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Chelated Trace Elements Improve Hill Lamb Performance

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Session 28 - Maximizing forage and pasture use in the diet of herbivores

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Background

- Hill pasture is typically deficient in trace elements (TEs) and vitamins essential for immunity and growth performance
- Certain TEs in grass decline as season progresses *(Suttle, 2005)*
- TE deficiencies can result in poor feed conversion and growth performance in lambs
- Chelated trace elements are more efficiently absorbed than inorganic sources *(Manspeaker, 1987)* and are important for improving flock health and production

Objectives

- To investigate the effect of drenching ewes pre-lambing with a trace element / vitamin drench on lamb weight at 8 weeks of age
- To investigate the benefits of dosing lambs at 8 weeks and at weaning with a micro-nutrient drench on growth performance
- To quantity the financial benefit of micro-nutritional drenching in a hill flock

Materials and Methods

Northumberland College Hill Flock

- 481 Scottish Blackface x Swaledale ewes
- Lambing commences mid April for 6 week period
- Ewes receive a high energy mineral block from mid February until 8 weeks post-lambing
- Lambs are weaned in September
- After weaning, male lambs are finished on lowland unit
- Female lambs are kept on hill for replacements or sold as breeding stock

Materials and Methods

Sheep Trial

- Ewes were scanned mid February 06 to determine litter size
- Half the single bearing ewes and half the twin bearing ewes were dosed with 20ml sheep drench 4 weeks pre-lambing
- Half the single bearing ewes and half the twin bearing ewes were not treated (control)

	Control	Treatment
Single Bearing Ewes (n)	159	158
Twin Bearing Ewes (n)	61	60

Materials and Methods

Sheep Trial

- Ewes were marked for identification, as were lambs at birth
- All lambs were weighed at 8 weeks of age

Materials and Methods

Lamb Trial

- At 8 weeks lambs from treated ewes were drenched with 7.5ml of lamb product
- Lambs from untreated ewes were not drenched (control)
- Treated lambs received a second 15ml drench at weaning (18 weeks of age)
- All lambs were weighed at weaning and at 4 weeks and 8 weeks post-weaning
- Lambs did not received additional micro-nutritional supplementation on the hill
- Data were analysed by single factor analysis of variance

