

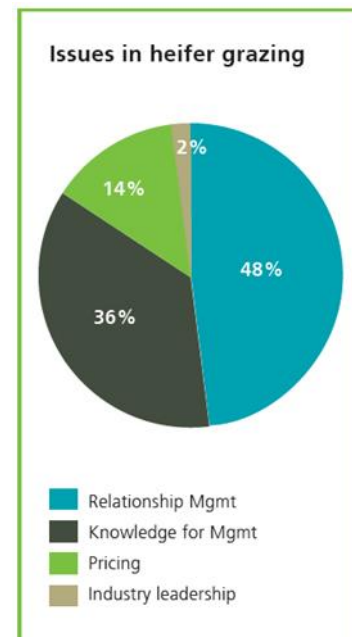
Meeting Heifer Growth Targets

Turning the vision of your herd into reality

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Herd reproductive performance is important for New Zealand farmers because of seasonal calving; it is valuable to get cows milking early and limit the number of empty cows at the end of mating. In 2008 the dairy industry set a target to improve herd reproduction and introduced the InCalf Programme to support the targeted improvements.

The InCalf programme identifies eight aspects that influence herd reproduction, one of which is growing heifers to meet liveweight targets prior to first calving. In 2012 LIC reviewed heifer liveweights in the national database and found that only 23% of animals were within 5% of their liveweight targets, based on Liveweight Breeding Values (Lwt BV). This underperformance will significantly impact herd reproduction and milk production on farm.



In 2013 DairyNZ led a review to try and understand the underlying issues influencing current heifer growth performance. Eight focus groups were set up throughout the country, from Northland to Southland, involving dairy farmers, graziers and rural professionals. Participants were asked to list the top three issues limiting good results. Relationship management was the most frequently mentioned issue, with one of the most common complaints being that stock owners and stock graziers do not have shared expectations of grazing.

Growing heifers to meet targets offers a number of benefits

- **Early calving.** In an Australian study, first service conception rates improved 20% by reaching 60% of liveweight targets at first mating compared to reaching only 50% of liveweight targets.
- **Genetic gain.** Heifer empty rates greater than 10% limit genetic gain.
- **Milk production.** Milk production can be reduced for 3 - 5 seasons if pre-calving liveweight targets are not met.
- **Improved reproduction.** Missing the 22 month liveweight target by 10% could reduce the herd's 6 week in-calf rates by 5%.
- **Lifetime productivity.** Heifers that miss liveweight targets are at higher risk of losing days in milk, not getting in calf at second mating, or being culled for low production.
- **Reduced replacement costs.** Lower empty rates and increasing productive years in the herd reduce the number of replacements needing to be reared each year.

- **Less intervention** is required at their second mating e.g. CIDRs or OvSynch.
- **Fewer animal health and calving issues.** Animals requiring assistance at calving are 10-15% less likely to get in calf.
- **Less environmental impact.** Good herd reproduction improves nitrogen efficiency.
- **Reduced farmer stress.** Poorly managed stock can be quite stressful for farmers.

Key considerations

When considering how replacements will be brought into the herd there are five options:

1. Manage the stock on dairy farm or at a runoff.
2. Contract growing stock to a grazier with a self-managed relationship to deliver stock performance outcomes.
3. Contract growing stock to a grazier through a grazing company that mediates the relationship and manages stock performance.
4. Contract growing stock to a grazier with a third party monitoring stock performance but the relationship is self-managed.
5. Purchase in grown replacements prior to calving.

Liveweight targets

The first step is to set the vision or expectations of the cows that you want to milk by selecting mature liveweight targets. There are three industry agreed methods for setting mature liveweights: liveweight breeding values (Lwt BV), average weight of the mature herd or typing animals and assigning weight by a breed average. None of the methods are perfect and each has its strengths and weaknesses.

