

Chapter 16

Perspectives on the Declining Ortolan Bunting (*Emberiza hortulana*) Population in Northern Sweden



Christer Olsson

Abstract The ortolan bunting (*Emberiza hortulana*) population in northern Sweden, which represents about 50% of the Swedish population, historically bred in cultivated farmland habitats. However, in the 1970s, it became evident that the ortolan bunting population had begun to move away from the farming landscape into forest clear-cut areas, which currently host the strongholds of the species in Sweden. The key factor that these two habitats share is the availability of exposed soil for feeding. Recent studies on the declining ortolan bunting population in the mid-Sweden farming landscape indicate that the six most important feeding microhabitats are unsown rows in the tracks of tractor wheels; sparsely sown or small bare patches in the crops; supplemental oat feeders; the canopies of trees and bushes; uncultivated field borders; and ditches containing eroded soil. In the forest clear-cuts, exposed soil occurs where vehicles have disturbed the surface layer during the logging process. These areas of bare soil persist for about 5–10 years before being fully vegetated by trees and bushes. The logging industry is now cooperating in a project with bird ecologists to create suitable habitats for longer periods and over larger areas. Evidence from their West African wintering area suggests that the greatest losses in the population are due to habitat changes in Sweden and not due to factors on the wintering grounds.

Keywords Changing agricultural practices · Cultivated habitat degradation · Methyl mercury · Ortolan bunting *Emberiza hortulana* · Forest clear-cuts · Pesticides · Population decline · Yellowhammer *Emberiza citrinella*

C. Olsson (✉)
Fågelperspektiv, Umeå, Sweden

1 Historical Background

The ortolan bunting (*Emberiza hortulana*) has been documented as a regular breeding bird in the province of Västerbotten in northern Sweden since at least the eighteenth century. There are no sources available for finding well documented records of this species before then. This implies that, even at that time, the ortolan bunting was present in the community of Umeå, where I have studied this species over the last 50 years.

In the late 1940s, there was a major survey of the ortolan bunting distribution in Sweden, when it was said to be quite common throughout the region of Västerbotten. Thereafter, during the 1950s and early 1960s, there was a steep decline in the ortolan bunting population across the whole of Sweden, mainly due to the widespread use of methyl mercury, which was traditionally used in agricultural chemicals as a fungicide or pesticide. This metal was a lethal physical threat to ortolan buntings (Svensson et al. 1999).

In the early 1960s many studies focused on the brutal effects of methyl mercury on the farmland avifauna. As a result of this research, the substance was prohibited from use in the agricultural landscape of the country in 1966.

The ortolan bunting populations responded quickly to this, especially in northern Sweden (Fig. 16.1), where they became increasingly abundant until the mid 1970s. At this point, there was a sudden change in the structure of the farming landscape which led to increasing areas of monocultures, where the same types of crop were intensively cultivated over huge areas, with few feeding areas available for the ortolans, which were accustomed feeding on open patches of soil along the edges of these fields.

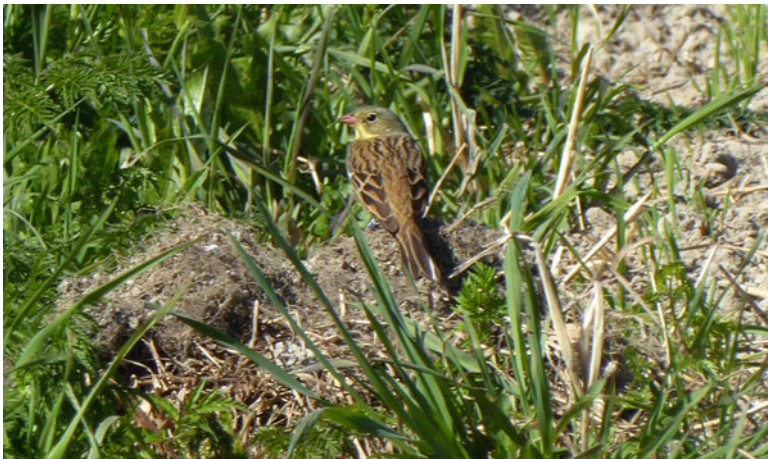


Fig. 16.1 A male from one of the last seven pairs of ortolan bunting in its former agricultural stronghold in northern Sweden: Röbbäcksslätten, in the vicinity of Umeå in June 2019. (Photo by Christer Olsson)

