

Drench-resistant parasites – A critical challenge

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This document highlights four case studies where we share Pāmu challenges and successes

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Scale of the problem

Drench resistance is a challenge to effective parasite control, animal health and farm productivity

Measuring the challenge

Pāmu uses regular testing to understand drench status and detect resistance. We class a farm as triple drench resistant when all three single actives have achieved less than 95% egg count reduction, or when the more sensitive larval culture shows a particular worm species with lower than 95% reduction efficacy post-treatment.

In contrast, much of the industry reporting is based on the single actives given in combination. This triple combination will sometimes achieve better efficacy, masking emerging resistance.

Pāmu is showing:

- **29% of our 49 sheep, beef, and dairy support farms show triple drench resistance.**
- **15 out of 26 North Island sheep farms (58%) have triple drench resistance. Just two of our 20 farms (10%) in the South Island are in the same category.**
- **Pāmu has four Efficient Beef System (EBS) farms and one calf-rearing facility with triple drench resistance.**

Reducing the threat

Parasitic worms repeatedly exposed to drenching over generations are developing the ability to tolerate it, and this is passed on to their offspring.

The past three years have seen a rapid decline in drench efficacy in both sheep and cattle across New Zealand farms. According to a recent study, triple drench resistance is a problem faced by more than one-third of New Zealand farms.*

Good farm system practices that improve nutrition to all animals and reduce larval intake by young stock, can reduce our dependence on drench, making resistance less of a threat.

*Source Techion <https://techion.com/media-releases/august-14>

Factors that can worsen the issue

Farm systems

- Intensive finishing systems focused on single livestock species/enterprise as well as having mostly young (less developed immunity) stock on farm/block.

Planning

- Not having well-structured grazing rotations -mixing species and mature stock grazing.
- Not having overarching annual animal health plans.
- Not knowing drench status
- Lack of quarantine protocols

Drench Management

- Using ineffective drench types.
- Not following quarantine drench protocol
- Under-dosing or over-reliance on drenches
- Poor on and long-acting drench efficacy

