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Ethical population management of feral cats on universities campuses based on Trap-Neuter-Return protocol

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Abstract. Trap-Neuter-Return (TNR) is the humane and effective approach for stray and feral cats. Studies show that TNR programs improves the lives of feral cats, improves their relationships with the people who live near them, and decreases the size of colonies over time. In this kind of population management, unowned cats are humanely trapped, brought to a veterinarian to be sterilized, vaccinated, ear tipped and then returned to their outdoor home. In the present study TNR program was established on two university's campuses, at Salto and Itu counties, where feral and stray cat population was uncontrolled. From the beginning of the program in August 2020, an ongoing careful audit of campuses' cats was conducted based on daily observations of cats seen at feeding sites and other campuses` locations, by the staff of the program. At Salto university campus 32 cats were recorded, 13 males and 19 females. At the Itu university campus 25 cats were recorded, 12 males and 13 females. The results of TNR programs are most commonly quantified by the number of cats sterilized. In the present study 75% of the cats' colony (7 males and 17 females) were sterilized at Salto´s campus. In the other hand, at Itu´s campus, 68% were sterilized (6 males and 11 females). Furthermore, a total of 14 kittens were placed for adoption (6 from Salto and 8 from Itu). Issues and solutions for dealing with unowned free-roaming cats are not simple, inexpensive, or broadly applicable. Trap and remove for euthanasia have been practiced in many localities for many years as part of animal control programs. Nonetheless, no location has ever achieved long-term control of free-roaming cats by use of this method. The provision of affordable services to neuter free-roaming cats raises awareness that cats require and deserve responsible care and enables people to behave ethically when cats take up residence on their property or in their neighborhood.

Keywords: Feral cats, stray cats, trap-neuter-return, animal welfare

Manejo populacional ético de gatos ferais através do protocolo de captura-esterilização-devolução em dois campus universitários

Resumo. Trap-Neuter-Return (TNR) é uma abordagem humana e eficaz para gatos ferais e de vida livre. Estudos mostram que os programas TNR melhoram a vida dos gatos ferais, melhoram seu relacionamento com as pessoas que vivem ao redor e diminuem o tamanho das colônias ao longo do tempo. Nesse tipo de manejo populacional, gatos de vida livre são capturados humanamente, levados ao veterinário para serem esterilizados, vacinados, marcados na orelha e depois devolvidos no exato local de sua captura. No presente estudo, o programa TNR foi estabelecido em dois campus universitários, nos municípios de Salto e Itu, onde a população de gatos ferais e de vida livre não era controlada. Desde o início do programa em agosto de 2020, foi realizado um levantamento cuidadoso e contínuo com base em observações diárias dos gatos avistados pelos campus, principalmente próximos

aos locais de alimentação, pela equipe do programa. No campus universitário de Salto foram registrados 32 gatos, 13 machos e 19 fêmeas. No campus universitário de Itu foram registrados 25 gatos, sendo 12 machos e 13 fêmeas. Os resultados dos programas de TNR são mais comumente quantificados pelo número de gatos esterilizados. No presente estudo 75% da colônia de gatos (7 machos e 17 fêmeas) foram esterilizados no campus de Salto. Já no campus de Itu, 68% foram esterilizados (6 machos e 11 fêmeas). Além disso, um total de 14 filhotes foram colocados para adoção (6 de Salto e 8 de Itu). Problemas e soluções para lidar com gatos de vida livre não são simples, baratos ou amplamente aplicáveis. Captura e remoção para eutanásia têm sido praticadas em muitas localidades por muitos anos como parte de programas de controle de animais. No entanto, nenhum local conseguiu o controle a longo prazo pelo uso desse método. A prestação de serviços acessíveis para esterilizar os gatos de vida livre aumenta a conscientização de que os gatos exigem e merecem cuidados responsáveis e permite que as pessoas se comportem de forma ética quando os gatos passam a residir em sua propriedade ou em sua vizinhança.

Palavras-chave: Gatos ferais, gatos de vida livre, captura-esterilização-devolução, bem-estar animal

Introduction

Internationally, feral cats constitute an important and controversial issue because of their impact on cat overpopulation, animal welfare, public health, the environment, and to disagreement about what are the best methods for their control (Wallace & Levy, 2006). According to Slater (2004), in many countries, the question has become do we cosset or euthanatize unowned cats? Are they to be seen as victims or villains? Feral cats are a subgroup of free-roaming cats, they have no owner, no dependable food source or home, and little, if any, human interaction (Gibson et al., 2002).

Fortunately, in the past years, how animals are viewed has changed. In 2012, the Cambridge Declaration on Consciousness crystallized a scientific consensus that humans are not the only conscious beings and that non-human animals, including all mammals and birds, and many other creatures, including octopuses, possess neurological substrates complex enough to support conscious experiences (Birch et al., 2020). Thus, the shift in values and attitudes toward animals, together with advances in animal welfare science, has created widespread support for the idea that animals deserve consideration of their well-being and health (Slater, 2004). Euthanasia of animals because no one wants them is no longer the preferred solution to an overabundance of cats.

