



Fasciola hepatica: Impact on Dairy Production and Sustainable Management on Selected Farms in South Africa

(PRJ-0060-2015)

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Quarter 4 2015 (October 2015 till December 2015)

Project goals

Goal 1 - Investigations on four dairy farms, selected on the strength of farmer perception of the production effect of *Fasciola* sp. on milk production on their farms.

Achievements

- 1. Visits were paid to the farms** Robhoek, Gradita, Veelgeluk and Oudebosch during October, November and December, 2015. Rainfall decreased over the period of this fourth report, with the result that the pastures progressively changed from particularly wet to relatively dry, despite support from irrigation.
- 2. Cattle serum sampling:** Since some of the trial cattle were removed for various reasons over time, the numbers of faecal and blood (and thus serum) samples collected by CapeCross Vet veterinarians were slightly lower than previously.
- 3. Cattle faecal sampling:** Collection, dispatch and laboratory processing of the faecal samples and counting of the trematode (flake-worm) and nematode (roundworm) egg counting progressed as before, but with the difference that, as explained above, they were smaller in number. Also as before, a total total of about 40 additional faecal samples were taken from animal classes and groups not included in the project, and processed as above, and farmers were urged to make use of this valuable, though limited, service whenever they wanted information on animals not included in the project trials. The results of the routine counts are presented in the sets of graphs that are appended to the report.
- 4. *Fasciola hepatica* worm counts vs levels of worm antigen in the livers of cattle.** There is nothing new to report. However, the opportunity mentioned in the previous report for recovery of worms from a relatively large number of livers and testing different methods of quantification of the *Fasciola* sp. burdens, is once again a possibility, since the farmer concerned has decided to slaughter his entire herd of dairy cattle for reason of the presence of a declared disease in the herd.
- 5. Snail survey:** On each farm surveyed, *Fasciola* intermediate snail host surveys were performed on six previously selected marshy spots. Relatively small numbers of snails from spots from which large numbers were obtained, were dissected for the presence of either *Fasciola* or paramphistomid intermediate stages, and the results are presented in a set of graphs uploaded to and included in the report.

No Non-achievements / underperformance has been reported

Goal 2 - Small-scale questionnaire survey on appraisal of farmer

perception and knowledge of *Fasciola* sp. specifically and worms of cattle in general for use in Phase 1 and as background to later phases, should the results of Phase 1 be judged to merit further investigation.

Achievements

While the questionnaire has been prepared, the survey is to be conducted during the continuation of Phase 1 of the project in 2016.

No Non-achievements / underperformance has been reported

Goal 3 - Evaluation of prevalence and seasonal cycling of *Fasciola* sp. on the selected farms.

Achievements

1. Comprehensive *Fasciola* intermediate snail host surveys were done for each of six previously selected marshy spots on each of the farms.

2. Snail sampling: As explained in the previous quarterly reports, small numbers of the snails recovered from the various marshy spots on the four farms were dissected for evaluation as to the presence of the parasites, and intermediate stages of both *Fasciola* sp and paramphistomid (conical, or stomach fluke) parasites were recovered from some of the snails. However, the small numbers involved mainly confirm the presence of both types of parasites, than to show trends in their epidemiology.

3. Investigation of the mode of parasite development and transmission per farm: The background to the evaluation of parasite seasonal cycling has been thoroughly described in previous reports. In short, it comprises primarily three different approaches, for the reason that each has definite limitations regarding accurate estimation of worm burdens and levels of challenge to the host at any given point in time. A fourth approach is to be tested on a relatively small scale subsequently in the project, granted sufficient funds to do the necessary systems development in the laboratory for the testing.

(i) Faecal worm egg counts : The results of the egg counts are presented as a series of graphs in Document 1 (attached).

(ii) Snail survey results : As above, the results of the snail surveys are similarly shown in Document 2 (attached) as graphs that have been updated to present all the results until the end of the report period.

(iii) Blood serum analysis for liver enzymes : This is an assay of intracellular enzymes, which are set free from the liver cells and enter the bloodstream during the hepatic migratory phase of the immature parasite, which literally eats its way through the liver tissue over a period of some weeks, on its way to its final destination in the bile ducts of the host.

(iv) ELISA testing for *Fasciola* sp. antigen and/or antibodies in milk and host serum : This aspect of the investigations is relatively expensive, but discussions have been initiated for cooperation with a private company, Deltamune, which is in the process of developing the system for analysis of bulk milk tank samples.

