COCCIDIOSIS PREVENTION STRATEGIES AND PRACTICES IN THE AMERICAS

V. Stanev¹, R. Vargas², M. Quiroz², D. Vancraeynest¹

¹ Zoetis International Services, Paris, France
² Zoetis Global Poultry, Durham, NC, USA

Abstract
The study objective was to evaluate the most commonly used strategies and practices in coccidiosis control in the Americas. Seventy five interviews with participants from Argentina, Brazil, Canada, Colombia, Mexico and Peru were carried out in the period March-April 2014. Nearly half of all broiler production in the region was represented.

In respect to the number of rotations, 84% of the respondents have used two or more different anticoccidial programs in the last 12 months, and only 16% have not rotated at all. The study indicated considerable understanding and agreement with the basic coccidiosis prevention postulates: (i) not to use a certain drug for too long (77% strongly agree); (ii) to give products sufficient rest after each period of use (69% strongly agree); (iii) to rotate between products of different classes (67% strongly agree) and (iv) to use a synthetic drug in a clean-up program at least once per year (63% strongly agree). The majority of respondents agreed that to avoid resistance development, the drugs should be rotated before having signs of inefficacy, demonstrating a high level of judicious drug use.

Only 9.4% of the respondents were not satisfied by the current control of coccidiosis in their respective operations, while 48% were “completely satisfied” and 42.7% “somewhat satisfied”. In countries with low rotation rate, satisfaction of coccidiosis control was the least, indicating correlation between the use of rotation and efficacy of prevention.

Introduction
Coccidiosis is one of the greatest threats to flock health and profitability of the poultry industry, costing an estimated $3 billion globally each year (Lillehoj, 2006). The disease can manifest itself in a clinical or a subclinical form. While the clinical form is relatively easy to diagnose and most of the time efficaciously treated, subclinical disease often remains hidden. Nevertheless, subclinical coccidiosis comprises up to 80% of the costs related to coccidiosis (Williams, 1998). To combat this costly disease, poultry producers and veterinarians have long reached for in-feed anticoccidial drugs and, more recently, vaccines. In-feed anticoccidials are by far the most vastly used prevention tool for coccidiosis control in poultry, under modern production practices. In its commission report 233/2008, the European Commission recognizes their use as “essential”. Unfortunately if these products are used injudiciously, resistance of field Eimeria strains ultimately develops and anticoccidial efficacy declines (Mathis et al., 1984; Chapman, 1986; 1997 and 2007). Moreover, the latest anticoccidial drug came in commercial use in the 1990s and no new products are anticipated to enter this segment in the near term, making it critically important for producers and veterinarians to use products in a way that maximizes performance while preserving long term efficacy.

In this respect the basic postulates in anticoccidial prevention are (i) not to use same drug for too long, as it is generally acknowledged that overuse of anticoccidial products will eventually lead to the development of resistance (Mathis et al., 1984; Chapman, 1986; 1997 and 2007); (ii) to give a rest period to all products that share a similar resistance mechanism, so that the Eimeria population is not exposed to the same/similar drug, which is beneficial for restoration of sensitivity (Chapman and McFarland, 2003); (iii) to avoid the use of drugs with similar structure and mode of action avoiding cross-resistance (McDougald et al., 1987; Bednik et al., 1989; Chapman and Hacker, 1994; Chapman, 2007; Marien et al., 2007), by rotating between products of different classes; and lastly (iv) to use a synthetic drug at least once yearly to reduce infection pressure (De Gussem, 2005).

The objective of the study was to evaluate the most commonly used strategies and practices in coccidiosis control in the Americas. To gain a deeper understanding and insights regarding current use of anticoccidials and vaccines; to identify common programs used, including rotational practices; to explore the efficacy perceptions among users and evaluate the correlation between satisfaction level and the prevention strategies employed.
Materials and Methods

Poultry producers, nutritionists and veterinarians across North and South America were interviewed. Seventy-five interviews with participants from Argentina, Brazil, Canada, Colombia, Mexico and Peru were carried out during the period of March and April, 2014. Nearly half of all broiler production in the region was represented by the study participants (Fig. 1). The following areas were explored:

