



agriculture & rural development

Department:
agriculture
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PROVINCE OF KWAZULU-NATAL

DAIRYING IN KWAZULU-NATAL

Dairy Farm Record Keeping

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INTRODUCTION

Farm records are kept for all or some of the following reasons:-

- **To satisfy the Receiver of Revenue**

This is an essential requirement of record keeping but should not be the sole reason, and a record system can be designed which satisfies the Receiver and is also useful for other purposes.

- **To assist in financial planning decisions**

Financial records, in more detail than those required for the Receiver, can be used for cash flow planning, enterprise analysis and other purposes.

- **To control labour**

This is usually a wages book recording days worked, wages paid, money owed, leave etc.

- **To assist in land management decisions**

These include farm maps and grazing, irrigation, fertilizer use, crop yield, areas and management operations records.

- **To assist in livestock management decisions**

These are the records of individual animals and groups of animals, their production, health, feed use etc.

- **No logical reason**

A lot of useless information is often kept which is never, or can never, be converted into useful information.

CRITERIA FOR RECORD KEEPING

The brief summary of record types given above illustrates that several sets of records must be kept, inevitably involving much of the farmer's time. Hence, if records are not to be more trouble than they are worth, they should satisfy the following criteria:

- **They must be useful**

Unless data which is being recorded will at some future time be used (turned into information) in making management decisions it should not be recorded at all.

- **Records must be kept in such a form that they can be easily converted into information**

Before keeping a record, the eventual end use must be decided upon so that the form in which the data are recorded will facilitate later analysis and interpretation. Too often the end use is not considered, and the usefulness of the data is severely impaired.

- **Record keeping systems must be simple**

Dairy farmers have enough to do without burdening themselves with complex record keeping systems, that are difficult to understand and time consuming to complete, and therefore nearly impossible to delegate to employees.

- **Duplication must be avoided as much as possible**

Some data may have to be recorded more than once in different forms, but this must be reduced to a minimum. In other words, if a record is to be made in the field, the recording system should be such that data can be conveniently entered in the field and does not have to be re-entered back at the office.

- **Records must lead to actions being taken**

Unless a record is specifically intended to be used for some future action or in management planning it should not be kept.

A SIMPLE SET OF DAIRY HERD RECORDS

An overview

It is not the purpose of this guide to describe a complete farm record keeping system. A simple, effective dairy herd record system, which satisfies the criteria listed above, will be described.

This convenient system can be used to supply information for:-

- Effective monitoring of animal performance right from birth.
- Evaluation of management and feeding systems.
- Individual animal comparisons to assist in breeding, culling and other decisions.
- Breed society, milk recording and computer program usage.
- Extraction of useful herd indices for evaluation and comparison.
- Production of Action Lists for management

The physical requirements for the system are cow byre sheets (or milk recording book), individual animal cards, ring-binder file/s with plastic filing sleeves, cow calendar board, heifer-rearing board, an insemination book, daily diary and last, but not least, a comfortable office. Other records which may be added include a separate mastitis record and chalkboards for drying-off and feeding lists.

Cow byre sheets/Milk recording book

These are used for:

Recording		of		live		mass
Recording		of		condition		scores
Recording		of		butterfat		percentages
Recording		of	daily		milk	yields
Recording			concentrate			allocations
Recording			concentrate			use
Noting			drying-off			dates
Noting						oestrus
Roughage	record	(camps	grazed,	quantity	silage	fed etc.)
Mastitis		presence		and		treatments
Running	lactation totals.					

It is not possible to reproduce an example sheet here as it would be too detailed, but the essential layout is illustrated in Figure 1. This layout can be achieved using some of the sheets which are given away by feed companies, or certain bookkeeping analysis books sold by commercial stationers can be used.

The essential points are as follows:-

- Cow names are recorded vertically in alpha-numeric order. Milk recording sample bottle numbers, butterfat percentages, live masses and condition scores are recorded monthly.
- Condition scores may be recorded fortnightly
- Days of the month are recorded horizontally, ideally with four columns per day. This is usually quite simple as many of the sheets which are available have space for three milkings per day plus a total and, as most herds are milked twice daily, the spare column can be used for two purposes. Note that in Figure 1 totals have not been added since most users of this system find that there is little point in recording totals since these daily totals can be calculated with a minimum of mental effort.
- The far right hand side is used for running lactation totals. Most people find it far easier to add vertical columns of numbers than horizontal columns. The most frequently done additions are thus arranged vertically. The only horizontal addition that has to be done is the running lactation total. This is done because official Milk Recording results frequently come back too late to be used for culling decisions and for other analyses.

There are very few farms where the milk is recorded at every single milking. In any event adding every single day's yield for the purpose of estimating a cow's yield is unnecessarily laborious (Official Milk Recording only uses one day per month). Therefore, it is suggested that three days of the month are selected; for example, the 3rd, 14th, and 24th. Add the three days together, and multiply by 10. If it's a thirty day month the total for the month has been arrived at, which can be added to the total for the previous month. If it is a thirty-one day month, add the three days together, multiply by 10 and add the middle day to get an estimate for the month. For February add the three days

together, multiply by 10 and subtract two days yield. For cows which calved or were dried off during the month, add the available days, divide by the number of records used and multiply by the number of days the cow was in milk.

An example:-

"Betty's" yields were $(33.75\text{l} + 33.5\text{l} + 27.25\text{l}) \times 10 = 945\text{l}$ for a 30 day month or, $945\text{l} + 33.5\text{l} = 978\text{l}$ if it were a 31 day month.

