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JMR A CURRENT REPRODUCTIVE MONITOR

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INTRODUCTION

Up until now, veterinarians doing production medicine for small dairy herds were in desperate need of a current reproductive index that reflected the present situation in the herd. We are all familiar with "Days to 1st breeding", "Days to conception", "Calving intervals", "Days Open", etc... The large, "California Style" 400 to 2000 cow operations function on a "COGO" basis (Conceive Or Get Out), whereas in Northern States and Canada, where our average herd has 50 cows, we work more on an individual basis where post-partum waiting periods vary from cow to cow and infertile cows are rebred rather than culled.

For the past few years in our practice we have encouraged our breeders to breed milking heifers at 80-90 days post-partum and the heavy producing cows later than the traditional 60 days depending on the level of production, body scoring, etc...

We needed something simple, precise and discrete, easy to understand by the client and quick to figure out on the farm. We needed to say more with less numbers, our clients being already overloaded with numbers and reports from DHAS (Dairy Herd Analysis Service). We found that new concept and also a new approach, a work method for monthly visits, an evaluation tool that can even predict tendencies (trends).

HISTORY OF JMR

The JMR Index was developped in March 87 by Dr Roger Martineau (Coaticook Veterinary Clinic, Eastern Townships, Quebec) to prove to a demanding client, Mr Bernard Lavoie, that despite an actual 8% incidence of repeat breeders in his herd (his best cows of course) things were going fairly well. That was the vet's feeling but he had no knowledge of an existing index to prove it. JMR was then invented and used to prove to Mr Lavoie that he was in an enviable situation when compared with 10 other good herds in the area.

Once the procedure was established, the JMR index was calculated routinely after each herd health monthly visit . We became familiar with the many possible interpretations of the index and its evolution in time.

What we present here is the fruit of 3 years of practical experience.

DEFINITION OF JMR

J: Jours (days)
M: Moyen (average)
R: Retard (late, delay, penalty)
(Average penalty days)

JMR is a quantitative value (numeric evaluation) of the reproductive efficiency of the breeder and his herd that takes into account his management decisions.

JMR is calculated at the end of the herd health monthly visit or once the reproductive status of each cow is known.

A Voluntary Waiting Period (VWP) before breeding must be attributed to each cow preferably at the post-partum examination. The VWP ends at the date the farmer would breed the cow if she showed a good heat. (Ref: AABP: VWP: Voluntary Waiting Period is the time in days before which the dairyman will not breed a cow, even if she is detected in estrus.)

In our practice milking heifers are automatically granted a fictitious VWP of 120 days even if we recommend a real VWP of 80 days (or more if the heifer is young - 24 to 26 months at calving - or a very heavy producer). This VWP of 4 months allows targeting the JMR on the adult cows where it really counts and encourages later breeding of the first calf heifers. In Dr Martineau's herds in 1989 the "Days to 1st breeding" was significantly higher on the milking heifers. It was 92 days compared to 83 days on the adult cows (cf. table 1). In fact, in our area a late fertile breeding on a first calf heifer lowers the risk of "First Calf Heifer Burn-Out" or "Sophomore slump" and gives consideration to growth requirements.

TABLE 1

DAYS TO FIRST BREEDING AND DAYS OPEN,
COMPARISON BETWEEN COWS AND HEIFERS

	Milking heifers	Adult cows
Number of animals	154	462
Days to first breeding	92*	83*
Days Open	135	120

* $P \leq 0.05$

The adult cows receive a minimal VWP of 60 days (2 months). This VWP could be longer depending upon the personal management decisions of the breeder or according to our recommendations (BCA, E.T., skinny cows, high producers, etc...). In any case, the VWP will certainly end at the date when the breeder would breed the cow if she showed a good heat. A VWP can be increased if need be as long as the breeder does not cheat with the granting of the VWP (Ex: the breeder changes his mind and decides not to breed the cow because she is a top producer or, if bred, she would calve at an undesirable date: it is then a voluntary delay with no penalty).

The procedure to calculate JMR requires minimal but good book keeping. For that matter we prefer individual cow charts where all pertinent information is recorded. The end of VWP is marked with a small arrow on the Individual Cow Chart (cf.annex 1).

To make the collection of data on the farm easier, we use a form (JMR Calculation Sheet, cf. annex 2)where all the cows of the herd are distributed in one of the 12 following categories according to their breeding status :

1. Not bred and not exceeding the VWP.
2. Not bred with a delay not exceeding 24 days past the VWP.
3. Not bred with a delay > 24 days past the VWP.
4. Bred once or twice and not preg. checked yet.
5. Bred three times or more and not preg. checked yet.
6. Not pregnant with one or two breedings.
7. Not pregnant with three or more breedings

8. Pregnant less than five months.
9. Pregnant between 5 and 6 months and due for body scoring.

10. Pregnant between 6 and 7 months and due to go dry in the next month.

11. Dry cows.

12. Cows to cull.

The distribution of cows in 12 categories allows us to spot the problem groups and to have a general view of the breeding status of the herd.

