



Integrated Control of Liver Flukes of Cattle Using Botanical Extracts and Biocontrol Agents

(PRJ-0109-2016)

University of kwaZulu-Natal -

Quarter 3 2016 (July 2016 till September 2016)

Project goals

Goal 1 - Survey farms to get a measure of infestation levels

Achievements

Suspended Research Goal

This goal has not be undertaken.

Non-achievements / underperformance

Research has not be undertaken on this goal.

Reasons for non-achievements / underperformance

This is a major project in its own right. We do not have the budget, the transport or the postgraduate student to undertake this aspects of the overall fluke research picture, at this stage.

Planned remedies for non-achievements / underperformance

If adequate funding, and suitable postgraduate students become available, then this could be considered and undertaken.

Goal 2 - Screen for drug and multi-drug resistance in the two primary flukes found in South African animals. Get the samples from livers at abattoirs and from the faeces of animals in the field. Test the animals of commercial and small scale farmers.

Achievements

Non-achievements / underperformance

Suspended Research Goal

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Planned remedies for non-achievements / underperformance

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Goal 3 - Develop storage protocols for flukes at various life stages

Achievements

- The reserch will concentrate on breaking flukes cycle in the egg stage, adult in the livers and the entrmatate host (snails)
- We are working with large animal vets who operate in Pietermaritzburg who are collaborating with this in this regard securing a reliable supply of a reliable contaminated livers from the abattoirs, and faecal samples from infected animals.
- We have been developing techniques for the ongoing production of a large population of the intermediate host (aquatic snails), which is essential for large-scale screening trials, which is the basis of biological control studies.
- A reliable source of aquatic snails that are prevalent in tropical aquariums and are amenable to producing a large population has been sourced.
- Cultivation of this species should be relatively easy and offers a source of material for the initial screening of snail antagonists.

Non-achievements / underperformance

It has taken time to find the right vets to collaborate with to secure access to liver flukes.

Reasons for non-achievements / underperformance

There are relatively few vets working on this topic in KwaZulu-Natal.

Planned remedies for non-achievements / underperformance

We have established good contact with the right vets working with liver fluke infections. This will ensure a supply of the life stages of liver flukes.

Goal 4 - Initiate primary screening in vitro of plant extracts on flukes.

Achievements

Plants were collected, dried and grounded into a powder ready to extract

Non-achievements / underperformance

Prepare of ethanol plant extracts

Working on the extraction

Working on securing contaminated livers from the abattoirs and faecal samples from infected animals.

Collection of liver samples and fecal samples

Start trials in the laboratory and collection of data

Reasons for non-achievements / underperformance

The MSc student started late due to visa issues. Secondly, her initial focus has been the writing of her literature review, and securing a checklist of appropriate plants from which to extract the potential active ingredients.

Delays in access to essential chemicals due to a slow purchasing system.

We are waiting for University Ethical Clearance. This is a slow process that we cannot accelerate.

Planned remedies for non-achievements / underperformance

The literature review has been largely written, and as a result, the student has a suitable list of plants. We have already secured all the plants on the list, or close relatives. She is now in a position to extract the active ingredients, once the Buying Office delivers the ordered chemicals for extraction.

We will secure liver samples from Dr Kretzmann, and fecal samples from Ukulinga, once we have ethical clearance.

Goal 5 - Initiate screening for biocontrol agents in infested pastures, to kill: a) the eggs in faeces; b) the miracidia in the faeces; c) the cercaria and metacercaria stages - In vitro (in microtitre plate wells) and In vivo trials (in pots)

Achievements

- Multiple sources of aquatic mud will be sampled and processed to build a culture library of *Bacillus* species for later use.

Non-achievements / underperformance

This research is on track with our expectations.

Reasons for non-achievements / underperformance

The student has secured the

chemicals he needs for the elective extractions and is undertaking isolation events with samples from various watercourses.

Planned remedies for non-achievements / underperformance

The student is on track.

Goal 6 - a. Isolate and screen for biocontrol agents that kill the alternate host, the snails in pot trials.

Achievements

Work is in progress to develop techniques for maintaining a population of snails as well as to breed them in the large quantities required for a broad screening trial.

Efforts to source breeding populations of the target snails from nature (Eastern Cape and Pietermaritzburg area) have failed perhaps due to either change of environment or likely due to seasonal weather conditions being inhospitable for these snail species.

However, a source of aquatic snails that are prevalent in tropical aquariums and are amenable to producing a large population has been sourced. Cultivation of this species should be relatively easy and offers a source of material for the initial screening of snail antagonists.

Thereafter, once a suitable population of liver fluke host snails are obtained, research would commence on the cultivation and testing of antagonists against the target snail species, and these protocols can be refining.

Non-achievements / underperformance

Once the circumstances surrounding snail cultivation and snail antagonists screening are clarified and resolved, this research project should progress rapidly with screening of the *Bacillus* antagonist library, and any potential nematode control agents.

Reasons for non-achievements / underperformance

Snails do not grow well in winter in nature.

Planned remedies for non-achievements / underperformance

We are making good progress in the growing of snails.

We have accessed numerous aquaria from Zoology.

Income and expenditure statement

Income and expenditure statement	Expenditure Biocontrol of liver fluke budget 2016 MilkSA.xlsx
Unnecessary spending during period	No

Popular Report

No file has been uploaded

Additional documentation

Statement

Levy funds were applied only for the purposes stated in the contract	Yes
Levy funds were applied in an appropriate and accountable manner	Yes
Sufficient management and internal control systems were in place to adequately control the project and accurately account for the project expenditure	Yes
The information provided in the report is correct	Yes