耐熱型天噸乳牛發展方向

Vision of Heat-tolerant Ten-tons Cow Herd

畜產試驗所Taiwan Livestock Research Institute
吳明哲組長(Mr. Ming-Che Wu)

Pacific Rim Dairy R&D&E Network
(From Japan, Korea, Taiwan, Philippines, Vietnam, Thailand, Malaysia, Indonesia to Australia & NZ)

越南與台灣乳業發展論壇
Dairy Industry Development - Vietnam and Taiwan
2018/09/12

TAIWAN Touch Your Heart

1

Farm Journal's **MILK**

APRIL 10, 2018

Where Will The Dairy Industry Be in 50 Years?

NEWS | BY: JIM DICKRELL

By 2067, the United Nations predicts world population will grow by 3 billion to **10.5 billion** people. Most of these folks will be added in Asia and Africa. Not only will population increase, but dairy consumption will increase even more as incomes rise and the demand for diets higher in protein grows. All totaled, **milk** production will have to grow **13.2 trillion pounds**. For that to happen, the average dairy cow in the world will have to double its annual milk production.

Dairy farmers in 2067 will meet the world's needs for essential nutrients by adopting technologies and practices that provide improved **cow** health and longevity, profitable dairy farms, and sustainable agriculture.
Integrated sensors, robotics, and automation will replace much of the manual labor on farms.

Journal of Dairy Science®
Official Journal of the American Dairy Science Association®

May 2018 Volume 101, Issue 5, Pages 3722–3741

Invited review: Learning from the future—A vision for dairy farms and cows in 2067

J.H. Britt, R.A. Cushman, C.D. Dechow, H. Dobson, P. Humblot, M.F. Hutjens, G.A. Jones, P.S. Ruegg, I.M. Sheldon, J.S. Stevenson

2

International Non-Governmental Organization (1951 Rome Italy)

Members of ICAR (International Committee for Animal Recording)

Feeding Robot in Taiwan

2011 (in blue)

Japan
Korea
Taiwan

3

Portfolio of Interbull evaluations
國際種公牛後裔女兒牛性能評估年曆

1995	Production						
1999	Production	Type					
2001	Production	Type	Cellcount				
2004	Production	Type	Cellcount	Longevity			
2005	Production	Type	Cellcount	Longevity	Calving		
2007	Production	Type	Cellcount	Longevity	Calving	Fertility	
2008	Production	Type	Cellcount	Longevity	Calving	Fertility	Workability

