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CHANGES IN TREE SPARROW *PASSER MONTANUS* POPULATIONS FROM URBAN PARKS

ABSTRACT

Studies of local Tree Sparrow *Passer montanus* populations from urban parks of Polish cities reveal changes in abundance and in nest site selection which differ from data collected from farmland. These changes are not always synchronous among neighbouring cities and parks. Several urban declines are difficult to explain, chiefly when obscured by the changes in the number of artificial nesting sites. One such case was a recorded decline Tree Sparrow and a switch to nesting in buildings observed in the Szczytnicki Park of Wrocław, after colonization by pine martens *Martes martes*. Judging from this the absence/presence of important predators or nest predators in other urban parks of Polish cities may be an additional factor promoting Tree Sparrow declines. It is suggested that a lack of precise data on the intensity of (mosaic-like in time and space) predation pressure in agricultural and urban landscapes should be considered when explaining the reasons for population changes in other bird species.

Key words: Tree Sparrow, breeding numbers, nest sites, predators, urban areas, Poland

INTRODUCTION

In Western Europe, from the British Isles to Switzerland, a serious decline in Tree Sparrow populations has been noticed during the 1950s and 1960s (Summers-Smith 1989, Marchant et al. 1990, Glutz v. Blotzheim and Bauer 1997), and again during the 1980s-1990s (Hagemeijer and Blair 1997, Both et al. 2002). This trend was especially conspicuous in agricultural regions. In western parts of Poland similar trends appeared in a much weaker form (decline by 30%) and later – during the 1990s (Kujawa 2000), while in the Silesian Lowland around Wrocław this has even not been noticed (Orłowski and Ławniczak 2009). Later, around the year 2005, both in western Europe, as on the farmland in Poland (chiefly in NW part, in Pomerania), a stabilization or a slight recovery was reported (Baillie et al. 2012, Kuczyński and Chylarecki 2012). In urban habitats, at least across the German-Polish Lowland, comparable changes have appeared much later, as during the 1960-70s still strong increases prevailed there,

while declines emerged as late as in the 1980s and 1990s (Mizera 1988, Tomiałojć and Stawarczyk 2007). Some asynchrony and a mosaic-like patchiness may suggest the involvement of various local factors.

Several explanations have been proposed, as possible reasons for such trends, some not necessarily exclusive to each other. One group of reasons was thought to be responsible for lowering the adult survival, i.e. acting through a shortage of winter food, while the other one pointed to poorer reproduction indices, possibly owing to higher nestling mortality, and apparently acting through a shortage of animal food, chemical contamination of an environment and food, and/or by increased impact of pathogens (Wesołowski 1991, Pinowski at al. 1995, Svensson et al. 2007). However, there is no general consensus on the main reasons for Tree Sparrow declines (Glutz v. Blotzheim and Bauer 1997, Gatter 2007), chiefly when one takes into account some spectacular local changes. A hypothesis that a retreat and then return of some predators could contribute to such changes remains a barely acceptable possibility (Thomson et al. 1998), though a different opinion by C.P. Bell (2011) should be noted.

On such a background, long-term observations from west-Polish towns, chiefly from Legnica, Wrocław and Poznań, the urban parks of which were located far from any direct impact of organochlorine biocides, though some might have suffered of heavy metal contamination, can add a new dimension. Another factor considered here, is the possible impact of important predators on sparrow populations over time.

STUDY AREA AND METHODS

The size of local Tree Sparrow populations has been estimated with the help of a combined version of the mapping method (spot mapping), with 7-11 visits conducted per season to each sample plot. In the case of this species the focus was on intensive searching for nests (Tomiałojć 1980), which were found in c. 90% of nesting territories. During field work the personnel responsible for park care had also been asked for observations of nocturnal mammals as potential predators.

