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10 November 2020

Victor Moffroid
LPD Category Manager, Australia & New Zealand
IDEXX

Dear Victor

Re: IDEXX Milk Pregnancy Test Assessment

Please find attached a report that reviews the management decisions surrounding empty cows and the potential use of the IDEXX Milk Pregnancy Test in New Zealand. We also enclose a calculator which assesses potential financial benefits.

If you have any questions, please do not hesitate to contact me.

Yours sincerely

R. J. Densley

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IDEXX Milk Pregnancy Test Assessment

Report prepared for IDEXX

Prepared by:
Raewyn Densley and Dave Miller

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1.0 SUMMARY

- There are three main calving regimes on NZ farms. Spring calving herds (approx. 95% of the total) calve in the late winter (July/August) and in-calf cows are dried off according to production level, cow condition score and pasture cover level in March to May. Autumn calving herds calve in March/April and milk through the winter months. Split-calving farms have both spring and autumn calving herds on the same farm.

- The management of empty (or non-pregnant milking cows) varies between districts:
  - In the North Island and the summer-dry, non-irrigated parts of the northern South Island, empty cows are generally identified by the vet in late January to mid-February and sent to the sale or the meat works as the on-farm feed supply starts to tighten.
  - South Island farms which are in high summer rainfall areas (West Coast or Southland) or under irrigation (Canterbury and Otago) also tend to identify empties early (January/February). However, because summer pasture growth rates tend to be higher and feed is not limiting, they are milked to the end of the season and culled in May.

- Around 90% of farmers pregnancy test, and rectal ultrasound is the most common method. Farmers rely on ultrasound pregnancy testing not only to confirm pregnancy, but also to identify calving date so that cows can be split into calving groups.

- Farmers in summer dry regions place a greater emphasis on the timeliness of pregnancy results. There is a significant surge in ultrasound pregnancy testing in the first week of February as this typically coincides with the removal of bulls from the herd six weeks prior.

- The seasonal calving nature of most of the herds in New Zealand mean that pregnancy testing of all cows occurs at the same time of the year and herd testing occurs four times a year.

- This is unusual relative to most dairying countries and it does negate some of the financial advantages of pregnancy testing via herd testing which have been observed in Australian dairy farm systems.

- For the 73% of New Zealand dairy herds that are already herd testing, IDEXX pregnancy testing offers the following advantages over conventional ultrasound pregnancy testing:
  - Improved accuracy
  - Better animal welfare
  - Reduction in farm labour required for testing
  - In some cases, lower testing cost.

- The combination of IDEXX testing as well as ultrasound may give better, more useful results than a single method of pregnancy diagnosis.

- **A promotional programme centred around the seamless supply of accurate pregnancy results via regular herd testing, the ability to pregnancy test multiple times including late in the lactation, and the animal welfare and farm workload advantages of IDEXX testing relative to rectal scanning is likely to have greater resonance with farmers than just an analysis of the financial advantages.**

2.0 DAIRY INDUSTRY BACKGROUND

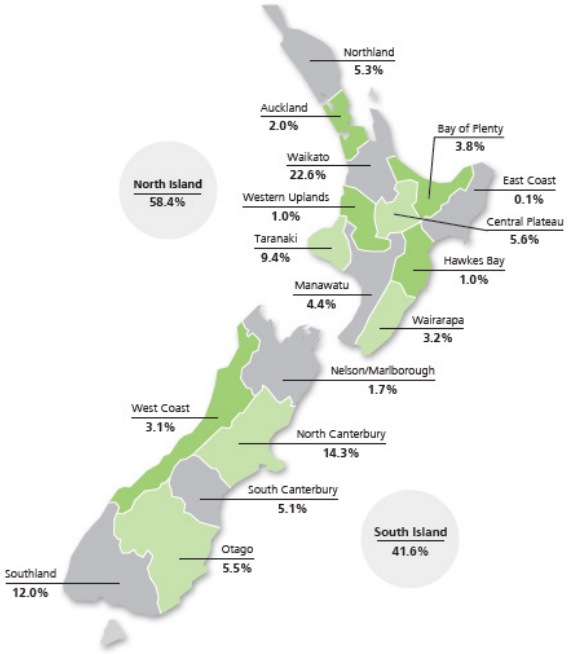
The New Zealand dairy industry comprises of 4.95 million cows milked in 11,372 herds from Northland to Southland.

