乳牛精液選配國際規範研討會

ICAR Guidelines on Sexed Semen and Insemination Technologies in Dairy Cattle

乳牛七大性能基因評選國家與品種

Breeds and Nations of Genomic Evaluation on Seven Traits of Dairy Cattle

行政院農業委員會畜產試驗所
吳明哲組長(Mr. Ming-che Wu)

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

International information 乳牛性能分項

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

NATIONAL GENOMIC EVALUATION FORMS PROVIDED BY COUNTRIES (22 Nations)

乳牛七大性能基因評選國家與品種

National GENO Forms are updated every time a country provides a new form.
Click on the breed code to download the respective GENO form.

Australia
- Production (HOL&JER)
- Conformation (HOL)

Belgium
- Production (HOL)
- Conformation (HOL)
- Udder Health (HOL)
- Longevity (HOL)
- Calving (HOL)
- Fertility (HOL)

Canada
- Production (ALL BREEDS)
- Conformation (ALL BREEDS)
- Udder Health (ALL BREEDS)
- Longevity (ALL BREEDS)
- Calving (ALL BREEDS)
- Fertility (ALL BREEDS)
- Workability (ALL BREEDS)

Czech Republic
- Production (HOL)

Denmark & Sweden & Finland
- Production (ALL BREEDS)
- Conformation (ALL BREEDS)
- Udder Health (ALL BREEDS)
- Longevity (ALL BREEDS)
- Calving (ALL BREEDS)
- Fertility (ALL BREEDS)
- Workability (ALL BREEDS)

France
- Production (ALL BREEDS)
- Conformation (ALL BREEDS)
- Udder Health (ALL BREEDS)
- Longevity (ALL BREEDS)
- Fertility (ALL BREEDS)
- Workability (ALL BREEDS)

Germany & Austria
- Production (HOL, BSW, SIM)
- Conformation (HOL)
- Udder Health (HOL)
- Longevity (HOL)
- Calving (HOL)
- Fertility (HOL)
- Workability (HOL)

Great Britain (UK)
- Production (HOL)
- Udder health (HOL)
- Longevity (HOL)
- Calving (HOL)
- Fertility (HOL)

Hungary
- Production (HOL)
- Conformation (HOL)
- Udder Health (HOL)
- Longevity (HOL)
- Calving (HOL)
- Fertility (HOL)
- Workability (HOL)

Ireland
- Production (HOL)

Italy
- Production (HOL, BSWinteragenomics, SIM)
- Conformation (HOL)
- Udder Health (HOL)
- Female Fertility (HOL)

Japan
- Production (HOL)
- Conformation (HOL)
- Udder Health (HOL)

New Zealand
- Production (HOL&JER)

Poland
- Production (HOL)
- Conformation (HOL)
- Udder Health (HOL)
- Fertility (HOL)

Slovenia
- Production (BSWinteragenomics)

Spain
- Production (HOL)
- Conformation (HOL)
- Udder Health (HOL)
- Longevity (HOL)
- Calving (HOL)
- Fertility (HOL)
- Workability (HOL)

Switzerland
- Production (HOL, BSW)
- Conformation (HOL, BSW)
- Udder Health (HOL, BSW)
- Longevity (HOL, BSW)
- Calving (HOL)
- Fertility (HOL, BSW)
- Workability (HOL, BSW)

The Netherlands
- Production (HOL)

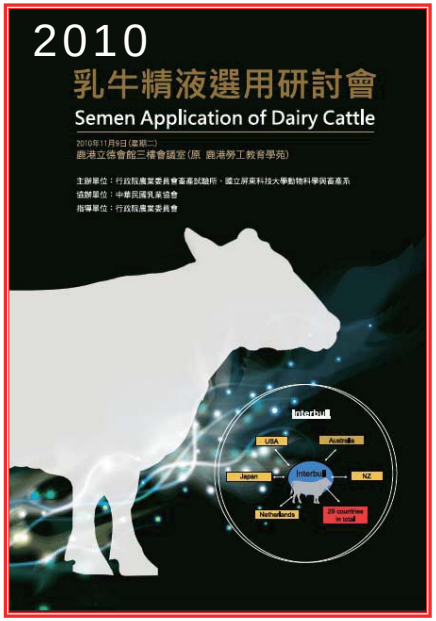
United States (USA)
- Production (ALL BREEDS)
- Conformation (BSW,HOL,JER)
- Udder Health (BSW,HOL,JER)
- Longevity (BSW,HOL,JER)
- Calving (BSW,HOL)
- Fertility (BSW,HOL,JER)

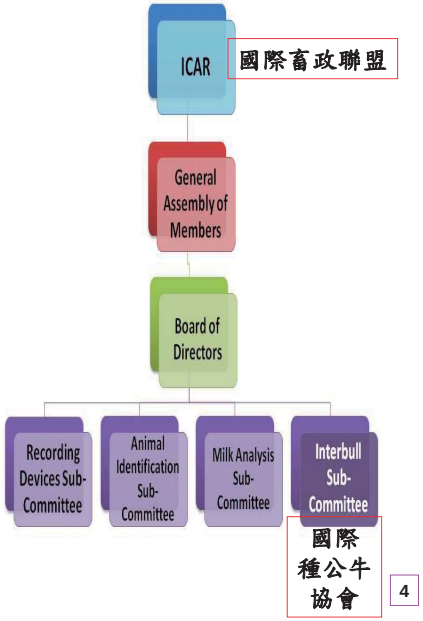
Breed Codes for International Genetic Evaluation of dairy and beef cattle