Field work was carried out by the authors during several periods between 1965 and 2012 in two parks of Legnica, a town now with a population of 110 thousand inhabitants (Tomiałojć 2007) and in a few parks of Wrocław, a city of 630 thousand inhabitants (Tomiałojć and Profus 1977, Mazurek 2003, Tomiałojć 2011). Data from other towns were accepted on the basis of identical census method and habitat similarity. Parks included in the analysis had to be over 100 years old, mainly of deciduous character, thus fairly stable structurally and similar trophically. Their location within town boundaries varied from the down-town zone, typical urban zone, and the one on the edge of dense urban development. More detailed characteristics can be found in Tomiałojć 1970, Tomiałojć and Profus 1977 and more recent papers listed above. Other common features of this sample were as follows: a) all park tree stands had abundant natural tree holes, b) there were only a few (up to 15) nest-boxes suitable

to the species. One exception occurred during the 1990s (between series of censuses) in the 17-ha part of Szczytnicki Park when 30 boxes were added, however, only a half of these were still present during bird counts in 2000-02; in Słowacki's Park btweeen 1983-95 there were 20 street lanterns offering the nest sites, c) Down-town parks in Legnica and Wrocław were crossed by busy streets (with c. 20 and 80 vehicles/minute accordingly), exposing these green areas to contamination with heavy metals, d) In most parks there were no predators important to Tree Sparrows, except red squirrels *Sciurus vulgaris* and small corvids, however in three of them more serious predators did occur, more recently. In Szczytnicki Park, from c. 1978 to 2001 pine martens *Martes martes* occurred, in 2005 an exceptional brood of the Sparrow Hawk *Accipiter nisus* was present, while between 2009-12 there was a threefold increase in Hooded Crows *Corvus cornix*, known to regularly kill bird fledglings and sporadically to open some nest-boxes (Tomiałojć 2011). In the peripheral Zachodni Park the presence of pine martens and two mustellids *Mustela nivalis, M. erminea* was reported, at least for the 1970s (Lontkowski 1989). Still more diverse was the predatory guild in the peripheral park of Legnica, though this area has been poorly studied.

RESULTS

Changes in Tree Sparrow abundance in some parks of west-Polish towns during the past half century have been summarized in the Table 1. Below are more detailed data.

Wrocław – Botanical Gardens. This down-town green area (7.4 ha, of which 4 ha with an older treestand) harboured 17-18 pairs in nest-boxes during 1953-55 while 5 during 1972 and 1976 (Peters 1963, Król 1977). Later only two pairs were found (Mazurek 2003). This could be attributed to a shortage of suitable nest sites, as with increased number of nest-boxes to 50 (since 2003) the Tree Sparrow population has risen to at least 16 pairs in April 2013.

Wrocław – Słowacki's Park. The abundance of Tree Sparrows was monitored in this down-town park for 40 years. The habitat differed from the Botanical Gardens by almost a complete absence of a bush layer. Numbers of sparrows were around 15-20 pairs, the addition of nest boxes (15) occurred in 1975 and street lanterns (20) provided nest sites until 1995. In spite of doubling the pedestrian and street traffic (from 18-40 to 45-80 vehicles/min in rush hours), and the transformation of a neighbouring weedy ground into grass lawns, no decline in Tree Sparrows occurred (Fig. 1).

Wrocław – Szczytnicki Park. A 17-ha "forest like" part of the whole park , recalling old riparian stand, has been repeatedly censused for half a century (Dyrcz 1963, Tomiałojć and Profus 1977). Starting with c. 50-69 pairs during from 1959-74, nesting mostly in natural tree holes, a dramatic decline of Tree Sparrows was noticed, first 6 then 2 pairs during 1986-88 and in 2001-02, later to nil (Cisakowski 1993, Mazurek 2003, Tomiałojć 2011). The decline occurred despite no marked differences in the habitat or its neighbourhood state, with the continuous presence of numerous *Tortrix*

