

## Conference Paper

# Monitoring of Artificial Nests in Horticultural Ecosystems-Observation of Woodpeckers Ethology

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## Abstract

In order to increase the integrated protection of horticultural ecosystems by using the biological fight, the installation on artificial nests, is an important measure to help the insectivore birds. In a research program, a number of 166 artificial nets for Passeriformes birds were installed in different ecosystems as parks, botanical gardens and orchards in the South-Eastern part of Romania. During the nests monitoring period an interesting, but in the same time warring phenomenon, was noticed: a certain number of artificial nets were prayed by woodpeckers, especially by *Dendrocopos major* (Great Spotted Woodpecker). In Romania, all the ten European woodpecker species are nesting, nine being sedentary and one (*Jynx torquilla*) migratory, leaving the country in autumn. Woodpeckers in general, are very useful in woody plant biological protection, having a predominant insectivore nutrition and being the only one to keep under control the insects that are leaving on, inside and under the trees bark. The paper presents some data regarding the woodpeckers ethology in the studied ecosystems. More research are needed to understand the woodpeckers behaviour and to find protection methods of useful birds' nests against the woodpeckers attack.

**Keywords:** useful birds; *Dendrocopos major*; *Dendrocopos syriacus*; *Passer montanus*; *Picus viridis*.

## 1. Introduction

In order to increase the integrated protection of horticultural ecosystems by using the biological fight, the installation on artificial nests, is an important measure to help the insectivore birds [1]. Woodpeckers in general are very useful in woody plant biological protection, having a predominant insectivore nutrition, as underlined by Ciochia et al. [2] and being the only one to keep under control the insects that live on, inside, and under the trees bark. Szabo et al. [3] demonstrated that, besides the insects, in winter time woodpeckers also eat fruits and seeds.

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**Figure 1:** Example of artificial nests distribution map at Istrița Fruit Station, Buzău.

The Great Spotted Woodpecker (*Dendrocopos major*) has an unpredictable behavior, stealing the eggs or juvenile birds from other nests [4]. During the breeding period, *Dendrocopos major* mainly feed on Lepidoptera, and also coleoptera, hymenoptera, orthoptera, and diptera. They exceptionally may consume eggs and juvenils from other bird nests or even small mammals [5].

Considering different opinions regarding the specific food of *Dendrocopos major*, we have made a study in breeding season of passerines in 2015. We try to contribute to a better understanding of woodpeckers behaviour. The birds bring a great contribution to any kind of habitat – either natural or anthropic – being very important indicators of the ecosystem health stage, thus it is important to know the ecology and behavior of every bird species.

## 2. Material and methods

In a research program, a number of 166 artificial nests for Passeriformes birds were installed in 13 different ecosystems as parks, orchards, botanical and private gardens in the South-Eastern part of Romania (Table 1).

Four models of wood-made artificial nests were used (Table 2). Each artificial nest had a specific code and its geographical location was determined by a GPS, model GARMIN etrex VISTA Cx.

For each location, the nests distribution map was designed using Base Camp and Google Earth Pro programs (Fig. 1).

TABLE 1: The nests installed in thirteen ecosystems in the South-Eastern part of Romania.

Location	Monitored surface (m <sup>2</sup> )	Nests No.	Model A	Model B 32	Model B 35	Model C
Exotic fruit orchard - UASVM of Bucharest	1,600	4	1	1	1	1
Apple orchard - UASVM of Bucharest	1,500	4	1	1	1	1
Cherry and apricot orchard - Moara Domneasca, Ilfov	6,500	7	2	2	2	1
Arboretum and Botanical Garden - UASVM of Bucharest	39,400	26	6	7	6	7
City Arboretum - Chitila, Ilfov	35,000	25	6	6	7	6
Private Garden - Sitaru, Ilfov	1,600	4	1	1	1	1
Private Garden - Dămăroaia, Bucharest	60	1			1	
Research Station Park Istrița Fruit Station, Buzău	17,500	25	6	7	6	6
Research Station Park Moara Domneasca, Ilfov	15,800	20	5	5	5	5
Campus Green Area - UASVM of Bucharest	44,000	23	4	6	6	7
Research Station Park - Pietroasa Viticulture Station, Buzău	14,000	21	4	5	6	6
Private Garden - Nucșoara, Prahova	700	3	1	1	1	
Private Garden - Plopșoru, Giurgiu	1,000	3	1	1	1	
Total	178,660	166	38	43	44	41

TABLE 2: Types of installed bird artificial nests and target species.

