An assessment of the seasonal variability in Forage and milk quality parameters on Dairy farms in a medium to low rainfall area

Francis P. A, CARDI

Velloza, T. M, University of Guyana

Introduction

- Forages - major economic source of nutrients in ruminant rations
  (Hosein, 1994, Fike et. al., 2003)

- Forage fibre quality - important to milk production (Mc Donald et. al., 2007, Wade and Minton, 2008)

- Nutritive value of tropical improved pastures potentially good
  (Rodrigues and Rivero, 1984, French, 1988, Jennings et. al., 2001, Fike et al., 2003, Miller et al., 2005)

Introduction

- Rainfed improved and unimproved pastures
- Apparent milk quality variability
- Concentrate feeding
- Cost of production

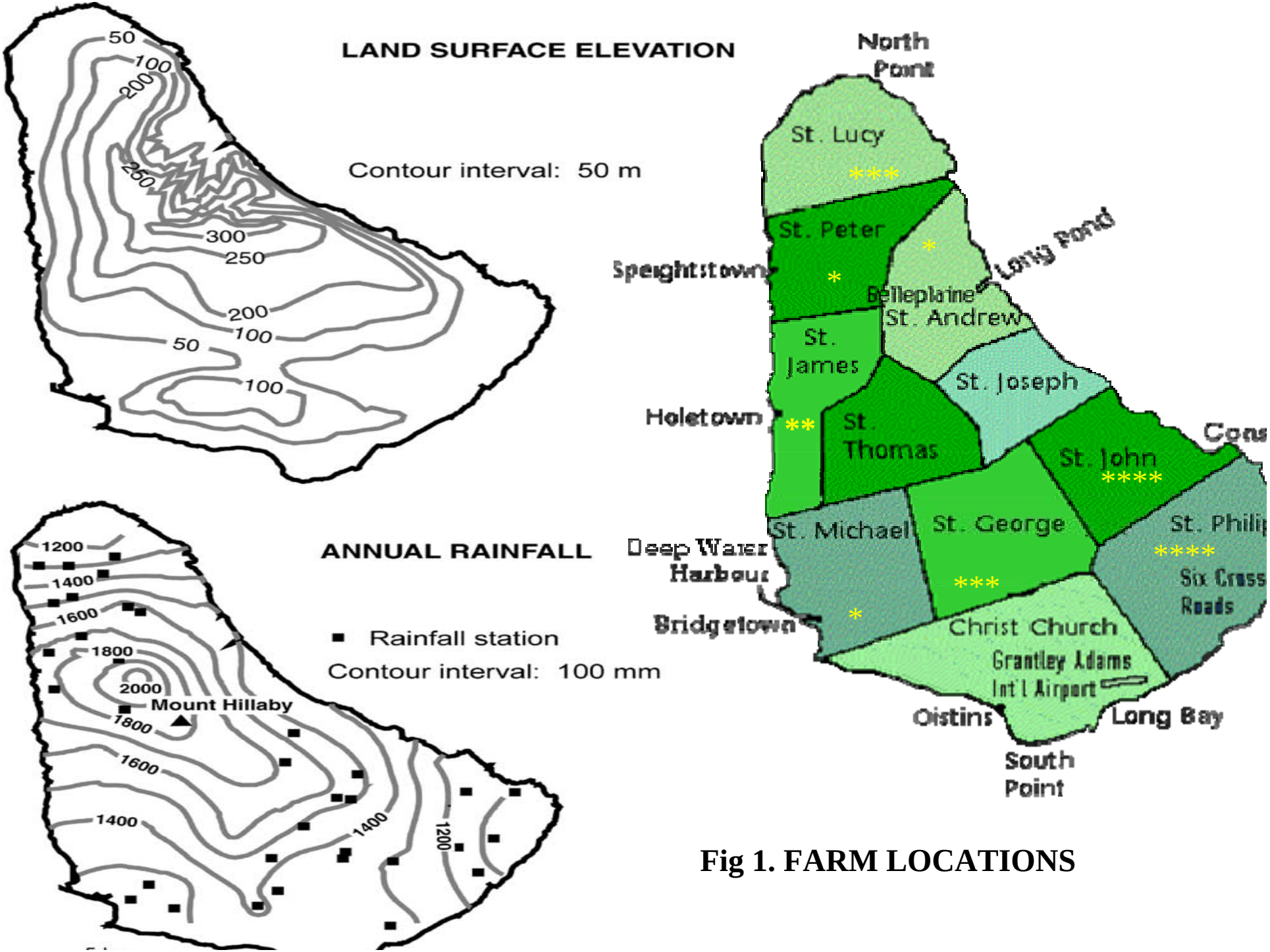
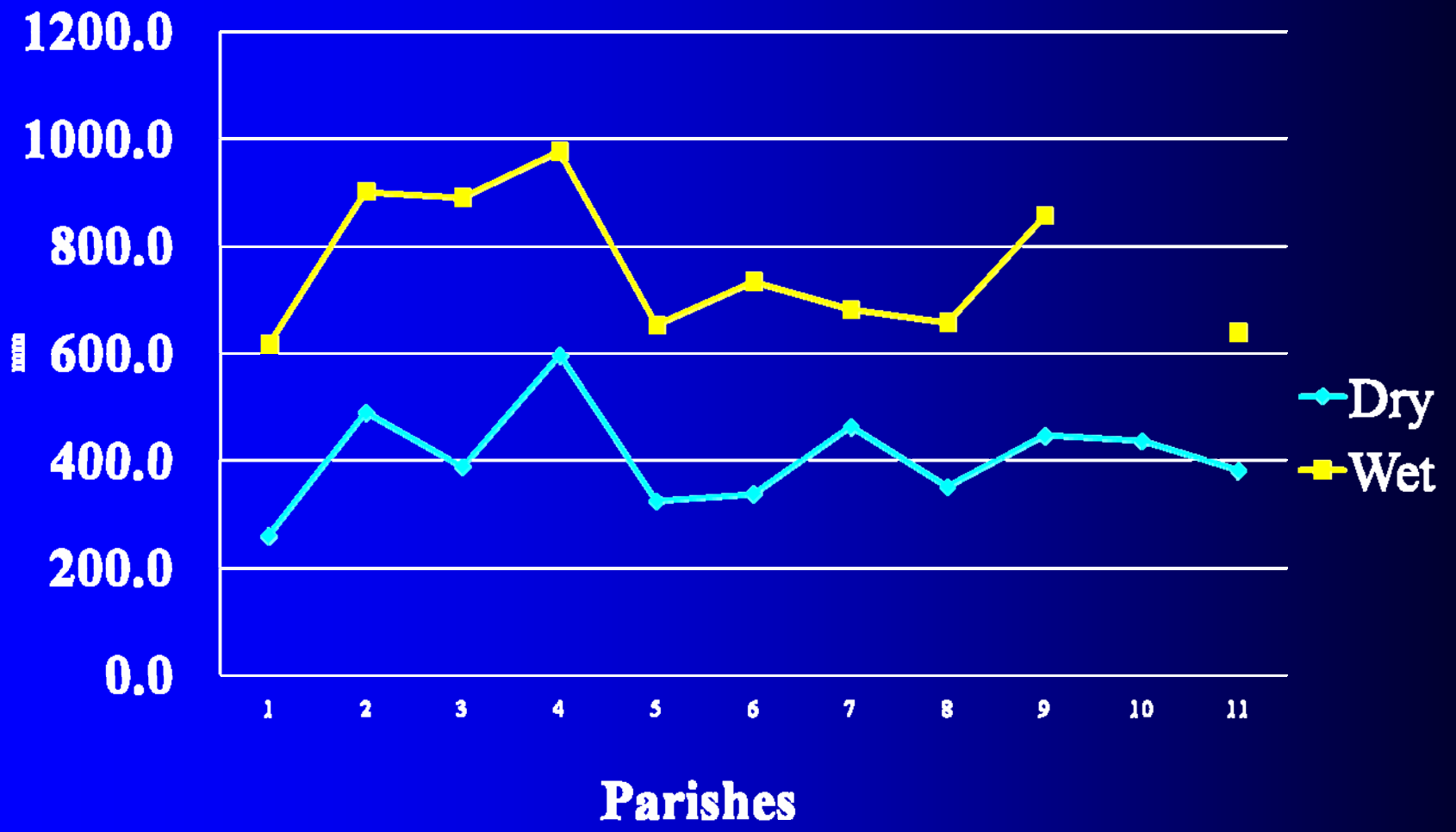


Fig 1. FARM LOCATIONS

Fig 2. Seasonal rainfall in Barbados 2009



Objectives

- Is there a difference in milk quality among farms in Barbados?
- Is milk quality affected by farm location?
- What factors affect forage quality on farm locations?