Table 1: Herd analysis by Region in 2018/19 (DairyNZ and LIC, 2019).

Farming region	*Total herds*	*Percentage of herds*	*Total cows*	*Percentage of cows*	*Total effective hectares*	*Percentage of effective hectares*	*Average herd size*	*Average effective hectares*	*Average cows per hectare*
Northland	820	7.2	264,142	5.3	116,407	6.7	322	142	2.27
Auckland	354	3.1	99,367	2.0	40,937	2.3	281	116	2.43
Waikato	3,249	28.6	1,117,207	22.6	381,098	21.9	344	117	2.93
Bay of Plenty	538	4.7	189,854	3.8	67,078	3.8	353	125	2.83
Central Plateau	490	4.3	278,569	5.6	103,760	6.0	569	212	2.68
Western Uplands	90	0.8	48,173	1.0	18,758	1.1	535	208	2.57
East Coast	9	0.1	5,884	0.1	2,155	0.1	654	239	2.73
Hawkes Bay	72	0.6	47,746	1.0	16,384	0.9	663	228	2.91
Taranaki	1,588	14.0	466,701	9.4	168,580	9.7	294	106	2.77
Manawatu	530	4.7	216,293	4.4	80,831	4.6	408	153	2.68
Wairarapa	416	3.7	156,612	3.2	57,469	3.3	376	138	2.73
North Island	**8,156**	**71.7**	**2,890,548**	**58.4**	**1,053,457**	**60.4**	**354**	**129**	**2.74**
Nelson/Marlborough	214	1.9	82,269	1.7	29,322	1.7	384	137	2.81
West Coast	372	3.3	153,077	3.1	69,382	4.0	411	187	2.21
North Canterbury	880	7.7	707,559	14.3	205,632	11.8	804	234	3.44
South Canterbury	320	2.8	251,119	5.1	73,571	4.2	785	230	3.41
Otago	445	3.9	269,746	5.5	91,473	5.2	606	206	2.95
Southland	985	8.7	591,987	12.0	220,837	12.7	601	224	2.68
South Island	**3,216**	**28.3**	**2,055,757**	**41.6**	**690,216**	**39.6**	**639**	**215**	**2.98**
New Zealand	**11,372**		**4,946,305**		**1,743,673**		**435**	**153**	**2.84**

The majority of dairy herds (71.7%) are located in the North Island, with the greatest concentration (28.6%) situated in the Waikato region (Figure 1). Taranaki, with 14.0% of dairy herds, is the next largest region. Although South Island dairy herds account for 28.3% of the national total, they contain 41.6% of all cows milked (Graph 3.1). Twenty-three per cent of all dairy cows are located in the Waikato region, followed by North Canterbury (14.3%), Southland (12.0%) and Taranaki (9.4%).

Figure 1: Regional distribution of cows in 2018-19 (DairyNZ and LIC, 2019)



On average South Island herds are bigger (639 cows) than those in the North Island (354 cows). They produce 408 kg milk solids (fat plus protein) per cow versus 362 kg milk solids per cow for the North Island (DairyNZ and LIC, 2019).

The New Zealand dairy industry is reliant on the growth of high quality ryegrass clover pasture as locally grown and imported grains and concentrates tend to be expensive and/or have feeding limitations (e.g. palm kernel extract which has an impact on milk quality parameters if fed > 3 kgDM/cow/day).

The industry groups farms into 'systems' based on the amount of imported feed. These are:

- **System 1:** All grass, self-contained, all adult stock on the dairy platform. No feed is imported. Approximately five percent of owner-operator herds.
- **System 2:** Feed imported, either supplement or grazing off, fed to dry cows. 90-99% of total feed is home grown feed. Approximately 25 percent of owner-operator herds.
- **System 3:** Feed imported to extend lactation and for dry cows. 80-89% of total feed is home grown feed. Approximately 40 percent of owner-operator herds.
- **System 4:** Feed imported and used at both ends of lactation and for dry cows. 70-79% of total feed is home grown feed. Approximately 20 percent of owner-operator herds.
- **System 5:** Imported feed used all year. 50-69% of total feed is home grown feed. Approximately 10 percent of owner-operator herds.

There are three main calving regimes on New Zealand farms.

