

RESEARCHES ABOUT THE BIOLOGY AND THE ECOLOGY OF THE SPECIES *Phoenicurus ochruros gibraltariensis* (Gmelin, 1789) IN THE AREA OF TINCA VILLAGE (BIHOR COUNTY, ROMANIA)

ILIE Aurelian Leonardo, MARINESCU Mariana

Abstract. The paper presents the results of the researches effectuated by the authors during 2001 - March 2014, about the biology and the ecology of the species Black Redstart, in the conditions of Tinca village. There were researched breeding, migration, clutch size, number of generations and food. A complete clutch contains 5 - 6 eggs. This species have 2 - 3 yearly generations and the food generally consists in insects.

Keywords: *Phoenicurus ochruros*, Tinca village, breeding, clutch size, migration, food.

Rezumat. Cercetări asupra biologiei și ecologiei speciei *Phoenicurus ochruros gibraltariensis* (Gmelin, 1789) în zona satului Tinca (Județul Bihor, România). Lucrarea prezintă rezultatele cercetărilor efectuate de autori în perioada 2001 - martie 2014, asupra biologiei și ecologiei speciei codroșul de munte în condițiile satului Tinca. S-au cercetat reproducerea, migrația, mărimea pondei, numărul generațiilor și hrana. O pondeă completă conține 5 - 6 ouă. Această specie are 2 - 3 generații anuale și hrana constă în general din insecte.

Cuvinte cheie: *Phoenicurus ochruros*, satul Tinca, migrație, reproducere, mărimea pondei, hrana.

INTRODUCTION

The Black Redstart is a bird more recently met in the human settlements from Tinca area.

Notes regarding the biology and ecology of this species in different locations from Romania were published by different authors (DOMBROWSKI, 1946; RADU, 1984; MUNTEANU, 1969, 2000; ILIE & ILIE, 2006).

The presence of more and more numerous populations, its accentuated adaptation, the nesting and the climatic modifications registered in the last years, all these determined the study of the biology and ecology aspects of this species in the conditions of Tinca area.

Tinca area is situated in the south-western part of Bihor County, at the contact of Miersig plain and Holod depression. The average altitude is 110 m, the climate is temperate-continental and the vegetation belongs to the oak forest.

The hydrographic system is represented by the Crișul Negru river (Fig. 1).



Figure 1. Tinca area (roturism.com).

MATERIAL AND METHODS

The researches regarding the presence of the species in Tinca area were began sporadically in the nineties of twenty century, then were realized systematically beginning with the year 2001 till the present.

The observations were realized in the open with the help of the binoculars size 8x21, following migration, brooding, food and influence of air temperature on the biology of this species.

The nests observed were placed in different locations from Ilie A. L.'s personal farm and the farms of his neighbours from Tinca village.

RESULTS AND DISCUSSIONS

1. Migration

As far as migration is concerned, we observed the following aspects:

- the first individuals arrived in spring were the males (juveniles and adults) and the period of appearance was, in general, the second decade of March: March 16, 2001; March 18, 2002; March 14, 2003; March 17, 2004; March 18, 2005; March 12, 2006; March 20, 2007, March 18, 2009; March 19, 2010, March 14, 2011; March 19, 2012; March 18, 2013; March 16, 2014, but there were also some exceptions: March 10, 2008;
- in the last days of March – first decade of April, the majority of the individuals of the populations of this species arrives in the area;
- the departure of the birds in autumn generally occurs till end of the second decade of October: October 7, 2001; October 11, 2002; October 10, 2003; October 15, 2004; October 12, 2005; October 6, 2006; October 14, 2007; October 11, 2008, October 9, 2009; October 19, 2010; October 13, 2011; October 11, 2012; October 8, 2013. Isolated individuals, probably some resulted from northern populations in migration or local populations were observed after this period, too: November 4, 2008 – one female individual; October 25, 2010 – one male individual; October 25, 2010 – one female individual; October 30, 2010 - two female individuals at the edge of Tinca forest, on shrubs; December 28, 2012 – two female individuals; October 17, 22-24, 2013 – one male individual.