Another example:-

"A59" calved on the 10th, her yields for the available days were 17 and 25. It was a 31 day month, she was therefore in milk for 21 days and her estimate would be $17\text{l} + 25\text{l} = 42 \times 21 \div 2 = 441\text{l}$.

It is useful, whenever possible, to add the vertical columns of yields as a check against milk sales or the inaccuracy of the recording jars or milk meters. It is normal for the sum of individual yields to be about 3% higher than bulk tank readings. This is owing to the cumulative effect of the tendency to read upwards when reading yields in the parlour. Larger differences should be investigated. The other items need only be added weekly to get an estimate of concentrate use, number of cows in milk, cows in herd, dry cows etc., as illustrated in Figure 1.

Some farmers enter the cows' names on the sheets in the order in which they calved. This has a marginal advantage once a month when samples are taken for Official Milk Recording, but for the rest of the month it is unnecessarily time consuming to search for cow names, especially in large herds. Also, the dry cows may not, and seldom do, calve exactly on their expected date and can be entered in the wrong order. The preferred system of entering is alpha-numeric (or logical) and would read thus:

Betty, Bugs, Joint, Mystery, R21, W79, 123, 128, 334.

Figure 1. Example cow byre sheet

Cow Name/ No.	Sample No.	Lact No.	Mass date	C.S. date	B.F. % date	Date				Dates ~	Milk this month	Milk this lact	No day
						Milk yield				Milk yields ~			
						AM	PM	T	C				
Daisy	10	3	500	2	3,7	14	10		10		690	1040	41
PMBurg	3	4	580	1,5	3,8	19	14		12		995	1908	68
Tugela	54	1	550	2,5		0	0		(2)		210	210	14
↓													
Alpha-numeric order													
TOTALS THIS MONTH						810	481		120 (25)	NOTES:			
[First page of month only]										Totals listed at left are only done weekly. Milk yields should be recorded to nearest ¼ lb. Width of sheet depends on the number of columns needed for number of cows.			
Total milk						1420				Sample No.: Bottle number for milk recording sample.			
Milk sold						1400				Lact No. Lactation number for present lactation.			
Total concentrates						455				Mass: Weight of cow and date herd was weighed.			
Concentrates used										C.S.: Condition score and date recorded.			
Production concentrates						415				B.F. %: Butterfat % and date of test.			
Dry cow concentrates						40				AM & PM: Morning and afternoon milk yields. An extra column will be needed if recorded daily.			
No. cows in milk						71				T: Total milk for the day. In a system where milk is recorded daily, recording heats observed, treatments for mastitis etc.			
No. dry cows						6				C: Feed (concentrate allocation). Two columns will be needed if milk is recorded daily, only one "C" column per week will be needed.			
(Heifers < 6 weeks)						(2)							
lb milk/cow in herd						18,5							
lb milk/cow in milk						20							
Kgs concentrate/cow in milk						5,85							
g concentrate/kg milk						292							

Individual animal cards

A commercially available card which fits into a standard filing tray, or filing folder, which can be carried conveniently and used in both the office and milking parlour is illustrated in Figures 2 to 5. This card was specifically designed to satisfy the criteria listed on page

1. Side 1 (Figure 2), the calf record card, is used first viz: from birth to calving. The emphasis on this side is on getting the heifer to grow out well. The outlines are for Friesland and Ayrshire breeders to record markings (very useful if ear tags are lost). Heats and inseminations are recorded on side 2 (Figure 3), and the card would normally be turned to this side once the first insemination has been done.

Figure 2. The heifer record card (Side 1)

INOCULATIONS			Calf Record	
Type	Month	Date	STANDARD GROWTH CURVES (HOLSTEIN AND JERSEY)	
1 G.S.	1-3			
2 R.W.	1-3			
3 Anthrax	4-6	APR 81		
4 1st Q.E.	4-6	10-5-80		
5 2nd Q.E.	4-6	1-11-80		
6 C.A.	4-9			
7 L.S.	6-9			
OTHER				
8 Parat	7-14 Days			
9 Stiff Sick	6 Onwards			
10 1st Botul	3-4			
11 2nd Botul	7 Weeks Later			
12 Anthrax	Annual	APR.		
13 Q.E.	Annual			
14 Botulism	Annual			
DOSING PROGRAMME				
Tapeworm			Dates	4-3-80
Round Worm			Dates	6-4-80 10-6-80 10-10-80
Other (Vx, A, Dehorn, Surplus Teats, Scours, etc.)				
Name UNICE Ear Mark No. U11 Birth Date 3-2-80 Dam GARTER Sire EE				

Figure 3. The breeding record card (Side 2)

N.C.D. COW RECORD CARD													
Name		Birth Date		Ear Mark		Reg. No.		A Form No.					
Cow UNICE		3-2-80		U11		App A D40/24							
Dam GARTER				G51		Grade							
Sire EE													
Lact No.	Post Calving Problems	Heats			Inseminations (Date/Sire)					Dates			IGP Days
		1st	2nd	3rd	1st	2nd	3rd	4th	5th	POD	Due	Dry	
H													
1	Breecb	25-10-82	15-11-82		19-9-81 EX					✓	28-6-82		
2		25-9-83	16-10-83		15-11-82 EX					✓	24-9-83	29-6-83	
3	Milk fever	27-9-84			6-11-83 ABC					✓	15-8-84	20-6-84	
4	Prolapse	1-9-85	20-9-85	25-10-85	16-10-84 VHF					✓	25-7-85	30-5-85	
5		30-11-86	20-12-86	16-2-87	10-12-85 RKT	1-1-86 RKT	20-1-86 RKT			✓	29-10-86		
6					6-3-87 SYM	27-3-87 SYM				✓			
7													
8													
Nominated Bulls: EX, ABC, RKT, SYM Catch Bulls: Test													
BIRTH DATE 3-2-80 DAM GARTER SIRE EE													
NAME/NUMBER UNICE A FORM													