乳量乳質—體型—體細胞數—高繁—產犢順—易懷孕—好擠乳

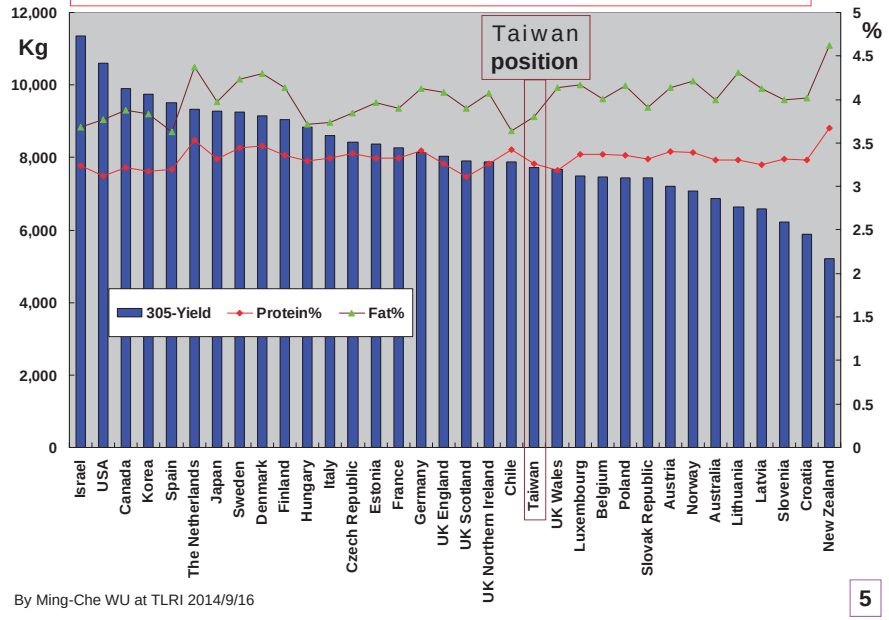
國際畜政聯盟
乳牛性能分項

International information

Cross-reference list
Interbull Cross-reference lists of bulls with multiple registrations
Production 乳量乳質
Evaluation summaries for production traits
Conformation 體型
Evaluation summaries for conformation traits
Udder health 體細胞數
Evaluation summaries for udder health traits
Direct longevity 高繁
Evaluation summaries for direct longevity traits
Calving Traits 產犢順
Evaluation summaries for calving traits
Female Fertility 易懷孕
Evaluation summaries for female fertility traits
Workability 好擠乳
Evaluation summaries for milking speed and temperament

4

Taiwan Position on Cow Milk Production and Quality of Year 2013



By Ming-Che WU at TLRI 2014/9/16

5

6

Canada

Figure 2: Average Profit to 6 Years by Age at First Calving in Holsteins

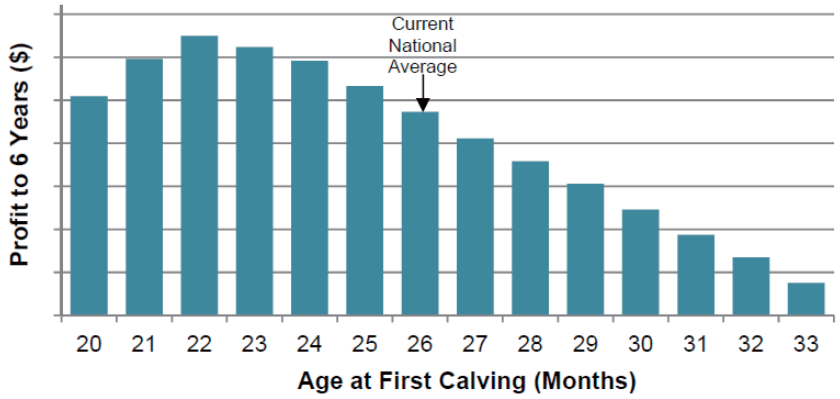


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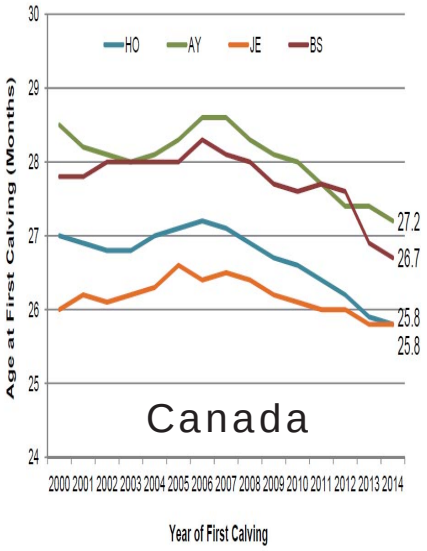
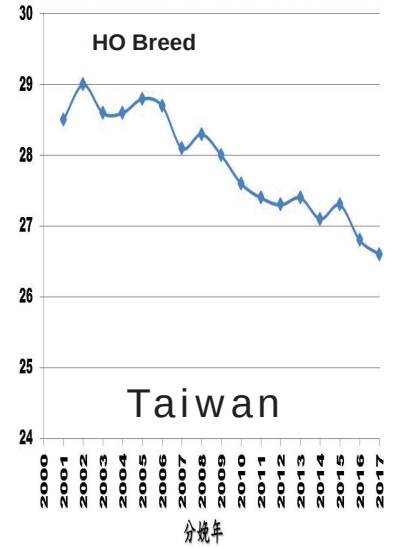
Figure 1: Trend in Average Age at First Calving by Breed



Tropical Dairy Cattle

台灣乳牛初產月齡平均(Month age at first calving)



