ACTA ORNITHOLOGICA
Vol. 30 (1995) No. 1

Proceedings of the International Symposium
EUROPEAN PEREGRINE FALCON
– ITS STATUS AND FUTURE

Maciej LUNIAK

Peregrine Falcon *Falco peregrinus* in cities – the background for its planned reintroduction in Warsaw

Luniak M. 1995. Peregrine Falcon *Falco peregrinus* in cities – the background for its planned reintroduction in Warsaw. Acta orn. 30: 53–62.

Abstract. This paper is a review aimed to provide compiled knowlege useful for planned reintroduction of Peregrine (PF) in Warsaw and other cities in Eastern Europe. PF inhabited human settlements for at least two centuries. Its vanishing from cities since 1950's was connected with the total crisis of the species. Recent recovery of the PF brought growth of its urban population, particularly in North America, mainly due to introduction and protection measures. But in cities of Eastern Europe, the PF is still absent. Urban population of PF show good brood productivity and behavioural adaptation to specific conditions of the urban environment. Their prey is diverse, one of the main components being pigeons. PF born or released in cities show a tendency to settle in urban areas. Urban habitat is favourable for cliff-nesting ecotype of PF, which is (versus tree-nesting one) a dominating feature of the species. Promoting of PF presence is purposeful for: 1) Success of of the species by its coexistence with urbanization; 2) Enriching urban ecosystems by a predator playing a selective and sanitary role (but not effectively reducing of Feral Pigeons); 3) Stimulating the ecological culture of a city's public by spectacularly enriching urban wildlife with a new, attractive element. Present knowledge and experience creates the possibility of successful reintroduction of PF to cities in Eastern Europe.

Key words: Peregrine Falcon *Falco peregrinus*, urban environment, urban fauna, synurbization, birds of prey.

Mus./Institute of Zoology, Wilcza 64, 00–679 Warszawa, POLAND

Received – March 1995, accepted – June 1995

INTRODUCTION

The paper is a review, based on accessible literature. It is aimed to provide some compiled scientific knowlege useful for the planned reintroduction of Peregrines to Warsaw and to other cities in Eastern Europe. The author was not, so far, directly involved in any research or conservation works on falcons and he does not consider himself to be an expert on the subject above.

Among sources this paper is based on, the main ones are general monographs of the species by Fischer (1977) and Ratcliffe (1980), the Peregrine section in the handbook of Cramp & Simmons (1980), an extensive review concerning the Peregrine in North American cities (Cade & Bird 1990) and its nesting on man-made structures (Mebs 1968), studies made on Peregrines in New York City by Herbert & Herbert (1969) and in Berlin by Mueller (1989), Mueller & Soemmer (1990) and by Soemmer (1989).

URBAN PEREGRINES IN THE PAST

The occurrence, more or less regular, of Peregrines in human settlements, and its nesting on buildings (castles, churches) in the relative vicinity of man, has been documented since the early XIX century. Mebs (1968) indicated 55 cases of Peregrine breeding (or attempts of breeding) on man-made constructions in 16 European, African and North American countries. The oldest case given in this assessment is nesting in ruins of Christiansborg Cassel in Copenhagen (years 1809 and 1810) and on the church Corton in Norfolk, England (about 1810). One of the longest traditions in this respect is connected with Salisbury Cathedral (England) where the nesting of Peregrines is documented (but not continually) since 1864 up to 1952 (Ratcliffe 1980). An example of long time individual wintering in the city was described by Taczanowski (1882): the female had wintered in the centre of Warsaw every year during the period 1840's – 1860.

Concerning "urban" presence of Peregrines in Eastern/Central Europe in the past: – Lorenz (1893) described regular occurrence of the species in Moscow, with examples of its nesting (or probable nesting) on churches and on one of the Kremlin towers (in 1872). Regular wintering of Peregrines in Moscow was observed up to the mid-1950's (Ilyichev et al. 1987). Several former Soviet authors mentioned about past (XIX and begining of XX centuries) occurrence of Peregrines in Petersburg (e.g. Malchevskiy & Pukinskiy 1983), where it used to winter, and about its wintering in other cities like Pskov and Kaluga, where it also nested on buildings (Dementev 1951). Also, Lvov (Ukraine) is an example of city where Peregrines were recorded (Godyń 1938) as regularly wintering. Among cities in Poland where breeding (or probably breeding) of Peregrines was documented, are Warsaw (Luniak et al. 1964) – probable breeding in ruined centre of the city about 1945 and then on the church in 1950, Wrocław – nesting on the cathedral and in Świdnica – on the church (Pax 1925), Gdańsk – on the church in 1929 (Mebs 1968). In some other Polish cities (eg. Cracov, Łódź, Poznań, Toruń) Peregrines were observed more or les regularly, mainly in winter and in migration seasons, up to the early 1960's. Baum (1955) has written about the regular occurence of the species in the centre of Prague.

