Key Highlights

- Use of Bovilis J-5 reduced the rate of clinical coliform mastitis 2.4-fold greater than Enviracor J-5 during the first 100 days of lactation.
- Rates of clinical coliform mastitis were higher in parity 3 and 4 cows compared with parity 1 and 2 cows. While not restricted to older cows, the greatest difference in Bovilis J-5 efficacy over that of Enviracor J-5 was in parity greater-than-2 cows.
- Rates of culling and mortality, reproductive performance and milk yield following vaccination during lactation did not differ between groups immunized with either Bovilis J-5 or Enviracor J-5.

Field Trial to Compare Efficacy of Bovilis® J-5 and Enviracor® J-5 Vaccines Against Clinical Coliform Mastitis During Early Lactation

SUMMARY

Bovilis J-5 is an *Escherichia coli* J-5 bacterin intended for use in healthy dairy cattle as an aid in the reduction of mastitis due to *E. coli*. This field trial compared efficacies of Bovilis J-5 and Enviracor J-5 for reducing clinical coliform mastitis during the first 100 days of lactation. Both vaccines were administered approximately 60 days prior to anticipated calving, 30 days later and on day 14 of lactation. Rate of clinical mastitis caused by coliform bacteria for animals immunized with Bovilis J-5 (0.0183 cases per 100 cow-days) was less than Enviracor J-5 vaccinates (0.0444 cases per 100 cow-days). The distribution of coliform species among clinical cases for Bovilis J-5 were nine *E. coli* isolates vaccinated cows compared with Enviracor J-5 vaccinated cows which had 20 *E. coli* and three *Klebsiella* species. Rates of clinical mastitis did not differ between vaccination treatments for mastitis caused by other pathogen groups. Incidence of death and early culling, first-service conception rate and pregnancy losses did not differ between animals in the two vaccine groups. Milk production did not differ between vaccine groups on the days surrounding immunization on day 14 of lactation. Use of Bovilis J-5 reduced the rate of clinical coliform mastitis 2.4-fold compared with use of Enviracor J-5 during the first 100 days of lactation.

INTRODUCTION

Bovilis J-5 is an *E. coli* J-5 bacterin distributed by Merck Animal Health and intended for use in healthy dairy cattle as an aid in the reduction of mastitis due to *E. coli*. Older cows during the first weeks of lactation are the population within a dairy herd at greatest risk to clinical coliform mastitis caused by *E. coli* and *Klebsiella* species[1]. The effective use of *E. coli* J-5 bacterins has been shown to reduce the severity and duration of clinical coliform mastitis during early lactation. The purpose of this trial was to compare the efficacy of Bovilis J-5 with that of Enviracor J-5 (Zoetis) for reducing the incidence of clinical coliform mastitis during the first 100 days of lactation.

PROCEDURES

Trial cows and heifers from a commercial herd of Holsteins milked three times daily in the central valley of California were enrolled over a 3-month period, from June to August of 2018. Cows were blocked on a weekly basis by parity and previous lactation milk production and then randomly assigned to one of the two treatment groups at enrollment. Heifers were blocked weekly and randomly allocated to vaccine treatments by their electronic identification numbers. Trial animals within a treatment group were immunized with either Bovilis J-5 or Enviracor J-5. Both bacterins were administered subcutaneously per label direction approximately 60 days prior to anticipated calving, approximately 30 days after the primary immunization and on day 14 of the subsequent lactation.

Clinical mastitis was diagnosed by farm personnel and quarter foremilk samples collected for bacteriological analyses prior to antibiotic therapy. The number of clinical cases was determined retrospectively by an investigator blinded to trial treatment codes using the on-farm records management system[(a)] and laboratory reports from the culture results of milk samples. An on-farm data management and recording system [(a,b)] was used to collect data for percentages of culling and mortality, pregnancy to first service, pregnancy loss and daily milk production.

RESULTS

Health and production data were collected from 506 animals vaccinated with Bovilis J-5 and 530 animals vaccinated with Enviracor J-5. These data were analyzed from 0-100 days in milk and the results include:

- Rate of clinical mastitis (Table 1) caused by coliform bacteria for animals immunized with Bovilis J-5 (0.0183 cases per 100 cow-days) was less than for animals vaccinated with Enviracor J-5 (.0444 cases per 100 cow-days) ($P<0.05$).
- Distribution of coliform species among clinical cases was nine *E. coli* isolated from Bovilis J-5 vaccinated cows and 20 *E. coli* and three *Klebsiella* spp. isolated from Enviracor J-5 vaccinated cows.
- Rate of total clinical mastitis (Table 1) in Bovilis J-5 vaccinated cows (.0690 cases per 100 cow-days) was less than Enviracor J-5 vaccinated cows (0.1138 cases per 100 cow-days) ($P=0.030$). However, rates of clinical cases caused by environmental *streptococci*, coagulase-negative *staphylococci*, other pathogens and bacteriologically-negative clinical cases did not differ between vaccine treatment groups.
- Among parity groups (Table 2), the rates for clinical coliform mastitis differed ($P<0.05$). The within parity clinical coliform mastitis rates did not differ between vaccine groups. The greatest difference in Bovilis J-5 efficacy over that of Enviracor J-5 was in the parity 3 and 4 cows.
- Percentage of animals that died or were culled (Table 3) in the first 100 days in milk did not differ ($P>0.05$) between cows immunized with Bovilis J-5 (3.8%) and Enviracor J-5.
- Percentage of cows pregnant after first artificial insemination service (Table 3) was 35.8% for Bovilis J-5 cows and 33.9% for Enviracor J-5 cows ($P>0.05$). Pregnancy loss was 5.8% for those in the Bovilis J-5 group and 7.1% for cows in the Enviracor J-5 group ($P>0.05$).
- Daily milk production in parity 1 (Figure 1) and parity 2, 3 and 4 (Figure 2) did not differ between vaccine groups for the two days prior to the immunization on day 14 of lactation or the four days after immunization.

