Animal welfare and environmental enrichment in the domestic breeding and ornamental rearing of geese and mallards

ORIGINAL ARTICLE

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SUMMARY

The concept of animal welfare has been widely studied and discussed in recent years. This is a science, which seeks an improvement in the quality of life of animals, ensuring that they have the right to their 5 basic freedoms respected. Animal welfare practices seek to have animals express their natural behavior, even when they are in captivity, ensuring their physical and psychological health. Such techniques help in the adaptation of the animal to the environment, especially in captive animals and in breeding. There is a direct relationship between the implementation of animal welfare practices and the ability of them to adapt and

have a good quality of life in the environment in which it was inserted. The growing increase in ornamental bird breeding and as pets has revealed the need to study and ensure welfare practices in the rearing of these animals. One of the techniques used to ensure animal welfare is the implementation of different types of environmental enrichments. Environmental enrichment seeks through different techniques and materials to provide more attractive and stimulating environments to animals, allowing interaction between animals and animal-environment, enabling them to enjoy and explore the environment, optimizing the available spaces, providing opportunities for the development of behaviors and natural abilities of the species, reducing the stress caused by space limitation and absence of stimuli. The objective of this work was to relate animal welfare in the implementation of environmental enrichment in two breeding stake of geese and mallards, one for ornamental and domestic purposes, birds being reared as pets. In particular describe the creation, report the implementation of three types of environmental enrichment: food, physical and social, and response of birds after the implementation of this technique of animal welfare promotion. The results of the implementation of food, physical and social environmental enrichment, to improve the well-being of birds, were verified in both breedings, obtaining a positive result. There was an improvement in the behavior of the animals, which is closer to the natural in both groups, attesting to improvement in quality of life and providing physical and psychological well-being to birds.

Keywords: Animal welfare, breeding, environmental enrichment, geese, mallards.

1. INTRODUCTION

The concept of Animal Welfare can be understood in different ways among people, it is entirely linked with the quality of life of the animal.

The theme is already widely used in pet animals, currently there are discussions about the area of animal production (BENETTON, 2017; ALVES et al., 2007; CARVALHO et al, 2017). In animal production, consumers have sought to acquire products from places where there are animal welfare practices, increasing concern about the subject.

Animals are sentient beings, are able to feel emotions like happiness and fear, so ensuring

well-being in their breeding is essential in order to give a better quality of life to animals and rid them of any kind of suffering.

In conservation creations “ex situ” there are studies of animal welfare practices in different species. One of the ways to ensure the welfare of these animals is through environmental enrichment.

Environmental enrichment can be physical, sensory, food, social or cognitive. In birds, it is common to implement these enrichments, in waterfowl it is possible to provide physical, sensory, food and social environmental enrichment easily.

In this study, different types of environmental enrichment were introduced in two goose and mallards breeding, one for ornamental/commercial purposes and the other as pet animals, in order to improve their well-being and quality of life.

Therefore, we will describe how enrichment was implemented in the animal environment and the result of these in improving the behavior and consequent well-being of birds.

2. ANIMAL WELFARE AND ENVIRONMENTAL ENRICHMENT

2.1 ANIMAL WELFARE

The term Animal welfare was first mentioned in 1965 in England by the then Brammel committee, a group called the Ministry of English Agriculture. Since then, its concept has been expanded and studied, making it a science that concerns the quality of life of animals, evaluating it in various aspects, such as health, physical and psychological condition and whether it has the possibility of expressing the natural behavior of its species (BROOM and MOLENTO, 2004).

Welfare practices allow an animal to adapt to the environment, such as captivity and breeding.

There is a direct relationship between the implementation of animal welfare practices and the

ability to adapt and have a good quality of life in the environment in which it was inserted.

The concept that guide animal welfare practices is that of the five freedoms. It was created by the Uk (Farm Animal Welfare Council – FAWAC).

2.1.1 THE FIVE FREEDOMS

The five freedoms are known internationally, they represent a way to recognize, determine and guarantee the basic rights of animals.