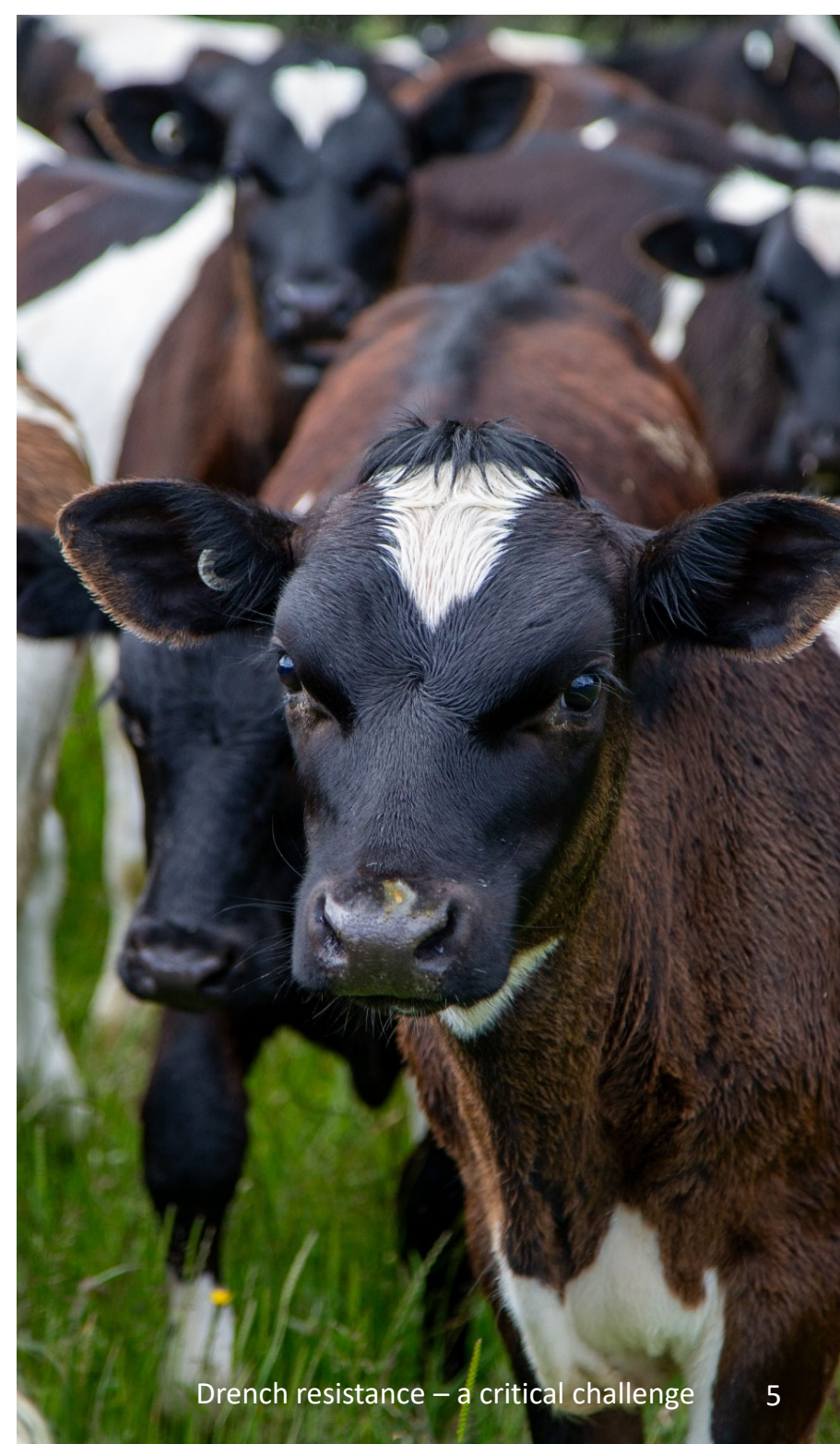
“Practices such as under-drenching, pour-on and capsules as well as single species finishing systems have been massive contributors to the challenges we face today. As demonstrated on Pāmu farms, working through a whole-farm system approach can result in positive improvements relatively quickly.”

- Pāmu General Manager Lower North Island Sam Bunny.



Top five Pāmu solutions

1. **Integrated grazing:** movement away from single livestock species focuses to mixed livestock systems to reduce parasite loading on pastures.
2. **Planning:** Have and follow a holistic Animal Health Plan. Plan grazing rotations to ensure mixing of livestock species and ages within blocks on farm.
3. **Active management:** frequent monitoring of faecal counts and animal performance (live-weight gain) with targeted (refugia) versus blanket drenching. Individual farm drench reduction test programme, relevant to status. Seeding good parasites.
4. **Quarantine policies:** incoming livestock are drenched and held on quarantine paddocks for 24 hours before entering the farm.
5. **Innovation:** Genetics and technology. Using health indexes in our breeding programmes to develop resilient stock (including AgResearch-developed CARLA & WormFEC testing). Sharing knowledge, attending B+LNZ Wormwise workshops and regular training with our vet partners and experts tailored for farms and regions.



Case study 1: Waipuna

Growing out dairy beef bulls in Southland

Waipuna near Te Anau is a challenging 550-hectare property, with high rainfall and cold winters. Four years ago, the predominantly sheep farm started taking on 100kg dairy beef calves from Canterbury farms.

Drench resistance is not an issue on Waipuna, and there are several measures in place to make sure it stays that way. However, the farm initially ran into some challenges with low growth rates, and subsequent production.

Fast forward to this season and system changes have shifted the dial on both dairy beef and sheep production.

Alex Field, Farm Manager for Waipuna, says his dairy beef bull calves achieve 100% higher growth on clean pasture – that is, pasture without cattle parasites present.

“Parasite management is key. We need to avoid calves eating worms. Sheep are a big part of the answer. The biggest operational change was pulling the finishing lambs off the recently sown young grass paddocks and putting the calves on them instead. While this initially had the negative effect of dropping lamb growth rates by 20%, calf growth rates went up by 100%. Over three to four years, calf growth went from 400-500 grams/day to 900 grams/day, peaking at 1.2kg a day. They are 280kg bull calves going into winter.” - Alex Field, Farm Manager.