Table 1. Rate of clinical cases (clinical cases per 100 cow-days) by bacteriological status during the first 100 days of lactation in cows vaccinated with Bovilis® J-5 or Enviracor® J-5.

BACTERIOLOGICAL STATUS	BOVILIS® J-5	ENVIRACOR® J-5	*P*-VALUE
Coliforms (*E. coli* + *Klebsiella* spp.)	**0.0183** (9 *E.Coli*)	**0.0444** (20 *E. coli* and 3 *Klebsiella* spp.)	**0.03**
Environmental *streptococci*	0.0203	0.0328	Not significant
***Staphylococcus* species**	0.0081	0.0116	Not significant
Other pathogens	0.0061	0.0058	Not significant
Bacteriologically negative	0.0163	0.0193	Not significant
Total clinical cases	**0.069**	**0.1138**	**0.03**

Table 2. Rate of coliform clinical cases (clinical cases/100 cow-days) by parity groups during the first 100 days of lactation in cows vaccinated with Bovilis® J-5 or Enviracor® J-5.

PARITY	BOVILIS® J-5	ENVIRACOR® J-5
4	0.0689	0.1297
3	0.0275	0.0753
2	0.0183	0.0173
1	0.0000	0.0226
Total	**0.0183**	**0.0444**

Table 3. Percentage of animals culled or died, diagnosed pregnant after first service and experienced pregnancy loss in cows vaccinated with Bovilis® J-5 or Enviracor® J-5.

PARAMETER	BOVILIS® J-5	ENVIRACOR® J-5
Culling and death	3.8%	4.4%
Pregnant after first service	35.8%	33.9%
Pregnancy loss	5.8%	7.1%

Figure 1. Mean daily milk weights for parity 1 cows vaccinated with either Bovilis® J-5 or Enviracor® J-5 on day 14 of lactation.

