

JUST THE FACTS

Fort Dodge and Intervet¹ have been telling you in handouts and advertisements that nematode resistance is a problem in cattle in the United States. Let's look carefully at their claims.

Both Fort Dodge and Intervet claim and imply in ads that there are many cases showing nematode resistance in U.S. cattle. **THAT'S BULL!**



Actually, there are just two documented cases of nematode resistance in cattle among the 792,050 herds in the U.S.^{3,4,5} Based on this, the chances of cattle having resistant nematodes is extremely low.

On the other hand, based on a survey and the number of cattle in the U.S., about 10% of U.S. herds have liver fluke infections.^{6,7,8} That means you are 39,441 times more likely to have liver flukes than anthelmintic-resistant nematodes in cattle on your operation.⁹ One should rule out more common causes for lack of efficacy before looking to resistance.

Fort Dodge and Intervet^{1,2} have been telling people that resistance is more widespread, suggesting that there are more than two cases of nematode resistance in U.S. cattle. **THAT'S BULL!**



There are **only** two well-documented cases of resistance in cattle.^{3,4,5} One case involved stocker cattle that were managed with very high stocking rates in a rotational-grazing program (75 head/acre or more) with multiple endectocide treatments per year (five to eight times or more).¹⁰ This operation has used this approach for many years on the same pastures and only recently had a problem. In this case, *all* endectocides were judged ineffective: doramectin, eprinomectin, ivermectin and moxidectin, and the benzimidazoles, fenbendazole and albendazole.³ In the other case, both doramectin and a generic ivermectin pour-on were found to be ineffective.⁵

In an ad and in a booklet, Fort Dodge implies^{1,2} that multiple studies using IVOMECE[®] Brand Products or generic ivermectin products represent resistance to IVOMECE (ivermectin) and not to CYDECTIN[®] (moxidectin). **THAT'S BULL!**



The active ingredients in IVOMECE Brand Products, CYDECTIN products and DECTOMAX[®] (doramectin) products all come from the same class of compound — macrocyclic lactones. There is no disagreement within the scientific community that all macrocyclic lactones have the same mode of action. Resistance to one macrocyclic lactone means resistance to all of them.

In a booklet, Fort Dodge claims,¹ in a study, that a 90% reduction in fecal egg count was never achieved by cattle treated with IVOMECE (ivermectin) Pour-On;^{11,12} and suggests this statistic should be meaningful to cattle producers. **THAT'S BULL!**



Fecal egg counts do not in any way measure parasite resistance.¹³ One reason producers use parasite control products is because their animals perform better. In this study where Fort Dodge tries to demonstrate resistance, **there was no difference in weight gain** between the cattle treated with IVOMECE EPRINEX[®] (eprinomectin), and the cattle treated with CYDECTIN (moxidectin) Pour-On. There also was no difference between DECTOMAX, IVOMECE EPRINEX and CYDECTIN.¹¹

In an ad, Fort Dodge claims² 58% lower fecal egg counts for CYDECTIN 1% Injectable, compared with IVOMEK Plus (ivermectin/clorsulon), measured at 50 and 100 days post-treatment. This also implied cattle will be more productive with CYDECTIN versus IVOMEK Plus.¹⁴ **THAT'S BULL!**



First of all, as we said before, fecal egg counts are not a good measure of product efficacy in cattle.^{15,16} Instead, the proof is in the results:

- For producers the **proof is in cattle performance**. This study showed no weight gain difference between the cattle treated with CYDECTIN and the cattle treated with IVOMEK Plus.¹⁴
- For scientists the proof of anthelmintic efficacy is in the well-controlled critical studies where animals are sacrificed and all internal parasites are counted. Fecal egg counts do not prove efficacy.^{15,16}

Finally, measurements at 50 and 100 days post-treatment are completely irrelevant. Neither IVOMEK Plus nor CYDECTIN 1% Injection has a claim for this duration.¹² This brings up an interesting note. Because moxidectin is more highly attached to body fat in cattle,¹⁷ it has a long tail that persists at levels below the accepted therapeutic threshold.¹⁸⁻²¹ This effect has been implicated in causing resistance in sheep parasites in Australia.²² One study shows the prevalence of resistance in sheep was 66% on farms where only moxidectin had been used and just 11% for farms where only ivermectin had been used.²²

We believe that Fort Dodge and Intervet are attempting to blur the facts about resistance to dewormers between **what has happened in sheep worldwide and what is happening in cattle in the United States**. Resistance to all anthelmintics and endectocides is well-recognized in sheep.^{5,23-29} In cattle, there are well-documented instances of resistance in only two locations in the United States.^{3,4,5}

The bottom line is this: Anthelmintic resistance to important nematodes of cattle is an extremely rare problem in the United States. In fact, you are 39,441 times more likely to have liver flukes than anthelmintic-resistant nematodes in cattle on your operation.^{6,7,8}

IVOMEK Plus (ivermectin/clorsulon): Do not treat cattle within 49 days of slaughter. Do not use in dairy cattle of breeding age or in veal calves. IVOMEK (ivermectin) Pour-On: Do not treat cattle within 48 days of slaughter. Do not use in dairy cattle of breeding age or in veal calves. IVOMEK 1% Injection for Cattle and Swine: Do not treat cattle within 35 days of slaughter. Do not use in dairy cattle of breeding age or in veal calves. Do not treat swine within 18 days of slaughter. IVOMEK EPRINEX (eprinomectin) Pour-On for Beef and Dairy: No meat or milk withdrawal is required when used according to label. All IVOMEK Brand Products: Do not use in other animal species not on the label as severe adverse reactions, including fatalities in dogs, may result.

