



Dairy Industry Network Data Standards

# Animal Observations

Discussion Document



Andrew Cooke, Kim Saunders  
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# 1 Introduction

Pastoral farming is becoming a data rich activity. Most biophysical processes from soil nutrient management to cow performance have both paper based and more organised data bases recording status, productivity and intentions. There are a significant number of tools covering livestock, nutrition and financial management. Most of these require the user to re-enter data from other sources and they overlap in functionality. It is probable that if data had been more accessible their design would have better focussed on the service they undertook to provide. Farmers will benefit from a highly innovative technology sector that delivers applications that are simple to use and access, which source the information they need without impedance and deliver value.

This document is part of a work stream focusing on Data Standards for interchanging Livestock (Animal) data. Work on this project commenced in late 2012, funded by DairyNZ and with contributions from FarmIQ Systems and Rezare Systems. A well-attended workshop on Animal Data Standards in February 2013 in Hamilton, New Zealand resolved that work should be carried out on three major themes:

- Animal Identification (unique identifiers for animals, land, and enterprises);
- Life Data (mostly static data that defines an animal); and
- Observations and Actions (measurements, health treatments, and records of management activities).

This document focuses on observations and records of actions carried out on animals and groups of animals.

## 2 What is being observed?

In order to discuss observations and actions, we must first identify:

- What is an observation?
- What is being observed?

### *2.1 What is an observation?*

The dictionary<sup>1</sup> describes observation as the act or instance of noticing or perceiving, or regarding attentively, and in our case as “an act or instance of viewing or noting a fact or occurrence for some scientific or other special purpose”. Thus an observation can include a note or record of an activity carried out, an event that has occurred, or a measurement taken.

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<sup>1</sup> [www.dictionary.com/browse/observation](http://www.dictionary.com/browse/observation)

The Open Geospatial Consortium describes observations<sup>2</sup> as involving “sampling of an ultimate feature of interest”. Of course in geographic terms, many features can only be “sampled”. However, with animals and particularly groups of animals, “sampling” is an important concept. It may be that only a sample of the animals in a mob is weighed, or that a device takes a sample of the fat or protein in milk at a moment in time.

The other distinction we make is that an observation itself does not represent “state”. It is instead a sampling of the state of an animal at a point in time. As a result, an observation will not tell you when an animal lactated – only that at a point in time it was observed lactating, or that lactation was observed to begin. Our discussion document about animal attributes<sup>3</sup> gives some examples of animal state information. Changes to some of these states may be *triggered by* an observation, but the observation does not represent the state itself.

## *2.2 What is being observed*

It is also important to identify what is being observed. This may be an individual animal, identified using one of the official animal identification schemes<sup>4</sup>, or it may be a group of animals, either as a sample, or a record of an activity carried out on all the animals in the group (for example, sale, purchase, milking or shearing).

As a result, an essential part of recording and transmitting any observation must be an identification of the animal or animals to which it applies.

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<sup>2</sup> OGC: Observations and Measurements – [www.opengeospatial.org/standards/om](http://www.opengeospatial.org/standards/om)

<sup>3</sup> Animal Life Data Discussion Document, Rezare Systems 2013 - <http://www.rezare.co.nz/Media/Default/data-standards/DINDS-Animal-Life-Data-Discussion-2013-05-21.pdf>

<sup>4</sup> Animal Identification Discussion Document, Rezare Systems 2013 - <http://www.rezare.co.nz/Media/Default/data-standards/DINDS-Animal-Identification-Discussion-2013-04-16.pdf>

### 3 List of Observations

The following table lists the distinct types of observation we have identified (along with some of their alternative names or descriptions). These observations in turn may have a number of attributes, which we will discuss later. All observations require a date or date/time field – this is not listed in the attributes in the right hand column.