In Germany, breeding of the Peregrine in the past (since 1840 in Goettingen) was indicated in several cities (Mebs 1968) including Berlin (Mueller 1989). An assessment made by Mebs (1968) proves that "urban" Peregrines were present in all parts of Europe – in its Western (e.g. Germany, England, France), Southern (e.g. Hungary, Yugoslavia, Italy, Spain) and Northern (Finland, Sweden) ranges. It also gives examples from African cities – Rabat (Morocco) and Nairobi (Kenya).

In North American cities, according to Cade & Bird (1990), the species "seldom nested successfully" before the 1950's. The most famous example is of the eyrie on the Sun Life Assurance Building in Montreal, "where the same female nested continually from 1940 to 1952 and raised 22 young from 3 different males" (Cade & Bird 1990). In New York, successful breeding of Peregrines (St. Regis Hotel on Manhattan) is known (Herbert & Herbert 1965) since 1943, and regular wintering was observed there. Other North American cities mentioned by Cade & Bird (1990), where Peregrines attempted to breed or successfully bred were: Philadelphia (City Hall in 1946 and 1949), Harrisburg in Pennsylvania (church) and Los Angeles (in 1940's).

In general: Peregrines inhabited urban habitats in a great part of the species range for (at least in Europe) for two centuries. Its breeding in cities was not common and was seldom successful. Much more often and regular was its wintering in cities.

RECOVERY OF URBAN POPULATION

In the 1950's and the beginning of the 1960's, when the rapid decline of the global population of the Peregrine took place (Hickey 1969), the species disapeared from European and North American cities. In Berlin, the last brood was recorded in 1952 (Mueller 1989), in Warsaw – 1950 (Luniak et al. 1964), in New York – about 1960. One of the last (may be the last) successful "urban" broods in Europe is known (Mebs 1968) from a church in Munich in 1964. Recent literature sources from post-Soviet countries, and from Slovakia, Czech Republic, Hungary and Poland, as well as personal information given to the author by ornithologists from those countries, show in that part of Europe, nesting of Peregrines in cities is actually not known, and the species is observed very rarely, even in winter. No actions aimed for the restoration of urban populations of the Peregrine are known from that part of Europe.

In Western Europe (particularly in England and Germany) and in North America (USA and Canada) general recovery of the species began in the mid-1970's, as a result of the improving of environmental situation and of various measures of conservation which were taken. Such actions (reintroduction from captive breeding, managing of nest sites, protection of broods) took place also in cities. Reintroduction of the Peregrine to several North American cities first occurred from 1974–1976 (Cade et al. 1990), in Berlin – since 1977 (Mueller & Soemmer 1990). In New York State, 91 young Peregrines have been released up to 1984, and several of them were hacked at two buildings in New York City (Program Report 1983–84 of N.Y.State Dept. Environm. Conserv.). In West Berlin, 13 falcons were released from buildings in the years 1977–1989. Similar actions took place in Frankfurt/M. since 1982 (Anhaeuser 1984) and probably in some other German cities.

These measures, and particularly a general improvement of the situation of the species, resulted in a return of the Peregrine to cities. In New York City, the first successful brood was recorded in 1984 (at Throgs Neck Bridge) after more than 20 years since last breeding, in Berlin in 1987, (on the church in the city centre) after 25 years. The brood in Frankfurt/M. in 1983 was the first one ever recorded in that city (Anhaeuser 1984). In Germany, Peregrines breed in several cities (eg. Berlin, Frankfurt/M., Goetingen, Coburg) and its urban population continues to grow (inf. G.Trommer). The same tendency is observed on the British Isles, where examples of recent urban nesting of the Peregrine are Bristol and Exeter in England, and Cardiff and Swansea in Wales (inf. J.G.Kelcey).

Intensity of the increase of urban populations of the Peregrine in North America has been documented by Cade & Bird (1990). In 1988, i.e. about fiveteen years after the reintroduction of falcons began, in 16 cities in USA and 8 in Canada, a total of 30–32 territorial pairs were recorded and 24 of them nested. In cities of Eastern USA the ratio of increase of the number of successfully breeding pairs was about one pair per year (Tab. 1), which seems to be high for this species. In the Upper Midwest region of USA, 29 broods in urban habitats were known (Septon et al. 1995) in 1993, and they comprised 83% of all Peregrine broods in that region.

Table 1. Growth of the urban population in the Eastern USA (Cade & Bird 1990).

[Tabela 1. Wzrost miejskiej populacji sokoła we wschodniej części USA.]