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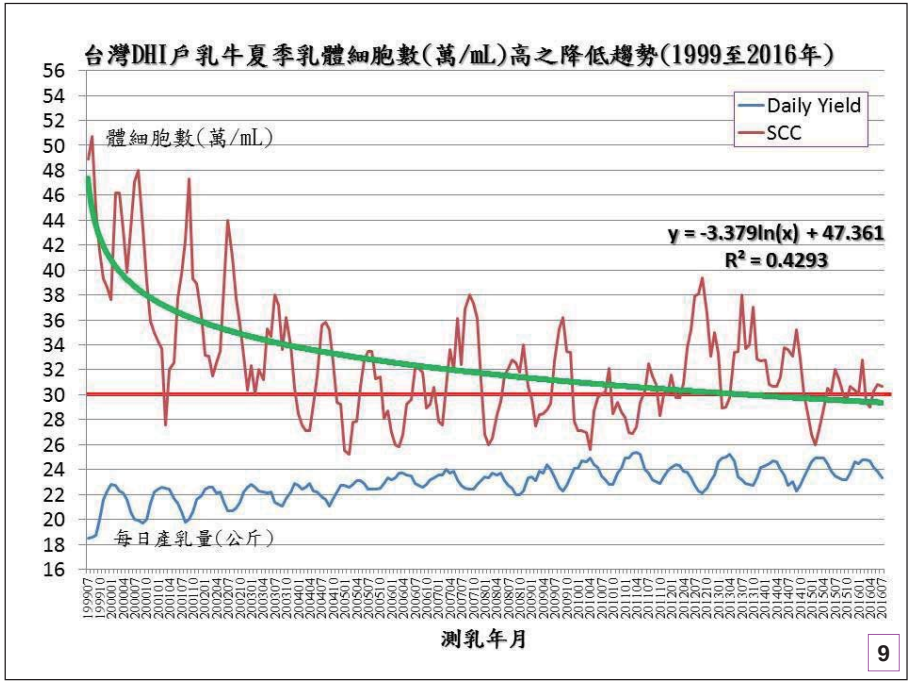