Experimental design

- **Eighteen or more dairy farms (whole population) monitored in 7 milking locations**

- **Milk quality % Fat and SNF determined daily and summarized weekly**

Experimental design

- Milk volume data recorded daily
- Feedstuffs and TMR nutritive values determined during wet and dry seasons
- Proximate analysis, ADF, NDF
- Questionnaire

Statistical Analyses

- Statistix 8 and SAS were used to evaluate data collected.
- Treatments means considered statistically different at P levels < 0.05

Results

Fig 3. Annual Milk production on Farms

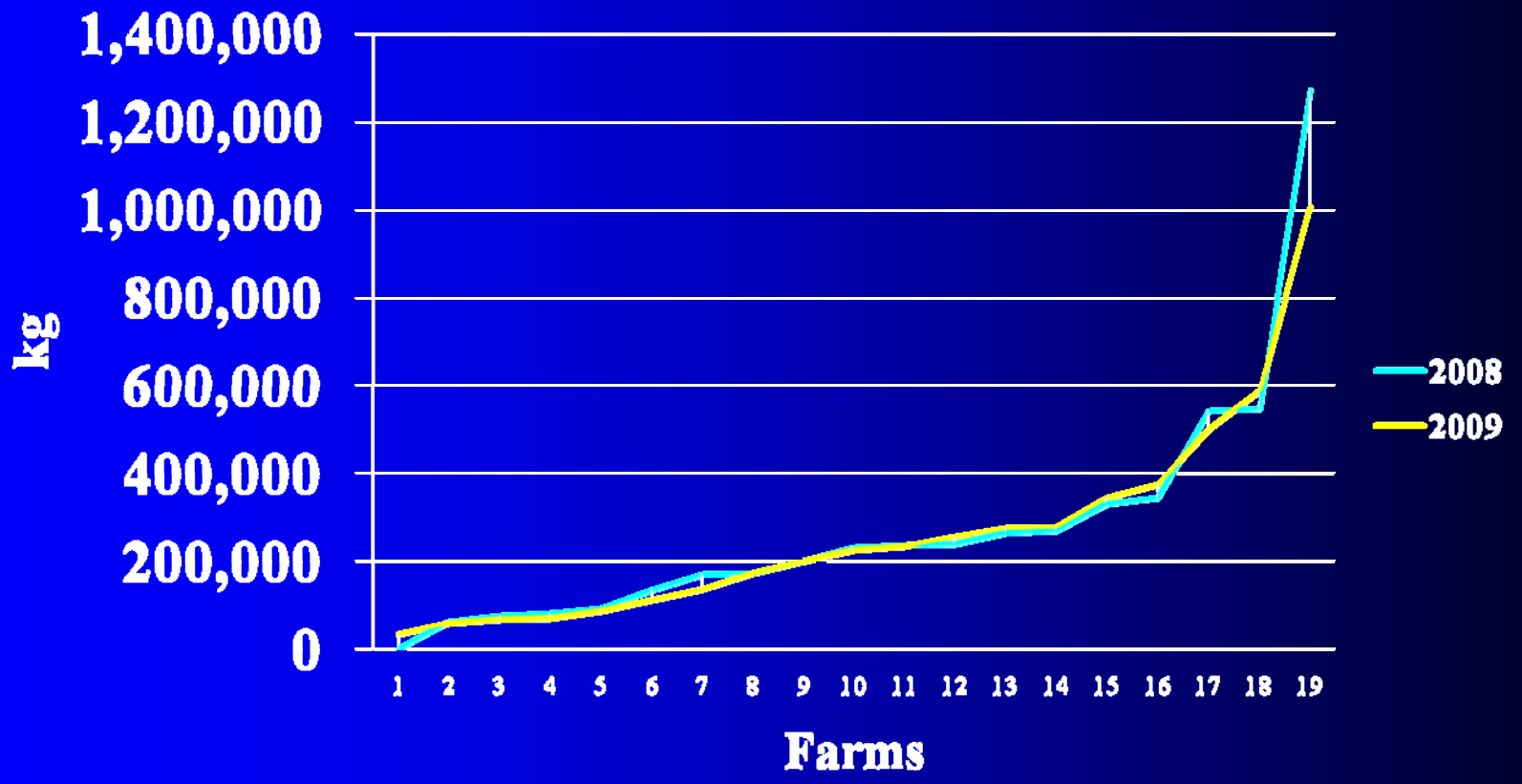
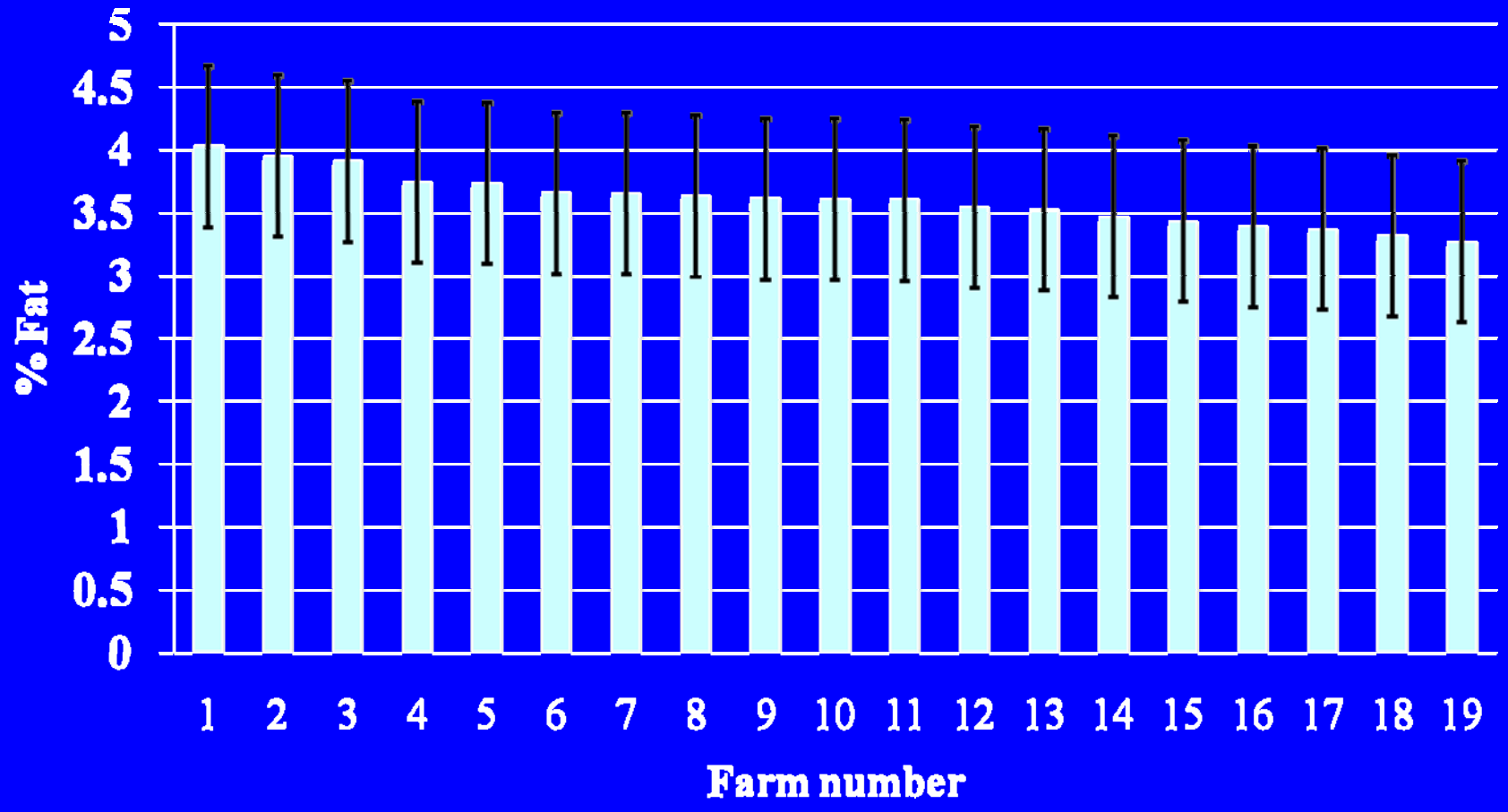


