EVALUATION SYSTEM FOR TRAITS OTHER THAN PRODUCTION

TOP

FOR DAIRY CATTLE IN NEW ZEALAND

EVALUATION SYSTEM FOR TRAITS OTHER THAN PRODUCTION (TOP) FOR DAIRY CATTLE IN NEW ZEALAND

Introduction

Yields of milk protein and milkfat are important traits for the profitability of a dairy cow. Milk volume, cow liveweight, fertility, somatic cell count and cow survival are also directly related to the profitability of dairy animals due to their impacts on farm revenues and farm costs. These traits are included in the Breeding Worth (BW) and Production Worth (PW) indexes on which selection decisions in New Zealand dairying are primarily based.

However, there are "Traits Other than Production" (TOP) like temperament, milking speed and conformation which contribute to the overall value of any animal in a herd and any bull which transmits them. Data on some of these traits is collected and analysed. TOP trait assessments for Udder Overall and Body Condition Score contribute directly to BW.

Breed Societies and artificial breeding organisations are interested in the recording and evaluation of traits other than production of New Zealand dairy animals. The TOP Advisory Committee of representatives from these organisations operates an evaluation system for traits other than production. The TOP system is based on:

* linear assessment of traits
* experience from many years of conformation assessment
* current genetic and economic knowledge
* latest research results from New Zealand and overseas
* national cost effectiveness
* future requirements for dairy cattle characteristics

The main objective of the TOP system is to provide accurate and unbiased comparisons of cows and sires, thus providing cow owners and bull owners with easy-to-use information. The TOP evaluation system is directed by the TOP Advisory Committee (a sub-committee of New Zealand Animal Evaluation Limited) which comprises of three representatives from the New Zealand Dairy Breeds Federation, one from the NZAEL, one from LIC, one from CRV and one representing AB companies other than LIC and CRV. The committee plays a major role determining policy relating to the system, sets inspection standards and monitors the performance of inspectors.

The Basis of the TOP System

With cow numbers stablising the focus on individual cows has increased, so it's more important than ever to ensure farmer's have highly efficent animals that will last in the herd. The TOP system plays an important role in this and includes adaptability to milking, shed temperament and milking speed. All these are important characteristics of cows in large herds.

Udder characteristics are very important. Udders allowing easy machine milking, reduce labour costs and improve milking efficiency.

Not all traits can be recorded or included in the selection objective: Some cannot be influenced by breeding methods, and others cannot be measured accurately or are not important. The TOP system incorporates of some of the most important traits required on the New Zealand dairy farm.

Benefits of the TOP System

The TOP system offers the following features:

- It improves and facilitates sire selection
- It gives the breeder an objective assessment of the animal
- It is easy to use
- It is compatible with electronic data processing
- It is easily understood
- It is accepted by dairy cattle breeders as well as commercial dairy farmers

Collection of data

Linear assessment

The accuracy of any system depends on the accuracy with which data is collected. This is also true when assessing the conformation of an animal.

The method of linear assessment is the most accurate method of conformation evaluation and for this reason is widely used. The TOP system is based on linear assessment of animals.

A detailed guide which explains the method of scoring and the definition of the traits recorded is given on pages 5-11.

Traits recorded

The following traits are recorded:

Information supplied by farmer:

1.	Adaptability to Milking	(slowly-quickly)
2.	Shed Temperament	(vicious-placid)
3.	Milking Speed	(slow-fast)
4.	Overall Opinion	(undesirable-desirable)

Information supplied by inspector:

1.	Stature	(<110cm - >145cm)
2.	Capacity	(frail-capacious)
3.	Rump Angle	(pins high-pins low/sloping)
4.	Rump Width	(narrow-wide)
5.	Rear Leg Set	(straight-sickled/curved)
6.	Udder Support	(weak-strong)
7.	Udder Attachment - Fore	(loose-strong)
8.	Udder Attachment - Rear	(low-high)
9.	Front Teat Placement	(wide-close)
10.	Rear Teat Placement	(wide-close)
11.	Teat Length	(short-long)
12.	Udder Overall	(undesirable-desirable)
13.	Dairy Conformation	(undesirable-desirable)
14.	Body Condition Score	(undesirable-desirable)

Any additional characteristics of the animal not described by these traits can be recorded as farmer's or inspector's comments.