Spring calving herds (approx. 95% of the total) calve in the late winter (July/August) and in-calf cows are dried off according to production level, cow condition score and pasture cover level in March to May. This production system means that cow peak early lactation intakes match peak pasture growth rates so pasture harvested by cows can be maximised. There will be several weeks (normally mid-May to mid-July) where no cows are in milk.

Autumn calving herds calve in March/April and milk through the winter months. Many of these are found in Northland where the winters are warm and pasture growth rates are high. These farms run a similar system to the spring calving herds but have all their cows dry over the middle of the summer (December to February) when pasture growth can be limited by a lack of rainfall.

Split-calving farms have both spring and autumn calving herds on the same farm. These farms milk year-round and high producing empty cows from the spring herd may be milked through the winter and mated with the autumn herd (or vice versa).

3.0 REPRODUCTIVE MANAGEMENT IN NEW ZEALAND HERDS

The constraint of a 365-day calving interval requires that cows must resume cycling, display oestrous behaviour, and be mated to conceive successfully during a mating period beginning 83 days after a designated 'planned start of calving', irrespective of time postpartum. (Blackwell et al, 2010).

Artificial breeding (AB) is typically used during the first four to six weeks of mating to generate replacement stock, followed by natural bull mating. On many spring-calving farms mating starts 10 - 20 October and the bulls are taken out at Christmas. There is an increasing trend for farmers to use 100% AB driven by the availability of short lactation bulls as well as easy calving beef breeds.

Mean six-week in calf rates are for the 2018-19 season ranged from 66-70% by dairy district (Table 2).

Table 2: Mean 6-week in-calf rate by farming region for the last three seasons.

	Actual						Estimated					
	2016/17		2017/18		2018/19		2016/17		2017/18		2018/19	
Farming region	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)	Number of herds	Mean 6-week in-calf rate (%)
Northland / Auckland	193	64.5	188	65.8	207	68.2	505	60.5	441	61.3	394	62.5
Waikato / Western Uplands	1,088	66.3	1,112	67.3	1,128	69.0	1,407	62.3	1,218	62.6	1,196	64.6
BoP / Central Plateau / East Coast	342	64.9	329	65.1	373	66.6	410	62.3	378	62.0	354	63.8
Hawkes Bay / Manawatu / Wairarapa	342	63.0	350	63.9	345	65.9	375	61.5	330	61.0	310	62.8
Taranaki	316	67.6	360	67.0	371	70.0	1,001	63.7	870	62.9	879	65.6
West Coast / Nelson / Marlborough	140	68.5	125	69.2	143	68.3	313	64.5	303	63.2	285	64.9
North & South Canterbury	763	65.7	743	66.0	816	66.0	224	63.8	185	62.4	178	63.6
Otago / Southland	768	65.9	756	67.9	824	66.8	330	63.7	309	63.5	286	63.9

Note: Results reported in this table are from an improved version of the Fertility Focus Report software and will differ from earlier publications.

Many farmers rely on visual observation of cow heat behaviour to determine which cows are pregnant and which are not. Some will do an early scan prior to Christmas to determine which of the cows put forward to AB held to the first round of mating. This is more common in the South Island where herds are larger and there are more staff on farm.

In North and upper South Island areas, which are prone to summer dry, it is common practice to scan spring calving herds in late January/early February to identify empty cows. This allows them to be culled before feed supply tightens, but also minimises the number of cows that are >120 days in calf at which point it becomes difficult to age the pregnancy.

Some farmers will scan again in April to pick up any cows which returned a false positive scan result, as well as those cows which have spontaneously aborted after the last scan.

4.0 EMPTY (NON-PREGNANT) COW MANAGEMENT

New Zealand dairy industry data collected from 1990 to 2013 was analysed to determine the reason for culling of cows two years or older. Of the 9,411,385 that were culled, 33.4% were empty and the reason was unknown for 29.2%. Low production (8.6%), old age (4.0%), mastitis (3.8%), udder problems (3.8%) and high somatic cell count (2.9%) were other key reasons for culling (Kerslake et al, 2018).

