

GET YOUR CATTLE PERFORMANCE READY WITH MULTIMIN[®] EVOLUTION



Mn
25
Manganese

Se
34
Selenium

Cu
29
Copper

Zn
30
Zinc

POISON
KEEP OUT OF REACH OF CHILDREN.
READ SAFETY DIRECTIONS BEFORE OPENING OR USING.
FOR ANIMAL TREATMENT ONLY

MULTIMIN[®] EVOLUTION
INJECTION FOR CATTLE

ACTIVE CONSTITUENTS: Mn 25, Se 34, Cu 29, Zn 30. 500 mL.

IMPROVING CATTLE FERTILITY

Shaping the future
of animal health

Virbac

IMPACT OF CALVING PATTERN UPON PROFITABILITY

Heifers and cows cycle every 21 days. This means all breeding females have four opportunities to conceive during a 90-day joining program. Unfortunately, the calving pattern in many Australian herds is spread out over several months.

Increasing the percentage of heifers and cows that conceive early in the breeding season will have a significant and lasting beneficial impact on the fertility and productivity of your herd. A tighter calving pattern also condenses labour requirements and reduces the amount of handling required.

Calves born earlier will have heavier weaning weights. In turn, these weaners will have more time – up to 42 days – to reach critical mating and target market weights. Heifers that conceive and calve earlier will have more time to regain condition before the next joining, improving their opportunity to conceive and calve earlier the following season.

In one Australian study, calves from early calving heifers [i.e. those that conceived in their first and second cycle] were, on average, 13 kg heavier at weaning than calves from heifers that conceived in their third and fourth cycle.¹ The early-calving heifers recorded a pregnancy rate of 91% at the next joining, 20% higher than later-calving heifers.¹

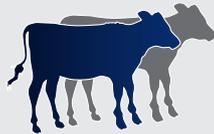
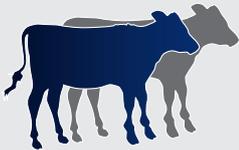
Likewise, steers will have more time to reach market specifications, meaning you will have larger and more consistent lines of saleable cattle. Economic modelling shows that reducing the calving pattern from 16 weeks to 8 weeks can improve economic returns by 11.9%.¹

Reproductive efficiency – the ability to cycle and conceive earlier, return to oestrus and maintain a 365-day calving interval – is determined by:

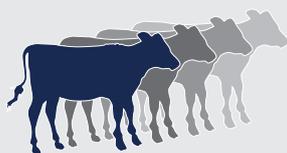
- **Good nutrition to ensure heifers attain critical mating weights and are in optimum condition at calving**
- **Implementing a thorough animal health program**
- **Trace mineral supplementation**
- **Maximising early conception**
- **Reducing embryo loss**



300 breeder herd with 16 week joining period = \$135,290¹



300 breeder herd with 8 week joining period = \$151,355¹



+\$16,065

WEEK 4

WEEK 8

WEEK 12

WEEK 16

Assumptions: 50% dressing percentage, 510 c/kg dressed weight, three year average to 2017, MLA.

MULTIMIN® GETS YOUR CATTLE PERFORMANCE READY

One of the easiest ways to tighten the calving interval is to ensure replacement heifers and cows have adequate levels of trace minerals required for optimum growth, development, fertility and general health.

Often, milk or pastures do not provide sufficient levels of these essential minerals during periods of 'high demand', such as weaning, joining and calving. Furthermore, oral supplements can take months to increase trace mineral status.

Multimin® Evolution Injection for Cattle is a unique trace mineral injection that makes your herd 'performance ready' by improving fertility and immunity. Administered before 'high demand' periods, at weaning or four weeks before joining or calving, this unique four-in-one mineral top-up is scientifically proven to improve conception rates, embryo survival, immunity and sperm quality.

