

The effects of using different species conservation priority lists on the evaluation of habitat importance within Hungarian grasslands

PÉTER BATÁRY, ANDRÁS BÁLDI and SAROLTA ERDŐS

Summary

Many bird species of conservation importance inhabit the grasslands of the Hungarian Great Plain. Although extensive grazing management usually supports more bird species than intensive management, the conservation priority is to protect rare or declining species. Therefore, the conservation status of species must also be included in assessments of the value of different habitats. We used territory mapping to count birds in 21 extensively and intensively grazed field pairs on the Hungarian Great Plain, and subsequently adjusted site scores depending on which species appeared on various lists of priority taxa. We investigated differences in conservation scores of two global conservation lists (the Bonn Convention and another based on values of eight biological characteristics), two West Europe based lists (Bird Directive and CORINE), three continental lists (European Threat Status, SPEC and Bern Convention) and two Hungarian lists (protected species of Hungary and an alternative based on the specifics of Hungarian populations). Extensively managed fields had higher conservation values under seven of the nine priority lists: only the two West Europe based lists showed opposite trends in more than half the study areas. Since both West Europe based lists cover many central and eastern European countries, there is an urgent need to revise these lists, especially the Bird Directive list that gives serious legal responsibilities to countries.

Introduction

Conventions and red lists are important tools in the conservation of plants, animals and their habitats, because they highlight survival threat status for species, indicate priorities for conservation action and can be used to designate new protected areas (Sutherland 2000). The red lists and conventions are evaluations of the need for conservation, based on population sizes and levels of threat to long-term survival of populations. If a list contains a certain bird species, it generally means that the bird is threatened and should be protected. There are several conservation conventions dealing with birds, for example the Bonn Convention (The Convention on the Conservation of Migratory Species of Wild Animals). The presence of listed threatened birds is also used to designate new protected areas, for example in the case of the Natura 2000 network. However, there is no comparative analysis of these lists. It would be desirable to know how well the lists really perform in area protection or nature conservation management.

Our study is an example of a comparative analysis of red lists using bird data from the grasslands of Hungarian Great Plain. The Great Plain is the largest geographical unit of the Carpathian Basin consisting of c. 100,000 km². In the Hungarian part of the Great Plain there are 25 Special Protection Areas for birds (Lovászi 2002), three National Parks, 16 Landscape Protection Areas and 55 Nature Conservation Areas (Láng 2002). The most common natural or

semi-natural habitats of the Great Plain are grasslands, which are extremely important habitats for breeding and migrating birds.

In a Fifth Framework EU project, we mapped bird territories of paired extensively and intensively grazed pastures in three different regions of the Hungarian Great Plain (Báldi *et al.* 2005). We considered a field extensively grazed if there was a maximum of one cow per 2 ha. Neither of the pastures were fertilized and both were managed in similar ways. In terms of the total number of all bird territories, the extensive (ext.) fields had a higher number of territories than the intensive (int.) ones in all regions ('Heves' region: ext. = 181 territories, int. = 111, *t*-test $P < 0.005$, $n = 14$; 'Meadow' region: ext. = 154 territories, int. = 82, *t*-test $P < 0.05$, $n = 14$; 'Alkali' region: ext. = 175 territories, int. = 113, *t*-test $P < 0.05$, $n = 14$; Báldi *et al.* 2005).

Our main aim here was to evaluate and compare important and widely used red lists for evaluating the occurrence of rare bird species. To compare the red lists between the two grazing managements, presence-absence and territory datasets from 2003 were used in combination with a scoring system developed in the present study. We hypothesized that the red lists would identify and protect more threatened species and more individuals on extensively grazed grasslands compared with intensive grasslands.

Methods

To evaluate the lists, we developed scoring systems for the different bird species according to their listings; we gave 0 points to a species that is not listed, and 1 point to one that is listed. When red lists were divided according to level of priority (e.g. Endangered vs Threatened), we created scales that increased as suggested protection increased. For example, Endangered birds were given a higher score than Threatened (Tables 1 and 2).