(1) ***Interbull*** *breed codes 2012*
(2) *Breed codes on bovine semen straws for international trade*

Breed	Breed Code(1) 3-ch	Breed Code(2) 2-ch
Abondance	ABO	AB
Angus	AAN	AN
Aubrac	AUB	AU
Ayrshire	RDC	AY
Bazadais	BZD	
Belgian Blue	BBL	BB
Blonde d'Aquitaine	BAQ	BD
Beef Shorthorn	BSH	-
Beefmaster	BMA	BM
Belgium Red & White	BER	
Braford	BFD	BO
Brahman	BRM	BR
Brangus	BRG	BN
Brand Rood	BRR	
British Frisian	BRF	
Brown Swiss	BSW	BS
Chianina	CIA	CA
Charolais	CHA	CH
Dairy Shorthorn	MSH	-
Dutch Frisian	DFR	
Eringer	ERI	
Meuse Rhine Yssel	MRY	
Dexter	DXT	DR
Devon	DEV	-
Dkbil	DIK	
Eastern Flanders White Red	BWR	
European Red Dairy Breed	RDC	RE
Gascon	GAS	-
Glan Donnersberg	GDB	
Galloway	GLW	GA
Guernsey	GUE	GU
Gelbvieh	GVH	GV
Groninger	GRO	
Hereford	HER	-
Highland Cattle	HLA	HI
Hinterwälder	HWD	
Holstein	HOL	HO
Holstein, Red and White	RED	RW
Jersey	JER	JE
Kerry	KER	-
Dutch Belted- Lakenvelder	DBE	
Breed	Breed	Breed

	Code(1) 3-ch	Code(2) 2-ch
Limousin	LIM	LM
Longhorn	LON	-
Luing	LUI	
Rouge des Pres	RDP	-
Murray-Grey	MGR	MG
Montbeliard	MON	MO
Marchigiana	MAR	MR
Mareremmana	MAE	-
Nellore	NEL	-
Normandy	NMD	NO
Norwegian Red	RDC	NR
Parthenaise	PAR	-
Piedmont	PIE	PI
Pinzgau	PIN	PZ
Red Angus	RAN	-
Romagnola	ROM	RN
Salers	SAL	SL
Santa Gertrudis	SGE	SG
South Devon	SDE	SD
Sussex	SUS	-
Simmental/Fleckvieh	SIM	SM
Swedish Red	RDC	SR
Sahiwal	SAH	SW
Tarentaise	TAR	TA
Tux	TUX	
Tyrol Grey	TGR	AL
Verbeter Roodbont	VRB	
Wagyu	WAG	
Belgium Blue Mixte	WBM	
Welsh Black	WBL	WB
Western Flanders Meat	BRV	
West-Vlaams Rood	BRD	
Witrik	WRI	





Interbull: the worldwide network providing genetic information services for improvement of livestock

5

Cattle Genetic Improvement

- Genotype x Environment Interaction
  - Climate, production system, etc
- Trait Definition
  - Lactations, days included, etc
- Methods Used for Nat'l Evaluation
  - Sire model vs animal model
  - Lactation yield vs. test-day records
- Estimation versus True Correlation
  - Connectedness
  - Pedigree and identification errors

6

Table 1. Improvement of performance in livestock species from the sixties to the present

Species	Trait	Performance*		
		Sixties	Present	% Change
Pigs	Pigs weaned/sow/year	14	21	50
	Lean %	40	55	37
	Feed Conversion Ratio	3.0	2.2	27
	Kg lean meat per ton of feed	85	170	100
Broilers	Days to 2 kg	100	40	60
	Breast meat %	12	20	67
	FCR	3.0	1.7	43
Layers	Eggs per year	230	300	30
	Eggs per ton of feed	5000	9000	80
Dairy	Milk production/ cow/lactation (kg)	6,000	10,000	67
'Average'				>50

* The figures vary greatly between regions and production systems. The table provides an indication of the change rather than accurate estimates.

7

Empowering technology of dairy potential in Taiwan

8

Both are operating at 4x their resting energy requirements!

Milk

Production in Taiwan how to reach out ?

