DATA ABOUT LONG-EARED OWL *ASIO OTUS* DIET IN A WINTER ROOST IN IMPERIA (WESTERN LIGURIA, NORTH ITALY) AND NOTES ON THEIR DAILY ACTIVITY CYCLE

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ABSTRACT

A Long-eared Owl *Asio otus* winter roost in Imperia town (Liguria, NW-Italy) have been studied since 2003. We've observed that a few tenth of owls every year occupy 4 nearby trees (2 *Pinus pinea*, 1 *Pinus canariensis* and 1 *Ceratonia siliqua*) from October to March (with a seasonal peak of more or less 50 individuals in December and January). All the owls in the evening leave the roost during a time range normally shorter than 30 minutes, with a peak of departures 27 ± 5.3 minutes after the sunset. In the morning they seem to arrive at the roost again during a short interval at dawn, mainly from the NW quadrant. Their flying direction lay in the NW quadrant towards the fields surrounding the town. A sample of 720 pellets and 17 prey remnants masses collected under the roost trees have been analysed giving us some insight about the wintering owls diet. Globally 1020 preys have been isolated. Mammals (nearly exclusively *Apodemus sylvaticus* and *Rattus rattus*) prevail in biomass (74.1 % of the whole), while Birds (mainly *Sylvia atricapilla* and *Fringilla coelebs*) result numerically dominants (63.4 %).

KEY WORDS

Long-eared Owl *Asio otus*, roost, winter, Liguria (NW-Italy), diet, daily cycle.

INTRODUCTION

Long-eared owl *Asio otus* is known to be a partially migrant species with an Oloarctic range (cfr. König et al. 1999). Wintering individuals tend to cluster in sharing common roosts sometimes hosting

tenth of owls and located in urban or suburban areas (Cramp 1985), more often on evergreen trees under 200-300 m a.s.l. (Brichetti & Fracasso 2006), totaling a winter population of probably more than 15-20 thousands individuals (Brichetti & Fracasso 2006). Such roosts have been studied in many Italian towns (cfr. Dinetti & Fraissinet 2001), but never in Liguria where however the species is known to be locally breeding, particularly in the Western part (Spanò & Truffi 1987; Verner 1989), migrant and wintering (Maranini 1998).

In march 2003 G. Gindro & S. Bava signalled to one of us (Galli) a roost located in a peripheral area of Imperia town (Western Liguria). The number of owls was declining due to the approaching of the breeding season, but there were still 8 individuals. So, since the following wintering season (2003-2004) we have started to monitor this site (for a few preliminary notes see Galli & Spanò 2004).

STUDY AREA

The roost we studied is located in the Imperia Porto Maurizio eastern suburbs. This site is nearly 50 m high a.s.l. and nearly 300 m far from the seaside. Owls occupy mainly a big *Pinus pinea* (Fig. 1) tree in a private garden while some others use two trees (a *Pinus canariensis* and a *Ceratonia siliqua*) laying in the garden of a public building (Province Administration and Prefecture) and a *Pinus pinea* again in a private garden. The two farthest trees distance is more or less 50 meters. With the exception of the last one (flanking a pedestrian way), the trees jut out on a moderately traffic road and on a pavement.

Figure 1. Pine used by wintering Long-eared Owls.

MATERIAL AND METHODS

Diet

Since October 2003 a total amount of 720 pellets and 17 "preys remnants masses" (mainly pellets flaked and melted by the rain) under

the roost trees have been collected: till now a sample of respectively 400 and 8 of them have been analysed.

Skull parts have been selected; using a stereoscopic microscope we have determined the prey species corresponding to such findings using the descriptions and illustrations published in Toschi (1965) and Nappi (2001) for Mammals and in Moreno (1985, 1986, 1987) for Birds. To confirm the determination we have then compared our specimens with those of the bones collection of Genoa Natural History Museum "G. Doria".

Daily cycle

To obtain better information of the owls abundance in the roost and about the daily cycle of departure from the roost during a few evenings (11th December 2004, 18th and 28th January 2005, 7th and 24th February 2005, 5th and 20th March 2005, 4th January and 4th February 2006, 14th December 2007 and 21st January 2008) we checked for each bird leaving time (using a watch) and direction of flight (using as reference system the main road crossing the roost site and a perpendicular pedestrian way). In three occasions (23rd January 2008, 14th February 2008 and 12th March 2008) we remained near the roost by night to check owls arrival time and their flight direction.

RESULTS AND DISCUSSION

Diet

Diet is based on two prey groups: Birds and Mammals (Table I). Invertebrates, Reptiles and Amphibians were absent in pellets, but also poorly available in the environment in winter.

In biomass calculations, we used the weight given by Cramp (1988-1994) and Nappi (2001) for the available sites nearest to the study area. According to their size, individual weights of 17,5 g and 20 g were

assigned to Passeriformes and Murinae undetermined items, respectively.

Table I. Long-eared Owl *Asio otus* pellets content: N = number of specimens, N % = percent occurrence, m = estimated biomass (basing on average weights), m % = biomass percentage.

