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Popular Article

Detection of Anemia Using Famacha Eye Colour Chart in Goats

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Goats have a wide distribution in the world (Anene *et al*., 1994). Their ability to survive on native pasture, high reproductive rate, low cost of feeding and requirement for minimal capital input make their production attractive to all classes of farmers (Aliyu, 1990). In many parts of the world, goats are raised for meat, milk or fibre (Saidu, 1978). The assessment of welfare in goat farms is also needed to increase the quality and hygienic standards of food production. Insufficient pasture facilities and intensive system of rearing plays a major role in spread of diseases among goats which leads to both direct and indirect economic losses.

Generally, farmers are aware of the signs associated with these diseases but their knowledge is not sufficient to accurately determine the degree of illness. Existing techniques for diagnosis of the diseases are too costly and unavailable to the groups making treatment decisions. One of the major constraints to goat production is diseases associated with anaemia. A novel and easy system that uses the severity of clinical anaemia to identify animals with severe anaemia is the FAMACHA system. This system was developed in South Africa and is used to grade the degree of anaemia by assessment of the shades of red/pink in the lower eyelid of animals (Bath *et al*., 1996).

A pen-side test was developed for use in small stock farming where helminthiasis, in particular *Haemonchus contortus* is a major cause of production loss. This test is called as FAMACHA eye colour chart was developed based on the assessment of colour changes of the

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mucous membranes. The name FAMACHA, an acronym derived the name of the originator Dr Faffa Malan (FAffa Malan CHArt-FAMACHA). This method will facilitate quick identification of *Haemonchus contortus* infected goats without the aid of any elaborate laboratory procedures. This system evolved for treating only those animals unable to cope with current *Haemonchus contortus* challenge on pasture, by using clinical anaemia as the determinant (Vanwyk and Bath, 2002). FAMACHA which is a novel test for detection of anaemia in goats. This consists of a laminated chart with five colour categories showing worsening degrees of anaemia. These colours are compared to the conjunctivae of the animals under examination. This test has been extensively tested in different countries and the use of this test has been shown to improve the treatment quality and flock health and to reduce the cost of drug (Van Wyk and Bath, 2002).

This test requires no invasive procedure and illiterate farmers can also be trained successfully in the use of this chart (Grace *et al*., 2007). The FAMACHA eye colour chart should be used to screen the goats. The colour of conjunctival mucous membrane will be classified into five categories from 1 to 5 (1- red, non-anaemic; 2- red pink, non-anaemic; 3- pink, mildly anaemic; 4-pink-white, anaemic; 5- white, severely anaemic) (Fig.1). In goats it is common for 20–30% of the animals to harbor 70–80% of the worms. Therefore, a selective approach that targets the portion of the herd or flock with high worm burdens will successfully control parasites in the entire group, while also reducing drug costs and delaying the development of anthelmintic resistance.

Fig. 1. FAMACHA chart showing severely anaemic and non-anaemic animals

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Although this method was developed specifically to address infection with *H. contortus*, which is the most common cause of anemia in small ruminants, it should be noted that there are other parasitic and non-parasitic causes of anemia (Kaplan *et al*., 2004). Furthermore, within a herd/flock it tends to be the same animals that are consistently infected with high worm burdens over time. Using the FAMACHA system, animals that repeatedly require treatment can be identified and culled to reduce the herd/flock worm load. In addition, selection of resilient animals that is the ability to withstand worm infection occurs by using FAMACHA (Burke *et al*., 2007).

Examination of animals using FAMACHA card

Proper FAMACHA scoring technique includes exposing the lower eye mucous membranes and matching them to the equivalent colour on the FAMACHA card. COVER, PUSH, PULL, POP is a four-step process describing the proper technique. COVER the eye by rolling the upper eyelid down over the eyeball; PUSH down on the eyeball. Use enough pressure to see that the eyelashes of the upper eyelid are curling up over your thumb, PULL down the lower eyelid. The mucous membranes will pop into view. Make sure that you score the mucous membrane using the FAMACHA card (Fig. 2).

Fig. 2. FAMACHA scoring COVER, PUSH, PULL and POP method

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Interpretation of the results using FAMACHA chart

Animals in FAMACHA category 4 & 5: Always deworm in these categories. Animals in FAMACHA category 1 & 2: Don't deworm animals in these categories unless there are other signs of parasitic diseases such as the presence of diarrhoea, poor body condition, dull or abnormal hair coat. Animals in FAMACHA category 3: Consider deworming if: >10% of herd scores as 4 or 5.

Precautions to be taken while using FAMACHA chart

FAMACHA is only applicable where the *H. contortus* is the main gastrointestinal parasite causing clinical disease. Redness of the ocular membranes can be caused by eye disease, environmental irritants, and systemic disease. Though they are uncommon, these conditions can mask anaemia. An elevated FAMACHA score is not the only reason to deworm an animal. Gastrointestinal parasites can play a role in other signs of disease including: diarrhoea, bottle jaw, poor body condition, dull hair coat, exercise or heat intolerance (Prashanth *et al*., 2020).

Conclusion

The FAMACHA system plays a major role in detection of anaemia by farmers and also aids in selective deworming, minimizing the use of dewormers and slowing the rate of drug resistant parasite population development. The FAMACHA system also aids in selective breeding decisions by identifying those animals that are most susceptible to parasitic infection.

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