Inspectors

Inspectors must pass a practical examination in order to qualify as TOP inspectors. They are nominated by participating organisations and are required to attend Certification Days organised and administered by the TOP Advisory Committee to ensure uniform standards. Breed Societies organise additional workshops on the granting of their respective breed awards.

Inspections

All TOP inspections of animals are organised by Breed Societies on behalf of all participating organisations. The TOP records from two-year-old animals are used for sire evaluations. To achieve valid comparisons between sires, two-year-old animals in a herd may not be inspected selectively: if any two-year-old is to be inspected they all must be, with the exception of herds that have been identified by AB companies as TOP Inspection Subgroup herds (where a subset of two-year-olds will be inspected).

However, selected older cows can be re-inspected at the cow owner's request.

TOP Breeding Value Analysis

Best Linear Unbiased Prediction (BLUP) under an animal model has been used to evaluate New Zealand dairy cattle for linear type traits. The animal model allows simultaneous sire and cow evaluation which prevents certain classes of selection bias and increases the accuracy of prediction compared to sire maternal grandsire models.

The statistical model for analysis includes effects for:

- herd-season contemporary group
- stage of lactation when scored
- age at first calving in months (nested within breed)
- heterosis
- genetic group
- animal genetic merit and
- the random residual

A grouping strategy in which a genetic group for each animal is derived from the genetic group effect of the animal's ancestors is used. For each animal with unknown ancestors, phantom parents without records are created. The phantom parents are assigned to appropriate genetic groups. The genetic group effects represent the average genetic contribution of the phantom parents. Genetic groups were assigned by sex (male or female missing parent), birth year, country of origin and breed. The genetic merit of the animals is defined as the breeding value which is the sum of the additive animal genetic effect and the genetic group effect.

Administration

Sire Registration

To include a sire for the TOP evaluation system, the sire must be enrolled with New Zealand Animal Evaluation Limited (NZAEL). The nominating AB company will be charged a herd fee for each herd nominated for TOP Inspection, as well as an animal fee for each two-year-old inspected.

Inspections

Applications for TOP inspections from cow owners are processed by the Breed Societies. Applications from bull owners who have enrolled sires for Animal Evaluation and TOP evaluation are processed by NZAEL.

According to the applications received, TOP lists are downloaded to an electronic data

recorder, with the identification of the animals to be inspected.TOP Farmer Lists are sent to the herdowner to complete.

Data Processing
The completed TOP inspections are uploaded to and stored in the Dairy Industry Good Animal Database (DIGAD).

The organisation and distribution of TOP publications is the responsibility of NZAEL. Breed Societies receive TOP cow listings for herds whose inspection was requested through them. Bull owners receive cow listings for herds which they requested to be inspected.

Charges
A current schedule of charges for TOP inspections and bull enrolments is available from the Breed Societies. The charges cover travel, accommodation and labour of the inspector, data entry, editing, analysing and reporting of the data.

Publications

TOP Cow listings
The TOP inspection results for their herd are sent to all farmers who had cows inspected for TOP. Part of a cow listing is shown on page 12. Besides the herd information the TOP results for each cow evaluated are shown. In addition the two-year-old average, herd average and the national breed average for each trait is printed. For pedigree cattle the TOP evaluations are also published in the Breed Societies Production Register, which are available from the individual Breed Societies.

Other Reports
The TOP information for an animal is incorporated in numerous other reports such as the Individual Animal History, Three Generation Pedigree and Sales Catalogue.

LINEAR ASSESSMENT FOR TRAITS OTHER THAN PRODUCTION (TOP)

The ability to evaluate dairy cattle more accurately for their traits other than production initiated the introduction of the method of linear assessment on which the TOP system is based. The increase in accuracy of sire and cow evaluations using linear assessment is brought about by two main factors:

- The objective description of the animal as it ranks between the biological extremes
- The scale with nine scores allows more of the variation present to be recorded

The main advantage of the TOP system is that inspectors describe the animal, rather than how closely the animal resembles an imagined "ideal" animal.

The description of the animal given by the inspector can then be interpreted and used by different people for their specific purposes. Thus the main objective of the assessment under the linear system is the objective description of the animal, its ranking between the two biological extremes, no matter which ranking is considered "ideal".