Category	Observation	Notes and other names	Attributes or Fields
Registration	Tagging	The act of applying an official tag. Applies to individual animals.	Tag Type Tag Identifier Add/Remove Tag Flag
	Retagging	The act of replacing an official tag, also called “Replacement”. Applies to individual animals.	Tag Type Previous Tag Identifier New Tag Identifier Retagging Reason
	Fate	Recording that an animal has died or otherwise left the herd. May also be called “Killed”, “Culled”. Typically applies to individual animals.	Fate Code Fate Reason Disposal Method
	Change Herd Membership	The act of changing from one “herd”, “enterprise” or other official recording group to another. May comprise part of a movement. Applies to individuals or a group.	Source Herd Destination Herd
	Change Ownership	Records a change of ownership of an animal, group, or herd. Often (but not always) associated with a movement between locations. This may also include a Lease (a change of ownership arrangements). Also called sale, purchase, transfer.	Previous Owner New Owner Previous Lessee New Lessee Tally



Category	Observation	Notes and other names	Attributes or Fields
Registration	Change Location	<p>A movement from one official location to another. We have called this “Change Location” rather than Movement to avoid confusion with moves within a location (for instance, between paddocks).</p> <p>Also called movement, transfer, grazing.</p> <p>Recorded for individuals for cattle and deer because of NAIT requirements.</p>	Source Location Destination Location Transport Method Transport Operator Vehicle Identification Transit Time Tally
Reproduction	Run with Sires	<p>Records that a female (or group of females) was run with one or more sires for the purpose of mating, but is not an observation of actual mating.</p>	Sire Identifier(s) Dam Ratio Entry Date Exit Date
	Observed Mating	<p>Record of a mating that was observed, which might include observed natural mating, artificial insemination, and AI with sexed semen (all differentiated by Mating Method).</p>	Mating Method Sire Identifier Straw Identifier
	Embryo Transfer	<p>The act of implanting a fertilised embryo, typically from another donor.</p>	Donor Dam Identifier Sire Identifier Embryo Identifier
	Egg Collection	<p>The act of collecting oocytes or eggs from a donor dam.</p>	
	Pregnancy Scan	<p>Also called “scanning” (although that term could refer to other scans), this is the process of determining pregnancy, and possibly the number of foetuses and foetal age.</p>	Scan type (short/long scanning for sheep) Foetus Count Foetal age
	Semen Collection	<p>The act of collecting semen from a sire.</p>	



Category	Observation	Notes and other names	Attributes or Fields
Reproduction	Parturition	Also called Birthing, this is a cross-species term for calving, lambing, or fawning.	Abnormal Birth Indicator Assistance Indicator [Progeny Number (within birth) Fate of Progeny Progeny Animal ID Progeny Sex] x No. Progeny
Feed and Growth	Liveweight	A weight recorded on a live animal (as opposed to dead weight). Abbreviated "Weight" in many on-farm tools.	Weight (Weight mean, tally and distribution for a group)
	Condition Score	A category scale score of the fatness or condition of an animal.	Condition Score
	Weaning	The act of removing young animals from being able to access milk. This causes a change in diet.	Pre-weaning Group
	Feed Regime Change	Records a change in a feed regime (for instance, onto or off a forage, or use of a supplementary feed). Often recorded for a group of animals.	[ Feed Category Feed Name Feed Quality/Energy Feed Allowance Per Head] x feeds.
	Change Paddock	Also called "internal move" or "grazing" by some systems, this is a record of movement of an animal or group from one internal farm location (a paddock) to another. This is often recorded for a group of animals.	Source Paddock Residual Pasture Cover Destination Paddock Destination Pasture Cover Tally
	Draft	Records that an animal was drafted in a certain direction (out a gate) or moved to another group.	Gate or Group
Animal Health	Tailing	The act of shortening the tail of an animal. Also called docking.	