Drench Formulation

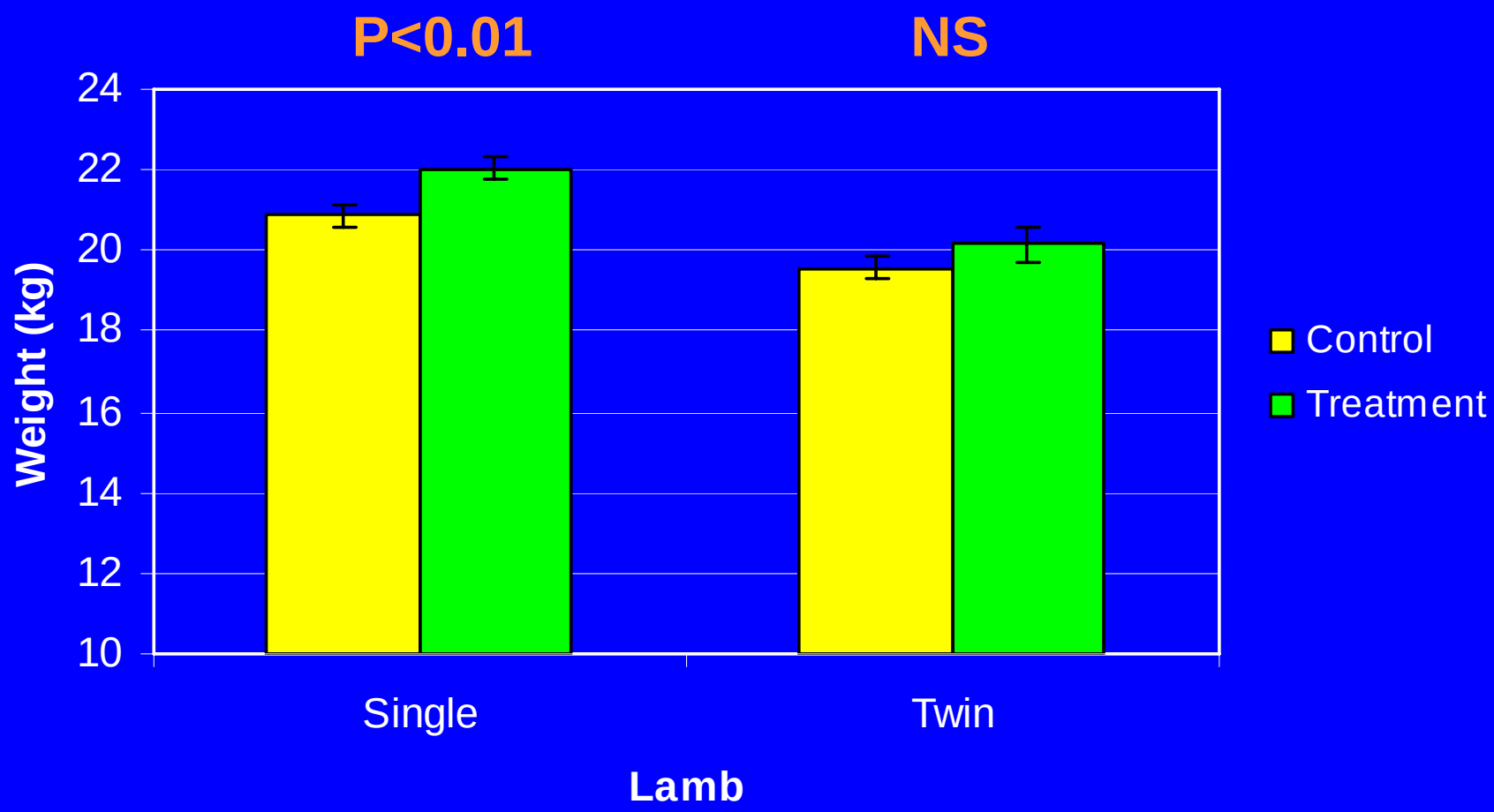
ELEMENT	SHEEP PRODUCT	LAMB PRODUCT	
	20ml Dose	7.5ml Dose	15 ml Dose
Vitamin A	20,000iu	5,000iu	10,000iu
Vitamin D_3	6,000iu	1,500iu	3,000iu
Vitamin E	160iu	40iu	80iu
Vitamin B_1(Thiamine)	36mg	18mg	36mg
Vitamin B_2 (Riboflavin)	20mg	5mg	10mg
Vitamin B_3 (Nicotinamide)	40mg	10mg	20mg
Vitamin B_5 (Pantothenic Acid)	20mg	5mg	10mg
Vitamin B_6 (Pyridoxine H Cl)	16mg	4mg	8mg
Vitamin B_9 (Folic Acid)	16mg	4mg	8mg
Vitamin B_{12} (Cyanocobalamin)	80mcg	40mcg	80mcg
Vitamin C (Ascorbic Acid)	30mg	7.5mg	15mg
Vitamin H (Biotin)	50mcg	12.5mcg	25mcg
Vitamin K (Menadione)	8mg	2mg	4mg
Copper	80mg	20mg	40mg
Cobalt	20mg	10mg	20mg
Zinc	100mg	25mg	50mg
Iron	18mg	4.5mg	9mg
Manganese	40mg	10mg	20mg
Selenium	5mg	2.5mg	5mg
Iodine	20mg	5mg	10mg
Lysine	30mg	7.5mg	15mg
Methionine	40mg	10mg	20mg

Forage Analysis

Nutrient	Result (mg/kg DM)	Guide Level (mg/kg DM)	NRC Recommendations (mg/kg DM)
Manganese	840	70 - 90	20 – 40
Zinc	42	60 -100	20 – 33
Copper	3.2	15 -25	7 – 11
Selenium	0.08	0.2 - 0.3	0.2
Iodine	0.9	1.5 - 2.0	0.1 – 0.8
Cobalt	0.1	0.3 - 0.5	0.1 – 0.2

