Another Look at Dairy Economics and Production Medicine

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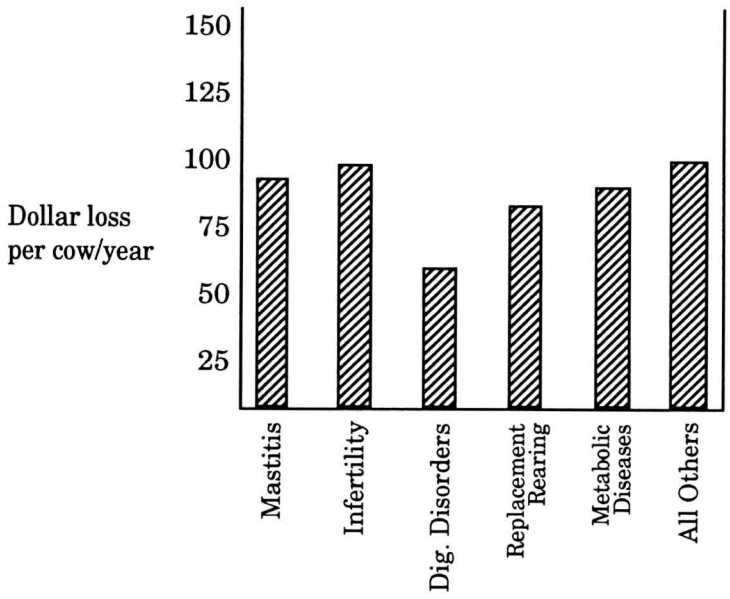
Dairy practitioners who have made the switch from traditional dairy practice to production medicine for their dairy clients find themselves paying closer attention to production records and the economic cost of disease for their clients.

Many veterinarians are aware of the cost to the dairyman of mastitis - chronic and acute, infertility, digestive problems and displaced abomasum, and costs involved in sub-optimal rearing of replacements. A bar graph illustrating these losses might look like this with wide variations from farm to farm.



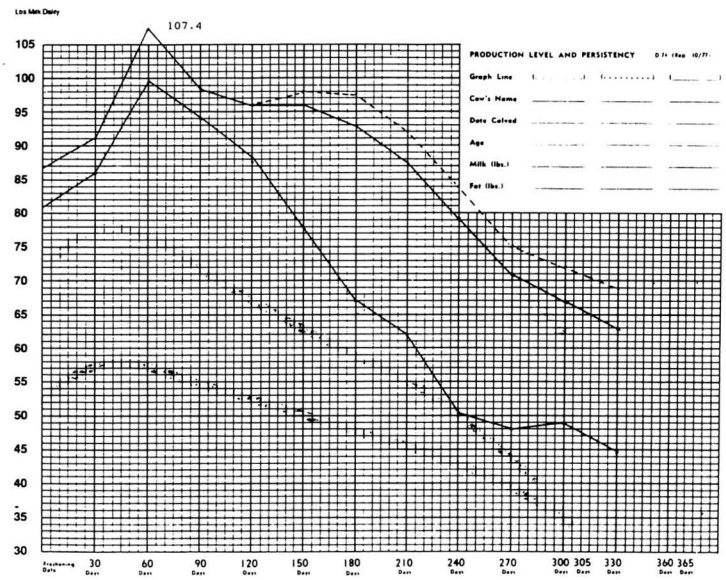
The purpose of this article is to broaden our thinking to include another condition likely more costly than any of the above. To date, this problem is little discussed and really hasn't been named yet.

On a herd basis, it could be called inconsistent lactation persistence. Leading nutritionists recognize the problem and hypothesize that the cause is high blood sugar stimulating secretion of insulin,which stimulates fat deposition at the expense of milk production. Conversely, prevention of the problem with careful feeding practices encourages secretion of bovine growth hormone. This has the opposite effect - encouraging milk production rather than fat deposition.