Model	Type	Entrance hole (∅)	Target bird specie
A	Closed	28 mm	<i>Cyanistes caeruleus</i> (Blue tit), <i>Periparus ater</i> (Coal tit), <i>Ficedula parva</i> (Red-breasted Flycatcher)
B 32	Closed	32 mm	<i>Parus major</i> (Great tit), <i>Poecile palustris</i> (Marsh tit), <i>Poecile lugubris</i> (Sombre tit), <i>Muscicapa striata</i> (Spotted Flycatcher), <i>Passer montanus</i> (Tree Sparrow)
B 35	Closed	35 mm	<i>Parus major</i> (Great tit), <i>Sitta europaea</i> (Nuthatch), <i>Ficedula hypoleuca</i> (Pied Flycatcher)
C	Half -Opened	150 × 120 mm	<i>Phoenicurus phoenicurus</i> (Redstart), <i>Phoenicurus ochruros</i> (Black Redstart), <i>Erithacus rubecula</i> (Robin)

Bird nests were periodically monitored in order to identify the nesting species, egg and chick number, eating habit and other observations regarding the diversity and distribution of bird population in the studied ecosystems.

### 3. Results and discussion

Most ornithologists that made observations regarding the food of *Dendrocopos major* consider that this species is insectivorous, consuming also fruits and seeds during cold periods. Burton [4] from *The Wildlife Trusts*, England, specialist in birds behaviour wrote about *Dendrocopos major* that would have an unpredictable behaviour, stealing the eggs and immature birds from other nests.

Burton's observations [4] are also validated by the Romanian Ministry of the Environment in 2015 that collected all recent studies about different bird species, mentioning that in exceptional situations *Dendrocopos major* can consume eggs and non-flying birds from other birds nests, without giving informations regarding the habitat or the cause.

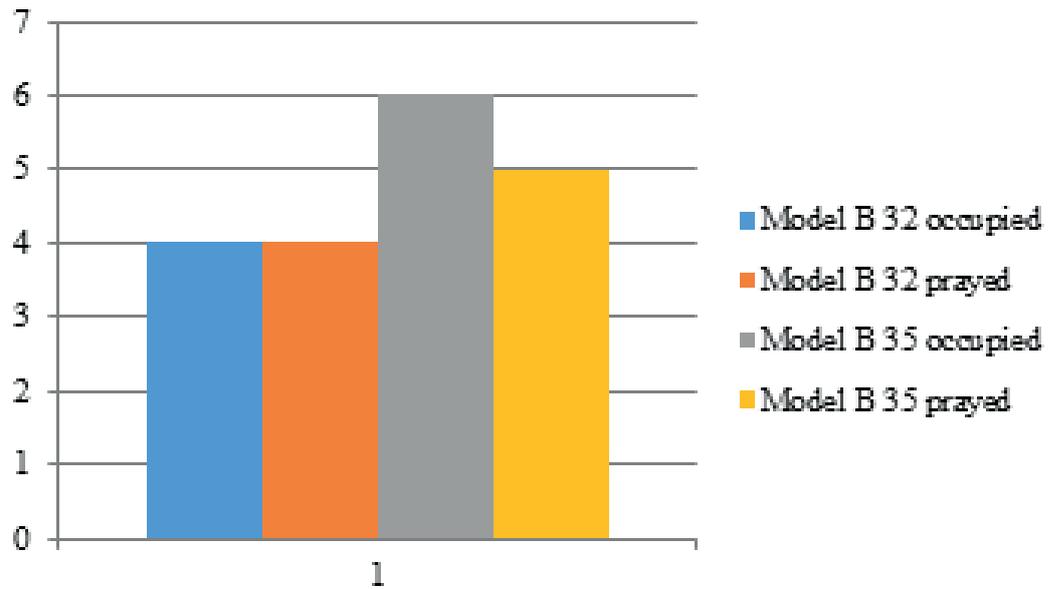
During the nests monitoring period, an interesting, but in the same time warring phenomenon, was noticed: a certain number of artificial nest were prayed by woodpeckers, especially by *Dendrocopos major* (Great Spotted Woodpecker). The observation confirmed previous affirmations that this species may have a strange behaviour, by attacking other nests [4, 5].