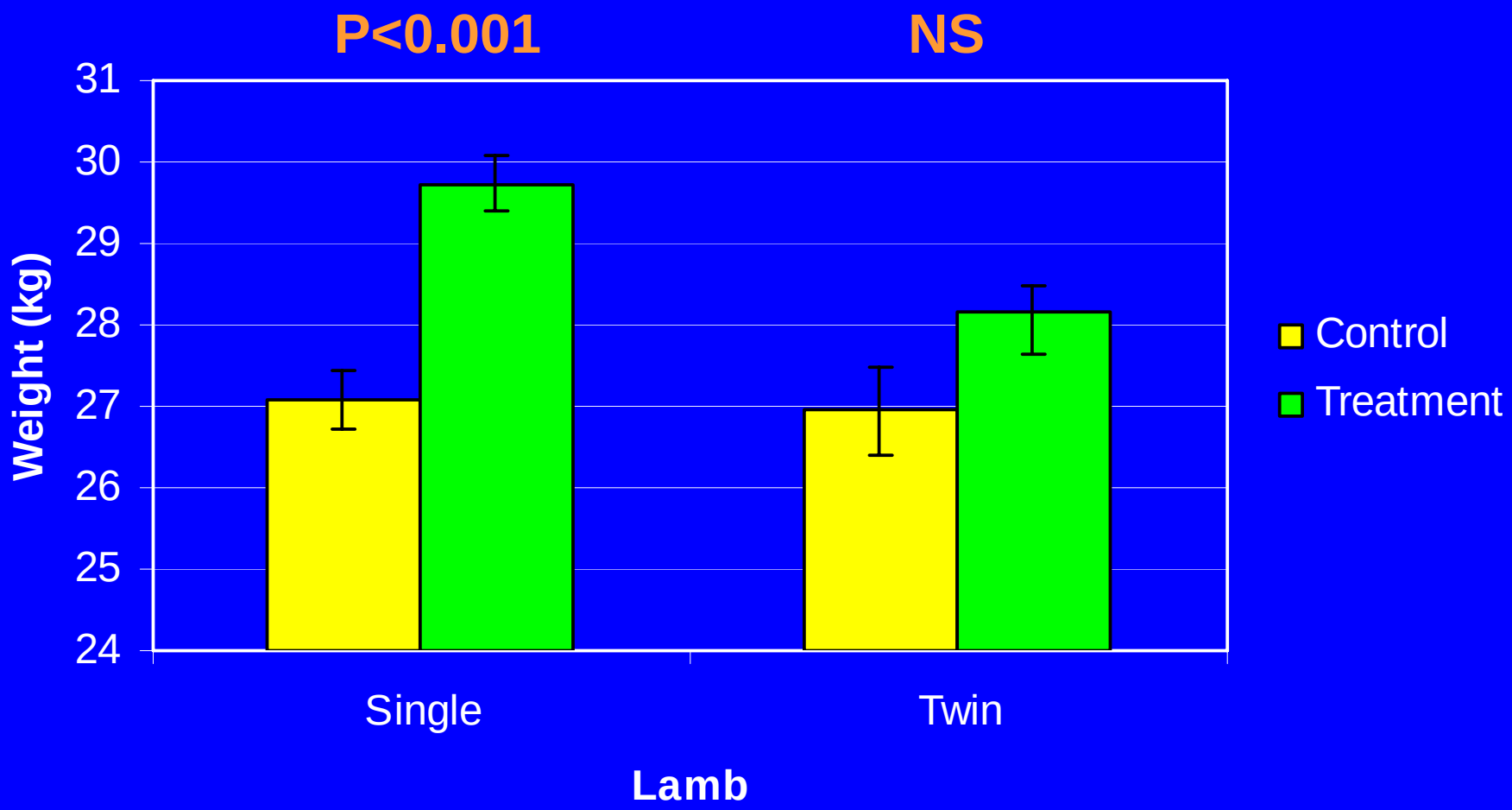
Results – Sheep Trial

Lamb weight at 8 weeks of age