	1980	1988	Total
Breeding attempts	1	10–11	41
Productive pairs	1	8	29
Young produced	2	16	71

Recent data show, that two decades after recovery of the species began, its urban population in Western Europe and in North America is more numerous than it ever was in the past. This success is a result of general increase of the species and of conservation measures (including reintroduction) taken in many cities. But in urban areas of Eastern/Central Europe (eastward from Berlin) the Peregrine is still absent as a breeding or regularly occurring species and no actions are known for restoring its presence in cities. In Moscow reintroduction of Peregrines is planned (Flint & Sorokin 1995).

SOME BEHAVIOURAL AND ECOLOGICAL FEATURES

Behaviour and ecology of Peregrines in specific urban conditions were described by Cade & Bird (1990) and by Herbert & Herbert (1965) in North American cities, and by Mueller & Soemmer (1990) in Berlin.

Reproduction, nesting

Data from North American cities (Tab. 2) show production of young in an urban population as no worse than in a non-urban one. Data above are comparable with averages given in general descriptions of the species in handbooks (see "Introduction"), by Herbert & Herbert (1965), before the pesticide crisis, and in the recent assessment made in U.K. which revealed in average 2.21 young in 571 fledged broods (Crick & Ratcliffe 1995). Also, survival of young released in cities, according to American data (Tab. 3), was similar to that from rural sites.

Table 2. Comparison of the production in urban (U) and rural (R) populations. Data from Eastern USA 1977–1988 (Cade & Bird 1990).

[Tabela 2. Porównanie produkcji w populacji miejskiej (U) i pozamiejskiej (R). Dane ze wschodniej części USA z okresu 1977–1988 (Cade & Bird 1990).]

	U	(R)
Breeding attempts	41	(134)
Productive pairs	70%	(77%)
Young produced	71	(258)
Young per successful attempt	2.5	(2.5)

Persecution by man, which was indicated as a main factor of direct reduction of Peregrines in the past (e.g. Herbert & Herbert 1969, Mebs 1971), is probably not significant in contemporary cities, in spite that pigeon fanciers could still be dangerous in some places. The predation factor, which in nature causes considerable losses of the Peregrine broods, does practically not

exist in urban areas. Cade & Bird (1990) specified hazards in cities as: strikes with glass panes, wires and aircraft, contaminated water or prey, and various traps posed by technical structures (e.g. air condition devices). A serious danger for young birds is that during their first flights (or during too early leaving from nest) they can not find convenient place to sit and they often flutter to the ground down the steep walls.

Table 3. Survival to independence among young released from urban versus rural sites. Data from Eastern USA 1975–1981 and from Canada 1976–1985 (Cade & Bird 1990).

[Tabela 3. Przeżywalność do wieku samodzielności u młodych ptaków introdukowanych w miastach i na terenach niezurbanizowanych. Dane ze wschodniej części USA z okresu 1975–1981 i z Kanady 1976–1985 (Cade & Bird 1990).]

	Urban sites	Rural sites
USA	83% (n=52)	79% (n=178) – from towers 63% (123) – from cliffs 80–85% – from cliffs safe of Great Horned Owl
Canada	89% (184)	88% (234)

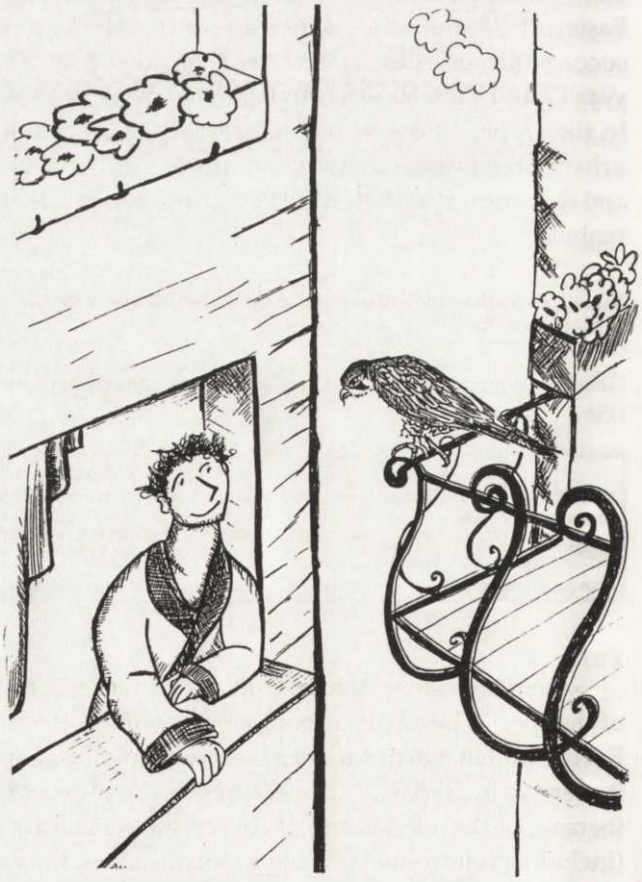
In Europe, Peregrines most often use churches as urban nest sites, and in North America they use skyscrapers and bridges (Cade & Bird 1990, Mebs 1968). Broods on bridges were considerably less successful than on buildings. Proximity of large bodies of water in the distance of a few hundred meters is a factor preferred by Peregrines. Nests are most often located in places protected from wind and from excessive sunlight. The data of Cade & Bird (1990) from American cities show that Peregrines preferred the tallest, or one of the tallest buildings of the city, and they located nests from the height of the 13th to the 50th floors. The problem of nesting on buildings and other technical structures is usually a lack of soft cover on the ledge in which a scrape for egges can be made.

