

Evaluating the Influence of Parasite Management Programs on Growth Performance of Steer Calves in EL Centro 1 – Management Programs Effect on Coccidiosis

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Summary

As a part of a protocol (Z2F10 – Laidlomycin calf - fed Holstein health management) Coccidiosis was studied in two hundred Holstein steer-calves (114 kg) to evaluate the effect of management and treatment programs. Early weaned animals were shipped to the University of California Desert Research Center El Centro on the 26th of May 2010. The calves were vaccinated and treated with internal and external anti parasitic also injected with Vital E - AD (5ml SC 100000 vitamin A/ml and 12ml of liquamycin. Steers were balanced by weight and assigned within weight grouping to (40) pens (5 steers / pen). Animals were randomly divided into four equal groups, the 1st was control group and the 2nd, 3rd and 4th groups were treated with Monensin Laidlomycin and Deccox respectively. Freshly lead fecal samples were collected during Summer months 2010 from the pens and a quantitative flotation technique was used. The Results showed that 50% of the control, 40% of the Monensin treated, 10% of the Laidlomycin treated and 70% of the Deccox treated groups were positive for coccidial oocysts. The prevalence rate of coccidia oocysts in the herd was (40.25 %).

Keywords: calves , EL Centro, coccidian, program.

تقييم تأثير برامج السيطرة على الطفيليات في عوامل نمو العجول في " السنترو " 1 – تأثير برامج السيطرة في مرض الكوكسيديا

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الخلاصة

كجزء من بروتوكول درس مرض الكوكسيديا في مائتين من ذكور العجول من عرق هولستين (معدل أوزانها 114 كيلو غرام) وذلك لتقييم تأثير الاجراءات الوقائية والعلاجية. شحنت العجول المفطومة حديثا الى المركز التابع لجامعة كاليفورنيا ديفس في مدينة السنترو يوم 26 ايار 2010 و لقحت العجول للوقاية من الامراض وعولجت ضد الديدان الداخلية والخارجية. كما أعطيت بعض الفيتامينات بالاضافة الى (12) مل من اليكومايسين، وزنت العجول وقسمت تبعا لاوزانها على اربعين حظيرة أحتوت كل منها على خمسة حيوانات. قسمت العجول عشوائيا الى اربعة مجاميع متساوية، الاولى تركت كمجموعة سيطرة، والثانية والثالثة والرابعة عولجت بـ مونسنين (Monensin) ولادلوميلين (Laidlomycin) ودكوكس (Deccox) على التوالي. جمعت عينات براز من الحظائر فور خروجها من العجول وخلال أشهر الصيف لعام 2010 واستخدمت تقنية التطويق. أظهرت النتائج ان 50% من مجموعة حيوانات السيطرة، 40% من المعالجة بالمونسنين، 10% من المعالجة بالادلوميلين و 70% من المعالجة بالدكوكس كانت موجبة للاصابة بالكوكسيديا. أن نسبة أنتشار المرض في القطيع بلغت (40.25%).

Introduction

Coccidiosis occurs universally most commonly in animals housed or confined in small areas contaminated with oocysts (1). In North America the disease occurs most commonly in beef calves after weaning in the fall when calves fed on the ground resulting in continuous fecal contamination of the feed. The prevalence of infection in calves in the Northwestern and Midwestern part of the United States is highest in summer, fall and spring. Coccidiosis occurs mainly in weaned feeder calves which may develop tenesmus and diarrhea containing clots of fibrin and blood *Eimeria zuernii* and *E. bovis* are the most pathogenic however, dozens of species may be involved causing high morbidity but low mortality (2 and 3). Age and seasonal variation appeared to have influence on the intensity of infection (4). Coccidiosis is a self-limiting disease severe infections can be fatal if untreated (3). Most of the coccidiostats have depressant effect on the early first-stage schizonts and are used for control Sulfadimidine (sulfamethazine), Amprolium, Monensin and Lasalocid have been used but none of them has been adequately tested in clinical trials. Monensin included in diet at 165 ppm of the diet can be used as a prophylactic treatment (2 and 3). Coccidian oocysts were found in 123 (46.9%) samples

