Review on Agriculture and Rural Development 2021 vol. 10 (1-2) ISSN 2677-0792
DOI: 10.14232/rard.2021.1-2.21-25

RESEARCH ON LEG TAGS IN GOAT BREEDING FOR ELECTRONIC IDENTIFICATION PURPOSES

OZKAN ELMAZ[1]*, ALI KAVURUR[2], MEHMET MURAT DOĞUSAN[1], YASEMIN BEYDILLI[3], DURMUŞ KAHRAMAN[3], AYKUT ASIM AKBAŞ[1]

[1]Burdur Mehmet Akif Ersoy University, Faculty of Veterinary Medicine, Department of Animal Science, 15030, Istiklal Campus, Burdur – TURKEY
[2]Burdur Mehmet Akif Ersoy University, Vocational School of Technical Sciences, Electronic And Automation Department, 15030, Istiklal Campus, Burdur – TURKEY
[3]Burdur Mehmet Akif Ersoy University, Agriculture, Livestock and Food Research and Application Center, 15030, Istiklal Campus, Burdur – TURKEY

*Corresponding author: elmaz@mehmetakif.edu.tr

ABSTRACT
This study is on the fall and readability of electronic leg tags, plastic ear tags and electronic ear tags used in 2 flocks of goats. Honamlı and Turkish Hair goat flocks were followed for 4 months and bred under different conditions. While the flock of Honamli goats went to pasture every day, the Turkish Hair goats remained indoors. It was found that the leg tags fell from 5 goats in the Honamli flock (96%), while none fell in the Turkish Hair flock. Plastic ear tags attached to goats were found to have fallen from 11 goats (92%) in the Honamli flock and 7 goats from Turkish Hair goat flock (90%). The readability of electronic leg tags, plastic ear tags and electronic ear tags used in goats for 4 months was determined as 100%. It is useful to carry out research on the use of electronic leg tags as an alternative option for goat breeding for identification purposes, with different trial groups formed on animals of different ages and different legs.

Keywords: Goat, identification, electronic, plastic, leg tags

INTRODUCTION

There were 37 276 050 sheep and 11 205 429 goat in Turkey in 2019 (TURKSTAT 2021). It is obligatory by regulation EC 21/2004 to identify sheep and goats which will be transported among the Member States of the European Union or to be shipped to third countries and to be able to monitor animal movements. According to the regulation, it has decided to use a double identifier in sheeps and goats. The first is at least 1 electronic descriptive bolus or electronic ear tag; Second, the visible identifier ear tag used for marking with traditional plastic ear tags, tattoos or paint are similar across the EU (EU2004). Today, most electronic id (e-ID) devices in use in the field of animal husbandry (ruminal bolus, e-RB, electronic ear tags, eET; electronic leg tags, e-LT or injectable transponders, e-IT) are considered effective tools for linking animal identity to information and performance data (TREVARTHEN AND MICHAEL, 2007; VOULODIMOS ET AL. 2010). It's been reported that electronic ear tags, bolus, leg tags and injectable chips were used for electronic identification purposes along with the use of plastic ear tags in goats. Foot bands are recommended only for adult dairy goats under intensive conditions. Although there are situations of loss related to foot bands, it has been concluded that they are available in the long term (CAJA ET AL. 2014). ABECIA AND PALACIN (2014), reported that he type of production systems in small ruminant breeding is an important factor to consider when choosing an electronic label. They reported that their extensive system can reduce the retention of foot bands. It has been reported that it is appropriate to wear foot bands after lambs and kids are at least 6 months old (40% of adult live weight).

Review on Agriculture and Rural Development 2021 vol. 10 (1-2) ISSN 2677-0792
DOI: 10.14232/rard.2021.1-2.21-25

The aim of this study is to determine the retention and readability of electronic leg tags, plastic ear tags and electronic ear tags used in 2 flocks of goats raised under different conditions for 4 months.

MATERIALS AND METHODS

This research is a part of project supported by Burdur Mehmet Akif Ersoy University, which was selected as the pilot university in the field of "Regional Development Focused Mission Differentiation and Specialization" project studies coordinated by the Higher Education Council and Presidency Strategy and Budget Directorate: Increasing the Sectoral Competitiveness of Burdur Province: Integrated Development by Differentiating in Agriculture and Livestock. It consists of some data (Department of Animal Science) obtained under the subproject titled and number "Dissemination and Small Ruminant Breeding 2017K12-41003-2". The study was carried out in Burdur Mehmet Akif Ersoy University, Agriculture, Livestock and Food Research and Application Center, Small Ruminant research unit.