Linear assessment as the base of the TOP system offers the following advantages:

- It allows a more accurate description of traits other than production for daughters of progeny tested sires, dams of bulls and pedigree cows
- It describes an animal objectively and is used to produce sire evaluations which give the animal breeder a more objective assessment of the value of the animal
- It agrees closely with evaluation systems used overseas and therefore will allow comparisons between different populations
- It allows efficient electronic data processing and computing, which increases the use and value of the recorded information

Assessing the animal

Each trait is scored separately on a scale from 1 to 9 represent the possible biological extremes.

The traits included in the TOP system are the traits currently considered most important in dairy cattle. They include four traits scored by the farmer, three of which describe how well the animal fits into the milking routine. These traits are scored by the farmer on a separate form called TOP Farmer List (see page 14) or from 2022 farmers are able to score the four farmer traits via the HFNZ Farmer Trait App (see page 13).

Thirteen conformation traits and body condition score are scored by inspectors using an electronic data recorder (see page 15). As the assessment is a description of the animal the scoring is carried out across breeds. Any additional characteristics of the animal not described by these traits, are noted in the Comment Codes column using codes shown on pages 16 and 'Inside Back Cover'.

Up to ten comments per animal can be recorded.

Further information is available from: NZ Animal Evaluation Ltd Manager Andrew Fear Private Bag 3221, Hamilton 3240

A. Farmer traits

Information supplied by the herd owner.

1. ADAPTABILITY TO MILKING
This trait describes how soon the animal settled into the milking routine after calving. (eg. How many milking's before milk let down was spontaneous. How many milking's before milking was completed without extra attention.)

1	2	3	4	5	6	7	8	9

Slowly < Average > Quickly

2. SHED TEMPERAMENT
This trait describes the temperament of the animal in the shed while being handled and milked. It is a different trait to adaptability to milking and should be assessed once animals have settled into the milking routine.

1	2	3	4	5	6	7	8	9

Vicious < Average > Placid

3. MILKING SPEED
This trait describes the milking speed of the animal, i.e. the time from putting cups on to the time flow stops or cups are taken off.

1	2	3	4	5	6	7	8	9

Slow < Average > Fast

4. OVERALL OPINION
This trait describes the farmer's overall acceptance of the animal as a herd member.

1	2	3	4	5	6	7	8	9

Undesirable < Average > Desirable

B. Inspector traits

Information supplied by the inspector.

*Note: All diagrams in this booklet are based on two-year-old animals.*

1. STATURE
This trait describes the height at the shoulders of the animal.

1	2	3	4	5	6	7	8	9
<110	110-114	115-119	120-124	125-129	130-134	135-140	140-145	>145cm

2. CAPACITY
This trait describes the capacity of the animal as a combination of strength and depth of chest and body as viewed from side, rear and front in relation to the physical size of the animal.
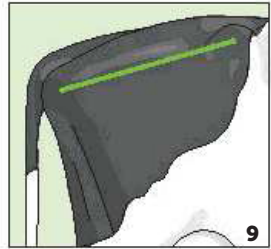
1	2	3	4	5	6	7	8	9

Frail   <   Intermediate   >   Capacious
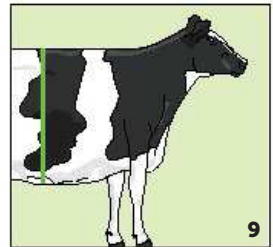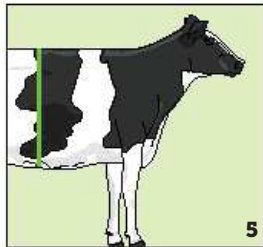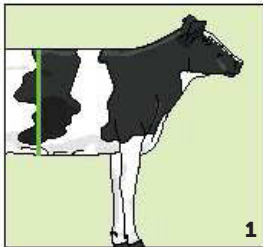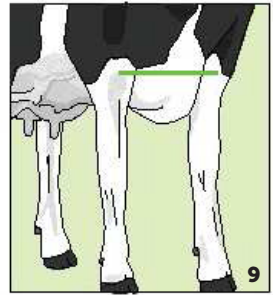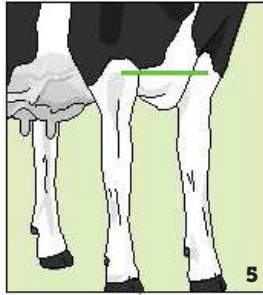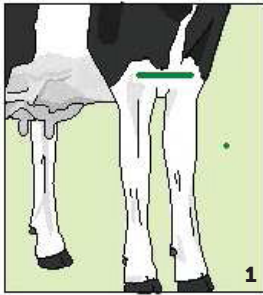
3. RUMP ANGLE

This trait describes the angle of a line between the centre of the hips and the top of the pins.