Liveweight breeding values	
Strengths	Weaknesses
<ul style="list-style-type: none"> • Objective measure • Best prediction based on genetics • Developed by data from sire proving herds • Accounts for individualised breeding programmes • More accurate for Crossbred herds than breed averages • The majority of animals have a Lwt BV 	<ul style="list-style-type: none"> • Only accessible through MINDA software • Low accuracy on an individual basis or groups fewer than twenty animals • Mis-mothering • Genes are randomly inherited so animals may not have “average” genes • Normal variation is -5% to +5% of the predicted weight • Liveweight is 35% heritable so management can mask genetics • Data will be less accurate for herds with a high proportion of overseas genetics
Average weight of mature herd	
Strengths	Weaknesses
<ul style="list-style-type: none"> • Representative of actual herd • Improves information for the herd e.g. stocking rates, drench rates, mineral dosing • Captures management factors and environmental conditions of the farm system 	<ul style="list-style-type: none"> • Time required to weigh cows • Not every animal will represent “average” • Does not capture recent changes in breeding policies e.g. increased crossbreeding • May set targets too low if mature stock were poorly grown
Typing and assigning breed average weight	
Strengths	Weaknesses
<ul style="list-style-type: none"> • Easily assigned through observation or breed make up (e.g. F10 J6 or F2 J14) • Could be more accurate than herd average weight if animals are typed well • Can be used in the absence of Lwt BV data • Effort to match phenotype with genotype if visually assigned 	<ul style="list-style-type: none"> • Subjective • Variations within a breed • Not every herd represents their breed’s average or individual

Once you’ve chosen a mature liveweight target then liveweight targets by age are:

- 30% of mature weight at 6 months.
- 60% of mature weight at 15 months (mating).
- 90% of mature weight at 22 months (pre-calving).

Relationship management

If you are using a grazer, grazing company or stock manager it is important to communicate your expectations. You may have expectations for growth rates, feeding levels, management of underweight animals or if there are feed shortages on farm, these need to be agreed.

Communication regarding stock management should be honest, two way and on-going. Monitoring needs to occur to have constructive conversations regarding stock performance. The only objective way to measure performance is through regular weighing: 4-6 weekly for weaned heifer calves and up to 8 weekly for R2 heifers.

Regardless of who is managing the stock day to day; as a stock owner, there are four areas that can/will influence whether or not you achieve the results you want.

1. Infrastructure
2. Animal health
 - Vaccinations - which ones and when.
 - Parasite management - monitoring faecal egg counts and drenching.
 - Minerals - timing and deficiencies.
 - Biosecurity/disease control - stock movement and risk management.
3. Feeding
 - Annual feed supply - quantity: stocking rates and supplemental feed.
 - Seasonal feed supply - quantity and quality: achieving growth rates.
 - Emergency feed supply - quantity and quality: overcoming adverse events.
4. Breeding
 - Planned start of mating - ideally heifers will be mated 10 days before the mature herd because, on average, heifers take 10-14 days longer to cycle than mature cows.
 - Mating (bulls/AB) - fertility, disease free, on farm and correct ratios to heifers.
 - Optimising conception rates - achieving puberty and multiple oestrus cycles before mating (target 60% mature liveweight at start of mating).

Economics

Youngstock are a long term investment for the farm business. Growing a heifer from birth to calving is estimated to cost \$1,400 to \$2,000 per animal. Expenses vary based on feed availability, stocking rate, and animal health requirements. If using a grazier, fair payment will reflect achieved performance and the service provided (i.e. animal health, weighing, guarantee of performance, etc.). There are four standard methods used to pay for grazing:

1. Price per head per week. This is the most commonly used method but runs the risk of not rewarding good performance and overvaluing poor results. The only way a grazier can increase their income is to either lift prices or increase stock numbers.
2. \$ per kilo of liveweight gain. This is the second most frequently used payment method. However, graziers have found that this method significantly increases their risk - particularly during adverse events. \$/kg liveweight gain doesn't value the expense of maintenance feed and there are times when feed is more expensive than the return of the weight gain. \$/lwt gain billing is less straightforward and returns from grazing are less transparent.
3. Base rate plus a bonus. This method, typically, combines the price per head per week with a bonus for meeting or exceeding targets. Bonuses are either on a kilo of liveweight basis or a fixed bonus of \$/head.
4. Price per kgDM consumed. This can be an underlying consideration for the three previous pricing models, however, this method formalises the amount of dry matter consumed and back calculates energy costs from an animal's liveweight gain. The benefits are that the grazier is paid for maintenance and weight gain and any fed supplement can be easily charged. The downsides to this payment method include: can be difficult to administrate, cashflow fluctuates and feed value changes by season.