The complete fertility history is recorded here, and bull codes for use at first and subsequent inseminations are instantly accessible when needed. Side 2 flaps open to reveal sides 3 and

(Figure 4), and on these two sides the complete production history of the cow can be recorded. Side 3 opens up to reveal sides 5 and 6 (Figure 5). Side 5 is used to record the cow's physical and psychological attributes and is used in conjunction with the bull brochure in selecting suitable mates for the cow. Side 6 is used to record any health problems. Particular emphasis is on mastitis control.

Figure 4a. Production records (Side 3)

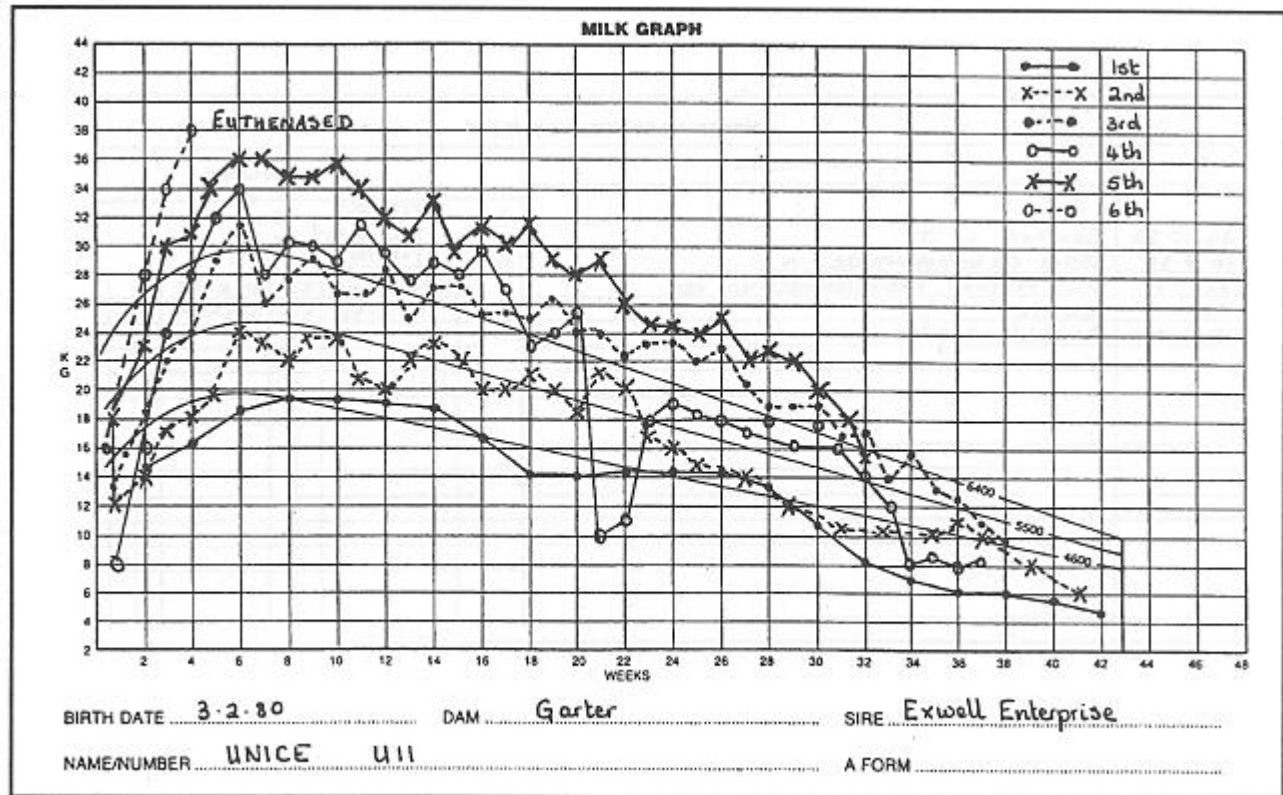
PRODUCTION 300 DAY LACTATION											Calf's Name
Lac No.	Calving Date	Calf		Yield (kg)	BF	Prot	Int. Calf Days	Milk Index	Prot Index	Dams Yield	Remarks
		Sex	No.								
1	23.6.82	♂		4321	3.8		—				Promising.
2	20.8.83	♀	8318	5106	4.2		423				Aunt
3	15.8.84	♀	8424	6215	3.9		361				Buttercup
4	22.7.85	♀	8519	6132	3.9		341				Constance - died
5	26.10.86	♀	8631	6921	4.0		460				Doris
6	3.1.88	♀	8802	1003	Short lactation —		broke back				Ellen
7						heavy cow rode her					
8											
9											

Reason for culling

Died see →

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Figure 4b. Production records (Side 4)



These cards also are filed in alpha-numeric order so that they can be used conveniently. Further, their portability lends the system to field use. Coloured tags are available which can be clipped to the bottom of the card to signify, for example, cows to be pregnancy checked. The file or tray is carried in the shed and notes can be made directly onto the card. Different colours can, if desired, be used to indicate "dry", "pregnant" etc. Lactation totals (up to 300 days and complete lactations) from the cow byre sheets are entered on these cards. If desired, these can be entered lightly in pencil and the "official" records superimposed when these are received. These cards are not designed to be kept in shoe boxes, and proper file drawers or folders are well worth the cost involved.

