

EFFECTS OF USE OF SOMATOTROPHIC HORMONE (BST) ON PERFORMANCE OF DAIRY COWS: A CASE STUDY IN A SINGLE HERD

Rafael M. Roman¹, Charles J. Wilcox²,
H. Herbert Head³, and Daniel W. Webb⁴

Department of Dairy & Poultry Sciences
University of Florida
Gainesville, FL 32611-0920

Introduction

A very large number of designed research studies have been performed to evaluate the effects of administration of somatotrophic hormone (BST) on dairy cow performance. Such research will not be reviewed here. In general research showed clearly that milk yield per cow was increased, perhaps by 15%. Less clear were the effects on other measures of performance such as milk composition, income over feed cost, and reproduction. Research has suggested that reproductive performance may suffer and that somatic cell counts may increase. Effects on milk composition were less clear; consensus was that essentially no effect on fat percentage occurred, but that protein percentage might have declined.

Description of Use of BST

A management decision was made in August 1994 to administer BST to all healthy cows not on designed research projects at the University of Florida Dairy Research Unit, Hague, Florida. Milking was 3x daily. All cows qualifying were injected regardless of stage of lactation, except that none were injected until at least 60 days postpartum. Compound used was Posilac⁵ provided by Monsanto Corp., at the recommended rate (500 mg biweekly).

Data used in statistical analysis were from the DHI test of February 15, 1995. Study thus represents a vertical study of data, rather than a horizontal (repeated measures) study. Comparisons of BST versus other cows not injected represents the cumulative performance of cows up to February 15, 1995.

In December 1994 several preliminary studies were made. Differences in the two groups of cows (BST vs no BST) were apparent with several of the response variables. Of major concern was the comparability of the two groups prior to 60 days postpartum, since the cows not receiving BST were not on other designed experiments. Performance of the two groups from 4 to 40 days was essentially identical; by 60 days no-BST cows were very slightly superior in milk yield to BST cows. Hence the no-BST cows were considered to represent a fair comparison with BST cows. At least any subsequent superiority in milk yield of BST cows should not simply reflect the fact that they were superior cows at the beginning of the injection series.

¹Research Assistant, ²Professor and Geneticist, ³Professor and Lactation Physiologist, ⁴Professor and Extension Dairyman.

⁵Mention of a trade name in this publication does not imply recommendation of this product to the exclusion of other products that may be suitable.

Table 3. Simple¹ and partial² correlations³ between response variables among cows.

Response	Milk yield	Protein %	Fat %	Protein yield	Fat yield	IOFC	Preg. status	Service number	Days open	Somatic cell count
Milk yield	1	.31	.11	.99	.96	.96	.19	.28	.73	-.10
Protein %	-.26	1	.24	.42	.37	.29	.18	.13	.30	.10
Fat %	-.26	.17	1	.14	.35	.12	.02	.04	.17	-.14
Protein yield	.91	.12	-.17	1	.96	.95	.20	.28	.74	-.09
Fat yield	.65	-.06	.48	.66	1	.92	.18	.26	.74	-.12
IOFC	.85	-.20	-.14	.77	.61	1	.18	.24	.67	-.15
Pregnancy status	-.11	.12	-.06	-.07	-.13	-.08	1	.14	-.36	-.08
Services number	.01	.01	-.02	.02	-.02	-.05	.04	1	.19	-.06
Days open	.02	-.08	.03	.01	.04	-.02	-.87	.02	1	-.04
Somatic cell count	-.11	.18	-.11	-.05	-.13	-.14	.03	-.02	.01	1

¹Above diagonal.

²Below diagonal.

³Correlations $\geq .13$ significant at $P < .05$; $\geq .15$ significant at $P < .01$.

(IOFC), .85; pregnancy status, -.11; somatic cell count, -.11; fat %, -.26. These agree with many previous studies and suggest that this data set is not unusual.

Results of the present study are compared with the consensus of published research in designed experiments in Table 4.

Tests of statistical significance (e.g. $P < .05$ or $P < .01$) in Table 2 provide estimates of the confidence one can place in the results. For example, milk yield of cows treated with BST truly was higher than no-BST cows, with 99% confidence. However, one could not state with confidence that fat % differed between the two groups.

Average number of days on BST in the BST group was 133; average number of days in lactation was 271. Hence the average BST cow had been fresh 138 days before treatment. The treatment effect of + 1281 lb thus represented an increase of 9.6 lb per day, or about 15%, similar to published research.

The poorer reproductive performance of BST cows also has been shown before (lower pregnancy status value, more services, more days open) although previous estimates have not been quite as large. We essentially did not find any effects on somatic cell count, contrary to the consensus of previous research. An increase of .02 is equivalent to an increase of about 1500 cells, far lower than the sensitivity of the test.

Table 4. Comparison of effects of BST in present study with consensus of previous research.

Variable	Present Study	Previous Research
Milk yield	Increase	Increase
Protein %	Increase	Little effect
Fat %	Decrease	Little effect
Protein yield	Increase	Increase
Fat yield	Increase	Increase
IOFC	Increase	Increase
Pregnancy status	Decrease	Decrease
Service number	Increase	Increase
Days open	Increase	Increase
Somatic cell count	No effect	Slight increase

Summary

Results of BST administration to part of the University of Florida Dairy Research herd resulted in responses essentially the same as found in previous designed research, although effects on protein and fat percentages are somewhat variable. No effect on somatic cell counts was found.

Acknowledgements

Technical assistance of M.E. Russell and D.M. DeLacure is gratefully acknowledged.