The management of empty (or non-pregnant milking cows) varies between districts:

- In the North Island and the summer-dry, non-irrigated parts of the northern South Island, empty cows are generally identified by the vet in late January to mid-February and sent to the sale or the meat works as the on-farm feed supply starts to tighten. In a dry summer when pasture supply is limited culling of in-milk empty cows takes place immediately after scanning in late January to early February, in a wetter summer these cows may be milked a little longer and culled in March/April. The timing of culling tends to be influenced by the milk price and the price and availability of supplements. If the milk price is strong and/or there is plenty of pasture or cost-effective supplementary feed available, farmers may milk empty cows for longer.
- South Island farms which are in high summer rainfall areas (West Coast or Southland) or under irrigation (Canterbury and Otago) also tend to identify empties early (January/February). However, because summer pasture growth rates tend to be higher and feed is not limiting, they are milked to the end of the season and culled in May. In these systems in-calf cows that are to be kept are dried off earlier than empty cows, to ensure they meet body condition score targets for calving.

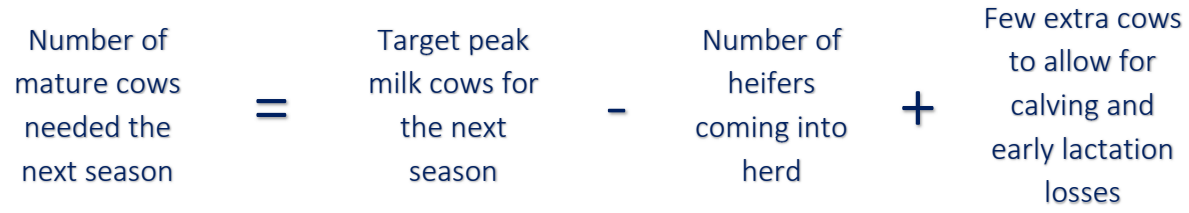
While there is no hard data, DairyNZ animal welfare experts indicate that around 90%+ of herds will pregnancy scan with the rest relying on the combination of artificial breeding (AB) records and visual observation to determine which cows are not in calf.

Most farmers will raise enough heifers to replace around 20-25% of the milking herd with two-year old heifers each season. The replacement cost of a cow before its first calving (as a 2-year old) was estimated to be NZ$1,445. This was based on the sum of costs to rear a replacement from a new-born calf to 40 weeks of age [rearing costs (NZ$187/calf), grazing costs (32 week at NZ$6/week), animal health costs (NZ$10/animal), and animal losses (2%)], from 40 weeks to

1 year and 40 weeks of age [grazing costs (52 week at NZ$9/week), animal health and reproduction (NZ$50/ cow), and animal losses (2%)], and from 1 year and 40 weeks to 2 years of age [grazing costs (13 week at NZ$24/week), animal health (NZ$20/cow), and animal losses (2%)] (Kerslake et al, 2018).

Empties are typically culled first followed by cows with health, somatic cell count or temperament issues. The final cull (usually prior to or at drying off) takes out old and/or low producing cows. The number of cows culled for production is largely determined by how many mature cows are needed in the herd the next season, plus the number of heifers coming into the herd (Figure 2). The more cows that are culled because they are empty, the less cows that can be culled based on production.

Figure 2: Calculating how many mature cows are needed for the next season



Historically few New Zealand farmers have bought in extra cows. The appetite for doing this has reduced even further since the first outbreak of *Mycoplasma Bovis* in New Zealand in 2017. The exception is the odd farm will buy a few extra in-milk cows in the spring usually to compensate for higher-than-expected losses over calving.

An analysis of culling data (Kerslake et al, 2018) shows nearly four times as many cows were culled for being empty as were culled for low production. Getting cows in calf, **and accurately identifying that they are in calf** is important for both current and future herd economics.

5.0 PREGNANCY SCANNING

Most large animal vet clinics in dairy regions offer an rectal ultrasound pregnancy scanning service for dairy cows, and virtually none rely on rectal palpation except for diagnosing reproductive issues, and checking the odd cow later in the season to determine if she is indeed in-calf.

The cost varies between practices with some charging $2.30 + GST per cow plus a call-out fee (which varies depending on travelling distance) and others charging around $3.00 + GST per cow with no call-out fee. The cost of vet scanning appears to be slightly higher in Taranaki ($3.80 + GST per cow) than other regions.

Vet Ent, who are New Zealand's largest practice with 21 clinics and more than 75 vets, offer pregnancy detection scanning at >42 days for $1.10 + GST per cow or aged scanning from 60 days post conception for $2.70 + GST per cow.