According to the Farm Animal Welfare Council, the five freedoms are defined as:

- 1) Free from hunger and sea – Unlimited access to good quality water and balanced diet should be ensured in order to meet physiological needs and keep the animal healthy;
- 2) Free from discomfort – Animals must have an appropriate environment, which is comfortable and safe, that meets their needs for activities and rest;
- 3) Free from pain, injuries and diseases – Animals should have access to veterinary services, both preventive and treatment, so that it provides a rapid diagnosis and treatment in cases of diseases;
- 4) Free to express natural behavior – With the appropriate environment, with sufficient space, socialization practices, such as the company of animals of the same species, in order for the animal to present characteristics of its natural behavior.
- 5) Free from fears and anguish – Ensure conditions and treatments that avoid suffering, such as good management practices, protection of predators and separation of animals that can generate conflicts.

2.2 ANIMAL WELFARE AND ENVIRONMENTAL ENRICHMENT

The research carried out in the area of welfare is the basis for the definition of laws,

agreements and other legal initiatives, in order to ensure that the freedoms and rights of animals are respected and respected, ensuring their health in all aspects.

It is proven in several studies that animals raised in conditions that can express their natural behaviors, with welfare practices are more efficient in a productive way, that is, in addition to the welfare practices being beneficial to animals, the producers who apply them in their creations are also favored, since, also, consumers have sought products with higher quality and with guarantee of an ethical breeding (SANS et al , 2014; SILVA et al, 2010; ZAGO, 2015).

With the evolution of the relationship between man and animals, increasing proximity and conviviality, animal welfare has been more assured. Animals that were formerly used for protection or production have been raised in the form of pets.

With the birds it was no different. The creation of birds ornamentally and as pet has increased considerably in recent years, bringing to light the welfare needs of these animals (CAMPOS, 2000).

One of the ways to ensure animal welfare is environmental enrichment. Basically we can define environmental enrichment (EA) as a management principle in order to improve the quality of life of captive animals, their living conditions and their well-being (CONCEA - ORIENTAÇÃO TÉCNICA No. 12).

The implementation of the EA seeks through different techniques and materials to provide stimulating environments to animals, making the environment more complex, attractive, facilitating the environment-animal interaction, stimulating the psychological and physiological of animals, promoting skills and behaviors appropriate to the species, reducing the stress caused by space limitation and absence of stimuli (FREITAS et al, 2015)

The EA offers improvements in the physical and mental condition of the animals, increasing the docility of these when being, decreasing the presentation of behavioral disorders, clinical interventions, mortality and consequently improves the quality of life and longevity of the animal (GREEN and MELLOR, 2011).

Studies and case reports, mainly in the area of conservation and breeding of animals “*ex situ*” show that environmental enrichment provides captive animals with interaction with the

environment, so that they exhibit behaviors consistent with those presented in nature, taking advantage of the environment, with possibilities to explore and optimize space, respecting the characteristics of species and improving living conditions (CAMPOS et al, 2017; JACINTO et al, 2010).

Through environmental enrichment it is possible to simulate situations and interactions with the environment similar to those that the animal would naturally encounter, avoiding stress and abnormal, stereotyped and repetitive behaviors, common to happen when the animal does not have enough stimuli in the enclosure and gets bored (CONCEA - ORIENTAÇÃO TÉCNICA No. 12).

In zoos and conservation units, environmental enrichment is indispensable, assisting in the rehabilitation of animals, and may make possible the reintroduction of some specimens into the wild (DIAS et al, 2010; FERREIRA, 2020; JACINTO et al, 2010).

2.3 IMPLEMENTATION OF DIFFERENT TYPES OF ENVIRONMENTAL ENRICHMENT AND ANIMAL WELFARE

In the implementation of environmental enrichment different techniques are used, these should be suitable for the animal species in order to ensure safety and a good variety of experiments to the animal. For this, it is indispensable to know the behavior of the animal when it is in free life and determine which of these behaviors are important for its survival and occupy its routine and should be implemented in its life in captivity (OIE, 2019).

There are different types of environmental enrichment that can be provided.

Basically, we can divide the EA into five types, this can occur by implementing physical structures (Physical EA), exploring the meanings of the animal (sensory EA), safe and peaceful interaction with animals of the same species or species that it would coexist together in nature (social EA), promote variation in animal feeding (food EA), or cognitive EA, which stimulates the intellectual capacity of the animal (SILVA and MACÊDO, 2013).

