

乳用動物之乳腺保養

Health Care of Mammary Gland

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甚麼樣的牛在何時容易得乳房炎？為什麼？

Who, When, Why

- 高產牛分娩前後免疫力變差 (Periparturient, high yielding cows are especially susceptible to mastitis due to immunocompromise)
- 可能原因：啟動泌乳生理壓力、嗜中性球數量減少且殺菌力降低 (The possible reasons : physiological stress of lactogenesis, decreased number and bacteria killing capacity of circulating neutrophils)

好發乳房炎的時段

High clinical mastitis incidence period

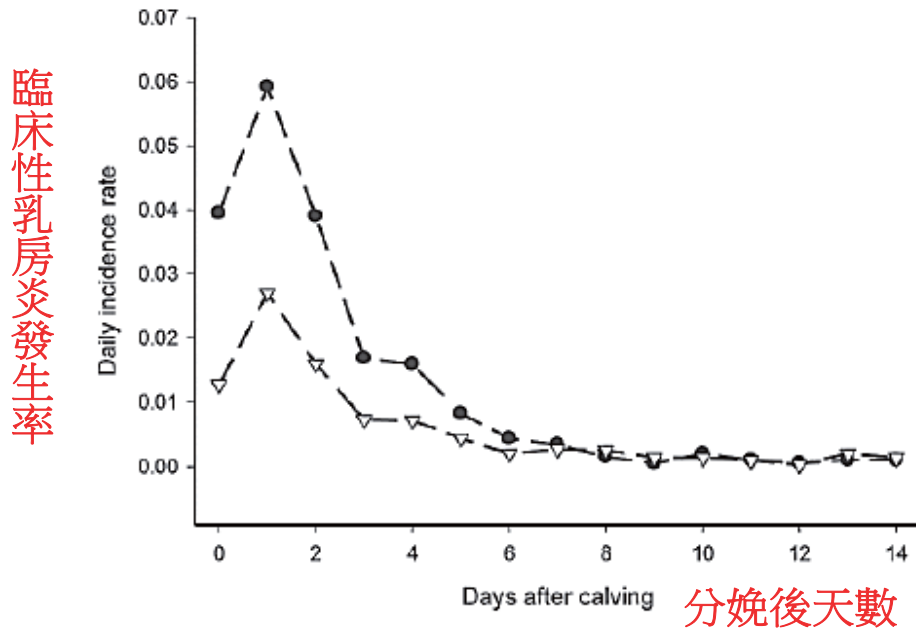


Figure 1. Early lactation daily incidence rate of clinical mastitis for heifers (●) and cows (parity >1; ▽) from 30 New Zealand dairy herds (data derived from McDougall et al., 2007a).

2014/1/20

J. Dairy Sci. 95:1025-1040³

高產乳牛須注意的事項

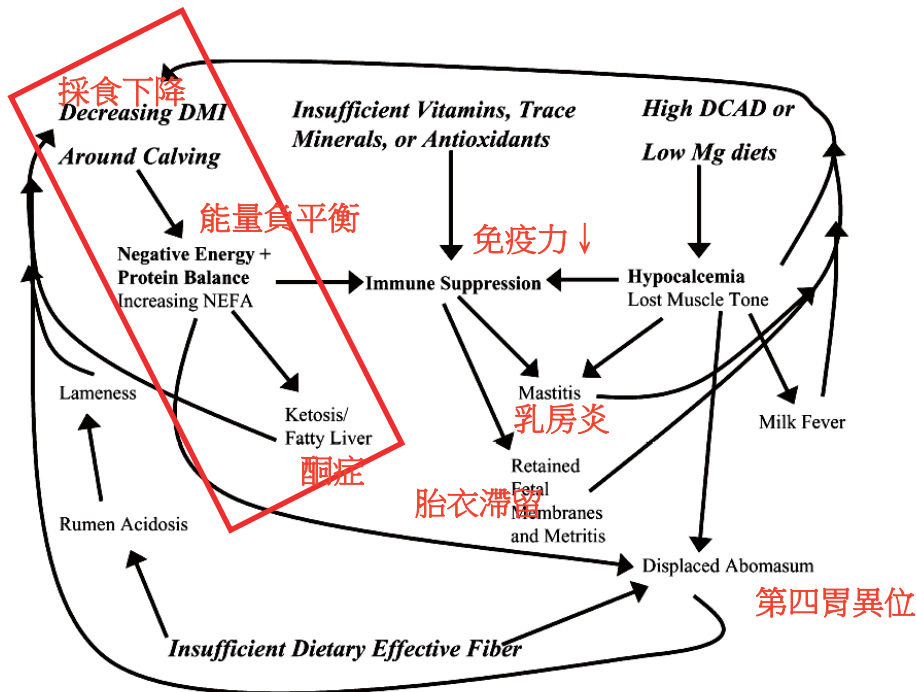
Precaution for high milk production cows