Fig 4. Mean milk fat on farms 2008



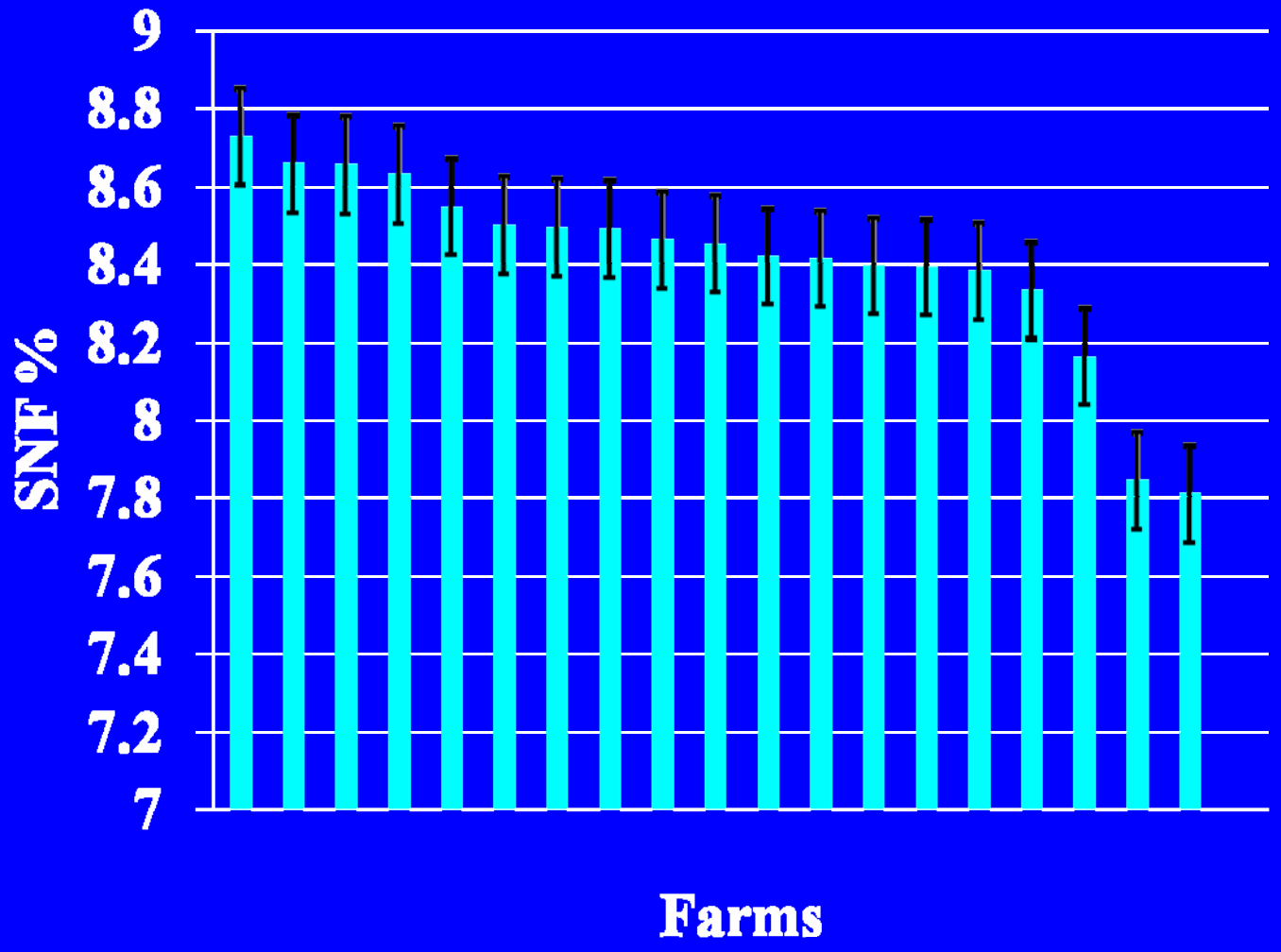
Farm	Min.	max.	median	location
41	2.7	4.1	3.2	James
28	2.8	4.1	3.7	John
37	2.9	3.9	3.4	Phillip
17	2.9	4.1	3.3	Andrew
12	3.0	4.4	3.4	Phillip
30	3.0	4.4	3.5	Peter
25	3.0	4.4	3.7	James
33	3.0	4.1	3.3	Lucy
32	3.2	4.0	3.6	John
22	3.2	4.3	3.7	George
48	3.2	4.6	3.9	Phillip
57	3.2	4.0	3.6	Lucy
59	3.2	4.2	3.6	Phillip
44	3.2	4.2	3.6	Lucy
19	3.3	4.2	3.7	John
15	3.3	4.4	3.9	Michael
45	3.3	4.2	3.7	John
29	3.5	4.6	4.0	George

Table 1. Milk Fat % on farms 2008

Table 2. Milk fat reduction and standard violation on farms 2008

Farm	QI 2008	Q2 2008	Q3 2008	Q42008
12	3.4891	3.3154	3.5638	3.4846
17	3.2237	3.2308	3.2715	3.5154
28	3.5545	3.3615	3.7177	3.7872
33	3.4545	3.2923	3.2385	3.4462
37	3.5083	3.2	3.3654	3.4615
41	3.4314	3.2769	3.1431	3.1846

Fig 5: Mean milk SNF % on Farms 2008



Farm	Min.	Max.	median	location
12	7.4	8.8	8.1	Phillip
28	7.5	8.9	8.5	John
48	7.5	9.0	8.4	Phillip
41	7.7	9.3	8.5	James
37	7.7	8.7	8.4	Phillip
44	7.7	8.7	8.4	Lucy
15	7.8	9.3	8.6	Michael
30	7.9	9.0	8.4	Peter
33	7.9	9.0	8.5	Lucy
57	7.9	9.2	8.3	Lucy
25	8.0	9.3	8.3	James
32	8.0	9.3	8.4	John
45	8.0	9.0	8.7	John
38	8.0	8.5	8.6	George
59	8.1	8.8	8.4	Phillip
19	8.1	9.1	8.5	John
22	8.2	9.1	8.6	George
17	8.2	9.0	8.4	Andrew
29	8.3	9.2	8.7	George

