



## Tail Docking and Ear Cropping in Ruminants:

### A Comparison of Welfare Aspects in the World and Turkey

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**Summary:** The aim of this paper is to identify the physiological and behavioral responses caused by tail docking and ear cropping in ruminants, to affirm the scientific evidence for the rationale and to evaluate laws, animal welfare and current practices in the world and in Turkey. The scientific research indicates that the practice of tail docking causes acute pain and behavioral responses in sheep, and that its protective effect against fly strike is controversial. The docking process and its effect on carcass quality and live weight gain are still unclear. It is argued that tail docking in cows causes relatively low pain but can result in an excess quantity of fly strike on the back of the animals. The practice of ear cropping for the purpose of tradition and treatment by folk healers in sheep and cows - generally without using anaesthesia and analgesia, in unsterilized conditions leads to distress, pain and injury in animals. In this review, the tail docking and ear cropping were briefly outlined and compared between Turkey and around the world. The development of alternative methods for animal health and welfare, the level of awareness should be increased on welfare and legislative issues regarding ear cropping and tail docking in Turkey.

**Key Words:** Animal welfare, ear cropping, ruminants, tail docking, Turkey

#### Ruminantlarda Kulak ve Kuyruk Kesme: Hayvan Refahı (Gönenci) Bakımından Dünyada ve Türkiye'deki Durumun Karşılaştırılması

**Özet:** Bu derlemede, sığır ve koyun yetiştiriciliğinde uygulanan kuyruk ve kulak kesme işlemleri nedeniyle oluşan fizyolojik ve davranışsal tepkilerin tanımlanması, hayvanlara yapılan bu işlemlerin bilimsel gerekliliğinin doğrulanması, yasal mevzuat ve hayvan refahı (gönenci) açısından dünyadaki ve Türkiye'deki durumunun değerlendirilmesi amaçlandı. Bilimsel araştırmalar koyunlarda kuyruk kesme uygulamasının hafif-orta şiddette akut ağrı ve davranışsal tepkilere yol açtığını ve sinek istilasına karşı koruyucu etkisinin tartışmalı olduğunu göstermektedir. Kuyruksuzlaştırma işleminin koyun canlı ağırlık artışı ve karkas kalitesi üzerindeki etkisi ise hala tartışmalıdır. İneklerde kuyruk kesiminin nispeten daha az ağrıya sebep olduğu ve ineklerin arka bölgesinde sinek birikiminin fazla miktarda oluştuğu bildirilmektedir. Türkiye'de, tedavi ve geleneksel amaçlarla koyun ve sığırlarda ampiriklerce uygulanan kulak kesme işlemi ise yetiştiricilerin genellikle analjezi ve anestezi kullanmadan, steril olmayan koşullarda ve uygun olmayan araçlarla uyguladıkları, ağrı, acı ve yaralanmalara yol açan bir uygulamadır. Bu derlemede, ruminantlarda izlenen kuyruk ve kulak kesme işlemleri ana başlıklar altında değerlendirilerek dünyadaki ve Türkiye'deki durumu karşılaştırıldı. Türkiye'de sığır ve koyunlar üzerinde uygulanan kuyruk ve kulak kesimiyle ilgili hayvan refahı ve yasal mevzuat hakkında yetiştiricilerin bilinçlendirilmesi ve hayvan sağlığı ve refahı için alternatif yöntemlerin geliştirilmesi teşvik edilmelidir.

**Anahtar Kelimeler:** Hayvan refahı (gönenci), kulak kesme, kuyruk kesme, ruminant, Türkiye

#### Introduction

Animal welfare is a subject related to the need of breeders to consider scientific, ethical, economic and political aspects when rearing animals (46). In

animal farms, management practices such as tail docking, cauterization, castration and dehorning, which increase the efficiency and performance of different breeding methods are followed in detail by the public (71,77). Tail docking is carried out as a management practice in pigs, sheep and cows because it prevents pigs from biting their tails, fly strikes on sheep and to reduce the risk of mastitis

and hygiene in dairy cows. It is performed on other animals, such as dogs, for aesthetic purposes (78).

