# RESEARCH SUMMARY

# USING MULTIMIN<sup>®</sup> PRE-MATING IN DAIRY HERDS



An injectable supplemental source of zinc, manganese, copper and selenium providin the minerals zinc, copper and manganese in a chelated form for cattle and deer.

## USE OF MULTIMIN® PRE-MATING

MULTIMIN® is designed to be used strategically in dairy herds, during periods of stress and subsequent high trace element demand. This extra demand can mean strategic supplementation will provide benefit even to animals that appear to have sufficient trace element levels. Key periods of stress in the lifetime of dairy animals include calf weaning, transport, drying off, calving and mating.

This document summarises relevant research on the use of MULTIMIN<sup>®</sup> pre-mating in dairy herds.

### D. Hawkins (2007).

# The Effect of Injectable Trace Elements (MULTIMIN®) on Health & Reproduction Parameters in N2 Dairy Herds.

## DCV Newsletter March 2007.

This study was originally published in the DCV Newsletter, and has subsequently been presented at the World Buiatrics Congress (Cairns 2014).

2,168 cows from throughout New Zealand were enrolled, including 505 from autumn calving herds. All farms were considered copper and selenium sufficient, and continued with their routine supplementation throughout the study period. While manganese and zinc levels were measured, the results were of limited value due to the limitations of the testing methods.

5 ml of MULTIMIN<sup>®</sup> was administered 4 weeks prior to calving, and again 4 weeks prior to mating, with control cows injected with 5 ml of saline. There were no significant differences seen in health parameters, including mastitis, or recorded anoestrus between treatment and control groups.

However there was a significant difference (P=0.035) in final in-calf rate, with a 3.3% higher ICR in the treatment group overall. There was also a near significant difference (P=0.058) in recorded pregnancy losses, with 25 cows recorded as losing pregnancies in the control group vs 13 in the MULTIMIN<sup>®</sup> group.

Median conception day relative to planned start of mating was 26.3 days for the control group vs 22.9 days for the treated cows i.e. MULTIMIN<sup>®</sup> treatment resulted in cows getting in calf 3.4 days earlier on average.

Estimated ROI was approximately 4:1, based on a \$4.00/kgMS payout. It was concluded that MULTIMIN<sup>®</sup> could have a significant effect on reproductive efficiency under typical NZ pasture based systems.

The mechanism of this effect was unknown, however it was hypothesised that it could be via improved conception and reduced embryonic mortality. Trace elements are components of many enzymes with structural and functional roles, so supplementation can have an impact on hormone synthesis, uterine health, maternal recognition of pregnancy and normal growth and development of the fetus.

It was concluded that MULTIMIN<sup>®</sup> could have a significant effect on reproductive efficiency under typical NZ pasture based systems.

#### STUDY ONE:







STUDY TWO:







V.S. Machado, M.L.S. Bicalho, R.V. Pereira, L.S. Caixeta, W.A. Knauer, G. Oikonomou, R.O. Gilbert, R.C. Bicalho (2013).

# Effect of an injectable trace mineral supplement containing selenium, copper, zinc, and manganese on the health and production of lactating Holstein cows.

### The Veterinary Journal 197 (2013) 451-456.

This study was conducted on 4 large dairy farms in upstate New York, with over 1,400 cows enrolled. Cows were housed and fed total mixed rations, with trace element concentrations 2-6 times above NRC recommendations. NRC recommendations are generally much higher than typical NZ diets, so these cows would not be considered to have deficient diets in NZ conditions. Cows were treated with 5 ml of MULTIMIN®\* at 230 and 260 days gestation, and again 35 days after calving.

There were a number of significant findings relating to udder health, including a reduction in average SCC (from 300,000 to 219,000) and a decrease in subclinical mastitis from 10.4% to 8.0% (P=0.005) in treated cows relative to controls. Treated multiparous cows also had 5.7% less clinical mastitis (P=0.03).

Significant reproductive results included decreased stillbirths and endometritis in treated cows. This supported an earlier 2012 study by Machado where it was shown that the incidence of uterine Fusobacterium and Trupurella bacteria was reduced in cows treated with MULTIMIN<sup>®</sup>.

In spite of the reduction in endometritis, there were no significant effects on reproductive outcomes.

This may be because endometritis is a less significant disease in yearround calving herds (as a delayed mating has less impact), which has been suggested by authors of studies of endometritis in seasonal calving herds.

The treatment regime described would approximately equate to treatment at drying off, then 3-4 weeks pre-calving and 6-7 weeks pre-mating in a seasonal calving system. In fact the treatment was probably much longer before mating in many animals due to the longer calving-mating periods in year-round systems, which may have negated some of the potential reproductive benefits.

The reduction in endometritis shown in this and Machado's previous 2012 study may partially explain the results seen in Hawkins' 2007 study in seasonal calving herds.

# STUDY THREE:



## K. Mitchel, W.A. Smith, A. Storch, N. Michael, J. Els (2008).

# Injectable trace elements increase reproduction efficiency in dairy cows.

Trace Elements in Animal Production Systems (2008) 295-298.

There were two trials outlined in this Short Communication, the second of which is of most relevance. This was conducted in Wisconsin in a 750 cow dairy herd. Cows were injected with 5 ml MULTIMIN®\* 3-4 weeks pre-calving, and 3-4 weeks prior to the end of their voluntary waiting period (i.e. the equivalent of 3-4 weeks pre-mating in a seasonal system). Control cows were treated pre-calving with a selenium/ Vitamin E injection that provided 40 mg selenium, compared with 25 mg/dose of MULTIMIN®.

MULTIMIN<sup>®</sup> treated cows had increased conception and pregnancy rates, resulting in a decrease in median days open, to 99 days for treated cows compared with 119 days in controls i.e. cows in the treatment group got in calf 20 days earlier than untreated cows.

While this is a Short Communication in a non peer-reviewed publication, it is of interest due to the timing of injection relative to mating (similar to what would be used in NZ), and the use of a selenium/Vitamin E injection in the control group. It was conducted in a single herd and in very different conditions to New Zealand, but the results support similar findings in other studies such as Hawkins (2007). Some authors, including Machado, have speculated that that the effects seen in their studies may be due mainly to correction of subclinical selenium and copper deficiencies, however this study suggests there may be other mechanisms involved.

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