TRANSYLVANIA DISSERTATION/THESIS PROJECT

TR94 Changes in bird communities in Tarnava Mare and habitat associations

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In Europe, agricultural landscapes often possess great conservation value. The European Environment Agency (Stoate *et al*. 2009) has estimated that 50% of all species in Europe have some reliance on agricultural habitats, including species considered threatened by the IUCN (2014). This is partly due to the wide spatial extent of agricultural land in Europe, but also because of the region's long history of low intensity farming practices which have allowed species-rich farmland communities to develop gradually over time (Stoate *et al*. 2009).

The conservation value of low intensity farming areas has been recognized by European agricultural policy since the 1990s. The term 'High Nature Value farmland' (HNVf) was coined at this time to define areas where predominantly agricultural landscapes overlap with either a high diversity of habitats and species, or where these landscapes support a species of particular conservation importance, or both (Lomba*et al*. 2014). Across Europe, the maintenance of High Nature Value farmland and its important biodiversity is usually dependent on the continuation of traditional farming practices (Henle *et al*. 2008). These traditional practices are, however, in sharp decline due to drivers in recent EU agricultural policy, and this is contributing to a concordant decline in farmland biodiversity. Three key trends are typically associated with the loss of traditional farming practises: intensification of agriculture, increasing scale of agricultural operations and abandonment of agriculturally marginal but High Nature Value farmland (Henle *et al*. 2008).

The Tarnava Mare, and Southern Transylvania in general, is an agricultural landscape supporting exceptionally high biodiversity, maintained by centuries of traditional small-scale farming (Mikulcak *et al*. 2013). The High Nature Value anthropogenic grasslands predominating here are of international conservation importance, representing an increasingly rare and largely intact ecosystem which has been lost in many other parts of Europe (Akeroyd & Page, 2011). Since the fall of the Communist dictatorship in 1989, this traditional farming has come under increasing threat, first from a collapse in agricultural employment and consequent rural population decline (Mikulcak *et al*. 2013), and more recently, since accession to the EU in 2007, from trends driven by EU agricultural policy (Henle *et al*. 2008).

The Tarnava Mare Natura 2000 site supports a rich diversity of birds, with over 150 species having been recorded here to date. Indeed, a Special Protection Area (SPA) was designated in 2008 under the EU Wild Birds Directive to protect the many species of high conservation importance within this area. The key species covered by this directive are: Ferruginous duck (*Aythya nyroca*), Lesser spotted eagle (*Clanga pomarina*), European Honey buzzard (*Pernis apivorus*), Hen harrier (*Circus cyaneus*), Corncrake (*Crex crex*), European Nightjar (*Caprimulgus europaeus*), Ural owl (*Strix uralensis*), Grey-headed woodpecker (*Picus canus*), Syrian woodpecker (*Dendrocopos syriacus*), Middlespotted woodpecker (*Dendrocopos medius*), Woodlark (*Lullula arborea*) and all aquatic bird species during migration periods (Kovacs *et al*. 2013). Other important species which still occur regularly here, despite widespread declines across much of Western Europe, include Little and Long-eared Owl, Turtle Dove, Red-backed Shrike, and seven other species of Woodpecker.

The persistence of such a high abundance and diversity of birdlife in Tarnava Mare is largely due to the continued use of low-intensity traditional farming methods, along with the natural variety of habitats found here (Haas *et al*. 2001, Baldi *et al*. 2005). The region possesses a mosaic landscape of hay meadows, orchards, pasture, woodland, arable fields and other habitats. Changing farming practices, however, can facilitate changing habitats, such as the encroachment of scrub onto abandoned hay meadows or loss of grassland plant diversity as grazing intensity on pastures increases. These changes will ultimately have an effect on bird communities. Doxa *et al*. (2010), for example, describes how as intensification of farmland increases, the composition of bird communities becomes increasingly dominated by generalists, at the expense of the more specialized species typical of HNV farmlands.

The Tarnava Mare therefore provides students with excellent opportunities to research how the various bird species found in the region utilize different habitats, in order to better understand and predict how changing farming practices could affect bird populations.