- 代謝性疾病 (Metabolic disease)
- 傳染性疾病 (Infectious disease)

2014/1/20

4

從採食量低落到疾病發生



J. P. Goff

2014/1/20 Figure 1. Interrelationships between nutrition and disease in the periparturient dairy cow. Key dietary factors are italicized; metabolic functions are in bold type.

J. Dairy Sci. 89:1292–1301

前一期高產乳量增加乳房炎機率 Previous high milk yield increases the risk of mastitis in current lactation

Table 2. Relationships between 305-d milk yield in the previous lactation, lactation number, and lactational incidence risks of certain diseases in dairy cows.

Disorder complex ¹	P 乳量 milk yield	P lactation number	a ²	b ₁ ^{3,4}	b ₂ ⁵	Lactations
RP	**	*	-4.12	1.82	0.12	1209
Metritis	†	*	-2.33	0.87	0.07	1209
OC	NS	NS	-2.63	1.00	-0.05	1209
Mastitis 乳房炎	***	†	-3.02	2.15	0.07	872
CD	NS	*	-2.40	0.85	0.11	697
Milk Fever	**	***	-5.34	2.17	0.28	1135
Ketosis ⁶	**	NS	-7.24	3.61	0.12	974
DA ⁶	*	NS	-7.17	3.62	-0.02	1135

¹RP = Retained placenta, OC = Ovarian cysts, CD = Claw diseases, DA = Displaced abomasum.

²a = Intercept.

³b₁ = Partial regression coefficient for milk yield.

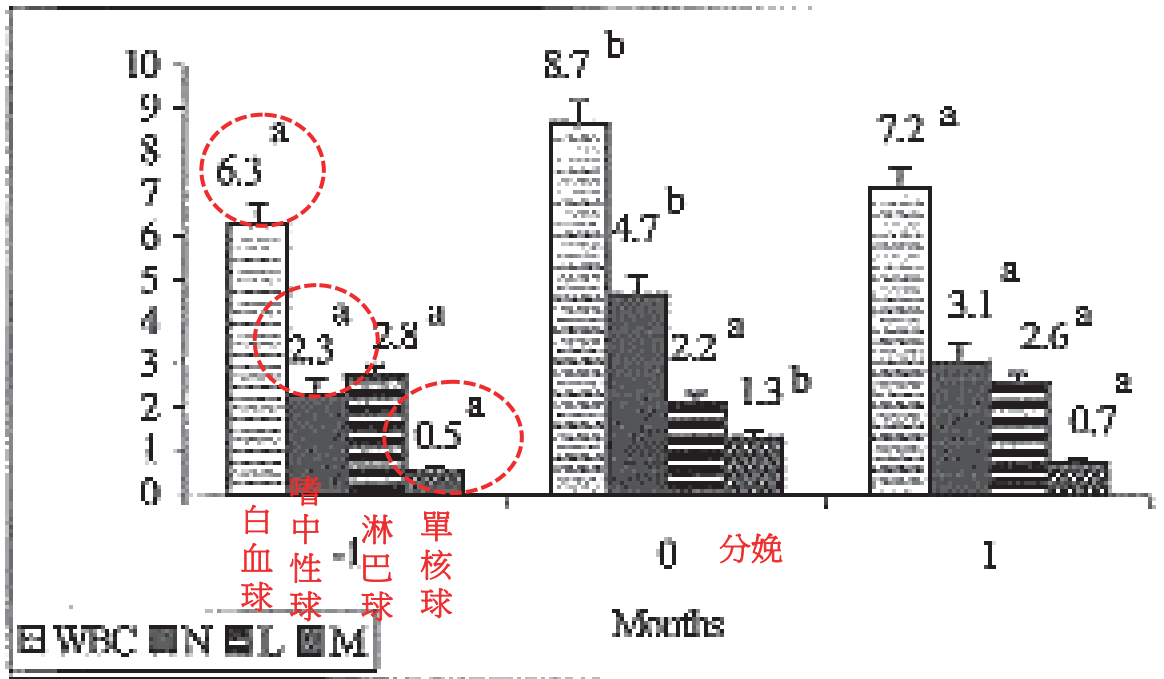
⁴The value for b₁ in the table must be multiplied by 10⁻⁴ before being used in the equation.