Table 3 : Milk SNF% on Farms 2008

Table 4: Milk SNF % reduction and standard violation on farms 2008

Farm	Q12008	Q22008	Q32008	Q42008
12	8.1701	8.2492	8.09	8.1238
25	8.5877	7.9854	8.4953	8.2562
37	8.2301	8.3508	8.4569	8.5292
44	8.3324	8.2069	8.3308	8.4454
48	8.2209	8.3677	8.4769	8.5762

Fig 6. Mean SNF % on Farms 2009

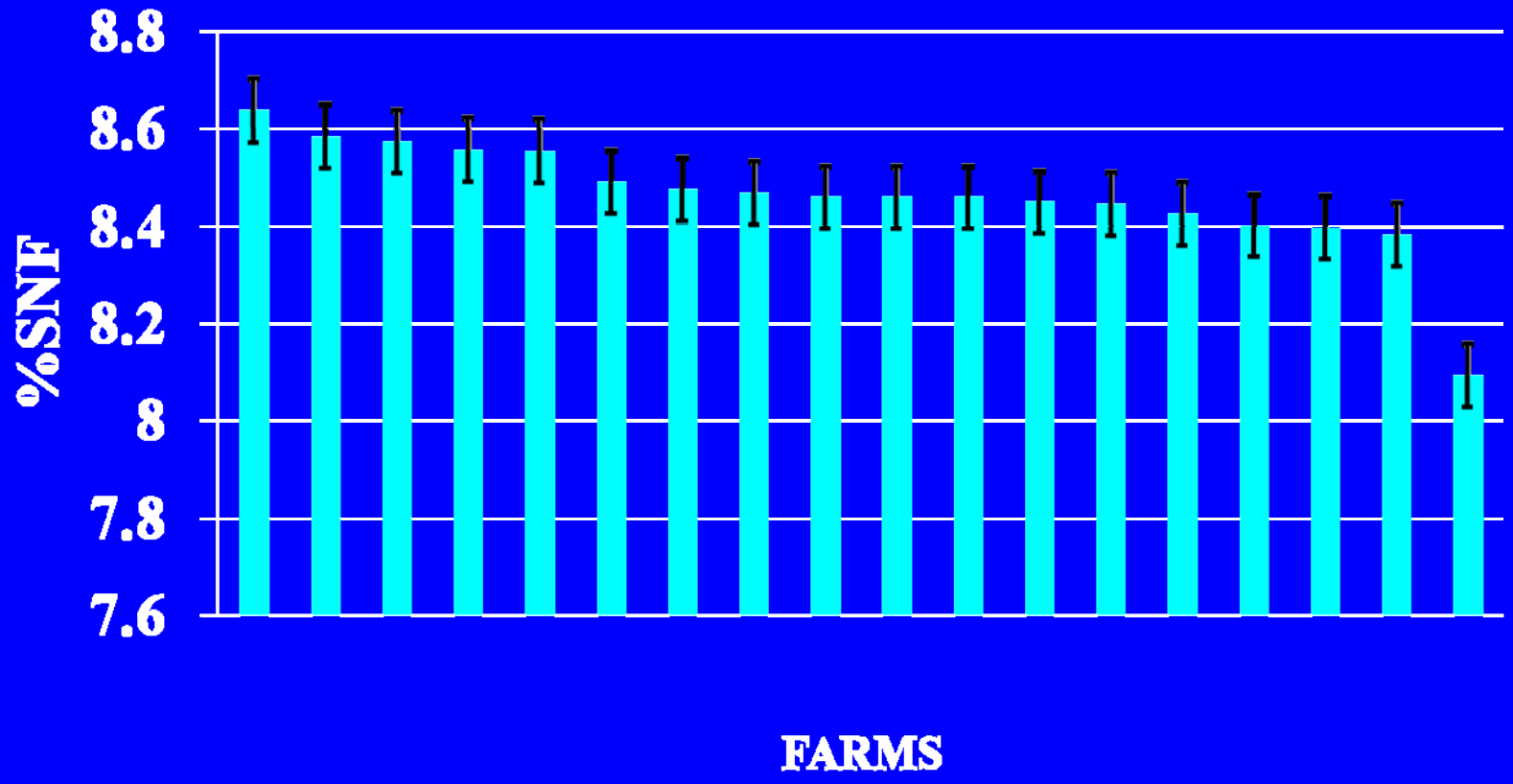


Table 5: Milk SNF% reduction and standard violation on farms 2009

Farm	Q12009	Q22009	Q32009	Q42009
12	8.1334	7.9918	8.1485	8.09
15	8.5946	8.4607	8.74	8.5354
17	8.3685	8.4931	8.6323	8.3677
19	8.5231	8.4531	8.5646	8.6715
22	8.6592	8.5415	8.6454	8.6908
25	8.2894	8.3769	8.5129	7.7958
28	8.6408	8.2231	8.4745	8.4862

Farm	Minimum	Median	Maximum
15	7.35	8.61	8.91
48	7.52	8.49	8.85
12	7.68	8.11	8.46
28	7.77	8.5	8.87
33	7.91	8.45	9.47
59	7.99	8.46	8.78
41	8.02	8.42	9.37
44	8.08	8.5	9.2
19	8.09	8.58	9.08
32	8.09	8.38	8.71
25	8.1	8.415	8.65
17	8.11	8.455	8.89
37	8.12	8.445	8.71
29	8.13	8.56	8.94
57	8.15	8.345	8.9
30	8.2	8.43	8.78
22	8.29	8.655	8.9
45	8.33	8.57	8.87