There are "five freedoms" approach that are a general rules for use of animals to prevent suffering, protect from various damage and provide good welfare conditions (4). There are many legislations in terms of animal welfare in European Union. Furthermore, animal welfare has become a subject of legal regulation on its own. In Turkey, this subject came into question especially in the framework of the European Union accession process, and some regulations were put into practice (60,69). Although ear cropping and tail docking are banned by law in Turkey, they are still applied on some farms, and the application can lead to pain and behavioral disorders that adversely affect animal health and welfare.

In this review, the aim is to identify the physiological and behavioral responses caused by tail docking and ear cropping in ruminant breeding, to affirm the scientific evidence for the rationale and to evaluate laws, animal welfare and current practices in world and Turkey.

### **Tail docking and ear cropping in sheep**

#### **Rationale and reasons for procedure**

Local sheep breed in Turkey are composed of approximately 88% fat-tailed and 12% lean thin-tailed sheep (2,27). In many scientific studies, it has been reported that the fat rate in the carcass of fat-tailed sheep in the world reaches to 33%, and this rate changes between 16% and 29% among the local breeds and crossbred in Turkey (35,73,79).

In Turkey, tail docking is carried out to obtain lean and tasty carcasses from the fat-tailed breed, to reduce the amount of fat in the carcass, to improve feed utilization, to enhance the gain in live weight and to facilitate mating with lean-tailed sheep breeds (13,26,31,36,66). Researchers point out that the fat rate in the lamb carcass can be decreased by docking the fat tail (48,55, 72).

According to the research results of Bingöl et al. (12), it was determined that tail docking contributed to increasing the body weight and characteristics of the carcass for the one day old, 28 Nordus fat-tailed male lambs. Cengiz and Arik (13) reported that the docking of the Akkaraman resulted in the lambs' total and daily weight gains being greater than the control group. Moharrery (55) identified that the docking of Badghisian lambs increased the leanness of the carcass when compared to the control group, the growth rate was increased

and the total fat content as a percentage of the whole body decreased. Furthermore, Moharrery (56) noted that tail docking had no effect on feed consumption on Baluchian lambs after birth, but improved meat quality and the amount of high-price cuts obtained from the carcass. However, the total fat content reduced as a percentage of the whole body.

Bıyıkoğlu et al. (11) investigated the effect on body growth by three different procedures of tail docking on 24 male and 24 female newborn Morkaraman lambs. When compared to the other docking procedures and control group, the combined knife and burdizzo procedure had the best results for increasing the weight in the first 21 day period on both males and females. The lowest weight gain was among lambs that had their tails ligatured by rope. From the 21<sup>st</sup> day to weaning time (112 days), in total 91 days, the greatest weight increasing was in the burdizzo groups and the least increase was among lambs ligatured with a rope (11). Isani et al. (34) compared the purebred docked Salt Range lambs, purebred fat-tailed Salt Range lamb and crossbred thin-tailed ram for growth and carcass characteristics, and determined that docked lambs gained more weight and the carcass weight more than in the undocked lambs, but the dressed carcass weight, dressing percentage and weight of loin and flank and leg cuts of crossbred lambs were higher than those of purebreds.

In contrast, Kadak et al. (35) reported that tail docking had no effect on the daily weight gain in Awassi lambs, and Panopoulo et al. (61) found that there was no significant change in the total rate of carcass fat on Chois lambs. Sarvar et al. (68) determined that tail docking had no effect on growth performance before and after weaning. Tilki et al. (82) reported that tail docking had no effect on the growth performance, live weight, carcass weight and rate of carcass fat on Tuj male lambs; Al Jassim et al. (1) declared that it caused fattening of the kidney and mesenterial adipose tissue.

Generally, the tails of thin-tailed sheep have been docked for wool production (11). Tail docking is thought to reduce the risk of fly strike by preventing the buildup of fecal material on the tail and hindquarters among thin wool-tailed sheep (78). This fecal material is called "*çakıldak*" which consist of feces, pasture grass, garbage and thorns. This contamination pollutes the wool of animals, attracts flies and insect and causes a rash under the tail. Sheep undergo tail docking operations to protect against fly strike, which is a painful condition caused

by blowflies. In particular, blowflies lay eggs in the tail of the animal, and soon the larvae lead to a loss of weight in a short time by burrowing to the organs of the animal (32,58). The presence of a fat tail may also predispose the lambs to strike by fleece worm or wool maggots (34).

