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NEW TYPE CONSTRUCTION OF ARTIFICIAL NEST BOXES FOR LESSER KESTREL USED FOR THE FIRST TIME IN BULGARIA

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Abstract

The Lesser Kestrel often nests in urban areas, as they provide nesting sites and the level of predation there is low. Due to the drastic reduction of natural habitats, the placement of artificial nest boxes provides reliable nesting sites with a low risk of predation. For that purpose, Green Balkans together with Hiltop Ltd. created a new type of artificial nest boxes specially designed for species. The artificial nest boxes were made from PVC flat sandwich panels and aluminium angular plates. The advantage of using these materials is that the materials are extremely lightweight. The used materials provide thermal insulation which protects the birds from the high temperatures in summer. The material is practically indestructible and it is not affected by climatic conditions. The new type artificial nest boxes were installed in the territory of the Lesser Kestrel breeding colony. There, targeted conservation activities are led by a team from Green Balkans as part of project "Life for Lesser Kestrel". During breeding season, it was proven that species easily recognised and occupied new type of artificial nest boxes.

Key words*: Aluminium, Falco naumanni, PVC sandwich panels, Recovered colony, Thermal insulation.*

INTRODUCTION

The Lesser Kestrel (*Falco naumanni*, Fleischer, 1818) commonly nests in urban areas due to the availability of suitable nesting sites and the reduced risk of predation.

In Europe, the population has declined by 46% since the 1950s, and in South Africa, where the species migrates for the winter, there has been a 25% decline since 1971 (BirdLife International, 2004). In South Africa, the main threats are the loss of grassland habitats due to overgrazing and the use of pesticides, which affect the birds when they forage on locusts or crickets that have been sprayed by farmers (Pepler, 2000).

The threats to the Lesser Kestrel in its breeding range include the destruction of older buildings where the birds nest, habitat loss due to afforestation, human persecution, urbanization, pesticide poisoning, and competition with other species (Biber, 1996).

Critically low numbers and isolation of the Lesser Kestrel populations are currently the most serious threat. These problems do not allow the species to recover naturally. Additional conservation efforts are necessary to ensure the sustainable existence of the recovered Lesser Kestrel colony in Bulgaria. Due to the drastic reduction of natural habitats, the placement of artificial nest boxes provides reliable nesting sites with a low risk of predation. Conservation programmes need to evaluate the efficiency and cost of providing artificial nesting places for birds (Korpimäki, 1985; Lowther, 2012; Lambrechts et al., 2012; MØller et al., 2014).

Urban bird species have an environmental, cultural, touristic, and even educational value, and play a key role for enhancing environmental awareness among city dwellers. They should not be neglected or overlooked in a modern world where urban areas increase along with the proportion of the human population inhabiting them. In the case of the Lesser Kestrel, it has been predicted that the western European

population will soon depend largely on artificial nesting sites (Catry et al., 2009).

The deployment of artificial nest boxes for Lesser Kestrels is a common conservation practice across Europe. Countries like Bulgaria, Croatia, France, Greece, Italy, Spain and Portugal use them for the recovery of the Lesser Kestrel as a breeding species to a location or for strengthening existing colonies (Yaneva et al., 2022).

In Bulgaria, about 25 pairs of the national population - which represent more than 60% of the population, occupy artificial nest boxes specially designed for Lesser Kestrels (Gradev et al., 2021).

In the Lesser Kestrel colonies in Bulgaria, used were mostly artificial nest boxes made out of wood. These wooden artificial nest boxes were specially designed and created considering the species' requirements. However, wood turned out to be extremely easily affected by unfavourable weather conditions which led to the destruction of the nest boxes and the need to replace them with new ones. This led us to the search for a new type of construction for the artificial nest boxes that is not affected by meteorological conditions.

MATERIALS AND METHODS

Green Balkans NGO together with Hiltop Ltd. created a new type of construction for artificial nest boxes specially designed for Lesser Kestrels. The artificial nest boxes were constructed from PVC flat sandwich panels and aluminium angular plates (Figure 1).