In the upper midwest, where shelled corn and corn silage is plentiful and inexpensive, nearly all herds will have this problem to a greater or lesser extent. In addition to lost milk production, high cull rates and other health problems often accompany the syndrome.

Milk production graphs are very useful in illustrating production losses. The following graph is a composite of the past four months production in an excellent dairy herd. Cows graphed are second lactation and older cows. The group numbers 47 cows. Six of these cows exhibit poor lactation persistence typical of the problem.

Month of Lactation	Cow Identification Pounds of Milk					
	1	2	3	4	5	6
1	90	90	81	83	94	80
2	100	94	104	106	92	101
3	93	93	95	92	89	102
4	93	86	80	86	80	98
5	83	71	67	79	66	87
6	71	60	62	75	61	77
7	66	62	56	68	52	
8	48	51	43	60	47	
9	42			56	40	
10				56	39	
11				52	33	
12				46	19	



The upper solid line of the Graph 1 is the production of all adult cows. The lower solid line is the complete lactation curves for these six cows to date. The dotted line shows production for all adult cows with the six cows removed.

Milk production in this herd in 1991 was 24,131 lbs. of milk, 929 lbs of butterfat. It appears that milk production would be about 1,000 lbs. higher if the losses of these six cows could be avoided.

In another excellent herd, the problem was more common. About one cow in three would fall off in production in later lactation. Production of the following cows gives some typical examples.

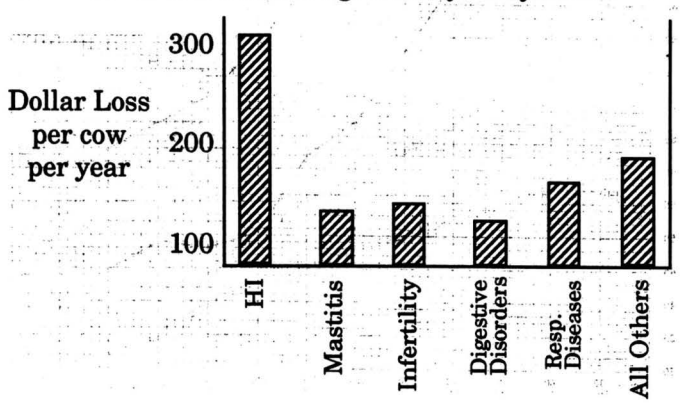
Cow No.	Month of Lactation											
	1	2	3	4	5	6	7	8	9	10	11	12
1	90	92	73	60								
2	99	77	73									
3	55	81	76	70								
4	71	88	78	72	64	58	56	37	30			
5	47	89	86	76	65	57						
6	90	79	75	78	56							

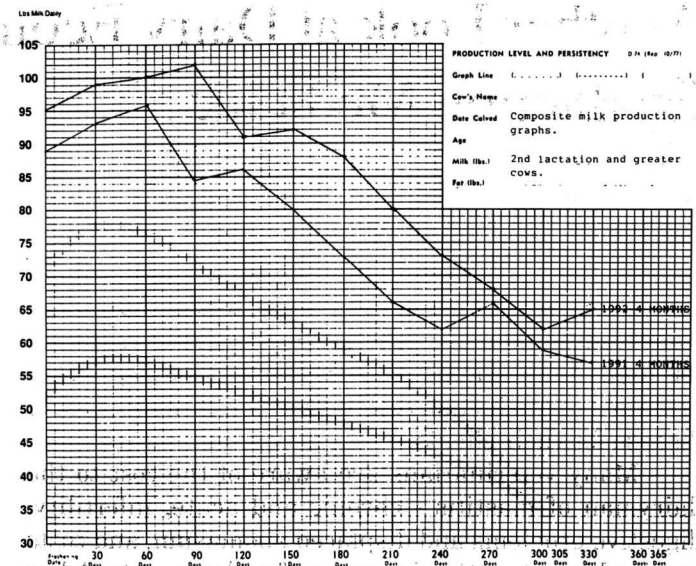
Production levels in this herd for 1991 and 1992 for both cows and heifers in the Graphs 2 & 3 show dramatic production improvement following changes in feeding practices.

