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Artículos científicos

Importancia del manejo de la población canina en situación de calle en México: perspectivas y desafíos

The importance of the management of the stray canine population in México: perspectives and challenges

Importância do manejo da população canina de rua no México: perspectivas e desafios

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Resumen

Se estima que la población canina en México es de aproximadamente de 18 millones, cantidad reportada por el censo de las jornadas de vacunación antirrábica realizadas en el país. Esto hace que México ocupe uno de los primeros lugares en Latinoamérica con sobrepoblación canina debido principalmente al deficiente conocimiento en bienestar animal. Por ello, se permite que los perros deambulen sin supervisión; además, no existe control de la natalidad, lo cual aumenta los índices de abandono y genera un impacto negativo en la salud humana. Esta situación, además, se asocia con problemas de tipo socioeconómico y de políticas públicas, de ahí que la educación sea un factor importante para modificar el comportamiento social, pues se podrían generar soluciones que servirían para prevenir el abandono y la reproducción, así como para tomar la responsabilidad sobre la adquisición de un animal de compañía. Este estudio, por tanto, presenta un panorama general del estado del arte del control de los caninos en situación de calle, para lo cual se propone un enfoque sostenible a través de un control sistemático de natalidad y de estrategias enfocadas en la educación. La identificación obligatoria puede ser un sistema eficaz y fiable para el registro de perros, y así promover la tenencia responsable. En tal sentido, el control de perros abandonados debe hacerse de una manera que no cause dolor innecesario. Para ello, la captura se debe hacer con el mínimo de fuerza y sufrimiento mental, y si la eutanasia es un recurso de control, hay que realizarla con humanidad.

Palabras clave: importancia, manejo, caninos, situación de calle.



Abstract

It is estimated that the canine population in Mexico is approximately 18 million, as reported by the census of the anti-rabies vaccination campaigns carried out in the country. Mexico occupies one of the first places in Latin America with canine overpopulation mainly due to the deficient knowledge of animal welfare; therefore, dogs are allowed to roam unsupervised, there is no birth control, and this causes abandonment, which harms human health, addition to socioeconomic and public policy problems. Education is an important factor in modifying social behavior, which can lead to a commitment to solutions to the problem, thus preventing abandonment, reproduction, and taking responsibility for the acquisition of a companion animal. This study presents an overview of the state of the art in the control of stray canines, for which a sustainable approach is proposed through systematic birth control and strategies focused on education. Mandatory identification can be an effective and reliable system for dog registration, thus promoting responsible dog ownership. Stray dog control should be done in a way that does not cause unnecessary pain. Trapping should be done with minimum force and minimum mental suffering, and if euthanasia is a means of control it should be done humanely.

Keywords: Importance, driving, canines, street situation.

Resumo

Estima-se que a população canina no México seja de aproximadamente 18 milhões, número informado pelo censo de sessões de vacinação antirrábica realizado no país. Isso faz com que o México ocupe um dos primeiros lugares da América Latina com superpopulação canina devido principalmente ao pouco conhecimento sobre o bem-estar animal. Portanto, os cães podem circular sem supervisão; Além disso, não existe controle de natalidade, o que aumenta as taxas de abandono e tem um impacto negativo na saúde humana. Esta situação também está associada a problemas socioeconômicos e de políticas públicas, pelo que a educação é um factor importante na modificação do comportamento social, uma vez que poderiam ser geradas soluções que serviriam para prevenir o abandono e a reprodução, bem como para responsabilizar-se pela aquisição de um animal de estimação. Este estudo, portanto, apresenta um panorama geral do estado da arte no controle de caninos em situação de rua, para o qual é proposta uma abordagem sustentável por meio de controle sistemático de natalidade e estratégias focadas na educação. A identificação obrigatória pode ser um sistema eficaz e fiável para registrar cães, promovendo assim a posse responsável. Nesse sentido, o controle



dos cães abandonados deve ser feito de forma que não cause dores desnecessárias. Para isso, a captura deve ser feita com o mínimo de força e sofrimento mental, e se a eutanásia é um recurso de controle, deve ser realizada de forma humana.