In our investigations we used two global conservation lists. One is the Bonn Convention (The Convention on the Conservation of Migratory Species of Wild Animals), which aims to conserve terrestrial, marine and avian migratory species throughout their ranges. Migratory species threatened with extinction are listed in its Appendix I and migratory species that would significantly benefit from international co-operation in its Appendix II. The other global list is an adaptation of a research article (Báldi *et al.* 2001), which was based on measuring eight biological characteristics of the birds: systematic status of the taxon, population size, population trend, size of the taxon's area, distribution trend, population concentration, reproductive potential for recovery, ecological specialization. Points given to bird species in the article by Báldi *et al.* (2001) were adopted into our scoring system (Table 2).

We used two West Europe based lists: the Bird Directive and CORINE (Coordination of Information on the Environment programme by the European Commission). The Bird Directive gives guidelines for the protection, management and control of all wild living bird species of the EU. It was developed only for the nine western and northern European countries of the 1979 EU (Tables 1 and 2). CORINE also contains nature conservation data, such as bird lists (Tables 1 and 2). CORINE's goal is to co-ordinate and compile information on the state of the environment according to the shared priorities of all Member States. It directs the collection of consistent, compatible data, which can be used at both state and international levels.

The other three European lists took the whole continent into consideration. One is the Bern Convention, also known as the Council of Europe Convention on the Conservation of European Wildlife and Natural Habitats. Its aims are to promote European co-operation to conserve wild flora and fauna and their natural habitats (Tables 1 and 2). The European Threat Status (ETS, i.e. the conservation status of Europe's breeding birds) was assessed by Tucker and Heath (1994) and was modified by Burfield and van Bommel (2004) (Tables 1 and 2). The aim of the last list, SPEC (species of European conservation concern), was to identify species that are of conservation concern across Europe. The bird species in this list are divided into four categories, depending on their global conservation status, their European Threat Status and the proportion of their world population in Europe (for full details see Tucker and Heath 1994; Tables 1 and 2).

Table 1. Scale, date of development, acceptance in Hungary by law, point system and source data of different red lists and conservation evaluations.

Red list or conservation evaluation	Scale	Developed	Accepted in Hungary ^a	Points	Source data, year
Bonn Convention	Global	1979	1983	App. I. - 2p; App. II. - 1p; NL - op	http://www.cms.int , 2004
Báldi <i>et al.</i> (2001)	Global	2001	–	special points, see text	Báldi <i>et al.</i> , 2001
Bird Directive	West Europe	1979	2004	Annex I. - 1p; NL - op	Papazoglou <i>et al.</i> , 2004
CORINE Bern Convention	West Europe Pan-European	1985 1979	1992 1989	L - 1p; NL - op App. II. - 2p; App. III. - 1p; NL - op	Horváth <i>et al.</i> , 2002 http://www.coe.int , 2004
European Threat Status	Pan-European	1994	–	6 - op depending on endangerment ^c	Burfield and van Bommel, 2004
Species of European conservation concern	Pan-European	1994	–	S1 - 4p; S2 - 3p; S3 - 2p; S4 - 1p; NL - op	Burfield and van Bommel, 2004
Báldi <i>et al.</i> (2001)	Hungary	2001	–	special points, see text	Báldi <i>et al.</i> , 2001
Hungarian Ministry of Environment & Water	Hungary	2001	2001	strictly prot. - 2p; prot. - 1p; NL - op	Hung. Min. of Env. & Water, 2001

^{1a}Came into force in Hungary, if convention or order.

²Abbreviations: App., Appendix; L, listed; NL, not listed; prot., protected; S, species of European conservation concern (SPEC).

^{3c}Endangered, 6p; vulnerable, 5p; declining, 4p; rare, 3p; depleted, 2p; localized, 1p; secure, op.

