Advancing internal parasite management: Research strategy insights from B+LNZ-led pan sector workshops

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beef+lamb new zealand

Parasite management and an increasing prevalence of drench resistance are some of the biggest animal health challenges facing the livestock sector globally. Beef + Lamb New Zealand has united representatives from across the sector – farmers, researchers, rural professionals including vets, industry bodies, animal health companies, diagnostic labs, government and meat processors to work together on this critical issue for our sector. During several workshops, we have collectively identified and clarified the key issues and mapped out a collaborative path forward. We are very grateful for all the time and effort provided by those involved to help bring fresh perspectives to this significant challenge for our farmers.

This document summarises the workshop outcomes. If you would like the raw data from the previous workshops, please contact research@beeflambnz.com for a copy.

To recap, during the workshop five themes were considered which were a result from the parasite* management workshops in February/March 2023. These were:

- **Theme 1:** how might we advance education, extension, and adoption to foster collaboration and impact across the sector?
- **Theme 2:** how might we progress integrated farm systems research?
- **Theme 3:** how might we achieve responsible usage and management of anthelmintics by the sector?
- **Theme 4:** how might we develop fit-for-purpose solutions in partnership with farmers, rural professionals, researchers, & government?
- **Theme 5:** how might we profile, develop, and communicate farmer case studies?

The sum of information generated through three activities on the day was:

- 356 brainstorming ideas,
- 115 innovation headlines and
- 5 action plans – one for each of the five themes

**Gastrointestinal nematodes (GIN)*

High level Themes identified from the September workshop

1. The need to develop clear, overarching objectives which apply to all stakeholders and to the subsequent work.

Insights indicated that this will help improve internal parasite management practices through:

i. Providing universal clarity of the most important thing for all stakeholders in improving internal parasite management

ii. Measuring if we are all getting closer to the objective

iii. Establishing baseline for values and decisions which advance positive internal parasite management

Potential objectives and baseline measures

Examples of potential objectives, based on inputs

- Genuine collaboration across the livestock sector*, nationally and internationally
- Consistent messaging throughout the livestock sector
- Advice based on sound parasite management evidence
- Development and application of right tool, in the right place, at the right time.

**Livestock sector includes, farmers, scientists, researchers, vets, rural professionals and retailers and educators*

The objectives were underpinned with suggested baseline measures:

- Internal parasite management in livestock does not deteriorate.
- Internal parasite management practices do not deteriorate.
- Knowledge and application about internal parasite management, across the sector increases

Themes were also identified which can be described as principles for improving sustainable parasite management.

Our interpretation is that there are principles which will advance progress and adoption of sustainable internal parasite management for the livestock sector.

Principle 1. Shrinking the distance between farmers, advisors and scientists...

- Creating mutual understanding
- Agreeing most important problem to solve
- Enabling two-way interaction

Principle 2. Establish common language

- Common understanding to ensure there are no mixed messages
- The means to interpret technical and contextual information between livestock sector stakeholders
- Clarity about results and outcomes
- Key terms which are understood by all
- Solutions and opportunities accessible to all stakeholders

Principle 3. Strategic extension

- Purpose-built extension strategy which maps the learning and adoption needs of stakeholder groups* to acheive overall objective
- Adoption of good practice in internal parasite management and identify where there is required practice and systems change
- Inclusion of internal parasite management in other programmes so it is not an isolated topic

- Increase the safety and comfort for participants to learn, unlearn, share and try something different
- Extend the target audience for extension beyond farmers to increase sector wide adoption of good practice in internal parasite management

  **for example: farmers, rural professionals, consultants and advisors, vets, education*

Principle 4. Ensure the "instruments" of extension are appropriate for increasing adoption of good practice. For example, there were many references to:

- Peer to peer learning.
  - We heard that fast feedback and confidence from others with skin-in-the-game is possible. This learning is around things like "why did you do this, how did you do this, how did you know, what happened, what advice do you have, what will you do next, would you do it differently next time?"
- Extension available for internal parasite management as a process in a farm system, not as a discreet topic.
- Healthy feedback loops between stakeholders to increase overall learning and adoption
- Leverage current extension practices
- Understand and identify how influence and influencers leverage positive alignment and adoption of sustainable internal parasite management

Finally – there were more granular findings from the day… We started with five themes, however, the findings from this workshop have made us reconsider their validity …

Through our revision, the following three pillars for the sustainable internal parasite managment programme are now suggested:

1. **Good practice implemented**
2. **New tools and solutions developed**
3. **Optimise the complete system**

The following ideas listed in each pillar came from the collaborative workshops held in February/March and September 2023.

