

Using Prostaglandin to Reduce Days Open

Days open is an important indicator of reproductive efficiency and excessive days open are costly. When cows remain open for more than 100 days, additional costs are between \$3.84 and \$4.12 per cow, per day (table 1).

Research has shown that the level of milk production decreases significantly in the lactation following breedings earlier than 45 days after calving. Therefore, producers should consider breeding cows at their first heat after 45 days. Some producers prefer to extend this voluntary wait period until the first heat after 60-70 days postpartum for their high producing cows.

If all the cows in a herd were bred at the first heat past 45 days, and they all became pregnant with this first service, the average days open for the herd would be around 56 days. However, reproductive management is not so simple, and a more realistic goal for average days open in a herd would be 90 -110 days. This would result in a 12.1- 12.8 month calving interval.

For a 12.5 month calving interval, cows must be pregnant by 100 days after calving. To achieve this, the goal would be to observe heats in over 90% of the cows before 45-50 days. This would allow for approximately three breeding opportunities before the 100 days after calving have elapsed.

Problems with fertility and heat detection will increase days open. Individual cows with days

open over 110 days should be identified and the reason for extra days open determined. Cows that are not to be bred (i.e. those to be culled, or used in an E.T. program) should not be included in the calculation of average days open, so that the figure will not be inflated. Producers on DHI should code these cows NTB (Not To Breed).

Inducing heat with prostaglandin

A major factor increasing average days open is the failure to detect cows in heat. In an effort to overcome this problem, some producers have tried to induce heats using prostaglandin. Here's how this works (see article [2C1](#)) :

- During the 4-5 days before a cow comes into heat, an egg develops in the ovary, contained within a structure called a *follicle*.
- At ovulation (a few hours after she stops showing heat), the egg is shed by the follicle into the uterus and the follicle turns into a *corpus lute m* (CL).
- The CL starts producing progesterone, which prepares the uterus for pregnancy and also prevents the onset of another heat cycle.
- If conception does not occur, the CL regresses, progesterone levels decline, a new follicle (and egg) develops and the cow comes into heat.
- If prostaglandin is injected when the CL is actively producing progesterone (5-17 days after heat) it will cause the CL to regress and 90-95% of cows will come into heat within 2-4 days.

Table 1 : Additional costs incurred when cows remain open for more than 100 days.

ADDED COSTS DUE TO :	DAYS OPEN				
	100+10	100+20	100+30	100+40	100+50
PRODUCTION	\$ 23.45	50.05	77.00	103.95	130.90
AI FEES	1.30	2.60	3.90	5.20	6.50
VET & MED	2.94	5.88	8.82	11.76	14.71
CALF LOSS	3.95	7.89	11.84	15.79	19.74
REPLACEMENT	6.80	13.60	20.40	27.20	34.00
TOTAL ADD. COST	38.44	80.03	121.97	163.90	205.84
AVG COST/DAY	3.84	4.00	4.07	4.10	4.12
costs based on : milk - \$50 /hL; feed - \$15 /hL; AI - \$15 /service; vet & med - \$6.50 /cow; calf price - \$150; replacement cost - \$1200.					

Although there is currently no simple test that will specifically identify cows between days 5 and 17 of their cycle, those with a functional CL can be identified by rectal palpation of the ovaries or by measurement of milk progesterone concentration.

Research has shown that there is a variation in the onset of heat depending on the age of the CL when the injection is administered. For this reason, fixed time inseminations (ie. at 72 and/or 96 hours after injection of prostaglandin) are not very successful and, therefore, not recommended. More consistent results are obtained when insemination takes place after signs of heat have been observed. Table 2 shows the normal pattern of heats that can be expected after prostaglandin injection.

Prostaglandin injection strategies

Prostaglandin can either be used occasionally (e.g. with heifers or certain problem cows) or routinely, on a weekly or biweekly schedule. In a scheduled program, prostaglandin is most efficient when used in a regimen of biweekly (14 - day) injections based on the reproductive status of the cow. Cows in heat after the first injection should be inseminated. Cows not inseminated should be injected 14 days later and inseminated. Routine 14 day prostaglandin injection will rapidly reduce the number of open cows during the first 21 days of the breeding period.

DAYS AFTER TREATMENT TO HEAT	WITHOUT PROSTAGLANDIN ----- % of cows -----	WITH PROSTAGLANDIN
1	4.7	1.2
2	4.7	4.7
3	4.7	44.4
4	4.7	17.5
5	4.7	6.9
6	4.7	2.9
% IN HEAT : DAYS 1- 6		77.6
DAYS 7-10		15.0
NO RESPONSE		7.4

Table 2 : Distribution of heats in 727 cows treated with prostaglandin. For comparison, without treatment, heats are distributed evenly over a 21-day cycle (100/21 = 4.7% per day).

	WITHOUT PROSTAGLANDIN	WITH PROSTAGLANDIN
Number of cows	228	219
Days to first breeding	81	70
Days open	111	93
First service conception %	47	55

Table 3 : In this trial, the use of prostaglandin resulted in a decrease of 18 days open.

Some producers use a single injection system based on ovarian palpation by a veterinarian. All cows eligible to be rebred after calving are palpated. Cows with a functional CL are injected with prostaglandin and observed for heat. Cows without a CL, and those that were not observed in heat following the initial injection are examined again at the next veterinary visit. The system continues on a routine, ongoing basis with every cow remaining on the program until diagnosed pregnant.

Pregnancy checks should be conducted 35 days after insemination. The value of examination is not necessarily related to pregnancy diagnosis, but rather to identifying cows not pregnant and increasing the likelihood that these cows could be inseminated at the next heat. Cows not pregnant can be included with the prostaglandin group or identified as cull cows.

Table 3 illustrates the results of a trial where prostaglandin was used to induce heats. A total of 313 doses of prostaglandin were used for the 219 cows treated (1.4 doses per cow). 73% of the cows treated showed signs of heat and were inseminated. Days to first breeding, days open (DHI : days to last breeding), and conception rate improved significantly for this group of cows.

If the cost of the prostaglandin, possible extra vet visits and extra handling of the cows is less than the potential savings from decreasing days open, a prostaglandin program is one means to a more efficient and cost effective dairy operation.

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