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SCHERING-PLOUGH ANIMAL HEALTH
technical services bulletin

Clostridium perfringens Type A Toxoid: Field Efficacy Without Sub-therapeutic Antibiotics
Part I: Coccidiosis Vaccine Trials

A novel *Clostridium perfringens* (Cp) Type A toxoid developed as an aid in the control of necrotic enteritis caused by *Clostridium perfringens* types A and C, was administered to 79,833 breeder pullets at 10 weeks and again at 18 weeks of age at a broiler integrator specializing in commercial antibiotic-free broiler production.

The integrator also maintained replacement pullet flocks of similar age that did not receive the novel treatment and were vaccinated with the standard pullet vaccination program only.

Key Points

- **Livability of antibiotic-free broilers – with or without maternal protection against *C. perfringens* alpha toxin – was compared.**
- **Odds for NE mortality were 47% higher between 22 and 28 days in standard broilers without maternal protection against alpha toxin.**
- **Odds for NE mortality during the cold weather season were 73% higher between 22 and 28 days in standard broilers without maternal protection against alpha toxin.**
- **Passive immunity provides significant protection against NE caused by *C. perfringens* Types A and C for antibiotic-free broilers.**

Coccivac®-B vaccine (Schering-Plough Animal Health Corp.) served as the sole method of coccidiosis control for broiler production, year-round.

Necrotic enteritis (NE) was a sporadic problem in the antibiotic-free broilers at this complex, particularly in the cold weather months. Peak mortality episodes tended to occur between 22 and 28 days, although mortality episodes associated with necrotic enteritis had been recorded at various ages.

Test Groups vs. Controls for 17 Placement Periods

Progeny from toxoid-vaccinated parent flocks and non-vaccinated control parent flocks were placed on random farms according to typical hatch placements.

Following placement, the integrator identified those houses which contained 100% birds from test breeder flock eggs, and compared the mortality patterns of the 100% test progeny to those of "standard" houses (pure control flock progeny and mixed progeny).