More information and resources for heifer management can be found at:

- Feeding: DairyNZ and Beef + Lamb NZ.
- Targets: DairyNZ and LIC.
- Relationship management: DairyNZ, Federated Farmers and grazing companies.
- Farm systems: DairyNZ and farm consultants.
- Mating: DairyNZ and vets.
- Economics: DairyNZ, Beef + Lamb NZ and grazing companies.
- Technology: LIC, NAIT and scale companies.
- Stock movement/biosecurity: Vets and DairyNZ.

Farmer case studies

David and Heather Gray – dairy farmers, Northland



Figure 1. Our grandson, the next generation of farmer meeting the next generation of cows on our farm.

Background

David and Heather Gray have been farming in Northland for the last thirty-five years. Previously to that David worked in medical microbiology, but a love of the outdoors led to a lifestyle change. The Grays bought a large lifestyle block just outside Whangarei and then they transitioned to a full time farming career. They started out with a 135 cow farm in Kaitaia, but now the Grays have moved to Awanui and have 240ha with 750 cows. The couple moved off farm a few years ago and David works as chairman of the Northland focus farm. Four years ago the couple decided to focus on improving heifer growth as the stock weren't as well grown since they'd moved off farm.



Figure 2. The Grays' dairy farm.

Goals for heifer rearing

Currently the mature cows are 430 - 440kg liveweight and the farm has 700 cows going through a 40 aside herringbone shed - 19 rows. The plan is to be able to drop cow numbers to reduce the number of milking rows over time but still carry the same liveweight per hectare if mature animals are grown to 480 - 500kg. The Grays are rearing 25% replacements to accelerate the genetic gain and larger animals.

Targets for the heifers:

- 90% of mature liveweight at calving based on Liveweight Breeding Values.
- Well grown replacements all calving at their target weights:
 - o Heifers compete in the herd after calving.
 - o Improved milk production.
 - o Get back in calf.
 - o Continue growing to their mature size.

Grays' runoff details

District	Awanui
Farm area	Calf block adjoining dairy farm - 34ha subdivided to 1ha paddocks Heifer lease blocks - 70ha, adjoining each other (below high tide)
Soil type	Calf block - sandy peat Heifer block - heavy clay
Contour	Flat
Pasture species	Both blocks kikuyu with Italian ryegrass under sown in autumn
Stock numbers	
<i>Calf block</i>	
Calves	180 (6/ha) – weaning to 1 st May
Cows	30 carry overs during spring 100 dry cows, eight weeks winter grazing
<i>Heifer block</i>	
R2 heifers	146
Cows	30 carry overs summer through winter
Feed made on farm or purchased	<ul style="list-style-type: none"> • Palm kernel. Start just after Christmas to calves at 1kg and goes up to 2kg • Grass silage made on runoff for winter

Managing young stock ourselves and changes made

Through self-management there is more control over stock decisions and monitoring. Focused on a system to make sure heifers meet targets since the couple no longer live on farm. Changes that have been made to the heifer system:

- Regular weighing.
- Shifting calves daily.
- Added supplement to improve growth rates.
- Oral drenching with combination drench.
- BVD testing after some animals in the herd had BVD.

Management observations

- Be cautious about rearing small or sick calves, they are much harder to rear and often struggle to meet target weights.
- Heifers need daily shifts so paddock subdivision needs to be small enough.
- Weaned heifer calves won't maintain pasture quality - use mower or carry over cows.
- Stock need to be weighed regularly and frequent handling means any problems are picked up early.
- Behind target animals should be preferentially fed - run them ahead of the main mob.
- Sometimes you might need to use supplements when there isn't enough pasture.
- Regular drenching and an established animal health program are needed.
- Monitor trace elements, eczema spore counts and feeding levels.

