

Reproductive Data Management with PCDART

Dan W. Webb

Department of Animal Sciences
University of Florida, Gainesville

PCDART is a software application for dairy cow and herd management that is fully integrated with the Dairy Herd Improvement (DHI) system. PCDART provides full-featured database management for cow and heifer inventory, reproduction, identity, grouping, milk production, health events and treatments, pedigree and various miscellaneous items. A herd's database in PCDART will contain 65 pre-calculated herd parameters and 568 individual data items for each cow. Data for left-herd cows are kept for a minimum of 19 months after exit. Users can view or print lists of animals from existing standard reports or by creating reports to meet their individual specifications. This paper will concentrate on those features related to reproductive management.

While some customization is offered, PCDART is a structured program and data should be entered as suggested for most benefit. Reproductive data are organized by event and date. The most common are listed below:

- Calving date (calf sex, identity, disposal)
- Heat date
- Breeding date (technician, service sire, breeding trigger)
- Embryo transfer
- Estimated bred date (days pregnant, service sire)
- Heat date
- Heifer turned with bull
- PGH (prostaglandin) date
- Repro health events (code, remark and date)
- Vet check (date and code)
 - N – diagnosed open
 - P – diagnosed pregnant
 - C – cull when low (do not breed)*
 - V – verified pregnant
 - R – recheck needed
 - K – o.k. to breed
 - S – estimated breeding
 - E – empty (no preg check data reported this lactation)
 - G – prostaglandin

Assuming data entry for all cows and the events listed above, herd managers can list cows for needed actions, summarize herd reproductive efficiency, project future calvings and evaluate reproductive management strategies.

Reports for cow listings can be set up to meet the herd's management specifications. An example is the following report that lists cows for that meet the specs for: fresh check, preg check, re-check and open:

053 - Cows for Vet Check

HERD NAME										
58740009 Ref:11-01										
Index	Calv Date	No Br	C D E	Bred Heat Date	Days Sinc Br-H	Preg Chk Date	Date Diag N/P	Days Sinc O/P	Reason on Report	
31	11-14-02	4	R	10-26	7	12-10				RECHECK
45	1-03-03	8	R	10-10	23	11-24				RECHECK
48	12-17-01	10	N	12-05	332	1-19	8-22	71		OPEN
75	1-04-03			CR						RECHECK
110	5-16-03	1	R	9-17	46	11-01				PREG CHK
130	7-01-03			R						RECHECK
138	10-26-02	6	NR	9-05	58	10-20	10-21	11		RECHECK
170	1-19-03	6	R	10-20	13	12-04				RECHECK
199	3-14-03	2	NR	7-15	110	8-29	8-26	67		OPEN
319	7-19-03			R						RECHECK
355	12-08-02	6	R	10-15	18	11-29				RECHECK
375	5-06-03	3		9-16	47	10-31				PREG CHK
397	2-19-03	2	R	9-19	44	11-03				PREG CHK
435	7-07-02	8	NR	9-13	50	10-28	10-28	4		RECHECK
512	9-22-02	6	R	9-26	37	11-10				RECHECK
687	10-25-03									FRESH CHK
739	5-10-03	3		9-18	45	11-02				PREG CHK
768	6-13-03			R						RECHECK
783	7-14-03	1		9-19	44	11-03				PREG CHK
855	3-28-03	5	R	10-26	7	12-10				RECHECK
866	7-04-03	2		9-12	51	10-27				PREG CHK
877	10-28-03									FRESH CHK
960	9-20-02	9		9-22	41	11-06				PREG CHK
962	5-15-03	1	NR	9-05	58	10-20	10-21	11		RECHECK
964	12-07-02	4	R	10-02	31	11-16				RECHECK

Another example is this list of cows for pregnancy verification.