⁵b₂ = Partial regression coefficient for lactation number.

J. Dairy Sci. 84:2025–2035

2014/1/20

6



White blood cells (WBC), neutrophils (N), lymphocytes (L), and monocytes (M) in blood samples taken one month before expected calving (-1), at calving (0), and one month after calving (+1) from ten dairy cows.

Acta vet. scand. 2001, 42, 139-150

7

乳房炎預防方法 (1) Way to prevent mastitis (1)

- 牛舍環境 (Housing environment)



2014/1/20

8

分娩前兩個月的牛舍型態 Housing-two months prepartum

	Clinic mastitis at day -7 to 30 postpartum (%)
Litter pen (bedding removed at interval >3 mon.) 墊料	7.3
Loose housing with freestalls 牛床	9.2
Long tied stall 較長繫留欄	3.5
Short tied stall 較短繫留欄	5.9

重點讓乳房保持乾淨 (Key point: keep udder clean)

(Svensson et al., 2006; J. Dairy Sci. 89:1990-1999)

9

移到牛舍時間點 Time moved to confined housing

	SCC \geq 200,000 cells/mL (%)
Calving on pasture (在牧草地分娩)	16.6
Moved at day of calving (分娩當天移入)	32.7
Moved before calving (分娩前移入)	18.3

重點緊迫讓免疫力下降 (Key point: stress hamper immunity)

2014/1/20

10

分娩欄地面與泌乳牛欄地面

Calving pen floor type & lactating cow floor bedding

	Herd SCC avg. (x1000 clls/mL)
Non-slatted calving pen 平面分娩	104
Slatted calving pen 條狀地面分娩	70
Straw or sawdust 墊料泌乳牛欄	98
Rubber or concrete 橡膠墊或水泥地面	115

重點讓乳房保持乾淨 (Key point: keep udder clean)

(De Vliegher et al., 2004; J. Dairy Sci. 87:937-947)

乳房炎預防方法-營養 (2)

Way to mastitis prevention -Nutrition (2)

- 維生素E (vitamin E) : 乾乳牛 (dry period) 1000 IU/day ; 泌乳牛 (lactating) 500 IU/day
- 硒 (Se) : 0.3 ppm
- 銅 (Cu) : 20 ppm
- 鋅 (Zn) : 40-60 ppm