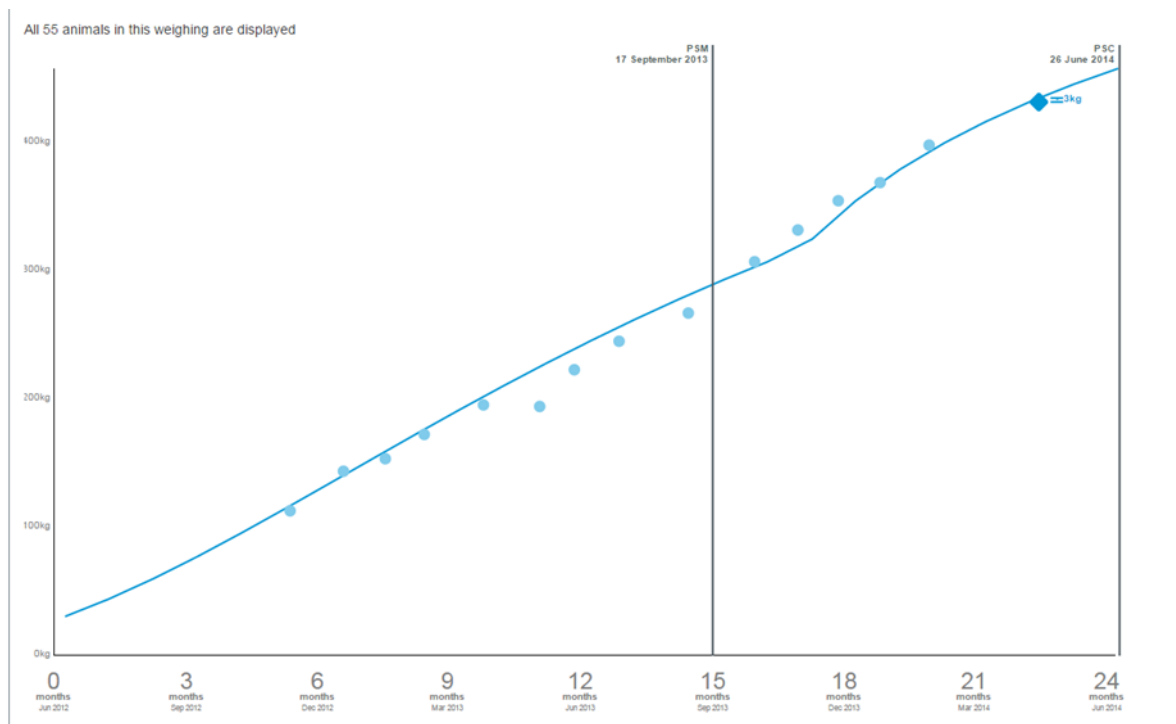


Figure 3. 2012 spring born line.

Challenges of growing stock well

- Wet winters—avoiding pasture damage and maintaining growth rates.
- Dry summers.
- Low energy grass, like kikuyu.
- Facial eczema.
- Mineral deficiencies, like copper and selenium.
- Small calves weaned off milk too early.
- Meeting feeding levels for feed quality and quantity with variable pasture growth.
- Setting a stocking rate at the runoff that meets the increasing feed demand as the heifers are growing.