2019年3月底乳牛飼養場數及在養量

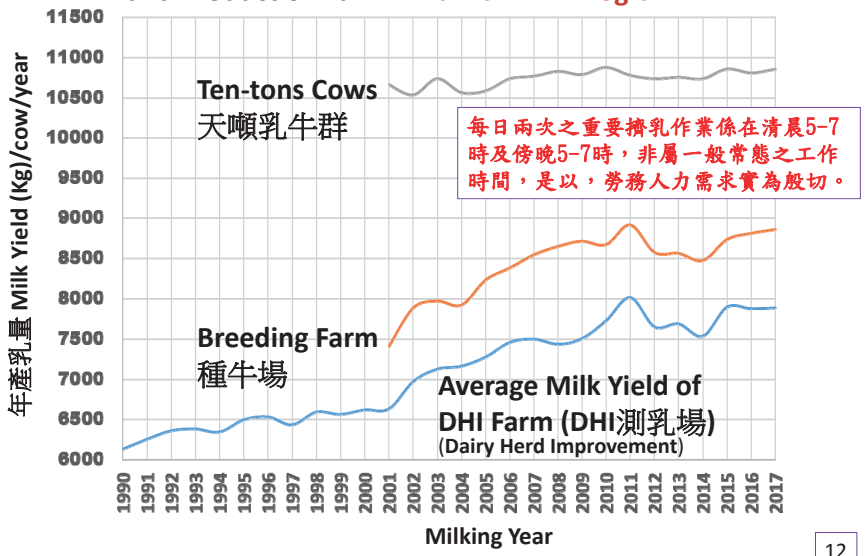
縣市別	飼養場數(場)		在養頭數(頭)				
	實數	%	總頭數 實數	總頭數 %	產乳牛	未產女牛	乳公牛(種用)
新北市	5	0.90	1,101	0.95	646	400	55
臺北市	1	0.18	52	0.05	38	14	-
桃園市	32	5.75	4,482	3.89	2,688	1,771	23
臺中市	21	3.77	2,675	2.32	1,650	1,007	18
臺南市	102	18.31	22,410	19.43	11,821	10,435	154
高雄市	32	5.75	6,513	5.65	3,635	2,865	13
宜蘭縣	-	-	-	-	-	-	-
新竹縣	8	1.44	1,940	1.68	965	973	2
苗栗縣	17	3.05	2,184	1.89	1,293	882	9
彰化縣	105	18.85	26,869	23.29	14,744	12,009	116
南投縣	5	0.90	826	0.72	462	359	5
雲林縣	74	13.29	14,580	12.64	7,375	7,190	15
嘉義縣	35	6.28	7,112	6.17	4,217	2,861	34
屏東縣	102	18.31	20,518	17.79	10,756	9,709	53
臺東縣	8	1.44	1,201	1.04	649	545	7
花蓮縣	5	0.90	2,196	1.90	1,071	1,091	34
澎湖縣	-	-	-	-	-	-	-
基隆市	-	-	-	-	-	-	-
新竹市	3	0.54	453	0.39	238	210	5
嘉義市	1	0.18	61	0.05	37	24	-
金門縣	1	0.18	177	0.15	132	10	35
連江縣	-	-	-	-	-	-	-
總計	557	100.00	115,350	100.00	62,417	52,355	578

2019年台灣酪農戶參加DHI(牛群性能改良計畫)統計(截至2019/5/23)

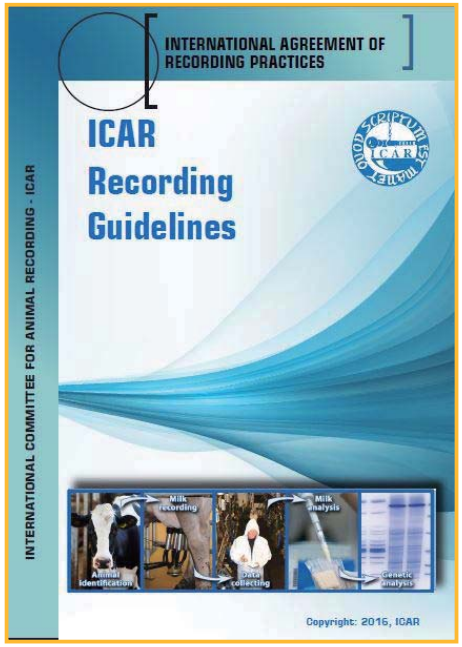
縣市	測乳戶數	測乳頭數	每戶測乳頭數	測乳月次	最近測乳日	輔導員配置 人數(+自)	輔導員配置 戶數/人	輔導員配置 頭數/人/日	2019年第一季在養調查 酪農戶數	總頭數	產乳牛	未產女牛	種用公牛	參加DHI率(%) 戶數比	參加DHI率(%) 產乳牛頭數比
台南市	38	5337	140.4	4.7	2019/5/22	4	9.5	107.4	102	22410	11821	10435	154	37.3	45.1
屏東縣	36	4578	127.2	4.9	2019/5/23	3	12.0	98.0	102	20518	10756	9709	53	35.3	42.6
彰化縣	23	4665	202.8	4.8	2019/5/22	3	7.7	165.0	105	26869	14744	12009	116	21.9	31.6
嘉義縣	15	1693	112.9	4.6	2019/5/21	3	5.0	88.5	35	7112	4217	2861	34	42.9	40.1
雲林縣	14	1523	108.8	4.1	2019/5/22	1	14.0	93.1	74	14580	7375	7190	15	18.9	20.7
桃園市	8	1225	153.1	4.1	2019/5/19	2	4.0	144.9	32	4482	2688	1771	23	25.0	45.6
高雄市	7	900	128.6	4.0	2019/5/14	2	3.5	98.4	32	6513	3635	2865	13	21.9	24.8
苗栗縣	7	590	84.3	4.3	2019/5/17	2	3.5	71.1	17	2184	1293	882	9	41.2	45.6
花蓮縣	4	979	244.8	5.0	2019/5/21	1	4.0	188.9	5	2196	1071	1091	34	80.0	91.4
台中市	3	123	41.0	5.0	2019/5/22	2	1.5	32.0	21	2675	1650	1007	18	14.3	7.5
新竹縣	1	219	219.0	3.0	2019/5/20	1	1.0	171.7	8	1940	965	973	2	12.5	22.7
南投縣	1	212	212.0	5.0	2019/5/5	1	1.0	165.4	5	826	462	359	5	20.0	45.9
金門縣	1	67	67.0	4.0	2019/4/26	1	1.0	48.3	1	177	132	10	35	100.0	50.8
嘉義市	1	31	31.0	5.0	2019/5/18	1	1.0	26.2	1	61	37	24	-	100.0	83.8
台北市	1	24	24.0	4.0	2019/4/21	1	1.0	21.3	1	52	38	14	-	100.0	63.2
台東縣	-	-	-	-	-	-	-	-	8	1201	649	545	7	0.0	0.0
新北市	-	-	-	-	-	-	-	-	5	1101	646	400	55	0.0	0.0
新竹市	-	-	-	-	-	-	-	-	3	453	238	210	5	0.0	0.0
宜蘭縣	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
基隆市	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
連江縣	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
澎湖縣	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
全部	161	22029	136.8	4.4	-	14	11.5	109.8	557	115350	62417	52355	578	28.9	35.3