054 - Cows for Pregnancy Verification

HERD NAME

58740009 Ref:11-01

	C	Bred	Date	Days	
	No D	Heat	Diag	Sinc	
Index	Br	E	Date	N/P	O/P
168	1	P	8-23	10-07	25
269	4	P	8-22	10-07	25
324	16	P	8-22	10-07	25
1087	4	P	8-21	10-07	25
1665	5	P	8-25	10-07	25
2302	7	P	8-27	10-07	25
2353	5	P	8-24	10-07	25
2374	2	P	8-24	10-07	25
2447	5	P	8-27	10-07	25
2557	2	P	8-21	10-07	25
2588	3	P	8-25	10-07	25
2598	2	P	8-24	10-07	25
2618	3	P	8-27	10-07	25
2734	1	P	8-23	10-07	25
2761	1	P	8-26	10-07	25
2778	1	P	8-24	10-07	25
3123	3	P	8-22	10-07	25
4573	6	P	8-23	10-07	25
4636	9	P	8-21	10-07	25
8029	2	P	8-23	10-07	25
8078	4	P	8-25	10-07	25

Standard reports are available to summarize reproduction. Examples of these appear at the end of this paper:

Conception rate summary for AI technicians (94)

Conception rate summary (106)

Group summary (111)

Pregnancy rate summary (126)

Repro measures for vet practitioner (144)

Herd summary – reproduction (801)

Reproductive performance (852)

Report 852-Reproductive Performance Analysis is a new tool designed to provide a detailed indication of how closely the herd management actions comply with the plan. The components that are measured include: breeding and heat intervals for pregnancy status; how quickly pregnant/open status is recorded; and success for various breeding triggers.

The Breeding and Heat Intervals section provides insight into how many breedings occurred after normal intervals versus abnormal intervals. It indicates the percentage of all breedings that were first breedings and the number of animals that possibly were “double bred” in the same estrous period (interval 1-3 days). This table can also be used as an indicator of missed heats.

The section entitled Days between Breeding and Preg/Open Diagnosis can be used to determine how quickly the repro staff has checked cows for pregnancy. For preg checkers that can determine pregnancy at 40 days, are most of the cows checked that soon? If preg checks are delayed, then open cows may not receive the attention needed to help them become pregnant.

Report 801 – Herd Summary – Reproduction provides a comprehensive breakdown of herd reproductive statistics in the DHIA format. This data resembles closely the information received from the monthly processing of DHIA test day on the Herd Summary 202 form. These data are summarized monthly and are fixed rather than calculated *on the fly* at run time.

Report 126 – Pregnancy Rate provides a tool to calculate percentage of eligible cows that become pregnant within a specific period of time. It measures how well and how quickly the herd management staff is getting cows pregnant. Traditionally, preg rate has been approximated by multiplying the heat detection rate (percent-heats-observed) times the conception rate (percent-breedings-successful) divided by 100. This approach makes clear which management practices are important: i.e. identify cows in heat and then successfully breed them. However, some herd managers do not record all heats and breedings. Maybe they use natural service or just prefer to record the last breeding. With these management styles, the percent-heats-observed will be artificially low and the percent successful breedings will appear high. The equation method of determining pregnancy rate will not work for these situations. PCDART’s method of determining pregnancy rate just depends on accuracy and promptness of recording the fresh date, voluntary waiting period, successful breeding date and pregnancy confirmation.

Timed AI. PCDART has a set of routines for generating the schedules based on whatever protocol the herd manager desires to use. The desired protocol(s) can be set up and named. Each protocol includes timing and number of injections of prostaglandin, GnRH and possibly other hormones and the time for insemination. Once the protocols are decided upon and entered into PCDART, cows can be selected for enrollment based on eligibility standards desired by management. Then the cows qualifying for enrollment can be flagged with the appropriate protocol so that they will appear on the work schedules accordingly. Once the program is begun, PCDART reports can be run to aid in new cow enrollment and in weekly administration of the program.

Report 135 Timed AI – All Dates Format shows a list of all enrolled animals with complete scheduled events and dates from the beginning of the schedule to the end, as shown below. Cows from multiple protocols can be displayed if event similarity conditions are met.

