REPORT FROM A BOU-FUNDED PROJECT

Yellow-breasted Bunting *Emberiza aureola* in peril: which threats occur on the breeding grounds?

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Introduction

The Yellow-breasted Bunting *Emberiza aureola* was once one of the most common songbirds across the Palaearctic, but the population crashed within the past decades (Kamp et al. 2015). Over-hunting on the wintering grounds seems to be a major problem, however, data about population size, breeding success and survival rates are virtually lacking. The Amur region is still a stronghold for this species, but the populations are now declining here as well (Antonov 2016). Recent changes in Russian laws force land owners to use their land for agricultural purposes, and due to dam constructions the Amur floodplain is drying out (Sokolova 2015). Together with climate change impacts, this leads to an increase in spring fires in the region (Flannigan et al. 2009). The aim of this study is to investigate if habitat loss or other threats on the breeding grounds in Far East Russia could impact the fate of this endangered species.

Methods

Study area

The study took place at Muraviovka Park in Far East Russia as a part of the Amur Bird Project (Heim & Smirenski 2013). This nature reserve is dominated by floodplains with surrounding agricultural lands and has a size of 6,500 ha. Human-caused fires occur almost annually, around 25% of the reserve´s area were burned by a fire 7th of April 2016.

Habitat use and impact of habitat changes

The first Yellow-breasted Bunting was seen 6th of May 2016. Territory mapping was used to survey the complete area, with a special focus on sites were territories were found during a pre-study in 2015. Territories were counted as re-occupied if a singing male or pair was observed within 100m radius. Observations were fixed with GPS locations, including information about habitat type category and whether the site was hit by a fire or ploughed. The following parameters were estimated for one plot (10 x 10 m) in each territory: mean height of shrubs (in cm), shrub cover (in %), mean height of herb layer (in cm) and wetness (dry, moist soil, soaked soil, standing water). Data regarding re-occupation of territories from the previous year were analysed using generalized linear models (GLMs, response variable: territory re-occupied (yes/no), factor: burned (yes/no) or habitat type (willow, steppe)).

Breeding success

Nests were found through direct observation of the parents or by *rope dragging*. We used iButton Thermochron loggers to measure temperature in the nests. The loggers were retrieved after the juveniles have fledged to obtain data about nest survival (Hartman & Oring 2006). Furthermore, we collected data on nest site characteristics (vegetation type & height, nest visibility from above).

Survival rates

Using tape lure and mist-nets we trapped local breeding birds and ringed them with individual colour-ring combinations.

Results

Habitat use and impact of habitat changes

The field work took place between 15th of April and 20th of July 2016. A total of 157 territories was found. 150 of them were located in *Salix* willow shrubs, four were located in steppes dominated by *Artemisia* and three associated with *Corylus* shrubs. The majority (90 %) of the willow shrubs ranged in height from 138-212 cm (mean: 172 cm), with shrub cover between 5 and 81 % (mean: 43,5 %). Th herb layer measured between 30 cm and 80 cm in height (mean: 52 cm). 79 % of the territories were found on moist soil, 13 % on soaked soil and 8 % in areas with standing water. 88 territories occupied in 2015 were controlled again in 2016 (see figure 1). None of the territories that were converted to arable land (n=7) were re-occupied in 2016 (8% of all territories). 33% of the territories were hit by a fire. Habitat type was found to be a reliable predictor for re-occupation (Chi^2=24.2, df=79, p<0.01), with a higher return rate in willow shrubs than in steppe vegetation. We could not find a significant effect of fire on re-occupation (Chi^2=0.7, df=79, p=0.4).