CALCULATION OF JMR

The JMR is calculated from the cows that exceed the VWP and have not been serviced, diagnosed pregnant or have been diagnosed open (this includes categories 2 through 7). A penalty is given to these cows for each day over the VWP. This penalty is attributed in the two following ways:

Non-pregnant cows (categories 2, 3, 6, and 7): their penalty is the difference between the end of the VWP and the date the JMR is calculated.

Questionnable cows (categories 4 and 5): their penalty is the difference between the VWP and the last breeding date. We assume them to be pregnant from the last breeding and do not over penalize them. When a cow is granted a penalty her I.D. is copied in the left column of the JMR Calculation Sheet with her number of penalty days.

The sum of the penalty days is then divided by the number of breeding cows in the herd (excluding the cows to cull) and this division gives the JMR in days/reproducing cow.

The penalty days are cancelled as soon as the cow is found pregnant or when the decision to cull her is taken. In both cases the breeding future of the animal is known. By not counting the penalties accumulated by the pregnant cows or by the ones to cull JMR targets the active reproducing cows (not pregnant) and therefore is a <u>current</u> index.

The cows with penalties are redistributed according to the number of penalty days in the categories of: 11 to 30 days, 31 to 60 days, 61 to 90 days, 91 and over. If the first category is constantly higher than the other ones, then the granting of the VWPs must be revised and increased.

Category 9 encourages the client and the veterinarian to body score cows in late lactation.

Special Cases

1. Embryonic death:
   In case of an embryonic death before a confirmed pregnancy (one that does not have to be rechecked next month) the waiting period remains the same.

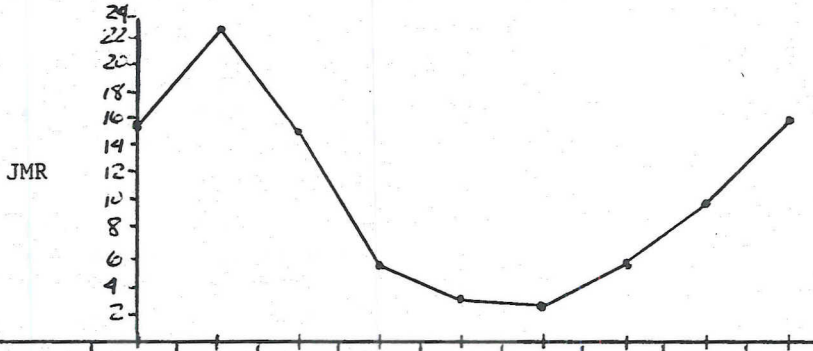
2. Abortion:
   a) In case of an abortion after a confirmed pregnancy and before drying off, we extend the VWP from the calving date to the date we expect to breed her again.

   b) If the abortion happens after going dry it is considered as a new calving and a new VWP is granted.

3. Purchase:
   For a purchased cow which is already late, the end of the VWP is the date of purchase and the cow receives no penalty

4. No known date of service:
   When cows are exposed to a bull (as in summer or free stall systems or in a "clean up bull" situation) the VWP of the exposed cows is increased by 35 to 40 days (allowing extra time for pregnancy check in a "no known date of service" situation).

SUMMARY REPORT OF BENOIT LAVIGNE'S HERD



DATE / NORMAL	JUN 89	JUL 89	AUG 89	SEP 89	OCT 89	DEC 89	JAN 90	FEB 90	MAR 90
JMR (<10)	15.5	23.0	14.5	5.3	3.2	2.9	5.3	9.4	14.6
D.O. (90 - 105)	116	108	115	123	128	129	137	134	123
SERV./CONC. (<2.00)	1.59	1.52	1.75	1.83	1.83	1.83	1.88	1.79	1.67
HEAT DET. % (>80%)	61%	72%	72%	66%	66%	64%	57%	56%	56%
Ds TO 1st SERV.(90Ds)	88	89	89	90	93	93	95	93	93
1st S. C-Rate (>40%)	45%	50%	52%	53%	55%	46%	45%	46%	46%
PROJECTION									
D.O.	119	125	126	127	125	127	127	125	120
#S/CONC.	1.79	1.82	1.84	1.75	1.74	1.75	1.69	1.77	1.59
HEAT DET. %	66%	62%	63%	62%	66%	65%	61%	60%	60%
REGIONAL JMR	15.4	13.6	11.4	9.7	8.6	8.3	8.5	9.2	9.5
TOT. PEN. DAYS	604	897	552	217	134	127	226	384	585
#COWS	39	39	38	41	42	44	43	41	40
AVG LACT #	2.6	2.7	2.6	2.5	2.5	2.5	2.7	2.8	2.9
DISTRIBUTION OF PENALTIES DAYS (11-30)	1	1	0	2	2	1	2	4	5
(31-60)	5	2	2	0	0	1	2	4	5
(61-90)	3	4	3	1	1	1	0	0	1
(91 & +)	1	4	2	1	0	0	1	1	1
CULL SUMMARY									
PRODUCTION:	2	0	0	2	0	0	1	0	0
REPRODUCTION:	0	0	1	0	0	0	0	0	0
MASTITIS/UDDER:	0	0	0	0	0	0	0	0	0
TEAT:	0	0	0	0	0	1	0	1	0
FEET/LEGS:	0	0	0	0	0	0	0	0	0
SALE:	0	0	0	0	0	0	0	1	1
OTHER:	0	0	0	0	0	1	0	0	0