Table 6 : Milk SNF% 2009

Fig 7. Mean milk SNF% 2009

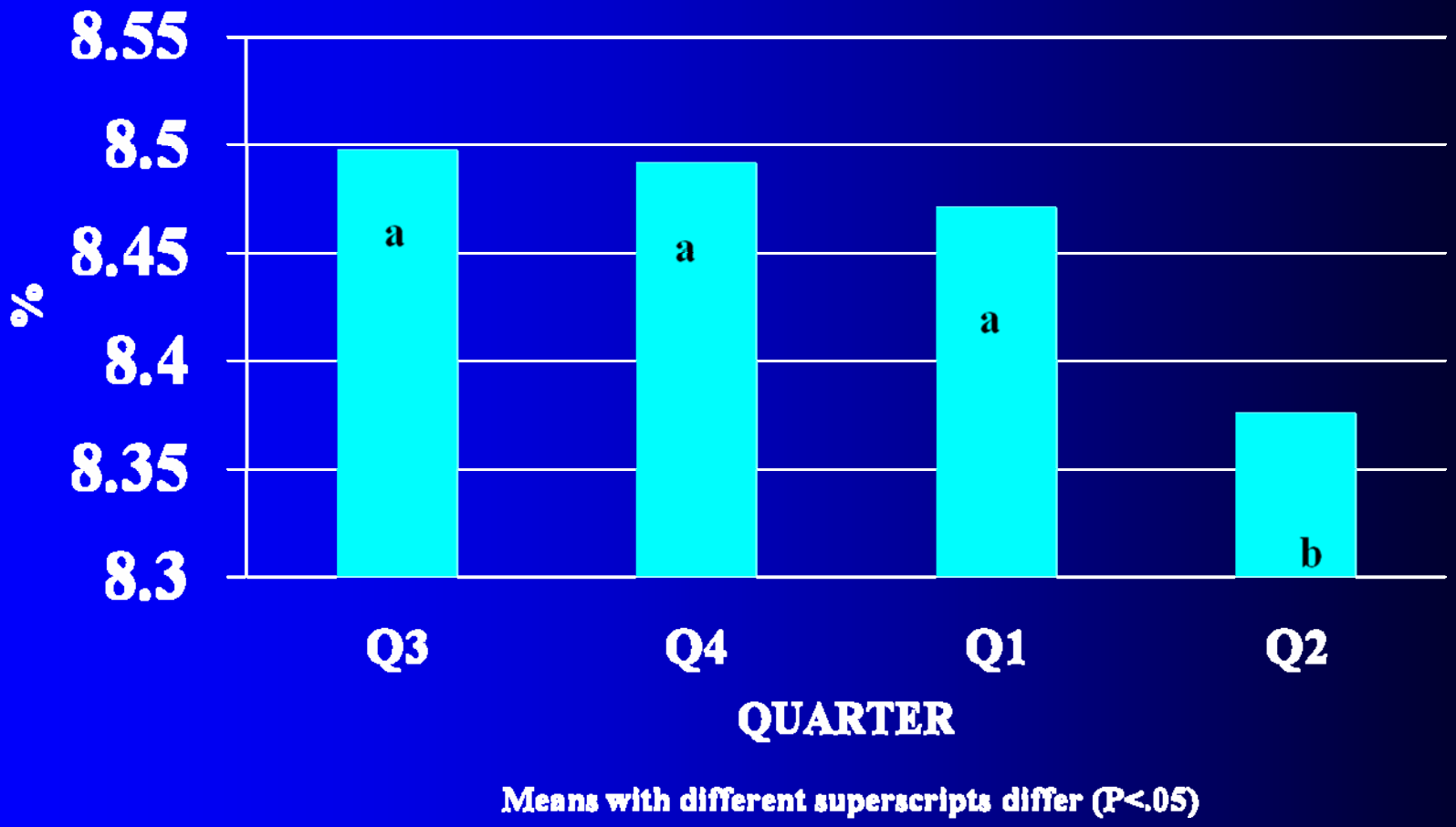
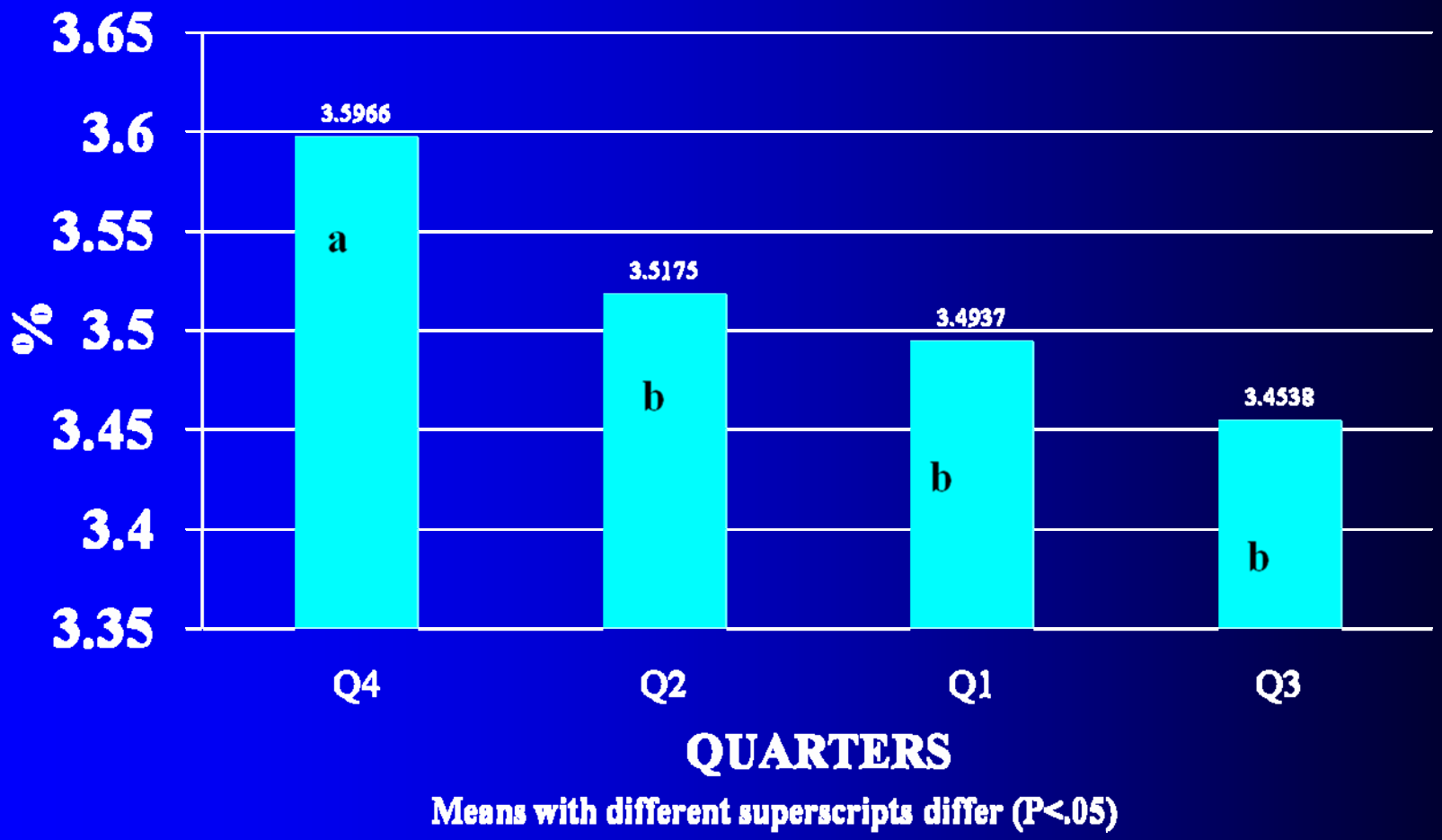