Territoriality

Urban breeding and wintering Peregrines show a high degree of territoriality and a tendency towards a sedentary lifestyle. Examples of this are the female nesting in Montreal, and the other one, a female wintering in Warsaw, in both cases the continous presence of nearly 20 years in the same territory was documented (see historical data above). In Berlin, the range of regular penetration of the pair nesting in the centre of the city was within six km, but flights of even 15 km were observed (Mueller & Soemmer 1990). In Los Angeles, two pairs nested within nine km of each other. In the Greater New York City area, eight territorial pairs and another two pairs along the East River nested three km apart (Cade& Bird 1990). In the Twin Cites (Minnesota, USA), two pairs nested 6.5 km apart, and in Milwaukee (Wisconsin), the distance was even less at 1.6 km (Septon et al. 1995). In the Chicago environs, 5 pairs attempted nesting in 1994. These examples from North America show ability of urban Peregrines to nest in a high (compared to rural ones) density. Territorial males often kill young released in the vicinity, but sometimes they foster young in hackboxes (Cade & Bird 1990).

Reaction to urban disturbances

Several authors – eg. Taczanowski (1882) in Warsaw, Herbert & Herbert (1965) in New York City and Mueller & Soemmer (1990) in Berlin – relate about



Hi, Mr Kowalski – did you sleep well?

[Dzień dobry panie K. – jak się spało?]

adaptation of the Peregrine behaviour to specific conditions of the city. They are tolerant to the presence of man, but their main activity is at considerable heights above street level. In Berlin, they preferred observation points at the heights of 80–365 m. They are tolerant to noises (bells ringing in the distance of few meters, aircraft, heavy traffic on the bridges where falcons nest), to helicopters flying nearby, even to fireworks exploding beside the nest. In rural areas Peregrines are much less tolerant to such disturbances. It is suggested (Cade & Bird 1990) that captively reared Peregrines are less sensitive to anthropogenic disturbances.

Prey

Information in handbooks cited above say that composition of the Peregrines prey is opportunistic, and there are considerable individual differences in this respect between pairs or particular birds. The prey of urban Peregrines was studied in Berlin by Schnurre (1966) and then by Soemmer (1989). There are also overviews made by Cade & Bird (1990) concerning data from North American cities and by Septon (1993) from mainly urban/industrial areas in Midwestern USA. Data from Berlin (Tab. 4) and from North American cities show, that the species composition of prey was diversified (in Septon's studies at least 107 bird species were identified). The main item is Feral (or domestic) Pigeons (in some cases up to 90% of prey items) and in Berlin most common prey was Starling

Table 4. Data on the prey of the Peregrine pair in Berlin 1986–1989 (Soemmer 1989).

[Tabela 4. Dane dotyczące zdobyczy pary sokołów w Berlinie w latach 1986–1989.]

Prey	Items	Weight
Sturnus vulgaris	15%	12%
Turdus spp.	13%	11%
Passer domesticus	12%	4%
Columba livia dom.	11%	31%
Micropus apus	7%	3%
Exotic species	5%	3%
Total >63 bird species	626	62 kg

I prefere light diet – mostly pigeons

[Wolę lekką dietę – najchętniej coś z gołębi]

Falcons preferably prey on exotic species

[Sokoły chętnie wybierają egzotyczne gatunki]

and four species of thrushes (Tab. 4). In Berlin (Soemmer 1989), the prey often included species not belonging to the typical avifauna of the city, but met there as rare migrants. Also exotic pet species (eg. canary, parakeets) were a relatively high portion of prey in Berlin (Tab. 4) and in American cities (Cade & Bird 1990). Such birds (migrants, domestic pets) are easy prey of Peregrines. Mallards and corvids, which are common in Berlin, were taken rarely.

