



UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM TIMISOARA

"YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH IN APPLIED LIFE SCIENCES"

13-14 November, 2025



"Young people and multidisciplinary research in applied life sciences"

Preliminary spatial assessment of the relationship between artificial releases and the current distribution of the Grey Partridge (*Perdix perdix* L.) in Hungary

László István Beier¹, Tamás Barta², Ferenc Jánoska³

¹Assistant lecturer: University of Szeged, Faculty of Agriculture, Institute of Animal Sciences and Wildlife Management, 6800 Hódmezővásárhely, Andrassy út 15. Hungary

²College associate professor : University of Szeged, Faculty of Agriculture, Institute of Animal Sciences and Wildlife Management, 6800 Hódmezővásárhely, Andrassy út 15. Hungary

³ Head of the Department: University of Sopron, Faculty of Forestry, Institute of Wildlife Management, 9400 Sopron, Bajcsy-Zsilinszky u. 4. Hungary

Abstract: Spatial analyses in QGIS 3.34 using georeferenced release polygons from Országos Vadgazdálkodási Adattár (OVA-National Game Management Database) and 10×10 km breeding data from Magyar Madártani és Természetvédelmi Egyesület(MME-The Hungarian Ornithological and Nature Conservation Society) surveys revealed only limited overlap between historical Grey Partridge (*Perdix perdix*) release areas and confirmed breeding sites. Jaccard index values indicated low establishment success over time, while national trend data (1999–2024) showed continued population decline despite intensive restocking, suggesting that releases alone cannot counter habitat loss and other limiting factors.

Introduction

The Grey Partridge (*Perdix perdix* Linnaeus, 1758), once abundant across Europe, has undergone severe declines due to agricultural intensification, pesticide use, and the loss of field margins and hedgerows. In Hungary, once hosting over half a million breeding pairs, populations have similarly collapsed despite extensive restocking by hunting associations. This study integrates data from the National Game Management Database (OVA) and the Hungarian Ornithological and Nature Conservation Society (MME) to evaluate the spatial relationship between historical release sites (1997–2010) and breeding distributions (2010–2025). Using georeferenced OVA polygons and 10×10 km UTM grid data in QGIS, spatial overlap was quantified with the Jaccard index and compared with long-term MMM population trends (1999–2024). The results aim to assess the contribution of restocking to population persistence and provide a reproducible framework for future adaptive management.

Material and methods

Two datasets were analysed: (1) historical Grey Partridge (*Perdix perdix*) release polygons from the National Game Management Database (OVA, 1997–2010), and (2) 10×10 km UTM breeding-distribution data (2010–2025) from MME MAP and MMM programmes. OVA maps (1997–2010) were georeferenced in QGIS 3.34 (EPSG 32634, WGS 84 / UTM 34N) and topologically corrected. MME data followed the EBBA2 10×10 km grid; only non-zero breeding cells were retained. Release polygons were dissolved, merged, and intersected with the MME grid to identify overlap. Area was calculated in hectares ($S_{area} / 10000$). Spatial overlap was measured by the Jaccard Index $J(A,B) = |A \cap B| / |A \cup B|$ and Overlap Ratio (%) = $(|A \cap B| / |A|) \times 100$ for 1997–2000, 2003–2006, 2008–2010, and cumulatively (1997–2010). MMM population indices (1999 = 1.0) were compared with OVA release and harvest data in Excel 2021 to evaluate the link between restocking intensity and population trends. All GIS analyses were performed in QGIS 3.34; charts were created in Excel 2021.

Results and discussions

Spatial overlap between release and breeding sites (1997-2010) Analyses showed limited spatial coincidence between historical grey partridge (*Perdix perdix*) release areas (OVA, 1997–2010) and breeding records (MME, 2010–2024). Overlaps occurred mainly in Central and Southeastern Hungary, while most release zones lay outside confirmed breeding areas. The overlap declined across periods (1997–2000, 2003–2006, 2008–2010), suggesting a decrease in the persistence of released populations (**Figure 1**).

For each period, both the absolute (ha) and proportional (%) overlap were computed, and an overall index was derived for the 1997–2010 period.