http://pigbase.angrin.tlri.gov.tw/pigbase/DairyFarmDHI.asp

Average Milk Yield of Ten-tons Cows, Breeding Farm and Production Farm in Taiwan DHI Program



2017/07/16 by Mingche WU



Dairy Cow

- Age at First Calving
- Calving Ease

3.1.3.3.3.2 Calculated ages at various reproductive events

Many ways of calculating ages and intervals as measures of reproductive performances are reported. In order therefore to provide a comprehensive picture of the trait, the details of the animals involved and of the elements included in the calculation are required.

- Age at puberty.
- Age at first breeding (in days or months).
- Age at first successful breeding (in days or months).
- Age at first calving (in days or months).

  The first calving of the animal should be checked against normal biological criteria and with reported calving number.
- Age at nth calving (in days or months).

Canada

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

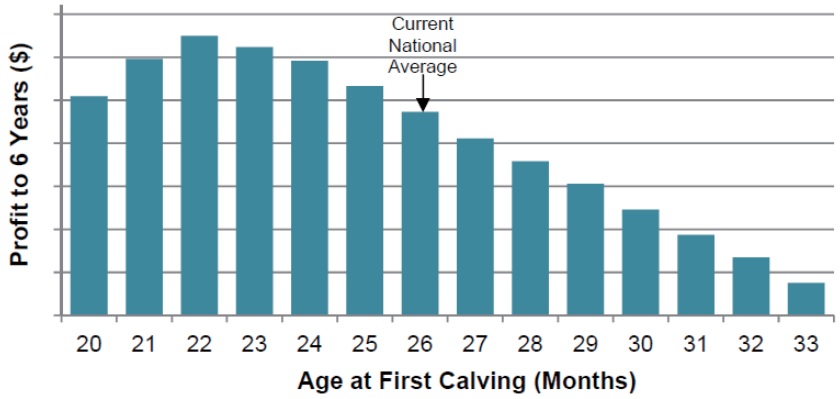
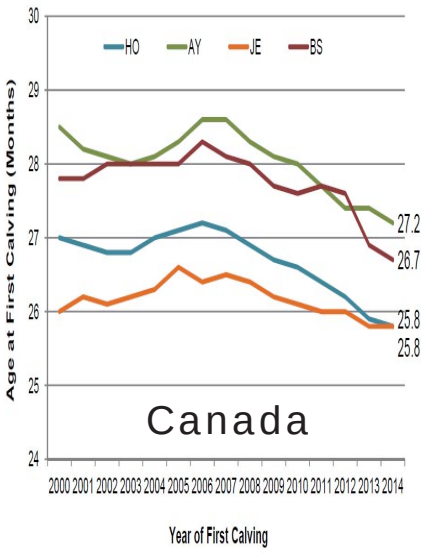
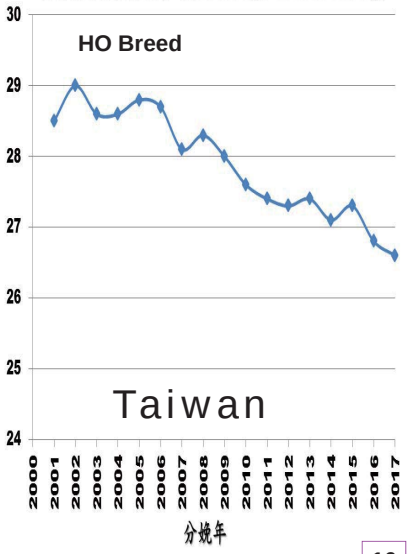


Figure 1: Trend in Average Age at First Calving by Breed



Tropical Dairy Cattle

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



State	Recording requirements [1]	
Calf	Conception	Outcome of a breeding, success or failure Date of the relevant breeding
	Birth	Date, identification, sex, weight [2]
	Pre-weaning period	Date of weight, measurements [3]
	Weaning	Date, weight, measurements
	Post Weaning period	Date of weight, measurements
	Death/Disposal	Date, reason
Breeding female	Puberty	Date
	First and Subsequent Breeding(s)	Type (AI, natural service, multiple sires) Rank of AI Sire identification Date (AI, mating, mating period) Measurements, Weight [1]
	Calving	Date, parity Calving ease, Measurements [2], Weight
	Death/Disposal	Date, Reason
Breeding male	Puberty	Date
	Mating/Semen collection	Date, Measurements, Weight, Semen characteristics
	Death/Disposal	Date, Reason

17

3.1.3.3.3.10 Calving ease or difficulty, calving mode

Difficult calvings lead to increased calf and cow mortality and could impair the health of the calf, the health of the dam, her subsequent fertility and her production performances.