In birds the types of environmental enrichment of easier implementation and most used are

physical, food and social.

It is not enough just to implement the EA, we need to make sure that the animal is really in the state of animal welfare, for this, we can ascertain their reactions and behaviors, if they are consistent with the natural ones, if they maintain their social interactions, stable, without presenting aggressive behavior or abnormal behaviors, if they present good development, normal body temperature, good body condition, physiological balance and homeostase (GREEN and MELLOR , 2011).

Remembering that well-being cannot be considered a permanent state, because it is always in need of adaptation according to the period of life of the animal, having changing concepts during the life of the animal.

All materials used in environmental enrichment must be non-toxic, should not facilitate leakage and should be safe for animals, being suitable for the size of the enclosure, in addition, they should provide animals with the option of choosing to interact or not with the enrichment offered (SILVA and MACÊDO, 2013).

In the breeding of aquatic birds, such as ducks, mallards and geese, environmental enrichment is indispensable, whether in a domestic or ornamental breeding.

3. CREATION OF GEESE AND MALLARDS

Geese and mallards are birds of aquatic habits, belonging to the family of Anatoids, Order Anseriformes. They are rustic birds, easy to manage and rear, easily adapt in different environments (SIGRIST, 2009).

In nature they live in flocks, some species perform migrations in search of greater abundance of food and better conditions for their reproduction.

In breeding, these birds are easily accustomed to management and care routines, reacting well to contact with humans (ALVES, 2019).

These birds have adaptations to the swim, such as the existence of membranes between the

toes and the secretion of oily substance waterproofing by the uropigian gland (located at the end of the back near the tail), such secretion, birds spread through the feathers with the help of the beak and this prevents birds from soaking while swimming (ALMEIDA, 2016).

Geese and mallards are birds that, when reared in direct contact with the owner, exhibit docile behavior. The life expectancy of both is more than 15 years (ALVES, 2019).

The mallards reach sexual maturity from 6 months of age, while geese from 9 months. Being from there considered adult birds.

One of the biggest differences between geese and mallards is the detachment of mallards before eggs and chicks as opposed to the extreme care of geese with them (MATHIAS, 2019; ALVES, 2019).

Gans usually hatch right after laying (on average 14 eggs per cycle) and raise their chicks next to the flock, while the mallards the breeding needs chocadeira or another bird for the hatchet, and a nursery for the chicks in the initial phase (MATHIAS and SILVA, 2018).

In commercial farms are marketed their meat, feathers, eggs, chicks, matrices, including tailings, such as the sale of feces for the elaboration of fertilizers or insumfor fish farming (in contact with water, the feces of mallards and geese allow the formation of microorganisms that are consumed by fish) (GONÇALVES, 2020).

Geese are also bred for protection purposes, they are birds that tend to defend their territory from strangers, being excellent guardians.

Currently, geese and mallards have been raised as pet and ornamental birds, increasing their proximity and relationship with humans (FIORIN, 2020).

3.1 HANDLING AND FEEDING

The basic feeding of both species is grass, vegetables, fruits, grains, small invertebrates, earthworms, herbs, snails and in creations is also provided commercial feed, depending on age. Through the beak, birds filter water and mud by obtaining plant matter, insects and

larvae for feeding (SIGRIST, 2009).

In addition to feeding there should be drinking fountains with clean water, it is important that the drinking fountains are not the same places where the birds bathe (GONÇALVES, 2020).

Feeders can be simple, and should allow all birds to have access to food simultaneously.

As in broilers, broiler can be divided into phases: initial, growth and adulthood (or fattening depending on the end of rearing) (MATHIAS and SILVA, 2013).

The feeding changes as the animal grows. In the initial phase, commercial, farelada feed, such as that offered to broide chicks, should be provided up to 21 days of age of the bird.

After the growth phase begins, where the size of the feed's bran may become larger, and skinned feed can be offered and the introduction to grazing and other bird foods can begin.