The total release area was approximately 998,000 ha, of which about 410,000 ha intersected UTM breeding squares.

The overall Jaccard index ($J = 0.1679$; 16.79%) indicates a low to moderate spatial coincidence between the release areas and later breeding distributions (**Table 1**).

A temporal comparison among the three periods revealed a slight decline in overlap percentages, suggesting a reduction in post-release establishment success over time. Population trend data (MME MMM) indicate a steady national decline of grey partridge (*Perdix perdix*) since 1999, despite repeated releases (**Figure 2**). The population index remained around 0.6–0.8 relative to 1999, showing only brief local recoveries. The decline and weak spatial overlap suggest that restocking did not offset habitat loss or fragmentation, and the species persists at critically low densities across Hungary.

Conclusions

Population trend data (MME MMM) indicate a steady national decline of grey partridge (*Perdix perdix*) since 1999, despite repeated releases (Fig. 2). The population index remained around 0.6–0.8 relative to 1999, showing only brief local recoveries. The decline and weak spatial overlap suggest that restocking did not offset habitat loss or fragmentation, and the species persists at critically low densities across Hungary. Population trend data (MME MMM) show a continuous decline of the grey partridge (*Perdix perdix*) since 1999, despite repeated releases (Fig. 2). The index stayed near 0.6–0.8 of the 1999 level, with only short local recoveries. This pattern and the low release–breeding overlap indicate that restocking failed to offset habitat loss, leaving the species at critically low densities nationwide.

Acknowledgement

The authors express their sincere gratitude to Károly Nagy, head of the Monitoring Centre of MME, for providing essential data, background information, and continuous professional support throughout the research.