Dystocia can be of maternal or foetal origin. Maternal factors are:

1. anatomical or pathological defects in the pelvic canal (variation in pelvic opening area, pelvis immaturity, and fibrosis of the reproductive tract);
2. insufficient preparation for parturition or expulsive contractions.

Foetal factors are:

1. oversize (relative, absolute or pathological);
2. faulty position;
3. dead calf;
4. twinning.

18

台灣DHI乳牛群母牛分娩難易度

代碼	定義
1	易產犢，完全無需協助，自然分娩，順產。
2	產犢順，需部分協助(一人)，需輕微協助後順產，屬輕度難產。
3	產犢不易，需兩人或以上費力協助後順產(含器械順產)，中至重度協助後才順產，屬中至重度難產。
4	剖腹產。
5	死產，毀胎術，碎胎術。

https://www.independent.ie/business/farming/quick-fix-of-inducing-cows-should-not-be-a-substitute-for-good-management-26711641.html

Dr Dan Ryan
March 8 2011 5:00 AM

19

台灣DHI乳牛群母牛分娩難易度

代碼	定義
1	易產犢，完全無需協助，自然分娩，順產。
2	產犢順，需部分協助(一人)，需輕微協助後順產，屬輕度難產。
3	產犢不易，需兩人或以上費力協助後順產(含器械順產)，中至重度協助後才順產，屬中至重度難產。
4	剖腹產。
5	死產，毀胎術，碎胎術。

Mingche WU 2018/12/27

種牛畜牧場 Breeding Farm　畜牧場 Production Farm

20

2017

Top Milk Producing Countries In The World

1. **USA** (91.3 billion kilograms)
2. **India** (60.6 billion kilograms) ...
3. **China** (35.7 billion kilograms) ...
4. **Brazil** (34.3 billion kilograms) ...
5. **Germany** (31.1 billion kilograms) ...
6. **Russia** (30.3 billion kilograms) ...
7. **France** (23.7 billion kilograms) ...
8. New Zealand (18.9 billion kilograms) ...

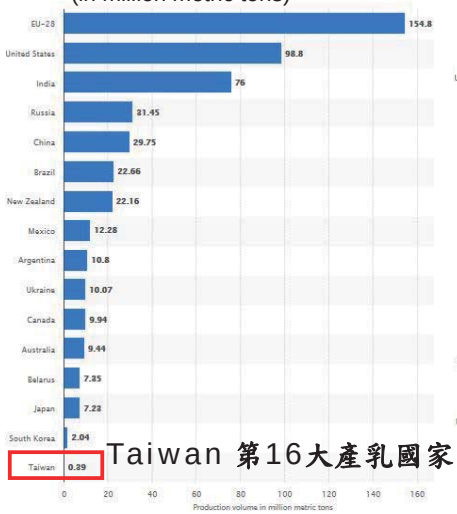
Top Milk Producing Countries In The World - WorldAtlas.com
https://www.worldatlas.com/articles/top-cows-milk-producing-countries-in-the-world.html

statista https://www.statista.com

2018

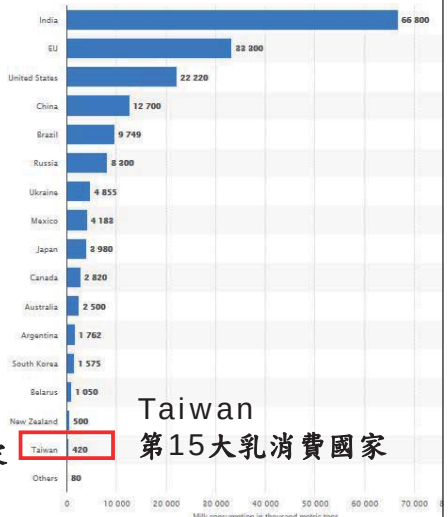
Annual consumption of fluid cow milk worldwide

Major producers of cow milk worldwide in 2018, (in million metric tons)



Taiwan 第16大產乳國家

(in 1,000 metric tons)



Taiwan
第15大乳消費國家

https://www.statista.com/statistics/268191/cow-milk-production-worldwide-top-producers/

https://www.statista.com/statistics/272003/global-annu consumption-of-milk-by-region/

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** (5,987,419,284 tons). 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

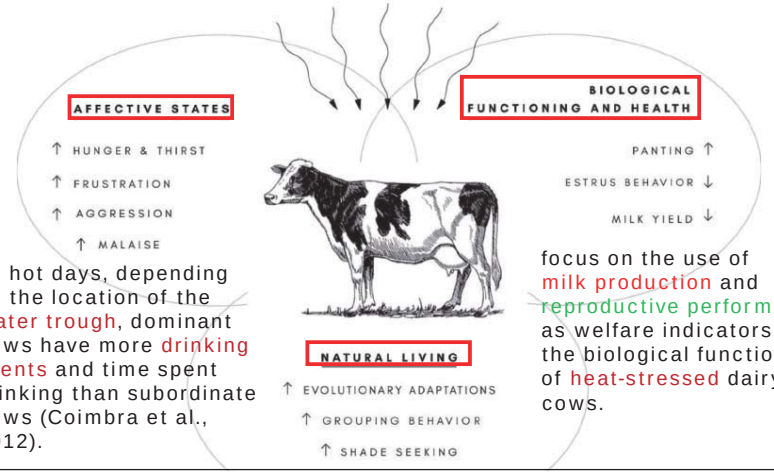
Invited review: Learning from the future—A vision for dairy farms and cows in 2067