Adult birds should also receive feed, the own commercial feed for birds such as geese and mallards is difficult to find, being then offered the commercial feed of laying or the mixture of broken corn (or trough) and concentrate, in order to meet all the nutritional needs of the bird without generating fattening (ALVES, 2019).

The supply of laying feed is of paramount importance during the reproductive cycle, since females produce a high number of eggs in the cycle and require levels of guarantees of vitamins and minerals in a similar way to laying chickens.

According to Gonçalves (2020), during the initial phase the chicks must have access to a heated place, usually the use of bells for the warming of birds in this phase. In addition, shelter should be provided to external influences, free access to water and food in the form of bran.

After the first 7 days the chicks can have access to external areas, where they will get used to the natural climate.

After 15 days, the chicks can already have access to places with water to bathe, with depths below their height to avoid accidents, while the geese must access after 40 days (MATHIAS

and SILVA, 2018).

In the growing phase it is already possible to offer commercial feed skinned birds, where there is less losses due to geese and mallards feeding and then taking water, thus, the skinned feed offers a higher yield, because there is less food waste by birds and less pollution of water sources with food bran. During this phase it is possible to introduce different foods to the bird, and to seam them to the management of the creation (MATHIAS and SILVA, 2013).

3.2 STRUCTURES FOR CREATION

In the breeding of birds such as geese and adult mallards there is no need for much structure as in the breeding of chickens, basically a covered area should be provided so that the birds can shelter from bad weather and shelter the feeders (MATHIAS, 2019).

It is of paramount importance that the feeders stay in a covered place, because the feed when wet and / or wet is fermented, and the bird that ingests will die.

Another common structure to be offered to these birds in order to enrich the environment is the installation of water fountains for baths. These should be cleaned frequently in order to avoid the emergence of algae, such as the known green algae or cyanophilias, which produce toxins that, when ingested, can cause severe intoxication and death (FREITAS, 2020), in addition to the appearance of slat, a material prone to the multiplication of *Clostridium botulinum*, which can lead to severe intoxication and death by Botulism, especially in dry seasons, birds when filtering water with slat, ingest the toxin produced by the bacterium (OLATE and LATORRE, 2008).

Providing an adequate place for these birds to practice swimming is essential. In breeding where there is no such enrichment, growing birds are more likely to develop bone and joint development problems, especially when together with malnutrition (ARNAUT, 2006).

Access to bathing places should be free to all birds, allowing them to enter and exit easily.

In commercial creations, the area available per bird is relatively small (about 1.5m² per mallards), being in ornamental creations and some domestic that generally, these have more

space available in the environment to present the natural behavior of the species (GONÇALVES, 2020).

3.3 RACES AND INITIAL INVESTMENT OF CREATION

The breeds that stand out with the largest number of creations in Brazil are, among the Geese the creation of the so-called “signers” (strong squeaking and excellent defenders of the environment), of the races: Chinese-white and Chinese-brown, African, Embden, Toulouse and the common goose (hillbilly), and among the mallards the races: Beijing, Rouen, Mallard Duck and Indian Runner (OLIVEIRA, 2019).

The proportion between males and females in rearing takes place, in the rearing of geese, from one male to two females, and in mallards from one male to up to 6 females.

The initial investment of creation is low, being basically composed of the purchase value of the matrices (from 100 to 300 reais depending on the breed) and the implementation of fences (60 to 90cm high are sufficient) and covered shelters (MATHIAS and SILVA, 2013).

3.4 SUSCEPTIBILITY TO DISEASES

Anseriformes are more resistant to diseases than chickens, and among them, geese and mallards are more resistant than ducks (ALMEIDA, 2016).

These birds have greater susceptibility to pathogens during the initial and growth phases, and care should be more intense during youth (OLIVEIRA, 2019).

According to Almeida (2016), there is little research on diseases in which this order is most prone, the country where there is the greatest literary production and research referring to China, which is home to the world’s largest production of this type of bird.

In Brazil, a country considered free of most pathogens causing avian diseases, birds generally suffer poisoning (such as botulism and ingestion of toxins produced by algae, for example) than the contraction itself of a disease.

According to the National Program of Poultry Health, vaccination, such as Avian Influenza and Mycoplasmosis, is prohibited in the national territory.

