乳牛場五大動線機器人示範場域運籌網研討會
Coordination Networking on Robots for Five Labor Lines of Dairy Cattle Farm

擠乳機器人如何看泌乳牛發情及測懷孕體重

畜產試驗所新竹分所
Hsinchu Branch, Taiwan Livestock Research Institute

葉亦馨
Yi-Hsin Yeh

2020.12.09

大綱 Outline

- 泌乳牛體重與健康

- 體重測量

- 發情預報系統

- 結語 Conclusion

泌乳牛體重與健康

泌乳牛體重與健康

- 透過飼養管理、營養調整、健康照顧以及育種改良使乳量大幅增加，但懷孕率下降。
(Poncheki et al., 2015)

- 負能量平衡經常發生在高乳量泌乳牛，測量體重或BCS變化都是監測負能量平衡的良好指標。 (Veerkamp and Brotherstone, 1997; Berry et al., 2002, 2007)

Panel 1 (top-left)

The Effect of Pregnancy and Parturition
on the Weight of Dairy Cows

R. F. MORGAN AND H. P. DAVIS
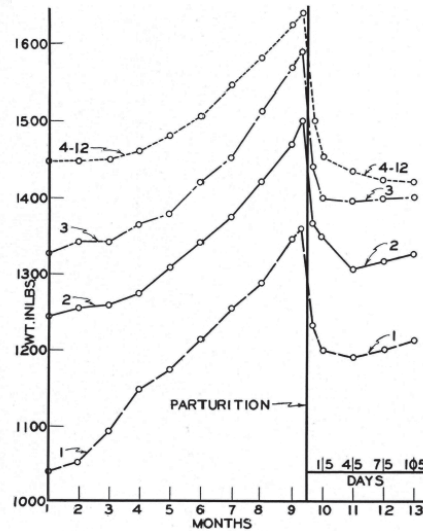Department of Dairy Husbandry

母牛體重單位轉換
1000磅（lb）= 453.6 公斤（kg）

LINCOLN, NEBRASKA
MARCH, 1936

FIG. 3.—Weight cycles for the first, second, third, and fourth to twelfth gestations for Holstein cows.
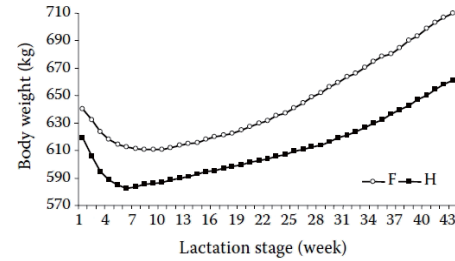
Panel 2 (top-right)

Figure 1. Least square means of body weight in Czech Fleckvieh (F) and Holstein (H) cows
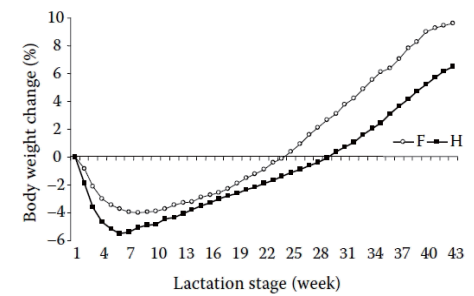
Figure 2. Relative body weight change in Czech Fleckvieh (F) and Holstein (H) cows

Panel 3 (bottom-left)

Improved attentions for weight fluctuations

The weighing floor in the Lely Astronaut milking robot has a double function; it not only establishes the starting position of the arm before each milking, but it also weighs cows prior to every milking. So far, this information was presented as an objective row of figures on weights and attentions and were primarily provided for cows showing (too) noticeable weight fluctuations within a short space of time (our own research has shown that the attention for weight loss as a result of sickness is now generated three days earlier; in addition, reliability has been improved!). The new software also considers the gradual progress of weight and the relation to initial weight, allowing you, as a dairy farmer, to act quickly in case of major loss of weight. In addition, cattle advisors can increase their insight in the cows' rations in order to ensure an improved condition at the start of lactation.
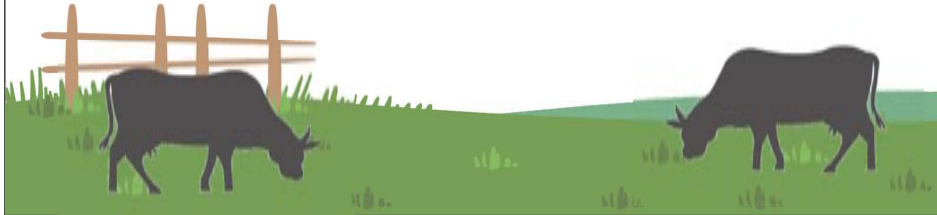
Panel 4 (bottom-right)
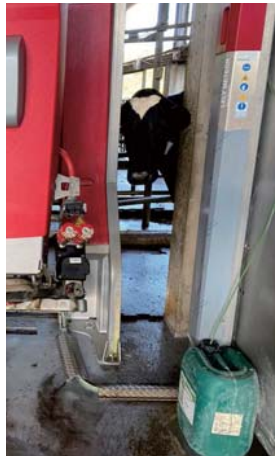
泌乳牛體重與健康