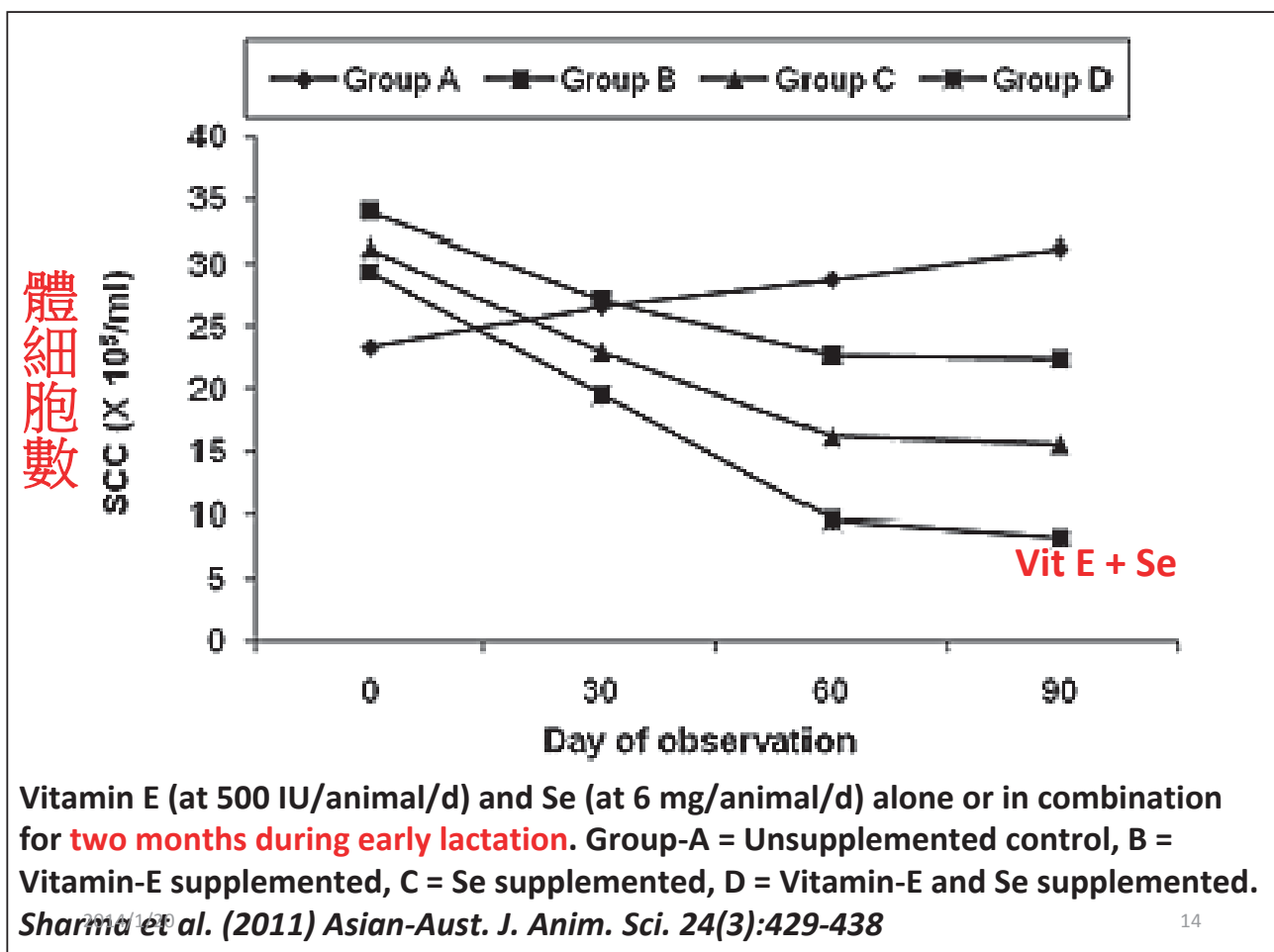
分娩前處理 (Prepartum treatment)

Table 1. Clinical Cases of Mastitis¹

Treatment	分房乳房炎感染案例 Cases of Mastitis per Lactating Quarter		乳房炎持續時間 Length of Each Clinical Case of Mastitis per Lactating Quarter	
	Cases	% Reduction ²	Months	% Reduction ²
Control ³ 不處理	0.41	0	0.95	0
Selenium 分娩前21天注射0.1 mg Se/kg 體重	0.36	12	0.51	46
Vitamin E 乾乳期740 IU/日	0.26	37	0.53	44
Vitamin E + Selenium	0.26	37	0.36	62