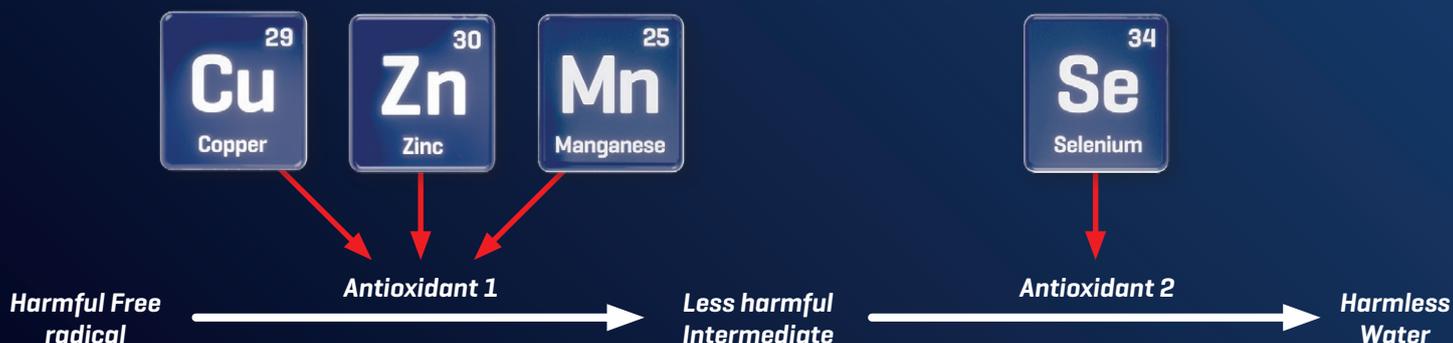
- **Rapidly absorbed 'top-up' of four essential trace minerals**²⁻⁴
- **Provides prolonged antioxidant activity**²⁻⁵
- **Balanced, chelated and water-based formulation**
- **Scientifically demonstrated to improve immunity and fertility in cattle**^{6-19, 21-23}
- **Nil Withholding Periods and Export Slaughter Interval**²⁰
- **Most concentrated trace mineral injection registered in Australia (90 mg/mL)**

4 ESSENTIAL TRACE MINERALS TO INCREASE ANTIOXIDANT LEVELS



Normal bodily processes such as metabolism, ovulation, pregnancy or fighting disease, produce 'free radicals'. These unbalanced molecules cause chemical reactions that may damage healthy cells. Antioxidants are substances that neutralise these 'free radicals'. Multimin® Evolution provides a rapid 'top-up' of the four trace minerals used

to synthesise antioxidant enzymes. These minerals also provide a direct source of nutrients used in the reproductive and immune systems. Multimin® Evolution is absorbed into the bloodstream in as little as two²¹ hours, reaches the liver in 24 hours, and provides prolonged antioxidant action for several months.²⁻⁵



Trace minerals in Multimin® are needed for the synthesis of antioxidants that neutralise harmful free radicals into harmless water.

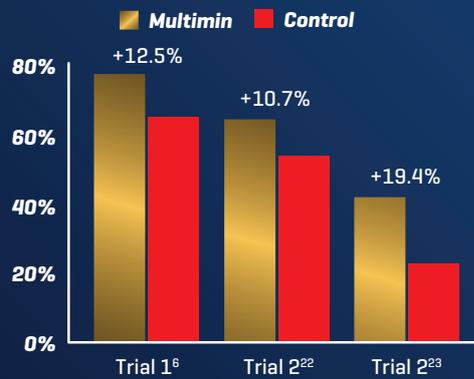
MAXIMISES EARLY CONCEPTION RATES

Improving the number of heifers and cows that conceive in the first or second cycles can dramatically tighten the calving pattern. Ideally, about 65 to 70% of cows should conceive during the first cycle, 20% in the second cycle and 10% in the third cycle to ensure most calves are born within nine weeks to coincide with seasonal pasture availability.

Administered a month before joining, Multimin® Evolution has been shown to improve the number of conceptions in the first cycle from 10.7 to 19.4%.^{6,22,23}

There is evidence to suggest that this effect is even greater in younger breeders, particularly second calvers.²²