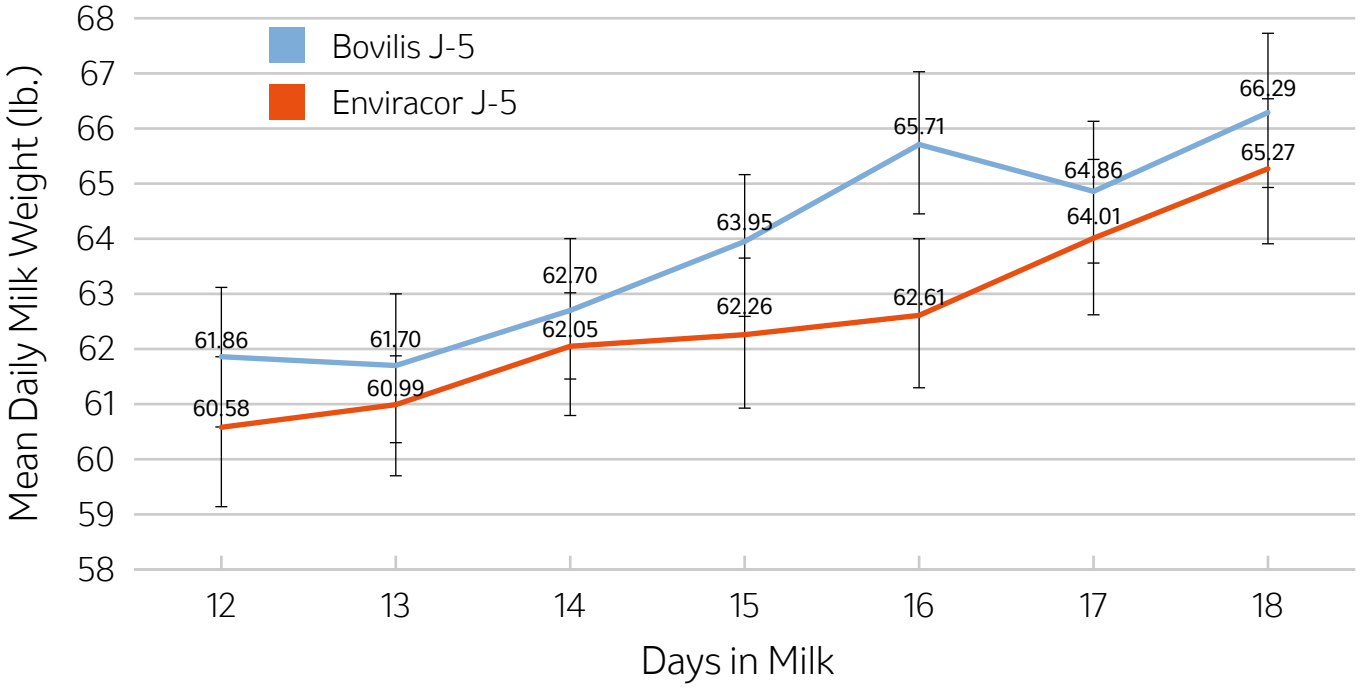
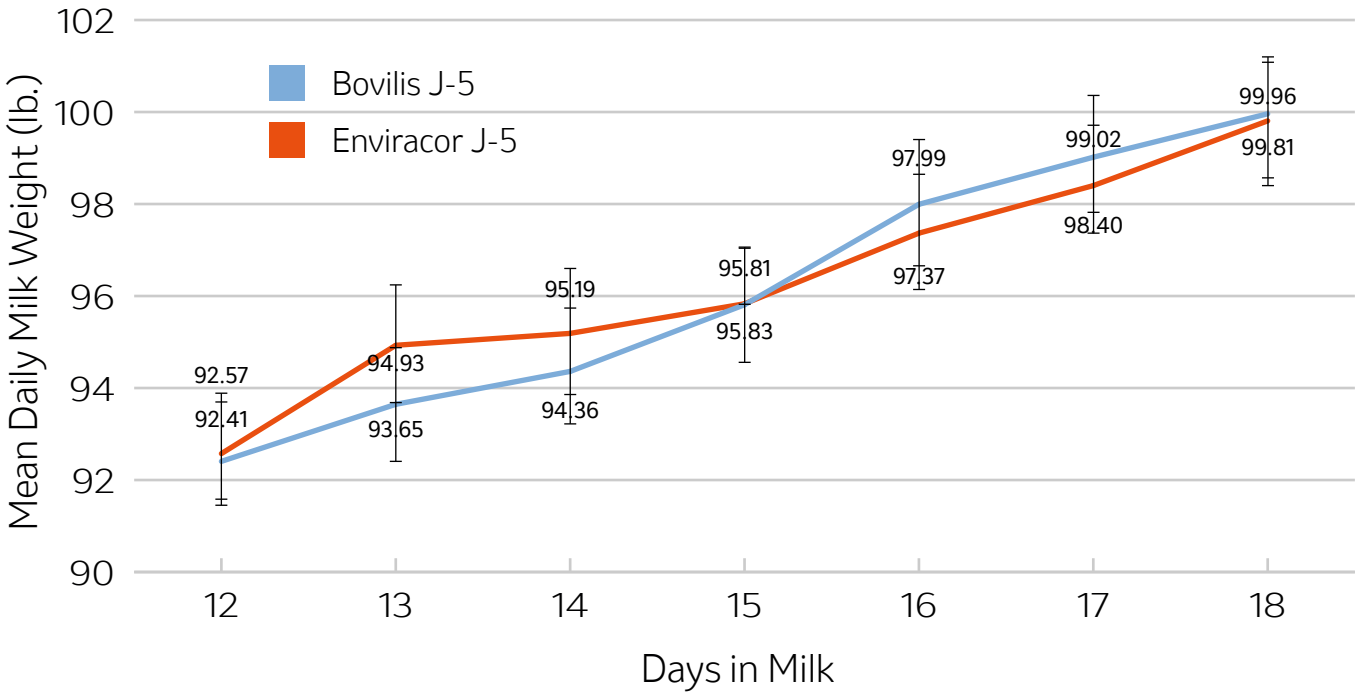


Figure 2. Mean daily milk weights for parity 2, 3 and 4 cows vaccinated with either Bovilis® J-5 or Enviracor® J-5 on day 14 of lactation.



CONCLUSIONS

Use of Bovilis J-5 reduced the rate of clinical coliform mastitis 2.4-fold compared with use of Enviracor J-5 during the first 100 days of lactation. Incidence of death and early culling, first-service conception rate and pregnancy losses did not differ between animals in the two vaccine groups. Milk production did not differ between vaccine groups on the days surrounding immunization on day 14 of lactation.

[1]Hogan JS, Smith KL, Todhunter DA, Schoenberger PS. Field trial to determine efficacy of an *E. coli* J5 mastitis vaccine. *J Dairy Sci.* 1992;75:78-84.

[a]Valley Agriculture Software, Tulare CA

[b]GEA DP 21, version 5.2, GEA Farm Technologies, Inc., Naperville, IL

Bovilis J-5 Warning: This product contains oil adjuvant. In the event of accidental self-injection, seek medical attention immediately. For additional information, please see the product label.

Bovilis® J-5

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