Palavras-chave: importância, manejo, caninos, situação de rua.

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Introduction

Several factors have favored the increase in the number of companion animals in homes, among which the demand stands out to fill socio-affective spaces in family environments or to have a companion for life, which has become a necessity for many. (Gómez *et al.* , 2007). However, according to Morán (September 27, 2012), there is no exact figure for the dog population in Mexico, although it is estimated that 30% of the dogs have an owner, 30% are community dogs and The remaining 40% is on public roads .

This disproportionate increase in dogs causes serious public health problems in developing countries, which can be associated with socioeconomic, political and animal welfare problems (Salamanca *et al.* , 2011). The World Organization for Animal Health (2010a) maintains that the canine overpopulation on the street comes, in a large percentage, from abandoned dogs, which includes puppies resulting from uncontrolled breeding and dogs without owners that reproduce on public roads . . According to the aforementioned organization, three types of street dogs are identified: 1) wandering dog with an owner, but free from surveillance or restriction at a given time, 2) wandering dog without an owner, and 3) feral dog (domestic dog that has returned to the wild and is no longer dependent on humans). These animal populations are limited by survival, reproduction and immigration/emigration.

Now, although various strategies can be used to control the massive increase in this population, Sawbridge (July 27, 2022) points out that the most humane way is to combine education with identification, while the International Companion Animal Management Coalition (ICAM) (2019) points out that the most effective method to regulate dog overpopulation on the streets is through a combination of techniques.



The dog

The dog (*Canis lupus familiaris*) is undoubtedly one of the domestic animals that has the closest relationship with humans, mainly due to its size, which facilitates its coexistence in homes. This species is a domestic carnivorous mammal that is a subspecies of the wolf. Its evolution is substantially due to its wild ancestors, probably due to the change in human activities from hunter-gatherers to sedentary ones. However, it has been its relationship with man that has drastically modified its diet and condition, hence it has become an omnivore, which has contributed to its domestication (Bentosela and Mustaca , 2007).

Furthermore, the socialization and plasticity of the dog's behavioral characteristics were very useful for humans; for example, from taking care of flocks and being support during hunting and guard duties to the search and rescue of people, which has generated a great bond between the two species (Cañón and Dunner , 2014). In this sense, the role and evolution of the dog hand in hand with humans has contributed significantly to developing a series of complex situations (Valadez and Mendoza, 2005), ranging from those that affect the state of health to those that they involve sociability with human beings (Granados, *et al.* 2007).

Mexico and the canine population

Mexico is made up of 32 states, and according to statistics, 8 out of every 10 homes have a dog, of which only 4 receive decent treatment, which includes adequate nutrition, attention and basic care that contributes to giving them a Good life quality. As there is no precise data, it is estimated that in Mexico - according to the National Institute of Statistics, Geography and Informatics and the Mexican Association of Veterinary Doctors Specialists in Small Species (AMVEPE), cited by the Gazette of the Senate of the Republic (2019) - There are an estimated 28 million pets, although not half of them have a home or shelter (Gaceta del Senate of the Republic, 2023). Some of the reasons for dog abandonment are the following:

- Investment of time and patience to educate him.
- Do not sterilize and reproduce it by accident.
- Lack of financial resources for their maintenance.
- Living in spaces where possession is prohibited.
- Death of the owner.



In addition to the above, the incompatibility of the breed with the owner must be taken into account, as well as the basic implications of living with an animal.

On the other hand, it is essential to understand from a bioethical perspective the impact that the abandonment of dogs has on society (Medina, 2011). In the context of Mexico, efforts to control the reproduction of canines have arisen from collaborations between the Ministry of Health, animal protection organizations and some local veterinary schools. However, these initiatives, far from effectively addressing the problem through permanent sterilization programs and the massive dissemination of information about the importance of dog sterilization, have proven to be insufficient so far (National Center for Preventive Programs and Control of Dogs). Diseases [Cenaprece], 2021). Therefore, it is necessary to explore and describe the dog population control techniques used worldwide and adapt them to the Mexican context, in order to propose effective solutions to reduce this problem.