The tails of fat-tailed sheep have been docked for some research and private purposes when they are young, in Turkey. For example, lean tailed Merino rams could not mate with fat-tailed Morkaraman sheep breeds because the fat tailed ram lifts the tail of the ewe with his chest to enable coitus with the sheep. The ram does this by instinct, but there is no such instinct in lean-tailed rams. This situation makes it impossible for natural coitus between fat-tailed sheep and lean tailed rams (80). Tail docking meant that Morkaraman sheep could be easily inseminated, and in this way, docked Morkaraman sheep could naturally become pregnant to Merino rams (10).

The sheep with ear cropped are easily recognized and distinguished from other herds. Known as “*en*” application, it is like piercing the animal’s ear and cutting notches in the animal ear (Figure 1-2), and each breeder has their own special “*en*” in the villages (74). The “*en*” is applied in lambhood before arriving at the plateau in the spring (88). Similarly, bloodletting has been applied by cutting the ears (Figure 3), such as enterotoxaemia (clostridiosis), *Coenurus cerebralis* or babesiosis, for the treatment of diseases in the folk veterinary medicine of Turkey. Thus, sheep owners believe that disease-causing and toxic blood is thrown out (74,88).



**Figure 1.** Known as “*en*” is a traditionally ear cropping procedure in Turkey.



**Figure 2.** Known as “*en*” is a traditionally ear cropping procedure in Turkey.



**Figure 3.** Apply of ear cropping with aim of treatment in a sheep

### **Description of tail docking in sheep**

A lot of procedures are used to dock tails in sheep: knife, combined knife and burdizzo, tight rubber ring, ring plus clamp, special scissors, heated nippers and iron, cauterizing iron and rope (9,28,53). The rubber ring method is often chosen over other methods (e.g. surgical, hot iron or burdizzo) due to easy, fast, effective and inexpensive (40).

Tail docking in sheep begins the first week after the birth of a lamb and continues until day 20 to 25 (80). The use of a rubber ring in fat tailed sheep should be done two days after birth because after this time the fat tail diameter will increase and the rubber ring will become impossible to use (55).

During the practice of ear cropping for the purpose of tradition and treatment by folk healers in sheep,

the auricle of the animals is cut using scissors, a razor blade or sharp knife. This application can lead not only to wounds at the ends and edges of the auricle but to it also being cut in half (74).

### **Pain and behavioral assessment**

The selection of the most humane procedure for docking, to make the application cause the least pain and distress is important for animal welfare (28). According to Bıyıkoğlu et al. (11), docking caused pain that continues until detachment of the tail, although ligaturing of the tail was bloodless in lambs. It was observed that during the tail docking with the burdizzo, the animals felt severe pain and screamed during the tail clamping and docking, and other than a minute amount of blood lost from the docking, there was no risk to the animal's life. Despite there not being an injury in docking with a rubber ring, dermatitis and wounds occurred due to the effect of urine and feces, and it also caused worms in some animals (11).

According to a survey of the effects of four analgesics used with docking (28), the rubber ring procedure leads to the most pain symptoms in three week old lambs. In this method, the active behaviors (abnormal postures) were more prominent than with the other methods as the pain continues for 60 minutes. Graham et al. (28) reported that the rubber ring method used with subcutaneous local anesthetics, epidural anesthesia or analgesic spray significantly reduced the active behaviors in sheep and was considered the most humane method. Both the rubber ring and combined burdizzo-rubber ring methods of tail docking increased behavioral and cortisol levels, which are considered to be indicative of considerable pain in lambs (38, 57). Nevertheless, Kent's (37) latter comparison demonstrated that lambs docked with the combined burdizzo-rubber ring method of tail docking produced the least acute pain and that it was a more humane alternative to rubber rings alone. Lomax et al. (43) determined that lambs undergoing ring docking exhibited agitation, bleating, lateral and ventral recumbency, lip curling, kneeling, knee walking, writhing and other abnormal postures indicative of intense pain and marked distress. However, Peers et al. (62) identified that the tail docking with rubber rings in lambs compared to other methods was the least painful. Mears and Brown (50) and Dinnis et al. (18) reported that docking did not increase the plasma concentrations of the cortisol and beta-endorphin in the first 24 hours after birth; in contrast, Mellor and Murray (52) found that the cortisol levels reached a maximum degree in the

first 30 minutes after application.