Vet Ent, and several other veterinary practices are part of Zoetis's Infovet programme (see https://www.zoetis.co.nz/species-products/infovet/index.aspx) . Infovet is designed to collect, analyse, and review dairy farm data to help plan and improve farm systems. It synchronises with Livestock Improvement Corporations MINDA (https://www.lic.co.nz/products-and-

services/minda/) and allows pregnancy scanning information, including aging data, to be combined with cow breeding information.

Ultra-scan https://www.ultra-scan.co.nz/ offer a nationwide scanning service for $2.80 + GST per cow and can generate an accurate pregnancy diagnosis from 30-days post-conception.

A single operator can ultrasound pregnancy scan up to 100 cows an hour. With two ultrasound units working at the same time cows can be scanned as they are milked in a rotary shed without having to slow the platform speed.

According to DairyNZ 69% of dairy farms have herringbone sheds: https://www.dairynz.co.nz/milking/milking-efficiently/milking-routine/herringbone-routine/). It is not possible to ultrasound cows in a herringbone as they are milked so they must be brought back to the shed outside of milking time. This generates an additional farm labour cost of around $30/hour or $0.30 per cow if there is a single ultrasound technician or $0.15 per cow for two technicians working at the same time.

Most vets offer a predicted calving date as part of their ultrasound scanning service. Data would suggest this is accurate with a study by Massey University showing 90% of 83,000 cows calved with 10 days of the predicted calving date: (https://www.northvets.co.nz/news/accuracy-aging-pregnancy-tests/). Dating pregnancy allows farmers to separate cows into calving date groups and to manage the return to farm of dry cows which have been sent to off-farm grazing.

6.0 HERD TESTING

A total of 3.67 million cows were herd tested in 2018/19, up 1.6% from the previous season and the highest on record. Both the percentage of total herds (73%) and percentage of total cows herd tested (74%) increased (DairyNZ, 2019).

Table 3: Use of herd testing by region in 2018/19

Farming Region	Herds tested	Total herds	Percentage of total herds tested	Cows tested	Total cows	Percentage of total cows tested	Average herd size tested	Average herd size
Northland	561	820	68.4	198,147	264,142	75.0	353	322
Auckland	231	354	65.3	67,662	99,367	68.1	293	281
Waikato	2,343	3,249	72.1	823,345	1,117,207	73.7	351	344
Bay of Plenty	382	538	71.0	134,782	189,854	71.0	353	353
Central Plateau	340	490	69.4	186,141	278,569	66.8	547	569
Western Uplands	62	90	68.9	32,041	48,173	66.5	517	535
East Coast	4	9	44.4	1,994	5,884	33.9	499	654
Hawkes Bay	56	72	77.8	36,368	47,746	76.2	649	663
Taranaki	1,241	1,588	78.1	371,091	466,701	79.5	299	294
Manawatu	375	530	70.8	160,725	216,293	74.3	429	408
Wairarapa	320	416	76.9	116,745	156,612	74.5	365	376
Nelson/Marlborough	158	214	73.8	58,250	82,269	70.8	369	384
West Coast	245	372	65.9	102,624	153,077	67.0	419	411
North Canterbury	668	880	75.9	549,606	707,559	77.7	823	804
South Canterbury	230	320	71.9	184,527	251,119	73.5	802	785
Otago	335	445	75.3	212,404	269,746	78.7	634	606
Southland	729	985	74.0	435,877	591,987	73.6	598	601
New Zealand	**8,280**	**11,372**	**72.8**	**3,672,329**	**4,946,305**	**74.2**	**444**	**435**

Note: Table includes figures from both herd test providers

It is recommended that farmers herd test four times a season and typically the tests would be in late September (before mating begins), November, February and April. The cost for herd testing for a 300-cow herd is $3.43 + GST for an AM plus PM milk test or $3.24 + GST per cow for a single AM or PM test.

7.0 IDEXX MILK PREGNANCY TESTING

The additional cost of running a pregnancy test with the herd test is $2.99/sample. It is possible to test the entire herd or a nominated list of at least 25 cows. Pregnancy can be detected from 28 days and there is a seven-day turnaround for test results which can be uploaded into MINDA. This means that the soonest a result could be obtained via IDEXX is 35 days post-breeding.