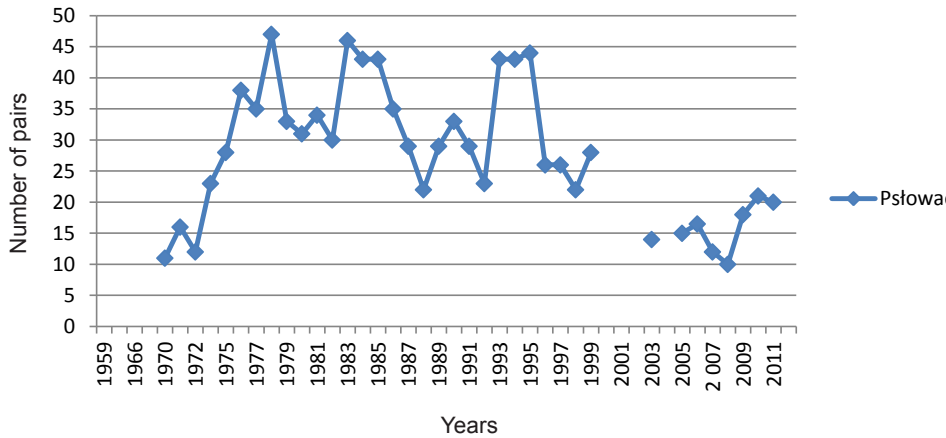

Fig. 1. An example of no Tree Sparrow decline, only a return to moderate numbers after removal of artificial nesting sites in down-town park of Wrocław

viridana caterpillars, and with no change in street traffic (up to 12 vehicles/min.). The decline followed the appearance in the park of a family of pine martensand and has not been reversed despite erecting 40 nest-boxes (150 in the whole park) during early 1990s (Mazurek 2003).

A bird census in 2011-12 covering the whole 90 ha of mostly deciduous Park stands revealed, that though there were no still Tree Sparrows nesting in trees or nest-boxes in the „forest-like" part, within the nearest neighborhood there were two Tree Sparrow colonies (14 +3 pairs) in two buildings plus another 20-22 pairs nesting each year in the buildings surrounding the Park (Fig 2, map for 2011). The colony of 14 nests has only appeared after that building was renovated in 2000, birds appeared perhaps after 2003 (Mazurek 2003). All these birds continue to forage in the park, chiefly on geometrid caterpillars in oaks, both during the nestling and fledgling periods.

Wrocław – Zachodni Park. Tree Sparrows were first censused from 1975-77 in this park, which at that time was on the periphery of urban development,. There were 44, 38 and 30 pairs accordingly, mostly in nest-boxes. Already before the end of the 1980s a distinct decline in numbers was noticed (Lontkowski 1989), while during 2002-03 there were 8 pairs, in spite of several nest-boxes present (Mazurek 2003). The reasons for the decline are obscure, as in the meantime a neighbouring weedy grassland has gradually been covered with an urban development and it is not known when precisely pine martens and weasels arrived in the park, though they were present during the 1970s, and subsequently disappeared.

Wrocław- Allotments. Repeated bird counts in two complexes of urban allotments (Jakubiec Bluj 1977, Jakubiec, in litt.) have shown fluctuations in the Tree Sparrow numbers at first, and afterwards their 2-4-fold decline. In Popowice complex instead