No Non-achievements / underperformance has been reported

Goal 4 - Evaluation of mode of transmission on each farm, for the parasite to be able to cycle to the extent of causing losses in milk production.

Achievements

The mode of transmission encompasses the entire life cycle of the parasite, comprising the chances of (i) the eggs of the worms in the faeces of the cattle to reach the pastures where the cattle graze; (ii) to hatch in water ; and then (iii) to infect their intermediate hosts and develop into the infective stage of in the snails; (iv) to emerge from the snails and encyst on herbage as so-called metacercariae; and (v) to gain access to and develop to mature, egg shedding adults in the bile ducts of their final hosts. It is planned to initiate investigation of the above on a small scale (as far as the budget will allow) during 2016, for instance to ascertain to what extent the worm eggs in the water run-off from milking parlours gain access to the pastures, and to find ways to prevent this if indeed found to be of importance.

No Non-achievements / underperformance has been reported

Goal 5 - Small-scale evaluation of anthelmintic efficacy against the *Fasciola* sp. populations per farm, in order to get a preliminary impression concerning the presence or absence of anthelmintic resistance. The reason for the limited extent of this aspect of the project is to obtain data for evaluation of the need for later inclusion of more farms in anthelmintic testing.

Achievements

Achievements: In order to evaluate the efficacy of the anthelmintics used, individual farmers have been requested to collect samples of faeces from about 15 cattle, both before and after treatment for *Fasciola* infection, but none have complied, and thus also no samples have been forthcoming to date. The need for specific testing is being scheduled for discussion with the farmers involved during the continuation of the project in 2016.

No Non-achievements / underperformance has been reported

Goal 6 - Formulation of options for sustainable management of *Fasciola* sp. on each of the farms.

Achievements

The formulation of options is scheduled for the end of the project. However, it is being approached as a continuous process of contemplation of possible options and it should be possible during the second half of Phase I of the project (during 2016), to offer suggestions for further steps that may be required to this end, and potential solutions.

One approach that has been in the planning stage since the beginning of the project, is to make use of a novel approach to strategic fencing of snail-infested marshy spots on pasture, to be able to attempt, at times of potential high levels of challenge of the cattle, to limit contamination of pastures with faeces from infected cattle, in this way to break the life cycle chain of the parasite. To this end, plans have been formulated for sustainable management and these have been presented as suggestions for the continuation with the project during 2016. Of special importance is that a small trial for evaluation of the novel approach has been discussed with one of the farmers, but unfortunately this has not been taken up as yet.

No Non-achievements / underperformance has been reported

Goal 7 - Telemetric activity monitoring (with the use of a low-cost system) as possible adjunct to worm management. Of importance, however, is that

the nature of the telemetric data is such as to require specialised data evaluation expertise. Evaluation of the large data sets to be obtained from the production of the dairy cows will be facilitated by inclusion with the telemetric data evaluation. However, due to the complexity of the analyses, results of only preliminary nature are to be expected in Phase 1.

Achievements

The aim with this goal was to develop use of specialised methods of data analysis telemetrically to evaluate animal activity not only for management in the milking parlour, but also on pasture, for instance as a system of security against stock theft and injury of animals by dogs or other predators, and for monitoring activity in relation to animal health and production. Unfortunately, however, clashes between systems in use and alternatives have militated against continuation with this initiative.

Non-achievements / underperformance

As reported previously, it has not been possible to install a telemetric system on any of the farms presently in the project.

Reasons for non-achievements / underperformance

Non-compatibility of the system on hand, with those in use on the project farms.

Planned remedies for non-achievements / underperformance

It is planned during continuation of the project to investigate the possibility of a way around the clashes between systems, which are making it impossible continue with activity monitoring. However, it should be noted that no funding is forthcoming from MILK-SA in the project in its present form, with the result that this work will have to be financed from elsewhere if at all possible.

Income and expenditure statement

Income and expenditure statement	A0Y005-MilkSA Financial Rep-Dec2015.pdf
Unnecessary spending during period	No

Popular Report

No file has been uploaded

Additional documentation

[MILKSA Fasciola-Progr.Rep.4-Snails-Dec2015d_RC-d.docx](#)
[MILKSA Fasciola-Progr.Rep.4-EPGs-2015b RC.docx](#)

Statement

Levy funds were applied only for the purposes stated in the contract	No
Levy funds were applied in an appropriate and accountable manner	No
Sufficient management and internal control systems were in place to adequately control the project and accurately account for the project expenditure	No
The information provided in the report is correct	No