T-STANDPOINT ASSISTS THE WAITING OF PREDATORY BIRDS IN LUCERNE

Simunić, Ana-Marija; Gantner, Ranko; Bošković, Ivica; Bukvić, Gordana; Gantner, Vesna

Source / Izvornik: **The holistic approach to environment, 2020, 10, 84 - 87**

Journal article, Published version
Rad u časopisu, Objavljena verzija rada (izdavačev PDF)

https://doi.org/10.33765/thate.10.3.4

Permanent link / Trajna poveznica: https://urn.nsk.hr/urn:nbn:hr:151:026824

T-STANDPOINT ASSISTS THE WAITING OF PREDATORY BIRDS IN LUCERNE

Ana-Marija Simunić*, Ranko Gantner*, Ivica Bošković*, Gordana Bukvić*, Vesna Gantner*

* Josip Juraj Strossmayer University of Osijek, Faculty of Agrobiotechnical Sciences Osijek, Osijek, Croatia

corresponding author: Ranko Gantner, e-mail: rgantner@fazos.hr

Professional paper
Received: January 7th, 2020
Accepted: February 18th, 2020
HAE-1932
https://doi.org/10.33765/thate.10.3.4

ABSTRACT

Field rodents can cause considerable economic losses in perennial crops, especially lucerne. Predatory birds can provide biological control of field rodent populations. However, modern arable landscape usually provides few or no natural standpoints for predatory birds to wait for their prey. According to the old farmers in eastern Croatia, T-standpoints installed into lucerne were traditional implements assisting the bird predation over field rodents. Aim of this study was to check whether the T-standpoints really are appropriate installations for the predatory birds to wait for their prey on the ground or not. The research has confirmed that predatory birds (*Buteo buteo* and *Falco tinnunculus*) descended on the installed T-standpoints (in average 1.35 arrivals per day of observation), waited (average period of stay was 17 minutes in the morning and 34 minutes in the afternoon) and landed on the ground, most probably to catch the prey (in average 13 % of arrivals to T-standpoints ended with landing to the ground, likely for the prey attack). Small forest restoration in arable landscapes and less chemical rodent control would probably improve the predatory bird populations, thus enhancing the biological control of field rodents. There remains the need for further investigation of efficiency of field rodent control by predatory birds.

Keywords: *field rodents, predatory birds, biological control*

INTRODUCTION

Lucerne (*Medicago sativa* L.) is one of the most important forage crops grown in the world. While recognized for its high yield and nutritive quality, it is prone to invasion of field rodents (*Arvicola terrestris, Microtus arvalis, Mus musculus, Apodemus agrarius, Apodemus flavicollis* [1]) which can cause considerable economic losses [2, 3] due to grazing lucerne herbage and biting its roots. Since the predatory birds are natural enemies of field rodents, they are supposed to provide biological control of these pests to some extent in lucerne crops. However, the modern agricultural landscape of arable forage enterprises usually provides few or no natural standpoints for predatory birds to wait for their prey on the ground. Luckily, according to the tradition of old farmers in eastern Croatia, T-

standpoints installed into lucerne fields were traditionally implemented to assist the bird predation over field rodents [4]. The aim of this study was to check whether the T-standpoints really are appropriate installations to wait for the prey on the ground by predatory birds or not.

EXPERIMENTAL

The research comprised an installation of two T-standpoints at approximately 1 ha of lucerne crop in the village of Ernestinovo in Croatia and monitoring of predatory birds descending to installations, waiting for the prey and landing to the ground (assumed as an attack) during 10 months of observation (from June 2018 to November 2018 and from March 2019 to June 2019). T-standpoints were about 3 m high (Figure 1).

Figure 1. Installed T-standpoint in the observed lucerne crop

Monitoring was performed twice a day; in the morning and in the afternoon since it had been initially realized that birds had not been active around mid-day. Recorded parameters were: a time of arrival to T-standpoints, time of landing to the ground or time of leaving the T-standpoint. Landing to the ground was explained as attack on prey, most probably on the field rodent. Period between arrival to the T-standpoint and landing to the ground or leaving was explained as waiting. Monthly average values for the number of arrivals to the T-standpoint with associated confidence intervals ($\alpha = 0.05$) and number of landings to the ground were calculated using Microsoft Office Excel 2007 statistical functions "Average", "StDev" and "Confidence".