1	2	3	4	5	6	7	8	9

Pins high   <   Level   >   Pins low/sloping
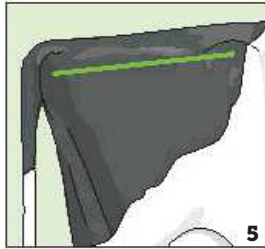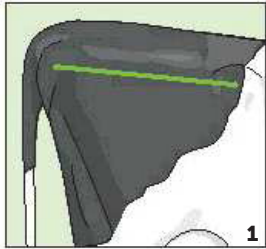
4. RUMP WIDTH

This trait describes the distance between the most posterior point of the pin bones relative to the size of the animal.

1	2	3	4	5	6	7	8	9

Narrow   <   Intermediate   >   Wide
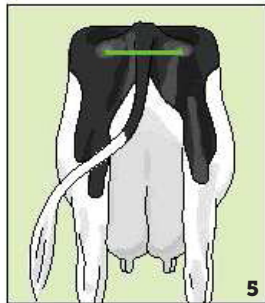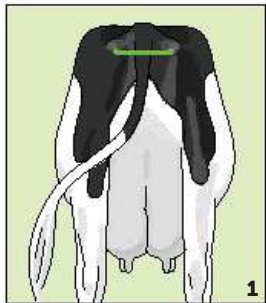
5. REAR LEG SET

This trait is an assessment of the straightness or curvature of the back legs from an imaginary line between thurls and the mid hoof while the animal is walking.

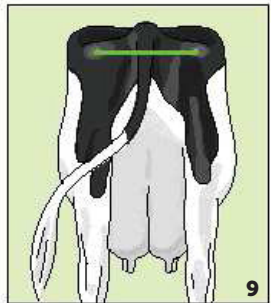| 1	2	3	4	5	6	7	8	9

Straight   <   >   Sickled/curved
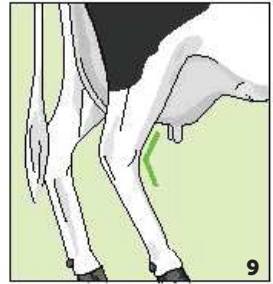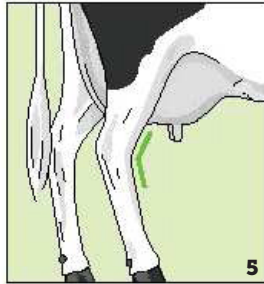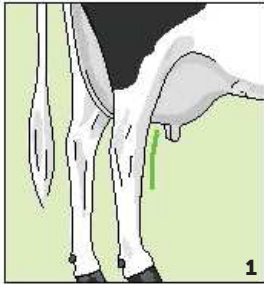
6. UDDER SUPPORT

This trait describes the strength of the suspensory ligament as viewed from the rear. It also includes the udder depth relative to the hocks. It does not include rear udder, which is a separate trait.

1	2	3	4	5	6	7	8	9

Weak   <   >   Strong
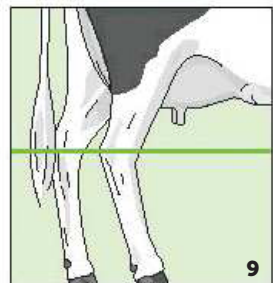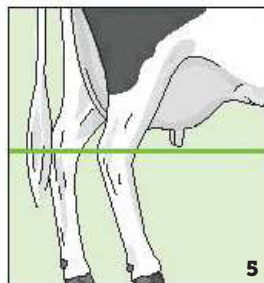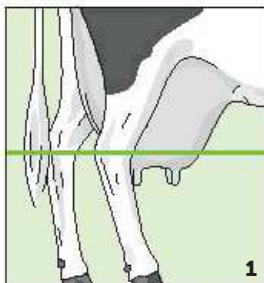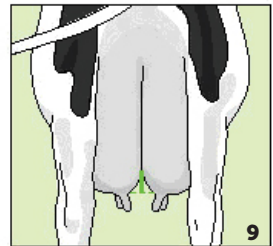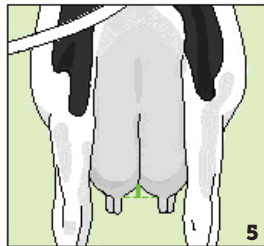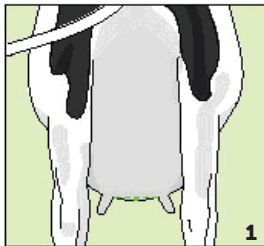
7. UDDER ATTACHMENT - FORE