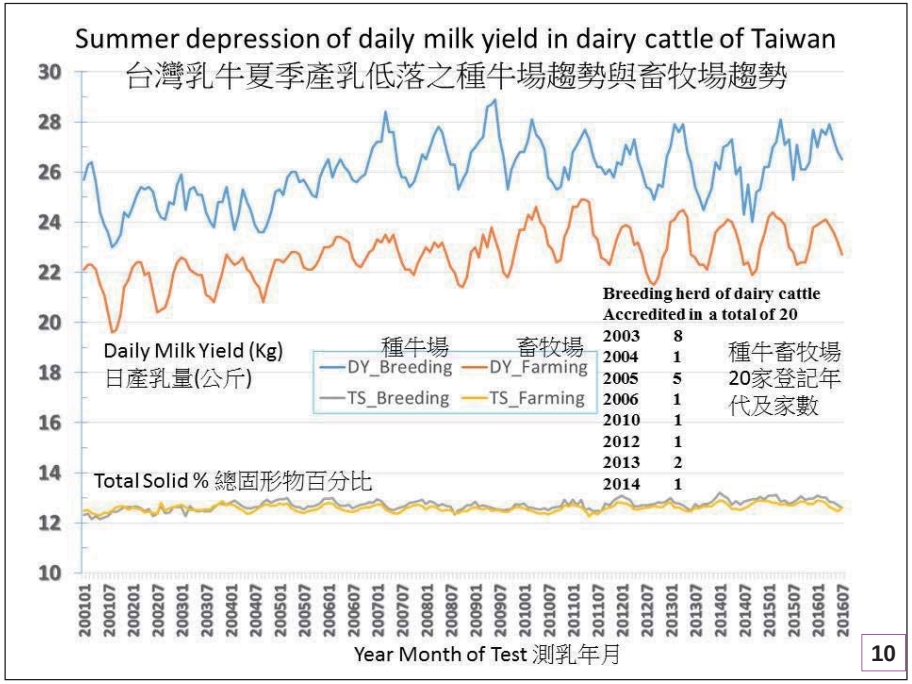
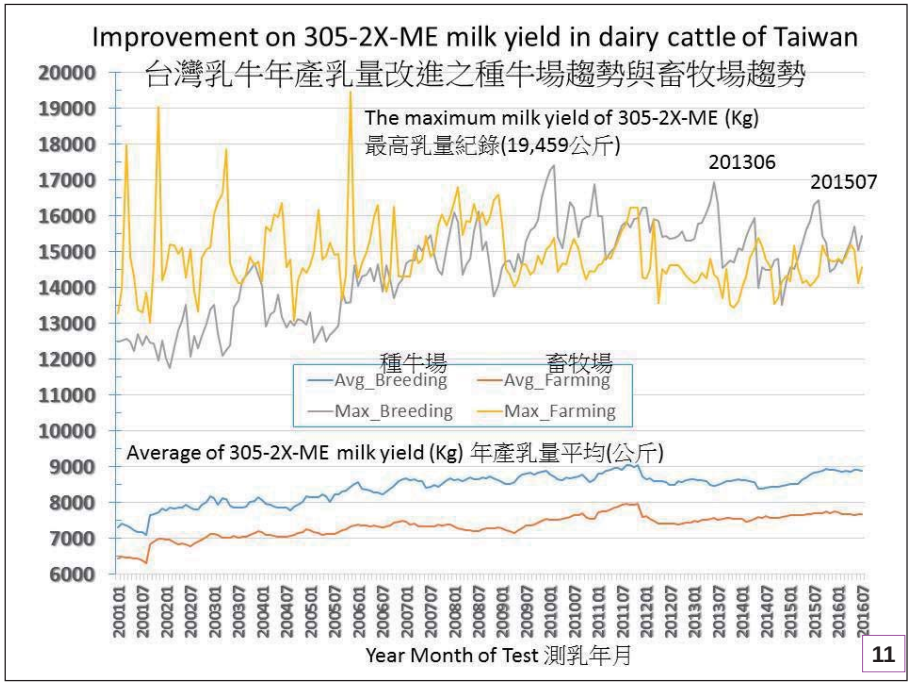
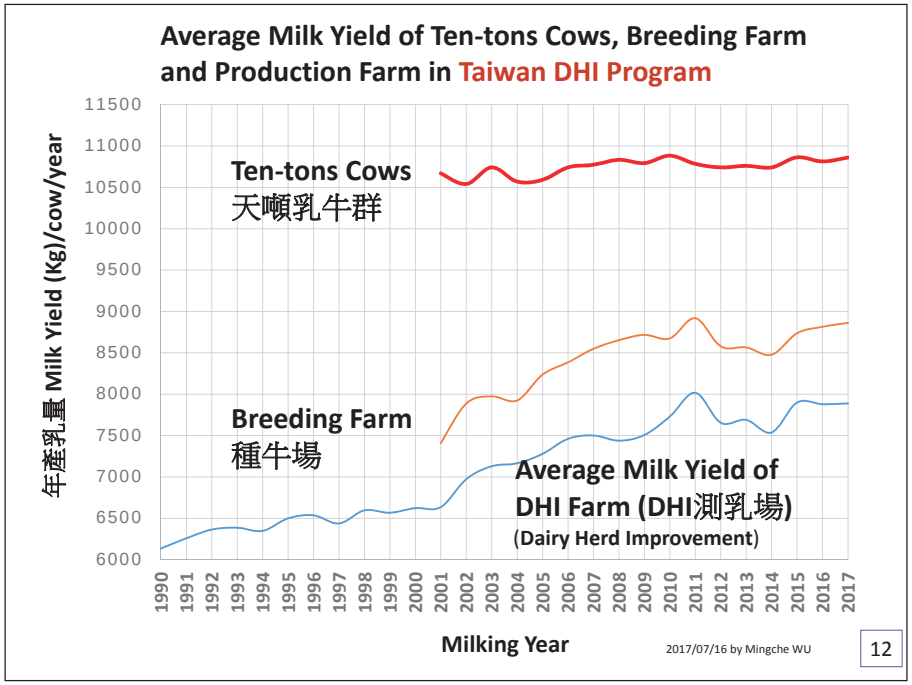