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

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

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

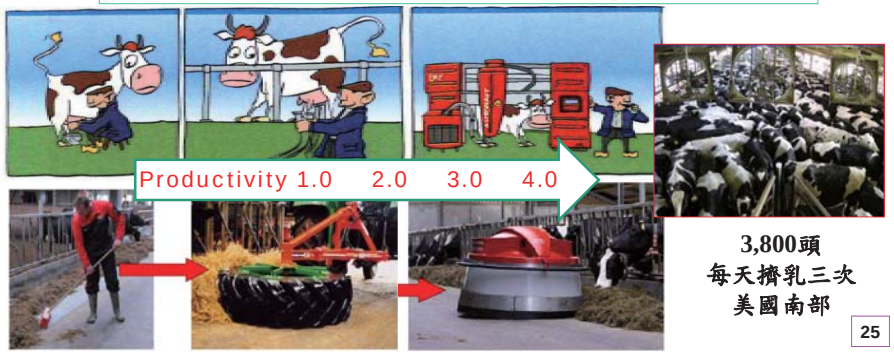
Liam Polsky and Marina A. G. von Keyserlingk[1]
Animal Welfare Program, 2357 Main Mall, Faculty of Land and Food Systems, University of British Columbia, Vancouver, BC, V6T 1Z4 Canada



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.

ICT支援乳牛產業案例



3,800頭
每天擠乳三次
美國南部

Denmark

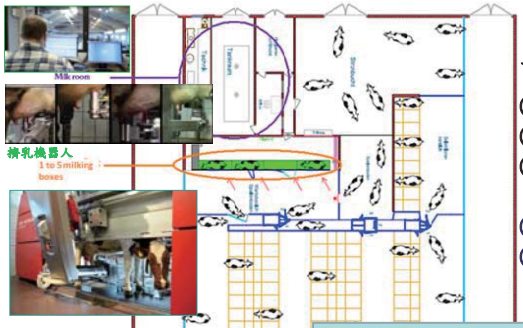
WHERE WE CAME FROM AND WHERE WE ARE HEADING
Milk recording and data value before and now
Uffe Lauritsen RYK, Denmark

智慧農業4.0

生乳產業領航產業技術研發與應用

台灣乳牛場導入五大動線機器人

Robotic Systems for Dairy Cattle Farm in Taiwan



台灣酪農戶進行五大日常工作動線之智慧型機器人上線來替代人工：

(1)每日擠乳動線 Milking
(2)每日餵養牛隻動線 Feeding
(3)每日清理牛隻糞尿及環境整潔動線 Clean Up
(4)週期監測牛隻健康動線Health
(5)週期管理母牛分娩及仔牛飼養動線 Calving

歐美日韓機器人照護乳牛動線
Basic Milking Center Layout

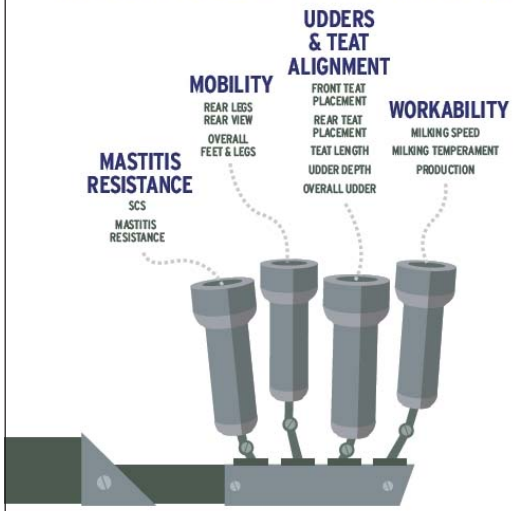
乳牛人工授精
目視鏡週期監測牛隻健康

Mingche WU 201

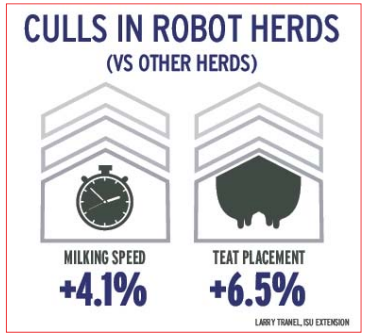
https://www.lely.com/solutions/milking/astronaut-a4/

擠乳機器人台灣模式

(櫥櫃型擠牛乳機器人使用情境及報表介面)



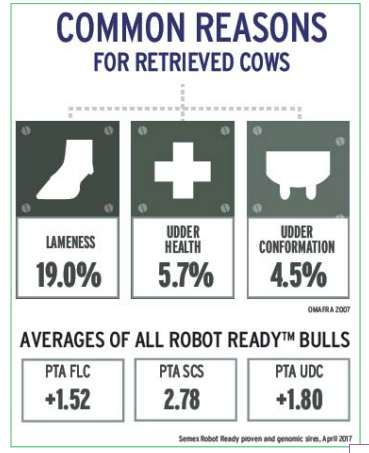
- 初產泌乳牛適應擠乳機器人的適應度(HH)計算公式
  = 最前三週的擠乳間距分鐘 – 第10至12週的擠乳間距分鐘
- 適應快的初產牛擠乳間距是492分鐘(~8小時)，是好擠乳母牛選育性狀。