Report 136 Timed AI – Next Week “To Do” displays a 7-day activity schedule. It includes all events, dates and day of the week associated with each cow for that week. Events and cows from multiple protocols can also be displayed if events similarity conditions are met.

Report 137 Timed AI – Today “To Do” shows daily scheduled events from a single or multiple protocols. It lists only events to do on that day. This report may come up empty or without a list of cows. It all depends upon how far apart events are scheduled and reference date report is run.

Some features of PCDART’s Timed AI Program include:

1. Cows will not be considered for Timed AI unless specifically enrolled.
2. Individual cows are removed from the Timed AI Reports after they are bred and remain off until diagnosed open.
3. When breedings are reported in PCDART for enrolled cows, the status of these cows in the program is changed. They will be unenrolled and will not show up on the eligibility list until diagnosed open.
4. When heats are reported for enrolled cows, they will be unenrolled and will show up as eligible for enrollment as new.

Steps for Enrolling Cows in PCDART Timed AI Program

Timed AI is a scheduler of events, requiring a base date to schedule any specified event. The scheduler uses the reference date in PCDART, which is based on computer’s system date. Keeping the system date is important. Follow these steps to enroll cows into the Timed AI program:

1. Access the DRMS Standard Reports and select report #134 Timed AI – Eligible for Enrollment. This report provides a list of cows eligible for enrollment into the TAI program.
2. Select the desired protocol to enroll the cows in.
3. Determine required filters for the report. Note that if a large number of cows are going to be enrolled in a protocol, the cows can be assigned to a Temp Group and enrolled at once instead of one cow at a time.
4. Now go to the PCDART Input Desk and click on the Timed AI button. A window will open with a list of all cows if the box next to ‘Use Animal Pick List’ is checked. Note that automatic enrollment of fresh cows can be set up by chaining P1 and P8. This will allow all fresh cows to be automatically enrolled when calving information is entered into PCDART.

5. Select cows to enroll by clicking on individual index numbers or click on the 'Select by Group or Temp-Group' button if Temp Group option was selected when determining eligible cows (Report #134).
6. Select S to start cows on Timed AI Program. Note that this same menu can be used to Exclude cows from TAI, zero start date, or remove exclusion.
7. Select a protocol from drop down list. Once a protocol is selected, scheduled events, dates and other information for the first cow will be displayed. If the selected protocol has the 14-day interval option, a message will appear in regards to the next scheduled synchronization group. The next event's scheduled date should require the TAI Reference Date to be moved up a week.
8. Click the 'Done' button to enroll all the animals and return to Cow Pick List.
9. Close the Cow Pick List and Input Desk windows to return to DRMS Standard Reports for the next step.
10. Run Report #135 to display all cows and scheduled events under the selected protocol. This information is also available on the cow's individual cowpage. Note that Reports 136 and 137 will display weekly and daily events, respectively.

PCDART provides for tools for recording and retrieving a number of reproductive related health events. Review of them is beyond the scope of this presentation.

In summary, we can say that PCDART provides herd managers the opportunity to record, retrieve and analyze most of the data needed for successful dairy reproduction management. It is designed to provide safety of input with numerous edits that reject illogical information. Every effort has been made to minimize redundant data entry and provide a system that is responsive and comprehensive. Happy breeding!

Appendix:

- 94 – Conception Rate Summary – Tech
- 106 – 6 Month Conception Rate Summary by Service Number
- 111 – Group Summary for Cows
- 126 – 9-Month Pregnancy Rate Summary by Date
- 126 – 9- Month Pregnancy Rate Summary by Lactation
- 801 – Herd Summary – Reproduction
- 852 – Reproductive Performance