According to ICAM (2019), it is advisable to promote the implementation of systematic education plans that mainly address education, reproductive control and, in extreme cases, euthanasia. This strategy should be led mainly by government institutions in close collaboration with the country's educational institutions with the aim of effectively controlling the reproduction of dogs (ICAM, 2019).

Materials and methods

The qualitative method uses data collection techniques such as in-depth interviews, participant observation, focus groups, and document analysis to gather detailed information about a research phenomenon. These techniques allow the opinions, beliefs, attitudes and behaviors of the participants to be captured in their natural context (Cañizares Cedeño and Suárez Mena , 2022).

In the case of this research, data was collected with the support of bibliographic references and literature review , as well as information from interviews with veterinary doctors that showed a general overview of the control of canines in a street situation.

Public policies for population control in dogs

Public policies related to the control of the dog population in Mexico are reflected in several articles of the General Animal Welfare Law. This law, which consists of six titles and 77 articles, has the main purpose of establishing guidelines for animal welfare and promoting optimal coexistence between humans and animals in all aspects of life.

One of the fundamental pillars of this legislation is to encourage the active participation of society in the dissemination of the culture of animal welfare, which is based on the dignified and respectful treatment of animals and the recognition of their rights. This implies the collaboration of the public, private and social sectors in the promotion of these practices.

In title II of the law, which addresses powers and competencies, special emphasis is placed on promoting the culture of respect for animals with the purpose of developing programs that prevent the abandonment, loss and overpopulation of dogs. Furthermore, Article 7 of this section establishes that it is the responsibility of the government to promote educational programs that prevent the abandonment, loss and overpopulation of animals, as well as prevent their sacrifice without a justified reason. On the other hand, article 8 states that federal entities have the responsibility of leading and promoting the culture of respect, responsibility, protection and dignified treatment of all animals, in addition to constantly disseminating information on this topic and carrying out campaigns. sterilization.

For its part, title III of the law, referring to companion animals, establishes the obligations and responsibilities that “the guardian” must fulfill towards his or her companion animal. This involves ensuring the well-being of the animal at all times and ensuring that it has appropriate and safe interactions with both humans and other animals (article 17). In addition, article 18 describes the purpose of Animal Care and Rehabilitation Centers, which consists of educating society, promoting responsible ownership of animals and controlling the reproduction of those that have been abandoned.

Likewise, in title IV, which deals with the animal protection attorney's office and sanctions, it is established that any person has the right to file a written complaint with the Ministry of Health, delegations or attorney's offices in case of non-compliance with this law, Therefore, each state must have an animal welfare attorney's office, in charge of resolving complaints and determining the corresponding sanctions. The nature and amount of these economic sanctions can vary from one to two thousand days of the current minimum wage



or include administrative arrest of up to 36 hours, depending on the severity of the offense (General Animal Welfare Law, 2016).

Possible solutions to the problem of canine overpopulation

The street dog population, when not effectively managed by owners or authorities, can cause a number of problems, such as filth in the urban environment, fear and injuries caused by aggressive dogs, as well as the transmission of zoonotic diseases. Additionally, these dogs often experience health problems due to underfeeding, and are exposed to injuries caused by accidents and mistreatment by passersby, leading to poor animal welfare conditions. Therefore, it is essential to develop population control plans to address this problem. In this sense, three key approaches are identified in relation to the control of street dog populations: education, reproductive control and, in certain circumstances, euthanasia (Contreras et al., 2017).

Education

In Mexico, various state and municipal entities are in charge of promoting and disseminating the culture of respect for animal rights. However, there is no specific data on the population of companion animals in the country. According to estimates by the Association of Veterinary Doctors Specializing in Small Species (AMVEPE), it is estimated that there are around 28 million pets in Mexico, but only 30% of them have an owner; The remaining 70% of companion animals are homeless, being victims or survivors of abandonment and abuse, and this figure increases by 20% each year. In addition, it is estimated that approximately 500,000 dogs are abandoned annually, according to data from the National Institute of Statistics and Geography (2023).

