

# Evaluation of the Impact of Parasite Control With the IVOMEC® SR Bolus Given at Breeding Age on First-Lactation Yield in Holstein Heifers

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## Introduction

A sustained-release ivermectin bolus (IVOMEC® SR bolus) has been proven efficient for the treatment and prevention of nematode infections in growing beef and dairy cattle. However, its effects on growth in breeding-age dairy heifers, as well as on first-lactation yield, have not been demonstrated. This field trial was designed to test the effect of treatment with a sustained-release ivermectin bolus on average daily gain and total weight gain in breeding-age Holstein heifers under commercial pasture conditions in southern Quebec during summer 1995. A follow-up pilot study was undertaken to test the effect of the IVOMEC® SR bolus on first-lactation milk production (projected to 305 days) and milk composition (% fat and protein) in heifers that calved between October 1995 and August 1996.

## Materials and Methods

At turnout, 96 heifers from 12 herds were randomly allocated to treatment with a commercially available ivermectin bolus (n=49) or untreated control (n=47) groups. Animals were weighed at turnout, mid-season, and at the end of grazing season. Fecal samples were taken and nematode eggs counted. Projected 305-day milk production, fat and protein content were retrieved from PATLQ reports (Quebec DHI records) for heifers that participated in the follow-up pilot study. Homogeneity of treated and control groups was confirmed statistically for age, weight and days bred at turnout (2-sample *t*-test), as well as for days pregnant at the end of the study, using the Wilcoxon Rank sums test. The T-test statistic was used to verify whether there was an overall significant difference at the herd level between the treated and control groups for projected 305-day milk productions, fat and protein contents. Two

herds were removed from the latter statistical analysis since they did not have at least 2 pairs of treated heifers that fit the calving date criteria.

## Results

The heifers weighed between 614-1023 lb (279-465 kg) at the start of the grazing season, with a mean of control heifers 900 lb (409 kg) and 404 kg respectively for treated heifers. Nematode egg excretion was relatively low (mean of 10 EPG for controls at housing) throughout the pasture season, which was abnormally warm and dry until mid-summer, according to Environment Canada. Using a multiple regression model, the average daily gain (ADG) and total weight gain (TWG) over the entire pasture season was found to be higher in treated heifers compared to controls (ADG: difference=0.176 lb (0.08 kg) day, *p*=0.010; TWG: difference=28.2 lb (12.82 kg), *p*=0.013).<sup>1</sup> Taking into account a possible farm effect, the 305-day milk production for Ivomec® SR bolus-treated heifers was significantly higher than for untreated animals (mean ± standard deviation (SD) 766±1047 lb. (348±476 kg); *t*-test=2.31, *p*<0.05) (Table 1). Overall, 8 of the 10 remaining farms in the study demonstrated a positive milk production difference in treated (n=34) versus control heifers (n=33).

Results of this field study suggest that preventive treatment of breeding-age, grazing dairy heifers with a sustained-release ivermectin bolus provides a significant weight-gain advantage during the isometric phase of the replacement heifer's development, even in situations with commercial utilization of moderately contaminated pastures. An improved ADG during this period of change of endocrine status has been shown to affect the body tissue composition, which is critical to maximize mammary cell proliferation and enhance performance during the first lactation.

**Table 1.** Herd level differences between projected 305 d milk production in Ivomec® SR bolus-treated and non-treated control heifers from 10 commercial dairy farms in southern Quebec.

Farms	Projected 305 d milk production difference lb (kg)		milk fat %	milk protein %
A	+683.1 (+ 310.5)	(4) <sup>a</sup>	- 0.27	+ 0.16
B	+1166.4 (+ 530.2)	(10)	- 0.19	- 0.06
C	-259.0 (- 117.7)	(6)	- 0.20	+ 0.05
D	-1577.4 (- 717.0)	(6)	- 0.30	+ 0.08
E	+1231.3 (+ 559.7)	(5)	- 0.22	+ 0.06
F	+1879.4 (+ 854.3)	(6)	- 0.20	- 0.14
G	+753.5 (+ 342.5)	(4)	+ 0.24	+ 0.16
H	+2008.2 (+ 912.8)	(9)	+ 0.65	- 0.02
I	+1132.6 (+ 514.8)	(11)	+ 0.05	+ 0.003
J	+637.0 (+ 289.5)	(6)	+ 0.04	+ 0.04
Average difference	+ 348.0		- 0.04	+ 0.05
Standard deviation	475.8		+ 0.30	+ 0.11
<i>t</i> -test	2.31		0.42	1.47
p-value	< 0.025 <sup>b</sup>		> 0.60 <sup>c</sup>	> 0.10 <sup>c</sup>

<sup>a</sup>Number in ( ) represents the number of heifers in each farm

<sup>b</sup>Unilateral probability

<sup>c</sup>Bilateral probability

## References

1. Caldwell V, DesCôteaux L, Doucet M. 1998. Impact of a sustained-release ivermectin bolus on weight gain in breeding age Holstein heifer under commercial pasture conditions in southern Québec. *Can Vet J.* 39: 701-705.