- Satisfaction with current control of coccidiosis
- Types of programs used to control coccidiosis
- Number of rotations in the past 12 months
- Industry stand on basic coccidiosis control strategy’s postulates
  - To change anticoccidial control tools to maximize program performance while preserving long term efficacy
  - To rest the anticoccidial drugs after period of use to allow them restoring efficacy
  - Rotation should be carried out among drugs of different classes in order to provide effective coccidiosis control
  - Once a year synthetic anticoccidial should be used as a chemical clean-up in order to reduce the infection pressure on the farm
  - Anticoccidial drugs should be rotated at given intervals even if they still seem to be working in order to avoid resistance development, thus increasing the level of subclinical coccidiosis or having clinical outbreaks, but most important to preserve the anticoccidial drugs viable for future use (avoid ‘burning’ the products).
  - Significance of the coccidiosis challenge on the field.

Results

Only 9.4% of the respondents were not satisfied by the current control of coccidiosis in their respective operations, while 48.0% are “completely satisfied” and 42.7% “somewhat satisfied”. Significantly more respondents in Argentina and Mexico are “completely satisfied” with current control of coccidiosis, as compared to respondents in all other countries. Respondents in Colombia and Peru were least satisfied (Fig. 2).

In respect to the number of different programs used, 84% of the respondents replied they have used two or more different anticoccidial programs in the last 12 months, and only 16% have not rotated at all. Based on the number of broilers produced in a weekly basis, broiler operations used an average of 2.5 different protocols for coccidiosis over the past year. Incidence of rotation is highest in Argentina and Canada and lowest in Colombia and Peru (Fig. 3).

Nearly two-thirds of protocols (prevention programs) involve a combination product (ionophore + synthetic) or a synthetic coccidiostat in the starter feed followed by an ionophore in the grower/finisher feed, while 22% of the protocols involved a synthetic product (either on its own or in combination product) during the whole grow-out cycle (Fig. 4).
In respect to the basic coccidiosis control postulates, 77.3% of the respondents “strongly agree” with the need to rotate between different coccidiosis control products in order to maximize program performance while preserving long term efficacy. 66.7% are aware of the cross-resistance between products with similar chemical structure and mode of action, so agree that rotation should be carried out between products of different classes. 69.3% of the respondents “strongly agree” that “resting” the anticoccidial drugs is needed to allow them restoring their efficacy and 62.7% “strongly agree” with the importance of at least an annual chemical clean-up (Fig. 5).

**Fig. 3** Number of rotations in the last 12 months Arrows for the different countries indicate more than average, average or below average frequency of rotation.

**Fig. 4** Types of coccidiosis prevention programs used in the last 12 months

**Fig. 5** Agreement with the basic coccidiosis control postulates.

**Discussion and Conclusions**

The study data indicated that there was considerable understanding and agreement with the basic coccidiosis prevention postulates. The majority of respondents consented with the basic anticoccidial prevention postulates: (i) not to use same drug for too long, as it is generally acknowledged that overuse of anticoccidial products will eventually lead to the development of resistance (Mathis et al., 1984; Chapman, 1986; 1997 and 2007); (ii) to give a rest period to all products
that share a similar resistance mechanism, so that the *Eimeria* population is not exposed to the same/similar drug, which is beneficial for restoration of sensitivity (Chapman and McFarland, 2003); (iii) to avoid the use of drugs with similar structure and mode of action avoiding cross-resistance (McDougald *et al*., 1987; Bedrnik *et al*., 1989; Chapman and Hacker, 1994; Chapman, 2007; Marien *et al*., 2007), by rotating between products of different classes; and lastly (iv) the use of a synthetic drug at least once yearly to reduce infection pressure (DeGussem, 2005). Moreover, the majority of respondents agreed that the drugs should be rotated before having signs of inefficacy in order to avoid resistance development. This demonstrates a high level of judicious drug use. Only 9.4% of the respondents were not satisfied by the current control of coccidiosis in their respective operations, while 48% were “completely satisfied” and 42.7% “some-what satisfied”. In countries with low rotation rate, satisfaction of coccidiosis control was the least, indicating correlation between the use of rotation and efficacy of prevention.

References


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