According to the WSPA (2007), education regarding responsible dog ownership has a long-term impact and should be aimed at society as a whole. Therefore, education is configured as an intervention strategy in social behavior, since it positively promotes values and generates a change in attitude regarding the responsible ownership of pets, which leads to a reduction in the number of abandoned animals (Valencia, 2012).

Responsible ownership

Ignorance regarding the responsible ownership of animals inevitably leads to the progressive increase in the street canine population. This is because, on many occasions, dogs are considered only as pets, and when behavioral problems, unplanned reproduction or changes in the owner's life arise, abandonment becomes an alternative. This practice contributes significantly to the growth of the homeless dog population due to the lack of adequate reproductive control (Gutiérrez, 2018).

Therefore, it is essential to understand that pets in general, and dogs in particular, are living beings that completely depend on their owners as responsible long-term caregivers. This responsibility covers aspects such as providing them with adequate nutrition, maintaining a clean and healthy environment, providing veterinary care that includes necessary treatments, and promoting their physical and mental well-being. According to the World Organization for Animal Health (2010b), animal welfare is defined as “the physical and mental state of an animal in relation to the conditions in which it lives and dies” (p. xxxx). In other words, it refers to the quality of life given to an animal.

But how can you determine if an animal enjoys a good quality of life? This is recognized through the fulfillment of the five fundamental freedoms: freedom from hunger, thirst and malnutrition; freedom from fear and anxiety; freedom from physical and thermal discomfort; freedom from pain, injury or illness; and freedom to express natural behavior.

Record

The individual identification of dogs and an adequate record of their existence represent valuable tools to promote the responsible ownership of these animals. The implementation of a registration census that covers pets and their owners would simplify the task of tracing and, when necessary, the imposition of sanctions. Additionally, it would help prevent owned dogs from wandering unsupervised.

In theory, identification and registration could serve as a basis for law enforcement, which in turn would foster a sense of responsibility as they would function as proof of ownership (World Animal Protection, 2023).

Table 1. Advantages of canine identification

Why identify?	It allows the owner to be located and promotes the value of responsibility.
	Ensures compliance with the law.
	Control and monitor the population.
Registration benefits	Allows you to recover lost dogs.
	Sanction if necessary.
	Create statistical data on the canine population for possible epidemiological plans.

Source: Own elaboration

Mexico City (CDMX) has a Single Digital Registry for Companion Animals (RUAC) system, which stores detailed information about pets, including data such as age, breed, color, coat pattern (coat), color of particular eyes and signs. In addition, attached is a series of photographs taken from five different angles: front, back, left, right and top. It also records relevant information about the pet's health, such as its reproductive status and the date of the last rabies vaccination. Likewise, it collects the owner's data, including name, address and telephone number.

An example of the registry is shown in figure 1. According to the CDMX government, registered pets can access a variety of services in accordance with public policies aimed at animal welfare. In addition, this registry grants them legal recognition and integrates them into the assistance network in case of loss, abandonment or if they are left alone without supervision (RUAC, 2021).

One of the strategies that has proven to have positive results in controlling dog overpopulation in various parts of the world is the implementation of a registration system. This can be applied to dogs that were once homeless and that have been sterilized and then returned to their place of origin. The purpose is to replace an uncontrolled and reproductively active dog population with a controlled and reproductively inactive population (Jackman and Rowan, 2007).

Reproductive control

Reproductive control aims to limit population growth—mostly, but not exclusively—by controlling the reproduction of the species. In the context of canine sterilization, the Mexican Health Sector reports that between 670,000 and 695,000 sterilizations are carried out annually. However, of the 16 million dogs on the streets, more than 10 million have not yet been sterilized. Sterilization therefore becomes a crucial strategy in the management of abandoned companion animals, since it controls reproduction and, therefore, reduces the number of litters and, consequently, abandonments (National Program Center Preventive and Disease Control [Cenaprece] , 2018).