2014/1/20

13

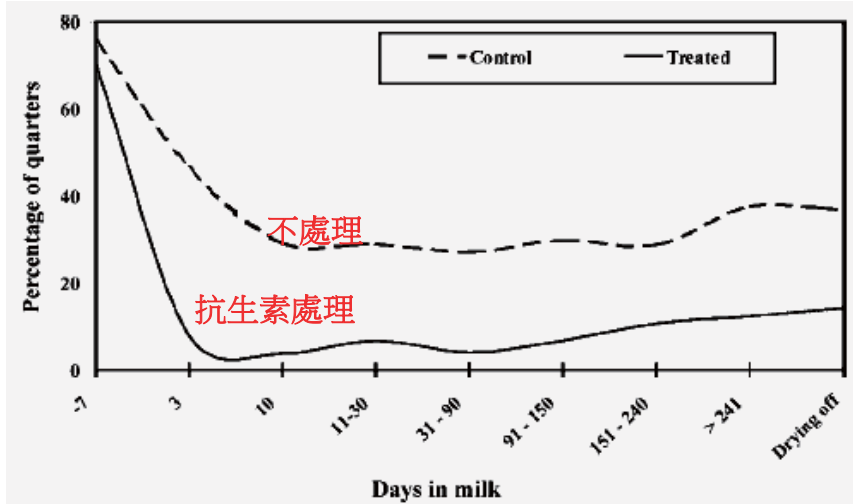


14

乳房炎預防方法 (3)

Way to prevent mastitis (3)

- 分娩前抗生素處理 (Prepartum antibiotic treatment)



200 mg sodium cloxacillin (Oliver et al., 2003; J. Dairy Sci. 86:1187-1193)

Figure 1. Isolation of mastitis pathogens in milk from control and antibiotic-treated mammary glands throughout lactation following antibiotic treatment of heifers 7 d before expected parturition.

分娩前抗生素處理

Prepartum antibiotic treatment

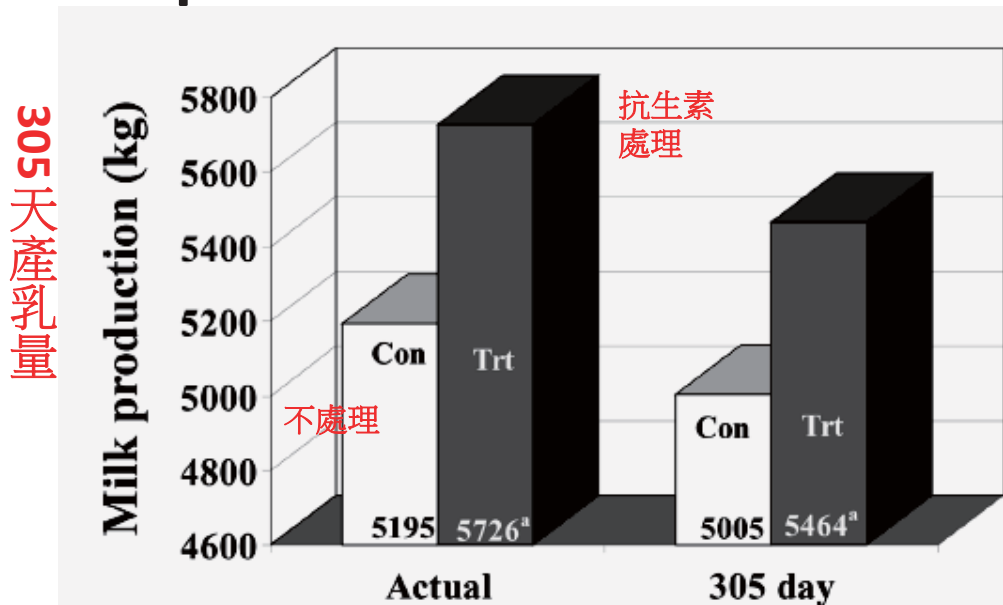


Figure 3. Actual and 305 day milk production in control and prepartum antibiotic-treated heifers. ^a Significantly different from controls ($P < 0.05$).

分娩前抗生素處理

10-21 day prepartum 200 mg sodium cephalosporin treatment

	不處理 Control	抗生素處理 Antibiotic
試驗女牛總頭數 Total heifer in trial	275	286
分娩前乳房感染頭數 Prepartum infection	172	174
分娩後乳房感染頭數 Postpartum infection	129	62

(Borm et al., 2006; J. Dairy Sci. 89:2090-2098)

2014/1/20

17

乳房炎預防方法 (4)

Way to prevent mastitis (4)

- 乳管封膠 (Teat canal sealant)

	乳頭封膠 Teat sealant	抗生素 Tylosin	封膠+抗生素 Teat sealant + Tylosin	對照組 Control
乳房感染 (%) Mammary gland infection (%)	7.5	24.9	9.2	24.7