Fig 8. Mean Milk Fat% 2009



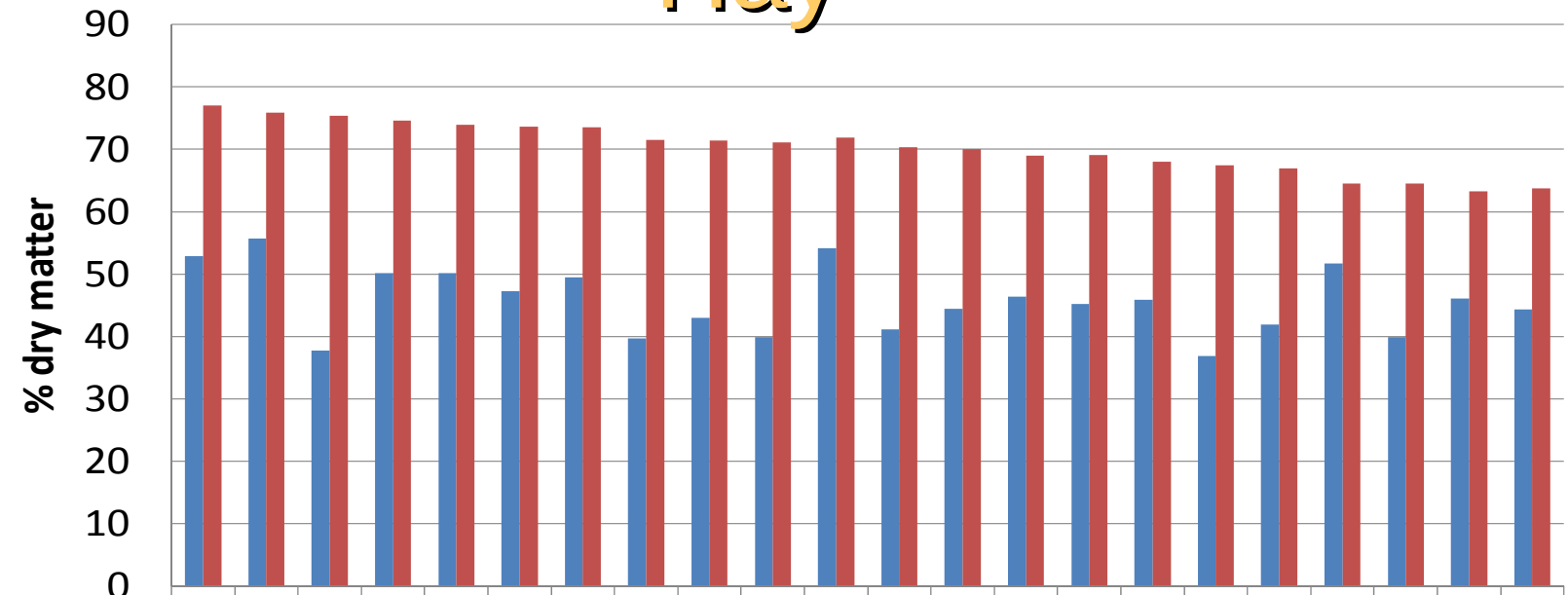
Farm	Minimum	Median	Maximum
33	2.4	3.1	3.7
22	2.7	3.2	4.3
41	2.7	3.3	3.9
17	2.8	3.3	4
28	2.8	3.6	4.2
12	3	3.4	4.1
15	3	3.9	4.4
37	3	3.4	3.9
44	3.1	3.9	4.3
57	3.1	3.7	4.4
59	3.2	3.6	4.9
25	3.2	3.7	4.2
30	3.2	3.5	4.3
32	3.2	3.5	3.9
19	3.3	3.6	4
45	3.3	3.6	4.2
48	3.3	3.9	5
29	3.5	4	4.6

Table 7. Milk Fat % in 2009

Table 8: Milk fat reduction and standard violation on farms 2009

	Q12009	Q22009	Q32009	Q42009
12	3.6218	3.4615	3.3615	3.2923
17	3.1462	3.3769	3.4	3.2923
19	3.6231	3.5538	3.6	3.7923
22	3.2923	3.3	2.9231	3.2385
30	3.5562	3.4385	3.3462	3.6308
33	3.1923	3.2462	3.1154	2.5846
37	3.2	3.3692	3.5154	3.4385
41	3.1692	3.4385	3.2923	3.4433

Fig 9. Fiber quality of Hay



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
%ADF	53	56	38	50	50	47	49	40	43	40	54	41	44	46	45	46	37	42	52	40	46	44
%NDF	77	76	75	75	74	74	74	71	71	71	72	70	70	69	69	68	67	67	65	65	63	64