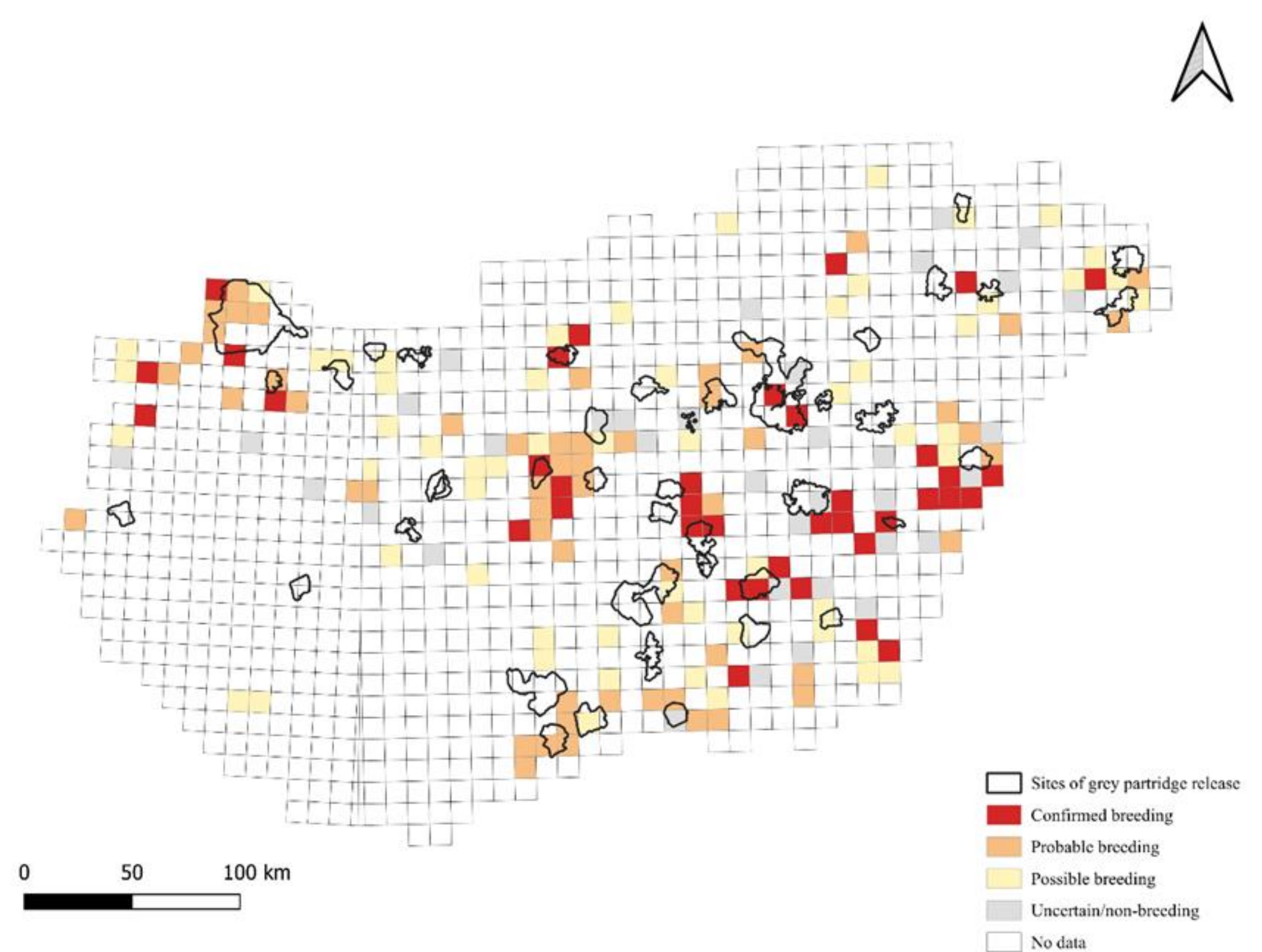


Figure 1. Sites of grey partridge (*Perdix perdix*) releases between 1997–2010 and UTM-based breeding squares (MME 2010–2024). Colours indicate breeding probability categories according to the MME monitoring system (Source: OVA and MME)

Period	Released area (ha)	Overlap area (ha)	UTM area (ha)	Jaccard index	Jaccard index (%)
1997–2000	370 890.65	144 274.68	1 850 899.70	0.0694	6.94 %
2003–2006	389 075.95	161 161.16	1 850 899.70	0.0775	7.75 %
2008–2010	238 110.76	104 070.01	1 850 899.70	0.0524	5.24 %
1997–2010 (total)	998 077.36	409 505.85	1 850 899.70	0.1679	16.79 %

Table 1. Quantitative spatial overlap between release areas (OVA) and breeding areas (MME UTM squares) by study period (1997–2010). (Source: OVA and MME)

