The organization of feeding animals in aviaries

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Abstract. The article discusses the modern general rules for feeding animals kept in enclosures (in zoos). The characteristics of plant and animal feeds used in zoos are given, the need for free access of animals to feeds and water is emphasized, the controversial use of enzyme additives and antibiotics for feeding animals is indicated. The various methods for storing feed are listed. It is indicated that aviary complexes in various natural and economic regions have different species composition of fodder products, significantly different from each other; therefore, it is difficult for all of them to unify animal feeding diets. A common feature for households is that they make extensive use of local feed, because costs can be reduced only with the help of such fee. In this case, the nutritional value of feed is usually determined by the calories based on the fact that thermal energy in the animal’s body is released during the oxidation of the nutrients coming from the feed. Each group of animals has its own norms and rules of feeding and watering, the examples of dietary standards for some groups of animals are given, the importance of the method of feeding the animal is noted.

Breeding animals in enclosures is a modern and effective technology that solves a group of problems:

- conservation of wild animals in nature, due to the extraction and breeding of animals grown in the aviary;
- the study of the biology of wild animals when grown in aviaries, the development of effective methods of biotechnology, including feeding;
- protection from predators, poachers and diseases;
- determination of limiting factors and their elimination by carrying out appropriate biotechnical and veterinary measures;
- improving the species composition and the formation of brood stock;
- a demonstration to visitors of wild animals for review, photos and videos; conducting educational lectures on the biology of the species.
- enrichment of hunting grounds with the release of hunting animals grown in semi-free condition, including the sale of animals to other farms.

Proper feeding of animals in enclosures is of great importance for maintaining the health of animals, maintaining their strength and performance, as well as in breeding animals and raising puppies. Violation of the correct feeding schedule, poor feeding and feeding of poor-quality feed lead to disease and often to the death of animals.
The purpose of this work is to consider the basic rules for feeding animals in aviaries. Feeding animals is carried out after cleaning the premises, cleaning or changing cages and removal from the section of dirty equipment, trays with bedding and other materials to be disinfected or disposed of. Feed animals should be strictly in accordance with the norms, according to the ration at the set time and benign feed.

Animals in the process of their life consume water of a certain quality. Feeding and watering animals during their rearing and operation is beneficial only in cases when animals have free access to food and water, for which, in rooms or in other places they make feeders and drinking bowls of a certain length.

With the lack of such devices due to the hierarchical behavior of animals in the herd or group, many of them, with an apparent excess of feed and water, starve. At the same time, the best way to supply animals with water is auto-drinking, in which water most often comes from a water supply system or the tanks installed in insulated attic rooms. To remove excess moisture, good sewage should be ensured, manure should be removed more often, bedding material should be used, and many chemical absorbers can also be used (3 kg of quicklime in powder can absorb up to 1 liter of water) [1].

Depending on the number of animals, feed should be stored in dry warehouses excluding wild rodents and insects access to them. The pantry must be equipped for the storage of daily (weekly) stock of loose, granular, rough and succulent feed. Perishable food (meat, milk, fruits and some vegetables) must be stored in the cold stores.

Aviary complexes in various natural and economic regions have different species composition of fodder products which are significantly different from each other, so it is difficult them to unify animal feeding diets for all of. A common feature for households is that they make extensive use of local feed because the costs can be reduced only with the help of such feed.

It has been established that the structure of the feed base for phytophages of captive animals is: 50–70%, green fodder 30–40, concentrated feed 8–12, succulent 3-10% [2].

Rough feeds include vegetable feed obtained by drying many plants (hay, straw, chaff and flooring, as well as some wood feed).

Hay is the main food of herbivores in the winter (stall) maintenance period and is a canned (by drying) green food. During drying, there is a loss not only of moisture (14-17%), but also of a number of nutrients (carbohydrates, vitamins, etc.), which are of great importance in feeding animals.

Green fodder is the ground parts of meadow plants and pastures, as well as specially grown annuals and perennials. These feeds are used for almost all domestic animals in summer. Young herbs are well digested and therefore herbivores can only live with such feed. Especially beneficial effect on animals is exerted by the green feed of the seeded herbs (alfalfa, clover, rape, sweet lupine, oatmeal mixture, a mixture of oats with peas, etc.).