The hot iron method used in tail docking increased the acute cortisol and led to physiological stress and behavioral responses (41,53). Small et al. (76) found that oral meloxicam administered into the buccal cavity reduced abnormal behavior before using the hot iron method in docking, and in that case, the pain occurred after tail docking. Lester et al. (42) reported that the knife method of docking produced considerably greater distress than either the rubber ring or heated docking iron in lambs aged between four and five weeks.

Kent and Molony (38) reported that tail docking caused the largest cortisol response with surgical methods. Mellor and Stafford (53) found that about half the amount of cortisol was produced after the surgery compared to the rubber ring method. In sheep, the use of the rubber ring procedure of tail docking caused less stress than surgical tail docking, surgical castration and partly mulesing method (33). Clark et al. (15) announced that using the rubber ring method for docking male lambs could not cause allodynia and hyperalgesia.

As found by McCracken et al. (49), who investigated the behavioral effects of tail docking associated pain after castration in lambs, the differences in pain-related behavior following docking appeared to be due to prolonged hyperalgesia induced by castration at one day of age compared to castration at 10 days of age. Significant increases in behavior were seen in the 30 minutes following tail docking and included abnormal standing, rolling, stamping feet, kicking and restlessness. The lambs castrated at one day of age had a greater behavioral response to tail docking than those castrated at 10 days of age. Similarly, according to some behavioral measures, it was observed to cause more pain on five day old lambs compared with the older group of lambs with surgical tail docking (57).

According to Lomax et al. (43), despite local anesthetics, such as lignocaine, which are highly effective in alleviating the pain associated with tail docking, local anesthetics are rarely used because of practical and economic constraints. Topical anesthesia, applied during or after the procedure, offers a practical alternative that may still be highly effective for surgical procedures. Local anesthetics can reduce the cortisol responses and short-term pain in a variety of tail docking methods, but their duration of action is less than the period of pain and physiological disruption that the procedures induce (43, 76). As a consequence, the potential of non-steroidal anti-inflammatory drugs (NSAID)

to provide longer term pain relief has been recognized (53, 76). Trentini et al. (84) reported that local anesthetics may be recommended on lambs older than a week. Lomax et al. (43) noticed that topical anesthesia alleviated wound pain and significantly reduced pain-related behaviors in lambs undergoing hot-iron tail docking, without a negative effect on wound healing or the risk of systemic toxicity. The use of topical anesthetic formulations has the potential to provide a practical and economic means of reducing the pain associated with tail docking and to improve the welfare of millions of lambs (43).

The application of an auricular incision from the treatment of folk healers causes wounds that can lead to abscesses or necrosis of cartilage and auricular phlegmon in sheep and goats (67).

### **Alternatives and legislations**

Tail docking can be ineffective for the removal of flies and leads to side effects in animals such as acute and chronic pain in sheep (78). There is limited evidence evaluating the reduction in fly strike associated with tail docking, and only one of three experimental studies demonstrate reduced strike in docked sheep compared to undocked controls (24,86). French et al. (24) found that undocked lambs had a greater accumulation of feces around the tail than docked lambs, and they are more often exposed to fly strike.

Despite the main role of fat tail being undoubtedly to serve as an energy store, providing a survival buffer against periodic food scarcity, such as in drought and winter, its amputation causes significant risk (59). Neuroma formation is found in docked sheep and cows (19,23). After the application, the formation of rectal prolapse has been determined (81). According to Trentini et al. (84), tail docking is still controversial with regards to its effects on the welfare of sheep, although its effectiveness in the prevention of myiasis seems clear. However, alternative strategies for myiasis control, such as integrated fly population management, animal immunization and shearing of certain areas should be systematically used. Another alternative, procedure of mulesing without anesthetic or analgesia involves the surgical removal of wool and skin from the breech (anogenital) region, which results in permanent enlargement of the bare and stretched areas of skin around the perineum and provides protection against fly strike (14). Lambs that were mulesed all demonstrated abnormal behaviors indicative of extreme pain 24 hours after mulesing, and some were still in pain after two

days. In spite of admitting that the operation is painful, legislation and animal welfare guidelines in all Australian States allow mulesing in all sheep breeds (58). However, it is advisable to immediately use topical analgesic after surgical mulesing (44). The procedure of plastic clips that tighten the skin and consequently stretch the bare area around the perineum without an open wound is more suitable than surgical mulesing in terms of animal welfare (33). However, more research is required to prove the effectiveness of alternative methods.