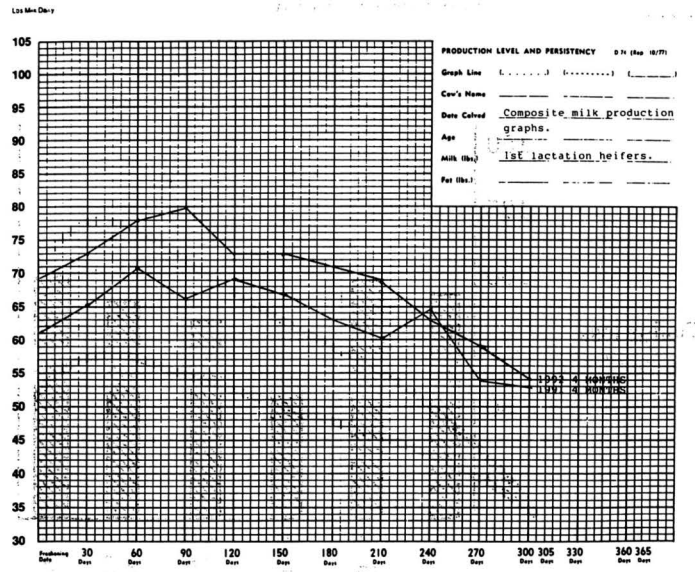
The Graphs 4 & 5 of two adult cows in one herd over two successive lactations give some clues about the early stages of lactation that tend to result in the poor lactation. The bad lactations are characterized by peaking in the first month of lactation and low fat test in the second month of lactation. One cow also had a low fat test in the first month. This is often a danger signal - either the cow has stopped mobilizing body fat or she had no more to mobilize.

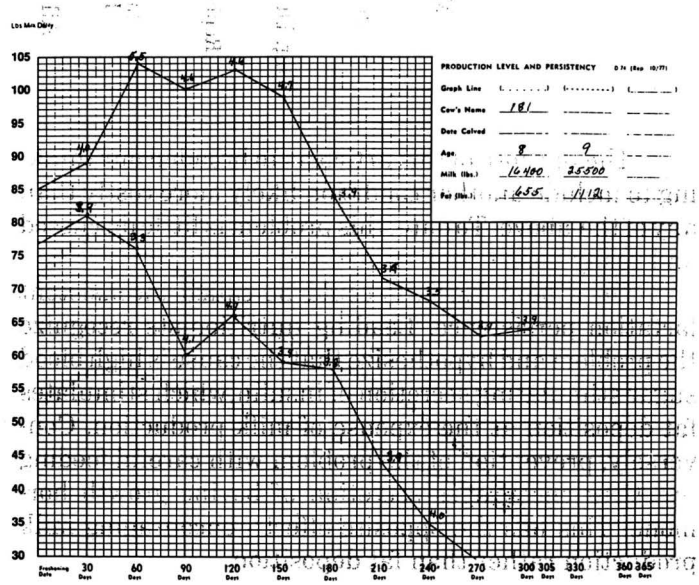
Until this condition is researched further and given a name, let's call it hyperinsulinemia (HI).

