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Conservation of the European Roller

A guide to nestbox installation and management

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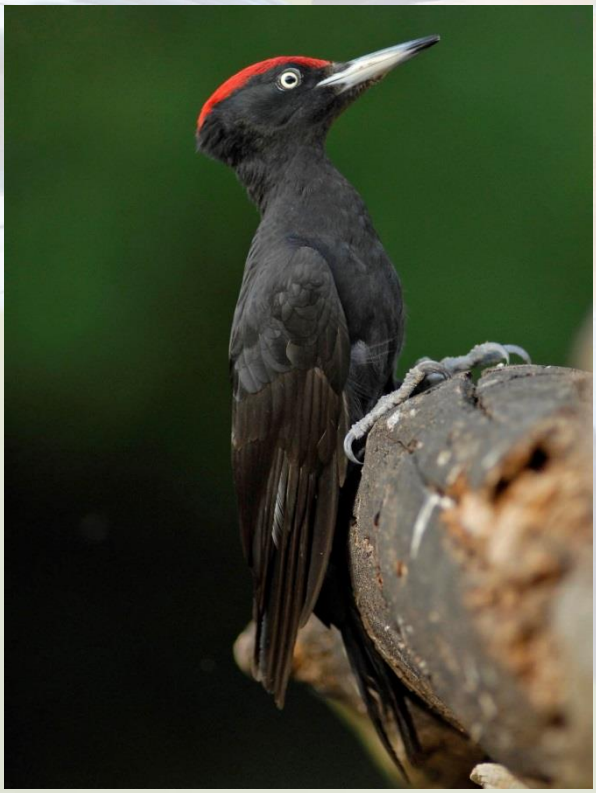
The conservation status of the European roller

All 12 roller species of the family *Coraciidae* are mainly secondary cavity nesters. Instead of making their own nest cavity, they occupy natural holes or abandoned nest sites of cavity maker bird species, such as woodpeckers. South of the Danube, the European Roller (*Coracias garrulus*) is known to nest in clay embankments and loess walls, occasionally as a colonial breeder. The Hungarian population mostly breeds in natural holes in old trees, or occupies the abandoned nest sites of the Black Woodpecker (*Dryocopus martius*) and the European Green Woodpecker (*Picus viridis*) (Cramp 1985).

Photo: Tamás Szitta



Black Woodpecker
(Photo: Bence Máté)

European Green Woodpecker
(Photo: Zoltán Orbán)

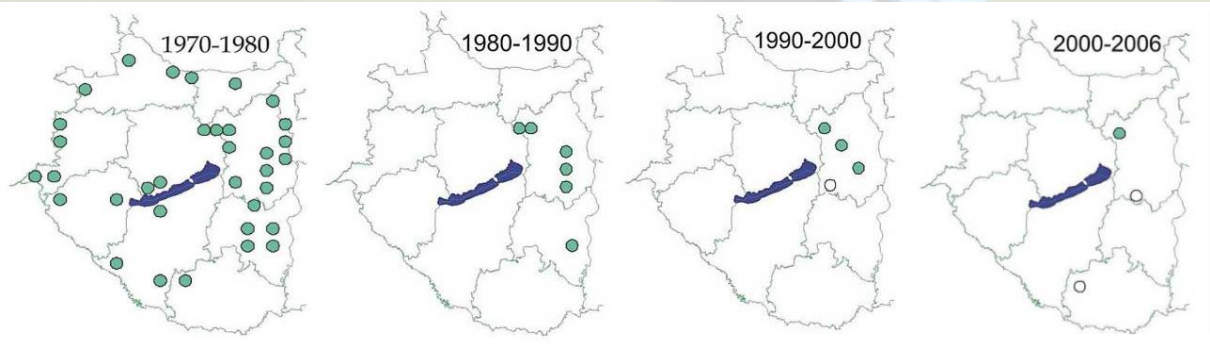
Most populations of the European roller decreased drastically during the second half of the last century. Many western European countries, such as Germany, Switzerland, Denmark, Sweden, Finland and Czech Republic have lost all their breeding pairs (Snow & Perrins 1998). Nowadays, 50-75% of the world population breeds in Europe, still showing a declining trend (Kovács et al 2008).