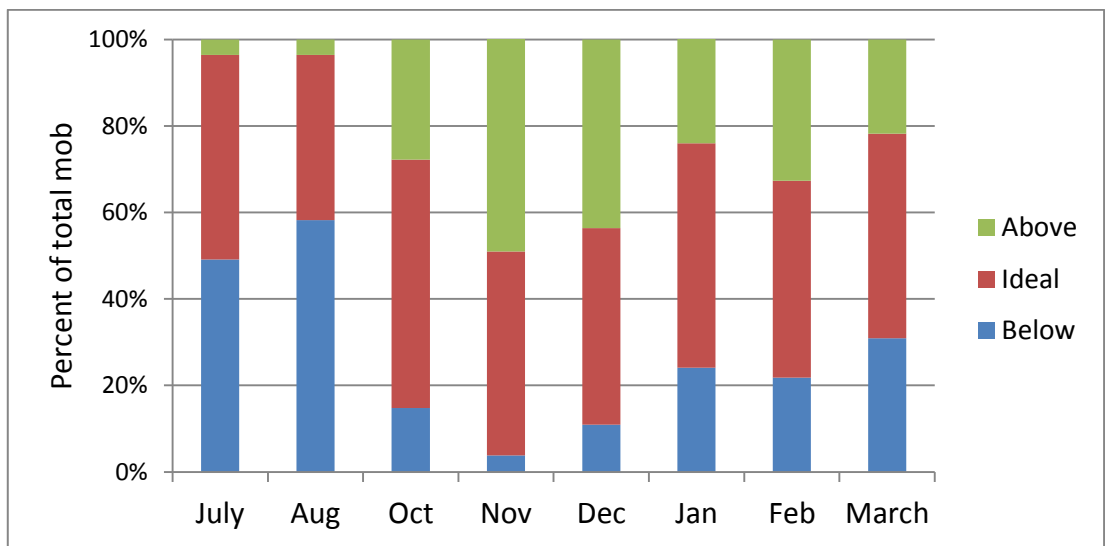


Figure 4. 2012 born heifers compared to Lwt BV weight for age targets.

Grays' seasonal management

Summer

- Weaned calves first summer - use supplement for growth rates.
- If dry - focus on feed quality and quantity.
- Maintaining pasture quality - willing to use mulcher and mower on calf block.

Autumn

- Monitor for facial eczema.
- Feed supplement until sufficient pasture is available after autumn rains.
- Undersow Italian ryegrass in kikuyu.

Winter

- Wet - avoid pasture damage by standing calves off in yards.
- 60 day round.
- Use N if pasture intakes are starting to drop.

Spring

- Focus on keeping pasture quality - surplus identification for silage.

John and Geraldine Taylor – graziers, Northland



Background

The Taylors purchased their farm in 1967; it was 139ha and had been the back half of another farm. When they first arrived the farm was split into 9 paddocks and didn't have infrastructure (water, buildings, etc.). Originally they were sheep farming, but after the market reform of the primary industry in the 1980s, John and Geraldine diversified into cattle and they took on dairy grazers. Over time they have dropped sheep numbers and increased the number of dairy grazers.

John and Geraldine believe that you can't farm now like you did 50 years ago and that farmers will need to comply with more environmental restrictions in the future. They believe there are win-win solutions to reduce environmental impact and increase profitability. Over the last ten years the couple has used subsidies from the council to fence off waterways, gullies and wetlands on farm. While benefiting the environment, the fencing has also made stock management easier and reduced livestock losses.

- Previously 1,900 breeding ewes on farm in the 1970s and 80s.
- Started with 50 head of dairy grazers.
- Banks were initially cautious about farmers cashing in their stock assets to carrying dairy grazers.

Goals for heifer grazing

The Taylors want healthy, well-grown calves when they arrive to their farm (i.e. rumen development) and a frame that enables the animal to grow and meet target weights. They also want to make a professional business from grazing. They currently use both the NZ Grazing Company and private grazing agreements to source stock.

Taylor farm details

District	Te Arari
Farm area	178ha (gullies have been fenced)
Effective area	160ha
Soil type	Podzolised soils (hard pan under soil)
Contour	Rolling to easy
Pasture species	Ryegrass/white clover - no kikuyu Grass to grass re-grassing
Stock numbers	
R1 heifers	70
R2 heifers	157
Ewes	700 Composite lambed
Ewe hoggets	150-200
Ewe lamb replacements	150-200
Works lambs	790
Feed made on farm or purchased	Typically 250 bales made on farm (835 bales in 2013 - lower stocked after the drought)

Purpose of heifer growing in enterprise

In the 1980s small dairy farms surrounding the Taylors decided to increase cow numbers; in the past they had grazed their own replacements but the farmers saw an opportunity for better returns by grazing young stock off farm. At the same time the sheep income dived and beef became expensive as every "Tom, Dick and Harry" got in, but then the beef market crashed.

The Taylors saw that dairy grazing was better than beef because it didn't require speculating when to buy and sell and there is no capital outlay. Dairy grazing also provides steady cash flow - it is like being on wages compared to sheep. Dairy grazing also allows farmers to be part of the dairy industry and the opportunity to develop a professional type of farming, lifting the profile of graziers. When graziers are paid for the value of feed they have the incentive to become more professional.

