Organization of keeping animals in the aviary

T A Moiseeva
Department of Zoology and Ecology, Petrozavodsk State University, 33 Lenina Street, Petrozavodsk, 185000, Russia

E-mail: tima3909@rambler.ru

Abstract. The article is devoted to the rules of keeping animals in aviaries. The conditions of keeping animals in zoos and the organization of their care are considered. It is said that the premises for the maintenance of wild animals should provide their biological, species and individual needs, the cubic capacity of the premises should ensure the freedom of movement of animals, the presence of sufficient air and light. The minimum norms of the area of the premises for keeping wild animals and cells sizes for the cellular keeping of animals are given, factors affecting the optimal microclimate in the rooms for animals are listed. The methods of maintaining cleanliness in aviaries, methods of caring for the skin and hair of animals, as well as the features of bathing animals are examined in detail. It is stated that a prerequisite for keeping animals in captivity is the presence of a veterinary service or a doctor, their responsibilities are listed, the rules for calculating the standard number of staff of veterinary specialists for the annual volume of veterinary work in zoos are given.

The cycle of keeping wild animals in open-air cages consists of the following stages (technological stages): trapping (or purchasing) animals, sanitary-epidemiological and veterinary examination of animals, and obtaining accompanying documents, transporting animals to a place of permanent residence, keeping animals in quarantine (“isolator”), placement of animals in the aviary, feeding, care, veterinary examination of animals.

In this article, we will consider, first of all, the rules for keeping animals in an open-air cage.

Currently, technology has been developed in sufficient detail for the cultivation of spotted deer, red deer, roe deer, wild boar, musk deer and many other animals in semi-free conditions [1, 2]. Information on the selection of animal species, sites for aviaries, enclosing and equipping a site, keeping animals in aviaries, is given in sufficient detail in the monograph by A A Danilkin [3]. Various design features of the construction of hedges in aviaries are given in the work of I V Druri and P V Matyushev [4]. Practical recommendations for increasing the number of rare species of animals in open-air cages are presented in the works: «Reliable wildlife enclosures» [5], «The Maintenance and Breeding of Rare Mammals in Zoos and Nurseries» [6]. A special topic is the most interesting work on enriching the environment of animals [7]. However, many issues remain unresolved.

Premises for keeping wild animals should provide their biological, species and individual needs, as well as preventing the arbitrary exit of wild animals from their places of detention. The conditions in which animals are kept certainly affect the general condition of the animal organism, its growth and development. Therefore, you need to know the main environmental factors and try to create in this regard such conditions that they have as little as possible have a harmful effect on the animal.
Animals adapt to environmental conditions (changes in physical and chemical indicators of the surrounding air, feeding regimen, composition of the diet, etc.).

The cubature of the premises should ensure the freedom of movement of animals, the presence of a sufficient amount of air and light.

Wild animals must be kept in enclosures, cages and (or) other premises for the maintenance of wild animals, the norms of the area of which cannot be less than the minimum norms of the area of premises for the maintenance of wild animals in accordance with the standards (table 1).

Table 1. Minimum standards for the area of premises for the maintenance of wild animals.

| N   | Name of wild animals                                      | Type premises   | Area premises in square meters | Height premises in meters |
|-----|----------------------------------------------------------|-----------------|-------------------------------|--------------------------|
| 1   | Mammals:                                                |                 |                               |                          |
| 1.1 | Small rodents (mouse)                                   | Aviaries, cells | 0.05                          | 0.2                      |
| 1.2 | Small predatory (weasels, ermines, etc.)                | "-"            | 1.0                           | 1.5                      |
| 1.3 | Medium rodents (squirrel, chinchilla and others)        | "-"            | 3.0                           | 2.0                      |
| 1.4 | Large rodents (porcupines, beavers, etc.), civeros (civeras, mongooses, etc.) | "-" | 4.0 | 2.5 |
| 1.5 | Medium predatory (raccoon, marten, small dogs - foxes, arctic foxes, etc.) | "-" | 6.0 | 2.5 |
| 1.6 | Canids (wolves), medium feline (lynx, leopards, etc.)   | "-"            | 20.0                          | 3.0                      |
| 1.7 | Large feline (lions, tigers, jaguars, etc.), bear      | "-"            | 25.0                          | 3.0                      |
| 1.8 | Wild boars, roe deer, tapirs, warthogs, small antelopes | "-"            | 20.0                          | 2.5                      |
| 1.9 | Goats, rams                                             | "-"            | 25.0                          | 3.0                      |
| 1.10| Moose, deer, large antelopes, zebras                    | "-"            | 50.0                          | 4.0                      |
| 1.11| Bison                                                   | "-"            | 100.0                         | 4.0                      |
| 1.12| Giraffes                                                | "-"            | 100.0                         | 8.0                      |
| 1.13| Pinnipeds (marine seals, seals, walruses etc.)          | Aviaries, cells, 1/3 area – pool not depth less than 1.5 m | 20.0 | 2.5 |
| 1.14| Hippos                                                  | Aviaries, cells, 2/3 area – pool not depth less than 1.5 m | 40.0 | 3.0 |
| 1.15| Rhinoceros                                              | Aviaries, cells | 50.0                          | 3.0                      |
| 1.16| Elephants                                               | Aviaries with by the pool not depth less than 1 m | 120.0 | 6.0 |
| 1.17| Edentulous (anteaters, armadillos, sloths)              | Aviaries, cells | 4.0                           | 2.5                      |
| 1.18| Medium sized kangaroo                                   | "-"            | 5.0                           | 3.0                      |
| 1.19| Kangaroo large times                                    | "-"            | 20.0                          | 3.0                      |
| 1.20| Small primates (marmosets, tamarines, etc.)             | "-"            | 2.0                           | 2.0                      |
1.21 Medium primates (monkeys, macaques, baboons and others) - 5.0 3.0
1.22 Large primates (gorillas, large chimpanzees, orangutans) - 20.0 4.0