However, despite the changing agricultural practices, the ortolan population remained in a relatively stable state for about a decade in the rural areas of northern Sweden. This was primarily because the species underwent a dramatic change in habitat preferences during this period, moving from their former crop areas to clear-cut areas made by the forest industry; a habitat that was increasing rapidly at that time (Olsson and Wiklund 1999).

There were no further reports of changes in the ortolan bunting population until the end of the 1980s when we heard the first warnings of a new decline. Initially, a few monospecific studies were carried out on discrete local populations. Among the first to notice the decrease were those counting the numbers of passerines on autumn migration. They detected an obvious decrease of this species at migration studying stations throughout the country (Kjellén 2002). Subsequent investigations during the breeding season revealed a dramatic decline in the Swedish ortolan bunting population; a decline that is ongoing (Sondell 2013).

By the turn of the millennium the ortolan bunting was a scarce breeding species in Sweden. For example, in the entire farming landscape area of Röbbäcksslätten (in the vicinity of Umeå), a survey in June 1972 recorded 125 singing males. In this same area in June 2019 only seven singing males remained (<https://www.artportalen.se/ViewSighting/ViewSightingList>). The last reliable estimation of the entire Swedish population is from 2012, when a survey estimated the total Swedish population to comprise about 3700 pairs, of which c.1800 were found in the county of Västerbotten.

2 Ecology

The ortolan bunting has a long history as a typical inhabitant of a farming landscape that nowadays has almost disappeared. The birds cannot cope in today's intensively farmed areas, without any ditches, rows of trees for the males to sing from and without possibly the most important feature, i.e. open soils without crops or vegetation. Neither can the ortolan bunting find suitable habitats in areas abandoned from agricultural use for more than ten years. In the region of Västerbotten, most former arable sites are now either highly industrialised or have been out of active cultivation for decades. As such, it is reasonable to say that the species has now become obsolete in its original and favoured habitat.

Ortolan buntings continue to decline rapidly in Sweden, mainly due to changes in agricultural practices. Landscape simplification, due to the removal of semi-natural elements, leads to a lack of breeding habitats. Furthermore, due to intensive artificial fertiliser applications and advanced agricultural equipment and technology, crops grow taller and denser than 50 years ago, so this species has faced many challenges and threats (Sondell et al. 2018).

3 Changing Habitat Preferences

The ortolan bunting changed its habitat preferences, from arable regions to forest clear-cuts, almost completely within a timeframe of 20 years from the mid 1970s. This was a response to the changes in cultivation practices and large scale turmoil in the forest industry, leading to the creation of huge areas of virgin open landscape.

In the region of Västerbotten, and elsewhere in Sweden, the 1970s was a period when the old form of commonly appearing open ditches were transformed to underground culverts, leading the water away from the fields. With the open ditches gone, the rows of bushes or trees for singing males to sit in disappeared. The era of huge areas of monocultures in the farming landscape was the basic model for the decade and for those to come.

In the beginning, there were no alarming signals to suggest that the population of the ortolan bunting as a whole was in a phase of decline in Västerbotten. We estimated that the number of buntings disappearing from the crop areas were equal to those settling in the forest clear-cut areas. This kind of habitat is definitely of interest to ortolan buntings during the primary years, when the vegetation is low and there are many open areas with lots of exposed soil and sand created through disturbance by tractors and other huge machines driving over sensitive ground.

Typically, clear-cut areas are of interest to ortolan buntings for a period of five to ten years (Fig. 16.2), before they are overgrown by dense vegetation (Fig. 16.3) of young birches (*Betula* sp.), willow (*Salix* sp.), aspen (*Populus tremula*), rowan trees (*Sorbus aucuparia*), planted pine (*Pinus* sp.) or spruce (*Picea* sp.). As this happens, the buntings disappear and move to adjacent areas with their preferred stage of habitat development. In the absence of these early successional areas, the species will undergo further declines.