Figure 5a. Type classification (Side 5)

LINEAR TRAITS				DESCRIPTION										CLASSIFICATION	
1.	Rump Height	—	short 120cm	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	tall 160cm	Udder	
2.	Chest Width	—	narrow	(1)	(2)	(3)	(4)	X	(5)	(6)	(7)	(8)	(9)	wide	O +
3.	Body Depth	—	shallow	(1)	(2)	(3)	(4)	X	(5)	(6)	(7)	(8)	(9)	deep	
4.	Dairyness	—	course	(1)	(2)	(3)	(4)	(5)	(6)	X	(7)	(8)	(9)	angular	Total Points
5.	Rump Angle	—	high pins	(1)	(2)	(3)	(4)	(5)	X	(6)	(7)	(8)	(9)	low pins	
6.	Rump Width	—	narrow	(1)	(2)	(3)	(4)	(5)	X	(6)	(7)	(8)	(9)	wide	
7.	Rear Legs — side	—	straight	(1)	(2)	(3)	(4)	(5)	X	(6)	(7)	(8)	(9)	sickled	
8.	Rear Legs — rear	—	cowhock	(1)	(2)	(3)	(4)	X	(5)	(6)	(7)	(8)	(9)	square	
9.	Heel Depth	—	shallow	(1)	(2)	X	(3)	(4)	(5)	(6)	(7)	(8)	(9)	deep	
10.	Fore Udder Attachment	—	loose	(1)	(2)	(3)	(4)	(5)	(6)	X	(7)	(8)	(9)	firm	Ease of milking
11.	Fore Udder Length	—	short	(1)	(2)	(3)	(4)	X	(5)	(6)	(7)	(8)	(9)	long	Good
12.	Rear Udder Height	—	low	(1)	(2)	(3)	(4)	(5)	(6)	X	(7)	(8)	(9)	high	
13.	Rear Udder Width	—	narrow	(1)	(2)	(3)	(4)	(5)	X	(6)	(7)	(8)	(9)	wide	Temperament
14.	Median Ligament	—	weak	(1)	(2)	(3)	(4)	(5)	(6)	X	(7)	(8)	(9)	strong	
15.	Udder Depth	—	low	(1)	(2)	(3)	(4)	(5)	(6)	X	(7)	(8)	(9)	high	Quiet
16.	Front Teat Placement	—	outside	(1)	(2)	(3)	(4)	(5)	X	(6)	(7)	(8)	(9)	inside	
17.	Rear Teat Placement	—	outside	(1)	(2)	(3)	(4)	(5)	X	(6)	(7)	(8)	(9)	inside	
18.	Teat Spacing—Side	—	close	(1)	(2)	(3)	(4)	X	(5)	(6)	(7)	(8)	(9)	wide	
19.	Teat Length — Fore	—	short	(1)	(2)	(3)	(4)	X	(5)	(6)	(7)	(8)	(9)	long	
20.	Teat Length — Rear	—	short	(1)	(2)	(3)	X	(4)	(5)	(6)	(7)	(8)	(9)	long	

Remarks/Deviations: Poor hind feet

Traits to be improved: Hind legs

Figure 5b. Veterinary records (Side 6)

[illegible]

Ring-binder files and plastic filing sleeves

In almost any herd the farmer collects pieces of paper relating to individual animals. The more common ones are breed society certificates and pedigrees, and Official Milk recording forms such as from LTD 1995 (the record of production and breeding performance received after each completed lactation). These forms, together with any other bits and pieces (photos etc.), are most conveniently kept, again in alpha-numeric order, in transparent plastic filing sleeves in ring-binder files. Under this system the latest performance record (the old one having been discarded), or any other information can be referred to with the minimum of effort. A separate file/s should be used for culled or sold animals as these records are very seldom needed.

