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Symposium Abstracts

SYMP01: Birds in urban landscapes

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The rate of urbanization is increasing in many regions of the world. Even in the highly urbanized UK, it is estimated that a further 7500 ha of land is urbanized every year and over the next five years some 200,000 new homes are due to be built in south-eastern England alone. The inevitable increase in urban habitat will lead to loss of natural and semi-natural habitats that may be important to some bird species. Furthermore, there is evidence that the quality of urban habitats for birds is declining as evidenced by population declines of a number of species (e.g. house sparrow *Passer domesticus* in several European countries, CRICK, H.Q.P. et al. 2002 – DEFRA, Bristol 2002). The design and management of urban green spaces may be crucial if bird biodiversity is to be conserved as much as possible.

Conversely, urban habitats may be important for certain species. For example, population density in urban green spaces may far exceed natural populations, even for declining species (GREGORY & BAILLIE 1998 – Journal of Applied Ecology 35: 785–799). Furthermore, gardens may act as a refuge (particularly where birds are actively fed) for species whose (semi) natural habitats are being degraded (WOODBURN et al. 2003, submitted to Nature). Urban green spaces are therefore ecologically important, but they are also socially important. Gardens and parks are often the only contact the urban population has with the natural avifauna and it appears that this contact is highly valued – in the UK for example, approximately 75% of households provide food for birds in gardens and the garden bird industry is worth £ 120–130 million per year.

Clearly, ecological studies of the urban environment have great scientific and social value and yet they are given comparatively little consideration in ornithology. This symposium aims to address a range of issues in the ecology of urban bird populations and to facilitate discussion between urban ecologists across Europe and beyond. A feature of the symposium will be the linkage of landscape-scale distributional studies across urban-rural gradients (CLEARGEAU et al. 2001 – Journal of Applied Ecology 38: 1122–1134) to finer-scale habitat association studies in parks and gardens (e.g. JOKIMÄKI 1999 – Urban Ecosystems 3: 21–34).

SYMP01-1 Bird synurby as a natural experiment: some methodical problems

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In bird synantropisation two phases occur, both with different mechanisms and responses involved: (a) the colonisation phase, when phenotypic adjustments prevail and (b) the synurbisation phase, when true adaptations may emerge in an urbanised population. In the second phase, the separation of consequences of „overcrowding" from impacts of other urban factors is crucial. When applying comparative methods one should take into account a diversity of urban sprawl, varying in relation to geographical region, surrounding habitat, soil fertility, size and age of urbanised area. It would be

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baseless to expect the synurbisation process to run identically in all cities; at any moment different stages of advancement may be evident in different places. The synurbisation is a „natural experiment" which, by disrupting the earlier state in bird populations and creating a new one, allows a clear-cut comparison. This chiefly concerns three kinds of interrelations: prey-predator, inter-specific competitive and nest-parasitic ones. In some old cities the bird populations have remained free from the impact of the natural set of factors for long periods. Studies of the role of predation and nest-predation have given clear-cut results by comparing the urban „release or restoration experiments" with a long-term presence or absence of main predators. For further synurbisation, the spatial isolation of urban populations from their non-urban counterparts will be crucial. The size/shape of urban areas and the width of farmland „buffering zones", usually separating urban areas from natural woodland, is of great importance. The age of the first incidence of synurbisation of a species should also be taken into account; when measured by number of generations, the span will be between ca. 8000 generations (the house sparrow) but only a few generations in some recent urban colonisers.

SYMP01-2 The human influence on birds across landscapes of the Midwest United States

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Bird populations across the United States have been found to vary greatly both across space and time. Although numerous mechanisms have been put forth to explain this variation, human effects have been thought to be particularly important. To assess the role of human influence on bird populations, we investigated both anthropogenic land cover and housing density, in relation to avian species diversity and trends of 12 species for the entire Midwest U.S. We hypothesized that (1) species diversity would be maximum at intermediate levels of human influence; (2) the amount of human influence affects the proportion of individuals of species occupying each landscape; and, (3) if birds display a relationship with human influence it will differ according to foraging or nesting guild. A negative relationship existed between avian diversity and both the number of housing units and the amount of anthropogenic land cover, with the latter relationship being stronger. Ten species displayed a relationship between landscape occupancy and at least one measure of human influence (land cover or housing). No significant differences existed in the species relationships to human influence based upon foraging or nesting guild. Humans have a detectable and broad scale influence on birds in the Midwest, but the influence does not appear to differ based on natural history factors.