This trait describes how well the front udder is attached to the body wall.

1	2	3	4	5	6	7	8	9

Loose   <   >   Strong
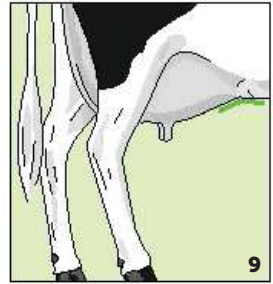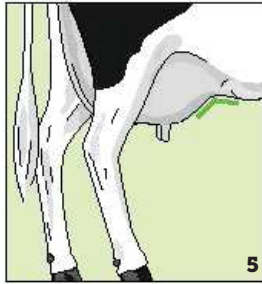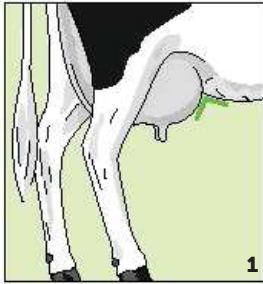
8. UDDER ATTACHMENT - REAR

This trait describes the height and width of the rear udder attachment as distinct from udder support.

1	2	3	4	5	6	7	8	9

Low   <   >   High
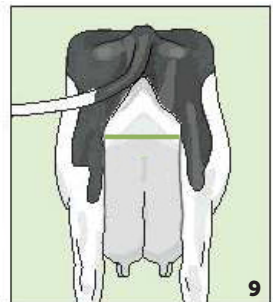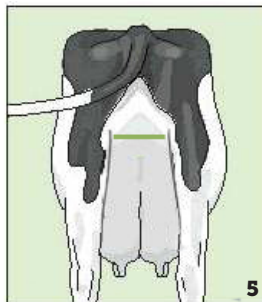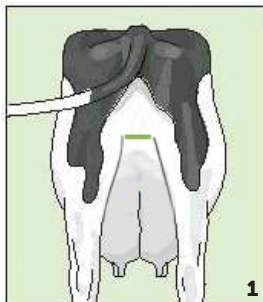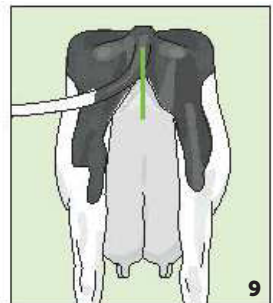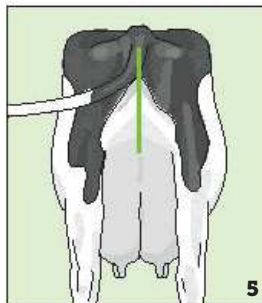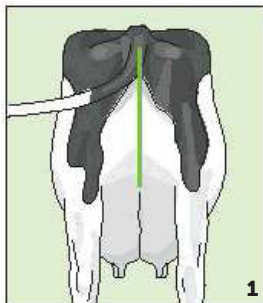
9. FRONT TEAT PLACEMENT

This trait describes the placement of the front teats (at the point of attachment to the udder) relative to the centre of the quarters as viewed from the rear.