Category	Observation	Notes and other names	Attributes or Fields
	Diagnosis	The diagnosis of a health condition. ICAR provides a detailed document about diagnosis of health conditions.	Diagnosed By Affected Part Disease Category Disease Disease Strain
	Treatment	A record of a health treatment applied (for instance, medication, vaccination, drenching or dipping).	Treated By Health Product, Code and SKU Treatment Method Dose Rate Dose Units Withholding Period Meat Withholding Period Milk Export Slaughter Interval Hormone Indicator
Dairy Production	Milking	Records that an animal was present at milking and was milked.	
	Milk Yield	Records the yield of milk from an animal at a single milking.	Measurement Method Precision Yield (Litres)
	Drying Off	Also called “End Lactation”, this marks the point from which an animal will no longer be milked in the current lactation. It may also be accompanied by animal health treatments.	Drying Off Reason



Category	Observation	Notes and other names	Attributes or Fields
Dairy Production	Milk Characteristics	Captures characteristics of an animal's milk (for instance, from a herd test or inline). Recorded against individuals.	Milk Measurement Method Sample Identifier Laboratory Identifier Fat Percentage Protein Percentage Somatic Cell Count
	Herd Test	Records that a milking monitored as part of an occasional (batch or DSM) herd test occurred. Must be recorded against individuals.	Milking Number AM/PM Indicator Previous Milking Time 24 Hour Average Number of Milkings Abnormal Test Code Sample Identifier
Meat Production	Dead Weight	Weight of an animal before cutting	Weight
	Carcass Characteristics	Grading, carcass weight, and other characteristics.	Hot Carcass Weight GR Fat Depth Fat Grade Faults
Fibre Production	Shearing	Record of the fact that an animal was shorn, and optionally, fleece weight and lab sample ID.	Fleece Weight Sample Identifier



Category	Observation	Notes and other names	Attributes or Fields
	Fibre Measurements	Laboratory measured fibre characteristics.	Sample Identifier Laboratory Identifier Yield Percentage Staple Length Mean Fibre Diameter Fibre Diameter Standard Deviation Fibre Diameter Coefficient of Variation Spinning Fineness Prickle Factor Comfort Factor

## 4 Data Dictionary

### 4.1 Subject Identification

Items in this table are used in some or all observations to identify the subject of the observation. Some observations only apply to individuals, while others may apply to a herd or group.

Item Name	Description	Cardinality	Type & Validation	Usage
Animal ID	The identification of a single animal (using an agreed animal identification scheme – see footnote 4).	1	Text, Identifier	Frequently called EID, Animal ID, Tag, Visual ID, or Official ID.
Herd ID	An identifier for a herd, enterprise, or other registered or official entity which represents a grouping of animals at a farm level.	1..n	Text, Identifier	May be called Participant Code, Herd Code, Herd ID, Flock No, Enterprise.
Group ID	An identifier for a management group of animals within a farm. Group identifiers do not typically form part of an official scheme, but are used frequently at the farm management level, and may be used to define contemporary groups.	0..n	Text, Identifier	Called Mob or Group.



## 4.2 Date and Time

All observations are recorded at a point within time, and must be accompanied by a date or date and time. For this reason, date and time is not listed separately for each observation in section 3.

Item Name	Description	Cardinality	Type & Validation	Usage
Observation Date	Date (and depending on observation, time) at which the observation was made. For some events, the time component of the observation is critical (for instance, Herd Testing). For others, (such as condition score), the rate of change is slow enough that time is irrelevant.	1	ISO Date/Time with time zone	

## 4.3 Observation Fields or Attributes

This table contains an alphabetically sorted list of the fields or attributes used in observations.