Surgical sterilization involves the removal of reproductive organs under general anesthesia. Two main surgical techniques are used: oosalpingo hysterectomy (OSH) in females, which involves the removal of ovaries, oviducts and uterus; and orchietomy in males, which involves the removal of the testicles, which prevents the production of sperm and testosterone. The procedure guarantees permanent sterilization and can reduce sexual behaviors (ICAM, 2019).

Controlled management of dog overpopulation presents significant challenges. Early sterilization through surgery is performed on puppies in a varying age range, generally between 6 and 24 months for females and between 6 and 12 months for males (Serrano et al., 2020) . Since puppy abandonment contributes greatly to the homeless dog population, it is essential to implement sterilization programs geared toward owned dogs. This, theoretically, would have a significant impact on reducing births, since animals that are pets tend to be the most successful at reproduction (Asmida *et al* ., 2021). In addition to preventing reproduction, sterilization offers various benefits to animals, which are detailed in the following table:



Table 2. Benefits of sterilization in dogs

Oophorosalingus hysterectomy	Avoid unwanted pregnancies.
	Avoid estrous cycle (heat).
	Prevents pyometras (infections in the female's reproductive organs).
	Avoid sexually transmitted diseases.
Orchiectomy	Completely prevent reproduction.
	Avoid sexually transmitted diseases.
	Reduces behavioral problems such as marking, fighting and aggression.

Source: Own elaboration

In this context, the Mexican Ministry of Health contributes annually to the State Health Services (SESA) by providing essential supplies, such as tranquilizers, anesthetics, sutures and healing materials. The purpose of this support is to collaborate with state health services, municipalities, and animal protection groups to ensure the availability of additional resources that allow them to achieve their objectives (Cenaprece , 2021). The SESAs promote agreements with animal protection groups, veterinary schools and municipalities to guarantee the presence of trained personnel and the adequate supply of materials. Animal protection groups handle outreach and community interaction, while veterinary schools provide veterinarians and interns.

These campaigns are well received and each year the goals are exceeded, as shown in Figure 2, leading to an increase in the number of sterilized and therefore infertile dogs.

The approach known as “capture, sterilize and return” (CED) is also used, but its application is not universal. It is advisable to implement it in communities where the majority of dogs are homeless and where the community is tolerant towards this canine population. Additionally, the environment must provide a reasonable level of well-being for these animals. The higher the proportion of annual sterilizations, the faster the population reduction and the lower the density of street dogs (Jackman and Rowan, 2007).

Reducing dog overpopulation ensures that the dog population is below its carrying capacity, meaning more resources will be available to improve their overall well-being.



When using strategic trapping, it is important to return the dogs to their home area, ensuring that they have access to the same resources they previously had, thereby reducing the risk of conflict and aggression between dogs when entering the area. uncharted territory (Sawbridge , July 27, 2022).

However, there is a risk of mistakenly capturing dogs with owners who are roaming unsupervised and sterilizing them without their consent. To address this issue, implementing this approach requires active community participation, encouraging owners to supervise their dogs and avoid confusion. Furthermore, it is essential that the animals involved are properly identified using permanent or visible to the naked eye techniques to avoid recapture (Jackman and Rowan, 2007).

Euthanasia

Euthanasia is a controversial topic in animal welfare organizations around the world and its acceptance varies depending on local culture. Although this can lead to a rapid reduction in the stray dog population, it does not address the underlying cause of the problem. Therefore, it should not be considered the only solution to control this population (ICAM, 2019).

Still, euthanasia is considered in situations where canine populations form packs that pose a risk to public health or when animals are suffering, so their well-being is compromised. When carried out, it is essential to prioritize practical and rapid methods that guarantee the safety of the operator responsible for the process, and, in all cases, humane methods must be used that ensure that the animal loses consciousness before dying.

Humane euthanasia is based on fundamental criteria, such as minimizing pain and discomfort, achieving rapid loss of consciousness and death, minimizing the animals' distress, and ensuring that the method is reliable and irreversible (World Organization for Animal Health , 2010a).

Currently, in Mexico, the official Mexican standard NOM-033-ZOO-1995 regulates humane slaughter protocols. This standard establishes that animals must end their lives quickly and painlessly, and drugs must be used at all times to reduce suffering (NOM-033-ZOO-1995, 2023).