Students taking this dissertation option will join experienced ornithologists completing their annual programme of bird surveys in the Tarnava Mare. Two key survey techniques will be used to collate ornithological datasets from each of the village sites visited – point counting and mist netting. Point counts involve surveying a number of fixed pre-set points along non-linear transects set up at each of the Tarnava Mare study villages. Three transects (each approximately 6km in length) have been established at each village; with each transect possessing a variable number of points spaced 500m apart. These transects were specially selected with the aim of traversing a range of land cover and land use types which are representative of the surroundings of each village. Students will visit each study point twice per season, surveying all birds seen and heard over a 10-minute period within a set radius at each site. Training in common European bird calls will be provided by experienced ornithologists familiar with the local avifauna.

Mist-netting involves the capture of birds in fine-mesh nets from which they are removed by trained bird ringers, identified, ringed, and then released. Mist netting surveys were introduced in Tarnava Mare in 2014 as part of a long-term ringing programme carried out with the support of the local bird conservation NGO 'Milvus group'. Mist net surveys will mostly be completed in agricultural sites slightly closer to our Tarnava Mare village bases than the point count surveys, with surveys starting shortly after dawn each morning.

Students will be able to use a combination of the point count and mist net datasets generated in the course of their study season, along with extensive pre-existing habitat structure datasets, to answer a range of research questions to examine relationships between bird community composition and land use in the Tarnava Mare region. One possibility is to use the point count data to compare community assemblages of birds in more intensely farmed agricultural areas close to villages with less intensively farmed areas further up the valley slopes. These comparisons could look at abundance and richness of avifaunal communities as a whole, and also focus on occupancy and abundance of key species such as those in the EU Wild Birds Directive priority list, or other species possessing a high regional conservation importance. Students could also test the hypotheses of Doxa *et al*. examining dominance of different feeding guilds in differently managed farm landscapes, to identify any relationships between the predominance of generalist and specialist feeders and disturbance level. Mist-netting data could be used to provide supplementary data to all these potential research questions, with students extrapolating and comparing catch records from netting sites located in areas with different levels of farming intensity.

As well as examining the relationships between bird communities and levels of farming intensity, the wide range of habitats students will be working in will also provide the opportunity to examine the conservation value of a range of discrete habitat types (grasslands, forests, low-intensity farmland, higher intensity farmland, different crop types etc) based on overall species richness and abundance as well as the presence of key species of high conservation concern.

In summary, students taking this research option will be able to generate very large biological datasets during their time on-site, and have the opportunity to conduct a wide range of different analytical approaches on these datasets to answer key questions on the conservation value and habitat associations of the bird communities of the Tarnava Mare region.

Recommended Reading

Coros, Monica Maria, et al. (2017), 'Innovative and sustainable tourism strategies A viable alternative for Romania's economic development', *Worldw. Hosp. Tour. Themes*, 9 (5), 504-15.

Culbert, Patrick D, et al. (2017), 'Legacy effects of past land use on current biodiversity in a low-intensity farming landscape in Transylvania (Romania)', *Landsc. Ecol.*, 32 (2), 429-44.

Dorresteijn, Ine, et al. (2013), 'The Conservation Value of Traditional Rural Landscapes: The Case of Woodpeckers in Transylvania, Romania', *PLoS One*, 8 (6),

Dorresteijn, Ine, et al. (2015), 'Impact of land cover homogenization on the Corncrake (Crex crex) in traditional farmland', *Landsc. Ecol.*, 30 (8), 1483-95.

Dorresteijn, Ine, et al. (2018), 'A new world for old landscapes: Land-use intensification and bird conservation in a traditional farming landscape', *North-West. J. Zool.*, 14 (2), 199-207.

Hanspach, Jan, et al. (2016), 'Characterizing social-ecological units to inform biodiversity conservation in cultural landscapes', *Divers. Distrib.*, 22 (8), 853-64.

Hanzelka, Jan, Petra Horka, and Jiri Reif (2019), 'Spatial gradients in country-level population trends of European birds', *Divers. Distrib.*,

Hartel, T, et al. (2009), 'Species richness - pond area relationships of amphibians and birds in two Natura 2000 protected areas of Romania', *Community Ecol.*, 10 (2), 159-64.

Hartel, Tibor, et al. (2014), 'Bird communities in traditional wood-pastures with changing management in Eastern Europe', *Basic Appl. Ecol.*, 15 (5), 385-95.

Sutcliffe, Laura M E, et al. (2015), 'Harnessing the biodiversity value of Central and Eastern European farmland', *Divers. Distrib.*, 21 (6), 722-30.