The result of our observations contributes to a much more detailed knowledge of *Dendrocopos major*, confirming Burton's observations [4], yet mentioning that is not an unpredictable behaviour, at least not in some anthropic ecosystems, as in our observations. We can say that is a habit of searching other food sources in the periods when there is a decrease in insects number either from natural causes or anthropic causes – insects disappear because of the use of chemical treatments in orchards, thus the woodpeckers have to consume other birds eggs or immature in order to satisfy their protein needs.

We support this point of view because of the great number of bird boxes attacked. As the chart 1 shows, almost all bird boxes occupied by small Passeriformes were attacked. Because the nest distribution was on a large land surface, we cannot say that it is an unpredictable or isolate behaviour, but an adaptation of *Dendrocopos major* to an emergency situation in an intensive exploited agro system.

In Romania, all the ten European woodpecker species [6] are nesting, nine being sedentary and one, the Wryneck (*Jynx torquilla*) is migratory, leaving the country in autumn. The paper presents some data regarding the woodpeckers ethology in the studied ecosystems.

Of the 25 nests orchard installed in Istrița Fruit Research Station orchard, Model A and C nests were not occupied by any bird species and not prayed by woodpeckers. Nests Model B 32 and Model B 35 were occupied by *Passer montanus* (Tree Sparrow) and prayed by woodpeckers as shown in the chart below (Fig. 2).



**Figure 2:** The nests box occupied by *Passer montanus* and prayed by woodpecker in Istrița Fruit Station orchard, Buzău.



**Figure 3:** Prayed nests by *Dendrocopos major* (Great Spotted Woodpecker).

In Istrița orchard from the 7 installed nests of Model B 32, 4 nests were occupied by *Passer montanus* (Tree Sparrow). All occupied nest were prayed by woodpeckers (Fig. 3).



**Figure 4:** *Passer montanus* nest occupied, not prayed by the woodpecker (a); Detail of the nest (b).

In the same location, from 6 nests, Model B 35, 6 nests were occupied by *Passer montanus* (Tree Sparrow – Fig. 4) and 5 of them were prayed by woodpeckers. Woodpeckers increased the nests entrance holes till 43 mm in order to enter the nest and to pray the eggs and chicks (Fig. 3).

Great Spotted Woodpecker (*Dendrocopos major*) was seen cutting the entrance hole of a B 32 nest (Fig. 3) having 5 eggs of *Passer montanus* (Tree Sparrow) inside. The major praying activity was registered in June. None of the A and C nest models were occupied yet by other species or attacked by woodpeckers.

Other interesting observations about artificial nests made of wood. On April 14, 2015 we found a nest Model B 35 mm (Fig. 5) old *Vespa crabro* nest (European hornet) where a *Muscardinus avellanarius* (Hazel dormouse) was still hibernating.

In the Arboretum and Botanical Garden of the University of Agronomic Sciences and Veterinary Medicine of Bucharest, and in the Private garden in Nucșoara, Prahova, woodpecker attacks were observed, but damage was insignificant until this moment.

## 4. Conclusions

Woodpeckers are specialized in finding insects that live on/inside branches and trunks of woody plants. It seems that woodpeckers eat eggs and chicks of other bird species during the nesting period (June). Our results showed that the Great Spotted Woodpecker (*Dendrocopos major*) prayed 9 of 13 occupied nests. From 13 horticulture ecosystems where artificial wood nests were installed, woodpeckers attacks were registered



**Figure 5:** European Hornet (*Vespa crabro*) (a) and Hazel dormouse (*Muscardinus avellanarius*) (b) in the bird nest.

in 3 areas. In order to protect the artificial wood nests against the woodpeckers attack, the entrance hole has to be reinforced with a metal layer. In the situations in which the food source of Great Spotted Woodpecker (*Dendrocopos major*) that normally is insects, is in great decrease, this species is searching for other proteic food source, thus eating other birds species eggs and the immature birds. The insects decreasing – in number and diversity – in an anthropic ecosystem may be influenced by the chemical pesticides applied for plant protection. Bird artificial nests build for dedicated species, can be occupied also by insects as European hornet (*Vespa crabro*) or even mammals as Hazel dormouse (*Muscardinus avellanarius*). Further studies are needed to better understand the Woodpeckers ethology in order to prevent and limit the damage and pray of useful bird nests.

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