Results

This study highlights the importance of adequately addressing the street canine population in Mexico, as it has a significant impact on public health. By implementing vaccination and sterilization programs, the spread of dog-borne diseases such as rabies can be reduced, contributing to animal welfare by providing veterinary care, adequate feeding, shelter, and promoting responsible adoption, which improves the quality of life of these animals.

In addition to these aspects, properly addressing this dog population can improve coexistence in urban areas by implementing policies and programs that encourage peaceful coexistence between dogs and city residents. This helps minimize conflicts and promote mutual respect in the community.

Controlling the reproduction of street dogs through sterilization programs is another important facet, as it helps reduce overpopulation and associated problems, such as abandonment and lack of resources for their care.

Finally, it is relevant to highlight that adequate management of the street canine population can generate economic benefits, such as promoting responsible tourism and creating jobs in areas related to animal care, through the implementation of adoption and care programs. responsible.

Discussion

Several authors have highlighted the importance of addressing the problem of the homeless canine population in Mexico. According to Castagno (2017), this population poses a significant challenge to public health, since stray dogs can transmit diseases to both humans and other animals. Furthermore, Varela (2022) highlights that the lack of control in the reproduction of these dogs contributes to overpopulation and an increase in cases of abandonment.

From the perspective of animal welfare, Buitrago (2019) highlights the importance of providing veterinary care and adequate food to street dogs, although the scarcity of resources and limited access to veterinary services are factors that negatively affect their quality of life. On the other hand, López (2018) highlights the positive impact that the responsible adoption of these dogs can have, by providing them with a safe and loving home.

With regard to urban coexistence, De Ávila and Ciro (2016) argue that the proper management of the street canine population is essential to avoid conflicts and promote security in communities. This involves implementing policies and programs that encourage peaceful coexistence between dogs and city residents.

From an economic perspective, Guerrero *et al.* (2022) highlight the possible benefits of adequate management of the street canine population, which includes the generation of employment in areas related to animal care and the promotion of responsible tourism. In other words, the existence of adoption and responsible care programs can attract tourists interested in supporting these initiatives.

Conclusion

Mexico is still in an education process, since it is common to see owned dogs wandering without supervision, which reflects a problem of abandonment and lack of empathy in society towards these animals. It is evident that there is a real problem regarding the low value given to dogs, but this situation is in the hands of human beings to be resolved.

However, by working on public education and supporting it with programs on responsible pet ownership, a culture can be achieved that rejects abandonment and does not allow dogs to roam unsupervised. Additionally, awareness of the responsibilities that come with being a pet sitter should be encouraged. Consequently, the re-education of society is essential, as sterilizations will play a fundamental role in controlling overpopulation, resulting in a reduction in both owned dogs and stray dogs.

Even so, it should be noted that the techniques mentioned in this work must be used with caution and carried out simultaneously. Education should be aimed at all ages, but it should be prioritized among young people, who will become the adults of the future. They must be aware of the problems caused by abandonment and poor ownership of dogs, and they must be taught the importance of sterilization to control the populations of animals that roam unsupervised and on the streets to avoid resorting to euthanasia.

Future lines of research

There are various areas of research that could be of great relevance in the management of the street canine population, which are mentioned below:

- Evaluation of the effectiveness of sterilization programs: It would be beneficial to investigate the effectiveness of different sterilization programs in controlling the street canine population. This could encompass the comparison of varied approaches, such as mass sterilization campaigns or sterilization and release programs.
- Study of the relationship between the homeless canine population and public health: Investigating the connection between the presence of homeless dogs and the spread of zoonotic diseases in the community would be very useful. This could involve analyzing the incidence of diseases transmitted by dogs in areas with a high street dog population and evaluating the impact of vaccination and disease control programs.
- Evaluation of the effects of adequate management of the street canine population on animal welfare: It would be important to investigate the impact that adequate management of the street canine population has on the well-being of these dogs. This could include assessing indicators of well-being, such as their health status, behavior and quality of life, especially in those receiving adequate attention and care.

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