1	2	3	4	5	6	7	8	9
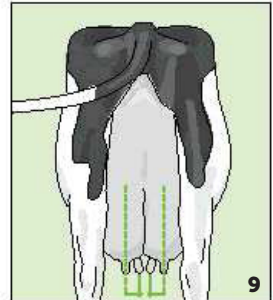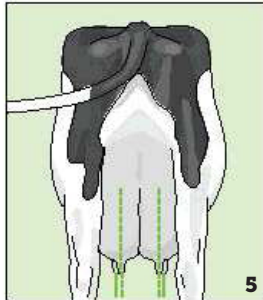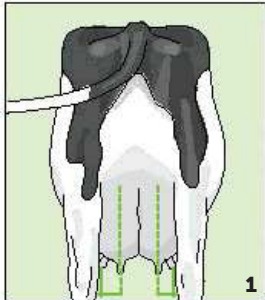
Wide   <   >   Close

10. REAR TEAT PLACEMENT

This trait describes the placement of the rear teats (at the point of attachment to the udder) relative to the centre of the quarters as viewed from the rear.

1	2	3	4	5	6	7	8	9

Wide   <   >   Close

11. TEAT LENGTH

This trait descibes the length of the rear teats.

1	2	3	4	5	6	7	8	9

Short   <   Intermediate   >   Long

12. UDDER OVERALL

All traits pertaining to the udder including those udder traits that have been linear scored.

1	2	3	4	5	6	7	8	9

Undesirable   <   >   Desirable

13. DAIRY CONFORMATION

All traits pertaining to dairy conformation including those body traits that have been linear scored, but excluding all the udder traits.

1	2	3	4	5	6	7	8	9

Undesirable   <   >   Desirable

14. BODY CONDITION SCORE

This trait is a visual estimate of an animal's body fat reserves.

1	2	3	4	5	6	7	8	9

Skinny   <   Desirable   >   Obese

3

5
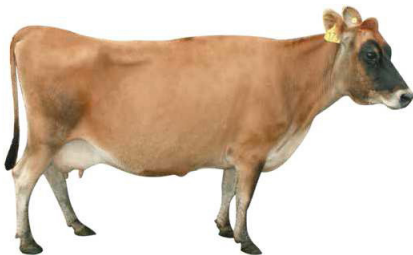
6

Photos from Dairy NZ publication:
Body Condition Scoring Made Easy: The official field guide, October 2022

Traits Other than Production (TOP) Results - Cow Listing

breedIT — Animal Evaluation

HERD OWNER: **Name**

INSPECTOR: PTPT/HERD CODE: **ABCD**   AE RUN DATE: **00/00/0000**

Inspector Name **ABCD** **00/00/0000**

TOP INSPECTION DATE: **00/00/0000**   DATE PROCESSED: **00/00/0000**

Name	Birth ID	Test No.	Sire	BW($)	AM	ST	MS	OO	S	W	C	RA	RW	L	US	FU	RU	FT	RT	TL	UO	DC	CS	Awd	Comments
FRIESIAN COW A	ABCD-2012-9	602	105758	-/-/-					9	9	8	4	7	6	8	7	8	5	6	6	8	9	9	EX	
FRIESIAN COW B-ET	ABCD-2012-7	606	103505	-/-/-					9	9	9	5	6	6	7	8	8	5	6	6	8	9	9	EX	
FRIESIAN COW C S3F	ABCD-2016-14	607	109790	-/-/-					9	9	8	5	7	6	7	9	7	5	6	5	8	8	8	88	
FRIESIAN COW D	ABCD-2016-7	608	115728	-/-/-					8	9	9	4	8	6	7	7	7	5	8	6	7	9	9	88	
FRIESIAN COW E	ABCD-2017-1	610	110714	-/-/-					9	9	8	5	8	6	7	8	8	5	6	3	8	9	9	EX	
FRIESIAN COW F S2F	ABCD-2016-8	611	114940	-/-/-					9	9	9	5	7	6	7	5	7	5	6	4	7	9	9	87	
FRIESIAN COW G-TW	ABCD-2018-16	616	111037	-/-/-					7	7	7	5	5	5	7	7	7	5	6	4	7	8	8	86	
FRIESIAN COW H S1F	ABCD-2018-50	617	117902	-/-/-					9	8	9	5	7	6	7	9	7	5	6	4	8	8	8	88	