Item Name	Description	Cardinality	Type & Validation	Usage
Abnormal Birth Indicator	Indicates an abnormal birth – premature, aborted, or induced birth.	0..1	Enumeration	Parturition
Abnormal Test Indicator	Indicates an abnormal test situation – Insufficient Sample, Farm anomaly, In season, Held milk, Herd tester processing anomaly, Run with calves, Sick, Contaminated sample	0..1	Enumeration	Herd Test
Affected Part	The body part or system affected by a disease. Coded using the ICAR draft diagnosis coding system.	0..1	Enumeration	Diagnosis
AM-PM Indicator	Indicates whether the milking measured represents a morning or afternoon milking using traditional batch milking methodology.	1	Enumeration	Herd Test



Item Name	Description	Cardinality	Type & Validation	Usage
Assistance Indicator	Indicates that a degree of assistance with required at parturition (0 = not reported, 1 = reported no assistance, 2 = assistance given).	0..1	Enumeration	Parturition
Average Number of Milkings	The average number of times that animals in the herd are milked over a 24-hour period at the time of the herd test sample milking	1	Float	Herd Test
Batch Number	The identifier of the manufacture batch of a health product.	0..1	Text, Identifier	Treatment
Clean Wool Yield Percentage	Clean wool yield as a percentage of greasy wool weight, from a fibre laboratory test.	1	Float	Fibre Measurements
Comfort Factor	A score of the comfort level of a wool from a testing laboratory.	0..1	Integer	Fibre Measurements
Condition Score	A rating (typically 1-5) on a category scale representing the condition of an animal, using a visual and tactile assessment. Half scores (e.g. 3.5) are valid.	1	Float, positive whole numbers 1-5 and half points.	Condition Score
Dam Ratio	The ratio of dams to sires where one or more sires are being run with dams for the purposes of mating. For instance, in sheep this might be 100:1, so the dam ratio would be 100.	0..n	Positive Float	Run with Sires
Destination Herd	Industry scheme-specific identifier representing a herd into which animals are being added.	1	Text, Identifier	Change Herd Membership
Destination Location	Industry scheme-specific identifier representing a location to which animals are being delivered.	1	Text, Identifier	Change Location
Destination Paddock	The paddock into which animals were being placed.	1	Text, Identifier	Change Paddock
Diagnosed By	Identifies the source of the diagnosis – veterinarian, farmer, technician	0..1	Enumeration	Diagnosis
Disease	The name of the disease.	0..1	Text	Diagnosis
Disease Code	The code of the disease, coded using the ICAR draft diagnosis coding system.	0..1	Enumeration	Diagnosis
Disease Strain	The code of the strain, coded using the ICAR draft diagnosis coding system.	0..1	Enumeration	Diagnosis
Disposal Method	Used to define the method of disposal of a dead/culled animal.	0..1	Enumeration	Fate



Item Name	Description	Cardinality	Type & Validation	Usage
Donor Dam Identifier	The animal identifier of the donor dam involved in an embryo transfer	0..1	Text, Identifier	Embryo Transfer
Dose Rate	The dose that was administered.	0..1	Float	Treatment
Dose Units	The units used to measure the dose.	0..1	Enumeration	Treatment
Drying Off Reason	A code identifying the reason for drying off	0..1	Enumeration	Drying Off
Embryo Identifier	The serial number or unique identifier for an embryo being implanted	1	Text, Identifier	Embryo Transfer
Expiry Date	The expiry date of the batch of health product.	0..1	Date	Treatment
Export Slaughter Interval	The minimum time between treatment and slaughter for export markets.	0..1	Integer	Treatment
Fat Grade	A species-specific coding of fat grade at plant.	0..1	Enumeration	Carcass Characteristics
Fat Percentage	Represents the percentage of fat in milk from an animal.	1	Float	Milk Characteristics
Fate Code	Defines the fate of an animal (died, killed for own use, killed other, culled).	1	Enumeration	Fate
Fate of Progeny	Defines the fate of a new progeny (reared, sold, died, bobbied)	0..n	Enumeration	Parturition
Fate Reason	The reason for an animal being removed from the herd.	0..1	Enumeration	Fate
Fault	A list of processor fault codes.	0..n	Enumeration	Carcass Characteristics
Feed Allowance	The quantity of feed allowed per animal (kg per day)	0..n	Float	Change Feed Regime
Feed Category	The category of feed provided	0..n	Text	Change Feed Regime
Feed Energy	Energy content of the feed (MJ ME/kg)	0..n	Float	Change Feed Regime
Feed Name	The name of the feed provided	0..n	Text	Change Feed Regime
Fibre Diameter CV	The coefficient of variation of diameter of fibres in a laboratory sample.	0..1	Float	Fibre Characteristics
Fibre Diameter Mean	The mean diameter of fibres in a laboratory sample.	1	Float	Fibre Characteristics
Fibre Diameter SD	The standard deviation of diameter of fibres in a laboratory sample.	0..1	Float	Fibre Characteristics
Fleece Weight	The weight of the shorn fleece in kilograms (optional)	0..1	Float	Shearing
Foetal Age	The estimated age of a foetus in months (used to predict birth date)	0..1	Float	Pregnancy Scan