Those notes correspond to those of the authors mentioned before.

Also, there were observed isolated individuals that wintered in area: January 29, 2010 – one female, February 3, 2011 – one female, February 22, II 2014 – one juvenile male.

2. Breeding

With regard to breeding, we followed the location of the nests, the material of construction, the sizes of the nests, the clutch size and the development of the brooding.

The location of the nest – the nine nests identified were situated in the following locations: in the cavity of a wall (three nests) – Fig. 3, in the abandoned swallow nests (*Hirundo rustica* Linnaeus, 1758) - Fig. 2, three nests, under eaves, on beams (one nest), in garrets (of one house and of one big pigsty) on beams (two nests).



Figure 2. Abandoned swallow nest (original).



Figure 3. Nests in the cavity of a wall (original).

The material of construction was extremely different: the outside of the nest being realized of branches, stems of some graminaceae, moss, narrow wires and wool and the lining was formed from feathers of domestic birds, of the proper species and of the sparrow, drying leaves, wool and remains of the capsules of some plants: morning glory (*Ipomoea purpurea* Linnaeus, 1832).

The sizes of the nests - the external diameter is variable depending on the available space.

Thus, those in the abandoned swallow nests varied between 17.5 and 22 cm, those from the cavity of walls between 9 and 18 cm, that under the eaves 17 cm, and those from the garrets 16-19 cm.

The internal diameter varied between 6.5 and 12 cm, the internal height 4-6 cm and the external height 8-9 cm.

As far as the song of this species is concerned, it could be heard both during the mating period and out of that. The songs at the first individuals are registered in spring from 6:25-6:30 a.m. and till 08:00 p.m.

In the mating period and during summer, the first songs were registered from 4:30-4:40 a.m. till 10:00-10:10 p.m.

The clutch size is variable (Table 1). The colour of the eggs is white.

Table 1. The clutch size of *P. ochruros* in the analysed period in Tinca area.

| Year | Clutch I | | Clutch II | | Clutch III | |
|------|-----------|----------|-----------|----------|------------|----------|
| | No. nests | No. eggs | No. nests | No. eggs | No. nests | No. eggs |
| 2001 | 4 | 5 | 4 | 5 | 2 | 3 |
| | 5 | 4 | 5 | 4 | - | - |
| 2002 | 5 | 5 | 6 | 5 | 3 | 3 |
| | 4 | 4 | 3 | 4 | - | - |
| 2003 | 4 | 6 | 2 | 5 | 1 | 2 |
| | 5 | 5 | 7 | 4 | - | - |
| 2004 | 6 | 5 | 2 | 6 | - | - |
| | 3 | 4 | 7 | 4 | - | - |
| 2005 | 5 | 5 | 4 | 5 | - | - |
| | 4 | 4 | 5 | 4 | - | - |
| 2006 | 3 | 5 | 7 | 5 | 1 | 3 |
| | 6 | 4 | 2 | 4 | - | - |
| 2007 | 4 | 6 | 4 | 5 | 2 | 4 |
| | 5 | 4 | 5 | 4 | 1 | 3 |
| 2008 | 2 | 5 | 6 | 5 | - | - |
| | 7 | 4 | 3 | 4 | - | - |
| 2009 | 5 | 5 | 9 | 4 | 1 | 3 |
| | 4 | 4 | - | - | 2 | 2 |
| 2010 | 8 | 5 | 8 | 5 | 2 | 2 |
| | 1 | 4 | 1 | 4 | 3 | 4 |
| 2011 | 7 | 5 | 2 | 6 | 1 | 3 |
| | 2 | 4 | 6 | 5 | - | - |
| | | | 1 | 4 | | |
| 2012 | 9 | 5 | 6 | 5 | 2 | 3 |
| | - | - | 3 | 4 | 1 | 2 |
| 2013 | 6 | 5 | 9 | 5 | 2 | 4 |
| | 3 | 4 | - | - | 1 | 3 |

Analysing the data rendered in the aforementioned table we find that one complete clutch contains 5 eggs, rarely 6 and the clutch III contains 2-4 eggs.