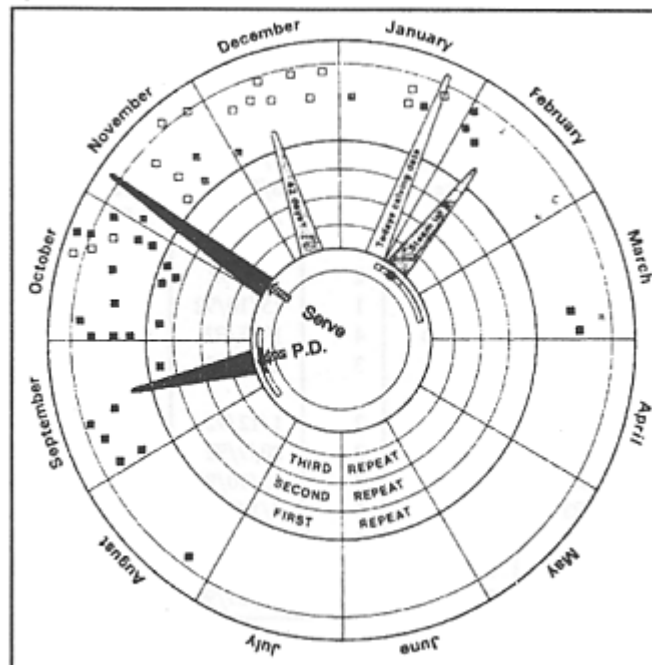
Cow and heifer calendars

Various "whole herd at a glance" methods are available and are essential ancillaries to the records listed above. In other words, these are not substitutes for the individual animal cards, but are supplementary to them, and are used to identify problem breeders, poor producers, cows due to show oestrus, and for other purposes. A commercially available cow calendar is illustrated in Figure 6. Each cow is represented by a two- or six-colour magnet which is placed on the board in a position and of a colour relevant to the latest event in her life. Full instructions on using these calendars are supplied by the manufacturers. The two most useful makes presently available differ slightly, therefore their use will not be described in detail here. But the necessity for the calendar is its usefulness in highlighting actions and for planning decisions. Some examples of these are cows for pregnancy diagnosis (PD) and numbers of cows expected to calve each week for the next 6 months. A heifer-rearing board can be constructed using "peg-board". This is marked similarly to the calf record card for mass-for-age graph (Figure 2), except that the calf outlines are omitted. Each heifer is represented by a wooden golf tee. Each month, when the heifers are weighed, the tees are moved to the correct mass and age position. The background should be painted with green schoolboard paint and dosings and inoculations can be marked on the board at appropriate ages. Coloured washers (castrator rings are good) can be put onto the tees to record inseminations and pregnancy or even important dosings and inoculations, especially if a whole age group is not done simultaneously. There is also a commercially made heifer-rearing calendar using steel magnets. Unfortunately, it does not permit masses to be recorded.

Insemination / PD notebook

Individual cow cards, unfortunately, do not lend themselves to certain important analyses and some duplication is unavoidable as will be clear from the following section on "Analysis of Herd Records". The insemination / PD notebook is simply a listing, in chronological order, of inseminations and their success or failure as determined at the regular veterinary inspection. A suggested layout for an insemination book is given in Figure 7. A pocket-sized notebook which can be used for this purpose is available from an A.I. co-op.

Figure 6. The layout of a commercial cow calendar



The daily diary

A large format "page a day" diary should always be on the office table. This has many uses. In particular, it is used for recording events not recorded elsewhere. For example, Reserve the first few lines for appointments such as "Vet due at 9h00" and the rest for events. "Dosed all calves in small shed with Lintex"; or "Started silage making today. 4 loads"; or "Top 60 cows to camp A1 (30 x 70 metres)" and so on. The diary is particularly important on large farms where more than one person may be involved in the management. The cow byre sheet can serve some of the daily diary functions, but not all. Other records. Files need to be maintained in the farm office for various bits of information which apply to the herd as a whole, such as leucocyte counts, milk recording summaries and T.B. tests. It should be apparent that, if these records are going to be effectively kept and the maximum value extracted from them, a comfortable farm office is absolutely essential.

ANALYSIS OF HERD RECORDS

No record keeping system is complete unless it leads to actions. Therefore the data collected and recorded in the sheets, cards, books and calendars must be processed (converted from data to information) before it is of real value.

Figure 7. An example A.I. / Insemination Book recorded in chronological order to facilitate a Q-sum analysis

Date	Cow ID	LN	DOB/ LCD	A.I./ Heat?	Days	PD'd Y/N	Bull ID	Ins	am/pm	Remarks
1/12/92	Betty	6	15/11/92	1 H	-	-	-		-	Douche
1/12/92	Pmb	1	7/ 9/92	2 AI	24	Y	007	JD	am	
2/12/92	Wolke	1	6/10/92	1 AI	43	Y	123J	Dad	am	Blood
4/12/92	8403	1	2/11/92	1 H	-	-	-	-	-	
5/12/92	8220	3	10/11/92	1 H	-	-	-	-	-	
10/12/92	8340	2	7/ 7/92	2 AI	19	N	090	JD	pm	
20/12/92	8417	1	15/10/92	1 AI	21	Y	007	Dad	am	
20/12/92	Dumisa	4	19/5/92	6 AI	44	Y	Bull	-	-	
25/12/92	Tastic	3	20/9/92	1 AI	67	N	090	JD	am	See 1/12/92
↓										
1/2/93	8310	2	1/12/92	1 AI	-	-	RAY	JD	am	-
5/2/93	Tastic	3	20/9/92	2 AI	42		007	SD	pm	See 25/12/92
9/2/93	8417	2	15/10/92	3 AI	20		007	JD	pm	Vet?
10/2/93	8420	1	2/1/93	1 H	-	-	-	-	-	-
10/2/93	8306	3	4/11/90	1 AI	60		123J	JD	am	-
11/2/93	Sally	5	17/12/91	2 AI	22	-	007	Dad	pm	-
11/2/93	8520	0	30/09/90	1 AI	-	-	SMA	SD	am	-
Notes: Date = Date the heat was observed or AI performed. LN = Lactation number, where 0 = heifer. DOB/LCD = Date of birth (heifers) or last calving date. AI/Heat? = Inseminated or heat observed. Days = Days since last heat or AI was observed/performed. Ins = Inseminators ID / initials. am/pm = Morning or afternoon AI.										

Breeding and selection

The individual cow cards lead directly to identification of poor producers, difficult breeders, mastitis problems etc. If the linear classification is used in conjunction with the A.I. co-op's bull brochure, suitable mates and alternative mates can be chosen as described in KwaZulu-Natal Diary Leaflet 2.2 and recorded on the cow's card. In this way, when a cow is ready for insemination, last minute confusion over which bull to use on her will be avoided, as this will have been decided at leisure, perhaps in conjunction with an A.I. co-op or breed society field officer.