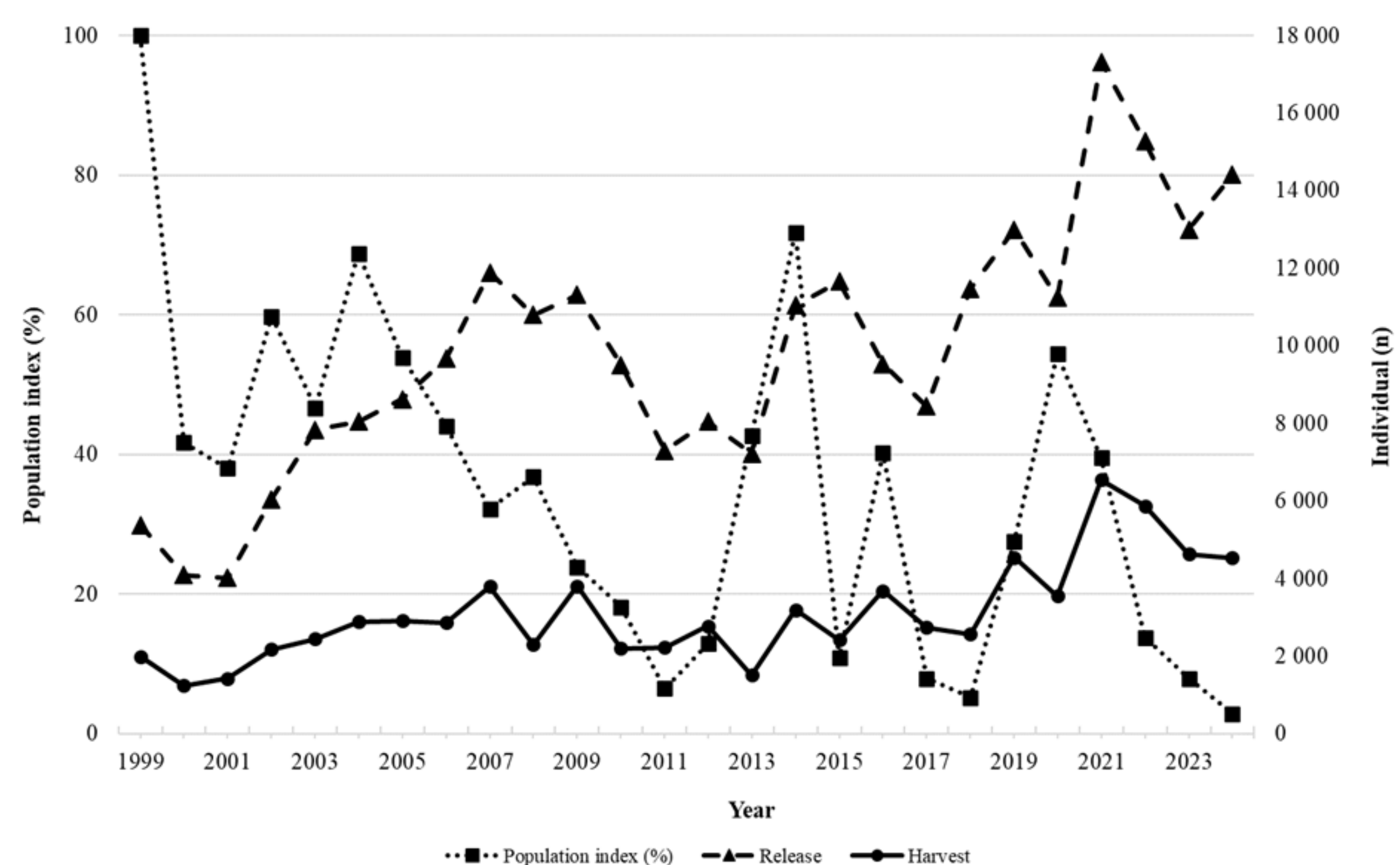


Figure 2. Long-term population trend of the grey partridge (*Perdix perdix*) in Hungary between 1999 and 2024, based on MME monitoring data. The national population index shows a slight but continuous decline despite historical release efforts. (Source: MME and OVA)



UNIVERSITY OF LIFE SCIENCES "KING MIHAI I" FROM
TIMISOARA

**"YOUNG PEOPLE AND MULTIDISCIPLINARY RESEARCH
IN APPLIED LIFE SCIENCES"**

13-14 November, 2025



**Preliminary spatial assessment of the relationship between artificial releases
and the current distribution of the Grey Partridge (*Perdix perdix* L.) in Hungary**
László István Beier¹, Tamás Barta², Ferenc Jánoska³

¹Assistant lecturer: University of Szeged, Faculty of Agriculture, Institute of Animal Sciences and Wildlife Management, 6800 Hódmezővásárhely, Andrásy út 15. Hungary

²College associate professor : University of Szeged, Faculty of Agriculture, Institute of Animal Sciences and Wildlife Management, 6800 Hódmezővásárhely, Andrásy út 15. Hungary

³ Head of the Department: University of Sopron, Faculty of Forestry, Institute of Wildlife Management, 9400 Sopron, Bajcsy-Zsilinszky u. 4. Hungary

Abstract: Spatial analyses in QGIS 3.34 using georeferenced release polygons from Országos Vadgazdálkodási Adattár (OVA-National Game Management Database) and 10×10 km breeding data from Magyar Madártani és Természetvédelmi Egyesület(MME-The Hungarian Ornithological and Nature Conservation Society) surveys revealed only limited overlap between historical Grey Partridge (*Perdix perdix*) release areas and confirmed breeding sites. Jaccard index values indicated low establishment success over time, while national trend data (1999–2024) showed continued population decline despite intensive restocking, suggesting that releases alone cannot counter habitat loss and other limiting factors.