Item Name	Description	Cardinality	Type & Validation	Usage
Foetus Count	The number of foetuses identified in a pregnancy scan (0 = empty)	1	Integer	Pregnancy Scan
Gate	The drafting gate through which an animal was drafted	0..1	Integer	Draft
GR Fat Depth	The depth of fat in mm at the GR measurement site.	0..1	Float	Carcass Characteristics
Health Product Code	The registration code of the health product used in the treatment. In New Zealand these are ACVM codes. In the EU these are issued by the European Commission, and in the US by the FDA.	0..1	Text, Identifier	Treatment
Health Product Name	The name of the health product	0..1	Text	Treatment
Health Product SKU	Stock Keeping code (barcode) for the health product	0..1	Number	Treatment
Hormone Indicator	Indicates that the product applied contains a hormone growth promotant	0..1	Flag (True/False)	Treatment
Hot Carcass Weight	The carcass weight of an animal prior to boning out in a hot boning plant, or prior to chilling.	0..1	Float	Carcass Characteristics
Laboratory Identifier	A unique identifier for the laboratory which processed a sample.	0..1	Text, Identifier	Fibre Measurements, Milk Composition.
Mating Method	The method of mating used for an observed mating.	1	Enumeration (AI, Natural, AI with Sexed Semen)	Observed Mating
Milk Measurement Method	Describes the method used to measure milk characteristics	0..1	Enumeration	Milk Characteristics
Milking Number	Indicates the number of the milking within the herd test (for instance, the first or second milking).	0..1	Integer	Herd Test
New Lessee	Owner Participant Code of the new lease of some animals (if any).	0..1	Industry Participant Identifier	Change Ownership
New Owner	Owner Participant Code of the new owner of some animals.	0..1	Industry Participant Identifier	Change Ownership
New Tag Identifier	The new (replacement) tag identifier in a retagging observation.	1	See Tag Identifier	Retagging