ACTION LISTS

This term refers to lists of names of animals requiring particular attention. The more important lists are discussed below.

Daily action lists

- Cows likely to show heat:

These can be identified directly from the up-to-date cow calendar. Cows within 18 to 24 days of their last heat or insemination should be actively sought out. It is quite likely that a cow in season will be missed when generally looking for heat signs in the herd as a whole. Small signs of heat such as a bull string or a roughened tail head can be picked up by having a good look at each cow on the 18 to 24 day list, especially in the morning, because night-time activity

could be, and usually is missed. Such close examination of every animal in the herd is neither practicable nor necessary.

- Cows due for drying-off:

Too long a dry period is money wasted. Therefore higher producers must not be dried off too soon or too late. Once a cow has been confirmed in calf, her dry-off date can be entered on her card and at the start of each month dry off dates can be marked on the cow byre sheet. The cow calendar is not accurate enough to be used as the primary source of drying off information. Use the calving calendar of Table 1 to work out the drying-off dates, and enter these on the cow byre sheet so that cows are dried off on the correct day.

- Cows and heifers due to calve:

Animals which are expected to calve must be carefully watched and any problems must receive attention. Due dates are easily read from Appendix Table 1 and entered on the individual cow cards and on the cow byre sheet. The cow calendar can also be used to generate this list. One should expect cows to calve up to a week early or late. Therefore, cows should appear on this list from seven days prior to the expected calving date, and remain on it until they calve.

Weekly action lists

Weekly activities will include dosings of younger animals, changes in feeding groups of growing animals and of cows, heifers now ready for insemination etc. Much of this can be read off the cow and heifer calendars. The alternative is regular perusal of the cards and the compiling of lists for the dairy.

Monthly action lists

An essential monthly activity (possibly fortnightly in large herds) is the routine veterinary examination. The following animals must be identified for this monthly visit:-

- **Cows and heifers for pregnancy (PD) testing**, i.e. cows which have gone 42 days from last insemination without recycling (list from the cow calendar). Put heifers onto the calendar when first inseminated. Use, say, the outer section of the circle so that they can be identified easily and not confused with the cows. For large herds of more than 150 cows, buy two calendars and put heifers and first-calvers on one and the rest of the herd on the other.
- **Cows for speculum examination:-** All cows calved or aborted within the last month (list from the cow calendar).
- **Cows for speculum re-examination:-** All cows treated (by uterine installation, i.e. douched) by vet. or farmer within the last month. (List from cow cards flagged at the time of treatment or diary).

- **Cows which have gone 42 days from calving without having been reported on heat** (list from cow calendar). These cows will retain their calving colour on their cow calendar magnets, amongst the rest whose magnets will have been turned to a different colour to reflect that they have shown heat.
- **Cows with open periods exceeding 110 days and still not in calf.** (Open period = period from calving to successful A.I.) (list from the cow calendar). They will stand out because their cow calendar magnets will be a different colour to the other cows whose magnet colour will reflect their status as in-calf. Reserve part of the calendar, say the centre area, for barren cows (cows on the cull list) so that they do not keep appearing in the action lists, or remove them from the active area of the board and put them in the top left hand corner.
- **Cows with irregular cycles** (listed from the cow cards and A.I. book).
- **Cows confirmed in calf and which have cycled again** (listed from the calendar and A.I. book).
- **Any other problems** (listed from the daily diary).

Fertility analysis

The pen and paper system described (or any other pen and paper system) requires a lot of hard work to produce herd summaries. These are critically important, as discussed in KwaZulu-Natal Diary Leaflet 2.3. Therefore, despite the hard work, a certain minimum number of analyses are too important to avoid. This is the one area where computers are of real value. All other aspects which have been discussed so far in this chapter do not require a computer for efficiency. In fact, for most of the information, a computer could be less efficient than pen and paper methods. For example, by the time the computer owner has loaded the right program, found the right cow, and found out which bull to use to inseminate her, the cow card user will be home drinking coffee, having completed his insemination. This example is only slightly exaggerated!

Intercalving period (ICP)

$$\text{Mean ICP} = \frac{\sum_{i=1}^n (\text{In BP}_i + \dots + \text{In BP}_n)}{n} + 280 + \text{VWP}$$

where: BP_n = breeding period = ICP - VWP - 280
n = number of cows
VWP = voluntary waiting period