out of (262) fecal samples examined by (5) in Mediterranean weather in Greece. A logistic regression model showed that the age of animals and the number of employees were associated with coccidian infection. On the other hand, in Zimbabwe (6) found coccidian in (19.8%) of (16264) cattle fecal samples examined *Coccidia* was recorded in calves more than in adults. However, of the total 584 fecal samples examined for *Eimeria* 275 (47.09%) were found infected with 6 spp of *Eimeria*. *E. bovis* was found to be the highest prevalence species followed by *E. zuernii* and others calves had significantly higher prevalence of *Eimeria* than adults (7). In western Turkey (8), a total of (504) bovine fecal samples were examined and coccidian oocysts were found in (20.04%) and no cases of clinical coccidiosis were observed in this study. While in five regions of Saudi Arabia a total of (34.1 %) of the individual cattle fecal samples were positive for presence of coccidian oocysts. The incidence of coccidian infected cattle was higher in the Eastern region (9). The aim of this part of the project was to evaluate the parasite management programs by determining the prevalence of coccidiosis in steer calves treated with different coccidiostat drugs.

Materials and Methods

This study was conducted In the Desert Research and Extension Center (DREC) 1004 E Holton Rd EL Centro California 92243. The center was established in 1912 and has grown from 10 to 255 acres. The elevation of UC DREC is 60 feet below sea level was originally named the Meloland field station Annual rainfall is less than three inches and temperatures can reach 120 degrees Fahrenheit UC DREC is home to one of the largest University research feedlot cattle facilities in the US in terms of pen replication and feed mill flexibility. Two hundred Holstein steer – calves (114 kg mean body weight) were vaccinated treated for parasites and injected with Vitamin A Steers were balanced by weight and assigned within weight grouping to (40) pens (five steers per pen). Steers were observed daily and a health record form (Fig 1) was used for each sick animal until slaughter in the proposed harvest date of 27th April 2011 Composition of basal experimental diets is shown in Table (1). Steers were divided randomly into four groups (50 calves each) and treated as follows :

- 1 – Control group
- 2 – Monensin treated group (367 mg/kg Dry Matter(DM) basis
- 3 – Laidlomycin treated group (122 mg/kg DM basis)
- 4 – Deccox 6 (260g Deccox/short ton) first 56 days followed by Laidlomycin as per treatment group 3

A quantitative flotation technique of fresh fecal samples from the (40) pens were collected in the early morning conducted during Summer months 2010 according to (10).

Trial -----

Ear tag-----

Pen -----

Symptoms when first pulled as sick

Depression	Slight	Moderate	Severe	
Nose	Dry	Crusted	Discharge	Clear
Eyes	Clear	Cloudy	Ulcers	Watery
Lungs/breathing	Labored	Rapid	Cough	
Stool	Black	Bloody	Watery	Normal
Digestive tract	Bloat	Acidosis	Drawn	Full
Pink eye	Yes			
Abscess	Yes			
Foot rot	Yes			
Other				

Severity of illness: Slight Moderate Severe

Date	Temperature	Weight	B-complex	Nuflor	Banamine	Amprolium	Albon SR	Silver nitrate	Baytril	L/A-200	Remarks

Figure – 1: Health record form

Table – 1 Composition of basal experimental diet to be fed to Holstein steers

	Basal diet
	% DMB
Steam-flaked corn	5890
Alfalfa hay	400
Sudangrass hay	800
DDGS	2000
Yellow grease	250
Cane molasses	400
Urea	060
Limestone	165
Magnesium oxide	005
Trace mineral salt ¹	030
Nutrient composition (DM basis) ²	
NE Mcal/kg	
Maintenance	220
Gain	153
Crude protein %	150
Calcium %	080
Phosphorus %	050
Potassium %	100
Magnesium %	032
Sulfur %	020

¹ Trace mineral salt contained: CoSO₄ 068% CuSO₄ 104% FeSO₄ 357% ZnO 124% MnSO₄ 107% KI 052% and NaCl 92.96%.

² Based on tabular values for individual feed ingredients (NRC 2000).