The basis of concentrated feed is grain cereals and legumes. Cereal grain is a highly valuable concentrated carbohydrate feed containing mainly starch and readily available saccharides. In such feeds, the amount of crude protein ranges from 8 to 12%, while the protein, as a rule, is deficient in lysine and methionine and also in tryptophan in corn; the amount of fat does not exceed 6%. Animals use corn, barley, oats, wheat, rye, millet, sorghum, chumizu, and sometimes sowing seeds, etc. Legume crops are a valuable protein concentrated feed containing 20–40% of crude protein, 2–17 of crude protein fat and 4-7% fiber [3].

Animal feeds are the analogues of high-protein animal feeds and are characterized by a high content of protein (up to 80%), fat (up to 22%), as well as ash elements (calcium - up to 11% and phosphorus - up to 5%). The protein of such feeds is characterized by a higher usefulness, although there is lack of methoyain in it. Animal feed is introduced into the ration to balance them with protein and ash elements. The exception is dairy products which are often used as the main diet for young animals.

Meat or, as it is commonly called in fur farmers, muscle meat of agricultural and other mammals is used to feed predatory animals. It contains 26-35% solids, 14-19% protein, 3.3-21% fat and 100-234 kcal / 100 g of energy. For feeding carnivorous animals, slaughter by-products (liver, kidneys, tongues, brains, meat trimmings, heart, diaphragm, tails and udder) are most often used, containing 9.7-21% protein, 1.7-15% fat and 64-196 kcal / 100 g of energy.
Meat and bone meal is produced in meat processing plants from animal waste not suitable for human consumption. Discarded carcasses, fruits, internal organs, animal corpses, and much more are processed into meat and bone meal.

Fish of low value varieties are most often used for feeding the animals raised for fur. In the enclosure, it is not used as often.

Currently, the microbiological industry is preparing hydrolysis, hydrocarbon, sulfite and baker's yeast, as well as numerous enzyme preparations and antibiotics. All feed yeast is characterized by the presence of a large amount of crude protein (up to 60%), a high content of lysine and a low content of methionine and tryptophan. Fodder yeast is used to balance rations and compound feeds with protein.

The use of enzyme preparations is problematic since they do not always give good results, and in small farms, in our opinion, they should not be used, as this will only increase the cost of feed.

Antibiotics should also not be used in feeding animals, since their careless use always leads to undesirable results, especially in the subsequent treatment of the sick animals.

The nutritional value of food is usually determined by the calories based on the fact that thermal energy is released in the animal’s body during the oxidation of nutrients coming from the feed.

Each group of animals has its own norms and rules of feeding and watering. For example, the average daily requirement of an adult dog for food at a normal calorie workload is on average: in the summer - 2000-2100, in the winter - 2300-2400 large calories. The fox feeding rates are presented in table 1.

| Table 1. Feeding rates for adult foxes, kcal per head per day. |
|---------------------------------|
| Month                          | Live weight of the animal, kg |
|                                | 5.5 | 6.0 | 6.5 | 7.0 | 7.5 | 8  |
| January                        | 400 | 420 | 440 | 460 | 480 | 510|
| February                       | 390 | 410 | 430 | 450 | 470 | 490|
| March - April                  | 380 | 400 | 420 | 460 | 480 | 500|
| May                            | 400 | 420 | 440 | 480 | 500 | 530|
| June-July                      | 450 | 480 | 520 | 540 | 560 | 600|
| August                         | 520 | 560 | 590 | 630 | 660 | 700|
| September                      | 530 | 570 | 600 | 640 | 670 | 710|
| October                        | 490 | 530 | 560 | 600 | 630 | 660|
| November                       | 460 | 490 | 530 | 550 | 580 | 610|
| December                       | 410 | 430 | 470 | 480 | 510 | 530|

Adult animals are best fed twice a day sharing the diet equally. In summer, adult foxes can live without muscular meat, fish and grain feeds, as well as dry animal feeds (meat and bone meal, meat meal, silkworm pupa, etc.) predominate in their diet. In the enclosure, the daily feed consumption per roe is as follows: oatmeal - winter - 450 g, spring - 700 g, summer - 500 g, autumn - 750 g; branch feed or hay - 1-2 kg in all seasons [4].