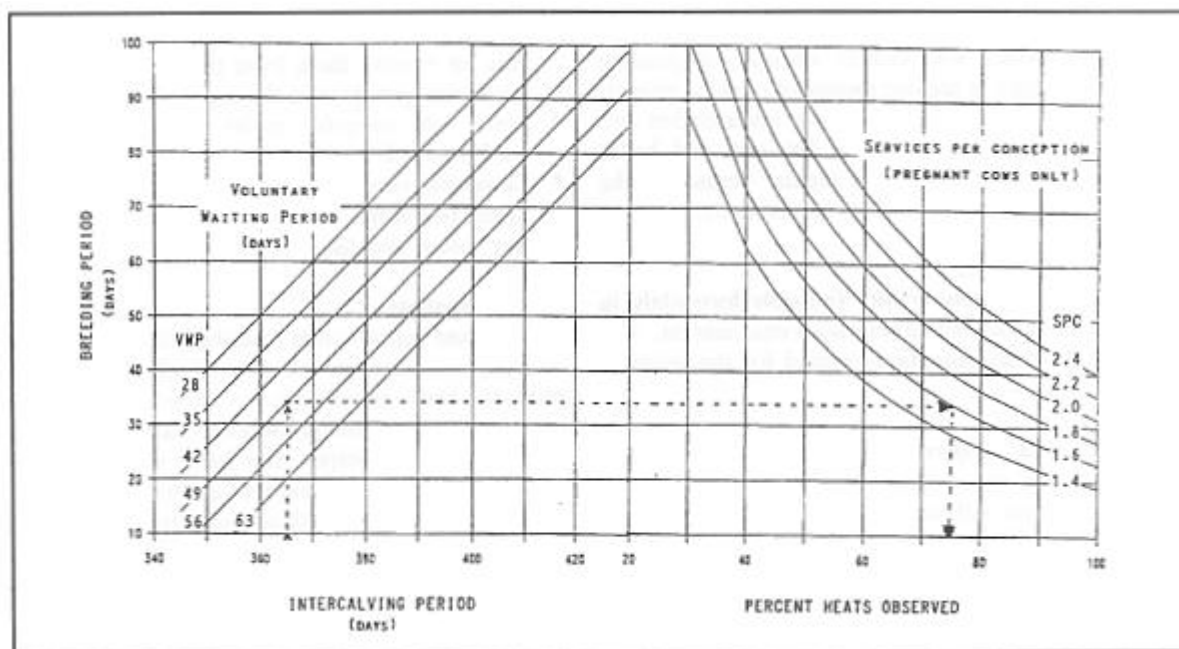
The best way to check the length of the VWP is to use the open period of the cow with the second shortest ICP. In other words, assume that the cow with the shortest ICP was bred too soon by mistake (maybe the neighbour's bull got to her) and use the days open of the next shortest as the indicator of the VWP. If it is shorter than expected then someone has been inseminating too soon after calving. Use Appendix Table 2 to calculate days between dates. An example work sheet is illustrated in Table 1.

Table 1. Some example calculations using the rules for days between dates at the foot of Appendix Table 2

LCD	Julian date	Today's date (TD)	Julian date	Diff < 365 d	Td > LCD	Number of days	
						Formula	Arithmetic
01/01/87	1	1/7/87	182	yes	yes	TD - LCD	182 - 1 = 181
19/3/87	78	10/8/87	222	yes	yes	TD - LCD	222 - 78 = 144
25/12/86	359	12/9/87	255	yes	no	365 + TD-LCD	365 + 255 - 359 = 261
15/5/86	105	1/9/87	244	no	yes	TD - LCD + 365	244 - 105 + 365 = 504
21/11/85	325	1/7/87	182	no	no	730 + TD - LCD	730 + 182 - 325 = 587

Note: LCD = Last calving date but it could be the date of any event
Julian dates are calculated from Appendix Table 2

Figure 9. Deriving percent heats observed from intercalving period, voluntary waiting period and number of services per conception



services (SPC) and Total (TSPC) services per conception

SPC =
$$\frac{\text{No. of inseminations to pregnant cows}}{\text{No. of pregnant cows}}$$

$$\text{TSPC} = \frac{\text{No. of inseminations performed}}{\text{No. of calves born}}$$

TSPC data are not easy to collect. Some computer programs use a mathematical technique to estimate the TSPC. The method is not practicable without a computer. Therefore, the usual figure quoted is services per conception (SPC) based on pregnant cows only, a difference which could be significant. For example, the cows which fall pregnant could do so very easily but this could be only a small percentage of the herd, thus SPC on its own could mask a real problem in the rest of the herd.

Percentage heats spotted

"Unless we see our cows in season the best A.I. technique with the most fertile cows and bulls won't get our cows pregnant".

% Heats spotted = $(\text{SPC} \times 2100) / (\text{ICP-VWP}-270)$
 where: SPC = services per conception (pregnant cows only)
 or read directly from Figure 9

Q-sum analysis

The Q-sum is a simple method of monitoring successes and failures and making comparisons between seasons, inseminators or even different bulls as well as identifying trends. A running Q-sum should be kept on the wall of the farm office and brought up to date at each regular veterinary visit. No other analysis gives an earlier warning of fertility problems.

The method is very simple. Assume that on a particular farm we were able to collect a list of insemination dates; who did the A.I., and the results of subsequent pregnancy diagnosis. An example of such data is set out in Table 2 and more fully in Figure 7.

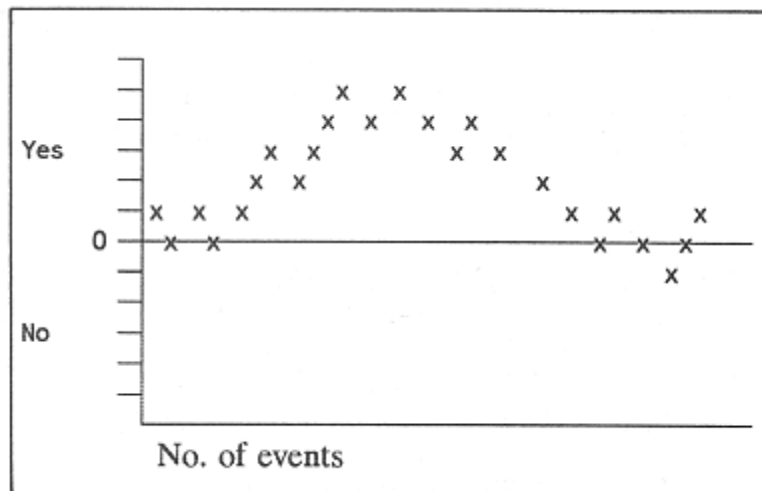
Table 2. Insemination date needed for a Q-sum analysis

Date of A.I.	Result of PD	Inseminator	Bull
1/1	Yes	James	FIN
1/1	No	John	SYM
2/1	Yes	John	XXX
4/1	No	James	FIN
5/1	Yes	John	SYM
9/1	Yes	James	HM
9/1	Yes	James	XXX
etc.	etc.	etc.	etc.