Case study 1: Waipuna - Avoiding reliance on drench

The Waipuna approach:

- Farming our pastures with several stock classes and ages integrated together.
- Monoculture systems, either whole farms or blocks of farms, are the single biggest driver of drench resistance.
- Diversifying stock helps as the parasites are species-specific. A 50:50 cattle-to-sheep ratio (by stock unit) has been shown to help alleviate the pressure of selecting for drench resistance.
- Lambs that grow slowly and remain on the farm for longer contaminate pasture and increase drench pressure. We grow lambs well and get them off-farm early, weaning early as Live Weight Gain from day 50 to day 80 is 50g/day less. From day 80 onwards we can grow lambs faster on pasture. This works in our Southland climate. We target our condition to be above Body Condition Score 3, measured a month before scanning for intervention if needed.
- Average pasture cover in an all-grass system varies on how much grass grows in the winter. We set stock our ewes for lambing at a rate where feed demand per day will be lower than the pasture growth rate so that we know the ewes will stay on good pasture covers. At seven ewes/ha we shouldn't mine covers and we rotationally graze mobs of ewes and lambs early to build feed ahead for weaned lambs.
- Focus on the top lambs first. At weaning we background lambs (bulk feed at a low stocking rate) on the hill until the heaviest lambs are killed. This enables us to control the tap for lambs entering finishing mobs and gives us control over the demand. Allocating more feed to kill lambs faster results in more feed for smaller lambs earlier.
- Drench is the ambulance and only used when it is needed, which means testing for faecal egg counts at day 28 and then weekly after that if not drenched. Ten days post-drench testing as a drench check is conducted randomly throughout the summer.
- As calves get older, we also use individual growth rate data in conjunction with faecal egg count tests. Calves are less reliable egg shedders as they age, and poorer performers can be identified by their slower weight gains.
- Leaving higher pasture covers for young stock (residuals of 1800mm for calves and 1400mm for lambs) reduces the number of larvae ingested and reduces drench pressure.

Case study 2: Rangitāiki

Dairy beef system changes with broader payoffs

Located near Taupō, Rangitāiki Station is 9,753ha (8,103ha effective) in size of predominately flat to rolling country. With altitudes ranging from 650m – 900m above sea level, winters are long, followed by explosive spring growth.

A sheep, beef, and deer operation wintering 85,000 stock units; Rangitāiki was one of the early adapters in the Pāmu dairy beef journey following the establishment of the Efficient Beef System in 2016.

Almost ten years later, dairy beef has become a significant part of the operation with a cattle trading system that soaks up more than 5,000 dairy beef calves (bulls and steers) each spring, carrying the majority through to finish on a two-year system.

One of the big challenges with the dairy beef programme is rearing large numbers of the same species of animals, at the same time, to their full potential. Internal parasites aren't the only contributing factors to recent pressure on the Rangitāiki system, which has also faced pasture reversion and climatic conditions such as drought. These have combined to add pressure onto the farm system and animals.

The impact of internal parasites has been significant on Rangitāiki, and at times a tough journey, say Farm Business Manager James van Bohemen. However, the changes to the farm system are paying dividends beyond the bull beef system, as learnings are applied further across the wider station platform.



Case study 2: Rangitāiki

The challenge - triple drench resistance diagnosed 2021

At the time, the farm's efficient beef system platform was a monoculture with 100% cattle. Rangitāiki had high stocking rates of young cattle who came onto the property at 100kg, and low pasture cover (residuals) as they managed grazing demand against the pasture curve.

This increased exposure to the impact of internal parasites more than with a fast-finishing type programme, where parasites may not be as significant an issue.

In 2021, stress on the farm system meant that production/ha had fallen by about 40% from where the system was three to five years prior.

Death rates had more than doubled from 2.2% to 5.7% at the same time.

"We recognised that something significant needed to change within this system as we were in a downward spiral and couldn't continue to farm the way we were. We identified the R1 bull performance over the summer as where we could make the most significant impact. Correcting this would assist in the wintering of them and flow through into R2/R3 bull performance." - Farm Business Manager James van Bohemen.