One of the two Hungarian lists is an adaptation of research by Báldi *et al.* (2001). This article has a national part, which was based on population size and population trend of bird species in Hungary and the occurrence of the bird species in Hungary (points were adopted from this article; Tables 1 and 2). The second Hungarian list is the departmental order of the Hungarian Ministry of Environment & Water (HMEW), which lists the protected and strictly protected species of Hungary (Tables 1 and 2).

There were three field study areas. One is situated in the Heves Landscape Protection Area in Eastern Hungary; it has some shrubby and wooded patches in the grasslands. Another, the 'Meadow' region, is more heterogeneous and has several marshy patches and woodlots within the grasslands. This and the third region are in Central Hungary, in the Kiskunság National Park. The third region is the 'Alkali' region in the Kiskunság National Park and it is situated between the River Danube and the 'Meadow' region. We had seven pairs of 12.5 ha plots in the extensively and intensively grazed grasslands in each region (21 pairs of fields altogether). Bird territories were mapped from behavioural records collected from four site visits in the breeding season.

We made two types of conservation inventories, initially using simple presence–absence data for birds and secondly using bird territory numbers. First, we simply summed the conservation points of the species for each list for the extensive and intensive fields and separately for the three regions (Heves, Alkali or Meadow). Second, we multiplied the conservation scores of each listed species by the number of their territories, in order to include a measure of abundance.

Table 2. Continued.

Scale	Global		West-Europe		Pan-European		Hungary		
	Bonn Convention (2004)	Báldi <i>et al.</i> (2001)	Bird Directive (2004)	CORINE (2002)	Bern Convention (2002)	European Threat Status (2004)	Species of European conservation concern (2004)	Báldi <i>et al.</i> (2001)	Hungarian Ministry of Environment & Water (2001)
Date of source data	2004	2001	2004	2002	2002	2004	2004	2001	2001
Red list or conservation evaluation									
Grasshopper Warbler	1	5	0	0	2	0	0	3	1
Nightingale	1	7	0	0	2	0	0	5	1
Bee-eater	1	26	0	0	2	2	2	5	2
Corn Bunting	0	7	0	0	1	4	3	5	1
Yellow Wagtail	0	7	0	0	2	0	0	5	1
Curllew	1	14	0	0	1	4	3	3	2
Great Bustard	2	33	1	1	2	5	4	18	2
Tree Sparrow	0	5	0	0	1	4	2	7	1
Partridge	0	13	0	0	1	5	2	15	0
Pheasant	0	5	0	0	1	0	0	7	0
Magpie	0	5	0	0	0	0	0	5	0
Sand Martin	0	21	0	0	2	2	2	5	1
Whinchat	1	13	0	0	2	0	0	5	1
Stonechat	1	9	0	0	2	0	0	5	1
Starling	0	7	0	0	0	4	2	5	0
Redshank	1	16	0	0	1	4	3	13	2
Hoopoe	0	7	0	0	2	4	2	5	1
Lapwing	1	14	0	0	1	5	3	5	1
<i>Locustella naevia</i>									
<i>Luscinia megarhynchos</i>									
<i>Merops apiaster</i>									
<i>Miliaria calandra</i>									
<i>Motacilla flava</i>									
<i>Numenius arquata</i>									
<i>Otis tarda</i>									
<i>Passer montanus</i>									
<i>Perdix perdix</i>									
<i>Phasianus colchicus</i>									
<i>Pica pica</i>									
<i>Riparia riparia</i>									
<i>Saxicola rubetra</i>									
<i>Saxicola torquata</i>									
<i>Sturnus vulgaris</i>									
<i>Tringa totanus</i>									
<i>Upupa epops</i>									
<i>Vanellus vanellus</i>									

We scored the different bird species according to the different red lists, giving 0 point to a species which is not listed and 1 point to one that is listed. In cases that had more appendices to a red list, we gave more points where there was a need for higher protection. In the case of the global and Hungarian conservation evaluations of Báldi *et al.* (2001) the scores are derived from eight biological criteria; and population size and trend and species occurrence in Hungary.

