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An on-station analysis of non-genetic factors affecting pre-weaning growth rate in East Africa

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Abstract:

Indigenous goats are one of the most important livestock species that are raised under extensive production systems. Also, they are mainly produced in arid and semi-arid parts of developing nations, where the harsh climatic conditions do not seem to have an effect on their productivity. In Kenya, arid and semi-arid regions make up a considerable percentage of the country. So, the goal of this study is to identify the non-genetic factors affecting the pre-weaning growth rates of Small East African (SEA) goats at the Naivasha sheep and goat station, which is situated in an area of Kenya that is categorized as semi-arid. Data on growth performance was mined from the farm's performance records. The average pre-weaning daily growth was calculated using the weaning age of 120 days. Using a generalized linear mixed model, the effects of fixed factors on the pre-weaning growth rate were investigated. Sex (the animal's gender, either male or female), birth type, season of birth, and dam's age at kidding were the fixed variables taken into consideration. Buck and year were the random factors. Results indicated that all the fixed factors taken into consideration, such as birth type, season, and dam age and sex had no significant ($p > 0.05$) effect on pre-weaning growth rate. The study's findings highlight the significance of non-genetic elements in goat's growth performance. The results may help with breeding decisions, farm management, and better conservation options for native goats.

Keywords: Extensive production, Kenya, Naivasha, native goats, non-genetic factors, pre-weaning

Introduction

Small East African goats are a vital genetic resource in Kenya, providing employment, food self-sufficiency, and monetary earnings to rural households. Furthermore, they adapt well to harsh tropical conditions and have resistance to various diseases. Therefore, it is crucial to comprehend the non-genetic factors influencing the pre-weaning growth rate because the breed's productivity and profitability depend on both its pre-weaning growth rate and an animal's average daily gain. Non-genetic factors influencing the pre-weaning growth rate of small East African goats were investigated to help with breeding decisions, farm management, and conservation options.

Material and method

Data on growth performance was mined from Ol'magogo Farm in Naivasha, managed by the Kenyan government's Directorate of Livestock Development from 2009 to 2019. Data used included animal ID, birth weight, weaning weights, doe number and buck number. The average pre-weaning daily growth was calculated based on the weaning age at 120 days. Using a generalized linear mixed model, the effects of fixed factors on the pre-weaning growth rate were investigated. Sex, gender, birth type, the season of birth, and the doe's age at kidding were taken as fixed variables, while the Buck and year were random factors.