Case study 2: Rangitāiki

A new approach

Young stock is now managed quite differently until 15 months of age. They are mixed with sheep and deer units on lucerne, then moved into mixed grazing pastures systems and onto winter crops.

Significant system changes include:

- **Forage changes:** Establishment of lucerne and summering calves on that platform instead of the bull beef platform. This means not only almost doubling the time between drenches, but also a higher quality feed which is less susceptible to droughts, increasing our ability to ensure pasture quality through the summer and autumn.
- **Integrated grazing:** The highest larval deposit from calves is during autumn, so farming sheep through the lucerne platform as the last rotation before winter creates a “circuit breaker.” Ewe lambs are integrated amongst calves. The right ratio is still not confirmed as there is still a surplus of cattle, but there is a focus in the 12-month calendar for strategic integration of multiple stock classes.
- **Trigger Drench Programme:** Moved to the use of a Zolvix/ Concur (BZ/levamisole) drench combination programme within the efficient beef system, with live weight gain and body condition scores as well as onsite faecal egg counting determining treatment requirements. In effect, animals are only drenched when there is a confirmed need.
- **Integrating refugia:** Leaving a proportion of animals undrenched maintains a population of drench-susceptible worms on the farm and can slow the build-up of resistant parasites.
- **Disciplined transport and quarantine management:** Animals are drenched before arrival with a quarantine drench and when they arrive, they are quarantined until 24 hours post-drench.

Success in this approach has required attention to detail and good stockmanship. Overall, the dividends are clear: The changes on the farm have almost doubled calf weight gains from 400g/day to an average of 750g/day. As a knock-on effect, bulls are healthier, staff workload is reduced, and team engagement and morale have lifted.



Case study 3: Managing on Meringa

Triple drench resistance in 2020 sparked substantial change

Meringa Station is a 1,904ha hill country property 30 minutes from Taumarunui producing 8,800kg of pasture dry matter/ha per year and running 16,000 stock units (62:38 sheep: cattle ratio) across a 1,492ha effective platform, most of the farm is lamb finishing, despite just 33% of the property being cultivatable and 41% moderate hill country, with some sheep and cattle breeding, and cattle finishing.

Review and change

Drs Dave Leathwick and Chris Miller (AgResearch) and (then) local veterinarian Dr Ginny Dodunski helped Farm Manager Graham Sinnamon designed a worm monitoring and management system.

The team carried out a farm policy review that changed how lambs were grown out and managed, as well as the growth of a high-performance ewe flock, using cattle on the property, and the strategic use of worms from other Pāmu farms.

While it added complexity to the farm systems, it has resulted in significant gains against the challenge of drench-resistant parasites.



Case study 3: Meringa approach

Changes to the farm system include:

- **Faecal egg count testing:** Knowing the exact problem at any time Meringa conducts faecal egg count tests every four to six weeks to assess parasite levels in livestock. This helps determine when drenching is necessary and ensures the right drench for the right worm is used. Testing is also carried out post-drench to measure efficacy.
- **Strategic drenching:** The farm moved from monthly drenching of all 25,000 sheep, to strategic drenching schedules based on the testing, parasite lifecycles and seasonal conditions. This targeted approach helps in using drenches more efficiently and reduces unnecessary treatments that could contribute to resistance.
- **Pasture management:** Grazing residuals is important. Longer grass both pre- and post-grazing is better as eggs are closer to the ground. Integrated grazing of lambs, then ewes or cattle, helps with this.
- **Bringing in cattle:** As sheep and cattle parasites are different, Meringa changed its stock strategy to graze three rotations of cattle after the sheep. Where the previous ratio of sheep to cattle was 80/20 stock units it's now 65/35.
- **Seed good parasites:** The team bring in sheep from other Pāmu farms where triple-drench resistance has not taken hold. They graze the pasture for one rotation, and the parasites they drop in their faeces change the population to those susceptible to drench.
- **Exit drench protocol and quarantining new stock:** Some farms believe that every kilo counts when putting stock on the truck, and don't follow the practice of drenching and standing down animals before travel. As a consequence, they can be sending dangerous parasite burdens onto the next property. Meringa is stringent about the drench status of stock arriving on farm and will follow up with a quarantine paddock before the animals are put on the farm.
- **Continuous learning and training:** Meringa's collaboration with experts helps the farm adopt new strategies to build on its approach to managing drench resistance.