SYMP01-3 Quantifying an urban avifauna

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How many wild birds make their living in an urban residential area in which, in the absence of quasi-rural intrusions, the primary habitat available is a matrix of small private gardens? What is the

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balance between resident and transient individuals in this bird population? Urban fieldwork has traditionally used gradient and meso-scale approaches, or focused on green spaces, which might be considered to be anomalies in the overall habitat. In contrast, this project combines territory mapping and colour ringing to examine in detail the diversity, demographics and phenology of the birds utilising a 1 km square of old-established homogeneous urban housing. This presentation will describe the fieldwork methodologies, their successes and pitfalls, and present some preliminary data.

SYMP01-4 Are granivorous farmland birds becoming dependent on garden bird food in winter in the UK?

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In the UK, provision of bird food in gardens is a common practice. This resource is heavily used by several species, especially in winter. For declining species, particularly those dependent on weed seeds in farmland, this food source could be crucial to survival. There is a great deal of evidence to suggest that formerly exploited seed/grain sources have declined on farmland since the mid-1970s. In this study, we use winter garden birds counts taken annually over a 30 year period to test the hypothesis that granivorous farmland species have increased their use of garden bird feeders in winter independently of population trajectory. We predict that use of gardens by generalist species over time will correlate with their population trends. There was evidence that granivorous farmland species had increased their use of gardens in the manner predicted, although certain species has shown a more recent decline possibly as a result of population declines becoming evident in gardens. However, the findings may be confounded by trends in the quantity and type of food provided. Further analyses incorporating food provided, landscape features and temperature are required to further understand these patterns.

SYMP01-5 An investigation into the causes of population decline of the house sparrow (*Passer domesticus*) in urban Britain

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We present preliminary findings of an investigation into the causes of population decline affecting house sparrows (*Passer domesticus*) in urban Britain. New data are presented describing nesting success, chick diet and condition, and habitat utilisation by breeding adults along an urban-suburban-rural gradient in Leicestershire, England. Many suburban broods starved during June and July 2002, suggesting that availability of key invertebrate prey may have limited productivity. Prey types such as Araneae (spiders), beetles (carabid and scarabid), Diptera (flies) and weevils accounted for 55% of all prey remains in chick faeces, although Formicidae (ants) and Hemiptera (aphids and froghoppers) became more important in later broods. Breeding house sparrows foraged mainly in the habitats of mown lawn, flowerbed and on artificial food, although usage of grazed grass and deciduous hedge was greater in rural areas and weedy patches became increasingly important in city

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areas later on in the breeding season. We shall also present data on overwinter survival and nesting success during 2003.

SYMP01-6 Differences in migratory disposition of urban and forest European blackbirds (*Turdus merula*)

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Population surveys of the partially migratory European blackbird (*Turdus merula*) have established that urban populations have a lower tendency to migrate than populations living in forest or rural habitats. The present study is concerned with the extent to which this difference in migratory disposition is due to the environmental conditions to which these populations are exposed, or to genetic differences which have evolved in the course of the urbanization process. In a common garden experiment, migratory activity and fat deposition were compared between hand-reared urban and forest blackbirds over a period of two years. During the first migration period urban birds exhibited less migratory activity than their forest conspecifics. In the second autumn and spring, these differences disappeared. Urban males had lower fat loads than forest males, whereas urban and forest females did not differ. Within the urban population females accumulated more fat than males, whereas in the forest population the sexes did not differ. Heritability estimates for migratory activity were low and not significant, whereas those for migratory fattening were moderately high and significant in the first, but low and not significant in the following year. These results may indicate genetic differences between the adjacent urban and forest European blackbird populations. Sex-specific selection may also operate on migratory behaviour in urban environments. However, the absence of a difference between urban and forest birds in the second year suggests that non-genetic factors may be also involved in the different expression of migratory behaviour between urban and forest European blackbird populations.