台灣DHI戶乳牛夏季乳體細胞數(萬/mL)高之降低趨勢(1999至2016年)
Daily Yield
SCC
體細胞數(萬/mL)
y = -3.379ln(x) + 47.361
R² = 0.4293
每日產乳量(公斤)
測乳年月
9


Summer depression of daily milk yield in dairy cattle of Taiwan
台灣乳牛夏季產乳低落之種牛場趨勢與畜牧場趨勢
Daily Milk Yield (Kg)
日產乳量(公斤)
種牛場
畜牧場
DY_Breeding
DY_Farming
TS_Breeding
TS_Farming
Breeding herd of dairy cattle
Accredited in a total of 20
2003 8
2004 1
2005 5
2006 1
2010 1
2012 1
2013 2
2014 1
種牛畜牧場
20家登記年
代及家數
Total Solid % 總固形物百分比
Year Month of Test 測乳年月
10


Improvement on 305-2X-ME milk yield in dairy cattle of Taiwan
台灣乳牛年產乳量改進之種牛場趨勢與畜牧場趨勢
The maximum milk yield of 305-2X-ME (Kg)
最高乳量紀錄(19,459公斤)
201306
201507
種牛場
畜牧場
Avg_Breeding
Avg_Farming
Max_Breeding
Max_Farming
Average of 305-2X-ME milk yield (Kg) 年產乳量平均(公斤)
Year Month of Test 測乳年月
11


Average Milk Yield of Ten-tons Cows, Breeding Farm
and Production Farm in Taiwan DHI Program
年產乳量 Milk Yield (Kg)/cow/year
Ten-tons Cows
天噸乳牛群
Breeding Farm
種牛場
Average Milk Yield of
DHI Farm (DHI測乳場)
(Dairy Herd Improvement)
Milking Year
2017/07/16 by Mingche WU
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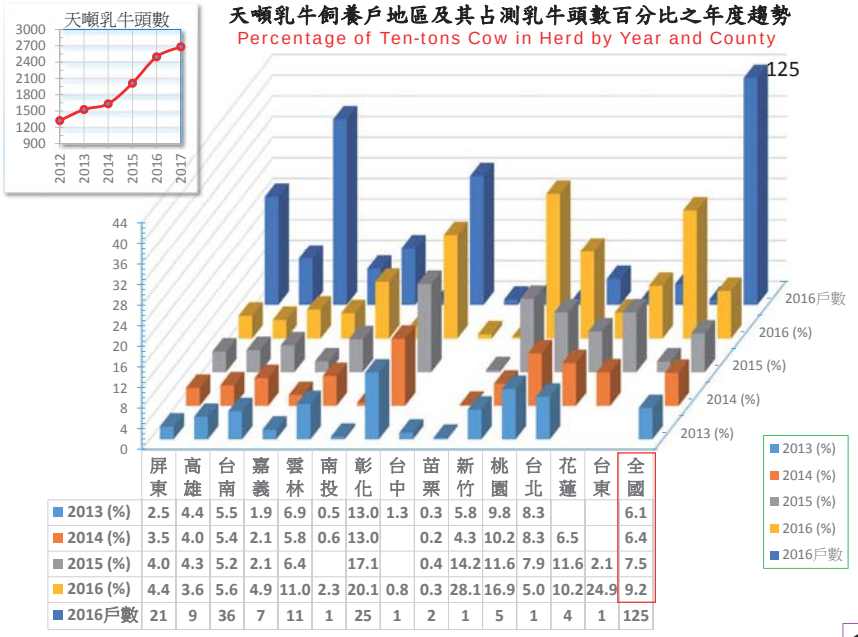

天噸乳牛飼養戶地區及其占測乳牛頭數百分比之年度趨勢

Percentage of Ten-tons Cow in Herd by Year and County

	屏東	高雄	台南	嘉義	雲林	南投	彰化	台中	苗栗	新竹	桃園	台北	花蓮	台東	全國
2013 (%)	2.5	4.4	5.5	1.9	6.9	0.5	13.0	1.3	0.3	5.8	9.8	8.3			6.1
2014 (%)	3.5	4.0	5.4	2.1	5.8	0.6	13.0		0.2	4.3	10.2	8.3	6.5		6.4
2015 (%)	4.0	4.3	5.2	2.1	6.4		17.1		0.4	14.2	11.6	7.9	11.6	2.1	7.5
2016 (%)	4.4	3.6	5.6	4.9	11.0	2.3	20.1	0.8	0.3	28.1	16.9	5.0	10.2	24.9	9.2
2016戶數	21	9	36	7	11	1	25	1	2	1	5	1	4	1	125