Name	BW($)	AM	ST	MS	OO	S	W	C	RA	RW	L	US	FU	RU	FT	RT	TL	UO	DC	CS
AVERAGE OF 2YR OLDS IN HERD	NaN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
AVERAGE SCORE FOR HERD 9 COWS INSPECTED	0.0	0.0	0.0	0.0	0.0	8.7	8.7	8.4	4.6	6.9	5.9	7.0	7.6	7.3	4.9	6.1	4.9	7.6	8.7	0.0
AVERAGE SCORE(2 YR OLDS) - ALL INSPECTIONS 0000/0000																				
AYRSHIRE		3.9	4.0	3.7	4.0	4.5	4.4	6.1	4.9	5.3	6.3	5.9	5.7	5.7	4.9	6.6	3.5	5.6	6.0	0.0
HOLSTEIN-FRIESIAN		4.7	4.8	4.7	4.9	5.1	4.8	5.8	4.3	5.4	6.0	5.7	5.5	5.5	4.6	6.2	4.0	5.4	5.7	0.0
JERSEY		4.9	4.9	4.9	5.1	4.2	3.9	6.2	4.3	5.7	6.1	6.1	6.0	6.1	4.6	5.8	4.0	5.9	6.2	0.0
MILKING SHORTHORN		0.0	0.0	0.0	0.0	5.5	5.3	7.0	5.0	6.2	5.7	6.8	6.5	6.2	4.8	6.0	4.0	6.3	6.8	0.0
GUERNSEY		0.0	0.0	0.0	0.0	5.5	4.5	6.0	5.0	5.5	5.5	6.5	6.0	6.5	4.5	6.0	4.5	6.5	6.5	0.0
BROWN SWISS		0.0	0.0	0.0	0.0	5.0	4.0	5.0	3.0	4.0	5.0	6.0	4.0	6.0	4.0	6.0	4.0	5.0	4.0	0.0

Please Note – The breed averages printed above are calculated as at the date of this report and are based on the animals inspected to date in the current season.

AM - Adaptability to Milking	OO - Overall Opinion	C - Capacity	L - Legs
ST - Shed Temperament	S - Stature	RA - Rump Angle	US - Udder Support
MS - Milking Speed	W - Weight	RW - Rump Width	FU - Front Udder

RU - Rear Udder	TL - Teat Length	CS - Condition Score
FT - Front Teat Placement	UO - Udder Overall	* = Animal Changed Location
RT - Rear Teat Placement	DC - Dairy Conformation	

Adaptability: 7

Shed Temperment: 3

Milking Speed: 2

Overall Opinion: 5

Birth ID: **ABCD-2019-31**

Cow Num: **63**

Breed: **PF**

Comment Codes:

Cause of not available for inspection ▶

Other code ▶

Other Comments:

1	2 ABC	3 DEF
4 GHI	5 JKL	6 MNO
7 PQRS	8 TUV	9 WXYZ
	0	⌫

2:15

ABCD 2021-08-05

Tag Number

Cow Num	Birth ID

All cows

11	ABCD-2019-139
15	ABCD-2019-28
17	ABCD-2019-17
18	ABCD-2019-126
23	ABCD-2019-87
43	ABCD-2019-107
51	ABCD-2019-136
60	ABCD-2019-58
63	ABCD-2019-31
64	ABCD-2019-2

Holstein Friesian NZ

HFNZ Farmer Trait App

Email

Password

Sign In

Forgot your password?

T.O.P **FARMER LIST**

Participant Code:

Requested Through:

Date Processed:

PREV	Cow Details			ADAPTABILITY TO MILKING	SHED TEMPERAMENT	MILKING SPEED	OVERALL OPINION	COMMENT
AWARD	Breed	Age	IDENTIFICATION	Cow No	1-9	1-9	1-9	1-9	CODES

Please Use Code Numbers

Adaptability to Milking
1 = extremely slowly
2 = very slowly
3 = slowly
4 = slightly slowly
5 = intermediate
6 = slightly quickly
7 = quickly
8 = very quickly
9 = extremely quickly

Shed Temperament
1 = vicious
2 = very temperamental
3 = temperamental
4 = slightly temperamental
5 = intermediate
6 = slightly placid
7 = placid
8 = very pacid
9 = extremely placid

Milking Speed
1 = extremely slowly
2 = very slowly
3 = slowly
4 = slightly slowly
5 = intermediate
6 = slightly quickly
7 = quickly
8 = very quickly

Overall Opinion
1 = extremely undesirable
2 = very undesirable
3 = undesirable
4 = slightly undesirable
5 = intermediate
6 = slightly desirable
7 = desirable
8 = very desirable
9 = extremely desirable