Identity and tenacity of urban population

According to Kirmse (1993) cliff and tree-nesting populations (ecotypes) of the European Peregrine are different genetically and by imprinting (early experience of nestlings). Nesting on cliffs (and adjustment to nesting on buildings) is, according to the author cited, dominating in the nature of the species, when tree-nesting is an adjustment to sub-optimal conditions. From this point of view, colonizing of cities is favourable for nesting preferences of the Peregrine.

Are we really different?

[Czy rzeczywiście różnimy się?]

North American data assessed by Cade & Bird (1990) demonstrate that Peregrines from urban nests (releases and broods) have some tendency to settle in cities. Among 16 birds breeding in cities nine were of urban origin and seven of rural (tower or cliff) origin. This tendency is more distinct in data of Septon et al. (1995) from Midwestern North America where 90% of identified falcons nesting in cities were of urban origin, while 83% of cliff nesters were from cliffs. Other data of Cade & Bird (1990) indicated the majority of 78 Peregrines investigated in Eastern USA and Canada, nested in the similar type of site from which they fledged. Authors cited express view that captively reared Peregrines have stronger tendency to inhabite cities, than those from broods in nature.

Young from urban releases or broods often leave cities of their origin and settle in other cities. Cade & Bird (1990) give several examples of such movements (including interchanges between cities). Septon et al. (1995) indicated that Peregrines (mainly of urban origin) in Midwestern North America were recorded as nesting in the distance up to ca 1100 km from the place of release, but in 75% of the cases (n=70) the distance was 355 km or less (females) and 170 km or less (males).

It is not conclusively known what is the degree of separation between urban and non-urban populations of Peregrines. Birds of rural origin come to cities (they often winter there) and urban falcons often leave cities (hunting for prey, long distance movements).

It could be concluded that an urban population of Peregrines is not isolated in areas of its occurrence from the rural one, but it has its own identity which is probably connected mainly with imprinting and behavioural factors. City habitat is favourable for the dominating cliff-nesting ecotype of Peregrine, and the nature of species allows for its adaptation to specific conditions of urban environment. So, Peregrines are one more example of synurbization (colonizing urban areas connected with adaptation to specific urban conditions) – the phoenomenon observed recently in more and more animal (mainly bird and mammal) species (Gliwicz et al. 1994).

PROBLEMS OF REINTRODUCTION

First attempts of introduction of Peregrines to cities are known from the 1930's and 1940's in Baltimore and Los Angeles (Cade & Bird 1990). During last two decades successful actions of that kind took place in several cities in North America and in Germany. E.g. in Upper Midwest region of North America 472 falcons have been released in 21 urban localities during the years 1982–1993 (Septon et al. 1995). The result were 29 broods in urban habitats of that region recorded in 1993.

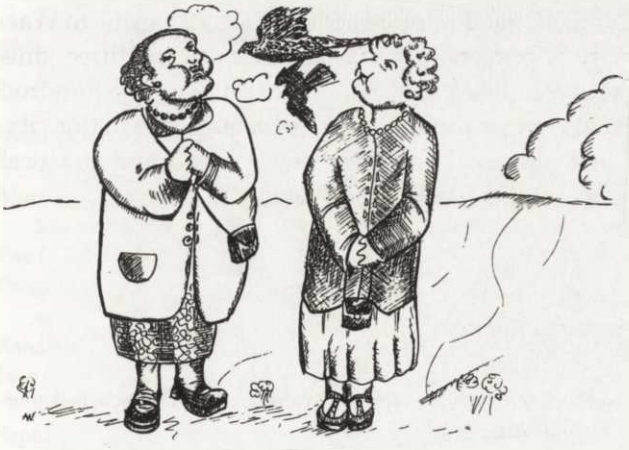
Practical methods of introduction/reintroduction and promotion of Peregrines in cities were described by Cade & Bird (1990), Mueller (1989) and Saar (1978).

It is a good idea! – We should reintroduce angels the same way

[Dlaczego sokoły? – Powinniśmy reintrodukować anioły]

According to authors cited, general factors favourable for reintroduction of the Peregrine in urban habitats are:

— Presence of tall, old style buildings or tall industrial constructions – as a place of releasing and future nesting site;
— Proximity of wide water bodies or rivers in the range of about 800 m;
— Absence of other territorial Peregrines;
— Protecion against pigeon fanciers;



I would like to fly like those falcons...

[Chciałbym latać jak te sokoły]

— Favourable public reception (mass media!) and support by sponsors – both concerned in the real benefit of falcons (not in sensation and only in commercial publicity).

Aims

Reintroduction/introduction of the Peregrine to cities is purposeful for three main aims:

1) Recovery and conservation of the regional (and overall) population of the species. Increasing presence of the Peregrine in cities means successful coexistence of the species with urbanization – i.e. with the extreme and global-wide form of anthropogenic transformation of landscape. Successful releases of falcons in North American cities, mentioned above, are a significant factor of the general increase in Peregrine population in that region.