CHARACTERISTICS OF JMR

1. IT IS A CURRENT MONITOR OF THE REPRODUCTIVE EFFICIENCY.

   a) JMR shows what is happening on the OPEN AND SERVICED COWS, whereas DAYS OPEN shows what DID happen 3 to 6 months ago with the cows NOW PREGNANT. (cf. figure 1 and table 2)

FIGURE 1

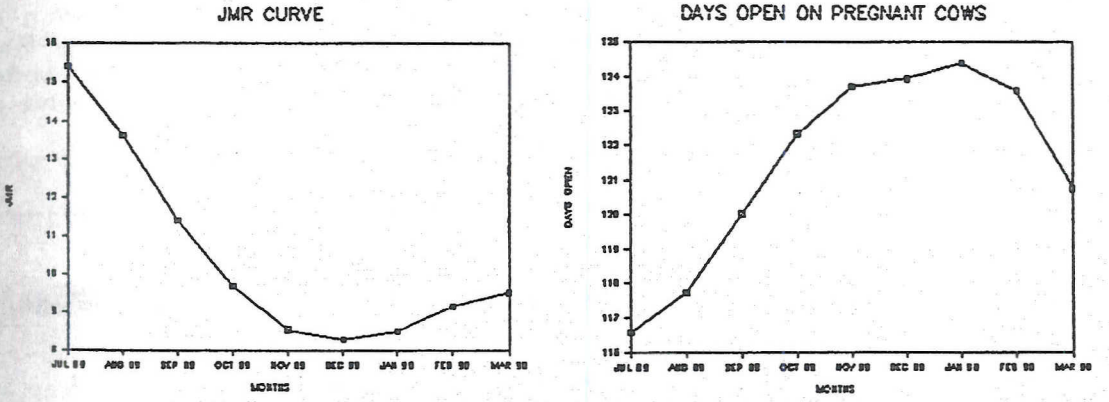


TABLE 2. DATA TABLE FROM 81 HERDS ON HERD HEALTH IN COATICOOK AREA

MONTHS	JUL 89	AUG 89	SEP 89	OCT 89	NOV 89	DEC 89	JAN 90	FEB 90	MAR 90
TOTAL NUMBER OF COWS	3926	3908	3983	4097	4177	4201	4266	4324	4245
TOTAL NUMBER OF HERDS	81	81	81	81	81	81	81	81	81
AVERAGE JMR OF ALL HERDS	15.4*	13.6	11.4	9.7	8.6	8.3*	8.5	9.2	9.5
STANDARD DEVIATION	9.4	9.5	7.5	7.8	7.3	6.9	6.8	6.4	5.7
AVERAGE DAYS TO 1st BREEDING	85.4	85.4	85.3	85.8	85.4	85.3	85.1	85.6	85.8
STANDARD DEVIATION	11.4	11.1	10.5	11.1	10.7	10.1	9.7	10.6	10.2
AVG DAYS OPEN (pregnant cows)	116.6**	117.7	120.0	122.3	123.7	124.0**	124.4	123.6	120.8
STANDARD DEVIATION	21.8	17.1	18.6	18.8	18.0	19.1	20.3	19.0	22.5

* Significative $P \leqslant 0.05$

** Not significative at $P \leqslant 0.05$

FEB 90	MAR 90
9.4	14.6
134	123
1.79	1.67
56%	56%
93	93
46%	46%
125	120
1.77	1.59
60%	60%
9.2	9.5
384	585
41	40
2.8	2.9
4	5
4	5
0	1
1	1
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0	0
1	0
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1	1
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b) Graphing the JMR allows for evaluation of current trends in breeding efficiency for the herd. The slope of the curve reflects the progress and is almost more important than the JMR value itself. This slope allows to identify when problems begin, to predict the JMR for the coming months, to evaluate if there is improvement even though the JMR is still high, etc... The annual curve of JMR will tend to repeat itself the next year. It helps to forecast the critical periods where the herd will be less reproductively efficient.

c) If, in a situation of a first calculation, JMR is really high, to predict next month's JMR the slope can be found by just calculating the index one month retroactively (the cow pregnant today at 80 days would have been so at 50 days, and so on).

d) JMR helps for early detection of problems.

e) JMR most often confirms the feeling you have after your herd visit.