SYMP01-P1 Effects of squirrel (*Sciurus vulgaris*) on the breeding success of an urban population of European blackbird (*Turdus merula*) in Szczecin (NW Poland)

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The biology of European blackbirds inhabiting two city parks in Szczecin (NW Poland) was studied in 1997–2002. The parks were similar in the age structure of their trees, in bush coverage, and in the number of predators (except the squirrel). In Park K (16 ha), 2–4 squirrels (6 adults at the maximum) were regularly encountered, the squirrel being absent from Park Z (24 ha) until 2002. Significant between-park differences in the breeding success (Park K: 11%; Park Z: 32%; $?^2 = 44.51$; $p = 0.0000$) and in the number of fledglings/pair/breeding season (Park Z: 2.0 ± 2.3; $N = 173$; Park K: 0.5 ± 1.1; $N = 93$; K-S test; $p < 0.001$) were observed. Because, in 2002, Park Z housed one squirrel; it became possible to follow differences in breeding success of the birds nesting in the squirrel's territory. In 2002, the 3 quadrants that were explored by the squirrel on the regular basis showed a breeding success of 6.7 fledglings, the breeding success in the remaining 5 quadrants

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never affected by the squirrel's presence being 15.0 fledglings (Student's t test; p = 0.037). Considering the species composition and number of raptorial birds in both parks, it may be presumed that squirrel can affect the final breeding success of open nesting birds inhabiting urban areas.

SYMP01-P2 The development of urban wildfowl populations in Moscow, Russia

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The expansion of urban areas in the Moscow region sometimes leads to formation of semi-natural habitats that may be important to bird species, especially wildfowl. Species vary in response to urbanization, e.g. mallard populations are increasing, teal decreasing. Ruddy shelduck and goldeneye are artificially introduced species that are increasing. Urban water bodies of Moscow serve as refuges for a wide range of wintering and breeding wildfowl species. The numbers as well as spatial and temporal distribution of wildfowl (both wintering and breeding) have been monitored in the Moscow megapolis since 1985 through a network of volunteers. Population trends have been used as indicators of the state of environment. Two spatially separated parts of the urban mallard population, settled and migrant, display different dependence on temperature fluctuations and social-economic situation. This dependence seems to be most pronounced in the period of the population decline (1990/91 – 1997/98). Engineering for water treatment in Moscow is now in conflict with wildlife protection with priorities usually given to technical developments destructive of the landscape. It is time, therefore to address restoration technologies for natural landscapes, especially river valleys. The master plan of Moscow development up to 2020 considers natural landscapes as a framework for city planning and provides for their conservation and enlargement. For protection of the natural heritage, rare and endangered animal species, including wildfowl, are listed in the Red Data Book of Moscow published in 2001. Some methods for restoration of populations of such species are being developed.

SYMP01-P3 Current status of urban wildfowl populations in Moscow

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Wildfowl were censused within an area of about 1000 km^2 in Moscow over five years (1998–2002) in summer and over nineteen years (1985–2003) in winter. In summer 11 wildfowl species were recorded. Six to eight of them are breeding. The number of mallard broods and ducklings at urban ponds has been increasing for the last 5 years simultaneously with the number of wintering birds ($r = 0{,}91$; $p < 0{,}01$ and $r = 0{,}84$; $p < 0{,}05$ respectively). Tufted duck *Aythya fuligula* and goldeneye *Bucephala clangula* both having relatively small breeding populations in the city, were found in low but increasing numbers till the end of the 1990s ($r = 0{,}81$ and $r = 0{,}76$; $p < 0{,}01$ respectively).

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In winter 19 species of wildfowl were recorded. The number of species varied from 3 to 10 in different years and significantly increased ($r = 0,78$; $p < 0,01$) during the study period. Mallard *Anas platyrhynchos* was far the most numerous species (9500 birds in January 2003). The total number of mallards has been growing since 1998 ($r = 0,87$; $p < 0,01$).