Identity indicators

* : Parentage not yet checked

: Parentage uncertain

= : Parentage cannot be verified

Date: ___/___/___

Signature _____
(Herd Owner or Manager)

TOP INSPECTOR LIST

Herd Code:
Participant Code:
Location:
Requested Through:
Date processed:

| COW DETAILS | | | | COW No | STATURE | CAPACITY | RUMP | | REAR LEG SET | UDDER SUP-PORT | UDDER ATTACHMENT | | TEAT PLACEMENT | | TEAT LENGTH | UDDER OVERALL | DAIRY CONFOR MATION | BODY CON DITION SCORE | AWARD | COMMENT CODES |
PREV AWARD	BREED	AGE	IDENTIFICATION				ANGLE	WIDTH			FORE	REAR	FRONT	REAR						

Ident. Indicators (need not inspect)
* Paternity not yet checked
# Paternity uncertain
= Paternity cannot be verified

Date Inspected:

Inspector Code _____ Signature_____

Inspector Code _____ Signature_____

TOP FARMER COMMENT CODES

These are scored via the HFNZ Farmer Trait App or via the paper TOP Farmer Lists. All animals **MUST** be scored with either the four farmer traits or if not available for inspection the reason why they are not presented i.e. Culled or Died etc

Each fate status/not available for inspection code **MUST** be followed by a cause of fate/ cause not available for inspection code. eg. C LP - Culled due to Low Production

FATE STATUS/NOT AVAILABLE FOR INSPECTION

C	Culled		R	Running with calf, not milked
D	Died		S	Sold
IN	Induced		Y	Dry
LC	Late calver/Not yet calved		O	Other (specify)

CAUSE OF FATE/CAUSE NOT AVAILABLE FOR INSPECTION

PRODUCTION
LP   Low Production

ACCIDENT
IA   Injury or Accident

DISEASE
BL   Bloat
FE   Facial Eczema
MA   Mastitis
OD   Other Disease (specify)

REPRODUCTION
AB   Abortion
CT   Calving Trouble
MT   Empty
RO   Reproduction Other (specify)

MANAGEMENT
TE   Temperament

SHED BEHAVIOUR
SC   Kicks Cups
SH   Holds Milk
SK   Sucker
SM   Slow Milker
SO   Shed Other (specify)

CONFORMATION
FT   Feet & Leg problems
LM   Lameness
TC   Teat Conformation
TD   Double Teats
UB   Blind Quarter
UD   Udder Conformation
UL   Light or Dry Quarter

TOP INSPECTOR COMMENT CODES

FATE STATUS
C   Culled
D   Died
S   Sold

OTHER
Y   Dry
IN   Induced
LC   Late calver
R   Running with calf, not milked
O   Other (specify)
Z   Missing inspection

CAUSE OF FATE

PRODUCTION
LP   Low Production

DISEASE
BL   Bloat
FE   Facial Eczema
MA Mastitis
OD Other Disease (specify)

MANAGEMENT
TE   Temperament

ACCIDENT
IA   Injury or Accident

REPRODUCTION
AB Abortion
CT   Calving Trouble
MT Empty
RO Reproduction Other (specify)

CONFORMATION COMMENTS

HEAD
HJ   Weak Jaw
HU Undershot Jaw
HW Wry Nose
HO Other (specify)

LEGS & FEET
FT   Feet & Leg Problems
LF   Overgrown front feet
LH   Hocky
LM Lameness
LR   Overgrown rear feet
LS   Shallow angle
LO   Other (specify)

TEATS
TA   Angling out (rear teats only)
TB   Bunched
TD   Double or fused
TF   Angled forwards
TL   Long
TP   Pointed
TR   Angled to the rear
TS   Small/Short
TT   Thin
TX   Extra teats which interfere
TO   Other (specify)

BODY
BN Narrow chest
BT   Low thurls
BW Weak loin
BO Other (specify)

UDDER
UB Blind Quarter
UC Collapsed, broken down
UE Oedema
UF Bulgy front udder
UG Short front udder
UL Light or dry quarter
UQ Quartered udder
US Slopey udder floor
UT Udder texture
UU Unbalanced udder
UO Other (specify)

OTHER
ER Eligible for registration
NT Not true to breed
OC Other causes
OF Off colour (Holstein Friesian only)
OW Predominantly white (over 80%)
RF Red factor