094 Conception Rate Summary -Tech Nov, 2003 Cows only All breedings

HERD NAME
58740009 Ref:11-01-03 Sub /D,35/C,C

Technician #			00	01	02	03	04	05	06	07	08	09	Total
Nov	02	(No. breedings	1	107	5	0	1	16	0	301	0	0	470
		(% successful	100	19	20		0	6		17			17
Dec	02	(No. breedings	0	10	0	0	0	5	0	490	0	29	600
		(% successful		20				20		25		24	24
Jan	03	(No. breedings	0	86	2	0	3	1	0	452	0	0	624
		(% successful		34	50		0	100		27			29
Feb	03	(No. breedings	0	9	0	0	0	0	0	385	0	58	509
		(% successful		33						23		24	23
Mar	03	(No. breedings	0	130	2	0	5	1	0	396	0	17	629
		(% successful		22	0		0	0		21		18	21
Apr	03	(No. breedings	0	5	0	0	11	2	0	372	0	152	593
		(% successful		40			9	0		21		25	22
May	03	(No. breedings	2	102	0	0	2	0	0	363	0	23	601
		(% successful	0	24			50			19		17	20
Jun	03	(No. breedings	0	0	0	0	0	1	0	362	0	119	528
		(% successful						0		14		13	13
Jul	03	(No. breedings	0	55	0	0	0	0	0	437	0	0	556
		(% successful		18						16			16
Aug	03	(No. breedings	0	2	0	0	0	0	0	425	0	136	591
		(% successful		0						19		19	19
Sep	03	(No. breedings	0	89	0	0	0	0	0	410	0	0	535
		(% successful		15						11			12
Oct	03	(No. breedings	0	42	0	0	0	0	0	350	0	15	437
		(% successful											
12 Month Summary													
		(No. breedings	3	637	9	0	22	26	0	4743	0	549	6673
		(% successful	33	22	22		9	12		20		20	20
Nov	03	(No. breedings	0	0	0	0	0	0	0	0	0	0	0

106 12-Month Conception Rate Summary by Service Number

HERD NAME

58740009 Ref:11-01-03

(Curr lacts only)

Service #	****Total****		09-02*10-02		11-02*12-02		01-03*02-03		03-03*04-03		05-03*06-03		07-03*08-03		
	#Serv	#Suc	#Serv	#Suc	#Serv	#Suc	#Serv	#Suc	#Serv	#Suc	#Serv	#Suc	#Serv	#Suc	
1	1520	283	19	135	2	178	5	361	99	357	88	226	40	263	49
2	1097	206	19	101	3	101	7	211	48	274	65	224	36	186	47
3	804	150	19	67	2	87	4	114	25	192	52	198	43	146	24
4	603	96	16	63	2	67	2	87	22	110	15	139	28	137	27
5+	2010	235	12	292	5	331	9	337	81	290	42	345	45	415	53
total	6034	970	16	658	14	764	27	1110	275	1223	262	1132	192	1147	200

111 Group Summary for Cows

HERD NAME

58740009 Ref:11-01-03

as of last testday

Grp #	# Cows	---Dry---		-----In Milk-----				-----Bred-----			--Preg--		----Daily Cow \$-----		
		#	Pct	#	Pct	Wt	DIM	#	Pct	#Br	#	Pct	Income	IOvFC	IOvTC
1	100	0	0	100	100	67	30	6	6	2.0	0	0	11.38		
2	91	0	0	91	100	52	32	4	4	1.3	0	0	8.74		
3	140	0	0	140	100	66	57	24	17	1.8	2	1	11.11		
4	156	0	0	156	100	45	343	135	87	4.5	103	66	7.63		
5	157	0	0	157	100	77	118	94	60	2.4	14	9	12.98		
6	150	0	0	150	100	48	320	136	91	4.8	94	63	8.03		
7	144	0	0	144	100	57	100	80	56	1.6	17	12	9.66		
8	178	1	1	177	99	46	299	164	92	3.8	119	67	7.69		
9	144	0	0	144	100	57	167	124	86	2.3	60	42	9.68		
10	139	0	0	139	100	48	301	117	84	4.9	70	50	8.11		
12	203	0	0	203	100	52	245	168	83	4.1	80	39	8.82		
21	79	79	100	0	0	0	0	77	97	3.8	76	96	.00		
23	107	107	100	0	0	0	0	105	98	5.0	105	98	.00		
27	68	68	100	0	0	0	0	68	100	3.6	68	100	.00		
35	105	1	1	104	99	56	121	40	38	3.5	15	14	9.17		
99	1	1	100	0	0	0	0	1	100	13.0	0	0	.00		
Avg	123		13		87	55	193		68	3.8		42	7.85		
Tot	1962	257		1705				1343			823		13577		