Only one author (RADU, 1984) mentioned that one complete clutch is formed from 4 eggs. The other authors (MUNTEANU, 2000; DOMBROWWSKI, 1946) mentioned that one complete clutch has 5-6 eggs.

During the entire the research period, the clutches of the some brooding pairs were in the same nest. The yearly average of the clutch size is rendered in Table 2.

Table 2. The yearly average of the clutch size of *P. ochruros* during the analysed period in Tinca area.

| Year | Yearly average of the clutch size |
|------|-----------------------------------|
| 2001 | 7 |
| 2002 | 7 |
| 2003 | 7.33 |
| 2004 | 6.33 |
| 2005 | 6 |
| 2006 | 7 |
| 2007 | 8.66 |
| 2008 | 6.33 |
| 2009 | 6 |
| 2010 | 8 |
| 2011 | 9 |
| 2012 | 6.33 |
| 2013 | 7 |

By analysing Table 1 and the clutch size we find out that the low values recorded in some years (6-6.33) are due either to the absence of the third clutch (for example: 2004, 2005, 2008) or to the existence of a low number of eggs in the second and the third clutch (for example: 2009) or only in the third clutch (for example: 2012).

The high values recorded (8-9) are due to the existence of a big number of eggs at the level of those three yearly clutches (Fig. 4).

The big number of eggs is generally due to the favourable meteorological conditions that determined both the existence and the development of the third clutch and the prolongation of the activity period of insects, the main food of this bird.

The average number of eggs (276) during the entire research period is 21.33.

This relatively high value represents one of the explications of the extension of the specific spreading area as well as the very high adaptability to the anthropogenic conditions.

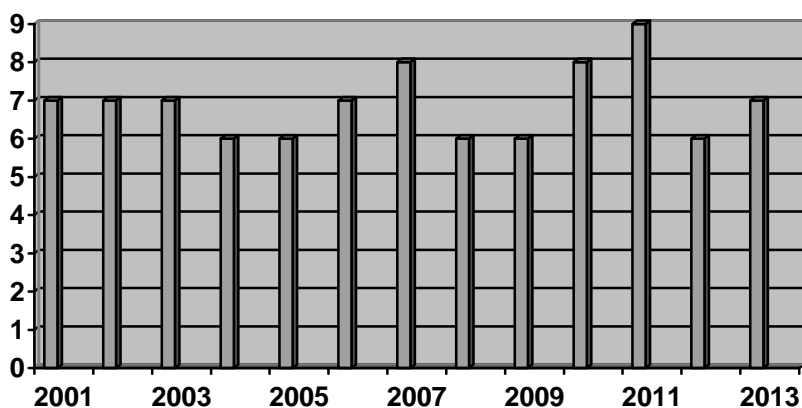


Figure 4. The yearly of clutch size of *P. ochruros* in the analysed period in Tinca area (original).

The development of brooding - the first clutch is laid in the period: last decade of April (majority) - first decade of May.

The yearly distribution of the first clutch in the period of researches is rendered in the following table (Table 3).

The brooding last 12-14 days, generally 13 days, being realized only by the female.

Generally, the female does not quit the nest during the brooding, but we observed too the moments when it left the nest for a short time.

Also, we observed few moments, when the male brought food to the female in the nest.

Example - April 29, 2002; April 26, 2007; April 30, 2011.

The hatching of the chicks was realized generally during May 10-15.

Table 3. The dates of the lay of the first clutch of *P. ochruros* in the analysed period in Tinca area.