In Europe there are recent cases of these birds' involvement by avian influenza (influenza), leading birds to mandatory sacrifice (REUTERS, 2020).

4. MATERIALS AND METHODS

The implementation of environmental enrichment and its results was carried out in two aquatic bird breeding, one for ornamental/commercial purposes, where eggs, chicks and matrices were sold, and another rearing for domestic purposes, with birds reared as pet. Both creations were composed of geese and mallards.

The domestic breeding (breeding A), the birds were reared as pet, was composed of 7 animals, between females and males, of these 4 mallards (3 mallards of Beijing and mallards Rouen) and 2 geese (1 African and 1 Chinese Signer), which lived in the same enclosure, of approximately 60m².

The other breeding, creation B, was larger, also composed of mallards and geese, forming a group of 19 animals, among females and males, being: 7 African geese, 2 Chinese signers, 9 mallards from Beijing and 2 mallards Rouen, installed in an area of approximately 660m².

For the implementation of environmental enrichment in the creations object of this work, different materials and techniques were used, in order to promote physical, food and social enrichment according to the available space and the type of management, which was different between the two creations.

4.1 SOCIAL ENRICHMENT

Social enrichment was similar in both creations. The animals, after reaching adulthood, were placed in the same environment.

First the birds underwent an adaptation phase, were separated by plastic mesh, in a height of

60cm, in mesh size in which the birds could not pass the head or beak to the other side of the fence.

After not presenting more aggressive behavior and being friendly between them, they were inserted in the same enclosure, where they formed a single band with defined hierarchy.

In this way the geese and mallards interacted with each other, similarly to the interaction that would occur in nature. After the group was cohesive, they welcomed the new chicks, without disputes over food, water or shelter.

4.2 PHYSICAL ENRICHMENT

Physical enrichment was implemented differently in both groups, we will describe physical and food enrichment separately in rearing groups A and B.

4.2.1 PHYSICAL ENRICHMENT IN CREATION A

As the space for rearing was limited, about 10m² per bird, different types of floor were implemented in order to provide birds with contact with different textures.

The environment consisted of: sandbox area (about 2m²), land area (about 2m²) where eventually grasses were transplanted, area with concrete floor (about 14m²), area with stones (about 30m², similar to gravel, but rounded) and area with roof with tilan floor (about 10m²) and area with cover with sawdust floor (2m²). The floors were sanitized daily.

In addition to the floors, plastic conéis were placed, cut in half, with bath water, with a water column height greater than the height of the bird, and this can swim.

The conéis were cleaned daily in the morning and afternoon, being washed and the water changed, and if necessary, they were washed at noon (if the water was already dirty).

Daily the barrels were exchanged places in the environment, respecting a distance of 1 meter between them, being implanted 1 barrel for each two birds.

The amount of conlets was sufficient not to generate conflicts and competition between birds.

The conéis were placed in the gravel area, as well as plastic houses (such as those used for dogs), with nests made of shavings, where the females used as nests for laying. Two females chose the same nest, but the size of the house was sufficient for both to enter simultaneously.

In the gravel area he had a tree that offered natural shade to the animals.

Birds during the day could freely explore the environments according to their free choice, being able to choose between the different floors and whether they wanted to stay in the shade or in the sun.

4.2.2 PHYSICAL ENRICHMENT IN CREATION B

In the second creation, for ornamental and commercial purposes, the available space was approximately 34m² per bird, so the implementation of physical and food environmental enrichment were different from those of creation A.

The environment of the creation was wide, with various types of trees and shrubs, grassy floors and land.

There was a predominance of natural shading areas, with few areas of sun due to the intense coverage of the treetops. For the bird's swimming was built a lake, concrete, with depth greater than the height of the birds, with at least 8m² of area, where the birds entered and left freely.

Due to the way of construction, the cleaning of the lake was hampered, accumulating sland in the background. Once a year, in the dry season it was possible to dry the lake and remove the accumulated stake.

In one of the corners of the enclosure was built covered shelter, with about 6m², with side cover, where the gansas and some marrecas made the laying, the other marrecas laid the

eggs by the environment without using the nests.