126 9-Month Pregnancy Rate Summary by Date

(No Exclusions)

HERD NAME

58740009 Ref:11-01-03

VWP:60 PgCk:45

Last Date of 21 days	----- Heats -----			----- Pregnancies -----		
	#Eligible	#Observed	%Obs	#Eligible	#Reported	Rate
02-22-2003	766	422	55	697	84	12
03-15-2003	804	398	50	731	76	10
04-05-2003	834	453	54	763	97	13
04-26-2003	832	425	51	759	88	12
05-17-2003	821	408	50	718	85	12
06-07-2003	777	416	54	659	71	11
06-28-2003	757	404	53	650	51	8
07-19-2003	741	390	53	611	45	7
08-09-2003	803	455	57	662	82	12
08-30-2003	745	412	55	617	70	11
09-20-2003	750	422	56	0	0	
10-11-2003	785	436	56	0	0	
11-01-2003	804	301	37	0	0	
total	10219	5342	52	6867	749	11

126 9-Month Pregnancy Rate Summary by Lactation

(No Exclusions)

58740009 Ref:11-01-03 HERD NAME VWP:60 PgCk:45

Lactation #	----- Heats -----			----- Pregnancies -----		
	#Eligible	#Observed	%Obs	#Eligible	#Reported	Rate
1	4288	2279	53	3140	411	13
2	3273	1703	52	2323	212	9
3+	2210	1178	53	1486	123	8
total	9771	5160	53	6949	746	11

801 Herd Summary - Reproduction

58740009 HERD NAME

Overall Herd

Date of Test 10/7/2003

REPRODUCTIVE SUMMARY OF CURRENT BREEDING HERD

WVP	60	Not Bred or Diag. Open			Bred But Not Diag. Preg.				
		Number	Number	Number	Number	Number	Number	Number	Days
		from VWP to 100 days	over 100 days	Diag. Open	Open fewer than VWP	Open VWP to 100 days	Open 101 to 130 days	Open more than 130 days	to first service
1st Lact	326	29	33	25	26	67	33	138	75
2nd Lact	251	25	35	29	8	53	28	102	77
3rd+ Lact	163	19	15	11	6	33	11	79	75
All Lacts	740	73	83	65	40	153	72	319	76

REPRODUCTIVE SUMMARY OF TOTAL HERD

	Days Open at 1st Service				Services per Pregnancy		Projected Minimum		Service or Heat Interval			
	Number Fewer than VWP	Number from VWP to 100 days	Number over 100 days	Avg. Days to 1st service	Preg. Cows	All Cows	Calving Interval	Days Open	Less than 18 Days	18 - 24 Days	36 - 48 Days	Other
1st Lact	184	486	84	77	3.4	5.9	14.6	164	152	876	291	682
2nd Lact	108	310	62	76	3.6	7.4	15.0	176	89	600	222	552
3rd+ Lact	63	184	31	74	4.0	9.2	15.3	184	58	349	158	341
All Lacts	355	980	177	76	3.6	7.0	14.9	172	299	1825	671	1575
% of all 1st srvs	23	65	12									

ABORTIONS

	This Month	Past Year
Actual	8	59
Apparent	0	0

SUMMARY BY SERVICE SIRE

Services for Past 12 Months

Service Number	Number Services	% Successful	Service Sire
1st srv	1835	33	+155
2nd srv	1296	29	+155
3rd+ srv	3861	27	+155
All srv	6992	29	+155