- 分娩後的體重變化在不同胎次間沒有顯著差異，但是數據顯示第一胎的體重變化大於第二胎。(Poncheki et al., 2015)

- 泌乳早期監測體重、乳量、BCS可有效預測牛隻繁殖表現。(Buckley et al.,2003；D. Řehak et al.,2012)

體重測量

體重測量

發情預報系統

	Lac Days	Date	Total Programmed	Rest Feed	Day production	Day production Dev.	ISK	Milking Number	Refusal Number	Failure Number	Milk Avg.	Refusal Avg	Failure Avg	Weight	Fat indication	Protein indication	Lactose indication
AVGe			1.97	0.13	30.8		34.8										
SOM			290.00	19.39	4502.2		5083.3										
	183	2019/08/02	2.00		29.3	2.70	40.1	2	0	0	2.3	0.4	0.00	588.00			
	182	2019/08/01	2.00	0.07	29.0	2.70	39.8	3	1	0	2.3	0.6	0.00	601.00			
	181	2019/07/31	2.00	0.05	29.5	4.70	40.4	3	0	0	2.3	0.4	0.00	591.00			
	180	2019/07/30	2.00	0.06	28.9	4.50	39.5	3	0	0	2.3	0.3	0.00	594.00			
	179	2019/07/29	2.00	0.11	19.3	-4.70	25.1	2	1	0	2.1	0.3	0.00	608.00			
	178	2019/07/28	2.00	0.05	27.9	3.60	36.2	2	0	0	2.0	0.3	0.00	591.00			
	177	2019/07/27	2.00	0.04	28.0	3.80	36.4	2	0	0	2.0	0.3	0.00	604.00			
	176	2019/07/26	2.00	0.07	27.5	3.40	35.7	3	1	0	2.0	0.4	0.00	585.00			
	175	2019/07/25	2.00	0.15	27.4	4.10	35.6	2	0	0	1.9	0.1	0.00	588.00			
	174	2019/07/24	2.00	0.15	27.2	3.90	35.4	2	0	0	1.7	0.2	0.00	590.00			
	173	2019/07/23	2.00	0.57	17.9	-5.50	23.2	2	0	0	1.6	0.1	0.00	592.00			
	172	2019/07/22	2.00	0.56	27.8	3.80	36.2	1	1	0	1.6	0.1	0.00	571.00			
	171	2019/07/21	2.00	0.04	27.6	3.50	35.8	2	0	0	1.7	0.3	0.00	601.00			
	170	2019/07/20	2.00	0.15	25.7	1.60	33.5	2	0	0	1.9	0.4	0.00	592.00			
	169	2019/07/19	2.00	0.61	24.4	0.00	31.7	2	0	0	1.9	0.6	0.00	605.00	2.71	3.01	4.57
	168	2019/07/18	2.00	1.13	7.8	-17.00	10.1	1	0	0	1.9	1.0	0.00	584.00	3.23	2.97	4.65
	167	2019/07/17	2.00	0.66	24.9	-1.40	32.4	1	0	0	2.0	1.0	0.00	560.00	3.16	3.00	4.64
	166	2019/07/16	2.00	0.05	22.6	-4.00	29.4	2	0	0	2.4	1.3	0.00	578.00	3.24	3.01	4.64
	165	2019/07/15	2.00	0.25	23.7	-3.20	30.9	2	2	0	2.4	1.3	0.00	580.00	3.17	3.06	4.62
	164	2019/07/14	2.00	0.07	26.5	-0.80	34.5	3	1	0	2.4	1.0	0.00	583.00	3.22	3.03	4.63
	163	2019/07/13	2.00	0.04	26.8	-0.70	34.8	2	0	0	2.4	0.9	0.00	571.00	3.51	3.00	4.67

發情預報系統

- 乳量
- 反芻
- 活動
- 週期

結語

- 體重是觀察牛隻的基礎，資料越完整越有利獸醫診斷。

- 兼顧乳量、健康與繁殖性能，才能延長牛隻的壽命。