Results

We compared the conservation points for grassland birds between management and regions using the presence–absence dataset. Of the two global lists, only the Bonn Convention showed a marked difference. There were more protected birds present on the extensively grazed grasslands in all regions (Figure 1). The West Europe based lists, which had the same conservation values for all 43 species analysed, showed no consistent pattern (Figure 1). The Pan-European lists did not show notable differences or trends between bird conservation values of extensively and intensively grazed pastures (Figure 1). Finally, at the Hungarian level, there was a trend to higher bird conservation values on extensive fields (Figure 1).

We also compared the bird conservation values combined with territory numbers. For all global, Pan-European and Hungarian lists, the extensively managed fields had higher conservation values than the intensively managed fields in all regions and also for pooled data from three regions (Figure 2). However, the two West Europe based lists, the Bird Directive and CORINE, did not show a consistent pattern (Figure 2). To confirm this statistically, we compared the territories of listed species between intensive and extensive sites for pooled data separately for each list (in the case of the two lists of Báldi *et al.* 2001, only those species which had conservation points higher than the mean value of all species were listed). We found that all lists, with the exception of the two West Europe based lists, had a higher number of bird territories on extensively grazed fields (Mann–Whitney *U*-tests: Bonn Convention: $Z = -1.67$, $P = 0.096$; Báldi *et al.* 2001. Global: $Z = -2.16$, $P = 0.031$; Bird Directive: $Z = -0.415$, $P = 0.68$; CORINE: $Z = -0.415$, $P = 0.68$; Bern Convention: $Z = -3.53$, $P = 0.001$; ETS: $Z = -1.81$, $P = 0.071$; SPEC: $Z = -1.81$, $P = 0.071$; Báldi *et al.* 2001. Hungary: $Z = -2.08$, $P = 0.037$; HMEW: $Z = -3.57$, $P = 0.001$).

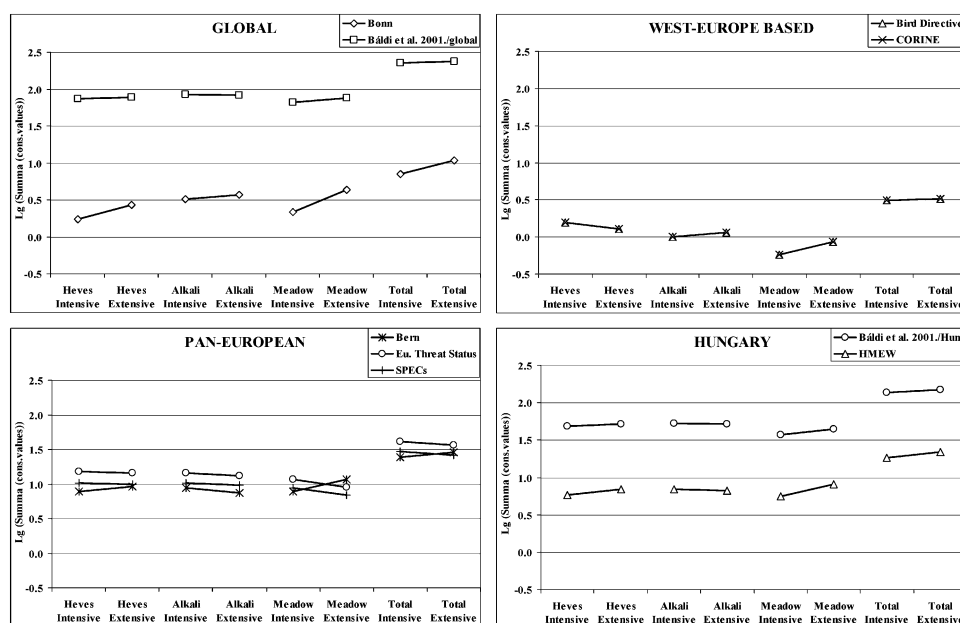


Figure 1. The sum of conservation scores of grassland bird species present per management (intensively vs extensively grazed pastures in Hungary) and per region (three different regions of the Hungarian Great Plain) on logarithmic scale. The lines between the management show trends. Total mean pooled data from the three regions. SPECs, species of European conservation concern; HMEW, red list of the Hungarian Ministry of Environment & Water.