Dairy grazing also suits the Taylors' farm because:

- It is winter wet and dairy grazing allows cattle to be run in larger, lighter mobs compared to beef finishing.
- It generates better returns through the autumn compared to a falling beef schedule.

New Zealand Grazing Company payment system

- Uses the Modelled Dry Matter (MDM) approach – reflecting the changing value of feed and maintenance requirements:
 - o Base rate: 13-15 cents/kgDM.
 - o Winter premium: 8-10 cents/kgDM (May to August).
 - o Young stock premium: 2 cents/kgDM (under 267 days of age).
 - o Exceeding target bonus: 2 cents/kgDM.
 - o Below target penalty: -8 cents/kgDM.
 - o Animal health: 60 cents/head/week.
 - o Bulls during mating: \$10/head/week.
- Penalties for deaths = \$500/heifer plus grazing costs refunded unless cause of death is a pre-existing condition.
- Mis-mating = \$400/head penalty.
- Bull loss during mating = \$1,000/head.

Management observations

- Different management required compared to beef:
 - o Spring mating.
 - o Feed patterns.
 - o Fussy eaters (i.e. need regular shifting).
- Climate and supplemental feed are playing a much bigger part than they used to for reaching targets.
- Price should not be the key factor for dairy farmers - achieving weight targets is more important.
- Know your grazier and their results because it needs to be profitable for you both.
- Weekly rates are similar to being on wages, but incentive payments motivate more professional behaviour and better performance (i.e. don't play stock numbers game).
- When dairy farmers are interested in well-grown young stock they benefit in the long term.
- It is important that animals are above target going into sensitive feed periods for a liveweight buffer.
- Monthly faecal egg counting has reduced drenching frequency.

Challenges of growing stock well

- Stock on arrival
 - o Receiving lines of calves that have been well-grown and transitioned on to grass.
 - o Being presented with a health summary of what has been done (e.g. *Lepto*, *Clostridia* vaccinations, etc.).
 - o Better bred stock grow better.
- Feeding
 - o Feed demand for heifers is a poor fit with typical pasture growth.
 - o To achieve target weights young heifers cannot be used to clean up pastures and that results in “scruffy” paddocks.
 - o Heifers need to be fed extremely well six weeks out from mating, but September is the worst month for growth on the Taylors’ farm.
 - o Making enough silage to cover dry period/bad winter when supplement needs to be fed daily.
- Managing stock on our farm/in our area
 - o Droughts, strong westerly winds and difficult springs in recent years have prompted a drop in stocking rates.
 - o In the winter months stock need daily shifts and sometimes twice when wet.
 - o Cold, wet conditions in the winter limit pasture growth but pasture can take off quickly when soil temperatures increase.
- Relationship management
 - o Grazing contracts with stock owners require stock owners to manage animal health, which can be quite frustrating when they get too busy to come drench.
 - o The responsibility of growing other people’s stock.