Made by Ming-Che Wu 2018/09/02

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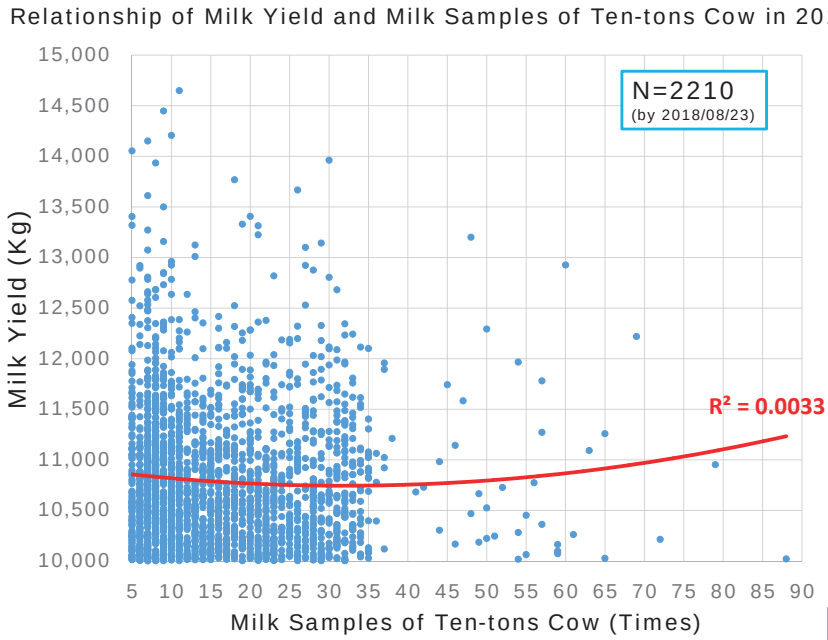

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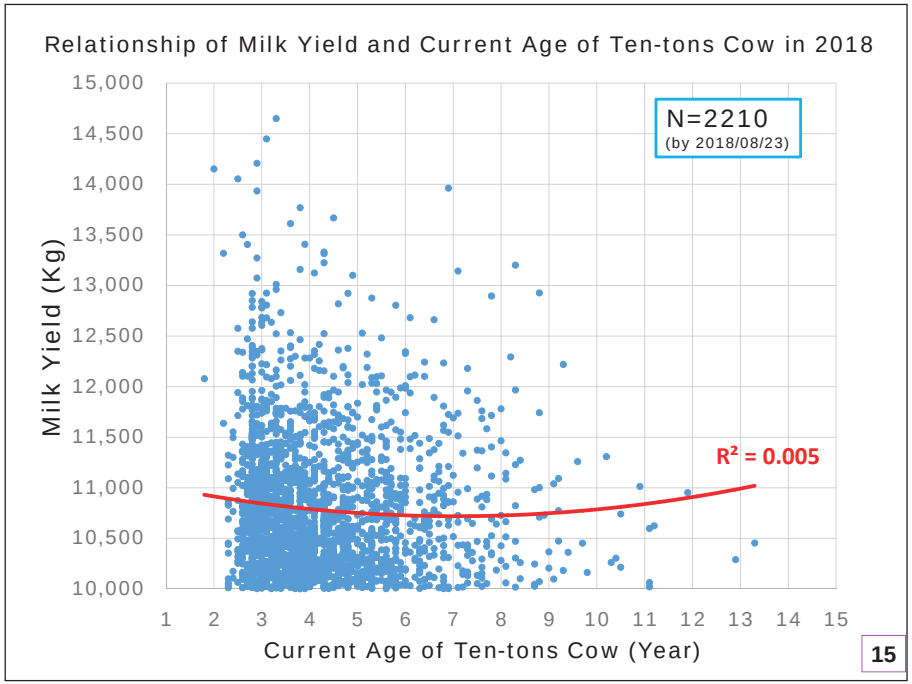