Various mineral feeds are often used to balance mineral rations. These include chalk, lime flour, salt, calcium phosphorus compounds (tricalcium phosphate, precipitate, bone meal, etc.), trace mineral salts and other mineral feeds.

Trace elements are best introduced into feed rations in the form of carbonic compounds, but sulfate compounds are cheaper.

For animal husbandry, special fodder vitamin preparations are produced, however they are often not enough, so ordinary pharmacy vitamin preparations are used, especially since their activity is expressed in the same units [5].

The diets of some animal species are very simple. So, the pelican menu includes only one product: fish. Frogs are given bloodworms, flour worms and maggots. But there are some diets much more diverse and rich. The macaw and cockatoo parrot menu includes wheat bread, oats, bran, millet, barley, wheat, peas, beans, rice, millet, buckwheat, corn, sunflower, nuts, canary seed, cabbage, onions, potatoes, carrots, beets, cucumbers, tomatoes, salad, radishes, pumpkin, zucchini, fresh fruits and
berries, dried fruits, raisins, jam, honey, sugar, butter, milk, baby milk powder, cottage cheese, boiled eggs, flour worm, and even vitamins and mineral supplements: yeast, chalk, bone meal and small stones [6].

A headed salad for saltwater fish is an excellent source of vitamins and minerals that they naturally get from algae. Pink beauties of flamingos lose their color if you do not take care of a special “coloring” top dressing - sweet red pepper, shrimp, or at least beets with carrots: it is with food that flamingos receive coloring pigment for their excellent plumage.

Interestingly, colobus animals-vegetarians (in the wild these monkeys generally only eat leaves), gorillas, and even land turtles - are also given animal feed at the zoo. It turns out that eating his favorite plants in nature the “vegetarian” can sometimes swallow a snail or a worm. Without such a protein supplement, they are threatened with diseases, vitamin deficiency and other troubles. So, cottage cheese, meat, eggs are prescribed for them, however, they should be in small quantities and not every day.

The correct feeding schedule is very important, because it is different for all animals. It is enough for someone (for example, boas and pythons) to eat once a week or even once a month. And for others, say, rodents and small birds, the feed must be in sufficient quantity constantly. Predators - tigers, lions, jaguars and others - need to arrange "hungry" days. Indeed, they are not lucky every day with prey in nature. Moreover, it is better to arrange hungry days according to a moving schedule - so that the animal does not develop a reflex to “fasting Thursday or Tuesday.”

The way the animal feeds is crucial. For example, amphibians and reptiles need only live prey. It can be a flour worm, a mouse, and for a large snake a whole rabbit, but the main thing is that the prey move, otherwise the animal simply will not see its food, this is how its vision works.

Does the number of animals in the aviary affect feeding? Yes, if a group of animals is kept in an enclosure or pen, the amount of feed must be increased - and much more. Those who are stronger than others are inevitably the first to get access to feed and the best pieces, and the rest have to be content with what remains. In principle, there is nothing terrible in it, the same is the case in nature, but the zoo staff still carefully monitors that there are no people deprived. If they see that an animal is not allowed to the feeder, they will feed it separately or even separate it from the group. Observation is also important in order to notice in time that one of the pets refuses to feed - this may be a manifestation of the disease.

In conclusion, we note that feeding animals and cleaning their premises must be done using the special equipment which should be labeled.

Storage and location of animal feed in the refrigerator should exclude the possibility of their contact with the floor, walls, cooling devices. Sanitary processing of cold rooms is carried out daily at the end of work or as necessary with drugs.

After each feeding of animals the equipment used (drinking bowls, buckets, meat grinders, etc.) should be sanitized as well as meat cutting sites. Decks for chopping meat are cleaned and covered with salt.

For the sanitization of containers, containers, pallets, racks, goods carriers, a washing station should be provided, located near the refrigeration circuit.

Thus, proper feeding is of great importance for maintaining the health of animals, maintaining their strength and performance. Each group of animals has its own norms and rules of feeding and watering. It is necessary (if the established norms require it) to feed the animals kept in accordance with the norms and diets every day.

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