These data could probably be read directly from the farmer's usual records, but they must be in chronological order so that trends can be detected. Hence the A.I. book (Figure 7).

The data are then plotted as set out in Figure 10, i.e. if an event was successful it is plotted above the zero line and vice versa; each successive event is added to, or subtracted from, the one before.

Figure 10. Q-sum (all events plotted)



In Figure 10 the general trend was positive until the 12th even (insemination) and then it began to decline. The trick is to find the reasons for changes in trend, and in the rate of incline or decline, was it a change of season, a new batch of semen etc.? In large herds with several inseminators, keep Q-sums for each inseminator as well as for the herd as a whole.

The big advantage of the Q-sum is that warnings are sounded within about two months of a change occurring. This will be a far better indicator that something is going wrong than with the usual calculations of average intercalving periods, days open, or inseminations per conception. These other parameters should still be calculated because they are important indicators.

If your reaction is: "what more records!"; then stop recording something less important. For example, how much use do you really make of all that pedigree information so patiently recorded back to the great grandsire on every cow's card?

COMPUTERISED DAIRY HERD RECORDS

An Overview

It has become very fashionable to computerise dairy her record keeping. A common result is a mountain of printout which is only looked at when an adviser calls. Many enthusiastic computer users have never tried a good pen and paper system. The writer is an enthusiastic computer user and has one personal computer in his office and another at home. Nevertheless, it is his firm conviction that, for many farmers, the pen and paper system described is the better system and that, unless a good pen and paper system is thoroughly mastered, no farmer or adviser is in a position to evaluate a computerised record keeping system. Too many computer systems can pull out extended pedigrees which could be looked up more quickly in a good filing system, but do not even calculate intercalving periods for the herd or if they do, do it incorrectly.

The only area where a computer system is superior to a well designed pen and paper and cow calendar system is in the production of action lists in (see section "Action lists") and the analyses described in KwaZulu-Natal Dairy leaflet 2.3, the farmer intending to buy a computerised record keeping program must ensure that features such as a mass-for-age analysis in the heifers, predicted future daily milk production and future calvings (very useful for cash flow budgeting) are included on the program. An on-farm computer system should be able :

- link up with a feeding program
- link to out of parlour feeders
- produce expected milk yields for the next milking
- and other practical outputs.

It is a simple truth that computers do not make life easier. In fact, they put more demands on management and, especially, do not take the place of competent advisers. For these reasons, many farmers are better served by not owning their own computers, but by making use of a pen and paper system for everyday management and by subscribing to a bureau service for analyses and feeding recommendations. An example of a herd analysis, part of the CEDARA dairy feeding program, is illustrated in Figure 11.

Figure 11. Part of the herd analysis from the CEDARA program

MEAN INTERCALVING PERIOD (DAYS), TOTAL SERVICES/CONCEPTION (TSPC), ETC.
(Herd% = cows in milk < 301 days as % of cows in herd; Srvd = no. served)

		% Success											

LN	Herd%	ICP/Srvd	TSPC	Mean	1st AI	!	Mass	Kg/day	/300days	BF%	C.S.		
1	31%	365/ 34	2.03	49	64	!	496	15.2	4290	3.6	1.9		
2	18%	362/ 22	2.00	50	68	!	519	19.3	5472	3.6	2.0		
3+	17%	360/ 18	1.77	56	42	!	503	17.3	5071	3.8	1.9		
Ave	66%	363/ 74	1.96	51	61	!	504	16.9	4808	3.7	2 (aim=2.2)		

ALL COWS in herd: Total straws/calf = 1.96, or 3.92 per heifer calf.
PREGNANT COWS only: mean of 1.50 services per conception = 67% success. If this success rate is raised 1%, mean ICP will fall 0.35 days. The non-pregnant cows will take 3.4 services to conceive, on average. The non-pregnant cows therefore need more services than expected. The average healthy cow must be served 5 times before failure to conceive can be blamed on her.

DISTRIBUTION OF INTERCALVING PERIODS IN THE HERD:

		% of herd						
ICP days	0	10	20	30	40	50	Actual	= Target *
281-301	!						0	0
302-322	!						0	0
323-343	!===*	=====					18	4
344-364	!=====					*	36	48
365-385	!=====				*		11	38
386-406	!=====*						7	8
407-427	!*=====						13	2
428-448	!=====						5	0
449-469	!=====						5	0
470-490	!==						2	0
491-511	!						0	0
512-532	!==						2	0
533-553	!						0	0
554-574	!						0	0
575-999	!==						2	0

ICP SPREAD INDEX: target = 100, catastrophe = 0; yours = 60

Summary distribution of ICP: <330 days = 0%; 330-400 = 70% >400 = 30%
Target distribution: 0% > 90% < 10%

Mean breeding period = 53 days, target < 40.

Days to 1st AI: MEAN=83; Vol waiting period = 51.

% heats serviced = 50. If this is raised 1%, Ave ICP will fall 1.1 days;
target > 75% of heats serviced.