3.1 Current Agricultural Habitats

Habitat changes, particularly in the agricultural areas (Wretenberg et al. 2007), environmental toxins and a generally high mortality during migration and in wintering areas are possible explanations for the decline of the Scandinavian ortolan bunting populations (Menz and Arlettaz 2012; Naturvårdsverket 2017). In Finland, a population crash in the early 1990s was specifically “associated with the amount of small-scale environmental heterogeneity and with agricultural practices” (Vepsäläinen et al. 2005). Ortolans are today present in the Nordic countries in a range of different breeding environments: farmland, forest clear-cuts in northern areas, wild-fire zones, peat bogs, bioenergy forests, and gravel extraction quarries, but also in industrial areas including runways and railroads (Ottvall et al. 2008). This diverse habitat use has confounded attempts to characterise the current preferred/optimal habitats for the species.



Fig. 16.2 A forest clear-cut area with lots of exposed soil and sand. Since the decline in the cultivated habitats, this is typical breeding habitat for ortolan buntings in northern Sweden. (Photo by Christer Olsson)

Breeding ortolans forage mainly on the ground and require bare soil for searching for prey (Menz et al. 2009). Ortolans also eat green larvae found in tree crowns (Stolt 1974), as well as seeds. Menz et al. (2009) determined that without small patches of open soil, ortolans find food (usually dark invertebrates) difficult to locate and extract. This suggests that a key factor in the decline of this species may be that the foraging prerequisites are not good enough to support a reproductive output capable of maintaining the population size (Sondell et al. 2018).

In a survey carried out in the central Swedish region of Närke (Sondell et al. 2018), only 18% of all observed foraging was outside the crop fields, and then mainly in natural grass, at oat feeders, and in the tree canopies. There was only one observed instance of successful hunting of insects in flight. The majority of foraging happened in crop fields; in fact a single field with two unsown rows was the favoured location for 41% of the foraging trips.

The study published by Sondell, J. et al. (2018) also found that the foraging habitats or specific food sources used by ortolans in mid-Sweden fall into six main categories:

1. Unsown rows in tractor wheel tracks;
2. Sparsely sown or small bare patches in the crops;
3. Supplemental oat feeders;
4. Tree or bush canopies;



Fig. 16.3 One pair of ortolan buntings still bred in this forest clear-cut in June 2019, but the future is bleak. Birch (*Betula*) and spruce trees (*Picea abies*) are recolonising strongly and the amount of exposed soil is at a very low level. (Photo by Christer Olsson)

5. Uncultivated field borders; and
6. Other local sources, such as ditches containing eroded soil (blown there from the field surface by strong winds in dry weather), natural grass close to the nests and flying insects.

Few, if any, of these are available in highly cultivated areas nowadays.

3.2 *The Forest Clear-Cut Areas*

In northern Sweden, the ortolan bunting now breeds mainly in forest clear-cut areas. In the county of Västerbotten, the birds spend most of their time in this habitat. In a study by Sondell (2013), ortolans were present in 48 of 123 forest clear-cut study areas. Investigations of these forest clear-cuts found that the birds prefer very open areas with exposed soil (Fig. 16.2) and that they avoid areas with lots of moist ground. Another important requirement of these clear-cuts is that they provide scattered, uncut trees and that exposed soil exceeds 10% of the total area: the area of open soil is typically created during forestry operations. Furthermore, almost all of the forest clear-cuts holding nesting pairs exceeded 30 acres in area (Naturvårdsverket 2017).

4 The Migration and the Wintering Grounds

An important requirement of the research into the long-term decline of the Swedish ortolan bunting population is to detect the migration routes, stopover points and wintering grounds of the birds. In recent years, there has been a study aiming to shed light on these issues; this involved equipping ortolans with light geolocators (Selstam et al. 2015). In all, 45 ortolan buntings were fitted with geolocators, 39 of them from northern Sweden, mainly from the Umeå area. This study found that the birds started their autumn migration during August (median 24 August) and that most birds had stopovers for about a week north of the 50th parallel. All of the birds made stopovers on the Iberian Peninsula or in Morocco, lasting from 6 to 32 days. The analysis also indicated that several of the birds passed through the French county of Les Landes, south of Bordeaux. On arriving to the south of the Sahara, all of the birds stayed at one or two locations for up to 35 days before arriving at the main wintering grounds, where all six birds with complete data (five of them from the Umeå region) stayed for approximately 5½ months.