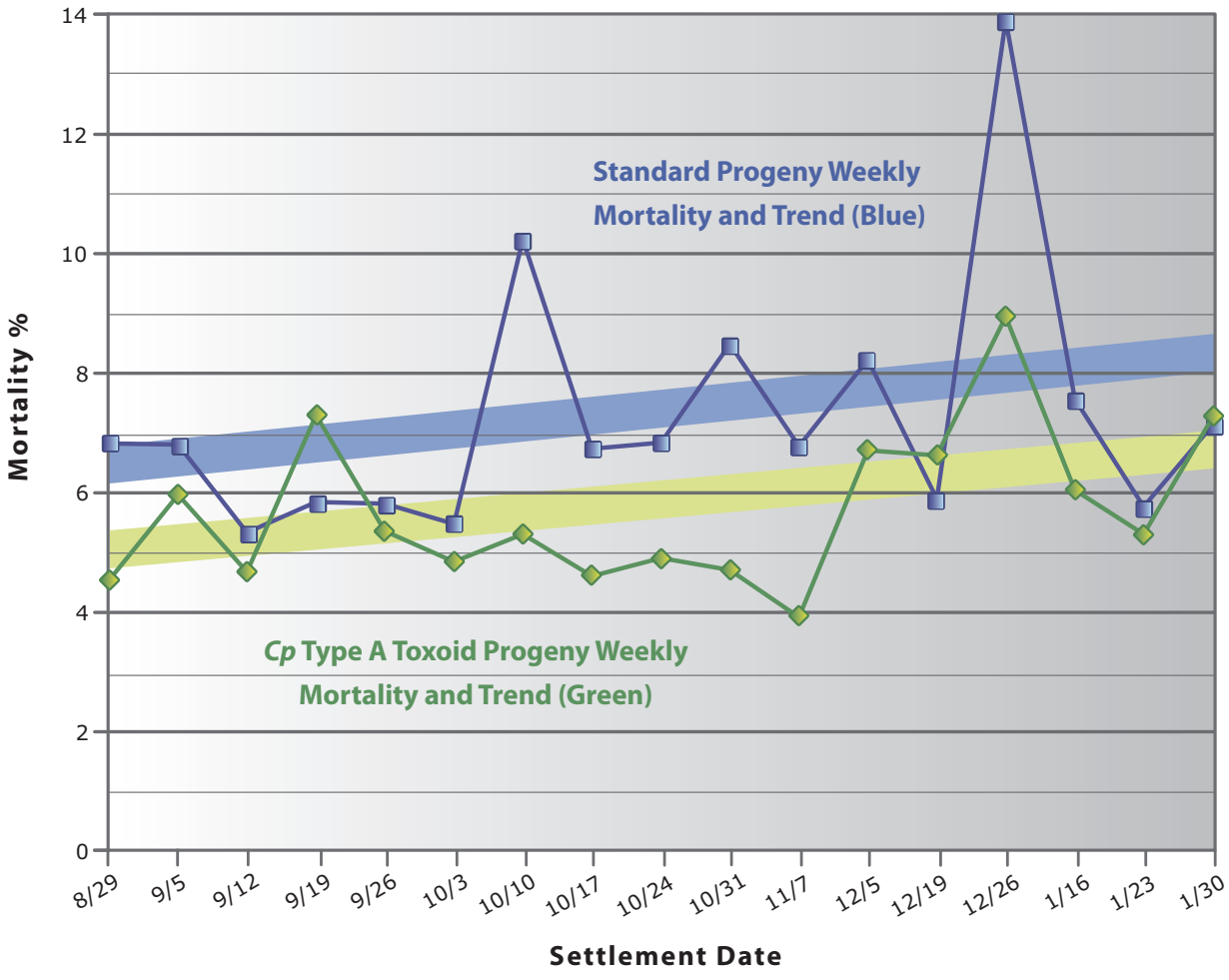
The mortality was evaluated over 17 placement periods from August through January. The number of trial progeny

ranged from 12,900 per week with initial trial hen flock production to 138,000 at peak production. These were compared to weekly "standard" progeny numbers ranging from 200,600 to 332,932 per week.

Total Flock Mortality (Figure 1)

The average total mortality by week of placement ranged from 3.9% to 8.9% in the trial flocks compared to 5.3 to 13.9% in the standard group (mixed progeny and progeny of standard flocks). Over all days, the odds for mortality in the standard group was **32**% higher than for the trial vaccine group ($p = 0.0005$).