European Union Directive 1998/58 on farm animal welfare does not provide for specific rules on tail docking, delegating relevant national provisions to the stakeholders. Dispositions are present at the national level, although some countries (Italy) do not have specific laws to safeguard sheep welfare during tail docking procedures (84). The Farm Animal Welfare Council allows tail docking in up to six week old lambs without anesthesia and the rubber ring method. The burdizzo and surgery methods are proposed for alternative implementation with older lambs (51). Tail docking is recommended between 2 and 12 weeks in Australia, and during the first week of the lamb's life in Canada (78). In New Zealand, if the tail causes a significant health and economic risk on the sheep farms, it is allowed to be docked (47). The Council of Europe (17) recommended that when docking with rubber rings, if rings must be used, pain relief should be provided. In contrast, the Council of Europe does not explicitly recommend pain relief when docking with the cautery iron.

According to the regulations of the Ministry of Food, Agriculture and Livestock in Turkey, it was enacted that "*tail docking in sheep and especially use of elastic band has been banned in organic breeding*" (5). Furthermore, tail docking and ear cropping were also banned, according to the title "*all of the organs, tissues or a part of them cannot be removed or be destroyed except medical purposes*" of the Animal Protection Act (3).

### **Tail docking and ear cropping in cattle**

#### **Rationale and reasons for procedure**

In dairy cows, tail docking is thought to improve cleanliness, udder health, milk quality and worker comfort (25). Miller (54) informed that tail docking was applied to reduce lameness and tail injury, and to improve the income of farmers. A survey on the occurrence of docking and beliefs about the practice was conducted by Barnett et al. (8) in 234 dairy industry members in Australia. According to the re-

search results, farmers believed that milking was finished quicker, the risks of leptospirosis for the operator and mastitis for the cow were reduced, the cows were easier to handle, fly numbers were reduced and milk quality was improved.

Tail docking is done (Figure 4-5) on some large-scale dairy farms in Turkey, but is not common, for udder health, worker comfort and to prevent energy loss owing to tail wagging. According to the results of research in folk veterinary medicine (6,74,75,88,89) in the Central Anatolia Region, Aegean Region and Low Euphrates Basin, it was determined that cutting a part of ear of cows for bloodletting were done as a treatment for diseases, such as rumen acidosis, tympani, enterotoxemia, colic, intoxication, icterus and babesiosis.



**Figure 4.** Docked tail of dairy cattle in Turkey



**Figure 5.** Docked tails of dairy cattle in Turkey

### **Description of tail docking in dairy cattle**

Tail docking is done a few centimeters under the vulva between the sixth and seventh vertebrae in dairy cows. The most common method is a rubber ring to reduce the blood stream feeding the tail. The rubber ring causes hypoxia in the tissues distal to the ring as a result of the diminished blood stream. The necrotic tail is often amputated after seven days, or it will eventually fall off on its own (83). It was reported that rubber rings were used on 87-92.5% of farms in the United States (25) and 75% of Australian farms (8).

### **Pain and behavioral assessment**

In dairy cows, a limited number of studies have been performed to determine the behavioral and physiological effects of tail docking (21,64,83). Behavioral changes associated with tail docking occur in some situations, but not others, providing only limited evidence that this procedure consistently causes pain (78).

Wilson (87) reported that the levels of plasma cortisol on docked cows with the rubber ring method increased, while pain, discomfort symptoms and appearance of specific behaviors were not observed. Eicher et al. (21) found that the rubber ring method in cows caused mild pain. Petrie et al. (64) observed that if an epidural local anesthetic (3 ml lignocaine hydrochloride) was given 10 minutes before application of the rubber ring, it inhibited behavioral responses for only two hours, and that tail docking with a rubber ring lead to some behavioral responses, but no significant differences in the normal feeding and rumination behaviors. In a later study, Petrie et al. (63) found no detectable benefit of using an epidural anesthetic based on the cortisol response of calves to docking with rubber rings or a docking iron. Tom et al. (83) determined the effects of tail docking using a rubber ring with anesthetic or without anesthetic on the behavior and production of lactating cows, and the results from this study suggested that tail docking of lactating dairy cows caused only mild discomfort; there was no advantage to using an epidural anesthetic, as no significant differences in milk production or feed intake were found.