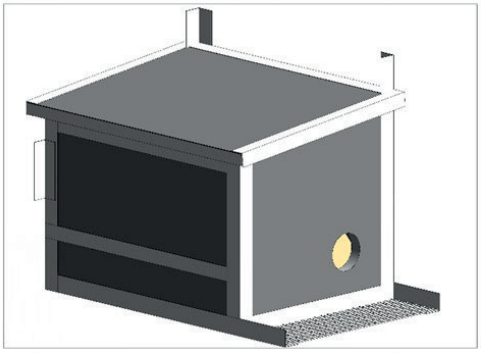


Figure 1. The new type of artificial nest boxes for Lesser Kestrels (Original figure)

PVC flat sandwich panels are composite boards with an extruded polystyrene (XPS) core and PVC sides. The panels are perfectly flat, rigid, with a reduced weight of approximately 2 kg/m^2. The PVC flat sandwich panels are intended for outdoor use and thus they have high resistance to external factors like precipitation, temperature fluctuations, UV rays, formation of mold and fungi. They are simple, easy to use and maintain. For the construction of the new type of artificial nest boxes we used aluminium angular plates with in the following profiles: L - profile with sizes 30 x 30 x 1.2 cm, T - profile with sizes 25 x 25 x 1.2 cm and C - profile with sizes 25 x 25 x 25 x 1.2 cm.

For the rendering of the sizes of the new type of artificial nest boxes we used the program Autodesk Revit 2024.

The advantage of using these materials when building artificial nest boxes for Lesser Kestrel is that the materials are extremely lightweight. An entire completed artificial nest box does not exceed more than three kilograms, making it much lighter than nest boxes made from wood and other traditionally used materials. The used PVC flat sandwich panels provide thermal insulation which protects the birds from the high temperatures in the summer. These materials are practically indestructible, unbreakable and they are not negatively affected by climatic conditions.

RESULTS AND DISCUSSIONS

The dimensions of the construction of the new - type of artificial nest boxes are tailored to the ecology specifications of Lesser Kestrels (Figures 2-9).

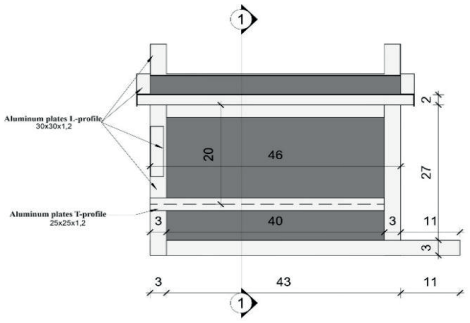


Figure 2. Sizes of new type artificial nest boxes - frontal (Original figure)

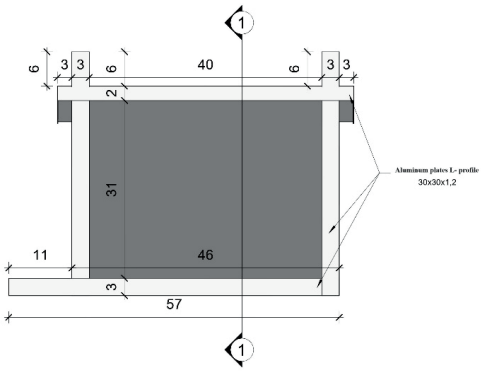
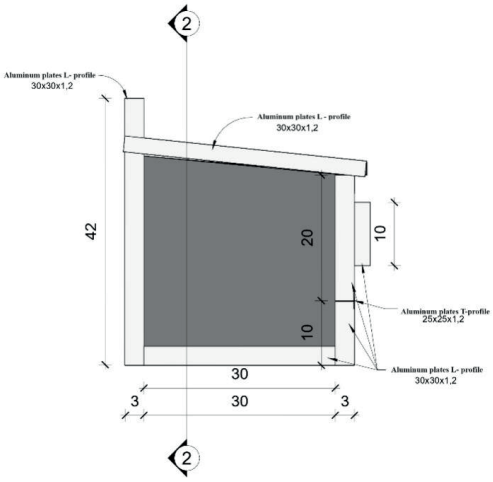