In a Trap-Neuter-Return program, unowned cats are humanely trapped (with box traps), brought to a veterinarian to be sterilized, vaccinated, ear tipped (the universal sign that a community cat has been neutered and vaccinated), and then returned to their outdoor home. More the less, depending on the program involved, a variety of other services may also be provided for the cats, including regular feeding, parasite treatment and removal of socialized cats for adoption (Levy et al., 2014; Wallace & Levy, 2006). In the present study Trap-Neuter-Return program was established on two university's campuses, where feral and stray cat population was uncontrolled.

Material and methods

The present study was submitted and approved by the Ethics Committee on Animal Use (CEUA), under protocol No. 0112021.

From the beginning of the Trap-Neuter-Return (TNR) program in August 2020, an ongoing careful audit of campuses' cats was conducted based on daily observations of cats seen at feeding sites and other campuses` locations, by the staff (mainly veterinarian students) of the program. Cats were given numbers for easier identification, and photographs and descriptions were recorded and cross-referenced amongst observers.

Cats were humanely trapped according with Griffin (2012) using a commercially available drop trap (Figure 1). Once captured, cats were held securely in their covered traps and taken to the university veterinary hospital. Traps containing cats were placed in a quiet dark holding areas until the time of sterilization surgery. Captured animals were sedated according to Robertson (2020). While sedated, each

animal was examined to determine sex, general health status, and presence of ectoparasites. Cats were sterilized with minimally invasive techniques according to Bushby & White (2020). With exception of the cats destinated to adoption, all cats had their left ear tipped according to Griffin (2012). Ear-tipping permanently identifies the cat as sterilized and protects the cat from the stress of being re-trapped and anaesthetized (ICAM, 2011). The procedure (Figure 2) involves removal of the tip of one of the ears at the time of surgical sterilization and is the accepted global standard for indicating that a free-roaming community cat has been spayed or neutered (Griffin et al., 2020).

Figure 1. Drop trap used to humanely capture cats. Strong-smelling food is placed on the ground beneath the trap, and the caregiver waits covertly nearby until the cat takes the bait. From the remote location, the caregiver pulls a string to remove the prop stick, causing the trap to drop, capturing the cat. A transfer door is used to safely transfer the cat from the drop trap into a regular box trap for transport.

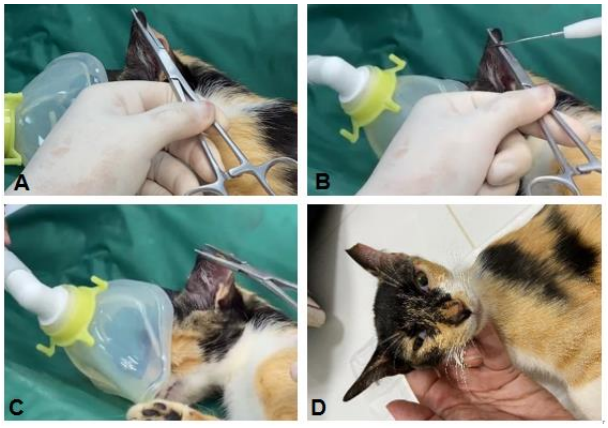

Figure 2. Ear tipping procedure. **A**, A straight hemostat is placed across the left pinna perpendicular to its long axis, exposing approximately 1.3 cm (0.5 inches) of the ear tip. **B**, Electrocautery are used to remove the ear tip by cutting over the top of the hemostat in a straight line. **C**. The hemostat is left in place until after surgical neutering to allow adequate time for hemostasis of the pinna to occur. **D**, Proper appearance of the ear following removal of the hemostat.

All cats received annual vaccination against rabies (Labovet®) as well as treatments for endoparasites and ectoparasites (ivermectin 0,3 mg/kg – Vansil and fipronil – Ourofino®). The biological data of each animal were recorded on individual forms.

Cats returned to clean traps following surgery, were hospitalized in their traps overnight and after returning to normal mental status and motor coordination they were released to their original home sites (no longer than 24 hours after being trapped).

Feeding of all cats on campus was achieved through the establishment of a cat feeding schedule that involved volunteer students and some local community volunteers. Cats were routinely fed four times a week at a number of places around the campuses, discretely hidden from pedestrians behind hedges, and behind external staircases. Fresh water was also always available at all feeding sites. Some feeding stations incorporated small feeding shelters to protect food from wild animals.

Kittens young enough to be socialized were placed for adoption. An estimated age of 4 months was generally the maximum age at which socialization of kittens was attempted.

Results and discussion

At Salto university campus 32 cats were recorded, 13 males and 19 females. At Itu university campus 25 cats were recorded, 12 males and 13 females. Both campuses are located near residential areas (Figure 3 and 4). Each campus group is thought to have developed from pet cats abandoned or lost by neighbors. Thus, the population consists of cats born feral from non-neutered former pets as well as cats who have been lost or abandoned. Because both stray and feral cats frequently co-exist within the same colonies, the term community cats is often used to refer to all of these outdoor-dwelling cats, regardless of socialization status (Griffin, 2012).