Pillar 1. Good practice implemented

We already have a lot of information about what good practice looks like for sustainable internal parasite management in NZ and globally. Pillar 1 will be about getting that information out to farmers in different ways to create impact and establish baselines of parasite management education across the sector.

Revisit suggested education ideas

- Best practice implemented on more farms – e.g. Wormwise principles
- Impact of internal parasite management measured – cost of products, but also on people's time – gross cost, not net cost.
- Case studies to promote good practice – e.g. podcasts, parasite groups
- Baseline parasite education across the sector (Scientists – Industry – Farmers)
- Red Meat Profit Partnership – revisit to see if anything can be adapted from this programme
- Revisit "Best Practice Parasite Management" farmers – what can we learn?

- Rewrite existing information with right language for the right audience
- Data analysis to combine similar data from multiple studies to find applicable principles, common results and identify overall trends

Revisit suggested existing tools and solutions:

- Promote the value of monitoring
- Diagnostics
- Promote current tools and improve what we already have. Get consistency across testing labs.
- More accurate, faster, cost effective tools for determining worm abundance and species
- Natural drench options implemented – (i.e. alternatives to drench)
- Grazeable shrubs with bioactive properties against parasites
- Narrow focus products for Haemonchus and liver fluke
- Risk assessment tools, decision support tools, decision trees
- Understand what these would be and implement if useful. For example, would a system like FEC check* be useful in NZ?
- How to hack existing and emerging technology for parasite management
- Tools for targeted selective treatments e.g. Smartworm® app
- Increase understanding about parasite epidemiology and population genetics to help with best practice, new tools and solutions and new systems
- Haemonchus vaccine

*https://app.moredun.org.uk/fec

Pillar 2. New tools and solutions developed

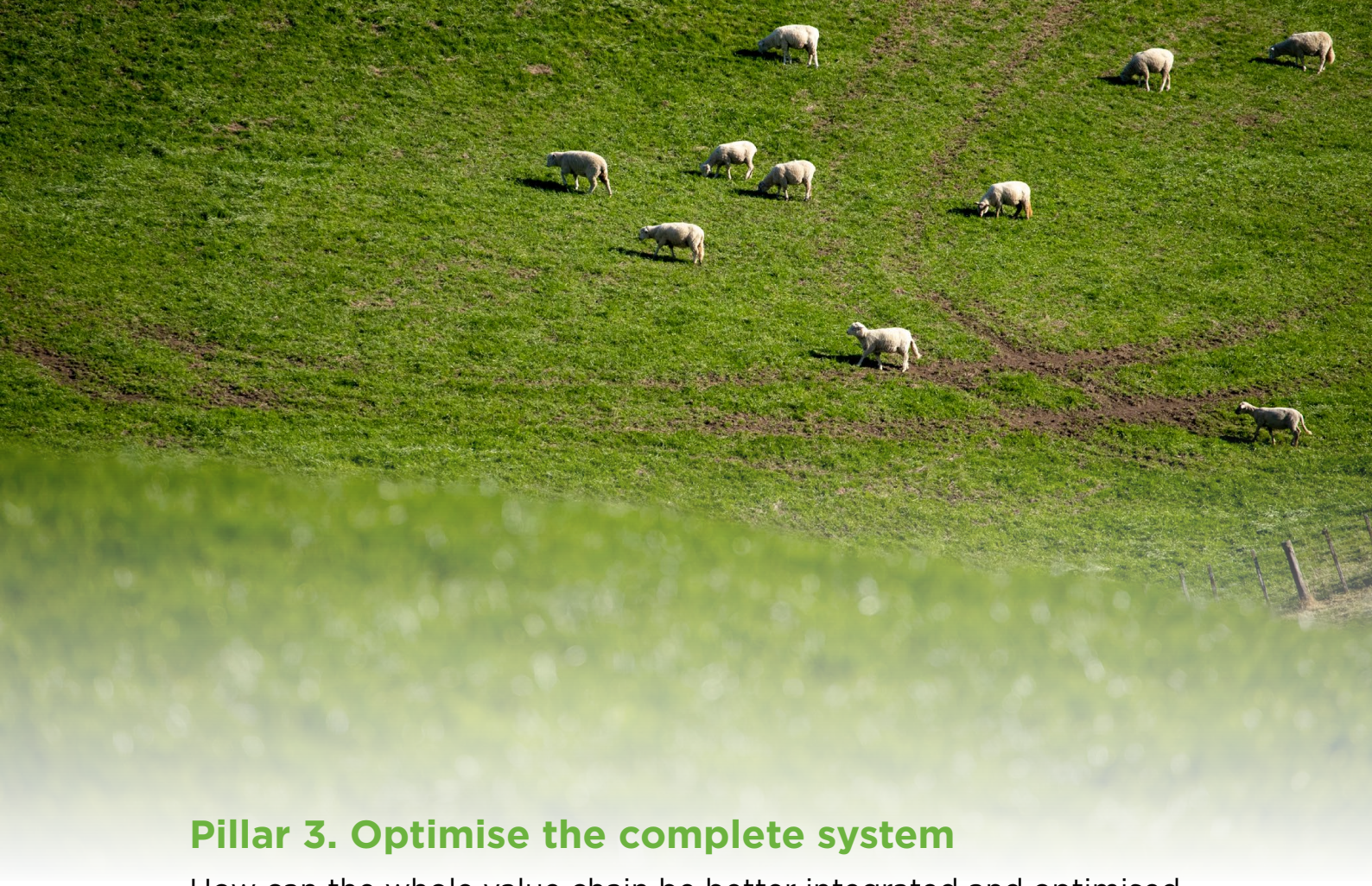
As technology progresses and we learn more about internal parasites, we can leverage this to create better tools and solutions for farmers and rural professionals