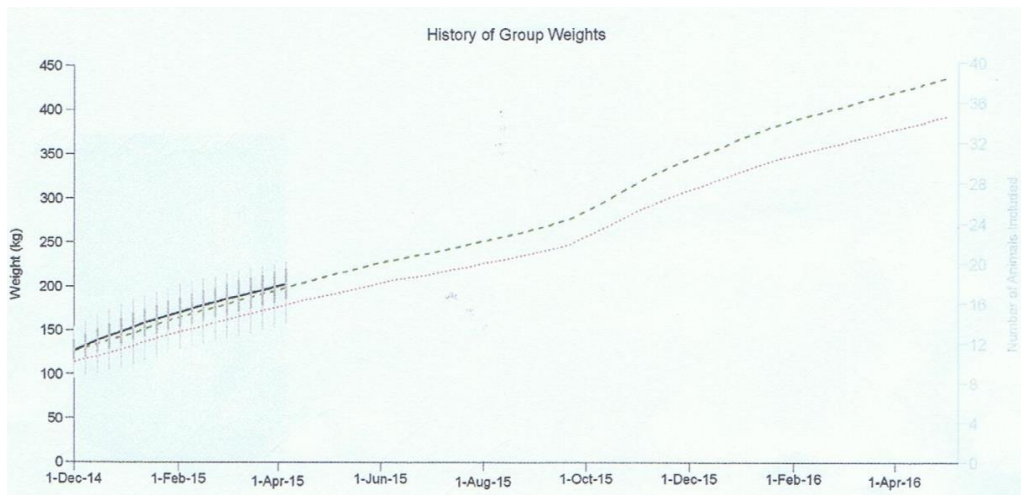


Figure 5. Growth performance of 2014 born line of 33 crossbred heifers: 10 April 2015.

- Solid black line = mob average
- Dashed green line = target growth line
- Dotted red line = minimum weight required
- Arrival mob avg = 128kg
- Current mob avg = 205kg
- Average rate of gain = 0.494kg/hd/day

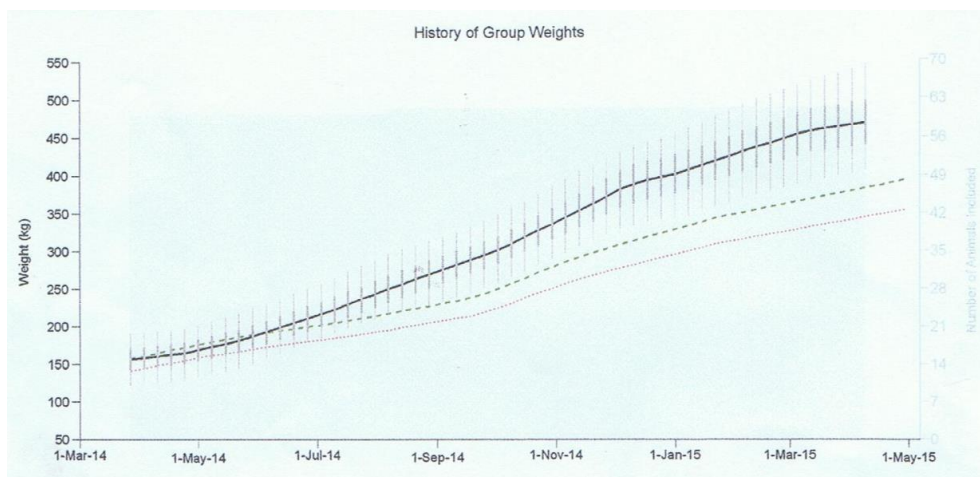


Figure 6. Growth performance of 2013 born line of 66 crossbred heifers: 10 April 2015.

- Solid black line = mob average
- Dashed green line = target growth line
- Dotted red line = minimum weight required
- Arrival mob avg = 169kg
- Current mob avg = 468kg
- Average rate of gain = 0.824kg/hd/day

Taylor's seasonal management

- Heifers stay in mobs of the same owners.
- Heifers rotationally grazed all year.
- Smaller heifers are run in separate mob and can be preferentially fed if required.

Summer

- Weaned heifer calves start arriving 100-130 kg liveweight.
- Weaning and sell prime lambs to drop feed demand - over 50% sold by mid-February.
- Start spore counting for facial eczema.

Autumn

- Heifers grazed May to May start arriving - grazing company stock arrive 1st May but private grazing contracts as late as 31st May.
- Sell prime lambs to reduce feed demand.
- Set up poly wires and portable water troughs in May so stock can have daily breaks in the winter.
- Mobs put in allocated blocks for late autumn and winter.

Winter

- Stocking rate just over 12 SU/ha.
- Heifers are allocated area of the farm to graze - 3 heifers/ha (750-800kg Lwt/ha).
- Daily shifts - twice a day on wet days.
- One acre/day (0.4ha) for every 50 heifers - approx. 40 day round.
- Start feeding silage at one bale per 100 heifers (1.5 kgDM/heifer).

Spring

- Move to two day shifts.
- Finish feeding silage mid-September.
- Surplus pasture harvested to maintain quality and to be used as a feed buffer.
- Start faecal egg counting.