Moscow population of ruddy shelducks *T. ferruginea* originated from a few escapees from Moscow Zoo. The number of ruddy shelducks has been rapidly increasing ($r = 0,99$; $p < 0,01$) and reached 256 individuals in 2003. The situation for the four mentioned above species of urban wildfowl in Moscow is now rather stable. The investigations were supported by the programm „Universities of Russia" and by Russian Foundation for Basic Research (grants 01–04–48204 and 02–04–49749).

SYMP01-P4 Number of mallards (*Anas platyrhynchos* L.) wintering in Moscow in 1985–2002 and their dependence on air temperature

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Over eighteen years (1985–2002) wintering mallards were counted in Moscow during the day in mid-January. Overall number of mallards gradually increased from the winter 1984/85 to the winter 1989/90, then decreased from 1990/91 to 1997/98 and then became stable. These changes appeared to be partly dependent on the mean daily air temperatures in the period between 1 November of the previous year and 15 January of the given one, e.g. from the beginning of the winter flock formation to their size stabilization. Two components of the population display different dependence on air temperature. Birds from the Moscow-river at the suburbs of the city depend on weather conditions at all stages of their number dynamics: raise ($r = 0,74$; $p < 0,05$), decline ($r = 0,88$, $p < 0,01$), and stabilization ($r = -0,80$, $p < 0,05$). Birds wintering at small rivers and pons of the inner town depend on weather only in the period of population decline ($r = 0,83$; $p < 0,01$). Dependence on air temperature in mallards seems to be the strongest in the period of population decline both in the whole urban population ($r = 0,89$, $p < 0,01$) and in each of its two components.

SYMP01-P5 The breeding bird communities in cemeteries in the city of Bratislava (Slovakia)

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The bird communities in three cemeteries of Bratislava (the Ondrejsky cemetery – 6.32 ha, the Ruzinov cemetery 16.46 ha and the Slavicie udolie cemetery – 18.15 ha) were investigated within the period 1992–1995 with the aim to characterise breeding bird communities in this urban type of habitat. The bird censuses were based on the combined version of the mapping method. Structure of vegetation and floristic composition of the windbreaks were quantified. A total of 33 breeding

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bird species were found in the localities, with 9 species constantly breeding in each of them. The mean density varied from 3.30 to 14.72 breeding pairs (BP)/ha. Altogether, 5 species were classified as dominant: *Turdus merula, Carduelis chloris, Sylvia atricapilla, Serinus serinus, Streptopelia decaocto*. The breeding bird communities follow the geometric model of abundance distribution, indicating harsh environment. The occurrence of breeding birds depended on the location of the cemetery in the town, and on the age, structure and composition of its vegetation. *Passer montanus, Passer domesticus* and *Sturnus vulgaris* occupied habitats with old lime trees characterised with high basal area. *Fringilla coelebs* was associated with high ash trees and *Luscinia megarhynchos* with dense young trees. Birds most connected with dense conifers included *Turdus merula* and *Carduelis chloris*. Areas with medium tree and shrub cover were prefered by *Serinus serinus, Sylvia atricapilla, Parus major*. Informations generated by this study have important implications for management of vegetation in cemeteries.

SYMP01-P6 Impact of urbanization on the qualitative and quantitative structure of bird communities in Olsztyn city (NE Poland)

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The aim of the study were a characteristic of species diversity, quantitative structure, biomass density of breeding and wintering birds communities in different habitats of Olsztyn, which show the influence of urbanization process in town on awifauna. The study was conducted 1991–1997 on 17 plots (total area 350 ha). The plots represent the three stages of urban management of environments in a town: (1) departure stages for urban environments – fields, forests, allotments, rustic – suburban village; (2) stages of formation of housing estates (from building lot site to 35-years old building) and formation the urban parks (10 and 25 years old parks); (3) stabile stage of urban ennvironments (old housing estates with block-type buildings, centre of the old town, villa estates, old park). The similarity of species diversity were described using the hierarchical cluster analysis method and the OCHIAI index. Changes in quantitative structure of avifauna were described using the RENKONEN index. Breeding communities of building lot sites characterise lowest value of species richness, lover overall density and biomass. In stages of forming the building estates (3–35 years old) increase value of species richness, birds density and biomass. The building estates (3–15 years old) were innhabited by birds which nested in/on buildings only (7–8 species). In oldest, stabile stage of housing estates nested 19 species. Breeding avifauna of villa estate has largest species richness value, high density, and low biomass. In winter avifauna occurred similar relation but the density and biomass was seriously higher than in breeding season.