According to information compiled by IDEXX, some of the advantages of milk pregnancy testing are early pregnancy diagnosis, greater accuracy, and an easier process (Table 4).

Table 4: Summary of the differences between palpation, ultrasound and milk pregnancy test (IDEXX, n.d).

	Palpation	Ultrasound	Milk pregnancy test
Earliest accurate testing time post- breeding	35 days	28 days	28 days
Accuracy	Depends on stage of pregnancy and experience of operator	Pregnant 73% Non-pregnant 82%	Pregnant >95% Non-pregnant >99%
Process	Palpation is stressful for animals, effects productivity and keeps animals off feed	Ultrasound is stressful for animals, effects productivity and keeps animals off feed	Using milk samples submitted to herd recording labs
Considerations	Experience necessary, strenuous, separation and herding of animals	Equipment and experience necessary, separation and herding of animals	Cannot date pregnancy when used in isolation*
Advantage	Immediate results	Immediate results	Reliability, less effort, accurately diagnose pregnancy 98% of the time. No adverse impact on cows.

Our own analysis also compares the pros and cons of the two pregnancy testing systems (Table 5). The big benefits of IDEXX are the ease of testing (less stress for the cow and the farmer), improved accuracy and in some cases lower cost.

Table 5: Scanning is IDEXX pregnancy testing.

	Scanning	IDEXX
Identify Non-pregnant cows (Day 28)	No	Yes, but report takes +7 days
Identify Non-pregnant cows (Day 35)	Yes	Yes
Can be used to age pregnancy	Yes	No
Would you use it to identify expected calving date?	Yes, with reasonable but not total calving date accuracy	Only via three 4-weekly tests and only to draft into four-week calving bands
Tool to confirm pregnancy where staff are inexperienced	Yes	Yes, but requires multiple tests (3 times)
Can be done during milking	Only in rotary sheds	Yes
Is it considered a significant chore on farm?	Yes, in most sheds	No
Possibility to incorporate future diagnostics, i.e. milk sampling for BVD	No	Yes

There would be significant benefit in using a combination of the two systems – IDEXX testing four weeks after the end of AI to identify cows in calf to AI, ultrasound pregnancy testing in February to confirm calving dates and potential empties and IDEXX testing in April to enable the culling of any empties which are still in the milking herd.

8.0 BENEFITS OF USING IDEXX MILK PREGNANCY TESTING IN NZ

8.1 Cost of testing

Given that 73% of New Zealand herds are being herd tested, there is a potential to provide a less obtrusive and, in some cases, cheaper method of testing by using the IDEXX milk pregnancy test vs herd ultrasound scanning (Table 6).

Table 6: Pregnancy determination costs (per cow costs for a 300-cow herd)

	Herd Testing	
	Yes	No
Cost of IDEXX testing	**Pregnancy test - $2.99/cow**	Pregnancy test - $2.99/cow One-off herd test - $3.24/cow **Total cost - $6.23 per cow**
Cost of ultrasound testing - (rotary)	**Ultrasound $1.10 - $3.80/cow** No extra farm labour	
Cost of ultrasound - (herringbone)	Ultrasound $1.10 - $3.80/cow Extra farm labour $0.15 - $0.30/cow **Total cost $1.25 – $4.10/cow**	

Clearly the opportunity for IDEXX lies with those farms which are already herd testing and especially with farmers who have herringbone sheds where it is not possible to pregnancy ultrasound at the time of milking. The cost saving could be as much as $1.10 per cow for a farmer who requires additional labour.

The first worksheet provides a framework for farmers to enter their own costs for ultrasound versus IDEXX testing. This can be done for the entire season or for a single test. Cells which are highlighted yellow are the key ones to customise when analysing a farm.

Table 7: Potential savings from using the IDEXX milk pregnancy test.