Effect of Multimin® on conception at first cycle^{6,22,23}



MULTIMIN

FOR OPTIMAL

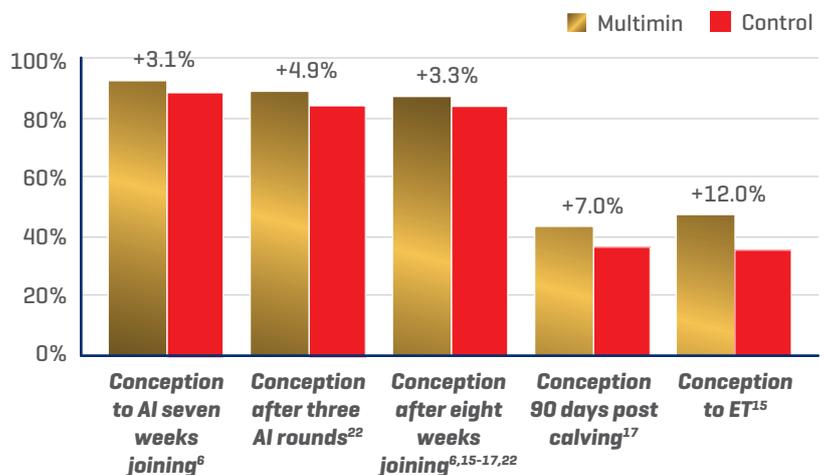
IMPROVES EMBRYO SURVIVAL

Unbalanced 'free radical' production is one of the main causes of early embryo losses in beef, dairy cows and many other species, including humans.²⁴⁻²⁶

While cows may conceive again later in the season, they will calve later and lengthen the calving pattern. If they fail to conceive, they will remain empty, resulting in reduced pregnancy rates and increased culling rates.

Multimin® Evolution improves embryo survival by providing the four essential trace minerals required by the antioxidant systems to fight 'free radicals'. Scientific and field trials have shown that the pregnancy rates in breeding females treated with Multimin® Evolution are 3 to 12% higher than untreated females, depending on the length of the breeding season and breeding method.^{6,15,17,22}

Effect of Multimin® on conception rates^{6,15-17,22}



IMPROVES SPERM QUALITY

Multimin® Evolution makes bulls 'performance ready' by optimising sperm quality.

A trial using both *Bos indicus* and *Bos taurus* bulls showed that bulls treated with Multimin® Evolution 90 days before joining had 22% higher sperm concentration and significantly more motile sperm than control animals.¹⁸ Used 90 days before breeding soundness evaluation, bulls treated with Multimin® Evolution had improved sperm motility and morphology, and more bulls tended to pass the exam.¹⁹

Make sure bulls are vaccinated and drenched routinely and are examined by a veterinarian before joining to determine their breeding soundness.



FERTILITY, IMMUNITY AND PRODUCTIVITY

BEST PRACTICE INJECTABLE NUTRITION PROGRAM

If vitamin B12 is required, most animal health companies recommend the use of hydroxocobalamin [hydroxo-B12]. This form of vitamin B12 has been shown to be the only commercially available form of B12 to effectively raise liver storage levels of B12. Meanwhile, cyanocobalamin [cyano-B12] could not significantly increase liver storage levels at any measured time point.²⁷

Hydroxo-B12 can be used at the same time as Multimin® Evolution. It can readily be found in B12 enhanced vaccines, such as Websters® 5 in 1 B12, as well as stand-alone B12 injections, such as Hy-B12® Injection for Sheep and Cattle.

Check the product label to ensure you are using hydroxo-B12.



DOSAGE

Multimin® is administered as a low volume subcutaneous injection at 1 mL / 50 kg in young cattle (up to 12 months) and 1 mL / 75 kg in yearlings (1–2 years) and 1 mL / 100 kg in adult cattle (>2 years).

Age	Liveweight (kg)	Dose (mL)	Doses per pack (500 mL)
Calves up to 1 year 1 mL per 50 kg	25	0.5	1000
	50	1.0	500
	75	1.5	333
	100	2.0	250
	125	2.5	200
	150	3.0	166
	175	3.5	142
	200	4.0	125
	225	4.5	111
	250	5.0	100
Yearlings from 1 to 2 years 1 mL per 75 kg [Round down to the nearest 0.5 mL].	190	2.5	200
	225	3.0	166
	265	3.5	142
	300	4.0	125
	340	4.5	111
	375	5.0	100
	415	5.5	90
Adult cattle over 2 years [1 mL/100 kg]	400	4.0	125
	500	5.0	100
	600	6.0	83
	700	7.0	71
	800	8.0	62
	900	9.0	55
	1000	10.0	50

WHEN TO ADMINISTER Multimin® EVOLUTION

Multimin® Evolution should be administered before 'high demand' periods. i.e. at weaning or four weeks before joining or calving, to allow antioxidant levels to peak. Multimin® Evolution should be administered to all breeding females four weeks before joining and calving and to bulls 12 weeks before joining.