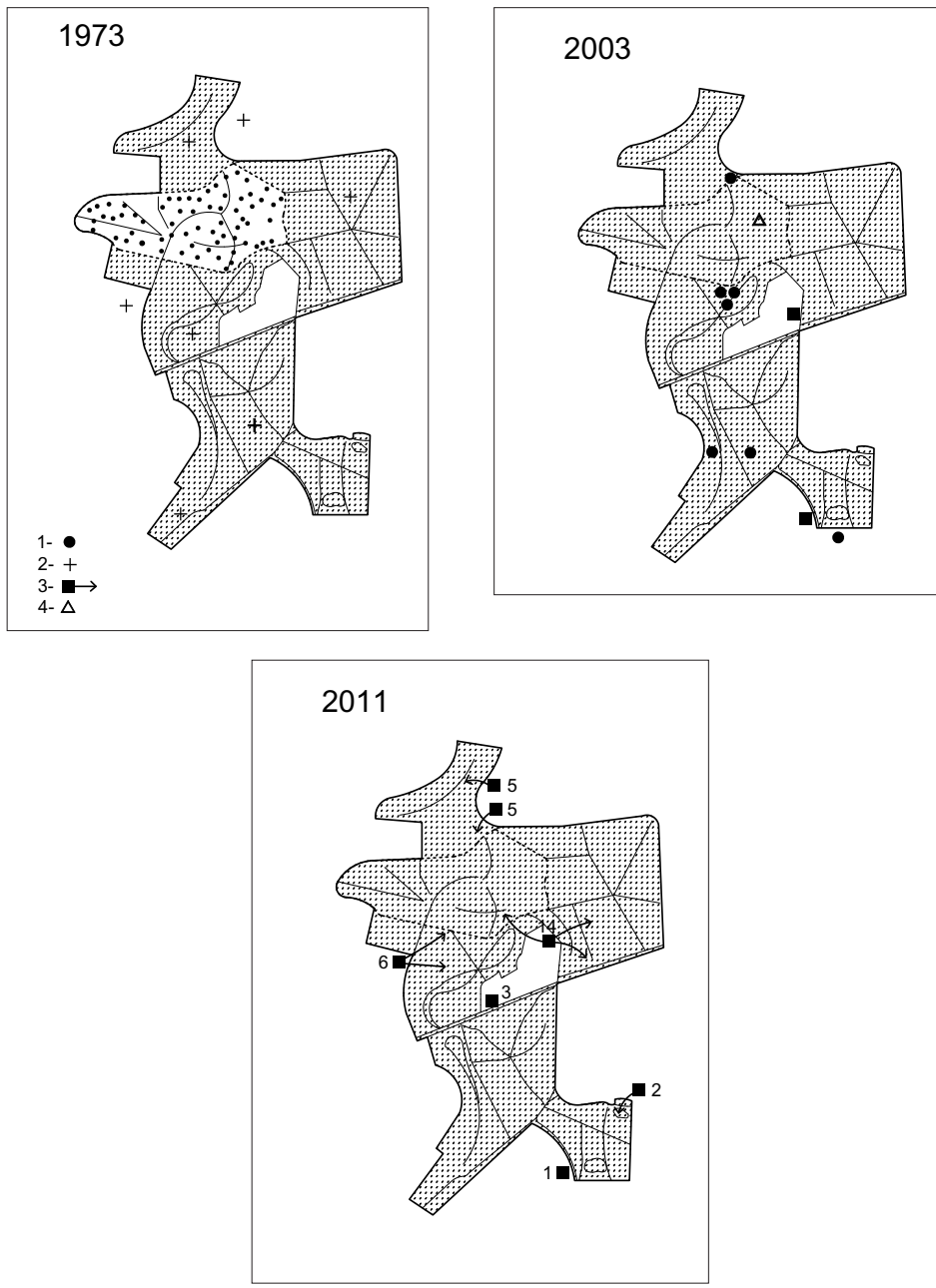

Fig. 2. Changes in Tree Sparrow distribution over the whole Szczytnicki Park, Wrocław (years 1973, 2003 and 2011). The symbols mean: 1 – occupied tree holes or (few) nest-boxes; 2 – areas with other nests, not censused, 3 – groups of nests in buildings, their numbers and the ranges of feeding flights; 4 – pine marten hole during 2000-01

of 28 and 18 pairs during 1976-77, later there were only 5 (1983), 8 (1985), 11 (2005) and 7 (2012) pairs. In Wytchnienie complex had 51-33 pairs during 1970-73, but only 6 and 10 pairs remained in 2010 and 2012.

Legnica – Central and Peripheral Parks. Censuses repeated in 2003-04 and 2007 have revealed the almost total disappearance of the species from both sites. In Central Park, after an increase between 1965 and 1972, the population nesting largely in natural tree holes declined from its peak number of 85 pairs to the mere three pairs in 2003-04 (Tomiałojć 2007). Casual observations in the meantime indicated there presence in this park during the 1980s, so the decline must have occurred during the 1990s. The reasons for the decline remain unclear, perhaps they should be looked for in agricultural areas some 2-3 km from the park.

Poznań – Sołacki Park. This down-town park (10.5 ha) in 1951 was populated by three Tree Sparrow pairs while in 1975 by 25 nesting mostly in tree holes. After erecting nest-boxes this population reached 64 pairs in 1984 (R. Graczyk, cit. after Mizera 1988). Yet, in 2006 there were only 5-6 pairs (T. Mizera, in litt.), in spite of the presence of nest-boxes.

DISCUSSION

The main difficulty in analysing the changes in Tree Sparrow abundance, as of other hole-nesters, comes of the uncertainty of, to a what extent and when the data were compromised by the introduction or removal (or through a decaying process) of artificial nest sites. To some extent this plagues the data in this paper. In spite of this reservation, it can be shown that after post-war increases observed in most of the Tree Sparrow urban populations in several Polish towns, strong declines took place subsequently (Tab. 1).

Table 1. Average numbers of Tree Sparrows nesting in some urban parks during particular periods (pentades). Peak numbers for each site shown in bold. Data after: Peters (1963), Król (1977), Mizera (1988 et in litt.), Lontkowski (1989), Mazurek (2003), Tomiałojć (2007, 2011).