Suggested new diagnostic/technology ideas to explore:

- Early indicators of parasitism
  - application of artificial intelligence to determine internal parasite burden via animal behavioural changes
  - monitoring for early detection of internal parasite outbreaks for improved control using indicator animals.
- On-farm testing – internal parasite load, species and parasite resistance status
- Internal parasites on pasture:
  - 'Heat mapping' of internal parasites on farm
  - Hyperspectral imaging technology to determine pasture contamination
  - Pasture contamination modelling
- Genetic test(s) for internal parasite resilience/ resistance in host

Suggested new tool and solution ideas to explore:

- Endophytes
  - to restrict the growth of parasite on pasture
- Genetic Engineering of internal parasites for sterility
- Pan worm vaccine
  - not duplicating work already under development
- Bioactive forages
- Unrealised potential of host genetics
- Biocontrol agents on pasture



Pillar 3. Optimise the complete system

How can the whole value chain be better integrated and optimised to enhance sustainable internal parasite management.

Business model innovation ideas

- Changing the narrative from drench resistance to parasite management
- Innovation needed – make service level offering more than the product offering.
- Interpretation of diagnostic results – e.g. FEC check
- Parasite passports
- Know the status of stock being brought on farm and get a premium for animals with good worm status

Equivalent of a healthline for farmers animal health – independent advice

New farm systems for sustainable internal parasite management

- To be developed with knowledge from pillar 1 and 2

Develop new effective means of communicating "same message" progress, constraints and successes to all livestock sector stakeholders

B+LNZ current initiatives

Research

- Development of a molecular diagnostic test for parasite abundance and species from eggs with Awanui Veterinary.
- Whole genome sequences of *Trichostongylus* species (*T. axei, T. vitrinus, T. colubriformis*) with CSIRO.
- To explore parasite resistance traits and gain baseline information of the genetics of these species with CSIRO.
- Use of the Smartworm® app for targeted selective treatment decision in NZ with VetServices Hawkes Bay, Cotter Agritech, Lincoln University.
- Evaluating a model for use to understand the economic impacts of farm system changes due to internal parasite management at a farm systems level with Agrisystems and Analytics.

Extension and adoption

- Parasite management groups – including evaluation of the impact the group is having on making changes to farm systems.
- Revamp of Wormwise – new website, more varied communication channels.
- Parasite Management Wall Calendar.
- Sharing farmer stories of those who are using less drench than their counterparts (The Parasite Chronicles).

Initiative to collaborate globally

- Approximately 30 organisations nationally and internationally have indicated they would like to be involved.
- Initial discussions have highlighted potential for knowledge sharing and project areas for alignment. Information will be combined and shared on the B+LNZ Knowledge Hub.