A dose given to females four weeks before calving will provide the cow with a rapid top-up of trace minerals, which can also be passed on to the unborn calf.²⁸ This is recommended for optimising the health and performance of both the cow and calf with a single injection.

For best results, Multimin® Evolution can be administered every 3 months according to your management practices, and the trace mineral requirements of your animals. Multimin® Evolution can be used regardless of seasonal conditions, and as part of an integrated nutrition and animal health program.

Multimin® Evolution may also be concurrently administered with other animal health products to optimise performance, including parasiticides, vaccines and vitamin supplements. **Always administer in a different injection site to other injectables. Do not use concurrently with vaccines, drenches or boluses containing Se or Cu.**



BEEF

Cows and Heifers	Weaners	Bulls	Feedlotting/backgrounding
30 Days pre-joining*	At or before weaning	90 Days pre-joining	Before or at induction
30 Days pre-calving		At joining	

DAIRY

Cows	Heifers	Calves	Bulls
30 Days pre-joining*	30 Days pre-joining*	At birth	90 Days before joining
At or before dry off	30 Days pre-calving	At weaning	At joining

*Use Multimin® Evolution 6-8 weeks before artificial breeding (TAI, ET, MOET, etc). For northern cattle producers, Multimin® Evolution can also be used at each muster.

WITHHOLDING PERIODS

Milk Withholding Period	Meat Withholding Period	Export Slaughter Interval
NIL	NIL	NIL

GET YOUR CATTLE PERFORMANCE READY WITH MULTIMIN® EVOLUTION



- **Multimin® Evolution is an optimised trace mineral injection that makes cattle 'performance ready' by improving immunity and fertility.**
- **Multimin® Evolution is rapidly absorbed, readily-utilised and provides prolonged antioxidant activity during 'high demand' periods.^{2,4,5}**
- **Scientific trials have shown Multimin® Evolution can improve early conception rates, embryo survival and sperm quality.^{6,15-19, 21-26}**
- **Scientific trials have shown Multimin® Evolution can improve vaccine response and reduce the incidence of diseases.⁷⁻¹⁴**
- **Multimin® Evolution is administered before 'high demand' periods [e.g. weaning, joining, dry off and calving].**

For more information about how Multimin® Evolution can improve the health and performance of your herd, contact Virbac Customer Support 1800 242 100.