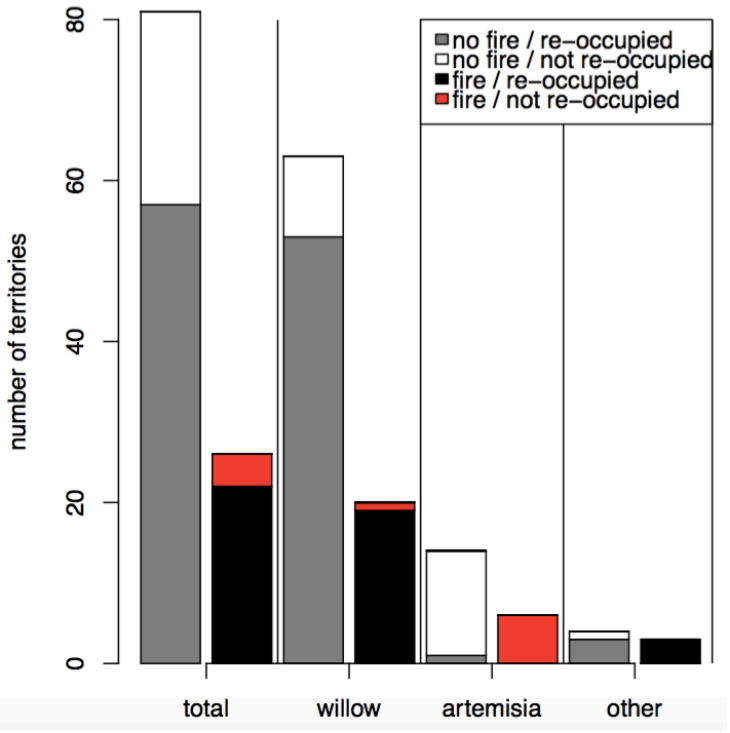

Figure 1: Re-occupation of Yellow-breasted Bunting territories in 2016 regarding habitat type and fire impact.

Breeding success

Only two active nests were successfully monitored with temperature loggers. One was built in an unburned area and the juveniles hatched, the second one was built in a burned area and failed. The nest in the unburned area was built on the ground (visibility 10%), the one in the burned area was built in the foot of a willow (visibility 40 %). The temperature loggers had to be fixed within the nests, otherwise the parents would remove them.

Survival rates

Three out of seven males (43%) colour-ringed in 2015 were re-located in their territories in 2016. None of the two females ringed in 2015 were observed in 2016. We equipped 27 more birds with individual colour-ring combinations (19 males, 7 females, 1 juvenile).

Discussion

The majority of the Yellow-breasted Buntings at Muraviovka Park were found in wet, low willow shrubs. In this preferred habitat type, re-occupation rate was highest, even if the area was burned. In steppe vegetation, re-occupation rate was much lower, and none of the territories were re-occupied if the site was hit by a fire or converted to arable land. A possible explanation might be the lack of song posts in crop fields and burned steppe habitats, while dead twigs persist in burned willow shrubs and can be used by singing males (personal observations). We assume that territories in steppe-like vegetation are therefore much more sensitive to fires.

Due to the small sample size, it was not possible to investigate the impact of fires on breeding phenology and success. However, broods in burned areas might be more susceptible to predation caused by the lack of a dense cover of dead organic matter, which hides the nest in unburned areas. All re-sighted colour-ringed males re-occupied their territory from the previous year, even if it was burned.

We conclude that fire does not influence the re-occupation of territories in prime habitat (willow shrubs), while it can have negative impacts in secondary habitats (steppe). Reclamation of agricultural land can locally decrease habitat availability for this endangered species - whether this has a population-scale impact should be investigated in future studies.

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References

Antonov, A. I. (2016). Breeding population trend of Yellow-breasted Bunting *Emberiza aureola* Pallas, 1773 at the south of Amur region. *Ecological Problems of the Lower Amur Region*, 17, 68–71. (in Russian)

Flannigan, M., Stocks, B., Turetsky, M., & Wotton, M. (2009). Impacts of climate change on fire activity and fire management in the circumboreal forest. *Global Change Biology*, 15 (3), 549-560.

Hartman, C. A., & Oring, L. W. (2006). An inexpensive method for remotely monitoring nest activity. *J. Field Ornithol.*, *77*(4), 418–424.

Heim, W., & Smirenski, S. M. (2013). The Amur bird project at Muraviovka Park in Far East Russia. *BirdingASIA*, 19, 31–33.

Kamp, J., Oppel, S., Ananin, A. A., Durnev, Y. A., Gashev, S. N., Hölzel, N., Mishchenko, A. L., Pessa, J., Smirensky, S. M., Strelnikov, E. G., Timonen, S., Wolanska, K. & Chan, S. (2015). Global population collapse in a superabundant migratory bird and illegal trapping in China. *Conservation Biology*, 29 (6), 1684–1694.

Sokolova, G. V. (2015). Analyzing the Amur River water regime for the period preceding the catastrophic flood in 2013. *Russian Meteorology and Hydrology*, 40 (7), 477–479.

