Risks of Mass Concentrations of Birds

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Abstract. The basis of an urban ornitotsenoz is formed by several synanthropic mass bird species whose numbers are hundreds of times larger than the small and rare species. The vital activity of mass species leads to undesirable consequences for humans, reduces the biological diversity of ornithocene. Populations of synanthropic birds are reservoir and source of pathogens of dangerous zoonoses and zooantroponoses. The contact between the bird and the man takes place in the places of their accumulation: at transport stops, in parks and feeding places. To identify the percentage of patients with chlamydia rock pigeons in the city of Kazan were investigated in the serum and the pathological material of pigeons that live in different parts of the city. By managing the factors influencing on magnitude of population it is necessary to increase stability of a city ornitotsenoz. The stability of the urban ornithocenosis is a necessary condition for a healthy environment.

1. Introduction

Biological, social and cultural diversity are the components of a sustainable development, the basis of a harmonious evolutionary community. Population of the cities needs biological diversity of surrounding space. The perception of natural landscapes, green zones, birds singing reduces the level of mental disorders and stresses. An urban environment is a peculiar ecosystem in which artificial constructions are built in a natural landscape. Kazan agglomeration is located on an ancient terraces of the Volga River, occupies the territory of water meadows, river lakes and bogs, inundated woods, stepped slopes. Natural sites are of an island type, their flora and fauna are unique, there are 7 nature sanctuaries on the territory of the city. A variety of biotopes is an important prerequisite for formation and functioning of ecosystems. Various biotopes are combined in the city: the natural, low-changed and built up territories. A variety of habitats defines specific richness of an avifauna. Violation of numerical balance between types in the cities led to stratification of an ornitotsen on mass and not numerous types. The mass congestion of birds brings the mass of inconveniences and sometimes irreparable harm. The most suffering spheres of production are: grocery (granaries, points of distribution of grain and grain products), transport (airports), energy branch, and also monuments of culture, architecture and simply owners of cars. There are constantly undesirable congestions of birds attracted by an available and plentiful forage at points of storage, unloading and processing of grain. Concentration of birds conducts to notable economic losses in connection with eating grain products by birds. Bird's dung, having got to the compound feed intended for poultry-farming farms can lead to distribution of zooanthroponosis. The congestion of synanthropic birds on airfields is the reason of accident, people become the victims, cars become useless. Bird's dung acids corrode anticorrosive layers of cars, spoil appearance of buildings and monuments of culture.
2. Material and methods
In Kazan city territory bird congestions have been observed since 2003. Numerical and specific structure of birds are received as a result of various techniques applied in the conditions of anthropogenic landscapes or the spot metering depending on the type of the anthropogenic territory. Routes and observation platforms were put in various types of building blocks of the city: in the multi-story (seven-story and above), five-floor, two-storied buildings, around the private sector and the park territory. Quantitative calculation of individuals in big congestions was defined by method of an assessment of quantity of birds in packs and colonies.

Researches on identification of blue rock pigeons synanthropic populations infection level by chlamydia were conducted during the period from December, 2004 to March, 2005 in laboratory of virology of Federal state institution "The federal center of toxicological and radiation safety of animals". There were used strains of chlamydia: "Rostinovo - 70" (the activator of sheep abortion) and chicken embryos 6-7 day age. For allocation and identification of chlamydia there were conducted laboratory researches of parenchymatous bodies of pigeons. Allocation of chlamydia was conducted on 6-7 day chicken embryos by infection them to the yolk-bag and carrying out consecutive passages. Thus in sterile conditions prepared 10% suspension of the studied materials on physiological solution with pH 7.2-7.4 and processed antibiotics at the rate of 500-1000 units of streptomycin and 100-150 mkg/ml of gentamycin. Then suspension of patented material was centrifuged in sterile conditions at 2000 rpm. within 20-30 minutes and supernatant liquid used for infection of chicken embryos. Infection carried out 0.3 ml in a dose. The infected chicken embryos incubated in the thermostat at a temperature +370s and relative humidity of 75%. The death of embryos in the first three days was considered nonspecific. The chicken embryos which fell for the fourth days and later opened, took vitelline covers and investigated on existence of chlamydia. The lethal dose (ml ELD 50/0.3) for chicken embryos was determined by Read and Menchu. For morphological identification of chlamydia in pathological material and the infected chicken embryos prepared dabs and dabs prints which investigated by methods of light microscopy and immunofluorescence. For usual microscopy dabs prints painted carbol-fuchsin on the modified Stemp’s method. Morphological structures of chlamydia in the form of small red points came to light on a greenish background. For the purpose of identification of the biological agents allocated on chicken embryos in reaction of immunofluorescence prepared on 3 dabs prints from the vitelline membrane of the dead chicken embryos. In case of chlamydial anti-gene detection there was carried out the control of immunological specificity of reaction by research of dabs prints painted by the fluorescing globulins after preliminary processing by immune chlamydial and negative serums to reactions of immunofluorescence. If in dabs prints processed by previously negative serum the specific luminescence of a chlamydial anti-gene, and in dabs processed by previously immune chlamydial serum came to light, the luminescence was absent or was dim, reaction of an immunofluorescence considered specific. In a basis of clinical and laboratory trials serological researches of 104 pigeons, districts of Kazan, caught in various on nature of building, laid down. At a choice of the studied territories considered the number of micropopulations and type of food of pigeons. The quantity of the caught birds made not less than 10% of the number of micropopulations (an exception - realizing base of bakeries where absolute number at the time of research included to 4000 individuals).

