

FAMACHA[©]

Information Guide

Originally compiled by the Faculty of Veterinary Science, University of Pretoria, the Onderstepoort Veterinary Institute, the Worm Workshop of the South African Veterinary Association, and Intervet South Africa, with the support of the Food and Agriculture Organization of the United Nations, the National Wool Growers' Association and the National and Provincial Departments of Agriculture in South Africa.

Modified by Dr. Ray M. Kaplan and Dr. James E. Miller within the framework of USDA SARE grant # LS02-143 to address use of FAMACHA[®] in the United States

IMPORTANT NOTE FOR ALL USERS OF FAMACHA[®]:

- To properly implement FAMACHA[®], it is essential for all users to: (1) obtain practical hands-on instruction in the use of FAMACHA[®]; (2) be sure they understand the information supplied; and (3) read and carefully follow all the instructions in this guide.

WARNING:

- As this Information Guide is used in circumstances outside the compilers' and distributors' control, users must undertake to use it at their own risk. The compilers and distributors, and/or any of their employees do not accept liability for any damage or loss suffered by any person as a result of or arising from the use of this guide.

WHY THE FAMACHA[®] SYSTEM WAS DEVELOPED:

- *Haemonchus contortus* (barber's pole worm) is usually the biggest disease problem of sheep and goats throughout the warm regions of the world, particularly in the subtropical and tropical areas. Major production losses and deaths can arise where the worm is not adequately controlled.
- Due to overuse of dewormers over many years, resistance to these dewormers is an ever increasing problem. On many farms in many countries, there is resistance to all the groups of deworming drugs and the viability of sheep and goat farming is threatened. No one can rely on the excessive use of drugs alone to control this parasite in the future.
- While most sheep and goats (especially the adults) are able to withstand the unfavorable effects of *Haemonchus*, a small minority cannot. In the past, treatment strategies were designed for the minority of animals that did not have the ability to withstand infection.
- Selectively deworming only those animals that require treatment greatly decreases the development of resistance because the eggs produced by the few resistant worms that survive treatment will be greatly diluted by all the eggs produced by the animals that did not receive treatment. In contrast, where all animals are treated and moved to parasite-"safe", or "clean" pasture, only resistant worms that survive treatment will produce all the eggs that form the next generation of worms.
- Both resistance (the ability to prevent or suppress infection) and resilience (the ability to withstand the effects of parasites) have been shown to be moderately heritable. This means that sheep and goats can be either culled or selected for these traits.
- Once sheep and goats that are unable to cope with existing worm challenge infections are identified, they can be targeted for special attention without the whole herd or flock having to be treated. In the long term, by culling animals that are repeatedly identified as unable to cope with moderate worm burdens, a more resistant and resilient flock, genetically suited to the environment can be bred.

CLINICAL DIAGNOSIS OF ANEMIA: PRINCIPLE ON WHICH FAMACHA[®] IS BASED:

Blood consists of a clear, fluid part (called plasma) and a cellular part (mainly red blood cells). The proportion of red cells to plasma determines whether the animal is healthy or unhealthy. This proportion can be measured in a laboratory (called PCV or hematocrit), but with training and practice can also be estimated fairly accurately by assessing the color of the mucous membranes of (especially) the eyes. As *Haemonchus* are blood suckers, the effects of a heavy parasite burden in non-resilient animal will therefore be evident as a low ratio of red cells to plasma. This is seen in the mucous membranes of the eyes as a visible paleness generally known as anemia. By monitoring anemia, resilient and susceptible animals can be identified.

USES AND ADVANTAGES:

- A significant drop in the amount and frequency of deworming can be expected for the majority of the herd or flock, which will reduce the amount of money spent on drugs.
- Because fewer animals are treated, the development of resistance in worm populations will be slowed down.
- In the long term, elimination of non-resilient animals will allow for the breeding of better adapted animals.
- There will probably only be a small to moderate number of sheep or goats that need to be treated at each examination.
- These animals can be treated before the symptoms and effects of anemia become too severe, if the flock is examined regularly.
- Individual animals that repeatedly fail to cope with *Haemonchus* in spite of an effectively designed control program can be identified and eliminated from the herd or flock.
- Animals that escaped treatment or were underdosed or improperly drenched (e.g. owing to faulty drenching syringe), can be identified before severe problems occur.
- If an ineffective dewormer for *Haemonchus* is used, this will become apparent because many anemic sheep are seen after treatment. However, if an effective dewormer is used, pale mucous membranes should become noticeably redder in color within a week or so, provided protein intake is sufficient and body condition is adequate.
- If there is a severe build-up of infective larvae on the pasture, an early warning of the impending danger can be a sudden increase in the number of anemic animals.
- Paddocks, pens, and pastures that repeatedly present problems can be identified and appropriate action taken.
- The process of inspecting the eyes is quick and can readily be integrated with other activities like vaccination, weighing, condition scoring or counting. In South Africa it is reported that up to 500 sheep can be inspected per hour with good facilities and practice.
- Because animals are examined frequently, other unrelated problems are quickly discovered.
- The technique is very easy and sufficiently reliable once learned under the guidance of a competent instructor.
- Animals become tamer and easier to handle.