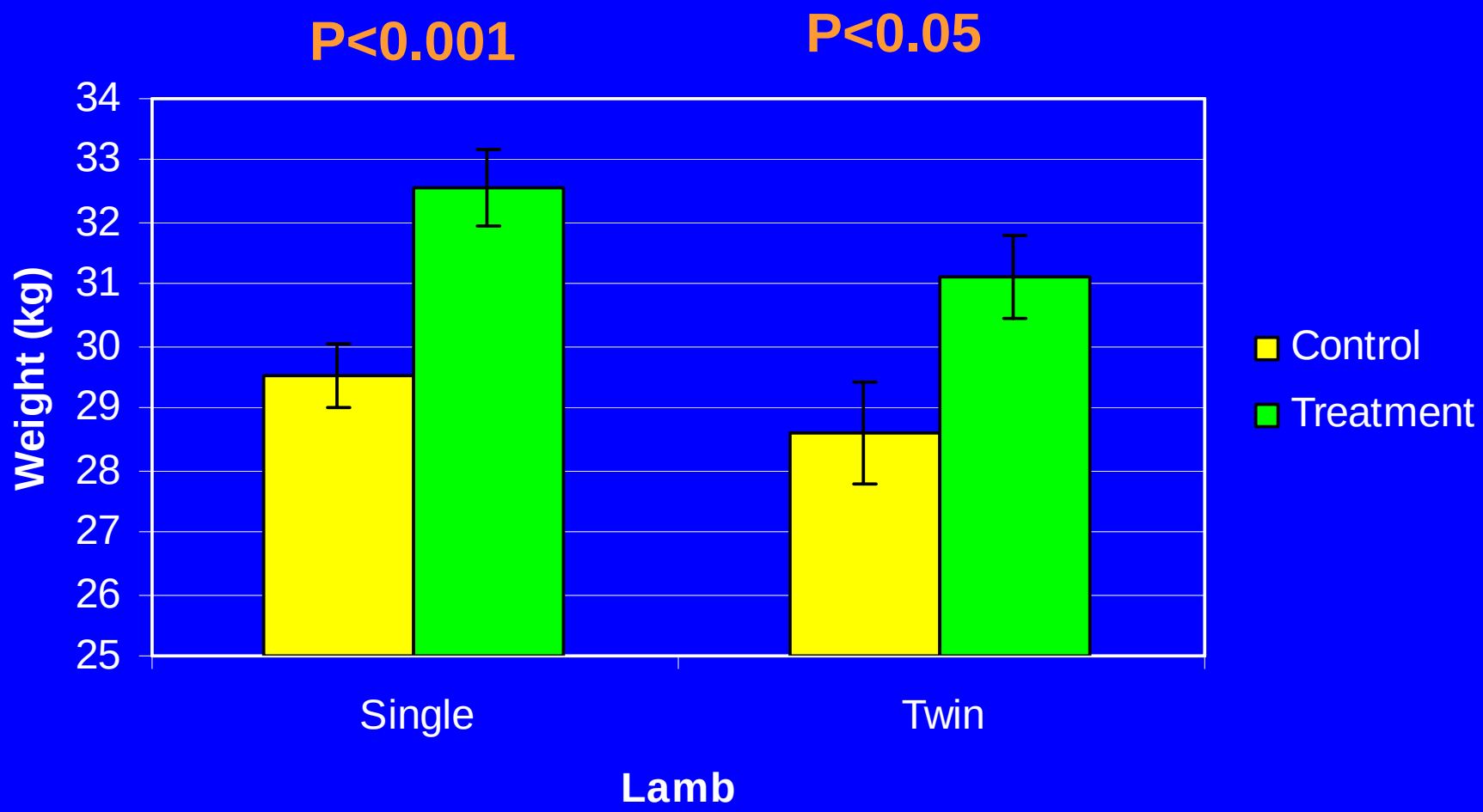
Results – Lamb Trial

Lamb weight at weaning (18 weeks)