| Year | The lay of laying I | | | | | | | | |
|------|---------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| | Nest 1 | Nest 2 | Nest 3 | Nest 4 | Nest 5 | Nest 6 | Nest 7 | Nest 8 | Nest 9 |
| 2001 | April 20 | April 22 | April 21 | April 20 | April 27 | April 25 | April 24 | May 2 | April 29 |
| 2002 | April 26 | May 2 | April 29 | April 26 | April 25 | April 27 | April 28 | April 23 | April 26 |
| 2003 | April 22 | April 30 | May 3 | April 23 | April 24 | April 26 | April 26 | April 21 | May 3 |
| 2004 | April 24 | April 28 | May 1 | April 22 | April 23 | April 24 | April 22 | April 22 | April 22 |
| 2005 | April 29 | April 26 | April 29 | April 20 | April 21 | April 22 | April 21 | April 25 | April 24 |
| 2006 | April 30 | April 22 | April 23 | April 22 | April 24 | April 23 | April 20 | April 28 | April 26 |
| 2007 | April 25 | April 20 | April 30 | April 19 | April 20 | April 19 | April 21 | April 21 | April 23 |
| 2008 | April 23 | April 26 | April 27 | May 1 | May 2 | April 26 | April 25 | April 29 | May 1 |
| 2009 | April 21 | April 22 | April 25 | April 25 | April 27 | April 28 | April 28 | April 27 | April 25 |
| 2010 | May 3 | April 30 | April 20 | April 23 | April 25 | April 23 | April 25 | April 20 | April 22 |
| 2011 | April 29 | April 28 | April 30 | April 29 | April 27 | April 20 | April 21 | April 21 | April 26 |
| 2012 | April 24 | April 30 | April 30 | April 30 | April 30 | April 27 | April 26 | April 29 | April 28 |
| 2013 | April 22 | April 27 | April 26 | April 25 | April 26 | April 25 | April 24 | April 25 | April 24 |

Legend:

Nest 1, 2, 3 = nests situated in the cavity of walls

Nest 4, 5, 6 = swallow abandoned nests

Nest 7 = nest situated under eaves, on beams

Nest 8, 9 = nests situated in garrets, on beam

The post-embryonic development lasts for 13-15 days.

The chicks are fed by both parents, even in case the nest is damaged or even if they fall down from the nest.

During May 20 - the first days of June, the chicks begin to leave the nest, but for another 3-6 days, they remains in its neighbourhood, being fed sporadically by the adults and their flight goes on with difficulty and on relatively short distances.

As it is a species that gets attached to the settlements, the clutches and chicks are more protected from enemies, comparatively with other bird species.

This fact is due to the choosing of safe places for the laying down of the clutch and the growth of the chicks.

The second clutch is laid generally at the middle of June (Table 4):

Table 4. The dates (June) of the second clutch laying of *P. ochruros* in the analysed period in Tinca area.

| Year | The laying down of the second clutch | | | | | | | | |
|------|--------------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| | Nest 1 | Nest 2 | Nest 3 | Nest 4 | Nest 5 | Nest 6 | Nest 7 | Nest 8 | Nest 9 |
| 2001 | 13 | 15 | 14 | 17 | 14 | 14 | 16 | 16 | 15 |
| 2002 | 14 | 16 | 15 | 13 | 12 | 14 | 15 | 15 | 13 |
| 2003 | 15 | 17 | 16 | 15 | 12 | 13 | 15 | 13 | 15 |
| 2004 | 12 | 14 | 15 | 14 | 16 | 15 | 16 | 14 | 16 |
| 2005 | 16 | 12 | 14 | 13 | 14 | 14 | 14 | 15 | 14 |
| 2006 | 15 | 13 | 15 | 14 | 15 | 16 | 16 | 16 | 15 |
| 2007 | 17 | 15 | 16 | 15 | 16 | 15 | 15 | 16 | 16 |
| 2008 | 14 | 16 | 13 | 16 | 15 | 13 | 14 | 13 | 15 |
| 2009 | 15 | 17 | 14 | 12 | 14 | 14 | 15 | 14 | 14 |
| 2010 | 16 | 16 | 16 | 14 | 13 | 16 | 15 | 16 | 15 |
| 2011 | 17 | 15 | 15 | 15 | 13 | 15 | 16 | 13 | 12 |
| 2012 | 13 | 14 | 14 | 16 | 16 | 13 | 16 | 14 | 14 |
| 2013 | 14 | 15 | 15 | 14 | 14 | 12 | 14 | 16 | 15 |

Under favourable conditions (low precipitation amounts, average temperatures between 30 and 35°C), there can be registered the third clutch, but the number of eggs is more reduced: 2-4.