PRECAUTIONS AND POTENTIAL PROBLEMS:

- The FAMACHA[®] system should be used only after it has been fully explained and demonstrated by properly trained instructors.
- Only *Haemonchus* infection can be monitored by this technique.

- **FAMACHA[®]** is only a component of a good management program for *Haemonchus* and cannot be used on its own. A good, integrated control program using smart drenching principles must still be used.
- Other worms can also be important. *Trichostrongylus* (bankruptworm) is found in sheep and goats throughout the US and *Teladorsagia* (brown stomach worm) is common in the northern parts of the US. A program for controlling these and other worms may be needed as well. If either of these worms are the primary problem and *Haemonchus* is only present in low to moderate numbers, then FAMACHA[®] may fail to provide a sound basis for treatment decisions.
- Herd or flock fecal egg counts should be monitored on a periodic basis.
- Animals should be monitored regularly (at least every 2-3 weeks during the *Haemonchus* transmission season, and possibly as often as weekly at the peak of the worm season).
- Animals should always be scored with the help of the chart, not from memory.
- Kids/lambs and pregnant or lactating does/ewes are more susceptible and need special attention.
- *Haemonchus* is by far the most important cause of anemia in goats and sheep; however, there are other causes of anemia that could cause confusion. Some examples are:
 - Hookworms (very uncommon in the US)
 - Liver fluke (most likely only a problem in the Gulf Coast and Northwestern States)
 - External parasites
 - Blood parasites (very uncommon in the US)
 - Bacterial and viral infections
 - Nutritional deficiencies
- On the other hand, certain conditions can make the eye's membranes appear redder than expected and thus mask the presence of anemia. Some examples are:
 - Hot and/or dusty conditions which irritate the eyes
 - Driving animals a long distance with no rest period afterwards
 - Any fever
 - Infectious eye diseases
 - Diseases associated with blood circulatory failure
- With FAMACHA[®], animals are allowed to become anemic prior to being treated. Therefore, *it is critical to use an effective dewormer*. Drug resistance to all available dewormers is becoming quite common. Therefore, testing to determine which drugs are effective against the worms on your farm should be done before applying the FAMACHA[®] system.
 - Available tests for resistance include the fecal egg count reduction test which is performed on the farm by your veterinarian, and the DrenchRite[®] test, which is performed in a laboratory from a fresh fecal sample that is mailed to the lab.
- Protect the card from light when not in use and replace the card after 1 year of use.

PRACTICAL USE OF THE FAMACHA[®] SYSTEM:

- Beginning in spring or several weeks prior to lambing/kidding, examination of the herd or flock using FAMACHA[®] should be made every 2-3 weeks by properly trained persons.
- During high worm transmission periods (warm wet weather), it may be necessary to monitor the flock more often, even on a weekly basis.
- The FAMACHA[®] guide should always be used on inspections. Do not rely on memory from previous examinations.

- Treatment can be safely withheld from adult animals until they score as 4s or 5s provided that animals are in good body condition and good overall general health, are examined frequently (e.g., every 2-3 weeks) and good husbandry is used to identify animals in need of treatment (e.g., unthrifty, lagging behind, bottle jaw) between FAMACHA[®] examinations. It is advisable to treat animals scored as 3s if any of these conditions are not met.
- Lambs and kids have comparatively small blood volumes and can progress rapidly from moderate to severe anemia. Ewes and does have decreased immunity to worms starting approximately 2 weeks before lambing/kidding and extending through the lactation period (called periparturient period). These animals should always be treated if scored as 3s.
- If 5-10% or more of the herd or flock is found to be anemic (categories 4 and 5) at any examination, it may be advisable to dose all animals scored in categories 3-5 and change pastures if available. Animals scored as 3 should also be treated when potential outbreaks of disease from *Haemonchus* are expected. Such periods of significant *Haemonchus* challenge appear to be heralded by a rapid downward trend in the number of 1s and a reciprocal increase in the number of 2s and 3s. Consult your veterinarian if in doubt.
- The essential decision to be taken at each examination is which animals are to be treated, and which are not. Assignment to precise categories is less important. It is better to err on the side of treatment if you are unsure.
- All animals treated with dewormer should be marked or identified in some permanent way (ear tags, ear marks, notches, cable ties, etc.) unless individual animal records are kept. It is recommended that animals permanently marked should also be given a temporary mark so that the same animal is not unfairly marked permanently at the next examination.
- Animals needing two doses more than the herd or flock's average could be considered for culling, while those needing three or more extra doses should definitely be culled.
- The proportions of the flock in each category (from 1 to 5) can easily be recorded by counting off each animal in the FAMACHA[®] block histogram (anemia score sheet) provided.
- If the herd or flock is very large, a random sample of 50 animals can be checked. If the combined percentage of categories 1 and 2 exceeds 80% (preferably 90%) and there are no category 4 and 5 sheep in the sample, it is unlikely that there is danger in not checking the whole flock. However, if any sheep are scored as 4 or 5, or the 3 category exceeds 10 – 20%, it would be safer to examine all the animals.
- Examine especially those animals that lag behind the herd or flock whether or not it is time for a scheduled FAMACHA[®] examination. These late-comers may be suffering from the effects of anemia.
- Always check animals for “bottle jaw” (presence of a soft swelling under the jaw). All animals with bottle jaw, whether they appear anemic or not, must be treated.

Inquiries and Orders:

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