Photo: Bence Máté

The decline of roller populations is caused by the loss of foraging and nesting sites. The increasing number of invasive hardwood species exclude the native softwood tree species, resulting in a decrease in natural cavities. Loss of tree alleys and solitary trees further limits the suitable nesting sites of rollers (BirdLife International 2004). Although rollers used to be common breeders on floodplain hay meadows in the beginning of the last century, changes in forest management have led to the disappearance of the species from this habitat type.

Artificial nestboxes

The Hungarian breeding population was about 4-5 thousand pairs at the beginning of the 20th century. Based on contemporary descriptions, rollers were common breeders everywhere, except closed forests and mountain ranges. The population of the Carpathian Basin started to collapse in the 1970s. By the 1990s, only 300-600 pairs were left in Hungary with the complete loss of the Transdanubian breeding population (Magyar et al 1998).



Disappearance of the European roller from the Transdanubian region (Legend: full cicrle - confirmed breeding, clear circle – possible breeding).

Edited by László Haraszthy

In Hungary, conservation actions started in the 1980s. Volunteers of BirdLife Hungary, along with the staff of the national park directorates installed artificial nestboxes for rollers in several regions of the country (Molnár 1998). Nestbox installation resulted in a significant increase in the roller population, clearly showing the dependence of the species on suitable nesting sites (Molnár 1998). Nowadays, the Hungarian population is stable with around 1300-1500 pairs, and it also started to recolonize the Transdanubian region.

The long-term conservation of the European roller can only be ensured by the restoration of natural foraging and breeding sites. By demonstrative habitat reconstructions, the LIFE+ project „Conservation of the European Roller in the Carpathian Basin (LIFE13/NAT/HU/000081), funded by the European Union, aims to propagate nature-friendly land use and management practices, to help the preservation of roller habitats. Until the restoration of foraging and nesting sites is complete, the stabilization and protection of the core breeding population in the Carpathian Basin is essential. The simplest and most effective way to support the conservation of rollers is creating nesting sites by the installation of artificial nestboxes.

Photo: Ottó Szekeres

Type D nestboxes

Various types and sizes of nestboxes can be insatlled for rollers. Traditional boxes are made of wood, but there are recent attempts trying to use ceramics and plastic. In western European countries, the application of wood-concrete nestboxes has started, that provide the multiple of the life-span of conventional wooden boxes.


Conventional wooden box (Photo: Flóra Hák)



Schwegler's wood concrete box, and a barn box (Photo: SCHWEGLER Vogel- & Naturschutzprodukte GmbH)

The most often used nestbox type for rollers is the type D nestbox made of 25 mm wide wooden boards with a 64-mm entrance hole in diameter.

Illustration by Szabolcs Solt

Wood is a cheap and widely available material for nestboxes, though these kind of boxes are the most threatened by deterioration caused by weather extremities. The life expectancy of such boxes can be improved in several ways:

– good quality hardwood material
– surface treatment (external wood paint)
– strengthening the lid (metallic plate, PVC)

Installing nestboxes

The first step of installing a nestbox is the selection of an appropriate site. Rollers mainly prey on insects – mostly orthopterans and beetles (Cramp et al 1993) – so a mosaic of extensively cultivated arable land, grazed or mowed grasslands, and sandy steppes provide ideal habitat for the species (Kiss et al 2012). Rollers are sit-and-wait predators, thereby requiring perches for hunting, such as tree alleys, solitary trees, or even power lines.

The site fidelity of rollers is rather high. The natal dispersion distance is about 40 km for second year birds, but only 5 km for adults (Kiss & Tokody 2014). Thus a small distance between the installed nestbox and the nearest roller territories increases the chance of occupation in the following years. However, as rollers are territorial birds, nestboxes should be placed at appropriate distances from the nearest neighbours. Territory size depends on the type and quality of the habitat, but a minimum of 800-1000 m is recommended between boxes (Molnár 1998).

Nestboxes are traditionally fixed on trees, but this is not always an option. In case of treeless habitats, boxes installed on medium or high voltage electric pylons are equally preferred by birds and are usually quickly occupied on account of their high visibility. In areas where both trees and electric pylons are absent, wooden posts can be installed directly into the ground. Nestboxes installed onto electric pylons or wooden posts are more prone to temperature extremities during the summer, however studies show that this does not have a negative impact on breeding success. Furthermore, mammalian predators are less likely to prey upon these broods. It is recommended not to install nestboxes on dried out, dead trees, as they are more likely to be fallen by heavy summer storms annihilating whole broods.