POTENTIAL COST SAVINGS - IDEXX MILK PREGNANCY TEST	
Comparative cost of using IDEXX vs ultrasound	
Herd details	
No of cows	500
Typical number of pregnancy tests per cow per season	2.5
ULTRASOUND TESTING COSTS	
Vet charges	
Cost per ultrasound scan ($/cow)	$2.99
Total vet ultrasound cost for the season ($)	$3,737.50
Farm labour cost	
Total number of hours to ultrasound the entire herd (hours)	4
No of farm labour units required to ultrasound	1
Average farm labour cost ($/hour)	$30.00
Total farm labour cost for ultrasounding herd ($)	300
Total cost of ultrasounding herd (vet + farm labour) ($)	**$4,037.50**
IDEXX MILK TESTING COST	
IDEXX test cost ($)	$2.99
Additional herd testing cost ($/cow)	0
Total cost of IDEXX milk pregnancy test of the herd ($)	$3,737.50
COST ADVANTAGE TO IDEXX MILK PREGNANCY TESTING ($)	**$300.00**

8.2 Cost of accidentally culling a pregnant cow

According to data provided by IDEXX, the accuracy of detecting a pregnant cow is 73% for early ultrasound versus >95% for the milk pregnancy test. This means that on a single early test, for every 100 pregnant cows 73 would be detected via ultrasound but >95 cows via milk pregnancy test.

In many cases a cow which was ultrasound tested as being pregnant will show physical signs of coming back on heat and will therefore be detected, but in some cases, particularly in the North Island when feed supply is tight and empty cows are culled soon after herd testing in late January or February, there is therefore some risk of culling an 'empty' cow which is in-fact in calf.

Meat processing companies keep no record of the number of slaughtered cull cows which are pregnant although they do collect foetal bovine serum from the hearts of calves collected from late pregnant cows.

In a study conducted in 2000, the reproductive tracts from 1134 cull dairy cows were examined after slaughter and evisceration at a commercial abattoir for the presence of pregnancy. The farmers that had submitted these animals for slaughter were surveyed for information about the farm and herd from which each cow was derived to establish whether the farmer believed each cow to be pregnant or not. The method that had been used to determine pregnancy status was recorded for each animal. Pregnancy was detected in 39% of cows, of which 2.3%

carried twins. The pregnancy status evident at slaughter varied from that reported by farmers in 7.0% of the 954 cows for which farmers were able to provide information. Of the cows that had been examined by palpation or ultrasound per rectum prior to slaughter, 10.3% that were recorded as non-pregnant by farmers were pregnant, and 3.2% of those recorded as pregnant were not. Of the cows that had not been examined, 3.8% of those recorded as non-pregnant by farmers were pregnant while 10.4% of those recorded as pregnant were not (Lawton et al, 2000).

Erroneously culling a pregnant cow means there is one less low producer which can be removed from the dairy herd. The second worksheet aims to summarise the cost of this occurring on the basis that another replacement must be reared to compensate for the lost cow. It is worth noting that if the cow was not culled either it, or the replacement, could have potentially been sold. The sale price for a high quality in-milk cow or heifer ranges from $1,200 to $1,600 depending on breeding worth and demand.

Table 8: Cost of erroneously culling a pregnant cow

COST OF CULLING A PREGNANT COW			
Cost of culling a cow which was actually pregnant (false negative)			
Beef value of a cull cow			
Cow weight (kg)	480		
Cull cow beef price ($/kg liveweight)	1.70		
Cull cow return ($/cow)	**$816.00**		
Cost of rearing a replacement heifer	$1,445.00	(Kerslake et al, 2018)	
NET COST OF CULLING A PREGNANT COW ($)	**$629.00**		
NO OF PREGNANT COWS CULLED IN HERD	2		
TOTAL COST TO THE HERD ($)	**$1,258.00**		

8.3 Cost of not culling an empty cow

The accuracy of IDEXX is helpful in reducing the incidence of cows that are empty being carried through the winter.

It has proven difficult to get conclusive data about the frequency of this occurring but in our experience around 2-3 % of the herd that is wintered, fail to calve. We estimate that 50% of these are genuine slips while the other half are empty cows which were erroneously scanned as being in-calf.

8.3.1 North Island

In the North Island empties are normally identified in late January/early February and culled relatively soon afterwards to reduce grazing pressure at a time when pasture supply is often limited. A cow which is thought to be in calf may be kept until August (six months) before the farmer realises, she is in fact empty and culls her. The per cow cost is significant as the animal has been dried off and then fed for many months before culling.