IT INTEGRATES THE MANAGEMENT DECISIONS OF YOUR CLIENT.

a) JMR's cornerstone is the voluntary waiting period (VWP). VWP being flexible, it respects the objectives of the breeder in regard to his management decisions.

b) It is a valid index for elite herds as VWP can be extended for certain cows (E.T., higher productions, aim some cows to calf for show time, etc...)

c) This measure stimulates the producer to be more efficient in reproduction because he can compare himself with other herds in the area, regardless of the production level and general management.

d) It is easy to understand by client.

3. IT IS EASY TO CALCULATE ON THE FARM.

a) Can be applied to all herds, whether or not on herd health program or DHAS. All that is needed is the last calving date, breeding dates, VWP, and Reproductive Status.

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b) The calculation is easy to do on the farm (5 to 10 minutes for a mid size herd for a practioner with some experience).

c) Spurs a better record keeping (individual cow chart = sine qua non condition for both farmer and vetenarian).

d) Easily adaptable to computer programs (all the information is already in).

e) Over a 3 year period our practice's JMR has fluctuated seasonally with a June - July high of 14.5 and a December low of 8.5. Some herds steadily stay between 0 and 10, others between 10 and 20, we even have some problem herds that climb up to 50.

IT GIVES YOU AND YOUR CLIENT A GENERAL OVERVIEW OF THE REPRODUCTION IN THE HERD.

a) Identifies the categories that cause problems (for example: empty cows, open cows not bred, repeat breeders).

b) Identifies the problem cows and helps in making culling decisions.

c) The index takes into account the infertile cows and the delays in breeding (different with Days Open which includes only pregnant cows).

d) JMR aims mostly at the delay taken by the adult cows. The number of days open could be normal at 105 or less despite an important delay in the adult cows in the case where the first calvers have an early breeding at 40 to 50 days. An error would have been hidden by another error.
A default VWP of 120 days on milking heifers encourages maximal breeding effort to be applied to mature cows.

e) Even if DO, #AS/CONC, Days to first AS, etc..., are not available JMR gives you, all by itself, enough information to know where the herd is and where it is going.

CONCLUSION

After using it with no interruption for 3 1/2 years we can say that JMR has improved our practice of Preventive Medicine.

More than an indicator of the herd's fertility JMR is a global concept of the herd's reproductive management which allows integration of various management practices, for ex.: later breeding on milking heifers, top cows etc...

We are a practice of 9 veterinarians in which 6 partners visit monthly 110 herds with a total of 5 800 cows. Each veterinarian supervises a certain number of herds and we record the JMR of each herd, on each veterinarian's herds and on the total number of cows. This allowed us to proof test our methods and adds a little healthy competition inside the group and stimulates us to improve our client's performance.

ANNEX 1

COATICOOK VETERINARY CLINIC
INDIVIDUAL COW CHART

Name:_____ Birth date:_____ Cow#_____

Sire:_____ Dam:_____

H: Heat NS: Nat. serv. : Female BL: Blood P -: Open P++: Confirmed
C: Calving AS: Art. serv. : Male +: Dead P +: Pregnant Pregnant

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

GENITAL ORGANS: EXAM & TREATMENT BY VET

Y/M/D				Vulva Vagina	Cer-vix	Ute-rus	L.O.	R.O.	TREATMENT	REMARKS

ANNEX 2

COATICOOK VETERINARY CLINIC
JMR CALCULATION SHEET

CLIENT _____ DATE _____

I.D. Penalty days	DISTRIBUTION	
	1. NB < VWP	(Not bred, not exceeding the VWP)
	2. NB > VWP < 24 days	(No bred, with delay < 24 days)
	3. NB > VWP ⩾ 24 days	(Not bred, with penalty ⩾ 24 days)
	4. P(?) < 3AS	(Serviced, less than 3 services not preg. checked yet)
	5. P(?) > 3AS	(Serviced, 3 or more times, not checked yet)
	6. P(-) < 3AS	(Open with less than 3 services)
	7. P(-) ⩾ 3AS	(Open with 3 or more services)
	8. P(+) < 5 months	(Pregnant less than 5 months)
JMR INDEX	9. P(+) 5 to 6 months	(Pregnant)
	Body score:	
# Breeding cows	10. P(+) to dry	(Pregnant 6 to 7 months)
DISTRIBUTION	11. P(+)	(Pregnant and dry)
11-30d: 31-60d: 61-90d: 91 and +:	12. To cull	