References: **1.** Based on concepts contained in Weaner throughput (Module 5), More Beef from Pastures: The producer's manual. Meat & Livestock Australia, 2013. **2.** Hansen (2010) Effects of Multimin@90 on trace mineral status of Angus and Simmental calves. Iowa State University, Department of Animal Science. **3.** Jackson, T. D. *et al.* (2020). Comparison of multiple single-use, pulse-dose trace mineral products provided as injectable, oral drench, oral paste, or bolus on circulating and liver trace mineral concentrations of beef steers. *Appl. Anim. Sci.*, 36(1), 26-35. **4.** Pogge, D. J. *et al.* (2012). Mineral concentrations of plasma and liver after injection with a trace mineral complex differ among Angus and Simmental cattle. *J. Anim. Sc.* 90(8), 2692-2698. **5.** Machado, V. *et al.* (2013). Effect of an injectable trace mineral supplement containing selenium, copper, zinc, and manganese on the health and production of lactating Holstein cows. *Vet. J.* 197:4516. **6.** Mundell, L. *et al.* (2012). Effects of prepartum and postpartum bolus injections of trace minerals on performance of beef cows and calves grazing native range. *Professional Animal Scientist*, 28:82- 88. **7.** Teixeira, A. *et al.* (2014). Effect of an injectable trace mineral supplement containing selenium, copper, zinc, and manganese on immunity, health, and growth of dairy calves. *J. Dairy Sci.*, 97:4216-4226. **8.** Berry *et al.* (2000). Efficacy of Multimin@ in Improving Performance and Health in Receiving Cattle. Oklahoma State University Animal Science Report, 980:61-64. **9.** Arthington, J. D., & Havenga, L. J. (2012). Effect of injectable trace minerals on the humoral immune response to multivalent vaccine administration in beef calves. *J. Anim. Sci.*, 90(6), 1966-1971. **10.** Palomares, R. *et al.* (2016). Effects of injectable trace minerals on humoral and cell-mediated immune responses to Bovine Viral Diarrhea Virus, Bovine Herpes Virus 1 and Bovine Respiratory Syncytial Virus following administration of a modified-live virus vaccine in dairy calves. *Vet. Immunol. Immunopathol.*, 178:88-98. **11.** Ball, M. (2016). Trace mineral injection enhances antibody response to botulism vaccination. *AVA Proceedings*, Adelaide. **12.** Bittar, J. H. *et al.* (2020). Immune response and onset of protection from Bovine viral diarrhoea virus 2 infection induced by modified-live virus vaccination concurrent with injectable trace minerals administration in newly received beef calves. *Vet. Immunol. Immunopathol.* 110055. **13.** Bittar, J. H. *et al.* (2018). Effects of injectable trace minerals on the immune response to Mannheimia haemolytica and Pasteurella multocida following vaccination of dairy calves with a commercial attenuated-live bacterin vaccine. *The Professional Animal Scientist*, 34(1), 59-66. **14.** Hoyos-Jaramillo A., *et al.* (2019) Health status and endoscopic evaluation of the upper respiratory tract of dairy bull calves inoculated with BVDV2 and BHV1 after vaccination and trace minerals injection. *Proceedings Steeve Giguère Science of Veterinary Medicine Symposium* October 10, 2019 University of Georgia. **15.** Sales, J. *et al.* (2011). Effect of injectable copper, selenium, zinc and manganese on the pregnancy rate of crossbred heifers (Bos indicus x Bos taurus) synchronised for timed embryo transfer. *Livestock Science*, 142:59-62. **16.** Hawkins D. (2007). The effect of injectable trace elements (Multimin@) on health and reproduction parameters in NZ dairy herds, NZ Dairy Cattle Veterinarians Newsletter, 24(3):12-16*. **17.** Mitchell, K. *et al.* (2008). Injectable trace elements increase reproduction efficiency in dairy cows. In *Trace elements in animal production Systems*, 296-299. **18.** Durel *et al.* (2016). Proceedings of the 29th World Buiatrics Congress, Dublin, Ireland, 3-8 July 2016*. **19.** Preedy, G. W. *et al.* (2018). Injectable trace-mineral supplementation improves sperm motility and morphology of young beef bulls. *The Professional Animal Scientist*, 34(1), 1-9 **20.** Refer to registered label. **21.** Virbac (2020) Trial protocol 616/20*. **22.** Virbac (2015) Trial protocol 578/15*. **23.** Virbac (2018) Trial protocol 594/18*. **24.** Agarwal, A., *et al.* (2006). The role of free radicals and antioxidants in reproduction. *Current opinion in obstetrics and gynaecology*, 18(3), 325-332. **25.** Tsunoda, S., *et al.* (2013). Oxidative stress and redox regulation of gametogenesis, fertilization, and embryonic development. *Reproductive medicine and biology*, 13(2), 71-79. **26.** Aitken, R. J. (2020). Impact of oxidative stress on male and female germ cells: implications for fertility. *Reproduction*, 159(4), R189-R201. **27.** Gonzalez-Rivas P.A., *et al.* (2021). A pilot study comparing the pharmacokinetics of injectable cyanocobalamin and hydroxocobalamin associated with a trace mineral injection in cattle. *Journal of Veterinary Pharmacology and Therapeutics* 00:1-5. **28.** Shao, T. *et al.* (2020). Effects of Maternal Supplementation with an Injectable Trace Mineral Containing Copper, Manganese, Zinc, and Selenium on Subsequent Steer Finishing Phase Performance and Carcass Characteristics. *Animals*, 10(12), 2226.

The benefits outlined in the above scientific studies may not necessarily be registered label claims. *The Multimin@ formulation in this study contained lower levels of minerals compared to Multimin@ Evolution. Benefits determined by these scientific trials are not necessarily registered label claims. Multimin@ is a registered trademark of Virbac.

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