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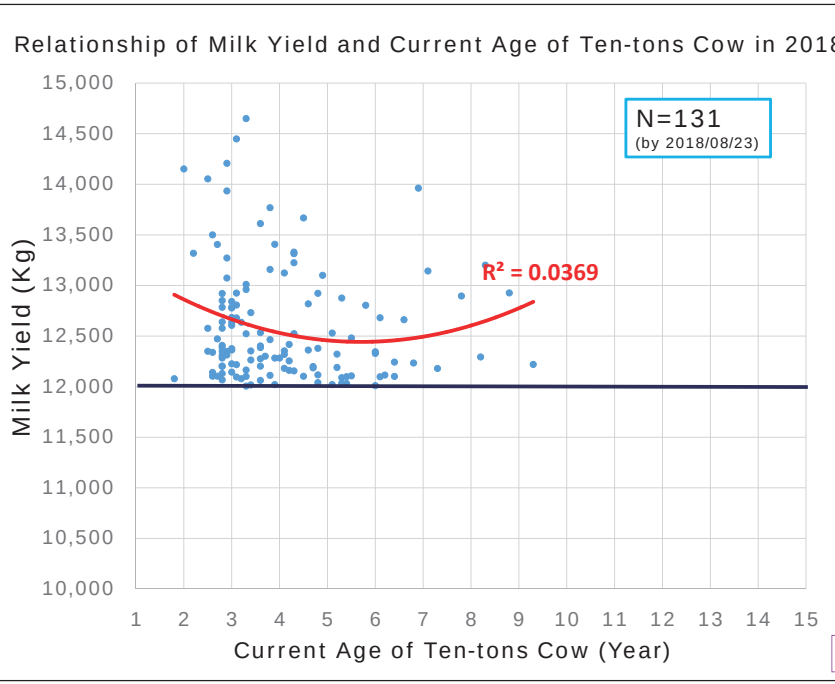

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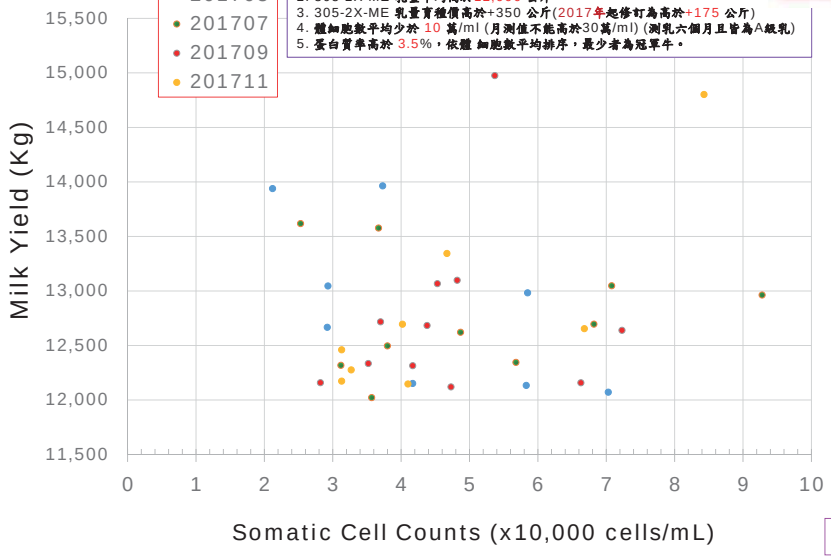
Elite Ten-tons Cow Selection on March, July, September and November of 2017

天噸乳牛冠軍牛評選的要件

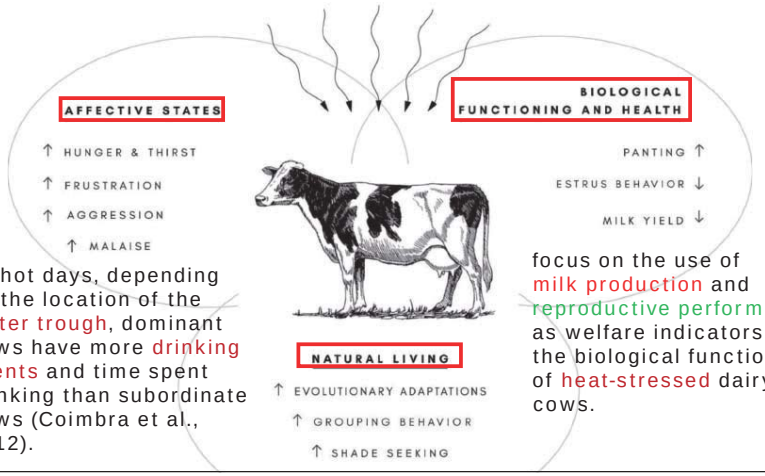
1. 六個月期間乳檢送測 6 次(每月一次)
2. 305-2X-ME 乳量平均高於12,000 公斤
3. 305-2X-ME 乳量育種價高於+350 公斤(2017年起修訂為高於+175 公斤)
4. 體細胞數平均少於 10 萬/ml (月測值不能高於30萬/ml) (測乳六個月且皆為A級乳)
5. 蛋白質率高於 3.5%，依體 細胞數平均排序，最少者為冠軍牛。