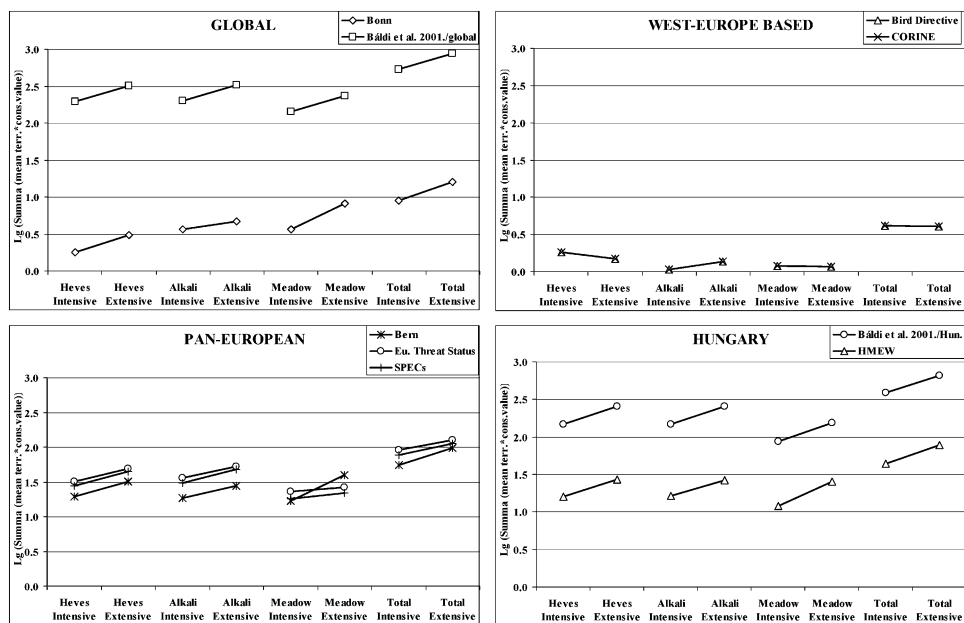


Figure 2. The sum of conservation scores multiplied by territory numbers per management (intensively vs extensively grazed pastures in Hungary) and per region (three different regions of the Hungarian Great Plain) on logarithmic scale. The lines between the management show trends. Total mean pooled data from the three regions. SPECs, species of European conservation concern; HMEW, red list of the Hungarian Ministry of Environment & Water.

Discussion

The populations of many species of farmland bird declined significantly across Europe during the last quarter of the twentieth century. These declines are correlated with agricultural intensity (Donald *et al.* 2001, Newton 2004, Papzoglou *et al.* 2004). Some studies have shown that extensive farming accommodates more birds than intensive farming (e.g. Benton *et al.* 2002, Verhulst *et al.* 2004, Vickery *et al.* 2004). Starting in the late 1980s, Hungary saw a decrease in large-scale farming and in chemical use, resulting in a significant increase in the population of the Great Bustard *Otis tarda* in the Kiskunsag National Park (Bankovics 1996). In their review, Kleijn and Sutherland (2003) found that only 13 of 29 bird studies reported positive effects of agri-environment schemes on bird species richness or abundance, two reported negative effects, nine reported both positive and negative effects and five found no effect. We showed that in Hungarian lowland pastures, bird assemblages of extensively grazed pastures have higher nature conservation values than those on intensive fields.