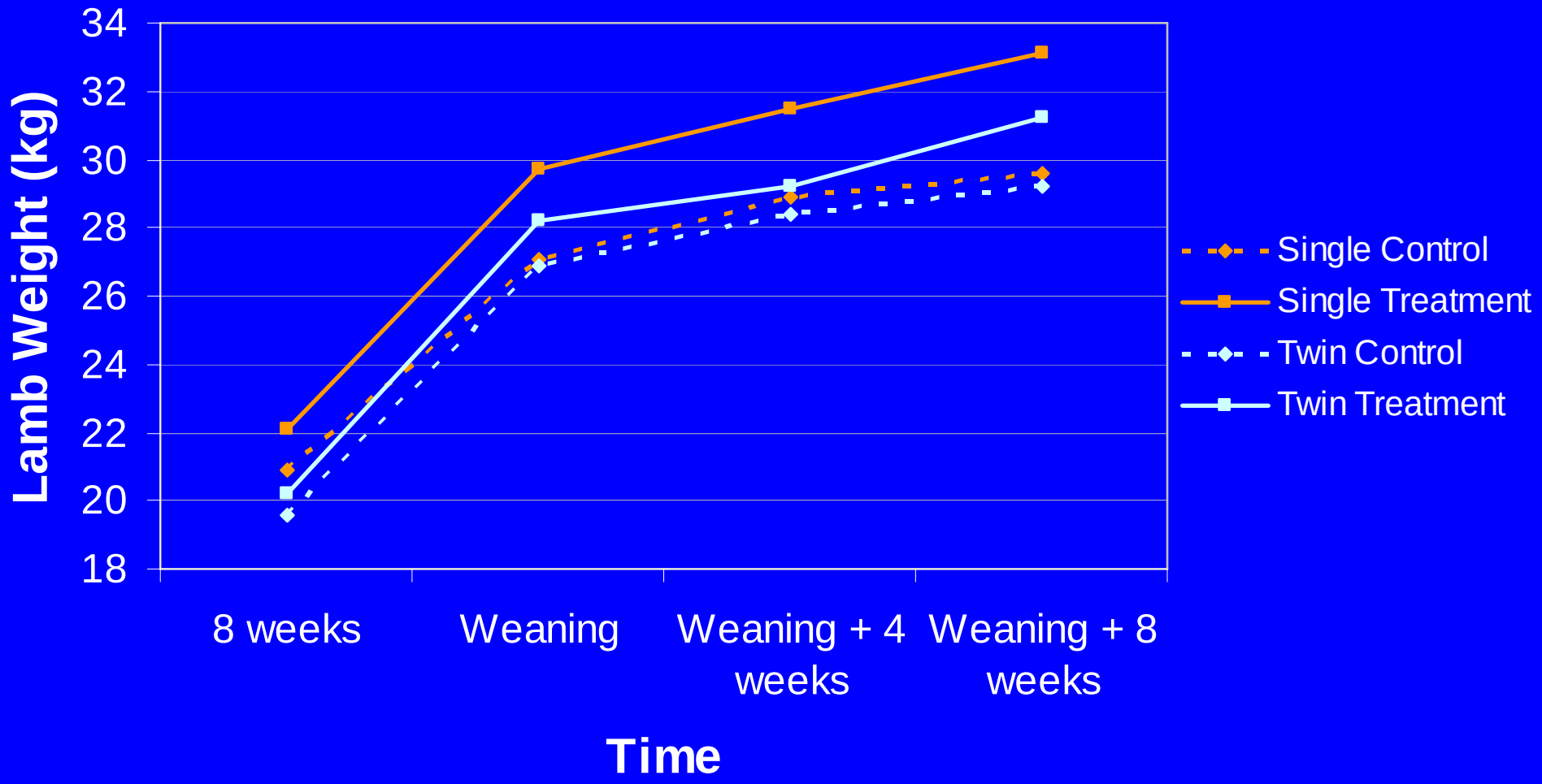


Results – Sheep Trial

Lamb weight at 8 weeks post-weaning (26 weeks)



Results – Lamb Growth Curves



Financial Return

- *Cost of 20ml Sheep drench = **€** 1.11/lamb
- *Cost of 7.5ml and 15ml Lamb drench = **€** 1.20
- Total Dose Cost = **€** 2.31

- Return per lamb average 2.8kg x **€** 1.65/kg
- Profit = **€** 4.62 - **€** 2.31 = **€** 2.31/lamb

Extra profit of € 2310 for every 1,000 lambs

Trial Quote

"I was surprised with the extra weight gain in the group that were dosed as the flock has been treated with other nutritional drenches in the past but with little success. We had taken forage analyses off the hill which confirmed deficiencies of many trace elements, in particular copper, cobalt and selenium. The chelated trace elements in the drenches helped to rectify these deficiencies."

Mr Jerry White, Deputy Head of Agriculture Department, Northumberland College

Conclusions

- Grass does not provide the correct micro-nutrient balance to support genetic potential for growth
- Treated lambs showed improved growth performance over untreated lambs (average +2.8kg)
  - *Treated twins showed improved growth compared to untreated singles*
- Chelated trace element supplementation was beneficial to feed conversion and live weight gain
- Significant cost-benefit to sheep farmers to improve production efficiency and profitability

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