Taxon	N. ind.	N %	m. (g)	m %
Sylvia atricapilla	526	51.5	10520	22.6
Parus major	13	1.3	234	0.5
Fringilla coelebs	65	6.4	1300	2.8
Serinus serinus	2	0.2	23	<< 0.1
Passeriformes undet.	41	4.0	-	-
Tot. Birds	**647**	**63.4**	**12077**	**25.9**
Crocidura suaveolens	2	0.2	7	<< 0.1
Soricidae undet.	2	0.2	-	-
Clethrionomys glareolus	1	0.1	130	0.3
Apodemus sylvaticus	176	17.3	3696	7.9
Rattus rattus	169	16.6	30420	65.3
Mus domesticus	12	1.2	228	0.5
Murinae undet.	11	1.1	-	-
Tot. Mammals	**373**	**36.6**	**34481**	**74.1**
Tot. Prey	**1020**		**46558**	

Numerically, Birds made up the majority of prey, resulting the 63.4% of the whole; the remaining 36.6% were mammals. On the contrary, birds accounted for 25.9% of the biomass and mammals for the 74.1%.

We identified 1020 prey items, 647 Passeriformes and 373 rodents, that amounted to a total biomass of 46558 g. The prey/pellet ratio was 1,06 and the mean prey mass 45,6 g.

The high occurrence of birds in the diet, especially in terms of prey numbers, is not so much surprising compared to diet composition

reported for other areas in Europe. The Long-eared Owl is generally specialized in hunting small rodents, especially voles, with a diet often more diverse in summer and a trophic plasticity allowing this species to feed in urban areas during winter (Mikkola 1983; Cramp 1985). In Southern Europe diet spectrum includes more often birds, even if rodents are largely dominant in the diet also in the majority of Italian studies (Pini 1986; Galeotti & Canova 1994; Aloise & Scaravelli 1995; Malavasi et al. 1995; Capizzi & Riga 1998; Castioni et al., 1999; Cecere & Vicini, 2000; Pirovano et al. 2000; Rubolini et al. 2003; Sergio et al., 2008; Fasano et al., 2009; Cecere et al., 2012).

Although the majority of authors reported a maximum of birds in Long-eared owl's diet in Italy during the wintering period, on the other hand Bertolino et al. (2001) in the Stupinigi Natural Park (TO) found birds pre-eminent in the diet only during the breeding season. Mastrorilli et al. (1999) in 4 roosts near Bergamo (northern Italy) and Mastrorilli & Barattieri (2001) in 45 areas in Italy found very high percentage of birds in owl's winter diet, all comparable with our findings. In most studies, sparrows (*Passer* sp.) and, to a lesser extent, finches (especially *Carduelis carduelis*) and small thrushes (expecially *Erithacus rubecula*), are the elective preys. Conversely, in our study the most common bird prey caught by Long-eared Owl is the Blackcap *Sylvia atricapilla*. Birds species we found in owl's pellets are the most abundant among the wintering birds in the study area (Bonifacino et al., 2015). Predatory behaviour of Long-eared Owls appeared then largely opportunistic and the differences among Italian roosts are probably related to resource availability in different environments.

Among Mammals, prevalence of *Apodemus* and *Rattus* observed in most of the studies is in agreement with our data, showing this two genera as largely dominant in owl's diet. On the other hand, the absence of Microtinae in the pellets of the roost in Imperia is in contrast with Aloise & Scaravelli (1995), Malavasi et al. (1995), Cecere & Vicini (2000), Bertolino et al. (2001), Sergio et al. (2008), Fasano et al.

(2009), Trotta (2010), Cecere et al. (2012), Basile (2015), who found this taxon as abundant or even dominant. It would be interesting try to find out why such group is absent in the diet of studied owls population.

Daily cycle

The maximum number of specimens, 51, was recorded during January 2006; 50 individuals were counted both in January 2005 and 2008: therefore, this seems to be the carrying capacity of the roost examined. This is an high consistency, infrequently found in other Italian roosts (Mastrorilli et al., 2010).

At sunset, the first owls resulted to leave the roost 9,1 ± 5,3 minutes before the end of twilight and the peak of departures correspond almost perfectly to it (27 ± 5.3 minutes after the sunset). All the specimens leave the roost during a 35 minutes period (Fig. 2), directed mainly to the remote and rural areas north of the city (Fig. 3).

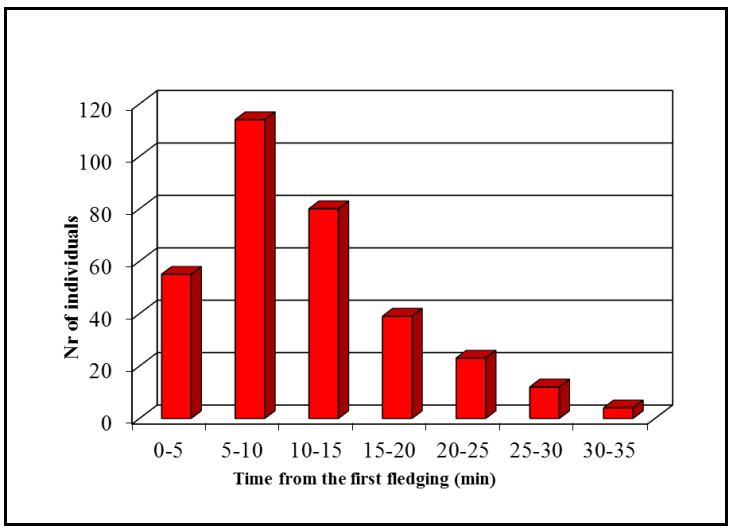

Figure 2. Time interval of fledging from the roost at sunset.

