# VACCINATION OF PREGNANT HEIFERS WITH E. COLI BACTERINS TO REDUCE THE INCIDENCE AND SEVERITY OF CALF SCOURS

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It is often said that an ounce of prevention is worth a pound of cure. If this is true, then a program of prevention by vaccination rather than treatment by medication would be desirable. Colostrum from heifers is normally lower in antibody level than colostrum from older cows. Also, heifers tend to produce less milk and are usually poorer mothers than mature cows. Therefore, a pre-calving vaccination program to increase specific immunities in the heifer would seem to be a valid management decision. Recent research at Kansas State University[4/] indicates that poor energy input for heifers prior to calving may lower antibody count, and in the process, affect the colostrum protection for the calf.

Currently, there appears to be some difference of opinion as to the value of vaccination as a preventative for calf scours between U.S. and Canadian workers.

Work reported by Schipper and Landblom[3/] indicated that vaccination of cows with E. Coli bacterins had no demonstrable preventative activity to clinical enteritis in the neonatal calf. The vaccines used in this trial were the K99 and the Coligen vaccine.

In other studies by Dr. Schipper, (personal communication) conducted during two calving seasons, 14.6% of Vicogen and 12.3% of Coligen vaccinated heifers had calves that demonstrated clinical enteritis. Only 5.4% of the control calves (heifers not vaccinated) developed clinical enteritis.

Canadian researchers Makarechian and Acres[1,2/] reported positive results in reducing the incidence of calf scours by vaccinating the heifers with the Vicogen brand of E. Coli vaccine. In their work, vaccination of heifers with Vicogen at 7 and 3 weeks prior to start of calving reduced the incidence of calf scours considerably. They concluded that every dollar invested in Vicogen vaccination returned $5.96 at weaning. They also concluded that had the entire herd been vaccinated, it would have increased returns by 12.2% at weaning.

This trial was designed to evaluate the effects of vaccination of pregnant heifers with Vicogen(R) (Connaught Laboratories) to prevent or reduce the incidence of calf scours caused by the E. Coli bacterin. It was hoped that results of this trial might help remove the confusion that exists between current Canadian and U.S. research findings.

In January, 1983, one hundred fourteen pregnant Hereford and Hereford X Angus heifers expected to calve in March and April 1983, were stratified by breed type and age of pregnancy and then randomly assigned to either a vaccinated or control group.

On January 17, 1983 the heifers were sorted into two groups, Vicogen vaccinated or control. All heifers were given a 5cc booster vaccination of 7-way vaccine, and a 3cc injection of Vitamins A and D. (500,000 I.U. Vit. A and 75,000 I.U. Vit. D per cc). In addition, all treatment heifers were given a 5cc subcutaneous injection of Vicogen(R) vaccine. On February 16, 1983 (20 days later), the Vicogen heifers were given a 5cc booster vaccination of Vicogen.

Both groups of heifers were housed in uniform, but separate calving areas approximately 6 acres in size. These areas are equipped with a slotted board fence for wind protection and an automatic waterer. Both calving areas are adjacent to smaller corrals and a maternity barn. As the heifers calved, they were moved into the small corrals until they were mothered up and the calves were nursing well. Those heifers requiring assistance at calving were moved directly into the maternity barn. Following delivery, the heifer and her calf were usually moved outside into the corrals within 24-48 hours. Groups of cows and calves 4-7 days old were then transferred to a clean, ungrazed forty acre pasture and held until the trial terminated on May 18, 1983.

All heifers were self-fed mixed alfalfa-crested hay using large round bales fed in 8 foot diameter steel hay feeders. Following calving, the heifers were fed five pounds of grain (70% oats and 30% wheat mixed) bulked up with chopped hay daily. In addition, they had access to mixed hay and limited grazing. Portable 8x8 foot plywood calf shelters provided weather protection for the calves.

All births were recorded showing birth weight, birth date, type of delivery, sire and time of calving. Heifers were checked and assisted when necessary on an every three hour schedule around the clock.

All calves were closely watched to see if they nursed and were accepted by their mothers. Two calves died at birth or shortly thereafter. One was stepped on and suffered internal damage by its mother, while the other calf failed to breathe after a difficult delivery. All calves were checked daily and those showing signs of diarrhea or scours were caught and treated with Sulkamycin-S boluses at the rate of one bolus per fifty pounds body weight. Calves were re-treated whenever it was deemed necessary. Cost of the Sulkamycin-S bolus was approximately 30¢ per bolus or 60¢ per treatment, assuming the calf weighed about 100 pounds.

The calves born in this trial were sired by Angus, Milking Shorthorn or Texas Longhorn bulls.