Periods:	1951-59	1965-69	1970-74	1976-79	1983-88	2000-05	2006-11
Wrocław							
Botanical Gardens 7 ha	**17.5**			5.0		2.0	? (**16.0**)[1)]
Słowacki's Park 7 ha			14.6	**38.2**	31.6	15.2	**19.6**
Szczytnicki P. 17 ha	c. 50.0		**57.5**		3	1.3	**0.3**
Szczytnicki P. 90 ha	many		many			8	**17.0**
Zachodni P. 20 ha				**37.3**	scarce	8	
Legnica							
Central Park 35 ha		51.3	**85.0**	several	scarce	3.0	0
Peripheral P. 20 ha		6.0				0	
Poznań							
Sołacki P. 10.5 ha	3.0			25.0	**58.0**		5.0

[1)] In April 2013 at least 16 pairs, all in nest-boxes (L.T.).

Directions and timing of urban Tree Sparrow population changes

Until the early 20th century Tree Sparrows avoided urban areas of central-European, including Silesian, towns (Kollibay 1906). Later they colonized them, which during the 1950s and 1960s was strengthened by three opportunities: a) emerging post-war extensive weedy ruderal sites, b) abundance of nesting niches in war damaged trees and buildings, and b) an absence in towns of efficient predators, even most corvids. In Silesian towns, but also elsewhere, from Dortmund, Hamburg, Berlin up to Warsaw and Lublin, the Tree Sparrow became a common breeder, chiefly in allotments, urban parks and villa districts. Its high numbers lasted until the mid-1980s or early 1990s, e.g. in Sołacz district of Poznań, in Legnica, Wrocław and Siedlce (Mizera 1988, Lontkowski 1989, Dombrowski and Łuczak 1998, Tomiałojć 2007, Tomiałojć and Profus 1977). Later a decreasing tendency was observed, and almost contemporarily from Dortmund (Abs and Bergen 1999), Hamburg (Mulsow 2006), up to Łódź (Janiszewski et al. 2009), Lublin (Biaduń 2004) and Gliwice (Grochowski and Szlama 2011). A lesser decline occurred in parks of Cracow between 1966-67 and 1991-92 (Krokos 1994), while in a park of Kielce as late as between 1997 and 2005 (P. Wilniewczyc, pers. com.). Some declines were irreversible even after erecting nest-boxes (e.g. Szczytnicki Park of Wrocław), but other populations recovered, as e.g. in parks of Warsaw (Nowicki 1992, Luniak and Węgrzynowicz 2009). Only in the NE-cities, Olsztyn and Kaliningrad, has a Tree Sparrow decline not occurred at all (Nowakowski et al. 2006, Lykov 2007). In general, the increases and then declines were fairly contemporary, with a slight geographical difference. Remarkably, post-war urban increases were contemporaneous with contrasting heavy declines in the farmland of western Europe, suggesting different causation. The later turn into urban declines was also not necessarily contemporary even with the changes in the state and extent in the nearest non-urban populations (e.g. in Wielkopolska and in Lower Silesia – Kujawa 2000, Orłowski and Ławniczak 2009) and not always contemporaneous in several towns (Tab. 1). Additionally, there was a strong differentiation of tendencies – within two cities (Wrocław and Lublin – Biaduń 2004), where alongside decline in some plots, there were other ones without such a tendency.

Possible cause of Tree Sparrow declines in urban green areas of western Poland

Of a range of causes of Tree Sparrow declines on farmland some for obvious reasons cannot be valid under urban conditions, where this species faces milder winters and is less exposed to organochlorine biocides, though instead, may be contaminated with heavy metals. In green areas in Wrocław, some fluctuations were of minor importance, as either they were fairly small or triggered by addition/removal of artificial nest sites and, finally, as resulting from a possible replacement of some birds between closely located plots (Botanical Gardens and Słowacki's Park). However, these data allow to

exclude a possibility of declines to be triggered by heavy metals (Kostelecka-Myrcha et al. 1997, Kamiński 1998). Though increased contamination by combustion gases undoubtedly occurred, due to twice increased numbers of passing vehicles/min. in rush hours (from 18-30 during the 1970s to c. 45-80 recently), yet there were no negative reflections in the most exposed Tree Sparrow populations: in Botanical Gardens it declined years before heavy traffic developed, while in Słowacki's Park changes depended on availability of nest sites, with no clear decline (Fig. 1). Contrarily, the strongest declines have been found in parks less exposed to street impact (8-20 vehicles/min), such as Szczytnicki Park, Zachodni Park, Central Park of Legnica and Sołacki Park of Poznań.