In evaluating the conservation potential of different habitat types, it is not enough to show there are more bird species or individuals on the extensively managed fields: it is also important to evaluate their conservation status. This is rarely done, except for some evaluations of globally endangered species (e.g. Garnett *et al.* 2003, De Juana 2004). An exception is a study by Stoate *et al.* (2003), who used national and European conservation lists to compare intensively and extensively managed farmlands in Portugal. They found that species of the greatest national and European conservation concern were most abundant in simple, open, extensively managed landscapes.

Here, the comparison of nature conservation values of extensive and intensive pastures based on the value of bird species present did not show a clear trend. However, if nature conservation values of species were weighted with abundance using territory numbers, extensive pastures have much higher conservation values than the intensive pastures, using any red lists, except the Bird Directive and CORINE. These two are West Europe based and the species they list did not have higher numbers on the extensive than on the intensive fields. We conclude that there are significant differences in the evaluation of bird conservation status of habitats using different threat status listings.

An important question is why, on the West Europe based lists, there are not more protected birds on the extensively managed fields than on the intensively managed fields, in contrast with the other lists. We believe the answer is that the West Europe based lists protect only c. 25% of the examined species and of these (11 Bird Directive and 11 CORINE species), six had higher densities on the intensive fields. These are: Tawny Pipit *Anthus campestris*, Stone Curlew *Burhinus oedicephalus*, White Stork *Ciconia ciconia*, Great White Egret *Casmerodius albus*, Red-backed Shrike *Lanius collurio* and Lesser Grey Shrike *Lanius minor*. Most of these species prefer the heterogeneity of more intensively used or disturbed pastures, which include trees for shelter, roads with hedges for nesting and/or perching, etc.

Papazoglou *et al.* (2004) recently provided a status statement of the EU Bird Directive. They found that the population trends of Annex I species were more positive in general than those of non-Annex I species between 1990 and 2000. Since the Bird Directive has a strong legal obligation in EU member states, it affects important decisions, in particular which species are protected with plans and resources. In May 2004, Hungary joined the EU and adopted the Bird Directive. That year, the Hungarian government declared the areas of the Natura 2000 network, which was partly based on the Bird Directive. For this reason, to have a species list appropriate for the whole continent appended to the Bird Directive is an urgent and important requirement. Although 10 new species and three subspecies were added with the accession of the new member states on 1 May 2004, changes are still needed. Finally, we conclude that all red lists, both the global and national lists, including the Hungarian ones, should be revised continuously, and policy makers should consider current research (e.g. Báldi *et al.* 2001) and other red lists, alongside local bird monitoring data.

Acknowledgements

We thank Attila Bankovics, S. Marsden, J. Marshall and two anonymous reviewers for their comments on earlier versions of the paper, and R. Bru and J. Marshall for linguistic revision. We are grateful to András Bankovics, B. Kancsal, T. Kisbenedek and L. Molnár for help with bird counting. Staff of the Kiskunság and Bükk National Parks gave valuable help; among others we thank J. Farkas, A. Máté, L. Molnár, I. Nagy, L. Tóth and T. Utassy. D. Vonah helped with the logistics in the Heves area. We thank the Kiskunság and Bükk National Parks for permissions, and landowners J. Csaplár, P. Oláh and F. Pongrácz for allowing us to work on their fields. The study was supported by the EU-funded project 'EASY' (QLK5-CT-2002-01495) and partly by the Faunagenesis project (NKFP 3B023-04). A. B. was a Bolyai Research Fellow of the Hungarian Academy of Sciences.

References

- Báldi, A., Csorba, G. and Korsós, Z. (2001) Setting priorities for the conservation of terrestrial vertebrates in Hungary. *Biodivers. Conserv.* 10: 1283–1296.
- Báldi, A., Batáry, P. and Erdős, S. (2005) Effects of grazing intensity on bird assemblages and populations of Hungarian grasslands. *Agr. Ecosyst. Environ.* 108: 251–263.