Fig 10. Crude protein levels in Hay samples 2009

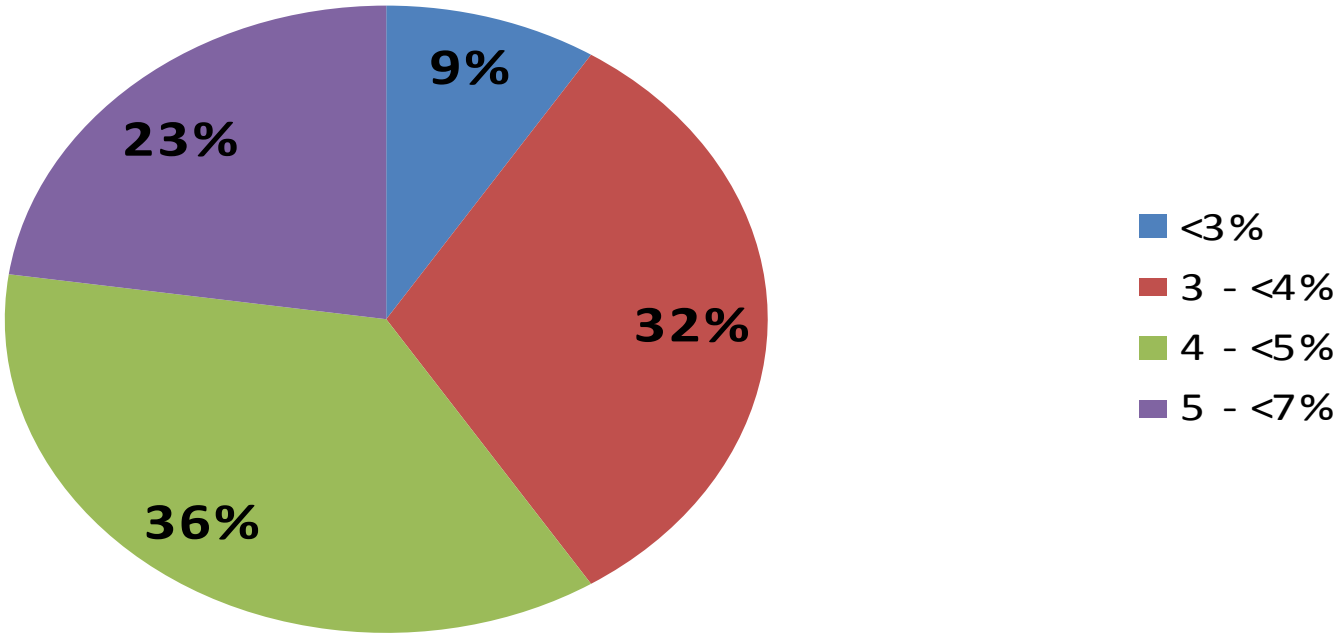


Fig 11. Silage Nutrient composition 2009

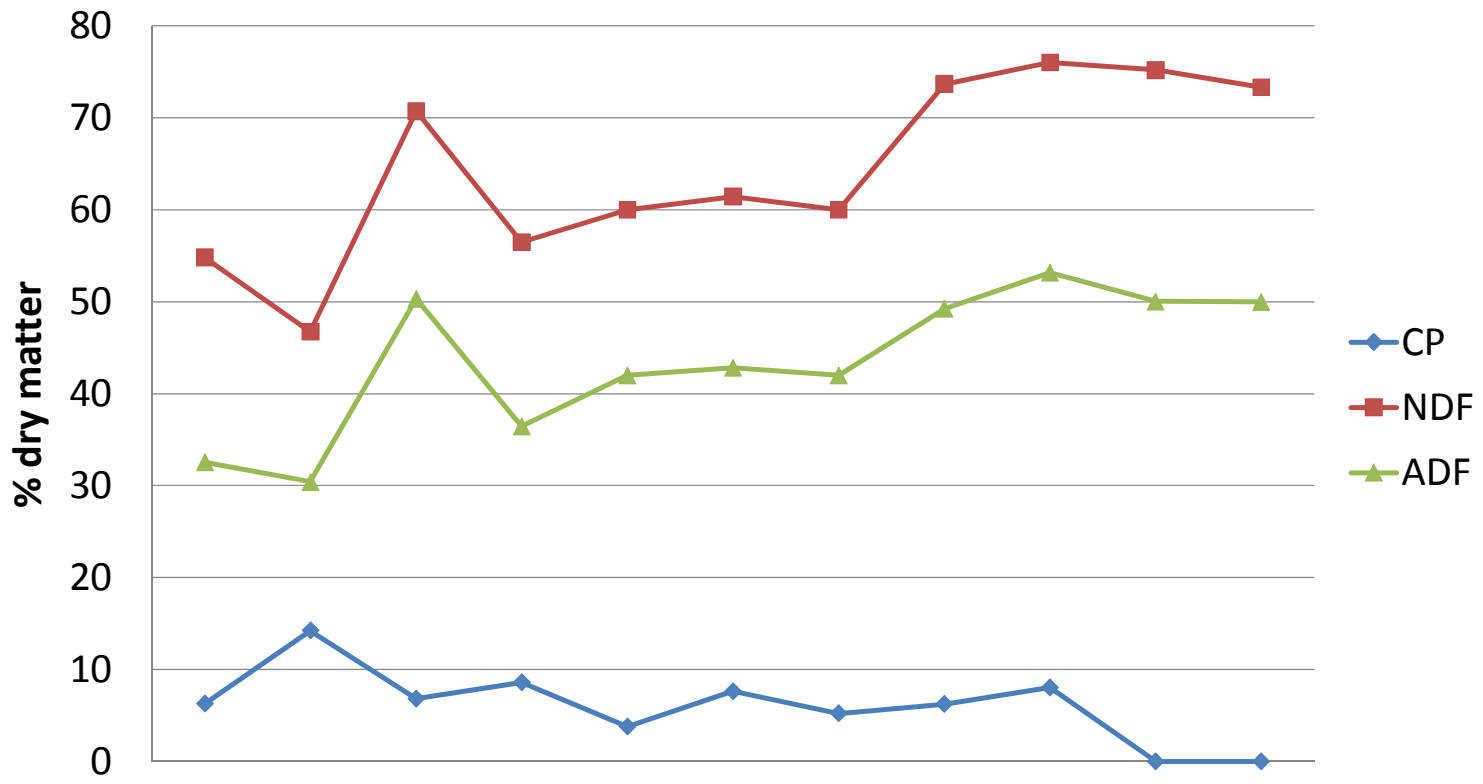
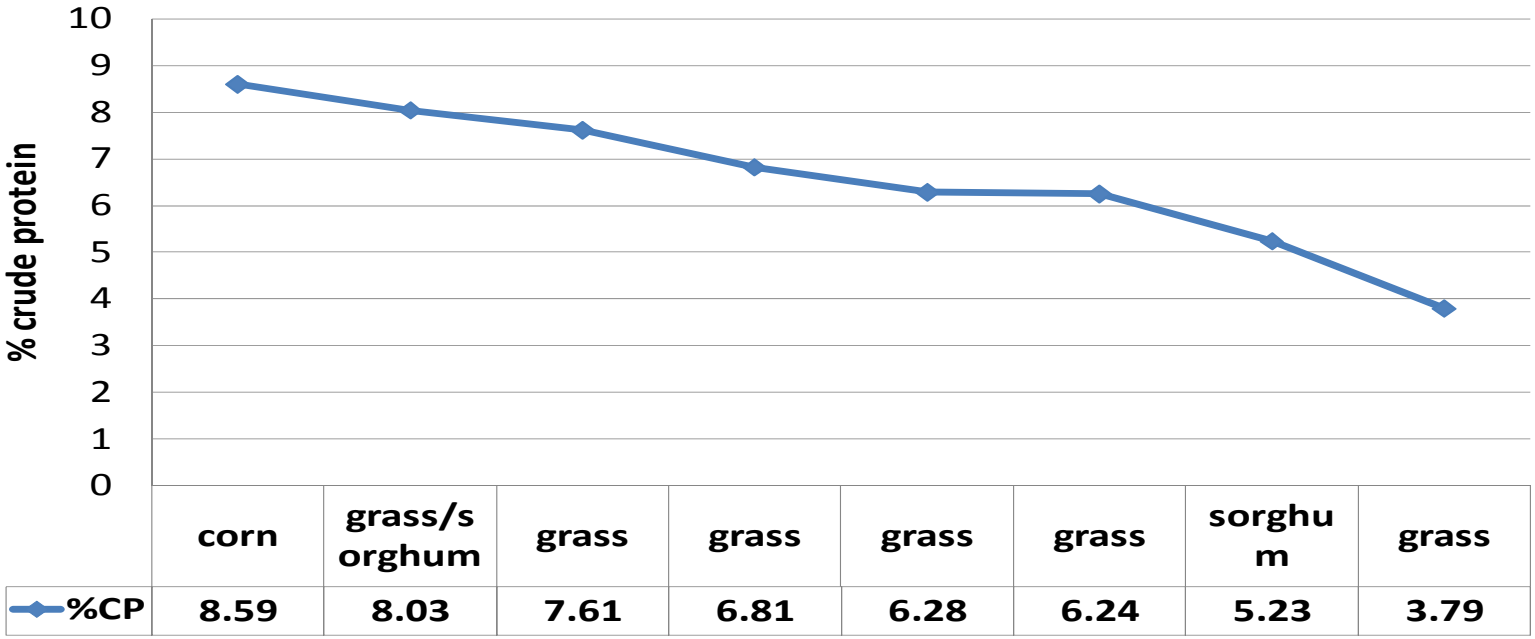


Fig 12. Crude protein content- Silage 2009



	corn	grass/sorghum	grass	grass	grass	grass	sorghum	grass
%CP	8.59	8.03	7.61	6.81	6.28	6.24	5.23	3.79