In this study, 122 Honamlı goat and 55 Turkish Hair Goats were used. In some animals, plastic ear tags are worn in pairs. When this study on different identification began, the goats were of different ages. Twenty-one of the animals in the Honamlı flock are 8 months old and 101 are between the ages of 2 and 8 years. Thirty-two of the hair goats were 8 months old and 23 were between the ages of 2 and 8 years. All of these goats had plastic Eartags implemented by Ministry of Agriculture and Forestry. Most of them also had RFID eartags also implemented by Ministry of Agriculture and Forestry. All goats reared in the University farm also had two plastic eartags but not all of them were left at the start of this study. This study was conducted for 4 months between December 2020 and April 2021. At the start of this study RFID leg tags were applied to all of the animals. Leg tags were placed on the, around the metatarsus, covering the entire region (*Figure 1*). Each type of tags is checked periodically and total number of each type of tags noted. While the flock of Honamli goats went to pasture every day, the Hair goats remained indoors. In monthly periodic checks, goats who lost identification tools were detected by cross-checking various identification methods.

RESULTS

During this research, the results of the use of electronic leg tags applied in the flock of Honamlı goats that are taken out every day in (*Table 1*). Turkish Hair goat flock kept inside are given in (*Table 2*). According to the results, it was determined that at the end of 4 months, leg tags fell from 5 goats in the Honamli flock (96% retention), and Turkish Hair goats did not loss any. In the Honamli goat flock, 2 of the animals whose electronic ankles fell are 4 years old, 2 are 3 years old, and 1 is 2 years old. However, Plastic ear tags attached to goats were found to have fallen from 11 goats (92% retention) in the Honamli flock, and 7 goats in Turkish Hair goats (90% retention) (*Table 3 and 4*). It was determined that among the Honamli goats that lost their plastic ear tags 1 animal was 8 months old and 10 animals were 2 years and older. In Hair goats each 7 of them was older than 2 years of age. 7 Honamli goats which lost their electronic ear tags (87% retention) one of which is 8 months old and 6 is over 2 years of age. 2 Turkish Hair goats lost their electronic ear tags both of which over 2 years old. The readability of electronic foot bands, plastic ear earrings and electronic ear earrings used in goats for 4 months was determined as 100%.

Review on Agriculture and Rural Development 2021 vol. 10 (1-2) ISSN 2677-0792
DOI: 10.14232/rard.2021.1-2.21-25

Table 1. Retention and readability rates of Foot Band EIDs recorded on Honamlı goat Flock (goats, outdoors)

Honamlı goat Flock (goats, outdoors)[a]	Tagged[b]	Retained	Retention	Read	Readability
0 days	122	122	100%	122	100%
30 days	122	119	98%	119	100%
60 days	122	118	97%	118	100%
90 days	122	117	96%	117	100%
120 days	122	117	96%	117	100%

Table 2. Retention and readability rates Foot Band EIDs recorded on Turkish Hair goat (goats, indoors)

Turkish Hair goat Flock (goats, indoors) [a]	Tagged[b]	Retained	Retention	Read	Readability
0 days	55	55	100%	55	100%
30 days	55	55	100%	55	100%
60 days	55	55	100%	55	100%
90 days	55	55	100%	55	100%
120 days	55	55	100%	55	100%

Table 3. Retention and readability rates of Plastic Eartags applies by goverment recorded on Honamlı goat Flock (goats, outdoors)

Honamlı goat Flock (goats, outdoors) [a]	Tagged[b]	Retained	Retention	Read	Readability
0 days	132	132	100%	132	100%
30 days	132	123	93%	123	100%
60 days	132	121	92%	121	100%
90 days	132	121	92%	121	100%
120 days	132	121	92%	121	100%

Table 4. Retention and readability rates Plastic Eartags applies by goverment recorded on Turkish Hair goat (goats, indoors)

Turkish Hair goat Flock (goats, indoors) [a]	Tagged[b]	Retained	Retention	Read	Readability
0 days	71	71	100%	71	100%
30 days	71	64	90%	64	100%
60 days	71	64	90%	64	100%
90 days	71	64	90%	64	100%
120 days	71	64	90%	64	100%

Table 5. Retention and readability rates of EID Eartags applies by goverment recorded on Honamlı goat Flock (goats, outdoors)

Honamlı goat Flock (goats, outdoors) [a]	Tagged[b]	Retained	Retention	Read	Readability
0 days	55	55	100%	55	100%
30 days	55	55	100%	55	100%
60 days	55	54	98%	54	100%
90 days	55	49	89%	49	100%
120 days	55	48	87%	48	100%

Review on Agriculture and Rural Development 2021 vol. 10 (1-2) ISSN 2677-0792
DOI: 10.14232/rard.2021.1-2.21-25

Table 6. Retention and readability rates EID Eartags applies by goverment recorded on Turkish Hair goat (goats, indoors)

Turkish Hair goat Flock (goats, indoors) [(a)]	Tagged[(b)]	Retained	Retention	Read	Readability
0 days	21	21	100%	21	100%
30 days	21	19	90%	19	100%
60 days	21	19	90%	19	100%
90 days	21	19	90%	19	100%
120 days	21	19	90%	19	100%