2) Enriching structural and functional diversity of impoverished urban ecosystems by a new species and a new predator. A general feature of animal communities in cities is low selection pressure by vertebrate predators, and the Peregrine can play such a role. It could be particularly important as a factor of sanitary selection in respect to Feral Pigeons. But it can not be a factor of effective reduction of their population in cities (see below).

3) Stimulation in a city's inhabitants of the ecological culture by using public involvement in a spectacular programme of enriching urban wildlife.

Ecological role

Ecological consequences of the presence of the Peregrine in cities could be seen mainly in its function as a predator. According to Ratcliffe (1980), in average, a family (a pair of adults and 2.5 of young) of Peregrines needs yearly a prey base totaling about 224 kg. This amount of biomass calculated for the proportions of the prey composition of the pair nesting in the city centre of Berlin (Soemmer 1989, Tab. 4) gives the following approximate numbers of prey per year:

— ca 400 Feral Pigeons + 338 Starlings + 278 thrushes *Turdus sp.* + 299 House Sparrows + 43 kg of another prey.

These numbers of prey compared to population numbers of above bird species living in the area of ca. 50 sq km in central Warsaw (data of W. Nowicki), means that none of bird species constituting main prey

of Peregrine would be reduced more than 0.5% of its population living in that area, even if some abandoned broods would be included. So, as it was mentioned above, Peregrines living in a "normal" density could not be considered as an effective factor reducing Feral Pigeons in cities. What may be important is the role of the Peregrine in sanitary selection of Feral Pigeons, which are a potential source of infections to the human population, and in reduction of exotic pets escaped from domestic breeding (see the section "Diet")

The ecological role of the Peregrine in cities could be more significant if the urban population achieves the degree of synurbization comparable with other falcon living in European cities – the Kestrel *Falco tinnunculus*.

Reintroduction to Warsaw

Main arguments for the considered reintroduction of the Peregrine to Warsaw are:

— Necessity of contributing to the three aims listed above.
— At least a hundred years of the past presence of the species in that city and favourable conditions for its existence in Warsaw now. During the recent two decades an increase (up to ca 30 pairs) of another falcon species – the Kestrel – takes place in Warsaw, and it is the proof of the quality of environment.
— Little probability that natural recolonizing of Warsaw by Peregrines could be expected soon.
— Examples of succesful reintroduction of the Peregrine in American cities, and the practical possibility (young from captive breeding, specialists experienced in reintroduction to forest habitats) for such action in Poland.

This paper is aimed to promote the task above.

CONCLUSIONS

1. In the past, Peregrines regularly inhabited human settlements for the past two centuries. But its breeding in cities was not common and it was seldom successful. Its wintering was much more often and regular.

2. General recovery of the species after its total decrease in the DDT era, brought considerable growth of the urban population during the last two decades, mainly due to introduction and protection measures. In North American cities, its numbers are much higher than it was in the past. In cities of Central/Eastern Europe, the Peregrine is still absent as a breeding or regularly occurring species.

3. Peregrines in cities have good brood productivity. They show behavioral adaptation to specific conditions of the urban environment. Their prey composition is oportunistic; pigeons constitute the majority of its base.

4. Peregrines born or released in cities show a tendency to settle in urban habitats, often in the distance of a few hundred km from the place of origin. The urban population is not isolated from the rural one, but it has its own identity, based probably on imprinting and bahavioural factors. City habitat is favourable for the cliff-nesting ecotype of Peregrine, which is the dominating ecotype of the species.

5. Present knowlege and practical experiences lend the possibility of succesful reintroduction/introduction of Peregrines to cities in Eastern Europe. Promoting presence of the Peregrine in cities is purposeful for three reasons: – 1) Successful coexistence of the species with urbanization – i.e. with the global-wide and extreme form of anthropogenic stress; – 2) Introducing to urban ecosystem a predator which plays a selective and sanitary role (but it could not reduce Feral Pigeons in cities); – 3) Spectacular enrichment of urban wildlife by a new attractive element could be useful for public ecological culture.

6. Planned reintroduction of the Peregrine to Warsaw is purposeful as contribution to the three aims above and as a continuation of an over one hundred years long tradition of Peregrine presence in this city. Environmental conditions of Warsaw and practical possibilities allow for such action.

REFERENCES

Anhaeuser H. 1984. Frankfurter Wanderfalken. Deutsch. Falkenorden, 1984, pp. 49–53.

Baum J. 1955. [Birds of the Greater Prague]. Praha, pp.123–124.