- Bankovics, A. (1996) Population increase of the Great Bustard (*Otis tarda*, L., 1758) in the Kiskunság National Park. *Állattani Közlemények* 81: 3–8 (in Hungarian with English summary).
- Benton, T. G., Bryant, D. M., Cole, L. and Crick, H. Q. P. (2002) Linking agricultural practice to insect and bird populations: a historical study over three decades. *J. Appl. Ecol.* 39: 673–687.
- Burfield, I. and van Bommel, F., eds. (2004) *Birds in Europe: population estimates, trends and conservation status*. Cambridge, U.K.: BirdLife Conservation Series No. 12.
- De Juana, E. (2004) Changes in the conservation status of birds in Spain, years 1954 to 2004. *Ardeola* 51: 19–50.
- Donald, P. F., Green, R. E. and Heath, M. F. (2001) Agricultural intensification and the collapse of Europe's farmland bird populations. *Proc. Roy. Soc. Lond. B. Biol.* 268: 25–29.
- Garnett, S. T., Crowley, G. M. and Stattersfield, A. J. (2003) Changes in the conservation status of Australian birds resulting from differences in taxonomy, knowledge and the definitions of threat. *Biol. Conserv.* 113: 269–276.
- Horváth, F., Kovács-Láng, E., Báldi, A., Gergely, E. and Demeter, A. (2002) *Survey and assessment of Hungarian natural areas*. Vácraót, Hungary: Institute of Ecology and Botany of the Hungarian Academy of Sciences (in Hungarian with English summary).
- Kleijn, D. and Sutherland, W. J. (2003) How effective are European agri-environment schemes in conserving and promoting biodiversity? *J. Appl. Ecol.* 40: 947–969.
- Láng, I. (2002) *Encyclopaedia of environmental and nature conservation*. Budapest, Hungary: Akadémiai Kiadó (in Hungarian).
- Lovászi, P. (2002) *Proposed Special Protection Areas for birds in Hungary*. Budapest, Hungary: Hungarian Ornithological and Nature Conservation Society/BirdLife Hungary (in Hungarian with English summary).
- Newton, I. (2004) The recent declines of farmland bird populations in Britain: an appraisal of causal factors and conservation actions. *Ibis* 146: 579–600.
- Papazoglou, C., Kreiser, K., Waliczky, Z. and Burfield, I., eds. (2004) *Birds in the European Union: a status assessment*. Wageningen, The Netherlands: BirdLife International.
- Stoate, C., Araújo, M. and Borralho, R. (2003) Conservation of European farmland birds: abundance and species diversity. *Ornis Hungarica* 12–13: 33–40.
- Sutherland, W. J. (2000) *The conservation handbook: research, management and policy*. Oxford, U.K.: Blackwell Science.
- Tucker, G. M. and Heath, M. F. (1994) *Birds in Europe: their conservation status*. Cambridge, U.K.: BirdLife Conservation Series No. 3.
- Verhulst, J., Báldi, A. and Kleijn, D. (2004) The relation between land-use intensity and species-richness and abundance of birds in Hungary. *Agr. Ecosyst. Environ.* 104: 465–473.
- Vickery, J. A., Bradbury, R. B., Henderson, I. G., Eaton, M. A. and Grice, P. V. (2004) The role of agri-environment schemes and farm management practices in reversing the decline of farmland birds in England. *Biol. Conserv.* 119: 19–39.

PÉTER BATÁRY*, SAROLTA ERDŐS

Hungarian Natural History Museum, Ludovika tér 2, 1083 Budapest, Hungary.

ANDRÁS BÁLDI

Animal Ecology Research Group of the Hungarian Academy of Sciences and the Hungarian Natural History Museum, Ludovika tér 2, 1083 Budapest, Hungary.

*Author for correspondence; e-mail: batary@nhmus.hu