FIVE CRITERIA FOR BREEDING ROBOT READY COWS

BY JEAN - DOMINIC CARON, ROBOT MILKER ADVISOR, CIAQ

- Somatic cell count and resistance to mastitis
- A good rear leg rear view
- Teat position and length
- Milking speed
- Temperament



GMACE Methodology

The following materials are recommended readings on the GMACE methodology:

- Sullivan, P.M. 2016. Defining a Parameter Space for GMACE. Interbull Bulletin 50:85-93
- VanRaden, P.M. and Sullivan, P.G. 2010. International genomic evaluation methods for dairy cattle. Gen. Sel. Evol. 42:7
- Sullivan, P.G. and Jakobsen, J.H. 2012. Robust GMACE for young bulls – methodology. Interbull Bulletin 45, Article 1.
- Sullivan, P.G. 2012a. GMACE reliability approximation. Report to the GMACE working group of Interbull. GMACE_rels 2013
- Sullivan, P.G. 2012b. GMACE variance estimation. Report to the GMACE working group of Interbull. GMACE_vce 2013
- Sullivan, P.G. 2012c. GMACE Weighting Factors. Report to the GMACE working group of Interbull. GMACE_gedcs 2013
- Jakobsen, J.H. and Sullivan, P.G. 2013. Trait specific computation of shared reference population. Reference sharing Nov 2013

https://interbull.org/ib/gmace_ref

Release dates for year 2019 of national and Interbull evaluations for WORKABILITY TRAITS

Country	Breed(s)	Evaluation date(s)	Observation
Australia	BSW, GUE, HOL, JER, RDC	2019-04-08 2019-08-19 2019-12-09	above are official releases, additional provisional releases will on every first Tuesday of the month (except 8/1 and 6/11)
Germany	BSW, SIM, HOL, JER, RDC	2019-04-02 2019-08-13 2019-12-03	
Italy	BSW	2019-04-02 2019-08-13 2019-12-03	
Netherlands	BSW, HOL, JER, RDC, SIM	2019-04-03 2019-08-14 2019-12-04	
New Zealand	BSW, GUE, HOL, JER, RDC	2019-01-14 2019-02-11 2019-03-18 2019-04-22 2019-05-20 2019-06-17 2019-11-11 2019-12-09	
Norway	RDC	2019-02-07 2019-05-09 2019-10-10 2019-12-05	
Slovenia	BSW, HOL, SIM	2019-03-12 2019-06-11 2019-11-12	
Switzerland	BSW, HOL, JER, SIM	2019-04-02 2019-08-13 2019-12-03	

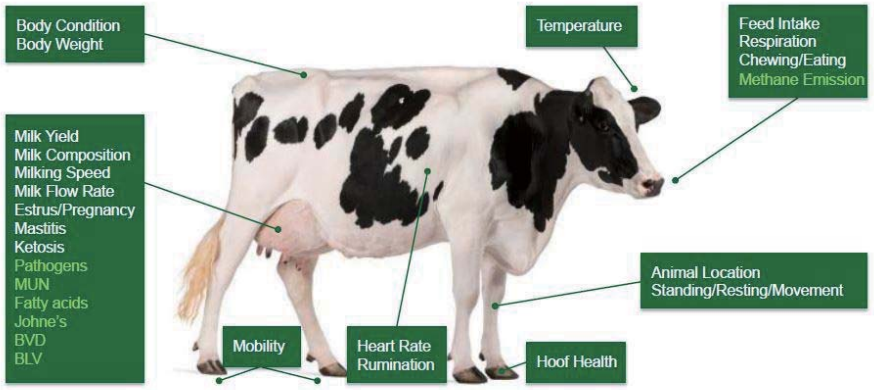
全球2018年已有10個國家對荷士登(HOL)乳牛品種之好擠乳(Workability)基因進行評選：
1) 加拿大
2) 丹麥
3) 瑞典
4) 芬蘭
5) 法國
6) 德國
7) 奧地利
8) 匈牙利
9) 西班牙
10) 瑞士

乳牛場採用擠乳機器人來配合DHI，才會有大數據資料知道每次四個乳房下乳速率及擠乳所需分鐘秒數，讓擠乳機器人的手臂，每小時可以擠乳6頭以上(10分鐘內擠到 20公斤以上)，才能每台每天擠乳滿 3公噸。

https://interbull.org/ib/releasedates

Denmark 模式

FARMER OR TECHNOLOGY



ICAR 2018 Auckland, New Zealand
February 11, 2018
THE GLOBAL STANDARD FOR LIVESTOCK DATA