Cade T.J., Bird D.M. 1990. Peregrine Falcons, *Falco peregrinus*, nesting in an urban environment: a review. Canad. Field Naturalist, 104: 209–218.

Cramp S., Simmons K.E.L. (eds.) 1980. The birds of the Western Palearctic. Vol. II. London, pp.361–378.

Crick H.Q.P., Ratcliffe D.A. 1995. The Peregrine *Falco peregrinus* breeding population of the United Kingdom in 1991. Bird Study, 42: 1–19.

Dementev G.P. 1951. [Birds of prey *Falco peregrinus*]. In: Dementev G.P., Gladkov N.A. (eds.) [Birds of the Sovet Union], vol.1. Moskva, pp. 95–96.

Flint V.E., Sorokin A.G. 1995. Programme for reintroduction of the Peregrine Falcon *Falco peregrinus* in the Moscow region. Acta orn. 30:71–72.

Fischer W. 1977. Der Wanderfalk. Wittenberg Lutherstadt, 152 pp.

Gliwicz J., Goszczyński J., Luniak M. 1994. Characteristic features of animal populations under synurbization – the case of the Blackbird and of the Striped Field Mouse. Memorabilia Zool., 49: 237–244.

Godyń Z. 1938. [Rare bird species of the *Falconiformes* observed in the years 1920–1937 in South–Eastern Poland]. Acta orn., 2: p. 141.

Herbert R.A., Herbert K.,G.,S. 1965. Behaviour of Peregrine Falcons in the New York City region. Auk, 82: 62–94.

Hickey J.J. (ed.). 1969. Peregrine Falcon populations – their biology and decline. Madison, USA, 596 pp.

Ilyichev V.D., Butyev V.T., Konstantinov B.M. 1987. [Birds of Moscow and its suburban area]. Moscow, p.218.

Kirmse W. 1993. Wiedereibuergerung baumbruetender Wanderfalken durch erneunte Traditionsbildung. Vogel u. Umwelt, 7: 231–240.

Lorenz T. 1893. Die Voegel des Moskauer Gouvernements. Bull. Soc. Nat. Mosk., 7: 341–342.

Luniak M., Kalbarczyk W., Pawłowski W. 1964. [Birds of Warsaw]. Acta orn. 8: 175–285.

Malchevskiy A.S., Pukinskiy Yu.B. 1983. [Birds of the Leningrad province and adjacent territories], vol.1. Leningrad, p.191.

Mebs T. 1968. Wanderfalkenbruten an menschlichen Bauwerken. Deutsch. Falkenorden 1968, pp. 55–66.

Mebs T. 1971. Todesursachen und Mortalitaetsraten beim Wanderfalken (*Falco peregrinus*) nach den Wiederfunden deutschen und finnischer Ringvoegel. Vogelwarte, 26: 98–105.

Mueller T. 1989. Management am Berliner Wanderfalkenpaar. Pica, 16: 114–120.

Mueller T., Soemmer P. 1990. Zum verhalten Berliner Wanderfalken. Falke, 37: 115–120.

Pax F. 1925. Wirbeltierfauna von Schlesien. Berlin, p.323.

Program Report 1983–84, New York State Dept.of Environm. Conserv. p.2.

Ratcliffe D. 1980. The Peregrine Falcon. Calton, England, 416 pp.

Saar C. 1978. Die Auswilderung von gezuechten Wanderfalken in Berlin. Jb. Deutsch. Falkenorden, pp. 4–14

Septon G. 1993. An overview of prey species taken by Midwestern Peregrine Falcons (*Falco peregrinus*) from 1987–1993. Manuscript, 9+11 pp.

Septon G., Marks J.B., Ellestad T. 1995. A preliminary assessment of Peregrine Falcon *Falco peregrinus* recovery in Midwestern North America. Acta orn. 30: 65–68.

Soemmer P. 1989. Die Ernaehrung des Berliner Wanderfalnenpaares. Pica, 16: 120–129.

Taczanowski W. 1882. [Polish birds] vol.1. Kraków, p. 73.

STRESZCZENIE

[Sokół wędrowny w miastach – przegląd zagadnienia w związku z planowaną reintrodukcją w Warszawie]

Treść pracy opiera się na danych z piśmiennictwa dostępnego autorowi, przedstawionych pod kątem dostarczenia wiedzy naukowej dla realizacji zamiaru reintrodukcji sokoła wędrownego w Warszawie i w innych miastach Europy Wschodniej.