Degree of ornithological appeal of economic objects was determined by the technique offered by Enaleev I.R. and Rakhimov I.I. [1]: the index of ornithological appeal was determined by the following criteria:
- presence of a plentiful forage in the territory;
- presence of an available forage in the territory;
- presence convenient additives, used by birds for rest and a lodging for the night;
- presence of conditions for nesting;
- safety of the territory, that is absence on object of feathery, land predators and other factors of concern;
presence of the rooms used by birds as shelters from bad weather and attacks of feathery predators.

Each criterion is estimated on a five-point scale where 1 point corresponds to lack of attractive conditions for birds, and 5 points correspond to the maximum presence of those on this object. The score defines an index of ornithological appeal of object. The score by these criteria for concrete object is higher, the it is more attractive to birds. Statistical data processing was conducted in a Statistica10 package.

3. Results and discussion

The total area of Kazan is more than 515,8 km². Green plantings (parks, gardens) in the city occupy about 23% of all square of the city, industrial facilities - 22% of the city, the inhabited massif of 55%. Within Kazan 193 of 305 bird species noted in RT that makes 63,3% meets. In natural, undisturbed biotopes a ratio of quantity of individuals of the majority of types of an ornithocenosis (community of birds) the approximately identical. The ratio of the dominating and small types is defined by features of a biotope. The schedule of abundance of the bird species nesting in Kazan testifies to the broken community. The domination variety curve (Whittaker) or a curve of the importance of types (Piyank) of an ornithocenosis of Kazan has an appearance of a lognormal curve. Than domination level is higher, i.e. the share of individuals of the most numerous types from total number of individuals in community, that less resources remains to other types of community, their number is lower than subjects and the probability of loss as a result of casual processes is higher. Respectively, each look in community increases stability and specific richness of a city ecosystem.

The main factors limiting the number of small and rare species in the city is a reduction of habitats, impoverishment of food supply, concern in the period of a incubation and bringing up of baby birds, ruin of nests, a press of predators (cats, dogs, rats, gray crows). The area of natural biotopes is annually reduced and split up, gains more and more island character. So, before construction of Millenium Cauldrons – "a green artery" of the city, a nature sanctuary of regional value "Russian-German Switzerland", the employee refugia for rare and endangered species of plants and animals. Under G. F. Hilmi's law, reduction of system leads to gradual loss of its structure and dissolution in environment. And now we observe sharp reduction of types of an avifauna. The similar situation developed in wetland in Victory park. With the backfilling and development of the outskirts of the wetland complex, black terns (Chlidonias niger) and white-winged (Chlidonias leucopterus); the number of individuals of a mallard (Anas platyrhynchos), ruddy-headed dive (Aythya ferina), crested duck (Aythya fuligula), a bald-coot (Fulica atra), a lake seagull (Larus ridibundus), the river tern (Sterna hirundo), etc. was reduced.

The separate problem of the cities breaking stability of an ornithocenosis is monospecific and mixed packs of mass bird species which are presented by the following types: blue rock pigeon (Columba livia), black martin (Apus apus), daw of ordinary (Corvus monedula), gray crow (Corvus cornix), house sparrow (Passer domesticus), field sparrow (Passer montanus). Within the city of Kazan about 1000 couples of a gray crow nest now. The majority of nests settles down on poplars (53%), birches (20%), lindens (10%), mainly in the yards of the city (50%). Height of an arrangement of nests depends on a biotope: in the yards and along large streets of a nest are authentically above, than in parks (p = 0,01). Average height of an arrangement of nests - 11,4±m. Density of a house sparrow in Kazan makes 208,8 wasps/ km², a field sparrow – 119,8 wasps/ km² [2] in the winter. The general density of a blue rock pigeon in Kazan (average on various biotopes, including industrial zones) during the winter period – 46,4 wasps/ km², in summer – 137,5 wasps/ km² (our data).