Results

During the calendar of this study which started on May /26/ 2010 to April /27/ 2011, no signs or symptoms of coccidiosis in steer calves were seen. The flotation technique used to examine (40) fresh fecal samples collected from pens revealed that (17) of them were positive for coccidian oocysts. The prevalence of coccidiosis in spite of the treatments used to control the disease was (40.25%). As the four calves groups of the project accommodated in ten pens each randomly five, four, one and seven pens related to the control untreated (50%). Monensin treated (40%), Laidlomycin treated (10%) and Deccox treated (70%) to the groups respectively, were positive (Table 2). The number of coccidian oocysts were very low ranging between 1 to 22 oocysts / 10 grams of feces. The highest number of oocysts was seen in the fourth group treated with Deccox and the lower was in the 3rd group treated with Laidlomycin, while (50%) of pens of the control untreated group of calves were free from coccidian oocyst.

Table (2) Pen numbers Calves treated groups and oocysts numbers/10g of feces (Z2F10)

Location	Pen	TMT	Dates	oocyst/10g feces
18 North	1	3	8/24/2010	
18 North	2	2	8/24/2010	
18 North	3	4	8/24/2010	
18 North	4	1	8/24/2010	
18 North	5	2	8/24/2010	
18 North	6	3	8/24/2010	
18 North	7	4	8/24/2010	
18 North	8	1	8/24/2010	
18 North	9	3	8/24/2010	
18 North	10	2	8/24/2010	5
18 North	11	1	8/26/2010	
18 North	12	4	8/26/2010	14
18 North	13	4	8/26/2010	16
18 North	14	2	8/26/2010	
18 North	15	1	8/26/2010	22
18 North	16	3	8/26/2010	
18 North	17	1	8/26/2010	
18 North	18	2	8/26/2010	
36 North	1	3	8/30/2010	18
36 North	2	4	8/30/2010	
36 North	3	4	8/30/2010	9
36 North	4	2	8/30/2010	18
36 North	5	1	8/30/2010	6
36 North	6	3	8/30/2010	
36 North	7	2	9/3/2010	1
36 North	8	3	9/3/2010	
36 North	9	4	9/3/2010	3
36 North	10	1	9/3/2010	6
36 North	11	1	9/3/2010	3
36 North	12	2	9/3/2010	
36 North	13	3	9/3/2010	
36 North	14	4	9/3/2010	4
36 North	15	1	8/10/2010	15
36 North	16	3	8/10/2010	
36 North	17	4	8/10/2010	12
36 North	18	2	8/10/2010	
Hospital	3	3	8/5/2010	
Hospital	4	4	8/5/2010	14
Hospital	5	1	8/5/2010	
Hospital	6	2	8/5/2010	8

Discussion

The two hundred steer calves were used to evaluate treatment effects on growth performance and Coccidiosis is an endemic disease in the area which needs to be studied Bovine coccidiosis almost invariably affects groups of cattle less than one year old although it does occasionally occur in old animals Not all members of the group are equally affected and light

infections are self-limiting severe infections can be fatal if untreated The disease is caused by the ingestion over a short period of large numbers of oocysts of *Eimeria* species by non-immune cattle the greater the infective dose the more severe the signs produced (11 and 12). No signs of coccidiosis were recognized in any of the Holstein steer calves along the 340 days of observations and examination of fecal samples for the presence of oocysts confirm these findings However care should be taken in interpretation of oocysts counts since small numbers are present in the faeces of many normal calves (1, 2,11and12).

It seems that although the calves were treated with drugs for prevention and control of coccidiosis a resistant species of *Eimeria* or unaffected species were present. Among management and husbandry practices feeding system waning system housing system floor and herd size strongly influenced the prevalence of *Eimeria* in cattle (3 and 7). However, treatment with Laidlomycin at a dose of (122) mg/kg Dry matter basis showed a better protection effect in comparison with other treatments of the various pharmacological compounds used to treat coccidiosis those which act against the late developmental stages (12) are the most effective. These findings are useful to formulate appropriate control strategies for coccidian parasites of beef cattle in El Centro and other areas in the world with similar climatic and management conditions. Proper hygiene regime and ensuring unfavorable conditions for oocyst survival in the environment will help to reduce infection (12).

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