Sokół wędrowny był od co najmniej dwóch stuleci, do połowy XX w., stałym – jednak dość rzadkim – składnikiem awifauny osiedli ludzkich w Europie i w innych regionach swojego występowania. Jego pomyślne lęgi w miastach notowano rzadko, natomiast zimowanie było częstsze i bardziej regularne. Również z obecnego obszaru Polski wykazano w przeszłości jego gnieżdżenie się w miastach (we Wrocławiu, Świdnicy, Gdańsku) oraz występowanie (w Poznaniu, Łodzi, Krakowie). Z Warszawy są dane o samicy regularnie zimującej przez kilkanaście lat w połowie XIX w. w ówczesnym śródmieściu, o występowaniu w okresie międzywojennym oraz (m.in. o prawdopodobnym gnieżdżeniu się) w pierwszych latach powojennych w centrum miasta. Od lat 50–tych naszego stulecia, w zwiazku z ogólnym kryzysem gatunku, spowodowanym zatruciem środowiska pestycydami, sokół zniknął z miast, zarówno w Polsce jak też w innych krajach.

Od połowy lat 70–tych poprawa stanu środowiska oraz ochrona i reintrodukcja, przyniosły stopniowe odrodzenie gatunku. W Ameryce Płn. i w Europie Zachodniej sokoły powróciły do miast. W USA i Kanadzie populacja miejska jest obecnie liczniejsza niż przed kryzysem lat 50–60-tych i wykazuje szybki wzrost (tab. 1), w dużej mierze dzięki reintrodukcji młodych ptaków z hodowli oraz instalowaniu miejsc lęgowych. W Polsce oraz na wschód od naszego kraju, sokół w miastach bywa obserwowany sporadycznie, nie podejmowano też działań dla odrodzenia populacji miejskiej. Najbliższym miastem skąd są dane o

stałym występowaniu i gnieżdzeniu się (od 1977 r.) jest Berlin.

Dane z Ameryki Płn. i Europy Zach. wykazują, że sokół dobrze przystosowuje się do warunków miejskich, a nawet jego byt jest tu pomyślniejszy niż na terenach niezurbanizowanych. Produktywność lęgów jest podobna jak u populacji pozamiejskiej, a przeżywalność młodych jest nawet wyższa (tab. 2 i 3). Dane z Berlina (tab. 4) i z miast amerykańskich wskazują, że zdobycz sokoła w środowisku zurbanizowanym stanowią ptaki o bardzo różnorodnym składzie gatunkowym, jednak największy udział w niej mają gołębie, szpaki i występujące na danym terenie gatunki drozdów. Stosunkowo częstymi ofiarami są egzotyczne ptaki, które wydostały się z hodowli domowej.

Młode sokoły wychowane (m.in. introdukowane) w miastach wykazują tendencję do osiedlania się na terenach zurbanizowanych, często w odległości setek kilometrów od miejsca pochodzenia. Ta odrębność (nie będąca jednak izolacją) w stosunku do populacji pozamiejskiej tworzy się prawdopodobnie przez tzw. imprinting (nauczenie się we wczesnym stadium rozwoju osobniczego). Ptaki wylęgłe w hodowli mają zapewne większą łatwość dostosowywania się do warunków antropogenicznych. Naskalna forma gnieżdzenia się sokoła jest, w stosunku do nadrzewnej, dominująca w naturze gatunku i reprezentująca ją populacja, uważana przez Saar'a (1978) za odrębny genetycznie ekotyp, jest predysponowana do osiedlania się w miastach.

Aktualna wiedza naukowa i dotychczasowe pomyślne wyniki działań praktycznych przemawiają za zamiarem reintrodukcji sokoła w Warszawie i innych miastach tej części Europy. Odrodzenie i rozwój jego miejskiej populacji ma uzasadnienie w trzech celach:

1) Sozologiczny – koegzystencja z urbanizacją, najbardziej ekspansywną formą antropogenicznego przekształcenia krajobrazu, stwarza gatunkowi perspektywę sukcesu;

2) Ekologiczny – wzbogacenie strukturalne i funkcjonalne bioróżnorodności zubożonego ekosystemu miejskiego o drapieżnika spełniającego istotną rolę selekcyjną i sanitarną, nie można natomiast oczekiwać żeby sokół spełnił w miastach rolę efektywnego reduktora gołębi;

3) Społeczny – spektakularne wzbogacenie miejskiej przyrody o atrakcyjny i znany z publikatorów gatunek może być wykorzystane dla kształtowania kultury przyrodniczej szerokiej publiczności, a także decydentów i sponsorów.

Reintrodukcja sokoła w Warszawie, służyłaby trzem wymienionyum celom oraz odrodzeniu conajmniej stuletniej tradycji obecności tego gatunku. Obserwowany ostatnio w Warszawie znaczny wzrost populacji pustułki (ok. 30 par) wskazuje, że stan środowiska umożliwia pomyślną egzystencję gatunku o typie troficznym sokoła wędrownego.