Figure 1
Toxoid Progeny vs. Standard Progeny
Total Flock Mortality



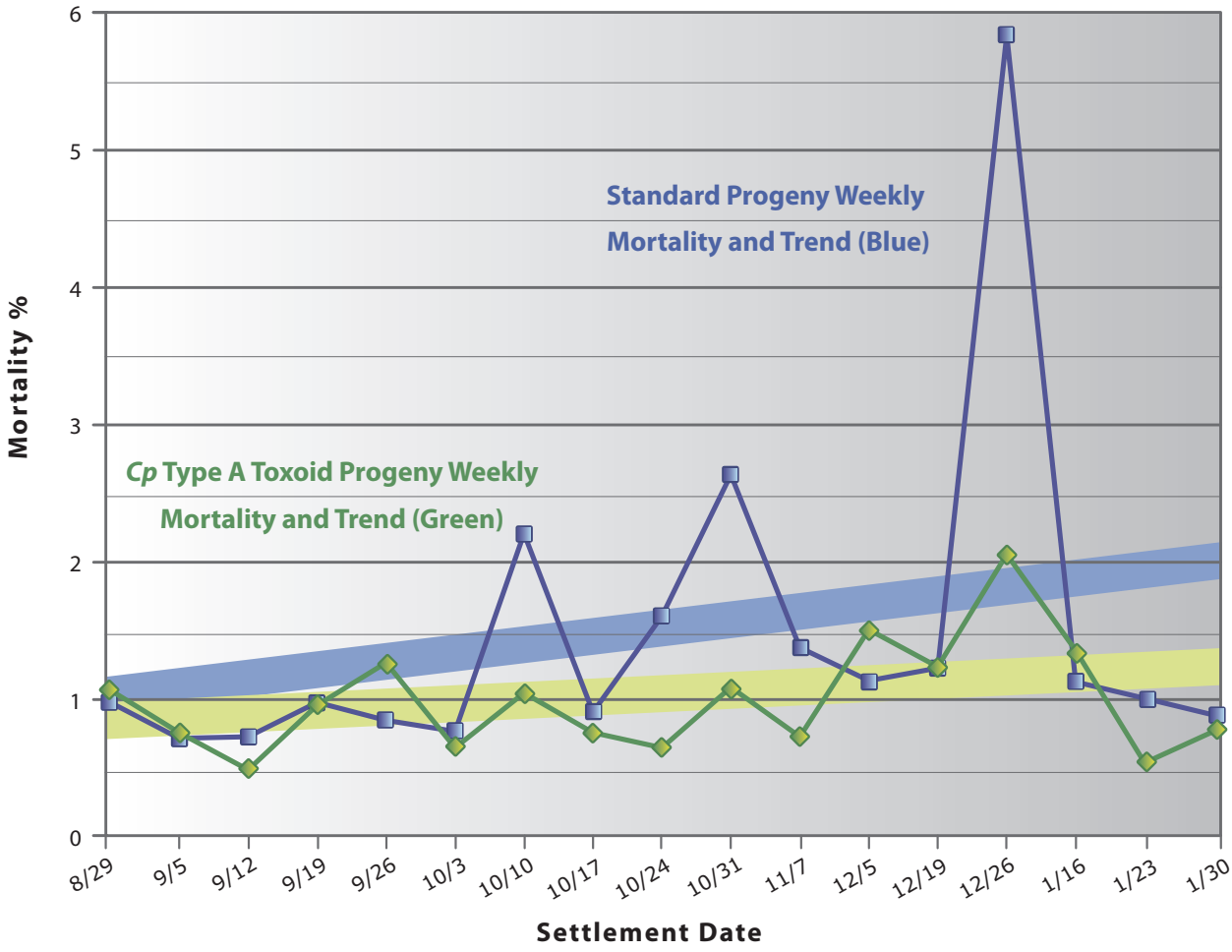
The uniformity in the weekly mortality numbers were greater for the trial vaccine groups than for the standard groups, indicating fewer dramatic episodic losses.

Mortality by Critical Age Group (Figure 2)

Losses due to NE tend to be greatest in the time period from 22 to 28 days of age at this complex. The odds for mortality in the 22 to 28 day period were **47**% higher for the standard group compared to the trial group (p= 0.0078).

Weekly mortality was more uniform in the trial vaccine group as compared to the standard group where major episodic losses were observed more often and antibiotic treatments were administered to mitigate further mortality.

Figure 2
Cp Type A Toxoid Progeny vs. Standard Progeny
Age 22 – 28 Day Period



Seasonal Effects on Mortality

This complex traditionally experienced greater episodic losses due to necrotic enteritis during the cold weather. There was a seasonal effect on the mortality data: the odds of mortality for the standard group during the 22 to 28 day age period was **73**% greater than for the trial group during the cold weather season (p = 0.0005).

Conclusion

These results demonstrate that vaccination of breeder hens with *C. perfringens* Type A toxoid significantly reduced the mortality related to necrotic enteritis in broiler progeny under field conditions. The effect became more prominent during the cold weather season when episodic losses were more frequent.

Maternal protection against alpha toxin produced by *Clostridium perfringens* Types A and C and transferred to progeny chicks can significantly improve livability in broilers reared without antibiotics.