The dramatic population declines after severe winters, which have been documented for Tree Sparrows e.g. on the outskirts of Warsaw (Pinowski 1968), hardly find a support in Silesian data. For example, the censuses started in Legnica plots three years after the „winter of the century" 1962/63 have revealed fairly good Tree Sparrow numbers, similarly as in parks of Wrocław there were no persistent "downs" after harsh or long winters 1978/79, 1986/87 or 2009/10 (Tomiałojć 2007, 2011, Fig. 1). This could be explained by a milder winter climate of Lower Silesia. Above does not exclude, however, a possibility of a long-term impact of the changes in the farmland surrounding the town, as a wintering habitat of urban Tree Sparrows. This seems most plausible in the case of Central Park of Legnica, where after peak numbers in 1972 Tree Sparrows later have declined to mere three pairs, and in the peripheral park to nil (Tomiałojć 2007), even though neither the structure of tree stands nor the numbers of nesting holes had changed significantly there. Yet, during last 25 years in the farmland around Legnica there were marked changes apparently influencing food availability during the winter: the fields have been separated from the parks by extensive zone of new urban development, and former fields with potatoes and sugar beet, abound of weeds, have been replaced by monocultures of dense maize and rape. Together with an explosion of dense and high vegetation due to eutrophication (Reichholf 2010), replacing former patches overgrown with low plants, all this has probably deteriorated conditions for winter survival. An alternative possibility, that in Legnica Tree Sparrows collapsed due to some epizootic disease (Pinowski et al. 1995), seems less probable in view of contemporary very strong population explosions of other bird species in the same park, apart from the House Sparrow *Passer domesticus* (Tomiałojć 2007).

The changes in Tree Sparrows abundance and behaviour in the Szczytnicki park were of a special category. Decline of high numbers in the long-studied 17 ha part of this park occurred during the period when elsewhere in Wrocław, Poznań and probably Legnica, dense populations still occurred (Tab. 1). It should be stressed, that this park was neither subjected to the strongest (down-town) urban influences, like contamination with heavy metals, nor to (distant) agricultural treatments with organchlorine biocides. In the radius of some 3 km, no marked changes in land use or in agricultural treatment were noticed. Yet, from "forest-like" part of this park formerly populated by

numerous Tree Sparrows (Dyrcz 1963, Tomiałojć and Profus 1977) they almost completely disappeared during c.1978-85. Contemporarily with an arrival of pine martens, the family of which thrived in the park till 2001 inclusively, bringing a symptoms of threat to hole-nesters (Tomiałojć 2011). In contrast to other urban parks, here the retreat of Tree Sparrows failed to be reversed even by erecting nest boxes during early 1990. Birds of this species appear to be highly sensitive to predators, and they may monitor the potential threat already during their autumn and winter sexual activity, while building nests and roosting in holes (Pinowski et al. 2009). Being threatened they could desert risky nest sites before the breeding season. Yet, Tree Sparrows did not desert Szczytnicki Park entirely. Censuses during 2003 and 2011-12 in the whole deciduous-tree-dominated part (90 ha) have revealed the presence of some pairs breeding in a few park buildings, as well as in buildings surrounding the park (Mazurek 2003, Fig. 2). In 2011 there were 37-40 pairs there. A decline in abundance was undeniable (probably by half or by 2/3), as formerly on 17 ha alone 65-69 pairs nested, so in the whole park probably there were twice as many. Alongside the decline there was also a permanent change in their behaviour and nest site selection, in particular desertion of nesting in tree holes or nest-boxes (last such cases were in 2000 and 2003) and a switch to nesting in niches of buildings and under roofing-tiles, in places apparently not penetrated by pine martens. Remarkably, even 10 years after pine marten disappearance Tree Sparrows no longer breed in trees. Last pairs nesting in trees solitarily, instead as earlier in clumps, turned to be very shy (R. Cisakowski; own obs.), and individuals coming to the park from outside also no longer go deep under canopy, but forage on the edges and meadows. Consequently, formerly optimal Szczytnicki Park, without any change in its structure, turned into a site worse than Słowacki's Park: proportions of breeding densities have been reversed from former 33.8 to 24.8 p/10 ha, to the present one 1.8 to 24.2 p/10 ha. However, continued foraging in this park, chiefly on numerous in some years caterpillars of *Tortrix viridana,* confirms that the change could not be triggered by a shortage of breeding season food resources.