For animals in cages, these data are summarized in table 2.

**Table 2.** Cage sizes in the cage keeping of animals.

| Category of animals | Live weight, kg | Cage height, m | Minimum cage width, m | Minimum area, sq. m. |
|---------------------|----------------|---------------|-----------------------|---------------------|
| A                   | Up to 4        | 0.5 - 0.6     | 0.3                   | 0.16                |
| B                   | 4 - 8          | 0.7 – 0.8     | 0.5                   | 0.26                |
| V                   | 8 – 15         | 0.8 – 0.9     | 0.6                   | 0.39                |
| G                   | 15 - 30        | 1 – 1.5       | 0.8                   | 0.7                 |

When placing animals in the premises, constant air temperature and relative humidity, a sufficient amount of air and its speed should be maintained (table 3). Excess heat and moisture, especially in the warm season, is removed using good ventilation, but care should be taken to ensure that there are no drafts in the premises. The lack of heat in the cold season, as a rule, is made up by warming the ceilings, walls and floors, the installation of double frames, vestibules at the entrances, and also carry out other activities.

**Table 3.** Optimal microclimate parameters in rooms for animals.

| Animals          | Temperature, Air, gr | Relative humidity, % | Amount of consumed air m³ / t | Air velocity, m / s | Norm of natural light (window openings to the floor) |
|------------------|----------------------|----------------------|-------------------------------|---------------------|-----------------------------------------------------|
| Horses           | 6-10                 | 60-70                | 80                            | 0.3                 | 1:10                                                |
| Bison            | 8-2                  | 80                   | 90                            | 0.2                 | 1:10                                                |
| Wild boar        | 16-20                | 75                   | 60                            | 0.3                 | 1:12                                                |
| Wolf             | 16-20                | 50-65                | 15                            | 0.3                 | 1:15                                                |
| Fox              | 15-18                | 50                   | 25                            | 0.3                 | 1:10                                                |
| Hare             | 14-20                | 50-70                | 20                            | 0.3                 | 1:3                                                 |
| Marmot           | 22                   | 40-60                | 0.7                           | 0.2                 | -                                                   |

The above parameters are greatly influenced by the density of animals in the room, as their crowded content leads to increased humidity, a lack of oxygen in the air and a decrease in the productive action of feeds due to a lack of proper feeding and watering front, and lack of proper rest of animals.

For the normal life of the animal, the main of the gases that make up the air is oxygen, which provides the basic processes of oxidation and metabolism in the body. Therefore, with a decrease in the oxygen content in the air to 15% and lower, animals experience oxygen starvation with signs of shortness of breath and a strongly depressed state. At the same time, an increase in carbon dioxide in the air no less negatively affects the animal’s state of health and can lead to its death. It must also be remembered that any air pollution always leads to a deterioration in the living conditions of the animal.

Of particular danger is air pollution by dust in long-term enclosed spaces, where favorable conditions are created for the accumulation of various pathogenic microbes. Thus, the physical and chemical properties of air (temperature, humidity, speed, atmospheric pressure, sunlight, pollution by harmful chemical impurities) affect many physiological functions of the animal’s body - thermoregulation, metabolism, resistance to various diseases (resistance), etc.

The room where the animal is housed must be kept clean and regularly ventilated. Ventilation of the room is usually carried out during the absence of the animal in the cage.
The correct illumination of aviaries and the light regime are of great importance when keeping animals in the premises. Animals, like all biological objects, are awake for a certain time, after which rest sets in. Most often, there is a lack of light in the rooms, so to whitewash their illumination, the walls are whitewashed. If there are windows in the rooms, they are washed periodically, and the second frames, etc., are removed during the warm season.