Item Name	Description	Cardinality	Type & Validation	Usage
Previous Lessee	Previous lessee if the animals being removed (if any).	0..1	Industry Participant Identifier	Change Ownership
Previous Milking Time	Indicates the date and time of the immediate previous milking, in herd tests.	0..1	ISO Date and Time	Herd Test
Previous Owner	Owner Participant Code of the previous owner of the animals.	0..1	Industry Participant Identifier	Change Ownership
Previous Tag Identifier	The old tag identifier being replaced in a retagging observation.	0..1	See Tag Identifier	Retagging
Pre-weaning Group	Group identifier used to identify the group of ewes to which a progeny was born and reared until weaning (typically used in sheep and beef cattle where dam-progeny links may not be recorded).	0..1	Text, Group Identifier	Weaning
Prickle Factor	A measurement or score of the prickle factor of wool, from a lab test.	0..1	Integer	Fibre Measurements
Progeny Animal Identifier	Used when a new progeny is tagged at or near birth.	0..n	Text, Identifier	Parturition
Progeny Number	When recording parturition, progeny number is used to identify among several new progeny (which may be untagged)	0..n	Positive Integer	Parturition
Progeny Sex	Used when the sex of the progeny is to be recorded at parturition.	0..n	Enumeration	Parturition
Protein Percentage	Represents the percentage of protein in milk from an animal.	1	Float	Milk Characteristics
Retagging Reason	A code that expresses the reason why an animal is being retagged.	0..1	Enumeration	Retagging
Sample Identifier	Used to identify a sample sent away for processing (for instance, a milk composition test or a fibre test).	1	Text, Identifier	Herd Test, Shorn Fibre Characteristics
Scan Type	When scanning sheep it is possible to count the number of embryos (e.g. 3) or just to determine than a ewe is empty or has singles, or multiples. The former method is called "Long Scanning", the latter "Short Scanning". This field is not required for cattle.	0..1	Enumeration (short or long)	Pregnancy Scan
Sire Identifier	One sire identified in an Observer Mating or Embryo Transfer observation, or a list of sires in a "Run with Sires" observation.	0..n	Text, Animal Identifier	Run with Sires, Observed Mating, Embryo Transfer



Item Name	Description	Cardinality	Type & Validation	Usage
Somatic Cell Count	The somatic cell count recorded for the sample on this test date. The count recorded in thousands of cells per ml of milk and is taken at each herd test (i.e., actual cell count divided by 1000).	0..1	Float	Milk Characteristics
Source Herd	Industry scheme-specific identifier representing a herd from which animals are being removed.	1	Text, Identifier	Change Herd Membership
Source Location	Industry scheme-specific identifier representing a location from which animals are being removed.	1	Text, Identifier	Change Location
Source Paddock	The paddock from which animals were being moved	0..1	Text, Identifier	Change Paddock
Spinning Fineness	A measure or score of the fineness of wool for spinning, from a lab test.	0..1	Integer	Fibre Measurements
Staple Length	The length of wool staple in mm from a wool laboratory test.	0..1	Integer	Fibre Measurements
Straw Identifier	The serial number or other unique identifier of an AI straw	0..1	Text, Identifier	Observed Mating
Tag Identifier	An animal identifier representing the identifier contained on a tag.	1	Text, Identifier	Tagging, Retagging
Tag Type	Defines the type of tag	0..n	Enumeration	Tagging, Retagging
Tally	Records the number of animals involved in an observation (where individual animals are not recorded, or as a check against the number of individual records).	0..1	Integer	Change Ownership, Change Location, Liveweight, Change Paddock
Transit Time	The length of time in hours while animals were in transit during a move between locations.	0..1	Float (Hours and fractions)	Change Location
Transport Method	Identifiers the method used to move animals between locations. This might include walking the animals, vehicle from source farm, vehicle from destination farm, ship or truck.	0..1	Enumeration	Change Location
Transport Operator	The organisation responsible for transporting animals between locations.	0..1	Text	Change Location
Treated By	The operator who applied a health treatment.	0..1	Text	Treatment
Treatment Method	The method of application of a treatment.	0..1	Enumeration	Treatment
Vehicle Identification	An identifier for a vehicle used to move animals (for instance, a fleet number or licence plate).	0..1	Text	Change Location



Item Name	Description	Cardinality	Type & Validation	Usage
Weight	The weight of an animal (live weight or dead weight, depending upon observation) in kilograms	1	Float	Liveweight, Dead Weight
Withholding Period Meat	Withholding period in days.	0..1	Integer	Treatment
Withholding Period Milk	Withholding period in days.	0..1	Integer	Treatment
Yield	The milk yield in litres	1	Float	Milk Yield
Yield Measurement Method	The device or process used to measure milk yield	0..1	Enumeration	Milk Yield
Yield Precision	The degree of precision of the measurement	0..1	Float	Milk Yield