Figure 3. Sizes of new type artificial nest boxes - back view (Original figure)



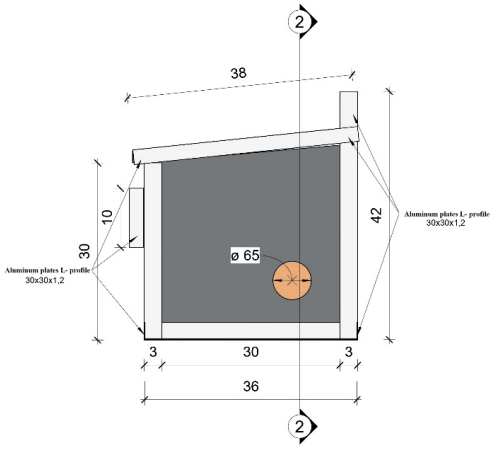


Figure 4. Sizes of new type artificial nest boxes - left and right view (Original figure)

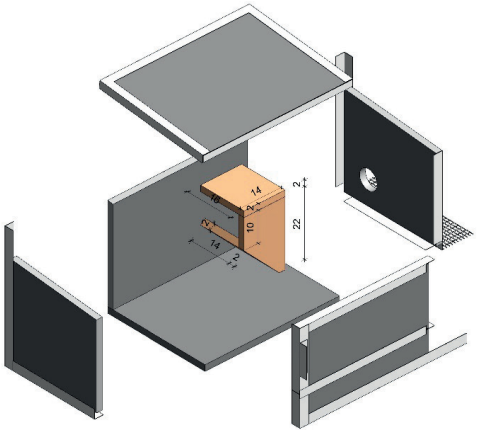


Figure 5. Size of new type artificial nest boxes - inside view (Original figure)

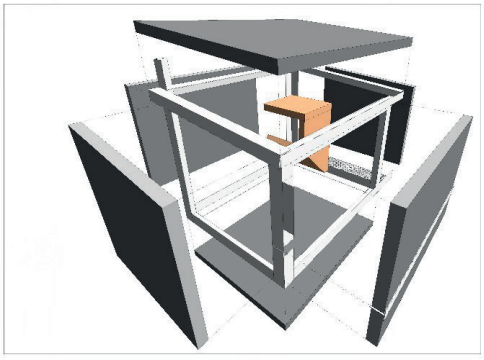


Figure 6. Shame of skeleton of new type artificial nest boxes (Original figure)

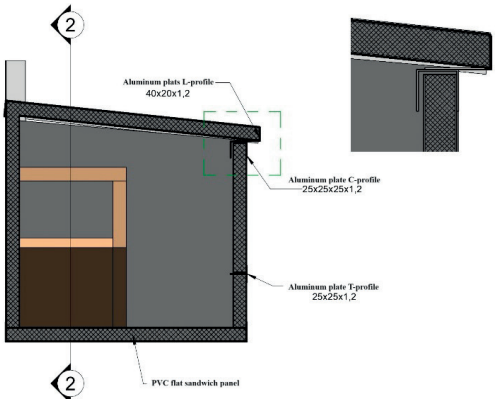


Figure 7. Cross section of new type artificial nest boxes (Original figure)

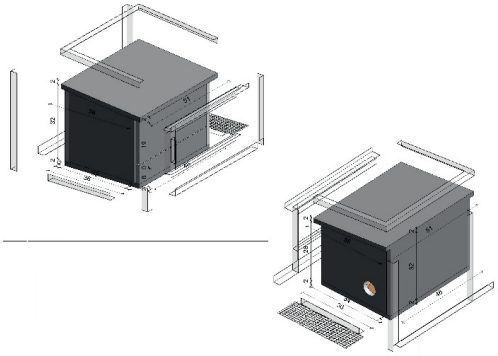


Figure 8. External dimensions of new type artificial nest boxes (Original figure)