The results of TNR programs (Table 1) are most commonly quantified by the number of cats sterilized (Levy et al., 2014). In the present study 24 cats were sterilized at Salto´s campus (7 males and

17 females). In the other hand, at Itu´s campus, 17 cats were sterilized (6 males and 11 females). Furthermore, a total of 14 kittens were placed for adoption (6 from Salto and 8 from Itu). Another 2 cats simply disappeared, and their fates are unknown.

A total of 3 cats were found dead during the two-year program. Two of these cats met with accidental deaths, of which one was hit by a car at the street around campus and another fell from the campus´ roof. The cause of death of the third is unknown, but illness is suspected, as his body score was well below the recommended range.

Figure 3. Satellite images of the University campus located in the county of Salto/SP and the locations where most cats were observed (red squares).

Figure 4. Satellite images of the University campus located in the county of Itu/SP and the locations where most cats were observed (red squares).

According to the literature, the sterilization rate that is minimally sufficient to invoke population decline over time is not an invariable quantity; but, in most situations, consistently maintaining a 75% sterilization rate will produce population decline over time (Boone, 2015). In this report, 75% (24/32) of the cats were sterilized in one campus (Salto) and 68% (17/25) at Itu´s campus. It is crucial to realize that TNR program is a long-term strategy to control free-roaming cat populations. Besides, emigration of new cats is always a possibility, and in many cases, a likelihood; thus, ongoing vigilance and management are required (Griffin, 2012). The TRN program established at the present study was implemented as a permanent action in order to promote an ethical population management.

Table 1. Disposition of 57 free-roaming cats included in a university campus trap-neuter-eturn program

Disposition	No. of Cats (%)	Campus		Sex		Socialization		Age		Desexed	Entire
		Salto	Itu	M	F	Feral	Sociable	Kitten	Adult		
Remaining	38 (67%)	23	15	14	24	34	4	0	38	31	7
Adopted	14 (25%)	6	8	9	5	0	14	14	0	8	6
Disappeared	2 (3%)	2	0	1	1	2	0	0	2	2	0
Died	3 (5%)	1	2	1	2	2	1	0	3	0	3
Total	57	32	25	25	32	38	19	14	43	41	16

As observed in the current report, the population-level effects of high sterilization rates are not manifested immediately, but only become apparent after significant long times. Upon being returned to the colony site, population size will be no different than it was prior to sterilization. Population decline will only occur as existing adults die, and then fail to be replaced by kittens, a process that occurs over years (Boone, 2015). If not for the TNR program, the number of cats on campuses would likely be much higher. It should be considered that, like many university and college campuses, the campus of the present study is part of a growing urban area. Just as it's unrealistic to expect an urban neighborhood to ever reach the point of having zero strays, it's likewise unrealistic to expect campuses of this kind to be completely free of cats (Spehar & Wolf, 2019). Even so, the number of females in the colony, with an average of 4.5 kittens per litter, was multiplied by 2 births per year according to Mello (2021); thus, it

was estimated that the castration of 28 females avoided the birth of about 252 kittens; 153 at Salto campus and 99 ate Itu's campus.

It is important to bring to light that getting the cats neutered has other advantages beyond the gradually falling population, as for example noise reduction, since most of the noise from feral colonies comes from matting and fighting. Odor becomes much less noticeable, since unaltered males mark their territory by spraying urine tinged with testosterone (Kortis et al., 2013). Consequently, these cats become less likely to be targeted as public nuisances. Neutering cats also serves to promote their welfare. Studies have shown that feral cats roam less and have higher body condition scores following neutering (Griffin, 2012; Scott et al., 2002).

As in the present study, most interventions choose to focus on mass sterilization as the primary goal and do not routinely test for Feline immunodeficiency virus (FIV) and feline leukemia virus (FeLV), because resources for managing cat populations are limited. Nonetheless, focusing resources on sterilization will reduce the transmission of FIV (by reducing fighting) and FeLV by reducing reproduction (ICAM, 2011).

Rabies is a zoonotic disease of particular importance. Vaccination against rabies virus is regarded as a core requirement for pet cats and is required by law in some countries, as in Brazil. Scientific literature has indicated that vaccination against various viruses at the time of neutering appears to induce good immune responses in feral cats (Fischer et al., 2007). Therefore, all cats received vaccines against rabies virus in this study.

Finally, issues and solutions for dealing with unowned free-roaming cats are not simple, inexpensive, or broadly applicable. Trap and remove for euthanasia have been practiced in many localities for many years as part of animal control programs. Nonetheless, no location has ever achieved long-term control of free-roaming cats by use of this method (Slater, 2004). Besides, trapping cats for euthanasia perpetuates the message that cats are disposable. In contrast, the provision of affordable services to neuter free-roaming cats raises awareness that cats require and deserve responsible care and enables people to behave ethically when cats take up residence on their property or in their neighborhood (Griffin, 2012).

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