The autumn migration lasted on average for 56 days from the beginning of the migration in Sweden until arriving at the first wintering/stopover location south of Sahara. After arriving in west Africa, one bird wintered at the same location until spring migration. The other birds visited one or two locations for up to 61 days before arriving at their main wintering locations. The birds stayed at the main wintering locations in West Africa (south-western Mali and northern Guinea) for 150–182 days. The return migration in spring started in late March (22nd) or the first half of April (median 7 April). All birds arrived at stopover points in Morocco or Spain a few days later, and remained for 5–18 days. It is uncertain whether one of the birds passed Sahara before its first stopover or not. Several other birds stayed at two locations in Morocco or Spain for up to 25 days. Two birds also stopped in central Europe (6 days) and Finland (14 days). On average, the spring migration took 40 days. The seven males all wintered in West Africa within a limited area of some 40,000–50,000 km².

The wintering area is located at the northern slopes of the Fouta Djallon mountain range. According to aerial photos, the ground is generally sparse savannah forest interrupted by brook ravines and cultivated areas, with part of the ground burnt periodically. The mountains are also the source of three large rivers: Senegal, Gambia and Niger and precipitation is relatively high. The two largest flocks of ortolan buntings reported from West Africa were at the airport of Labé, central Guinea, where the birds were on partly burnt grassland close to the air strip. All of the tagged ortolan males winter in areas situated between 50 and 350 km from Labé.

The large number of ortolan buntings wintering in West Africa suggests that the declines in the Swedish population are mostly due to habitat changes in Sweden and not on factors occurring during migration or on the wintering grounds (Selstam et al. 2015).

4.1 *The Influence of Trapping on Ortolan Bunting Populations*

Sondell et al. (2011) identified the three most likely causes of the decline in the Swedish ortolan bunting populations as: (1) changes in the agricultural breeding habitat influencing the production of offspring; (2) hunting or trapping along the migration route, especially in France; and (3) factors affecting the survival in the wintering area and migration routes for ortolan buntings. In a small region in SW France between the Bay of Biscay, the Pyrenees and the pine forests south of Bordeaux situated on an ortolan bunting migration route, there is a restricted agricultural area that still traps the species. The aim is to trap them and then fatten them for human consumption. Before the EU banned legal hunting in 1999 some 50,000 birds were caught annually (Selstam et al. 2015). Today, no catching figures are available, but it is probable that the catch is still substantial (bulletins from Ligue pour la protection des oiseaux, LPO).

5 Current Conservation Measures for Ortolan Buntings in Sweden

There are two conservation programmes designed specifically to preserve the declining ortolan bunting breeding population Sweden, these are described briefly below.

5.1 *Measures to Improve Agricultural Habitats for Ortolan Buntings*

The classic environment for the ortolan bunting in Sweden, fields cultivated with barley and oat, needs small areas of exposed soil to provide optimum habitat. Initially, to achieve this, it is essential to inform the farmers in the breeding areas that they host a threatened species on their land. The best chances of positive results are where the farmers are willing to cooperate with ecologists, because leaving parts of a field proposed for growing crops with patches of exposed soil will incur financial losses for the farmer.

The regional government in the county of Örebro in Central Sweden has contracted landowners of cultivated fields hosting ortolan buntings and provided financial aid to sow only the half of the normal quantity of crops. Thus the farmers are leaving strips (approx. 50 cm in width) of exposed soil both in the middle of the fields and at their borders. Here the birds can find optimal feeding habitat and protection. These strips are also commonly used by skylarks (*Alauda arvensis*) and yellowhammers (*Emberiza citrinella*), other species declining as a consequence

of changing agricultural practices. It is critical that these strips of exposed soil are not too narrow, as the birds need to land and take off without any obstacles from the surrounding vegetation (the wing-length of the ortolan bunting is approx. 26 cm). It is also important that the strips are not treated with pesticides.