Aviaries should be cleaned regularly, cells daily. This helps to preserve the health of animals, has a beneficial effect on their performance.

Waste and debris from the cages, the litter is stacked in a tank with a tight-fitting lid. After emptying, the tanks must be washed and disinfected.

For cleaning the rooms used: iron shovel, metal scraper on a wooden handle, broom, broom, metal scoop, mop and buckets. These items are assigned to employees and stored in the premises for inventory, in specially equipped racks.

In the warm season, 1-2 times a week, the room and the cells are washed with water from a hose or bucket using a mop. Wash the gutter groove. In winter, instead of water, pure snow is used, which is poured into the room, and then swept out with garbage.

Cleaning of animal waste products (litter, manure) must be done using a special scoop after each bowel movement. It is not allowed to rake manure to the ground. Sewage should be removed from the territory of the enclosure complex daily, after which the waste bins should be treated with drugs approved in Russia.

Before disinfection, the room is thoroughly cleaned of debris. Then, using the control panel or a broom with a disinfecting solution, the walls, the floor of the room and the booth are abundantly moistened. Gutters are also disinfected. Modern tools allow disinfection in the presence of animals.

The main condition for successful control of insects and rodents is the observance of a strict order of keeping the premises and the surrounding area and storage. The rooms and around them must be kept clean; store food in closed chests, drawers, refrigerators, etc., promptly remove food residues and cover litter bins [8].

Manure and garbage collection from the territory is carried out daily in tightly closed waste containers installed in specially designated places. Overflowing bins is not allowed.

Corpses, manure (litter), the remains of litter, feed, waste to be disposed of or destroyed must be transported on specially equipped vehicles with a sealed body to special landfills.

Caring for animals is the main condition for preventing their disease.

Skin and hair care consists in removing dirt, dust, dandruff, dead hair, microorganisms and parasites. It is necessary to clean the animals regularly, because only such a regime of animal care can prevent various skin diseases in a timely manner.

A useful procedure for many animals is swimming. It is desirable to produce it in the warm season at a water temperature of at least +18 °C. Insecticidal shampoos or other similar means should be used only when necessary. The choice of such funds is preferably provided to the veterinarian. After bathing, it is advisable to control the behavior of the animal until it dries, that is, not to give it the opportunity to lie in the ground or in hot places.

A prerequisite for keeping animals in captivity is the presence of a veterinary service or a doctor. Their responsibilities include: conducting regular examinations of animals, their therapeutic and surgical treatment, ensuring compliance with animal health and veterinary rules when caring for animals.

Thus, the main work in the aviary can be reduced to the following groups:

- daily (if the specifics of this species requires) to carry out cleaning of enclosures, artificial shelters, shelters, utility rooms, the adjacent territory from traces of animal activity in order to ensure normal veterinary and sanitary conditions and to give a demonstration look;
- monitor the state of the enclosures during the validity period, if necessary, repair or refit, promptly eliminate minor defects that impede the preservation of livestock;
- to provide constant veterinary supervision and the necessary veterinary services for animals, to ensure that the relevant control and oversight bodies carry out inspections;
• carry out or organize in the prescribed manner the necessary veterinary and sanitary measures (quarantine, vaccination, disinfection, disinestation, disinsection, deratization, and when; necessity and deodorization) by involving specialized organizations or authorized bodies on one-time applications or contracts.

References
[1] Balakirev N A 2017 Modern Scientific Trends in Animal Husbandry, Hunting and Ecology (Kirov: Vyatka State Agricultural Academy) pp 26-31
[2] Yang Q 2003 Biological Conservation 109 333-42
[3] Danilkin A A 2016 Wild ungulates in the hunting economy (basics of resource management) (Moscow: Publishing House GEOS)
[4] Drury I V and Mityushev P V 1963 Reindeer husbandry (Moscow, Leningrad: Agricultural Publishing House)
[5] Reliable wildlife enclosures 2006 (München: Federal Union of Insurance for Accidental Cases)
[6] V V Spitsin et al. 2010 The Maintenance and Breeding of Rare Mammals in Zoos and Nurseries (Moscow: Moscow Zoo)
[7] Knoepfer S 2015 Captive Brown Bear (Ursus arctos) Recommendations - Enrichment and Creation of an Optimal Environment (Arsenbach: FOUR PAWS, Bear Rescue and Rehabilitation Center)
[8] Methodical recommendations on the use of the Teflex-BET disinfectant with the washing effect for the disinfection of objects of veterinary surveillance and the prevention of infectious diseases of animals 2011 (St. Petersburg: Ministry of Agriculture of Russia)