(Parker et al., 2008; J. Dairy Sci. 91:169-181)



18

乳房炎預防方法 (5)

Way to prevent mastitis (5)

- 蒼蠅控制 (Fly control)

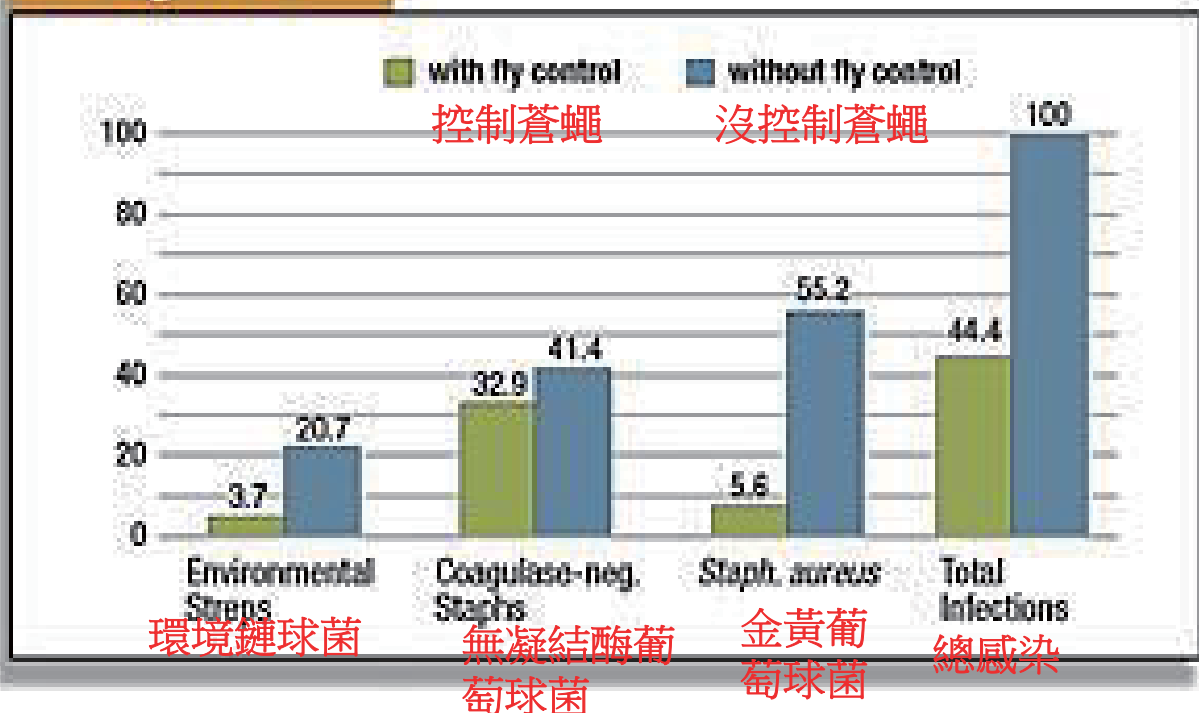


2014/1/20

19

Figure 1

Percent of heifers with mastitis



(Mark Taylor, 2012; Progressive Dairyman)

2014/1/20

20

蒼蠅控制

Fly control

- 移除讓蒼蠅繁殖的物質如糞便、潮濕乾草、漏掉的青貯、潮濕穀物

(Removing fly breeding materials such as manure, moist hay, spilled silage, wet grain)

- 使用捕蠅紙

(Use sticky tapes, paper, ribbons)

- 捕蠅走道

(Walk-through trap)



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21

乳房炎預防方法 (6) Way to prevent mastitis (6)