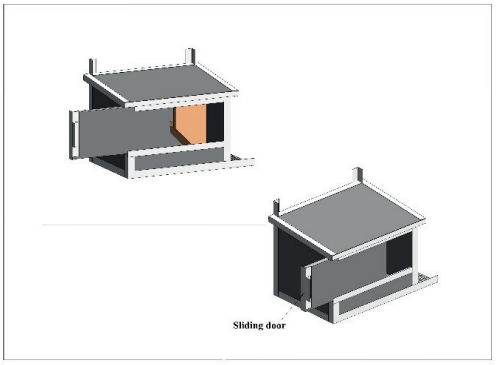


Figure 9. Outside view of new type artificial nest boxes (Original figure)

We also took into account previous experience in building artificial nests from different materials for Lesser Kestrels. The modern material used for the construction of the new artificial nest boxes for Lesser Kestrels is, according to technical specifications, resistant to unfavourable weather conditions making the nests boxes practically indestructible. This allows them to be used by Lesser Kestrels in the long term. There is no need to replace them with new artificial nests, which in turn makes them economical from a financial point of view. The materials used for the new type artificial nest boxes are very light - much more than the ones traditionally made from wood which allows for much easier installation and maintenance. The materials which we use for the new type artificial nest boxes have thermal insulation, they are durable, reliable and protect the birds, eggs and young chicks. Especially the thermal insulation properties of the materials - protecting the birds from high temperatures in summer, are big step up from the previously-made wooden artificial nest boxes.

Prior to the 2023 breeding season, eight new type nest boxes were installed in the territory of the Lesser Kestrel Release and Adaptation Module in village Levka SPA "Sakar" (BG0002021). There, targeted conservation activities are led by a team from "Green Balkans - Stara Zagora" NGO as part of project "Better Life for Lesser Kestrel in South-East Balkans" LIFE19 NAT/BG/001017 (Figure 10).

Figure 10. Installation of new type artificial nest boxes (Original photo)

The eight new-type nest boxes represent 11.76% of all artificial nest boxes installed in the territory of the Lesser Kestrel Release and Adaptation Module (Figures 11 and 12).

Figure 11. The new type of artificial nest boxes used by Lesser Kestrels (Original photo)

Figure 12. The new type of artificial nest boxes used by Lesser Kestrels (Original photo)

Even during the breading season 2023 from the eight new type artificial nest boxes placed, four were occupied by Lesser Kestrels, which is 0.23% of all occupied nest boxes in the territory during the season. In three of them, Lesser Kestrels successfully bred, which represents 20% of the total successful breeding pairs of Lesser Kestrels. In the new artificial nest boxes 13 eggs were laid which is 15.12% of the total number of eggs in the territory (Figure 13). These three breeding pairs have hatched ten chicks which represent 21.28% from total hatched chicks in the breeding territory of Lesser Kestrels.

Figure 13. The new type of artificial nest boxes with Lesser Kestrel eggs (Original photo)

During the breeding season 2024 from all new type artificial nest boxes seven of them were occupied by the Lesser Kestrel. This is 31.82% of all occupied nest boxes by Lesser Kestrel in the territory. All seven occupied nest boxes successful bred, which representative 33.33% of the total successful breeding pairs of Lesser Kestrel. 36.36 % of total number of eggs in the territory were laid in the new type of artificial nest boxes, which is 36 eggs. From these eggs the breeding pairs have hatched 21 chicks, which represent 35.59% from total hatched chicks in the breeding territory of Lesser Kestrels (Figure 14).

Figure 14. The new type of artificial nest boxes with hatched chicks (Original photo)

CONCLUSIONS

During the 2023 and 2024 Lesser Kestrel breeding season, it was proven that the species easily recognized and occupied the new type of artificial nest boxes. This proved that providing the new type of artificial nest boxes was instrumental in conserving and increasing the Lesser Kestrel population. The materials used for the new type of construction, according to technical specifications, are resistant to unfavourable weather conditions making the artificial nests boxes practically indestructible. This allows them to be used by Lesser Kestrels in the long term. This eliminates the need to periodically buy and install new artificial nest boxes, which makes them economical from a financial point of view. The thermal insulation properties of the material protect the birds, eggs and young chicks from high temperatures in summer.

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