Results and discussions

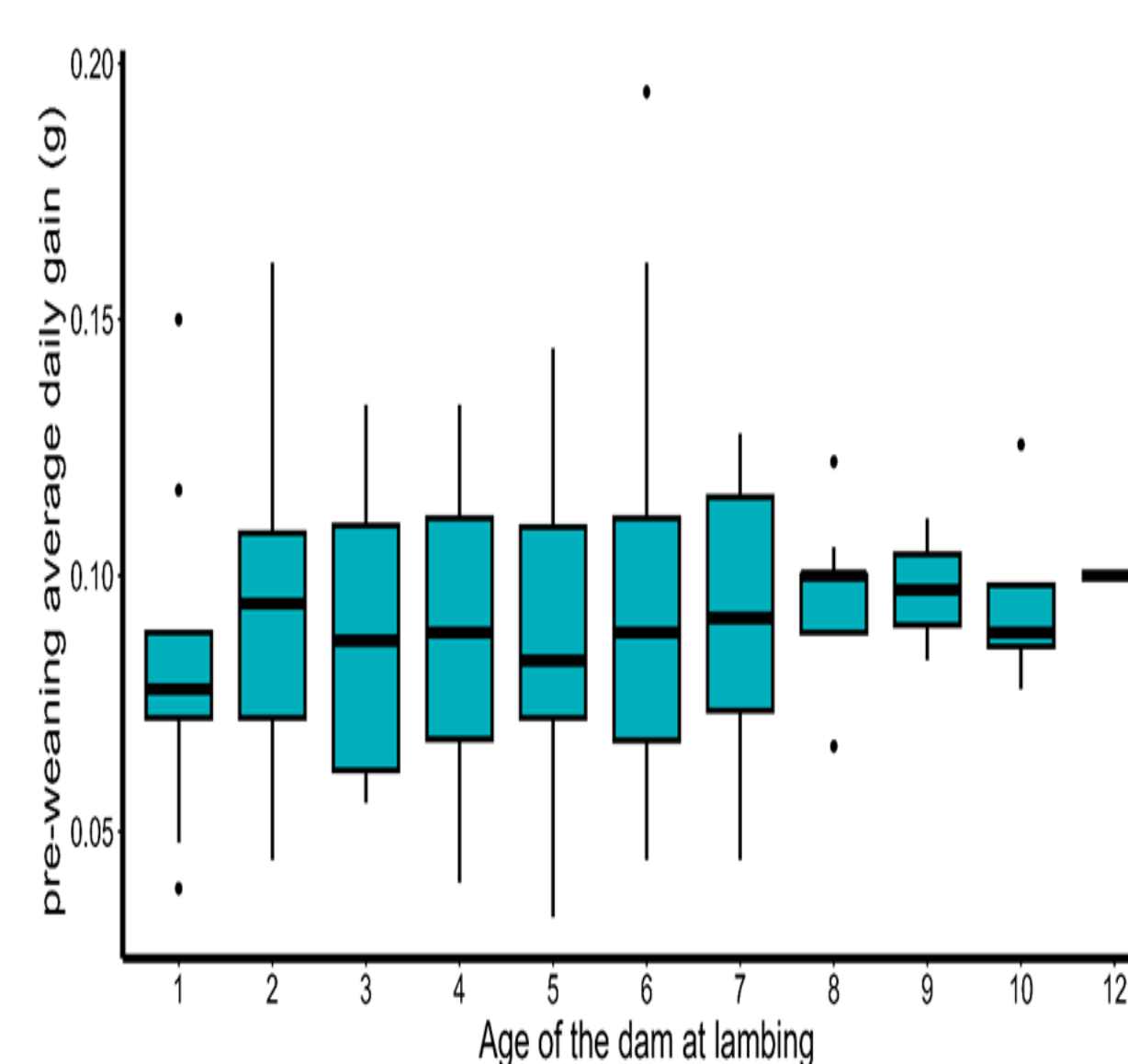


Fig 1:Effect of dam-age on preweaning performance

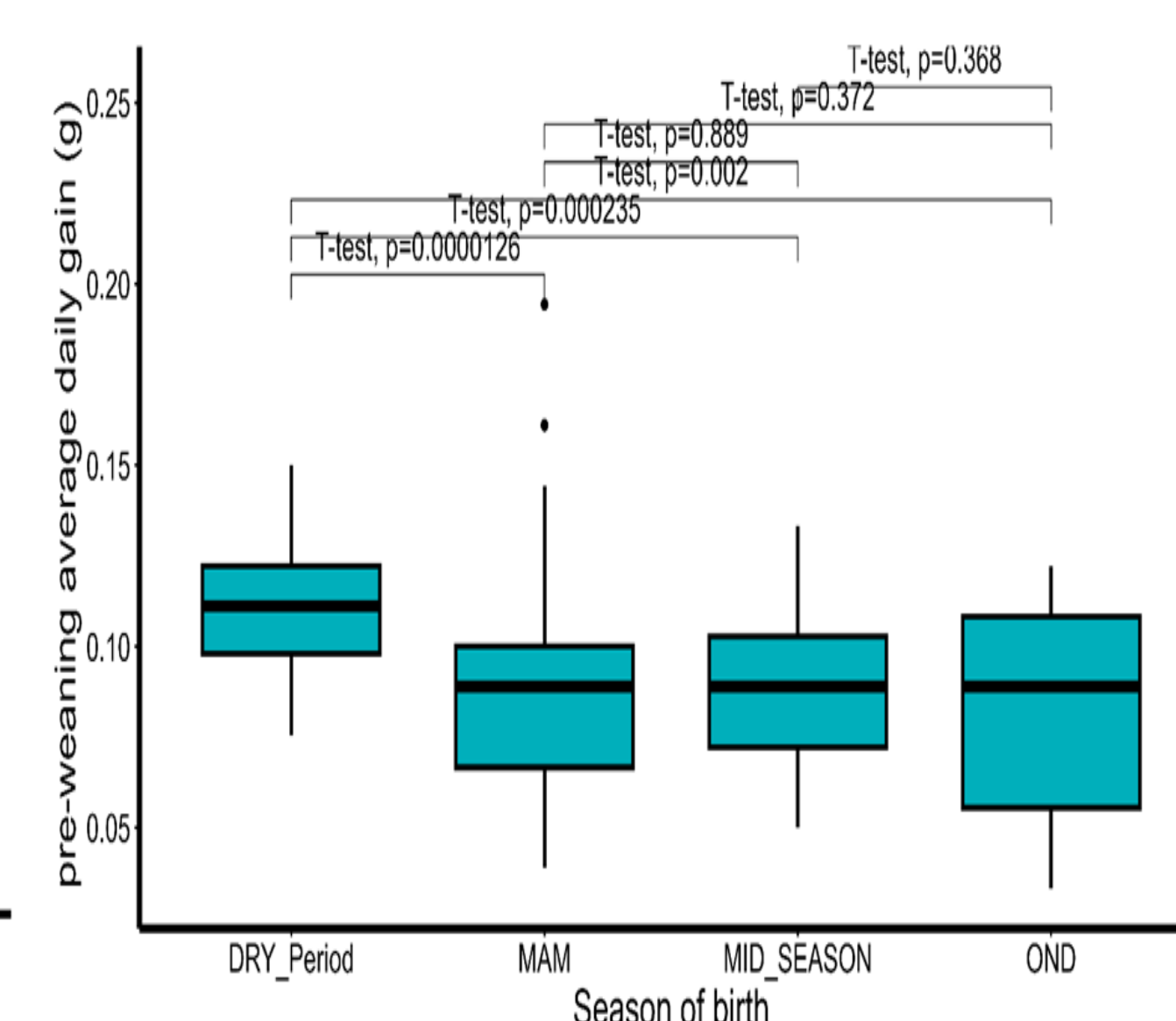


Fig 2:Effect of season of birth on preweaning growth rate