擠乳前藥浴

Predip



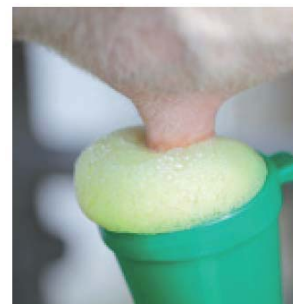
浸泡

Dipping



噴

Spraying



泡沫

Foaming

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22

擠乳前藥浴→清潔 Predip→cleaning



乳頭藥浴產品型式的優缺點

Table 2 - Teat Dip Type Benefits and Risks

Teat Dip Type	Perceived Benefit	Typical Use Condition	Risk Factor
Thin Liquid 稀液體	Easy to use 容易使用	Standard environmental conditions 環境乾淨	Limited environmental protection between milkings 保護效果有限
	Low consumption 前藥浴、後藥浴、自動擠乳系統、噴灑 Pre, Post, AMS - Sprayable	Automated application Used with limited teat prep 乳頭不須特別清理	Poor teat coverage when sprayed 噴灑覆蓋率差
High Viscosity (Non-Barrier) 黏液體 (無封膠)	Extended contact time 延長液體接觸時間 Highly visible	Increased environmental challenge	Required to be mild and effective with extended teat contact
	Requires dipping - Good coverage	When high visibility after milking is desired: hired milkers	Slow-drying under wind chill conditions
Barrier 封膠	Improved protection against environmental organisms	High levels of environmental mastitis	Increased risk of dirty teat bedding material sticking to teats
	Improved teat conditioning	Challenging environmental conditions for teat skin	Requires proof of efficacy and skin compatibility of dried barrier film
Foam-Generating Liquid 泡沫液	Good teat coverage - Dip only	Wet / muddy conditions	Slow-drying under wind chill conditions
	Improved cleaning - Visible foam promotes better cleaning procedure	Pre-milk under high soil conditions 乳頭髒	Not enough liquid for heavy soils 髒污太厚則液體量不足
	Improved coverage	Removal of barrier dips 需移除封膠	No benefit for post-milking 不適合後藥浴
	Reduced consumption		

擠乳後藥浴 Postdip



2014/1/20

25

正確擠乳程序

Good milking routine

Managing for Milk Quality

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Table 1. Influence of Milking Routine on Performance for Wisconsin Freestall Farms

Variable		Cows per Hour per Operator	P value	Monthly Rate of Clinical Mastitis	P Value
Written Milking Routine	Yes	46.9	<0.001	5.0%	0.19
	No	35.6		7.1%	
Training Frequency	Never	33.6	0.003	9.6%	0.05
	At Hiring	41.6		8.3%	
	Frequently	49.4		5.8%	
Complete milking routine ^a 確實擠乳程序	Yes 是	40.8	0.22 每小時 處理量 差異 不顯 著	5.5%	0.03 乳房炎 發生率 差異 顯著
	No 否	35.3		10.3%	
Predip 擠乳前藥浴	Yes 是	40.3	0.12 著	6.0%	0.02
	No 否	22.7		19.0%	
Forestrip	Yes	40.9	0.12	5.8%	0.16
	No	32.9		9.4%	
Wear gloves	Always	40.3	0.52	6.2%	0.93
	Occasional	36.9		6.0%	

^a routine includes forestripping, predipping, drying before unit attachment

2014/1/20

26

確保最佳乳腺發育

Ensure optimal mammary gland development

	代乳 (milk replacer) 0.44 kg (I)	代乳 (milk replacer) 0.98 kg(II)	I+女牛控制 增重 (I+heifer growth control)	II+女牛控制 增重 (II+heifer growth control)
性成熟日齡 Puberty age (d)	286 ^a	258 ^b	284 ^a	264 ^b
性成熟體重(kg) Puberty wt (kg)	279 ^{ab}	262 ^b	290 ^a	291 ^a
總乳量(kg) Milk yield (kg)	10784 ^c	10916 ^c	11558 ^b	12104 ^a
3.5%乳脂校正乳 量(kg/d) 3.5%FCM(kg/d)	28.6 ^c (100%)	29.8 ^b (104%)	30.0 ^b	31.4 ^a (110%)

2014/1/20

(Shamay et al., 2005; J. Dairy Sci. 88:1460-1469)

27

結論

Conclusion

- 乾淨地板墊料 (Clean floor & bedding)
- 維生素E與硒、銅、鋅 (Vit. E, Se, Cu, Zn)
- 分娩前抗生素處理 (Prepartum antibiotic treatment)
- 乳管封膠 (Teat canal sealant)
- 蒼蠅控制 (Fly control)
- 擠乳前後藥浴 (Predip & Postdip)
- 仔牛/女牛生長(Calf/heifer growth)

2014/1/20

28