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

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INTRODUCTION

In the April, 1981, issue of this Journal, Prindle and Livezey (PL) address the very important question of how a dairy farm manager should attempt to adjust production in response to expected seasonal production patterns of the dairy cow, monthly milk prices and variable milk production costs. The authors construct a representative farm linear programming model to address this important question.

I find the methodology used by PL to be novel and entirely appropriate; however, I find the adjustments to the standardized lactation curve to be inconsistent with published dairy science research and the assumptions employed in calculating variable costs to be unrealistic. Unfortunately, these difficulties raise serious questions about the usefulness of the results.

ADJUSTMENTS TO LACTATION CURVE

The adjustments for month of calving used by PL are nearly the opposite of that published by dairy science researchers (Miller, Lentz and Henderson; Dairy Records Processing Lab; Oltenacu, et al.). Table 1 illustrates the difference between PL and published research. Miller, Lentz and Henderson used 494,490 lactation records from the Northeastern U.S. The percentage adjustments implied by mature equivalent factors come from Dairy Records Processing Lab and are currently used for calculating mature equivalent milk production. Oltenacu, et al., adjusting for freshening date using three seasons, found cows freshening in October through February to have the highest production.

Two questions must also be raised concerning the distribution of production by month of lactation. PL show milk production to be highest in the first month. Since cows peak in production at six to eight weeks into lactation (Sniffen), it is impossible for production in the first month to exceed production in the second month. Most research has shown the second month in lactation to be the highest in production (Oltenacu, Ainslie and Keown; Nott, Sargent and Search).

Second, PL implicitly assume that the effect of month of calving on distribution by month of lactation is simply linearly to move the curve up or down. With the seasonality of production already discussed, it is unlikely this assumption is valid. Oltenacu, Ainslie and Keown found different distributions for each of three seasons of freshening.

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CALCULATION OF VARIABLE COSTS

Accurate calculation of variable costs is not easy, but I find the assumptions employed by PL unrealistic and over simplistic. PL use the full-time hired man approach to labor where the same amount of labor is hired each month. I have no argument with this approach, when the fixed labor is available to all farm enterprises, not just to the dairy cow enterprise as assumed by PL. Labor requirements of crop enterprises must be considered to analyze realistically seasonality of milk production. Linear programming models that consider labor use by all enterprises are readily available (Nott and Harsh).

Feed requirements were incorporated by PL by assuming that the forage and most other feed are a fixed cost with additional feed purchased for production over 13,000 pounds based on energy requirements. The simplicity of this procedure severely underestimates the impact of production changes, particularly for production between 12,420 and 13,000 pounds. Depending on month of freshening, PL's production range is 12,420 to 13,920 pounds. The use of ration formulation programs (Brown and Chandler; Harsh, Hillman and Schoonaert; Milligan, et al.) to formulate feed budgets for use in representative farm LP's is hardly new (Nott and Harsh; Knoblauch, et al.; Wackernagel, Milligan and Knoblauch; Milligan and Knoblauch) and should have been used in this analysis.

Table 1: Percentage Adjustment in Annual Production for Month of Calving

Month	Prindle & Livezey	Miller, Lentz & Henderson	M. E. Factors (48 Month Cow)
Jan.	+ 1.6	-0.3	0
Feb.	3.9	-1.2	0
Mar.	5.0	-2.1	-1.0
Apr.	7.1	-3.1	-1.9
May	10.7	-4.5	-3.8
June	10.2	-5.3	-5.7
July	7.0	-6.7	-8.7
Aug.	3.2	-5.6	-7.7
Sep.	1.9	-3.0	-3.8
Oct.	0.3	-0.4	-1.0
Nov.	-0.8	+0.1	0
Dec.	Base	Base	Base

Other variable costs also are affected by milk production level but were not recognized in the model. The most directly related is milk marketing expense. Consequently, any extra milk due to freshening date is produced at an unrealistically low cost. This low cost causes an over estimate of return to extra milk and compounds errors introduced by the lactation adjustments.

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