Nestbox on a tree
(Photo: Csaba Lendvai)

Nestbox on a wooden post
(Photo: Csaba Lendvai)

Nestbox on a concrete pylon
(Photo: Dr. Gyula Molnár)

Contacting the landowner, or the relevant power company (in case of electric pylons) before installing nestboxes is recommended. Preliminary permission to carry out nestbox monitoring is important, individual field visits may need to be authorised in advance upon request.

Potential sources of disturbance should be considered when choosing the location for an artificial nest site. Nestboxes installed onto electric pylons are more visible to humans, potentially provoking their removal. The underlying cause of these activities is more often curiosity than deliberate malice, thus a laminated information sheet (containing the contact details of the person in charge) installed onto the stand at a visible height can generate more cooperation by the public. Proximity to a high traffic road can reduce the chances of survival. Electric pylons should be properly insulated in order to provide nesting locations.

Deceased young European roller (Photo: Tamás Szitta)

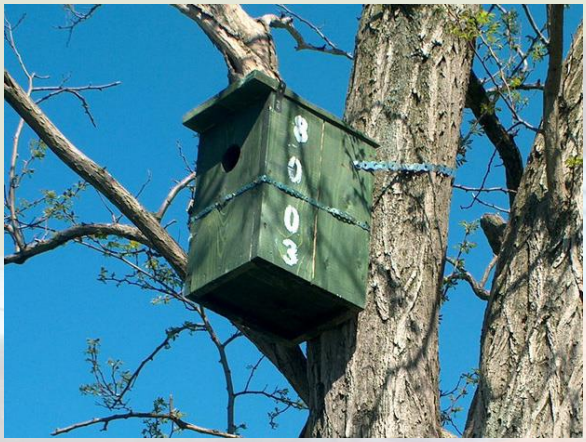
Adequate insulation on a medium voltage poletop (Photo: Zoltán Orbán)

The height at which the nestbox is installed is a compromise among several aspects. A nestbox installed too low might attract unwanted disturbance from the public, especially in case of ladder-style concrete pylons. Information cards placed under the boxes can prevent such activities. However regular monitoring will be more difficult if nestboxes are inaccessible. Previous monitoring data indicate that the height -above a certain measure- at which a nestbox is placed does not correlate with the occupancy, an installation height of 3-4 metres above ground level is optional.

Photo: Gerhárd Golen

Photo: Flóra Hák

A variety of installation techniques can be used, depending on the type of stand. Adjustable metallic strap (Hilti band) can be used on trees, allowing the possibility to accommodate tree growth in the future. The use of nails can be avoided if the Hilti band is positioned on the tree trunk above a branch. Hilti-bands can be used on wooden, and ladder-like concrete poles, although a combination of a stabilizing pole and nailing can also be used with the former.



Nestbox strapped onto a tree with a Hilti band (Photo: Béla Tokody)

Nestbox nailed onto a stabilizing pole (Photo: Tamás Szitta)

Adhering to the basic health and safety rules when installing and monitoring nestboxes is very important:

– fixing the ladder on several points onto the roof rack whilst transporting
– the presence of more than one person at all times in the field
– finding safe support and foothold for the ladder when in use
– climbing equipment where necessary.

Nestbox monitoring

Artificial nestboxes require regular monitoring. Even though wood-concrete boxes can withstand the adversity of the weather for prolonged periods of time, hardwood boxes can degrade within a few of years, and can even become dangerous to breeding birds. Checking the boxes at least once before the breeding season yields information about their condition. Split or cracked boxes are potential hazards that need to be replaced or repaired before the start of the breeding season. Absent, or fallen nestboxes can also be replaced before the birds return from their wintering site. Nestboxes installed on trees can be adjusted as necessary, to follow the tree growth and avoid damage to the boxes.

A split box can take lives (Photo: Zoltán Orbán)

Unsuitable nestbox (Photo: Balázs Csibrány)

The growing tree can ruin the nestbox (Photo: Balázs Csibrány)

Monitoring the occupancy of the nestboxes, taking counts of the eggs and young during the breeding season provide useful information that can help the conservation of the species to a great extent. It is necessary to direct all monitoring data to the relevant regional coordinator. Applying ornithological rings on European roller chicks requires a permit, and is carried out when monitoring nestboxes.