**Discussion:**

As shown by the brief weather table, the spring of 1983 was an almost perfect calving season with warm and dry conditions prevailing. Both March and April had an abundance of clear sunny days, which coincided with the peak calving activity.

Approximately 25% of the calves in both groups were treated for scours at an average of 12 days. No calves died due to scours, and of the calves treated, 1.5 treatments per calf were required to control the diarrhea, on the average.

**Discussion (Continued):**

In summary, it appears that in 1983, little if any benefit was derived by vaccinating the pregnant heifers with Vicogen, since no serious outbreaks of scours were noted. However, the weather patterns in 1983 were warmer and drier than normal, which no doubt had a positive effect on calf health and freedom from scours. This trial will be continued for at least two more years to get information under more adverse conditions.

Results of this year's trial are shown in Table 1.

A brief summary of the 1983 weather conditions for the months February through May is shown in Table 2.

**Table 1. Results of 1983 Trial Comparing Incidence of Scours in Calves Born From Heifers Vaccinated with Vicogen vs. Those Born From Heifers Not Vaccinated**

| | Vicogen Vaccinated | Control |
|---|---|---|
| No. Heifers Vaccinated | 59 | 55 |
| 1st Vaccination | January 27, 1983 | -- |
| Booster Vaccination | February 16, 1983 | -- |
| Cost for 2 Vicogen Vaccinations, $ | 100.30/Lot 1.80/Cow | |
| | | |
| **1983 Calving Period:** | **Feb. 23 – May 11** | **March 4 – May 1** |
| % Born by Month | | |
| February | 1.7 | 0 |
| March | 67.8 | 60.0 |
| April | 27.1 | 38.2 |
| May | 3.4 | 1.8 |
| **Total** | 100.0 | 100.0 |
| | | |
| No. Live Calves | 58 | 54 |
| Calving % | 98.3 | 98.2 |
| | | |
| **Calves Treated For Scours:** | | |
| Heifers | 5 | 7 |
| Bulls | 9 | 9 |
| **Total** | 14 | 16 |
| % Treated | 24.1 | 29.6 |
| | | |
| No. Treatments/Calf | 1.5 | 1.43 |
| Range of treatment | (1-3) | (1-2) |
| | | |
| **Cost of Sulkamycin-S:** | | |
| Treatment/Lot, $ | 12.60 | 13.80 |
| Treatment/Calf, ¢ | 0.90 | 0.86 |
| | | |
| **Avg. Age in Days of - Calf Treated:** | | |
| Heifers | 10.2 | 12.3 |
| (Range in Age) | (8-16) | (10-16) |
| Steers | 13.6 | 12.3 |
| (Range in Age) | (6-27) | (8-19) |

**Table 2. A Brief Summary of Weather Conditions During the Period From February through May, 1983**

| | Feb. | March | April | May |
|---|---|---|---|---|
| Avg. Maximum Temperature, ˚F | 37.6 | 36.4 | 50.4 | 62.1 |
| | | | | |
| Range, ˚F | 11-58 | 21-57 | 31-68 | 32-86 |
| | | | | |
| Avg. Minimum Temperature, ˚F | 16.6 | 20.3 | 24.4 | 34.4 |
| | | | | |
| Range, ˚F | -4-28 | 3-30 | 10-44 | 21-48 |
| | | | | |
| **Precipitation, inches:** | | | | |
| Snow | 1 | 1.5 | 1.75 | 9 |
| Rain | | | .32 | 1.15 |
| | | | | |
| **Sky Conditions:** | | | | |
| Days Cloudy | 19 | 21 | 7 | 18 |
| Days Clear | 9 | 10 | 23 | 13 |

**References:**

1/ Makarechian, M. and S.D. Acres. "Effectiveness of Two Vaccines in Reducing the Incidence of Calf Scours", The 60th Annual Feeders Day Report, Department of Animal Science Faculty of Agriculture and Forestry. The University of Alberta, Edmonton, Alberta, Canada. June 12, 1981.

2/ Makarechian, M. and S.D. Acres. "Economic Aspects of Vaccination Against Calf Scours", The 61st Annual Feeders Day Report, Department of Animal Science Faculty of Agriculture and Forestry. The University of Alberta, Edmonton, Alberta, Canada. June 10, 1982.

3/ Schipper, I.A. and D. Landblom, S. Pommer, T.J. Conlon. "Calf Enteritis Investigation", The 32nd Livestock Research Roundup. Dickinson Experiment Station, Dickinson, North Dakota. October 13, 1982.

4/ Spire, Mark. "Five-point Scours Program Outlined", Tri State Livestock News. P.O. Box 129, Sturgis, South Dakota 57785. Saturday, April 2, 1983.