Congestions of birds are a source of the problems connected with the biodamaging activity at the enterprises of the grain industry, fish and fur farms, architectural constructions, culture monuments, equipment, airfields, shopping centers [3,4,5]. Packs the synanthropic of bird species concentrate in places where there are plentiful and available forages. On elevators, warehouses of storage and places of unloading of grain products of a scattering of grain attract pigeons and jackdaws.
For certain territories of the city we determined an index of ornithological appeal [1] by the following criteria: existence of a plentiful forage; availability of a forage; existence convenient additives, used by birds for rest and a lodging for the night; existence of conditions for nesting; safety of the territory, that is absence on object of feathery, land predators and other factors of concern; existence of a pas object of the rooms used by birds as shelters from bad weather and attacks of feathery predators. Each criterion was estimated on a five-point scale.

As a result of linear route accounts objects with a constant mass congestion of birds in Kazan were revealed. The special attention was paid to strategic objects: JSC Kazan Zernoprodukt, JSC Kazanskaya realizatsionnaya baza of bakeries", JSC UK moloko Prosto, JSC Kazan Oil Extraction Plant, the Kazan airport, the grocery market, and acted as control sites: park and private sector of "Kuyuki" (tab. 1).

| Table 1. Index of ornithological appeal. |
|------------------------------------------|
| Criterion of ornithological appeal | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|----------------------------------------|---|---|---|---|---|---|---|---|
| Availability of a forage | 5 | 5 | 4 | 3 | 5 | 3 | 4 | 3 |
| Forage profuseness | 5 | 5 | 3 | 5 | 2 | 3 | 1 | 2 |
| Existence of shelters | 5 | 5 | 3 | 5 | 2 | 3 | 2 | 2 |
| Existence of places for nesting | 5 | 5 | 2 | 2 | 2 | 1 | 5 | 1 |
| Safety of the territory | 5 | 2 | 5 | 1 | 3 | 4 | 3 | 2 |
| Score | 25 | 22 | 17 | 16 | 14 | 14 | 17 | 10 |

Note: 1 JSC Kazanskaya realizatsionnaya baza, 2 - JSC Zernoprodukt, 3 - JSC UK moloko Prosto, 4 - JSC Kazan Oil Extraction Plant, 5 - the Kazan airport, 6 - the grocery market, 7 - park, 7 - the private sector of "Kuyuka".

JSC Kazanskaya realizatsionnaya baza hleboproduktov and JSC Zernoprodukt as they represent a successful combination of such ecological factors as existence of plentiful and available food supply, places of nesting or rest of birds, and also safety of the territory appeared the most attractive objects for birds.