Ringing a European Roller chick Photo: Balázs Csibrány)

The European roller does not require the nestbox to be cleaned, the species removes unwanted material from the nest if necessary. It may be useful to remove accumulating derbis from wooden boxes in order to protect them from any moisture that might be stored in old nest material. Checking all types of boxes before the breeding season is important, as other cavity nesting species, such as starlings or tree sparrows often use baling twine when building their own nests. Birds can easily get tangled in these strong plastic strings, that can eventually cause death. The removal of bee or wasp nests from the boxes should be carried out before the breeding season.

European roller tangled up in baling twine (Photo: Balázs Csibrány)

European roller trapped and killed by baling twine (Photo: Balázs Csibrány)

Bees nest (Photo: Katalin Balogh)

Bees nest (Photo: Csaba Lendvai)

The breeding season

The European roller is a late spring migrant, not reaching the breeding grounds until late April-early May. It is a monogamous species, the somersaulting courtship flight of the breeding pairs is a characteristic sight in early summer. Breeding pairs defend a territory throughout the breeding season.

Adult European roller on nest (Photo: Tamás Szitta)

European roller eggs (Photo: Zoltán Orbán)

The breeding season expands from late May to late July, with one breeding attempt only, replacement clutches are relatively rare after a failed attempt. The clutch consists of 4-5 white eggs with the average dimensions of 36 x 28 mm. The female spends more time in the nestbox during the egg laying period. The incubation starts after the third egg is laid. The male often takes over the task of incubation after the clutch is complete.

The eggs hatch asynchronously after 18-19 days of incubation. Differences between the chicks in terms of size and developmental stage are prominent until the time they fledge. Both parents feed the brood. The young fledge 28-29 days after hatching.

Photo: Béla Tokody

Photo: Béla Tokody

Photographic aid for the age determination of European roller chicks: *(Photos: György Horváth)*

Day 0

Day 2

Day 4

Day 6

Day 9

Day 13

Day 15

Day 24

Other cavity nesting species

Nestboxes installed for European rollers are often occupied by other species. Nothing should be done in such cases, especially as most species that could occupy the nestboxes are protected by law. European roller pairs are capable of evicting other species, should they need the nestbox themselves. Below is a short description on other species that could potentially occupy a nestbox installed for European rollers.

Common Kestrel (*Falco tinnunculus*)

Egg dimensions: 39 x 31 mm

The most common Falconidae predatory bird in Hungary. It usually breeds in the old nest of magpies or hooded crows, but also occupies dilapidated, lidless nestboxes. The clutch consists of 3-8 reddish brown eggs with darker brown blotches. The incubation period lasts for 28-30 days, fledging takes place in 28-30 days. Common kestrels mainly feed on rodents (mainly common voles), lizards and insects.

Photo: Zoltán Orbán

Photo: Szabolcs Solt

Photo: Tamás Szitta

Little owl (*Athene noctua*)

Egg dimensions: 34 x 29 mm

A common species of owls, that prefers anthropogenic environment, and often breeds on attics, or under the roofs of farmyard buildings. The species conservation actions include the installation of specific nestboxes, but the species also occupy roller's nestboxes. The female lays 3-5 round, white eggs that hatch after 28-29 days. Even though the chicks leave the nest after 30-35 days, they only learn to fly by the 38-46th day. Little owls prey mainly on rodents and passerines, but would also eat reptiles, amphibians and insects.

Photo: Attila K. Szabó

Photo: Ottó Szekeres

Photo: Zoltán Orbán

Eurasian Scops owl (*Otus scops*)

Egg dimensions: 31 x 27 mm

The only migratory species among the owls breeding in Hungary. The Scops owl is typical of plains and foothills. It requires large trees for breeding, but avoids closed forests. It prefers natural tree cavities, but also readily takes roller nestboxes. The clutch consists of 3-6 plain white and spherical eggs, that hatch after 20-31 days of incubation. The chicks leave the nest after 3-4 weeks, but only learn to fly around the age of 33 days. Scops owls mainly feed on insects.

