# Online Decision Trees to support the Control of Gastrointestinal Worms in Ruminants

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### Abstract

Control of gastrointestinal worms is crucial to any pasture system for ruminants. To support the farmer's foresighted planning of pasturage and to avoid excessive deworming in Germany we created four decision trees and put them online. They are freely accessible at www.weide-parasiten.de. There is one decision tree for young first season cattle in intensive dairy husbandry, one decision tree for young cattle in suckling-cow management and one decision tree for sheep and goats, respectively.

## Introduction

Grazing on pasture is the most appropriate husbandry system for ruminants. But all ruminants with access to pasture are exposed to gastrointestinal parasites. In the course of foresighted animal health care it must be prevented:

- that parasitic disease occurs.
- that lower performance reduces the economic success of the farmer.
- that pastures get that much contaminated with parasite eggs that subsequent grazing is only possible if a large amount of pharmaceuticals get administered.
- that an unnecessary amount of medicine is applied.

Furthermore, only the epidemiological optimal deworming agent should be used and the farmer should only treat at the right moment. This aids environmental protection and also serves to delay the spread of anthelmintic resistance in worm populations.

Pasture for all ruminants is an important point in sustainable husbandry and animal welfare. In the consumer's perception of animal welfare grazing has a central role. At the same time more grazing for the animals means more opportunities to become infected and ill. This problem is particularly relevant in case of parasitic infections.

But skillful planning of pasture management can often meet the two demands. Within the operating plan for the management of pastures the farmer can match measures that are important for parasite prophylaxis (e.g. provide surfaces that do not contain worm larvae at turn out) together with other aspects of management (e.g. the time of mowing). However, the cost of this planning and the sustainable parasite control must be visibly worthwhile for the farmer (Besier 2012).

Therefore a management tool should be created to represent scientific knowledge about the somewhat complicated parasite problems in a way that the farmer has the option to involve parasite prophylaxis at the beginning of his pasture planning. In addition, suggestions for sustainable parasite control and efficient medication should be offered.

## Methods

For this task, a decision tree has been proven to be suitable (Ploeger et al 2008). For young cattle in intensive production in the Netherlands a decision tree is already online for several years (www.parasietenwijzer.nl). On this site there is also an English version available for young cattle as well as one for horses.

## Results

During the last years four decision trees have been built, one for first season cattle in intensive dairy husbandry, one for young cattle in suckling-cow management and two for lambs in intensive sheep and goat husbandry, respectively.

At "www.weide-parasiten.de" these decision trees are free to access (see Figure 1).



### Figure 1: Screenshot of the home site of www.weide-parasiten.de

Questions about the pasturage of ruminants (capital letters in the navigation scheme), that need to be answered with Yes / No, make you navigate through the decision tree. After passing through the navigation scheme you will end up at one recommendation (digits in the navigation scheme), which initially has the safety of the animals in focus (see Figure 2).

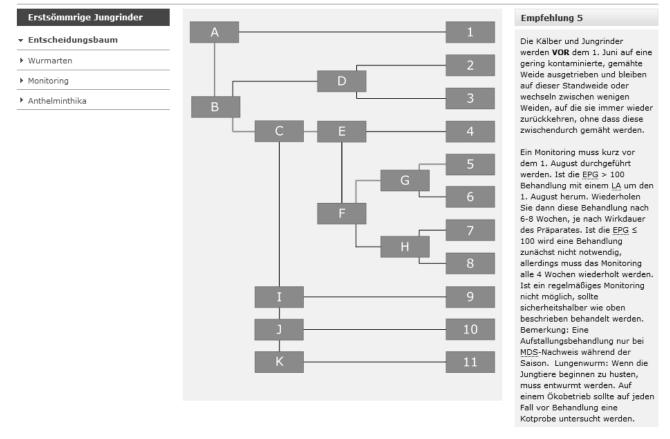
Depending on the answers, you will get the recommendation to wait and watch your animals carefully, to monitor the egg count of the herd or to treat with long acting or short acting anthelmintic drug.

German law does not allow mentioning pharmaceuticals by user's name. But if you click at "Anthelminthika" you will find a list of allowed pharmacologically active substances. All of them need a veterinarian prescription. The European regulations on organic farming let anthelmintic treatments explicitly free of restriction in the number of treatments (EC 889/2008, Article 24, No. 4). However, the withdrawal periods have always to be doubled. In EC substances which have no registration and no value for their "Maximal Residue Limit" in meat, milk or eggs, are not allowed to be used in production animals. This concerns as well phytotherapeuticals or other alternatives in use for deworming. Therefore these are not mentioned in the decision trees.

By trial and error the farmer can follow the various paths through the navigation scheme of the decision trees. He can make out which pasture conditions must be met in order to reduce his drug use and not to endanger the health of his animals and his economic success.



Sie sind hier: Startseite... Erstsömmrige Jungrinder... Entscheidungsbaum



#### Figure 2: Screenshot of recommendation No. 5

Of course, decision trees are just a tool and recommendations may sometimes be too strict to prevent disease. For instance, in cattle a threshold of 100 strongyle eggs per gram feces (EPG) is used before it is advised to treat. Such a threshold may be too conservative. But it has to keep in mind that such thresholds are set as well to prevent too much contamination of pasture with worm eggs, thereby keeping pastures relatively safe for grazing by animals. Another problem of the decision tree may be the search for a laboratory which is able and willing to count eggs (McMaster method) instead of using more qualitative techniques to check samples for worm eggs.

In addition to the decision trees the website offers various biological and technical informations about roundworms in ruminants (see Figure 3).

In the coming years, the pages will be updated regularly. Through communication with users and professionals we want the site to be constantly improved.

Ultimately, the authors hope that a suitable grazing will be offered to all ruminants, also to those in adolescence. By foresighted pasture measures, regular monitoring for worm eggs in feces, supplemented by scheduled deworming if necessary, gastrointestinal parasites are manageable in organic farming.

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## Figure 3: Screenshot with information about sustainable parasite control

#### References

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