YEARLY REPRODUCTIVE SUMMARY

Service Number	Number Services	% Successful	Service Sire	Date of Test	% Heats	Number Services	% Successful	Number Confirm Preg.	Number Calving	Total Pregnant		
1st srv	1835	33	+155	Month Dropped	80	578	26	72	142	819		
2nd srv	1296	29	+155	11/5/2002	76	578	28	90	229	749		
3rd+ srv	3861	27	+155	12/3/2002	65	521	31	110	186	722		
All srv	6992	29	+155	1/6/2003	72	725	33	91	263	653		
				2/4/2003	70	547	33	127	203	658		
				3/3/2003	72	512	27	207	138	795		
				4/7/2003	74	729	27	197	122	847		
				5/6/2003	74	557	28	179	106	939		
				6/3/2003	79	546	26	152	135	991		
				7/2/2003	79	508	23	135	159	986		
				8/13/2003	76	785		142	213	954		
2nd Lact	619	76	11	430	178	9/10/2003	79	488	90	140	920	
3rd+ Lact	396	77	13	238	145	10/7/2003	88	496	97	168	871	
All Lacts	1017	76	26	668	323	Averages	75	583	29	135	172	840
						Totals		6992		1617	2062	10085

DRY COW PROFILE

	Number Dry Periods	Dry Days	Number Dry Fewer Than 40 Days	Number Dry 40 - 70 Days	Number Dry More Than 70 Days
2nd Lact	619	76	11	430	178
3rd+ Lact	396	77	13	238	145
All Lacts	1017	76	26	668	323

Printed 2/20/2004

DRMS PCDART

Ames, Raleigh

852 Reproductive Performance

Ref: 11/01/2003

58740009 HERD NAME

Cows; Cur lact events;End 2/20/2004

Animals: 1962 cows passed controls; 1434 cows with breedings; 582 cows with Heats;

Breeding and Heat Intervals

	First Br/Ht	1 - 3 days	4 - 17 days	18 - 24 days	25 - 35 days	36 - 48 days	> 48 days	Total #
# Heats	580	0	63	27	11	2	0	683
# Preg (Diag)	160	0	26	326	109	107	109	837
# Open (Diag)	235	2	44	250	160	127	130	948
# Open (Not Diag)	532	3	168	1120	487	375	426	3111
# Not Diag	57	0	27	210	78	71	87	530
Total	1564	5	328	1933	845	682	752	6109
% of Sum	26	0	5	32	14	11	12	100
% Preg	17	0	11	19	14	18	16	17
Avg # Breedings	1.0	3.6	4.6	4.3	4.8	4.2	4.0	3.8

Days Between Breeding and Preg/Open Diagnosis for On-Farm PCDARTs

Interval	None	<20	20-29	30-39	40-49	50-59	60-69	70-79	80-89	>89	Total
Number	3641	1	18	220	1182	138	41	22	27	136	5426
Percent	67	0	0	4	22	3	1	0	0	3	100

Breeding and Heat Intervals By Breeding Triggers for On-Farm PCDARTs

Triggers	First Br/Ht	Percent Within Each Trigger						Total #	% Preg
		1 - 3 days	4 - 17 days	18 - 24 days	25 - 35 days	36 - 48 days	> 48 days		
Standing								0	
Mounting								0	
Mucus								0	
Full Kmar								0	
Part Kmar								0	
Ovarian Palp								0	
Chalk/Paint								0	
Pedometer								0	
Timed AI								0	
Nervousness								0	
Edema								0	
Ultrasound								0	
User Def 1								0	
User Def 2								0	
								0	
Times	First Br/Ht	Percent Within Each Time Since Trigger						Total #	% Preg
		1 - 3 days	4 - 17 days	18 - 24 days	25 - 35 days	36 - 48 days	> 48 days		
< 2 hours								0	
2 - 12 hours	100	0	0	0	0	0	0	1	100
> 12 hours								0	
								1	