Table 9: Cost of keeping a non-pregnant cow in the North Island

COST OF KEEPING A NON-PREGNANT COW - NORTH ISLAND						
Cow kept after empties have been sent off farm. Found to be non-pregnant in spring						
Costs of drying a cow off						
Teat seal ($/cow)	9.00				input numbers into yellow cells	
Dry cow ($/cow)	17.00					
Animal health ($/cow)	5.00					
Labour ($/cow)	15.00					
Total cost per cow ($)	**$46.00**					
Costs of feeding a dry cow to increase 1CS			Feed	$/kgDM fed	kgDM/day	Cost/day ($)
Amount fed per day (kgDM)	10		Pasture	0.15	6	0.90
Feed cost per day ($)	2.30		Maize silage	0.32	2	0.64
Length of time dry before being culled (days)	180		PKE	0.38	2	0.76
Total feed cost ($)	**$414.00**		Other	0.00	0	0.00
			Total		**10**	**2.30**
Less added value of extra LWG						
No of kg gained	30					
Beef price $/kg liveweight	1.70					
Value of extra weight	**-$51.00**					
NET COST OF KEEPING A NON-PREGNANT COW	**$409.00**					
NO OF NON PREGNANT COWS KEPT	1.00					
TOTAL COST TO THE HERD	**$409.00**					

8.3.2 South Island

In the South Island the cost of drying off and keeping an empty cow is high because in-calf cows tend to be dried off a month earlier than empty cows so there is a loss of production, and dry cow wintering is more expensive due to the lack of winter pasture growth.

Table 10: Cost of keeping a non-pregnant cow in the South Island

COST OF KEEPING A NON-PREGNANT COW - SOUTH ISLAND						
Dried off early with in-calf cows. Found to be non-pregnant in spring						
Lost production from drying off earlier than the empties				input numbers into yellow cells		
No of days earlier dry-off	30					
Milk solids production per day (kgMS)	1.4					
Milk price ($/kgMS)	7.00					
Lost milk return ($)	**$294.00**					
Costs of drying a cow off						
Teat seal ($/cow)	9.00					
Dry cow ($/cow)	17.00					
Animal health ($/cow)	5.00					
Labour ($/cow)	15.00					
	$46.00					
Costs of feeding dry cow			Feed	$/kgDM fed	kgDM/day	Cost per day ($)
kgDM feed per day	10		Pasture	0.15	2	0.30
Feed cost per day	3.10		Pasture silage	0.35	4	1.40
Length of time dry before being culled (days)	180		Crop	0.35	4	1.40
Total feed cost	**$558.00**		Other	0.00	0	0.00
					10	**$3.10**
Less added value of extra LWG						
No of kg gained	30					
Beef price $/kg liveweight	1.70					
Value of extra weight	**-$51.00**					
NET COST OF KEEPING A NON-PREGNANT COW ($)	$847.00					
NO OF PREGNANT COWS KEPT	1.0					
TOTAL COST TO THE HERD ($)	**$847.00**					

Off-farm winter grazing is a common practice in the South Island with more cows leaving for longer periods of time. Under an off-farm grazing scenario, cows are checked by the owner less frequently and there is a higher chance that a bulling, non-pregnant cow would go undetected until the spring.

9.0 REFERENCES

Blackwell, M. B.; Burke, C.R.; Verkerk, G.A. 2010. Reproductive management practices in New Zealand dairy farms: what will the future hold in a consumer-focused, export-driven marketplace? Proceedings of the 4th Australasian Dairy Science Symposium. p 407-414

DairyNZ. 2019. DairyNZ Economic Survey 20-18-19. https://www.dairynz.co.nz/media/5793394/dairynz-economic-survey-2018-19.pdf

DairyNZ and LIC, 2019. New Zealand Dairy Statistics 2018-19. https://www.dairynz.co.nz/media/5792471/nz_dairy_statistics_2018-19_web_v2.pdf

IDEXX, n.d. Milk Pregnancy Testing. New Zealand 4-page brochure.

J. I. Kerslake, J.I.; Amer, P.R.; O'Neill, P.L.; Wong, S.L.; Roche, J.R.; Phyn, C.V.C. 2018. Economic costs of recorded reasons for cow mortality and culling in a pasture-based dairy industry. J. Dairy Sci. 101:1795–1803.

Lawton DE, Mead FM, Baldwin RR. 2000. Farmer record of pregnancy status pre-slaughter compared with actual pregnancy status post-slaughter and prevalence of gross genital tract abnormalities in New Zealand dairy cows. N Z Vet J. 2000 Dec;48(6):160-5. doi: 10.1080/00480169.2000.36187. PMID: 16032147.

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