We found out that prolonged drought does not have inhibitory effects over the existence of the third laying because the consumed food is very rich and varied, but abundant and long precipitation periods have a inhibitory effect over the laying down of the third clutch and then over the development of the chicks because the amount of food is very little (insects shelter during rains).

The laying down of the third clutch is achieved in the last days of July – the first days of August (Table 5).

Although the locations selected for nests present a relatively high security degree, however, we identified harmful species which had access at the nests situated in garrets, on beams: grey rat (*Rattus norvegicus* Berkenhout, 1769) and polecat (*Mustela putorius* Linnaeus, 1758).

Those species ate the eggs belonging to all clutches, but especially those of the third clutch.

In the nests with destroyed eggs, we did not observed the laying down of other eggs.

Table 5. The dates of laying down of the third clutch of *P. ochruros* in the analysed period in Tinca area.

| Year | Laying down of the third clutch | | | | | | | | |
|------|---------------------------------|----------|----------|----------|----------|----------|----------|----------|--------|
| | Nest 1 | Nest 2 | Nest3 | Nest 4 | Nest 5 | Nest 6 | Nest 7 | Nest 8 | Nest 9 |
| 2001 | | | July 30 | | | July 31 | | | |
| 2002 | | July 29 | | August 1 | | | | August 3 | |
| 2003 | | | | July 30 | | | | | |
| 2006 | July 30 | | | | | | | | |
| 2007 | | | July 31 | | August 1 | | | August 1 | |
| 2009 | July 31 | | August 2 | | | August 1 | | | |
| 2010 | | August 2 | | July 31 | July 30 | | August 1 | July 31 | |
| 2011 | | | | August 1 | | | | | |
| 2012 | | August 2 | | August 2 | | July 30 | | | |
| 2013 | | July 31 | | July 31 | | August 2 | | | |

3. Food

The food is extremely varied and consists in different species of invertebrates, generally insects and secondary spiders.

In order to identify the type of the food, we monitored the adults that brought food to the chicks. Also, we analysed the stomach content at two dead adult specimens: one male specimen, May 20, 2006; one female specimen, January 10, 2012.

The eaten insects belonged to the orders *Coleoptera* (the majority), *Diptera*, *Orthoptera* and *Lepidoptera* (Table 6), much from them being pests agricultural cultures or forestry.

Table 6. The composition of the food at *P. ochruros* in Tinca area.

| Name of food | The economic value of food | | |
|--|----------------------------|-------------|-------------|
| | Useful | Pest | Indifferent |
| Arachnida <i>Opilio</i> sp. | X X | | |
| Insecta Orthoptera <i>Gryllus</i> sp. <i>Locusta</i> sp. | | X X X | |
| Coleoptera Cerambycidae Buprestidae Carabidae scarabaeidae | X | X X X | |
| Diptera <i>Tipula</i> sp. <i>Musca</i> sp. | | X | |
| Lepidoptera Caterpillars Microlepidoptera Noctuidae | | X X X | |

We did not identify vegetal food (seeds) comparatively to the data presented by the aforementioned authors who also identified vegetal food (seeds of elder tree).

CONCLUSIONS

The researches realized during 2001 - 2013 about the species *Phoenicurus ochruros* Gmel. emphasized the following aspects:

- that species is very anthropophilic;
- it presents 2 - 3 generations per year;
- generally a complete clutch is formed of 5 - 6 eggs, the last laying presents a more reduced number of eggs: 2 - 4;
- the length of brooding is 12 - 14 days;
- the post-embryonic development lasts for 13 - 15 days;
- is an insectivorous species, it is a useful bird, eating much pest insects;
- from the phenological point of view, it is a summer visitor species, but in the conditions of some mild winters, some specimens winters in area.

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Aurelian Leonardo Ilie

“Nicolae Jiga” Theoretical School Tinca, Jud. Bihor, Romania.
Str. Republicii, No.36 A
E-mail: aurelian_ilie@yahoo.fr

Mariana Marinescu

University of Oradea, Didactic Staff Training Department (DTS)
Str. Unersității, No. 1, Romania.
E-mail: marinescum54@yahoo.com

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