4.3 FOOD ENRICHMENT

4.3.1 FOOD ENRICHMENT IN CREATION

Due to the creation being pet, food enrichment was favored, due to the non-concern with the costs of implementing it in the creation.

Daily commercial feed was offered for skinned laying for birds, feeders were placed during the day, filled with feed (enough for all birds without offering excess food), and at night collected, to avoid contact of vectors with food debris.

On rainy days the feeders and drinking fountains were installed in the covered areas, and the animals could have free access to the other environments.

In addition to the ration, vegetables, fruits, grasses and pastures were offered daily. The birds were supplied at random: cabbage, spinach, grated or filleted carrots, broccoli stems and leaves, cabbage leaves, beetroot cooked in pieces, fruit peels, papaya, watermelon, mango pieces, banana, cut grass, seasonal pastures, tomatoes, etc.

Each day different foods were offered, allowing the animals to come into contact with foods of different shapes, textures and flavors, enriching food and giving the opportunity for birds to choose the food they wanted to consume.

4.3.2 FOOD ENRICHMENT IN CREATION B

The feeding of the birds of rearing B was made by corn in bran mixed in laying concentrate. This was offered in the morning and evening.

In addition to the feed, in the afternoon, the birds had access to areas with grass/pasture, and may present the behavior of natural grazing.

Eventually vegetables and vegetables were offered, such as lettuce, cabbage, spinach and tomatoes, which were planted in the owner's vegetable garden, as well as grass and cut pastures.

5. RESULTS AND DISCUSSION

In both creations, social enrichment took place in a similar way, as well as the results obtained. The birds lived peacefully with each other, forming a hierarchy with dominant males and females of the flock, presenting the behavior of natural society among them.

In creation A, there was only one male of each species, forming a single and united flock, without competition for females.

In rearing B, there were more males, having a proportion close to one male for each female, generating a natural competition for their coverage in the mallards, and the natural formation of couples between geese. However, such competition for mating did not generate conflicts between the birds.

In physical enrichment, there was a greater change in behavior in birds of rearing A, where they stopped presenting repetitive behaviors.

The birds spent different parts of the day exploring the environment, bathing and cleaning their feathers, interacting with each other, were attentive to any modification in the environment.

In addition, as the breeding was pet, the birds approached to interact with humans, gaining affection and sleeping in the lap of the breeders.

In the birds of ornamental rearing, due to the ample available space, there was little change in behavior. Some birds bathed during the day, but most of the time they roamed the enclosure in search of food, such as insect hunting.

In food enrichment, the pet group received a greater variety of food, besides being encouraged to capture these foods in different ways, such as hanging or hidden among the

stones, in addition to hunting insects and earthworms. Group B, on the other hand, could express their natural behavior by grazing, hunting insects in the large enclosure and eventually receiving different foods.

In both creations it was possible to verify the improvement in the well-being and quality of life of the animals. The birds presented adequate development, good body score, expressed natural behaviors of the species, interacted socially among them, were docile to management (creation A even more due to the proximity of the relationship with breeders), their body temperatures were normal (ascertained by sampling in creation B) and were free of diseases and parasites.

In rear-creation A, where the implementation of physical environmental enrichments and feeding the animals presented repetitive behaviors, these were normalized after the implementation of the EA.

6. FINAL CONSIDERATIONS

There is an ethical duty to have an animal farm or keep animals in captivity. We must provide them with physical and psychological health, offering the animal the possibility of choice, exercising its reactions to the environment in which it is inserted and presenting the natural behavior of its species.

In this way we use environmental enrichment to provide the animals of the two creations with different types of interaction with their environment, making it as dynamic and interactive as possible, improving their quality of life.

In both creations, different materials were implemented for physical and food enrichment, based on the area available in the enclosure and characteristics of the management of each rear, in order to ensure improvement in the well-being and quality of life of the animals, respecting their freedom of choice.

Thus, we conclude that in both creations it was possible to implement physical, food and social environmental enrichment. Through different tools, the two creations provided better quality of life and good well-being practices, with improvement in the behavior of birds,

without them presented more stereotyped and repetitive behaviors, presenting the natural behavior of the species and better relationship and interaction between birds and the environment.

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