SYMP01-P7 Evidence of biogeographic effects in urban birds of Hamburg, Berlin and Warsaw?

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Distribution and population size of the breeding birds of Hamburg, Berlin, and Warsaw were investigated recently. These three cities extend west to east in the northern part of Central Europe with

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variable distance to the nearest seashore (North or Baltic Sea) accompanied with some climatic change from atlantic to more continental. These variations in geographic factors could cause biogeographic effects in the bird communities. All three cities cover roughly similar areas, have roughly similar human populations and have comparable cover of heavily built-up areas. However, the cover of more natural habitats (farmland, forests, lakes and rivers) diverge to a much greater extent. A comparison of density estimates from Hamburg, Berlin and Warsaw found urbanised bush (tree) breeders show a strong tendency for Hamburg and house breeders for Warsaw or Berlin. The bush (tree) breeders are much more urbanised in Hamburg. Does this result imply a biogeographic effect of urbanisation eventually bound to the more atlantic climate? Alternatively, do the slight to large differences in house breeders mean that they favour a more continental climate, or are differences in the microstructure of habitats (available nesting places, nutrition etc.) responsible for the effects? The case of house sparrow may be bound to differential dynamics in the recent past with strong declines of populations in the west and apparent stability in the east, which may be taken as a biogeographic effect of dynamics.

SYMP01-P8 The past and present status of the unique urban population of ruddy shelducks in Moscow

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The population of ruddy shelducks *Tadorna ferruginea* has been existing in Moscow, Russia, for 55 years. It originated from a few birds kept in the Moscow Zoo and numbers now more than 250 individuals. All of the birds winter in the Zoo, but none of them nest there. The nesting sites are located in various parts of the city close to numerous water bodies. The population has been increasing in its numbers rapidly over the last decade (from 50 in 1997 to 266 in 2002). The northern edge of the species' range in the European part of Russia is located about 800 km south-east of Moscow. The history of this unique population and its present status, as well as peculiarities of the birds' breeding and other traits of their biology in the urban landscape are considered

SYMP01-P9 The roosting behaviour of the magpie *Pica pica* in an urban environment

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An urban magpie roost was studied in Zielona Gora, Poland where the population has been increasing for the past 25 years. The local urban population is surrounded by forest and so isolated from the farmland population outside. Seasonal changes in the number of magpies at the roost from 1985 to 2002 were recorded. The roost was active between early November and April. Numbers peaked in January and February. An annual decrease in numbers was observed at the end of December each year. We believe this is due to disturbance caused by the New Years celebrations. There was a correlation between the increasing magpie breeding density and roost size. The largest roost had a maximum of 780 birds recorded. This is far greater than that recorded in the literature (e.g.

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farmland roosts 50–120 birds). There was a positive correlation between temperature and roost size in winter. The shorter day length and lower temperature may have influenced magpie behaviour, forcing them to sleep near their food resource thus conserving the energy used in long flights to the roosts. We recorded the flow of magpies to and from the roosts. The inward flow took longer in the evenings compared to the outward flow in the mornings. We conclude that the number of magpies at roosts is only limited by the total size of the population in the urban environment.

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Digitale Literatur/Digital Literature

Zeitschrift/Journal: Vogelwarte - Zeitschrift für Vogelkunde

Jahr/Year: 2003/04

Band/Volume: 42_2003

Autor(en)/Author(s): Chamberlain Dan, Greenwood Jeremy

Artikel/Article: Symposium Abstracts: SYMP01: Birds in urban landscapes 7-15