Schreiner and Ruegg (71) observed that tail docking on calves 7 to 42 days old and heifers 20 to 25 months old caused no significant behavioral, immunological or hormonal responses. Tail banding had no significant effect on the behavior of calves  $\leq$  21 days old, whereas some behavioral differences in response to the application of tail bands were

demonstrated in calves 22 to 42 days old. However, Eicher et al. (21) determined that young cows were in much more pain than older cows with regards to behavioral signs.

Abnormal growth of nerve fibers after tail docking can result in neuromas that cause chronic pain. Neuromas are caused by many kinds of similar amputations (21). It has also been reported that clostridial diseases, gangrene and tetanus could occur in animals after tail docking (77). Some studies identified no differences in performance or incidence of tail tip injury between cattle with docked tails and cattle without docked tails housed on slats (30,39). In another study, cow cleanliness, udder cleanliness, and SCC (Somatic Cell Count) scores were not different for docked heifers compared with intact heifers (85).

### Alternatives and legislations

Many researchers have imply that there is not a clear rationale to support tail docking in cows in terms of animal health, human health and animal welfare (29,45,71,77,85). On the other hand, there is much evidence that docked cows are less effective at fly removal: docked dairy cattle have more flies landing on their hind legs than animals that are undocked (20,22,65).

Docked dairy cows contain a higher fly load as they do not have the ability to remove the fly with their tails (65). Tail-docked cattle have higher fly loads than intact cows and also show increased fly-directed behavior, which are factors that may compromise their welfare (83). Eicher et al. (22) speculated that tail docking causes stress because the procedure may reduce the cows' ability to control flies. Lombard et al. (45) found in a recent survey of 265 dairy farms in the United States of America, those which docked tails had a higher percentage of very dirty udders (8.8%) compared to farms that did not engage in the practice (5.7%).

Stull et al. (77) argued that when comparing docked cows and undocked cows that had the hair at the tip of the tail trimmed (switch-trimming), the rate of flies on the back of the cow was at a medium density and milking worker comfort was achieved. For these reasons, Tom et al. (83) suggested that switch trimming should be considered as an alternative method instead of docking.

Tail docking in cows is a common procedure used on farms in many countries, such as in the USA, Canada, and Australia (83). In Europe, tail docking in cattle is not recommended by the Council of Eu-

rope (16), and has been banned in countries such as the Netherlands, Denmark, Germany, Norway, Sweden, Switzerland and the United Kingdom; and, the American Veterinary Medical Association (AVMA), Canadian Veterinary Medical Association and Dairy Farmers of Canada are organizations in the world that oppose tail docking in cows. In New Zealand it is permitted to partially dock the tail or to cut the last caudal vertebrae. The AVMA opposes docking for routine purposes, but approves docking if it is necessary and authorized by veterinarians (7). In Turkey, according to the Animal Protection Act (3), tail docking is banned in cattle.

### Conclusions

The scientific research presented here indicates that the practice of tail docking causes acute pain and behavioral responses in sheep, and that its protective effect against fly strike is controversial. The docking process and its effect on carcass quality and live weight gain are still unclear. Further researches are required to justify tail docking lambs.

It is argued that tail docking in cows causes relatively low pain but can result in an increase quantity of fly strike on the rear of the animals. Tail docking can result in neuroma formation in ruminants. Furthermore, dairy cows do not bear any beneficial effect from tail docking. There has been a decline in developed countries, like the USA, where this process has been banned. Although ear cropping and tail docking are banned by law in Turkey and some European countries, they are still applied by some veterinarians and breeders. So veterinarians and veterinary societies should be united against the practice of tail docking. In addition veterinarians must be aware of the responsibility on ethics and deontological attitude. The switch trimming and mulesing as an alternative method instead of docking should be considered. Tail injury from trampling can be minimized by maintaining a lower stocking density and providing solid flooring and/or bedding for cattle.

No logical reasoning has been found to support the cropping of a ruminant's ears or docking of their tail in modern veterinary medicine. The veterinarians should use every available opportunity to educate and persuade breeders and the public. In conclusion, the level of awareness should be increased on welfare and legislative issues regarding ear cropping and tail docking in Turkey.

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