Fig 13. Crude Protein of selected pastures 2009

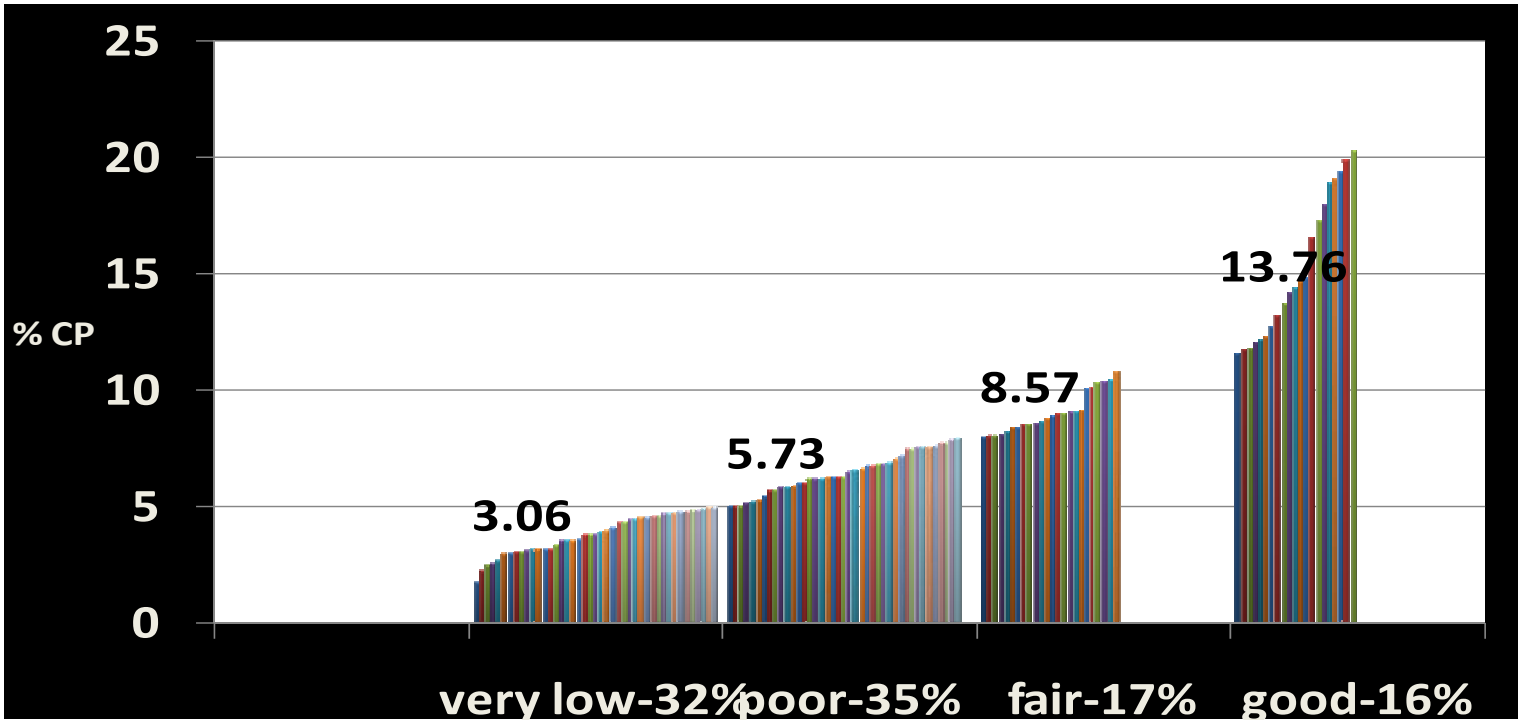


Fig 14. NDF of selected pastures in 2009

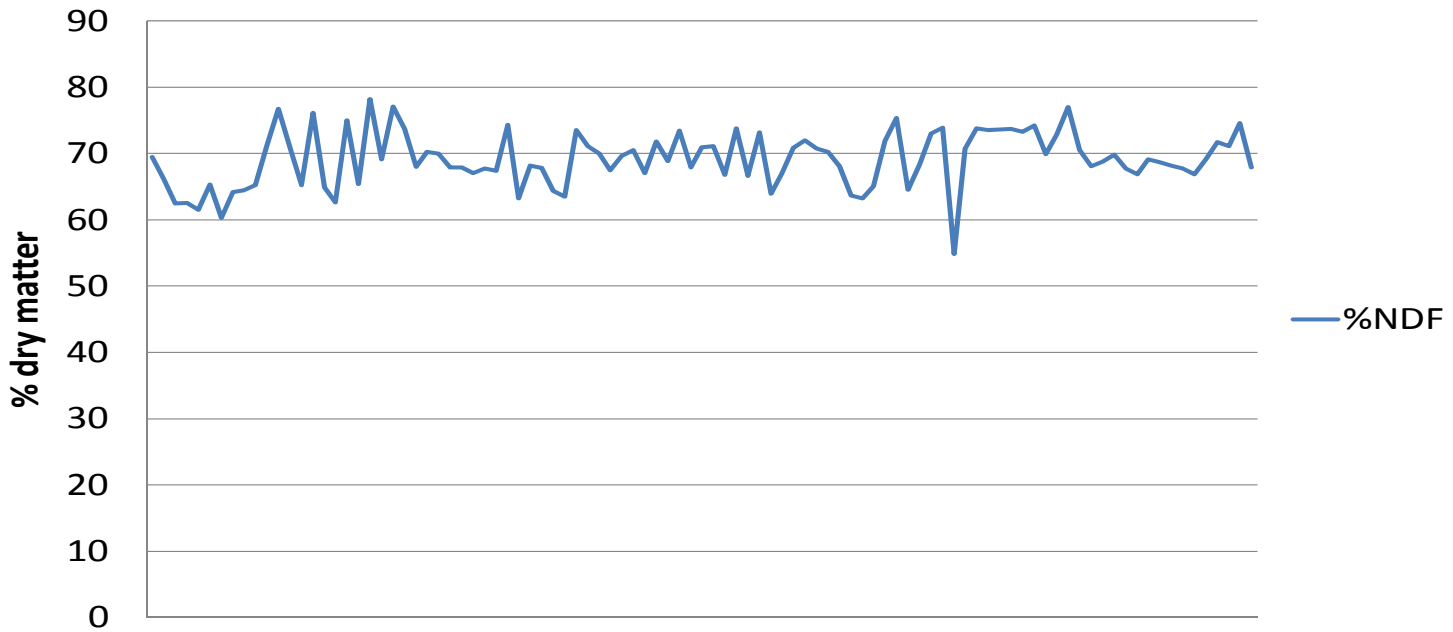
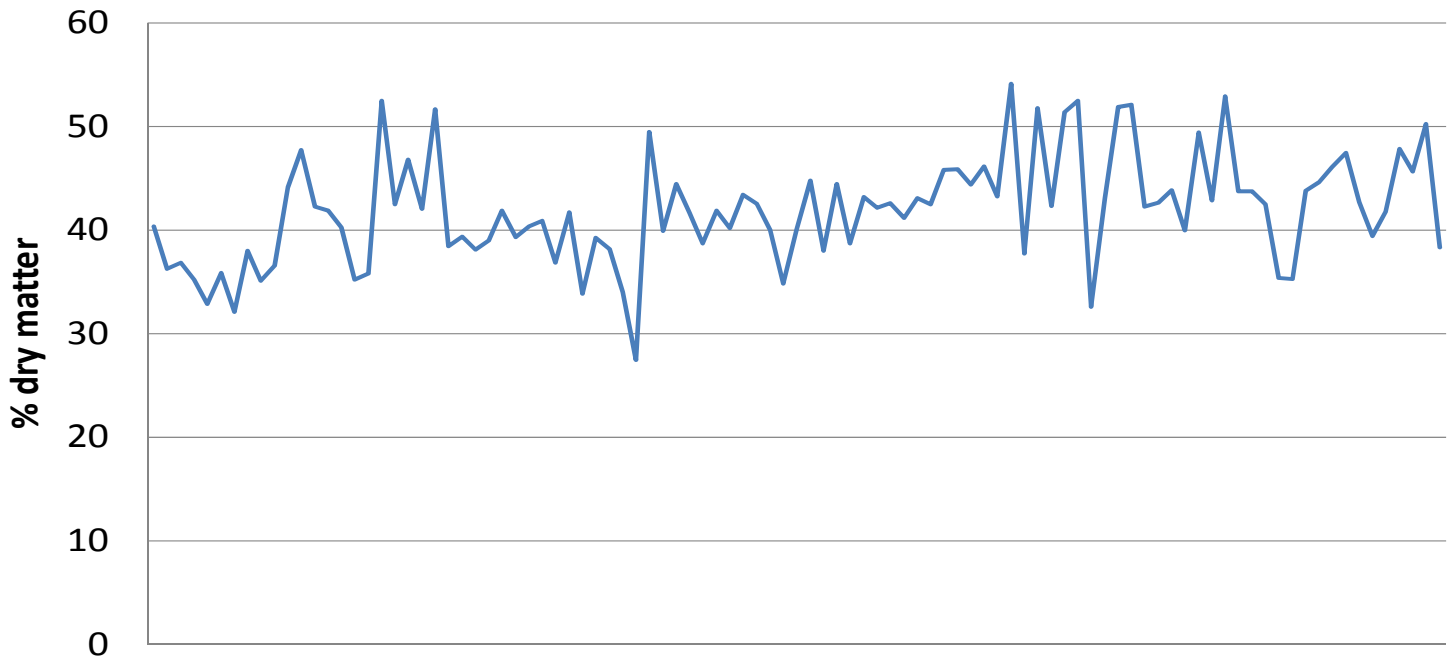


Fig 15. ADF of selected pastures in Barbados



Conclusions

1. SNF and Fat affected either in Q1 and or Q2, 2008 and 2009
2. Forage quality and availability affected milk quality
3. Milk volume unaffected
4. Hay quality fair to poor

   Grass, silage quality fair- good

Recommendations

- Increase silage production
- Improve pasture management
- Introduce highly nutritious forage species e.g Mulato *Brachiaria spp.*

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Thank You