When eating by birds grain becomes soiled a dung and feathers, we will feel economic damage. Populations the synanthropic of birds – the tank and a source of activators of dangerous zoonoz and zooantroponoz. Contact between a bird and the person happens in places of their congestions: at transport stops, in parks and places of top dressing. Also danger is born by the populations nesting on attics. Invertebrate parasites of birds on the ventilating courses get into apartments and serve as carriers of causative agents of diseases. Under natural conditions the person easily catches about a half of infectious and parasitic diseases of animals. It is proved that pigeons transmit to people more than 50 infectious diseases. Chlamydia (psittacosis-ornithosis) is one of the zooanthroponoses The *Chlamydia psittaci* activator is allocated in environment with the nasopharyngeal expirations, excrement [6,7,8]. For identification of percent of patients with clamidiosis of blue rock pigeons in. Kazan serum of blood and pathological material of the pigeons living in different districts of the city was investigated. For the purpose of identification of the reasons promoting increase of an incidence, tests were selected with diverse under the terms of food and density of micropopulations of pigeons (n=104). By the results of serological researches the quantity of the birds who are positively reacting to Chlamydia fluctuated from 22 to 70%. Shares of males and females in number the seropozitive of individuals are approximately equal: 45,3% (n = 53) and 41,2% (n = 51) respectively. Communication between the weight of a bird and incidence is also not found. The food type, apparently, has no essential impact on contamination level (r = 0,27): in group with the raised maintenance of Chlamydia all three types of food, also as well as in group with low indicators on this sign are presented. The increased percent of sick pigeons is connected with bigger density of birds. The size of a congestion of birds is determined by type of housing building and the sizes of food supplies. On places of available
grain crops pigeons are flown from adjacent districts of the city. Birds densely incubate towers, roofs, actively contacting among themselves. To several hundred pigeons collect attics of houses of a certain architecture which are used by pigeons as nestings and places of a lodging for the night. Big density of birds leads to reduction of the nested territory, as a result of it the distance between couples is reduced that increases probability of infection. On the contrary, individuals with rather low percentage of Chlamydia psittaci live small (from one to several tens individuals) colonies with the rarefied nesting. Thus, an important factor of infection of birds of Chlamydia psittaci is density in places of top dressing and nesting. Diagnosis of an ornithosis ornithosis among the population is complicated since the picture of a disease is similar to other respiratory infections. The group of risk includes the employees of poultry farms, people contacting to synanthropic populations of blue rock pigeons, for example, who are daily feeding up or selecting and nursing sick birds of the house. Special danger to the person is constituted by a winter and spring season – time when the lowered resistance of a human body coincides with surge in incidence among blue rock pigeons. The simplest measures of prevention of infection of Chlamydia psittaci among the population: to avoid congestions of birds. We recommend to close garret windows of residential buildings, cracks of grain stores, to construct dovecots in which it is possible to regulate easily the number of birds and to watch over their health. The undesirable increase in number is promoted by insanitation of dumps of MSW, barefaced grain at stages of transportation of storage and processing, top dressing of birds by the population. Top dressing makes an essential contribution to an imbalance between mass and small bird species. So, top dressing wintering mallards on nonfreezing reservoirs of the city promotes increase in number of individuals: for 3 years the wintering group of a mallard increased in Kazan by 2,5 times. On winter feeding troughs in the cities generally limited number of types eats: house and field sparrows (Passer domesticus, Passer montanus), big titmouse (Parus major), blue pigeon (Columba livia), jackdaw (Corvus monedula) and gray crow (Corvus cornix). Thus, mass bird species of the cities eat food waste, grain and crumbs which are incidentally dropped by the person. Food resources are localized on dumps, in places of storage and processing of the food industry, in the open markets, in places of top dressing by the population, in the enclosed space of malls, on sidewalks. Strategy of a foraging of birds depends on a type of food objects, its location and plasticity of a look. Field and house sparrows – the grainy-eating birds specializing on seeds of weeds. Give a lot of trouble in shopping centers where all the year round soil goods with waste of the activity. Eat grain products, grain, cheese, greens, drink water from trays with live fish. Special measures for their capture are required. Thanks to high rational activity ways of production of food at birds of family of Corvidae are more various. The omnivorous crows possessing identity quickly switch to different types of a forage. It both kitchen garbage, and drop, and hunting from air and from the earth on pigeons. Thus, city ornithocenosis in itself is unstable system. The listed factors promote increase in a difference in the ratio of number between mass and small types. For a sustainable development of a city ornithocenosis it is necessary to regulate the number of mass types. In most cases for this purpose it is necessary and to exclude enough their top dressing and to increase the level of ecological literacy of the population and a sanitary condition of domestic territories. With reduction of ecological capacity of the environment also the excessive number of separate types will be reduced. The solution of problem situations which develop in places of warehousing and processing of food resources requires work of experts. Success of a choice of methods of regulation of number of congestions in each separate case has to be defined by specific conditions, knowledge of ecology of a look, mosaic of adaptations of birds and the principles of tolerant ornithology [9,10]. Besides measures for decrease in number of mass types in parallel it is necessary to promote increase in small types. Expansion of the area of parks and "green channels" between them, a green zone round the city creates habitats and resource food supply for herbivorous and insectivorous birds. Now in Kazan the urgent need in creation of the official center of rehabilitation of birds ripened. The center existing nowadays is the organization of volunteers. For rendering victims to competent medical care of the rare, included in the Red List RT and Russian Federation of birds it is necessary to
carry out of borders of the republic. Transportation is transferred not by all birds. To take out some there is nobody. Critical situations happen generally during the autumn and spring flying period, many birds fly through the city. Assistance even one individual of an endangered species – an invaluable contribution in maintenance of biological diversity. Thus, improvement of populations the synanthropic of birds, restoration of a harmonious ratio of types of city community demands special measures and it is necessary as unstable avifauna bears risks for health of the population and reduces a biodiversity in general.

4. References
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