RESULTS AND DISCUSSION

Predatory birds accepted the set T-standpoints to arrive on them very quickly, in just 2 days after installation. They used them for waiting for the prey and for landing to the ground, most probably to capture the prey. Two species of birds of prey arrived at the set T-standpoints: common buzzard (*Buteo buteo* from the *Accipitridae* family) and common kestrel (*Falco tinnunculus* from the *Falconidae* family), the latter being recorded more frequently and with higher activity. This was explained by greater preference of common kestrel to urban sites [5]. During 2018, the highest number of arrivals to T-standpoints and the highest number of landings were observed during September and October (Figure 2), when the highest population density of field rodents was expected along with low herbage cover of lucerne. During 2019, an even higher number of arrivals to T-standpoints was observed during March and April, but with a lesser average number of landings per observation day (Figure 2), probably due to a decrease in the rodent population following the loss of individuals during previous winter. In May, there were a very few arrivals per day of observation and number of landings per arrival to the T-standpoint (Figure 2), probably due to excessive lucerne herbage cover which hid the rodents. In average, during the whole observation period, birds of prey visited T-standpoints 1.35 times per day of observation.

Generally, about 13 % of landings to T-standpoints ended with landing to the ground, most likely to attack the prey. Although more arrivals to T-standpoints were observed in the morning, slightly more landings to the ground

or potential attacks occurred in the afternoon (53 %), which could be explained by the need for vomiting the pellet of undigested prey parts in the morning, before new ingestions. Also, waiting lasted longer in the afternoon (34 minutes in average) than in the morning (17 minutes in average), throughout the observation period (Figure 3).

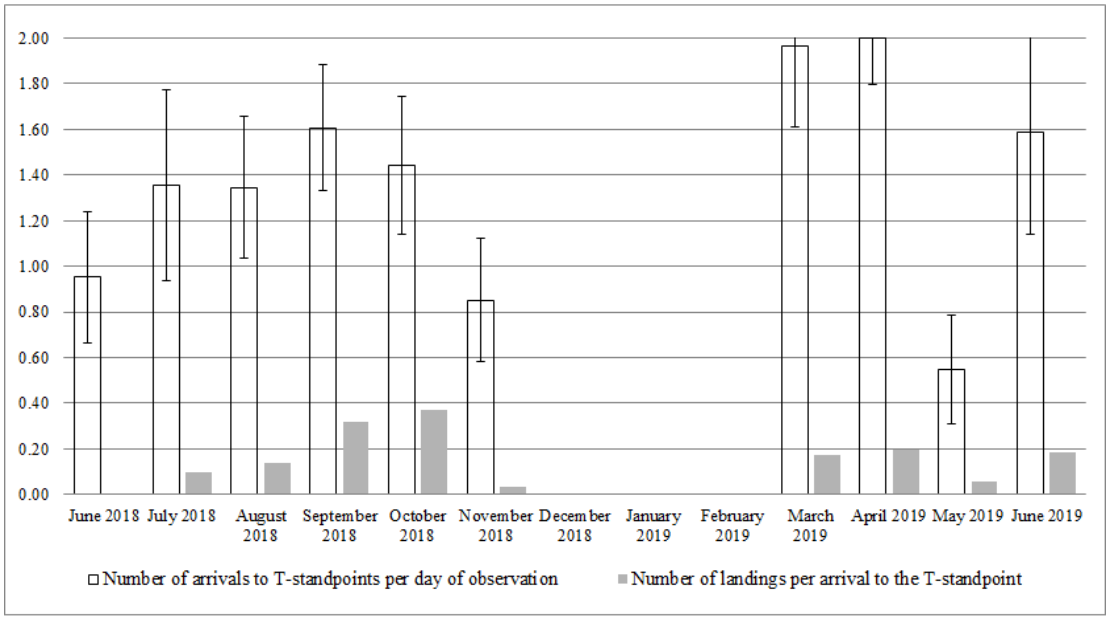

Figure 2. Average number of arrivals to T-standpoints per day of observation and landings to the ground per attending the T-standpoint. Vertical bars show confidence intervals of arithmetic mean ($\alpha = 0.05$)

