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OPTIMAL PRODUCTION SCHEDULES FOR A REPRESENTATIVE FARM UNDER ALTERNATIVE SEASONAL  
MILK PRICING PATTERNS OF THE BASE-EXCESS PLAN: REPLY

Allen M. Prindle and Janet S. Livezey

We were pleased that the author of the Comment indicated the methodology of the research was "novel and entirely appropriate" and that the issue examined was important. The Comment's author then raised a series of questions related to specific input data and modeling assumptions.

Our article described a linear programming model designed to examine how a representative dairy farm manager should adjust production in response to monthly changes in milk prices resulting from the operation of a base-excess plan, such as the one operating in the Mid-Atlantic Milk Marketing Order.

The expected production response issue is of interest both from the standpoint of the individual producer and also from the standpoint of the administrator of the Milk Marketing Order. Emphasis of the modeling effort would likely vary depending on which focus dominated the effort. Our modeling effort focused more on the market order and expected production adjustments resulting from changes in specific details of the base-excess plan. The author of the Comment may have focused more on the individual producer.

Table 1 of the Comment displays adjustments in annual milk production for month of calving, and contrasts input data used in our model with data from two other sources. The adjustments used in our model were based on 1973-1974 data from cows in New York, aged 22-48 months. The adjustments reflect a number of influences including environment, feed availability and quality, and various management practices. Clearly dairy herd management practices differ throughout the U.S., indeed throughout the Northeast. Practices have also been rapidly changing over time. The combined effects of stress caused by heat and humidity is a current research topic (Irving). The use of stored feed versus pasture as a predominant practice also affects adjustments. By limiting the sample to cows aged 22-48 months, probably one-fourth to one-third of the producing population was eliminated from the sample. This may bias the adjustments. It is a common prac-

tice to calve first-calf heifers in the spring. Then, with calving intervals of 13-14 months, older cows would be calving later in the year. This may serve to explain possible differences in the adjustments. Clearly the differences are great enough to warrant re-examination of the model with alternative production input data, as suggested by the author of the Comment.

The data in Table 1 of the Comment did not come directly from our article. Our data do not correspond exactly with those printed in the Comment.<sup>1</sup> The author of the Comment was correct in contrasting the adjustments and questioning the validity of the results.

The model described in our article can easily accommodate various forms of lactation curves, including seasonal shifts, percentage or linear movements, and curves with different shapes. The challenge is to select data appropriate to the individual farm or to a market area and then to review the results of the analysis.

The author of the Comment suggests refinements which could be added to account better for variable costs in the model. The primary focus of the research was to examine expected responses to changing price patterns and pricing policies of the base-excess plan. This plan was designed to give producers incentives to level milk production and to balance seasonal supply better with seasonal demand. One benefit of balancing seasonal supply and seasonal demand is better utilization of processing capacity. The simplifications in the model discussed in our article provided a means of examining optimal producer response to changes in the base-excess plan. Sensitivity of the model to pricing changes, given the assumptions of the model, indicated some producer response in the expected direction. The base-excess plan must provide sufficient incentives to producers to be effective in reducing seasonal surplus reserves. Perhaps further refinements of the model can contribute a means of establishing appropriate incentives through the base-excess plan for a more efficient dairy sector.

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The original paper was published in the April, 1981, issue of the Journal. The comment by Robert Milligan was published in the Spring, 1982, issue of the Journal. This reply by Prindle and Livesey was received after the Spring, 1982, issue went to press. Consequently, the reply is presented here.

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<sup>1</sup> Percentage adjustments used in our model were: Jan. 1.5; Feb. 3.4; Mar. 5.6; Apr. 7.8; May 11.0; Jun. 10.7; Jul. 7.3; Aug. 3.3; Sep. 1.6; Oct. 0.4; Nov. -0.9.

## REFERENCES

Irving, Michael. Personal conversation related to current research being conducted at the University of Maryland, Department of Dairy Science, January, 1982.