The farm's proactive stance serves as a model for other farms facing similar challenges. And the approach has had other positive impacts on farm performance.



Case study 4: Organics at Pāmu

Since 2016 Pāmu has been investing in organic dairy farming. Pāmu operates with the belief that environmentally sound farming practices create the highest-quality natural products.

Today we have a total of 11 farms and three runoffs, based in Wairākei near Taupō, and Moutoa in Manawatū. We have 6,430 cows on 4,190ha across these farms: 1,500 R1s and 1,500 R2s.

There are significant restrictions on what drench can be used on organic youngstock. The majority of products are prohibited, meaning if an animal is treated with them, they must leave the organic system.

- **Attention to detail** on animal welfare and **acting quickly** on any concerns is fundamental. There is a strong focus on daily shifts, higher residual management, getting minerals and feeding right and regular monthly weighing.
- Animals are drafted every 4-6 weeks based on their weight and daily growth performance into management lines and those that are behind get preferential feeding and supplemented with kibbled maize if required. MINDA data is used to track performance.
- Moxidectin is currently the only drench that can be used on organic youngstock by way of a pour-on. They lose their organic meat status if this product is used but may still be used as milking animals. Furthermore, there are restrictions on the number of treatments an animal can receive per year.
- To drench, evidence of an issue and a vet recommendation must be acquired. Therefore, the objective for organics is prevention over treatment.
- Typically, around only 10-20% of young stock receive one drench in their first year, with none being required after that. This is significantly less than a conventional system. Animal performance has been comparable and, in some cases, better than conventional farms.



Background and Pāmu vet view

Pāmu has had a drench management programme in place since the 1990s, that was originally written by parasitologist Dr Dave Leathwick, from AgResearch. This involves rotating drenches to prolong their effectiveness, along with on-farm parasite management strategies.

Faecal egg count reduction testing (FECRT) started on Pāmu farms as early as 1992. Testing has been done on each sheep farm every one to four years since then (depending on status), giving each farm a large bank of historical data where drench efficacy can be tracked.

Where drench efficacy is seen to be declining or where risk is identified an action plan with multi-pronged approaches is put in place to address farm management systems to improve the parasite burden.

Led by Pāmu veterinarian Dr Angela McEwan, local veterinarians have been engaged and are actively involved in day-to-day management discussions on parasite management.

There is urgency on several farms to find a better balance between commercial imperatives and a focus on parasite management. Farm system conversations alongside drench use are critical to the success of this programme. This has often started surfacing other opportunities and benefits, and Pāmu has been active in supporting industry knowledge-sharing of farms' experiences.

“Parasite management is the hardest disease prevention programme for our farms because it is complex, and each farm system is different. The best solution is a tailored one, with one-to-one detailed support from an expert with an extensive farm system and parasite knowledge. While there are some very experienced veterinarians in this field, others are still navigating it and learning.” - Dr Angela McEwan, Pāmu Head of Veterinary.



Education and training

Pāmu works closely with experts such as B+LNZ Wormwise Programme Manager Dr Ginny Dodunski and works in alignment with Beef + Lamb New Zealand's Wormwise programmes. This is bolstered with training from our vets and other expert facilitators to ensure everyone gets timely training which is also tailored to the status of farms in each region.

All regions have had training over the past 36 months. Farm teams regularly have the option of attending as well as follow-up training.

Parasite management is also embedded in other parts of our farm staff extension programmes such as dairy beef bull rearing from 100kg.

Some of our non-farming corporate teams attended a recent B+LNZ Wormwise workshop in Porirua to ensure a greater understanding across the business of the issue.

We share our experiences for the benefit of the wider industry by opening up our farm gates for Pāmu Farm Open Days, through industry presentations, and by sharing our case studies internally and with industry stakeholders.





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