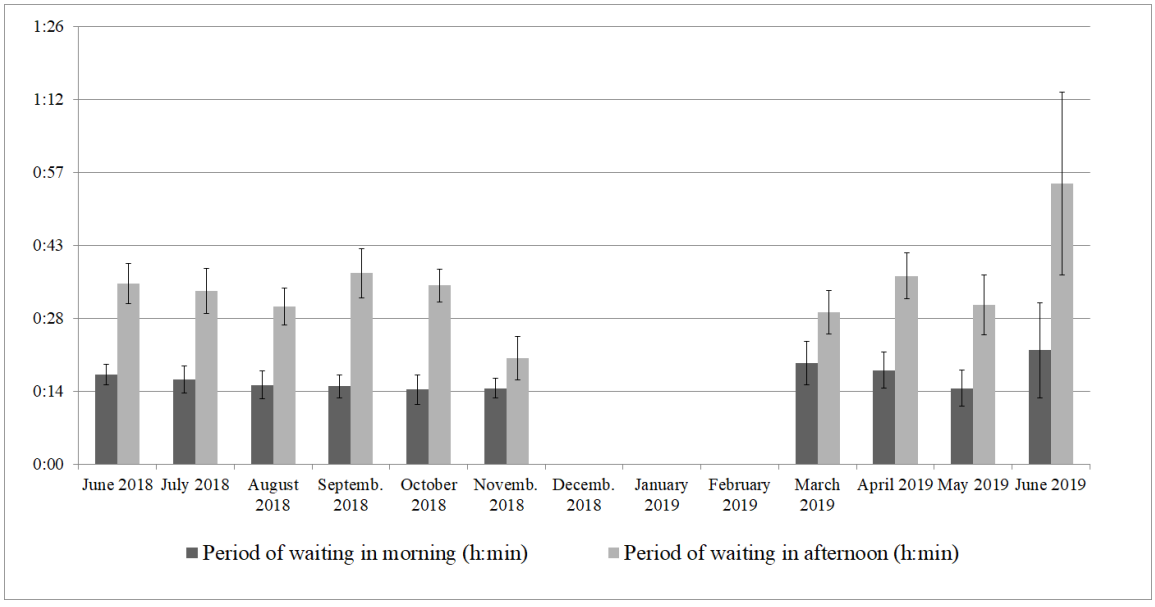

Figure 3. Average period of waiting during morning and evening hours (h:min, represented by columns) and standard deviation of data (represented by vertical bars)

During the bird monitoring, daily presence of domestic cats (*Felis catus*) was found within the observed lucerne crop. Also, cats were seen walking away with a caught prey (a small rodent) in their mouths. Cats, as non-target predators, were found to visit lucerne more often than birds of prey, probably due to position of the observed lucerne crop in the proximity to human accommodations [3]. Despite the historical reliance on biological control of field rodents, modern field rodents control relies mainly on the use of anticoagulant rodenticides which can cause a secondary poisoning of natural enemies [6, 7]. Less poisoning and more predatory bird habitats (i.e. small forest) restoration in arable landscape would probably improve the predatory bird populations, thus enhancing the biological control of field rodents. There remains the need for further investigation of efficiency of field rodent control by the use of predatory birds.

CONCLUSION

The research has confirmed that T-standpoints are used by predatory birds in their waiting for the prey on the ground in lucerne crops. In average, during the whole observation period, predatory birds arrived to T-standpoints 1.35 times per day of observation and about 13 % of arrivals ended with a landing to the ground, most likely to attack the prey. Less chemical rodent control and small forest restoration in arable landscape would probably improve the predatory bird populations, thus enhancing the biological control of field rodents. There remains the need for further investigation of the efficiency of field rodent control by predatory birds.

REFERENCES

[1] M. Maceljski, Poljoprivredna entomologija, Zrinski d.d., Hrvatska, 1999, 432-438.

[2] J. Jacob, P. Manson, R. Barfknecht, T. Fredricks, Common vole (*Microtus arvalis*) ecology and management: implications for risk assessment of plant protection products, Pest Management Science 70(2014), 869-878.

[3] O. Fuelling, B. Walther, W. Nentwig, J. P. Airoldi, Barriers, Traps and Predators – An Integrated Approach to Avoid Vole Damage, Proceedings of the 24th Vertebrate Pest Conference, ed. R.M. Timm, University of California, Davis, February 22 - 25, 2010, 222-227.

[4] A. Josipović, R. Gantner, G. Bukvić, S. Tolić, Protection against field rodents in organic forage crops, Proceeding of the 5th International scientific/professional conference Agriculture in nature and environment protection, ed. B. Stipešević, R. Sorić, Glas Slavonije d.d., Osijek, June 4 - 6, 2012, 187-190.

[5] J. Riegert, D. Fainová, V. Mikeš, R. Fuchs, How urban Kestrels *Falco tinnunculus* divide their hunting grounds: partitioning or cohabitation?, Acta Ornithologica 42(2007), 69-76.

[6] V.M. Mendenhall, L.F. Pank, Secondary Poisoning of Owls by Anticoagulant Rodenticides, Wildlife Society Bulletin 8(1980) 4, 311-315.

[7] P.J. Thomas, P. Mineau, R.F. Shore, L. Champoux, P.A. Martin, L.K. Wilson, G. Fitzgerald, J.E. Elliott, Second generation anticoagulant rodenticides in predatory birds: Probabilistic characterisation of toxic liver concentrations and implications for predatory bird populations in Canada, Environment International 37(2011) 5, 914-920.