WHERE WE CAME FROM AND WHERE WE ARE HEADING

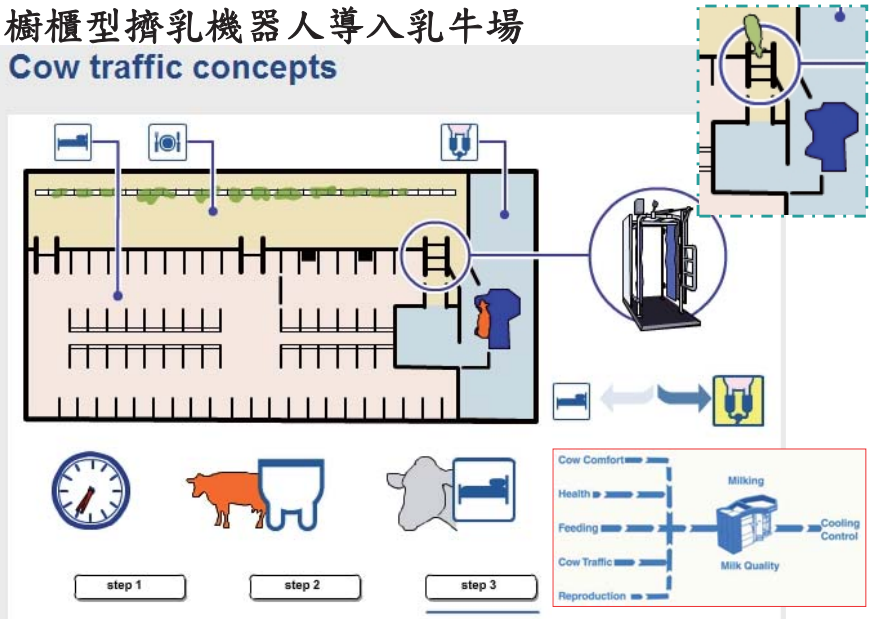
Milk recording and data value before and now

Uffe Lauritsen RYK, Denmark

33

櫥櫃型擠乳機器人導入乳牛場

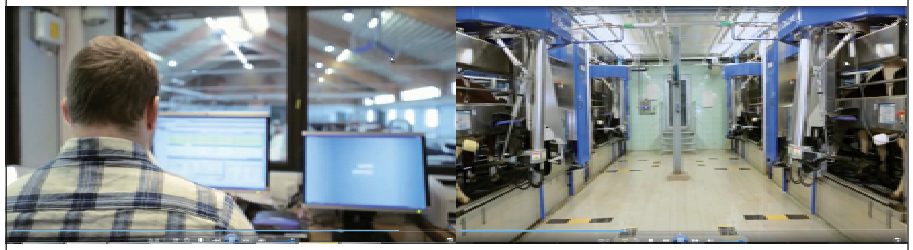
Cow traffic concepts

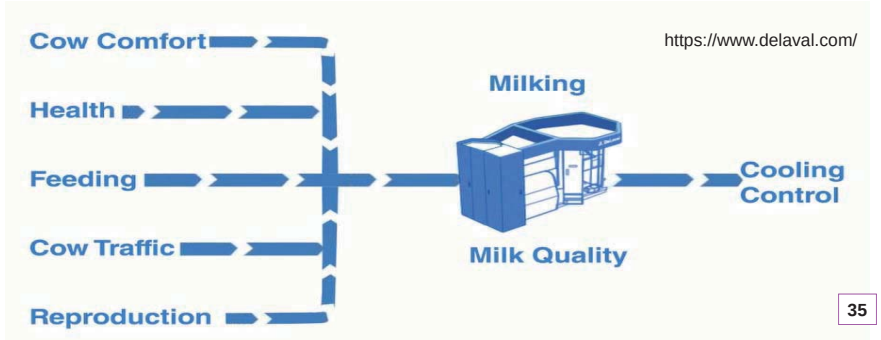


http://www.delaval.com/en/-/Product-Information1/Milking/Systems/Automatic/Cow-traffic-concepts/

34

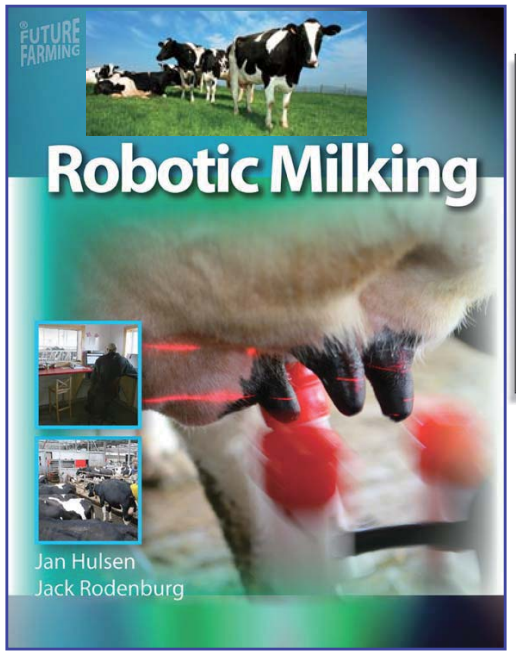
櫥櫃型擠乳機器人(70頭)串聯組合多



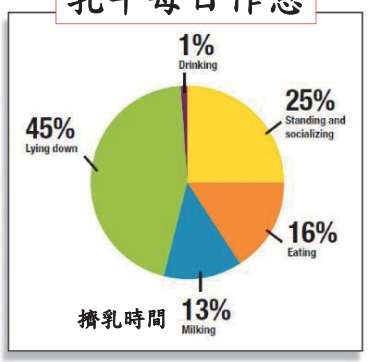


https://www.delaval.com/

35



乳牛每日作息



36