Thus, even when accepting as a general explanation for Tree Sparrow increases and declines some changes on farmland, possibly acting through reduction in the winter food supply, this does not exclude a possibility of contemporaneous modifications caused by patchily acting predation. In Szczytnicki Park the restored predation by pine martens (Tomiałojć 2011), was followed by destruction of broods and then desertion of nesting sites by some hole-nesters (*Passer montanus, Corvus monedula*), less by Starlings *Sturnus vulgaris*. After a retreat of Tree Sparrows and Jackdaws, the pine martens continued to rob nests of other species or to block the entrances to nest-boxes with extracted nest material. This made feeding of nestlings by Pied Flycatchers *Ficedula hypoleuca* impossible: during 2000-01 six such cases were recorded, while there were none in the absence of pine martens (Tomiałojć 2011).

A radical change in the pattern of nesting in Szczytnicki Park, from scattered and solitary in natural holes or in a few nest-boxes into a group (2-14 pairs) nesting

exclusively in buildings recalls a situation found in one of Budapest parks. There Sasvari and Hegyi (1994) revealed that after brood failure Tree Sparrows were changing the way of nesting from solitary to colonial or vice versa, as an alternative reproductive strategy. No mentioning, however, what was the ultimate reason for this. Perhaps originally it was a variable response to a threat from predators (when dynamic coloniality paid off) or to a long-term absence of such a danger (when solitary nesting was possible). Yet, in that park main predators might be absent for generations.

Here it should be made clear that, contrarily to pine martens, the presence in urban green areas of stone martens *Martes foina* had no impact on breeding Tree Sparrows or other hole nesters (Tomiałojć 1980a, 2011, Klausnitzer 1987). At least since the 1960. These mammals have regularly been occurring in all parks of Legnica and Wrocław. Yet, their presence failed to inhibit strong increases in bird numbers, including Tree Sparrow, at that time (Tomiałojć 1970, Tomiałojć Profus 1977).

A danger of predation as a factor modifying distribution and local abundance of Tree Sparrows

A difficulty with explaining field data comes from a lack of reference data from close-to-pristine populations of the species, i.e. those nesting in natural holes and along the edges of forests not subjected either to eradication of predators or to influences from big cities (which may offer safe nesting or wintering sites). This gap in our knowledge is especially important in the case of Tree Sparrow. This species is known to have very variable nesting habits, which may be a mechanism reducing losses due to predators, like weasels *Mustela nivalis* (Deckert 1973, Glutz v. Blotzheim and Bauer 1997). Sparrows when disturbed at their nests with eggs or nestlings usually deserted the holes at a very high percent – even 85-90% (Pinowski 1968, Pinowski et al. 1972). For example, in Szczytnicki Park during 2000-02, when only solitary Tree Sparrow pairs remained, and unable to obtain mutual warning with their neighbours, these birds turned into an extreme shyness (R. Cisakowski, Tomiałojć 2011). Judging from literature, we still do not know precisely what kind of predators acted as main robbers of the broods or as main threat to adult Tree Sparrows during their nesting in natural holes and along the edges of natural forests (but see some data in Gatter 2007; Adamik and Kral 2008). Their natural population dynamics is not known (Glutz v. Blotzheim and Bauer 1997), chiefly when in the forest-steppe zone, where the species used somehow to co-occur in the deciduous gallery forests with several representatives of the *Mustelidae (M. martes* included*), Glyridae* and *Accipitridae* (Novikov et al. 1963). Though Deckert (1973) and J. Pinowski (in litt.) noticed, that Tree Sparrow broods in nest-boxes were quite safe at the presence of some species of marten, polecat *Mustela putorius*, weasel, squirrel *Sciurus vulgaris* and domestic cat, yet this is not necessarily valid for the broods in natural holes (Wesołowski 2011). Population of this raptor breeding in a farmland-woodland landscape did not necessarily influenced urban Tree Sparrows in winter differently recently than it was before, because urban areas since