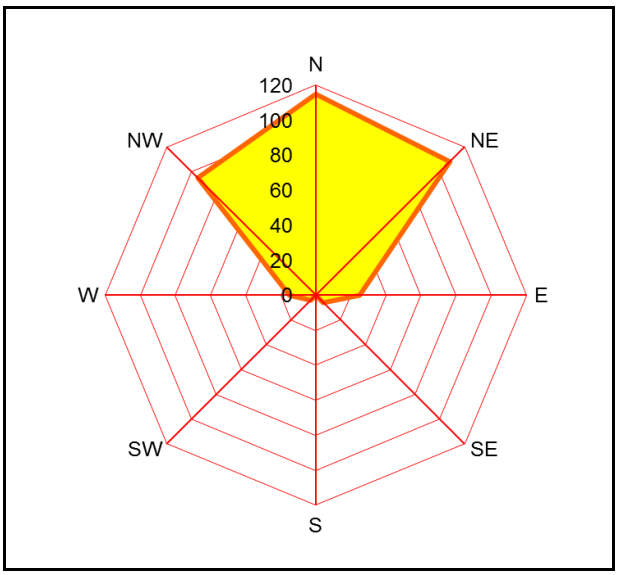

Figure 3. Fledging directions from the roost at sunset.

At dawn all the owls reach the roost during a period of 30-60 minutes before sunrise (Fig. 4). Their direction is coming from the north quadrant, confirming that they use such sites hunting areas north of the city (Fig. 5). Synchronization of departures and arrivals would seem to suggest a certain degree of sociality in the hunting activity of wintering owls. This behavior could be related to nocturnal hunting roosting birds (Cramp, 1985).

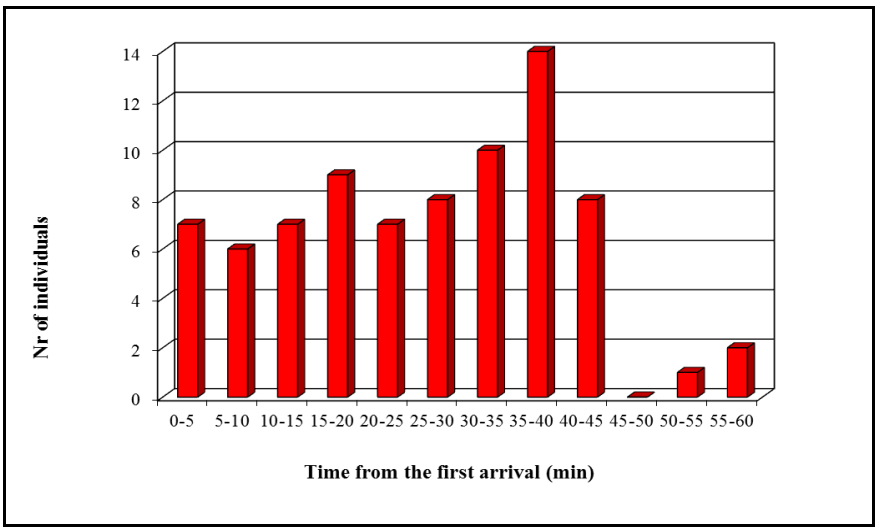

Figure 4. Time interval of arrival at the roost at sunrise.

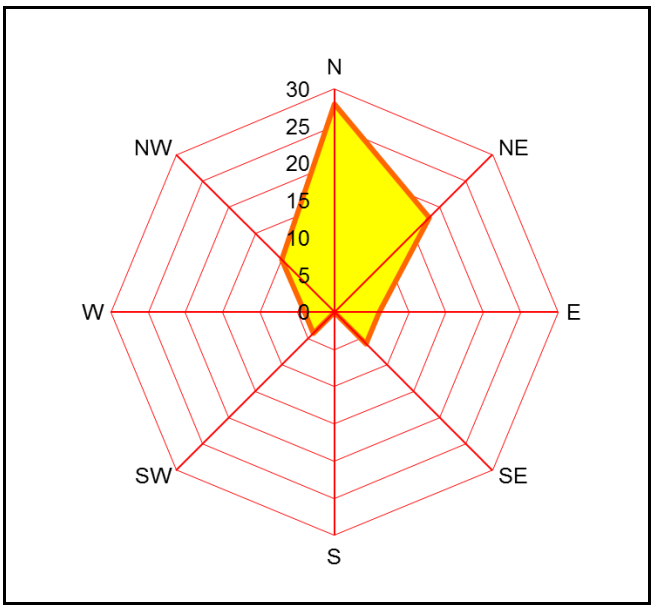

Figure 5. Arrival directions to the roost at sunrise.

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