J. Dairy Sci. 100:8645–8657
https://doi.org/10.3168/jds.2017-12651

Invited review: **Effects of heat stress on dairy cattle welfare**

Liam Polsky and Marina A. G. von Keyserlingk[1]
Animal Welfare Program, 2357 Main Mall, Faculty of Land and Food Systems, University of British Columbia, Vancouver, BC, V6T 1Z4 Canada



on hot days, depending on the location of the water trough, dominant cows have more drinking events and time spent drinking than subordinate cows (Coimbra et al., 2012).

focus on the use of milk production and reproductive performance as welfare indicators for the biological functioning of heat-stressed dairy cows.

瑞典農業大學研究所學位論文(2017)

Individual drinking water intake of dairy cows in an AMS barn
Individuellt dricksvattenintag hos mjölkkor i ett AMS-stall

Caroline Axegård
Supervisor: Torsten Eriksson, Bengt-Ove Rustas och Lena Lidfors
Department: SLU, Department of Animal Nutrition and Management
Examiner: Kerstin Svennersten Sjaunja
Department: SLU, Department of Animal Nutrition and Management

擠乳機器人導入的乳牛
每天飲水次數及飲水量

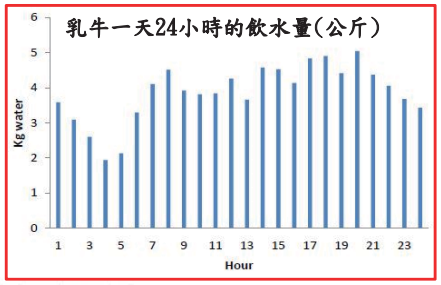
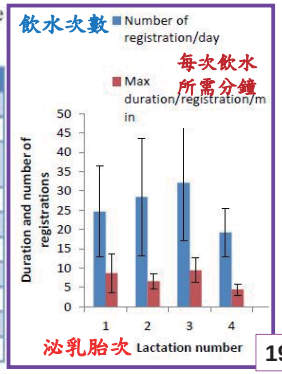


Table 3. Live weight, milk yield and intake of water, dry matter and feed constituents for the 37 cows used in the final evaluation (36 cows with milk yield)

Item	Mean	Standard deviation	Range
Live weight, kg	649	48.5	534 - 806
Milk yield, kg/d 乳量	38.3	7.4	24.0 - 55.3
Dry matter intake, kg/d	23.6	4.4	9.7 - 31.9
飲水量 Free water intake, kg/d	93.5	20.7	23.9 - 130.4
Total water intake, kg/d	123.8	24.4	46.2 - 171.7
Free water/ kg milk	2.5	0.4	1.8 - 3.4
Tot water/kg milk	3.3	0.5	2.4 - 4.5
K intake, g/d	525	91.3	330 - 727
Na intake, g/d	133	26.4	63 - 182
N intake, g/d	713	137	282- 952



https://www.dairyherd.com/article/new-heat-tolerant-holstein-genetics-available

Dairy Herd Management

New, Heat-tolerant Holstein Genetics Available

Maureen Hanson March 10, 2018 04:52 PM

Prof. Pete J. Hansen
University of Florida
pjhansen@ufl.edu
(352)392-5590
http://www.animal.ufl.edu/hansen/

- The **SLICK** haplotype is a dominant trait that produces cattle with a **short, sleek hair coat**. The trait is caused by a mutation in the prolactin receptor gene.
- The summer reduction in milk production was less severe in animals with the SLICK trait.
- Slick-Gator Blanco (551HO03574)
- Slick-Gator Lone Ranger (HOUSA000144046164)

Animals possessing a haplotype for a short, sleek hair coat in the Holstein breed have been developed by the University of Florida. (University of Florida)