Retention = no. retained tags / (no. tagged tags - no. sold or dead tagged animals)
Readability = no. read tags / no. readable tags
(a) Days after tagging
b) Differences on subsequent reading dates due to dead or sold animals

Figure 1. Electronic leg tag used in the experiments (Prof. Dr. Özkan Elmaz)

DISCUSSION

In the study of ABECIA AND PALACIN (2014), the rate of staying in animals in a completely closed area was determined as 100%. It is similar to the results in this study. On the other hand, the 90th day stay rates of animals living completely outdoors were determined as 94.5% and 78.2% in two herds, which is higher than the result obtained as 96% in this study. However, in the study of ABECIA AND PALACIN (2014), the retention rate in animals until the 180th day decreased to 63% and 78.2%, indicating that longer-term studies should be conducted. CARNE ET AL. (2010), in their study on the dairy Murciano-Granadina goat breed, it was reported that there was no loss of footband and all of them could be read visually, but 3 goats (1.5%) had to be removed due to limping, and this had 98.5% retention of the footband. In addition, in 7 goats (3.6%) the foot straps were found to be open and not electronically readable. These results are similar to the findings about the Honamli goat herd in the study. The drop and reading rates of electronic and plastic ear tags reported for the same study were found to be higher than the values.
For identification purposes, it is beneficial to conduct researches on the use of electronic foot straps as an alternative option in goat breeding by establishing different experimental groups on animals of different ages and foreleg and hind legs.

Review on Agriculture and Rural Development 2021 vol. 10 (1-2) ISSN 2677-0792
DOI: 10.14232/rard.2021.1-2.21-25

ACKNOWLEDGEMENTS

This research is a part of project supported by Burdur Mehmet Akif Ersoy University, which was selected as the pilot university in the field of "Regional Development Focused Mission Differentiation and Specialization" project studies coordinated by the Higher Education Council and Presidency Strategy and Budget Directorate: Increasing the Sectoral Competitiveness of Burdur Province: Integrated Development by Differentiating in Agriculture and Livestock. It consists of some data (Department of Animal Science) obtained under the subproject titled and number “Dissemination and Small Ruminant Breeding 2017K12-41003-2”.

FUNDING

This research is a part of project supported by Burdur Mehmet Akif Ersoy University, which was selected as the pilot university in the field of "Regional Development Focused Mission Differentiation and Specialization" project studies coordinated by the Higher Education Council and Presidency Strategy and Budget Directorate: Increasing the Sectoral Competitiveness of Burdur Province: Integrated Development by Differentiating in Agriculture and Livestock. It consists of some data (Department of Animal Science) obtained under the subproject titled and number “Dissemination and Small Ruminant Breeding 2017K12-41003-2”

REFERENCES

Abecia Ja, Palacin I. (2014). Use of electronic leg tags for identification of small ruminants. Rev Sci Tech. 2014 Dec;33(3):783-90. doi: 10.20506/rst.33.3.2317. PMID: 25812203.

Caja G., Carné, S., Salama, Aak., Saidi, Aa., Olivares, Ma., Rovai, M., Capotec, J., Argüello, N., Ayadi, M., Aljumaah, R., Alshaikh, Ma. (2014). “State-of-the-art of electronic identification techniques and applications in goats”, Small Ruminant Research, 121, 42-50.

Carne S, Caja G, Rojas-Olivares Ma, Salama Aak. (2010). Readability of visual and electronic leg tags versus rumen boluses and electronic ear tags for the permanent identification of dairy goats. J Dairy Sci, 93(11): 5157-5166. DOI: 10.3168/jds.2010-3188

EC. (2004). Council Regulation (EC) No 21/2004 of 17 December 2003 establishing a system for the identification and registration of ovine and caprine animals and amending Regulation (EC) No 1782/2003 and Directives 92/102/EEC and 64/432/EEC. Off. J. Eur. Union L5:8–17. https://ec.europa.eu/food/animals/identification/ovine_caprine_en

Trevarthen A., Michael K. (2007). ‘Beyond mere compliance of RFID regulations by the farming community: A case study of the Cochrane dairy farm. In The 6th International Conference On Mobile Business. Toronto, Canada, 9–11 July. Accessed Apr. 7, 2014. http://ro.uow.edu.au/cgi/viewcontent.cgi?article=1563&context=infopapers.

TURKSTAT (Turkish Statistics Institute), (2021): The Results of Animal Production Statistics, http://www.tuik.gov.tr/UstMenu.do?metod=temelist (accessed 17.03.2021).

Voulodimos A.S., Patrikakis C.Z., Sideridis A.B., Ntafis V.A., Xylouri E.M. (2010). A complete farm management system based on animal identification using RFID technology. Computers and electronics in agriculture, 70(2), 380-388. DOI: https://doi.org/10.1016/j.compag.2009.07.009