5.2 Measures to Improve Forest Clear-Cut Habitats for Ortolan Buntings

There is also a conservation programme developed specifically to preserve the ortolan bunting population in the forest clear-cut areas in northern Sweden; this was designed by the responsible authority in Sweden (Naturvårdsverket 2017). Their focus is to create optimal conditions in as many forest clear-cuts as possible where ortolan buntings still breed. This work has concentrated on creating larger areas of disturbed ground with exposed soil and on removing tree saplings to maintain an open landscape. The forest industry has at least partially recognised that there is opportunity to generate some goodwill from this work and is cooperating with the organisers of the national ortolan bunting project, which was founded in 2017 and is ongoing until at least 2021.

The hope is that the work of these programmes will preserve the remnants of the ortolan bunting population in Sweden.

References

- Artportalen (2019) (<https://www.artportalen.se/ViewSighting/ViewSightingList>) (In Swedish)
- Kjellén N (2002) Sträckräkningar i Falsterbo från förr och nu. Meddelande nr 212 från Falsterbo fågelstation. Anser 114–123. (In Swedish)
- Menz MHM, Arlettaz R (2012) The precipitous decline of the ortolan bunting: time to build on scientific evidence to inform conservation management. *Oryx* 46:122–129. <https://doi.org/10.1017/s0030605311000032>
- Menz MHM, Mosimann-Kampe P, Arlettaz R (2009) Foraging habitat selection in the last Ortolan Bunting *Emberiza hortulana* population in Switzerland: final lessons before extinction. *Ardea* 97(3):323–333. <https://doi.org/10.5253/078.097.0308>
- Naturvårdsverket (2017) Åtgärdsprogram för ortolansparv *Emberiza hortulana* 2017–2021. Rapport 6781. (In Swedish with English summary)
- Olsson C, Wiklund, J (1999) Västerbottens fåglar. 665 pages. Umeå. ISBN 91-973576-0-X (In Swedish)
- Ottvall R, Green M, Lindström Å, Svensson S, Esseen P-A, Marklund L (2008) Ortolansparvens *Emberiza hortulana* förekomst och habitatval i Sverige. *Ornis Svecica* 18:3–16. (In Swedish)
- Selstam G, Sondell J, Olsson P (2015) Wintering area and migration routes for Ortolan Buntings *Emberiza hortulana* from Sweden determined with light-geologgers. *Ornis Svecica* 25:3–14
- Sondell J (2013) Aktuellt om ortolansparven 2012–2013. *Fåglar i Kvismaren* 28:8–13. (In Swedish)
- Sondell J, Brookes C, Persson M (2011) Ortolan Bunting *Emberiza hortulana* at Kvismaren, Central Sweden – breeding studies and suggested management. *Ornis Svecica* 21:167–178

- Sondell J, Durà C, Persson M (2018) Breeding prerequisites for Ortolan Bunting *Emberiza hortulana* in Swedish farmland, with special focus on foraging. *Ornis Svecica* 29:5–25
- Stolt B-O (1974) Gulsparvens *Emberiza citrinella* och ortolansparvens *Emberiza hortulana* förekomst vid Uppsala under 1960-talet. *Vår Fågelvärld* 33:210–217. (In Swedish)
- Svensson S, Svensson M, Tjernberg M (1999) Svensk fågelatlas. Vår fågelvärld, supplement 31. Stockholm. (In Swedish)
- Vepsäläinen V, Pakkala T, Phia M, Tiainen J (2005) Population crash of the Ortolan Bunting *Emberiza hortulana* in agricultural landscapes in southern Finland. *Ann Zool Fennici* 42:91–107
- Wretenberg J, Lindström Å, Svensson S, Pärt Å (2007) Linking agricultural policies to population trends of Swedish farmland birds in different agricultural regions. *J Appl Ecol* 44:933–941