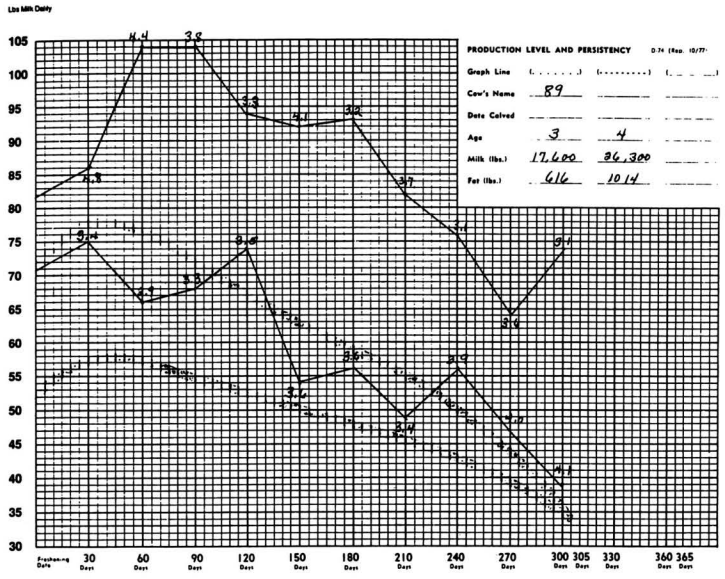
Assuming that HI is the largest unsung metabolic disease and we are to include it in a bar graph estimating dollar loss to the dairyman, the graph would likely look much like the following in many dairy herds.











Unfortunately, recognition of a problem does not solve it. The following observations illustrate some of the problems and possible solutions:

1. High blood sugar levels encourage high milk production. Non-fiber carbohydrate (primarily starch) encourages production of propionic acid from rumen fermentation which is the prime source of blood glucose.

2. The line between too much propionic acid formation and too little is probably not very wide. The dairyman who stays within this narrow range is an excellent feeder and the breed is quite rare.

3. An important part of studying DHI records is to correct feeding practices as soon as possible after suspecting a problem. Very often a low fat test one month will be followed by a sharp drop in production the following month. Easing off on grain feeding will often correct the problem and the next month's production will again be normal. If feeding corrections are not made early, it will be too late later and all that can be done is to be more careful in the next lactation.

4. Secondary energy sources other than shelled corn - oats, barley, beet pulp, soy hulls, whole cottonseed - are often helpful in making the concentrate diet more mellow. These products will still supply energy but should encourage more acetic and less propionic acid from rumen fermentation.

5. When possible, the following combinations should be in place to minimize problems:
   a) good sized cows.
   b) good quality forage.
   c) not much grain fed.

   This should bring the following results:
   a) cows peak high and persist.
   b) small changes in body condition
   c) healthy cows with good breeding performance.
   d) high dry matter intake.

   It is somewhat surprising that in spite of low grain levels, body condition is still maintained. High dry matter intake, normal rate of passage, thoroughness of digestion and desirable end products of rumen fermentation probably account for this paradox.

6. Very often, a poor lactation will begin with the cow peaking in the first month and heading down from that point on. In these cows, usually the dairyman needs more patience in bringing his cows on to higher concentrate levels. Early lactation needs two primary goals - mobilize excess body fat and develop a vigorous appetite and in that order. The second must follow the first. At 30 days into lactation I like to see good levels of milk with a high fat test and at 60 and 90 days, high milk with a respectable fat test and vigorous appetites.

7. In recent years, much attention has been given to the partitioning of carbohydrates in dairy rations. Guidelines that set minimum levels of fiber (NDF) and non-fiber carbohydrate (NFC) are recommended. This is one of the more constructive means of minimizing this problem in dairy herds. Unfortunately, most research is done on a short term basis and because of this, long-term losses of production due to gradual loss of persistence of lactation are not noticed. A study of high producing dairy herds around the country usually have surprisingly high levels of fiber (NDF) and lower levels of non-fiber carbohydrate than is commonly thought to be necessary for the high producing cow.

In a rapidly changing industry with ever increasing demand for efficiency, this problem badly needs solution. I am certain that through ignorance it is putting many otherwise good managers out of the dairy business or at least making it marginally profitable.

Veterinarians involved in production medicine could assume a leading role in correcting the problem. I would suggest the following:

1. Look for it - you'll find it.
2. Give it a name.
3. Research it.
4. Correct it.