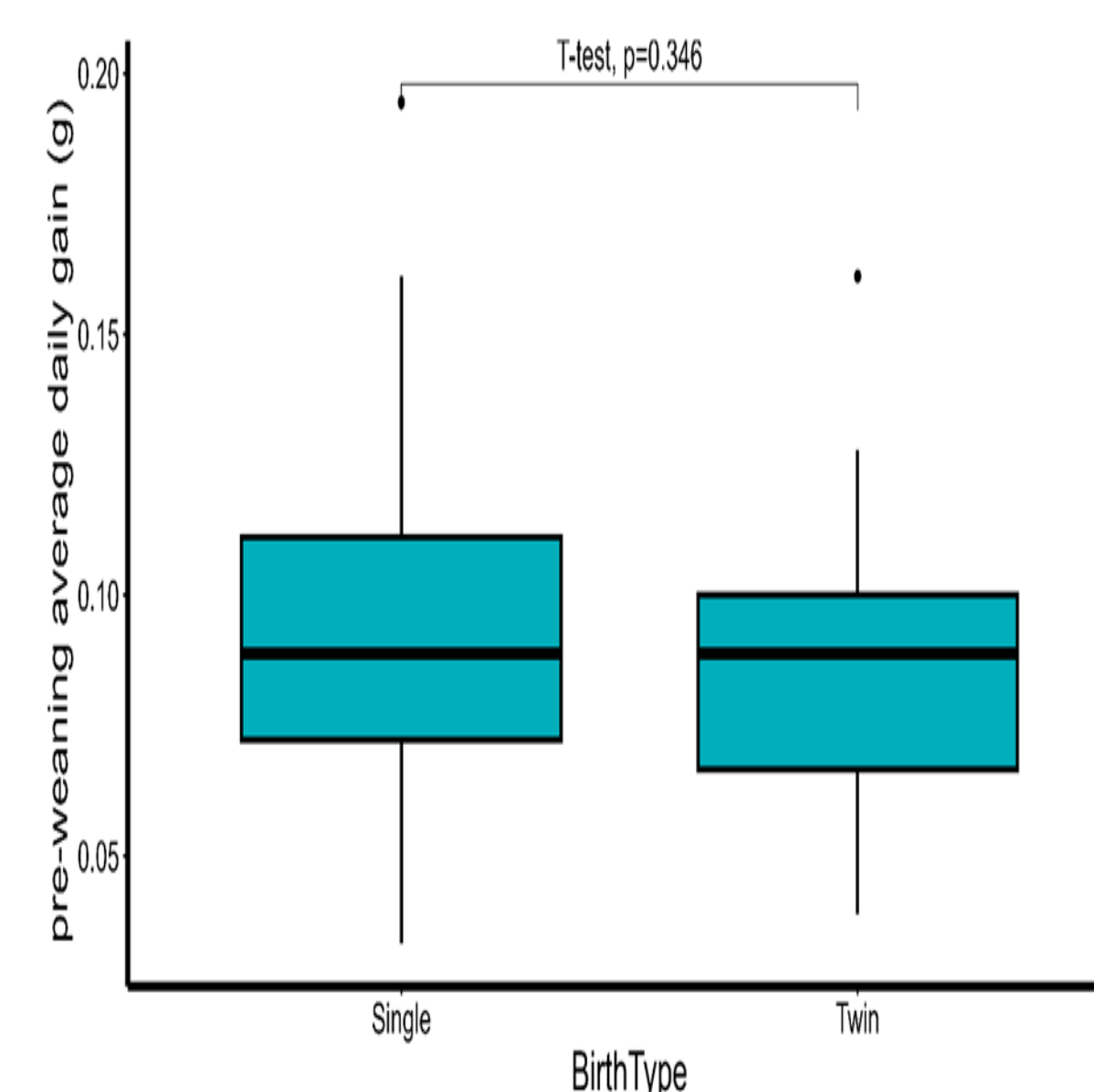


Fig 3:Effect of birth type on preweaning performance

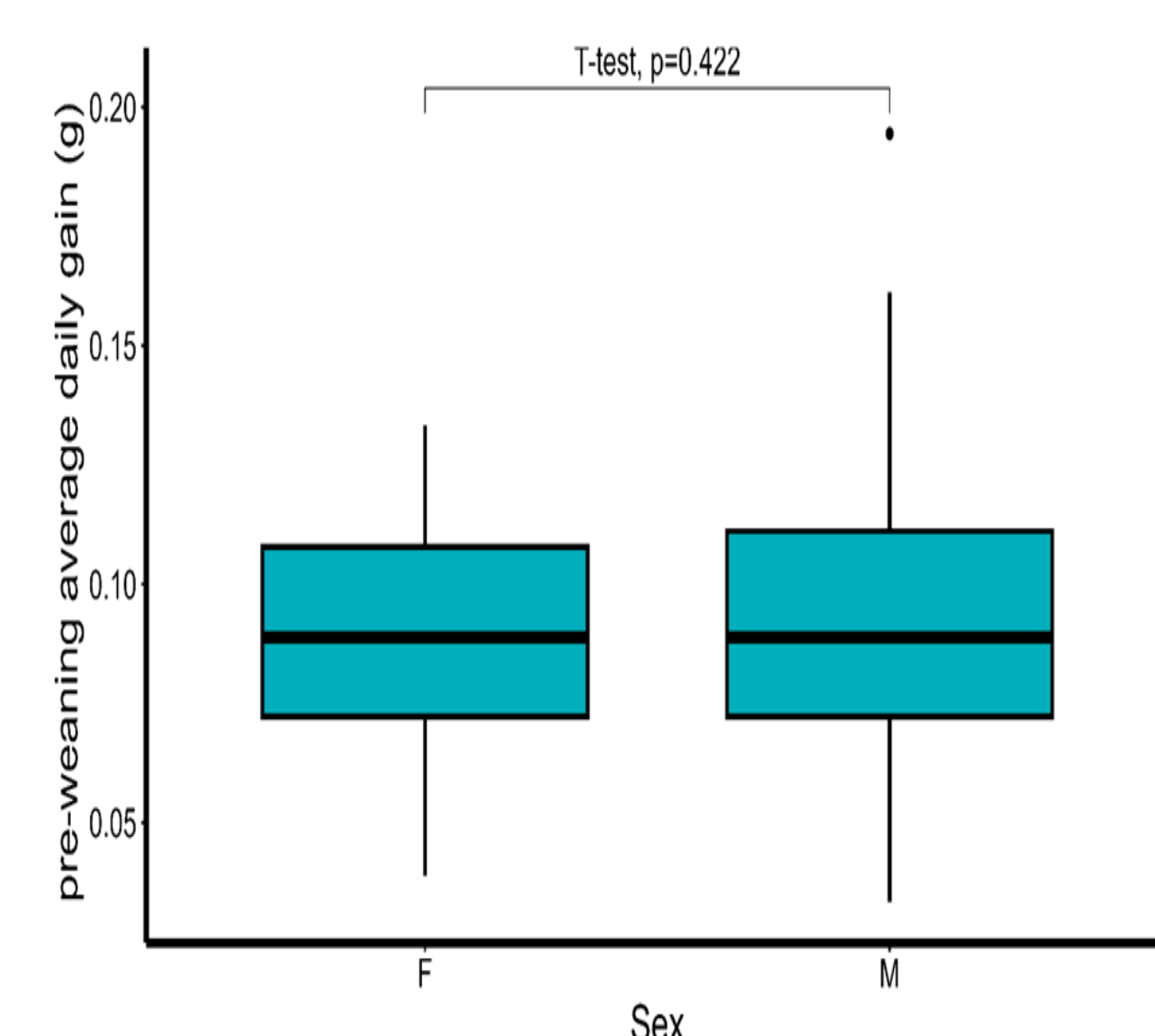


Figure 4:Effect of sex on preweaning performance

Conclusions

The study's findings highlight the significance of non-genetic elements in goat's growth performance. The results may help with breeding decisions, farm management, and better conservation options for native goats.

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