¹ Fort Dodge brochure, "Parasite Resistance." Distributed in 2007.

² Fort Dodge advertisement, "Parasite Control Primer. Resistance: Put your dewormer to the test." Placed in spring 2008.

³ Gasbarre LC, Smith LL. Identification of cattle nematode parasites resistant to multiple classes of anthelmintics in a commercial cattle population. *Proceedings, AAVP*; 2005:46.

⁴ Smith LL, Gasbarre LC. Evaluation of individual or a combination of anthelmintics in a commercial cattle population where anthelmintic resistant parasites had been observed the previous year. *Proceedings, AAVP*; 2005:63.

⁵ Edmonds, et al. Efficacy of two pour-on products in two feedlot studies: *Proceedings of the American Association of Veterinary Parasitologists 52nd annual meeting* 2007:14.

⁶ Briskey DW, et al. A prevalence survey of liver flukes (distoma) in beef cows at slaughter in the western United States. *Agri-Practice* 1994;15:4.

⁷ National Agricultural Statistics Service, Agriculture Statistics Board, USDA. *Cattle* February 2008.

⁸ National Agricultural Statistics Service, USDA. *Livestock Operations, 2003 Summary* April 2004.

⁹ Data on file at Merial.

¹⁰ Smith L. Personal conversation. Nov. 27, 2007.

¹¹ Williams JC, et al. A comparison of persistent anthelmintic efficacy of topical formulations of doramectin, ivermectin, eprinomectin and moxidectin against naturally acquired nematode infections of beef calves. *Veterinary Parasitology* 1999;85:277-288.

¹² Based on label and FOI summaries.

¹³ Stromberg BE. Fecal egg count reduction test (FECRT) standardization recommendations for cattle — an introduction. *Proceedings, AAVP*; 2007:73.

¹⁴ Yazwinski TA, et al. A field study comparing fecal egg count reduction, weight gain and product safety in stocker cattle treated with either moxidectin or ivermectin with clorsulon.

¹⁵ Kaplan, et al. Statistical considerations in the performance and analysis of fecal egg count reduction tests in cattle: *Proceedings of the American Association of Veterinary Parasitologists 52nd annual meeting* 2007:76.

¹⁶ Kaplan, et al. Recommendations for standardization of fecal egg count reduction tests in cattle: *Proceedings of the American Association of Veterinary Parasitologists 52nd annual meeting* 2007:78.

¹⁷ Fort Dodge brochure, "Get the long-acting CYDECTIN effect." Distributed in the United Kingdom and Ireland.

¹⁸ Imperiale F, et al. Comparative depletion of ivermectin and moxidectin milk residues in dairy sheep after oral and subcutaneous administration. *J Dairy Res* 2004;71(4):427-433.

¹⁹ Abbott KA, Cobb RM, Glass MH. Duration of the persistent activity of moxidectin against *Haemonchus contortus* in sheep. *Aust Vet J* 1995;72(11):408-410.

²⁰ Gokbulut C, Boyaciglu M, Karademir U. Plasma pharmacokinetics and faecal excretion of ivermectin (EQVALAN® paste) and doramectin (DECTOMAX®, 1%) following oral administration in donkeys. *Veterinary Science* 2005;79(3):233-238.

²¹ Sutherland IA, Leathwick DM, Brown AE. Moxidectin: persistence and efficacy against drug-resistant *Ostertagia circumcincta*. *J Vet Pharmacol Ther* 1999;22(1):2-5.

²² Rendell, et al. Evidence that moxidectin is a greater risk factor than ivermectin in the development of resistance to macrocyclic lactones by *Ostertagia* spp. in sheep in southeastern Australia. *New Zealand Veterinary Journal* 2006;54(5):313-317.

²³ Shoop WL, Haines HW, Michael BF, Eary CH. Mutual resistance to avermectins and milbemycins: oral activity of ivermectin and moxidectin against ivermectin-resistant and susceptible nematodes. *The Veterinary Record* 1993;133:445-447.

²⁴ Kieran PJ. Moxidectin against ivermectin-resistant nematodes — a global view. *Australian Veterinary Journal* 1994;71:18-20.

²⁵ Pomroy WE, Whelan NC. Efficacy of moxidectin against an ivermectin-resistant strain of *Ostertagia circumcincta* in young sheep. *The Veterinary Record* 1993;132:416.

²⁶ Conder GA, Thompson DP, Johnson SS. Demonstration of co-resistance of *Haemonchus contortus* to ivermectin and moxidectin. *The Veterinary Record* 1993;132:651-652.

²⁷ Le Jambre LF, Gill JH, Lenane IJ, Lacey E. Characterisation of an avermectin-resistant strain of Australian *Haemonchus contortus*. *International Journal for Parasitology* 1995;25:691-698.

²⁸ Martin PJ. Development and control of resistance to anthelmintics, in: *Proceedings of the 6th International Congress of Parasitology* 1986:493-501.

²⁹ Pomroy WE. A perspective on nematode control in NZ, in: *Proceedings of the 20th Seminar of the Sheep & Beef Cattle Society of the NZ Veterinarian Association* 2000:89-98.

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