Photo: Csaba Nagy

Photo: Csaba Nagy

Photo: Zoltán Bajor

Western Jackdaw (*Corvus monedula*)

Egg dimensions: 35 x 24 mm

This smaller sized corvid is very common in anthropogenic habitats. It readily nests on buildings (ledges, attics), regularly uses tree cavities and the old nest of rooks. It can also be found in the nestboxes installed for rollers. Females lay 4-6 light blue eggs with dark spots. The incubation lasts for 17-18 days and the chicks fledge after about a month. Jays feed on insects and other invertebrates, but also eat rodents, and leftovers found in communal waste.

Photo: Zoltán Orbán

Photo: Zoltán Orbán

Photo: Zoltán Orbán

Eurasian Hoopoe (*Upupa epops*)

Egg dimensions: 26 x 18 mm

This characteristically patterned, migratory bird is typical to extensive orchards, vineyards, and other habitat types where small-scale agricultural land use prevails. It breeds in hollow, decaying trees, stone heaps, outbuildings, but also uses woodpecker cavities and nestboxes. The clutch consists of 5-10 bluish grey eggs from which the chicks hatch in 15-18 days. As an anti-predatory action, the chicks can direct streams of faeces, and make a snake-like hissing sound if scared. The young fledge at the age of 26-29 days. Hoopoes eat worms, insects, with a preference to mole crickets.

Photo: Csaba Lóki

Photo: Zoltán Bajor

Photo: Zoltán Bajor

Eurasian Wryneck (*Jynx torquilla*)

Egg dimensions: 21 x 16 mm

A characteristically patterned, migratory bird relates to woodpeckers. Its name refers to its typical emergency display of the wringing of its neck. Wrynecks rarely excavate their own nest cavities, instead they use old woodpecker cavities, or natural tree cavities. The clutch consists of 7-12 plain white eggs, that are mostly incubated by the female. The chicks hatch after a 12-14 day incubation period, and fledge after 20 days. Wrynecks primarily feed on ants, that are lapped up by their specialized, crooked tongue.

Photo: Balázs Csibrány

Fotó: Nagy Csaba

Fotó: Nagy Csaba

Common Starling (*Sturnus vulgaris*)

Egg dimensions: 30 x 21 mm

One of our most common breeding birds, that prefers tree alleys, solitary trees, and forest edges to nest in. It lays its eggs in natural cavities, or abandoned woodpecker holes, but it also occupies artificial nestboxes, which it lines with plant fibre and leaves. The clutch consists of 4-5 light blue eggs that hatch after 12-13 days. The chicks fledge when they are about 21 days old. Even though starlings consume large quantities of berries (e.g. grapes) in the autumn, they feed almost exclusively on insects during the breeding season.

Photo: Csaba Nagy

Photo: Csaba Nagy

Photo: Csaba Nagy

Eurasian Tree sparrow (*Passer montanus*)

Egg dimensions: 19 x 14 mm

The dark cheek patches and the brown crown differentiates the species from its similar relative, the house sparrow. Male and female individuals look alike. Tree sparrows are less common in urban areas, they prefer agricultural land, tree alleys provide suitable nesting habitat. Tree sparrows raise 2-3 broods a year. They readily take up nestboxes, using a considerable amount of plant fibre as nest material. The female lays 5-7 light grey eggs densely freckled with dark rusty spots. The eggs hatch after 12-13 days of incubation and the fledglings leave the nest when 15-18 days old. Tree sparrows feed on insects from spring until autumn, and subsist on seeds throughout the winter.

Photo: Csaba Nagy

Photo: Csaba Nagy

Photo: Csaba Nagy

Great tit (*Parus major*)

Egg dimensions: 18 x 13 mm

One of our most common bird species that can be found in a wide range of habitats from city parks and backyards, through orchards and forests. It nests in natural cavities, abandoned woodpecker holes, and artificial nestboxes. It builds its nest from fibrous plant material lining it with mosses and fur. The 6-13-egg clutches hatch after 12-15 days. The eggs are off-white with reddish brown spots. The fledglings leave the nest 20-22 days after hatching. Great tits usually have two broods per season. They feed on insects (mostly caterpillars and spiders) during the reproductive period, and grains and seeds over the winter.

Photo: Csaba Nagy

Photo: Csaba Nagy

Photo: Csaba Nagy

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