preservation habitats for hamsters. The construction of wind turbines and the road network pose a potential threat to dwarf hamsters.

No pre-construction monitoring on small mammals was done on the Kherson site. When we started our survey, the power plant construction was close to the end. During 2019-2020 we registered zero hamster occurrences within the construction site, while this species was present on the adjacent areas. During 2021 hamsters started to slowly come back to the WPP site.

Alternatively, on Zaporizhya site, we have done an intensive pre-construction survey in 2019, mapped over 20 localities with hamster presence within the area, planned for WPP construction. Additional detailed surveys in 2020 and 2021 provided more information on the presence of this protected species and its ecology. Together with WPP company, a detailed plan of reducing impact on dwarf hamster's population was developed. This included:

- relocation of hamsters from all of the area influenced by construction in 2021 and 2022 (just prior to the construction);
- captive breeding and reintroduction after the construction finished;
- population monitoring after the construction;
- promotion of hamster-friendly practices among local farmers.

The Russian invasion of Ukraine broke all the efforts for the conservation of dwarf hamsters. Both sites were occupied by Russian troops, all conservation activities were abandoned and the fate of hamsters subject to translocation and monitoring remains unknown.