long ago were penetrated by wintering Sparrowhawks *Accipiter nisus* of a NE origin. Firm data on an impact of the recently restored population of this raptor on adult populations of Tree Sparrow are also lacking (Tomiałojć and Stawarczyk 2003). In the sole Polish town, where around the year 2000 a small population of breeding Sparrow Hawks emerged – in Lublin – this could not cause Tree Sparrow decline, because the latter happened dozens of years earlier (Biaduń 2004).

From the present-day distribution maps and habitat selection descriptions (Tomiałojć and Stawarczyk 2003, map in Kuczyński and Chylarecki 2012) it is evident that Tree Sparrow reaches the highest large-scale densities in the farmland of central Poland, where only 10-15% are afforested. Contrarily, the species is very scarce amongst large forests. This allows to speculate that once its past increase in numbers and an expansion on the farmland, i.e. the habitat regionally prevailing for one to five (Lower Silesia) thousand years, could be triggered by better food resources and a higher nesting success in mid-field copses, as not easily found and penetrated by arboreal mammals. Also, colonization and increases in urban areas, could benefit not only from a better food and milder urban climate, but from generations-long release from predation, even from a fear of being predated. According to „ecology of fear" reasoning (Brown et al. 1999), it is possible that exactly the memory of possible risk from pine martens (a kind of „tradition") may cause, that Tree Sparrows in Szczytnicki Park still refuse to return to nesting in trees, and to the forest-like half-open park habitat, even if recalling pristine conditions. Very high densities once demonstrated either in urban allotments (up to 20-26 p/10 ha) or in down-town parks (up to 59-61 p/10 ha), were found in areas for dozens of generations devoid of main natural enemies (Jakubiec and Bluj 1977, Mizera 1988, Tomiałojć 2011). Hence, recent return and replenishment in urban green areas of predators (Tomiałojć 2011), allows to predict low abundance of urban Tree Sparrows in the future.

Finally, here is a commentary on conclusions about an unclear role of predation pressure drawn of the attempts to evaluate an impact of recently restored in Western Europe pressure of raptors, chiefly of the Sparrow Hawk, on the songbirds, including Tree Sparrow (Thomson et al. 1998, Gatter 2007). On one hand, even clear negative correlation between such large-scale monitoring of predators and abundance of their prey would not necessarily mean a causal relation. On the other hand, there are weak points in such a conservative conclusion. The first one is – the raptors, and avian predators, are by no means the only enemies, nor the most important ones to hole-nesters, as small mammals may locally be crucial (Gatter 2007). Second one is: – comparing the averaged data on species abundances from large regions, may not be a sensitive enough measure of an intensity of prey-predator relation. Usually we cannot measure precisely enough the extent and pressure of various predators acting over large regions to be later suitable to correlate it with the changes in prey abundance; here non-adequate fragments from populations of a predator and of a prey can often be confronted: the data about the predator embrace only the areas where it actually occurs, while the data on

abundance of prey species often contain averaged two categories of values: data from the areas actually penetrated by predators, and the data from those not penetrated by them. The patches (refugia) temporarily or permanently inaccessible to predator, which often hunts according to a model of „an area concentrated search" (Curio 1976, Tomiałojć 1980a), may constitute „safe patches" of successful reproduction of the prey. Large-scale data may camouflage the true relations between prey and predator. The final reservation is, perhaps, even more important. While elaborating sample data from large areas researchers usually do not know how old is particular co-occurrence of a predator with its prey, in each sampled site. Is this a fresh co-occurrence of a still scarce and inefficient predator facing replenished prey (during predator's absence), or it is a case of a long coexistence of two partners with co-adapted proportions between their abundances. These two states may quite differently influence the calculations of the correlation between prey and predator abundances and the judgments on possibility of an influence. Therefore I share a view of C.P. Bell (2011), on an urgent need of detailed case studies of the predator-prey relationship (c.f. Tomiałojć 1980a) as one of possible ways to find reasons of the recent songbird decline, perhaps additional to food or nest-site shortage, pathogens, or chemical contamination.

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