

On-farm welfare assessment protocol for dairy goats

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Observations start one hour after the end of morning feeding.

Information from the farmer is required for some measures. An appointment should be made, taking into account how long it takes to register the animal-based welfare measures.

Outdoor registrations at arrival:

Date

Time

Lux

Temperature

Air humidity

Questions to farmer prior to the observations:

1. How many goats are there in the house today?

2. Are there any sick animals?

If yes:

How many?

In what way are they sick?

Are they isolated from the other animals?

Familiarise yourself with the facilities (buildings, pens, possible observation points etc.).

Disturbance of the animals should be avoided as far as possible.

Walk quietly in the animal housing with calm movements. Avoid overalls with bright colours.

How much roughage is left one hour after feeding?

2 = Abundant

1 = Some leftovers

0 = Empty

Animal based indicators

Group-level observations

Make sure all the goats notice your presence and wait five minutes to allow the animals to settle down to undisturbed behaviour. Use this time to draw a sketch of the building, pens feeding places etc. Number the pens, and use these numbers when registering resource measures later.

Observe the animals for 20 minutes. Stop at one observation point and observe for a while before moving slowly to the next point. Move slowly around in the building and make sure you observe all areas/pens.

Animals that show clear signs of disease:

Register the number of animals that show clear signs of disease, are lethargic/depressed or non-responsive/uninterested. This may include goats that lie/stand separated from the rest of the herd, that do not perform synchronised behaviour (e.g. do not eat or lie while the other animals do), do not show interest in the surroundings or do not react to the presence of the observer. Sick, lethargic, apathetic animals may have sunken eyes, hanging ears, rough/bristle or damp coat or rapid respiratory rate.



Visibly sick goat

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Coughing:

Definition: Sudden and noisy expulsion of air from the lungs.

Register the number of coughs heard during the 20 minutes of observation. (One coughing fit with several continuous coughs are registered as one cough.)

Qualitative behavioural assessments (preliminary version):

When the observation is completed, score the five descriptors using the visual analogue scales.

Draw a line across the scale at a point between minimum and maximum, indicating the level of which the term is expressed across all observed animals. Note that more than one term can have a high or maximum score.

Resting: Animals that are lying, but not including sick or lethargic animals.

Aggressive: Animals that are actively engaged in physical conflicts with other animals, e.g. by butting, chasing or biting.

Inquisitive/interested: Animals that show in interest in the observer, either by walking or stretching towards the observer, staring/sniffing/tugging or getting in direct physical contact. Positive reaction, no vigilance or fear.

Fearful: Animals showing active avoidance when the observer approaches the part of the building or the pen the animals are kept in.

Calm/indifferent: Animals that do not show any noticeable reaction when the observer approaches, or that react only mildly before calming down and returning to undisturbed behaviour. Does not include those that are indifferent due to lethargy/apathy, but implies a positive, relaxed state.



Inquisitive/interested

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Resting

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Individual animal observations:

Handling test: Indication of human-animal relationships (20 animals)

The farmer/stockperson is asked to mark 20 animals that later will be restrained for the clinical examinations. Ask the stockperson to move and handle the goats the way he/she usually does, but not too fast. The 20 animals are to be selected at random, evenly distributed across all parts of the housing/pens. To ensure that clinical examinations are performed on the same individuals, the stockperson marks each of the selected goats with a marking crayon on the animal's neck (preferably so that it is visible both from front and behind when they are restrained in the head rail). Avoid marking on the head, as goats generally dislike being touched on the head. Avoid marking with a spray, as the goats may react to the sound.

Assess the stockperson's behavioural style as he/she approaches and handles each of the 20 goats.

Approach (stockperson):

Score:

- 1 = Positive physical *and* verbal interactions. E.g. approaches the goat in calm manner while talking quietly. Touches/pets/strokes the goat.
- 2 = Positive physical *or* verbal interactions. E.g. Does not talk to the goat while approaching, but touches her in a friendly manner when arriving, or talks, but does not engage in physical interactions.
- 3 = Neither positive nor negative physical interactions (neutral), no verbal interactions. Does not talk to the goat when approaching, does not engage in physical interactions like petting/stroking, but handles without being rough.
- 4 = Negative verbal interactions and/or mild negative physical interactions. E.g. shouting or a certain degree of chasing to catch the goat, or holding the goat by its fur or tail.
- 5 = Strongly negative physical interactions, with or without negative verbal interactions. E.g. sudden, threatening movements (like waving arms), rough handling, tugging fur, or a lot of chasing.

Positive verbal interaction: Talks to and calls on the goats with gentle and quiet voice.

Positive physical interaction: Petting, stroking and other friendly touches.

Negative verbal interaction: Whistling, shouting. Loud voice.

Negative physical interaction: Hitting, kicking, tugging, rough handling.

Response (goat):

- 1 = Positive reaction, no fear; approaching the stockperson immediately and initiating physical contact
- 2 = Somewhat positive reaction, no fear; approaching stockperson and initiating contact during the testing time
- 3 = Indifferent: Neither approaches nor avoids
- 4 = Mild fear: Attempts to avoid stockperson, but no panic
- 5 = Strong fear/panic: Avoids immediately, difficult to catch

Lameness:

Ask the stockperson to encourage each of the 20 goats to walk, unless they willingly walk away after being marked. This assessment is not possible to standardise due to differences in housing solutions. Choose whichever solution that is most practical and gives the best opportunity to

observe lameness given the facilities available.

Lame animals have an uneven gait/walking rhythm. They may have an arched back when they stand or walk, shortened or lengthened strides and nodding of the head as they move. They may be reluctant to bear weight on one or more feet (Whay, 2002).

Four-point lameness scale (based on Brenninkmeyer et al, 2007 and Flower and Weary, 2008):

- 0 = No lameness
- 1 = Short striding gait with one limb (even if just noticeable)
- 2 = Short striding gait with more than one limb, or strong reluctance to bear weight on one limb
- 3 = Does not support weight on one limb, or strong reluctance to put weight on two or more limbs, holding a limb up whenever possible



Lame goat not bearing weight in one limb

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Ask the stockperson to restrain the 20 marked goats with head locks at the feeder or in the milking parlour, depending on availability and practicality. This decision can usually be made during the five minutes before the behavioural observations start in the morning. (If the head locks at the feeder are used, all animals in the pen must be restrained.)

Observations from anterior end:

Chin contact test (modified from Whay, personal communication)

Prior to the health registrations, assess each goat's fear of an unknown person. Stand in front of the goat in an arm's length from the goat's head. Hold the hand with the palm facing up, and move it gently towards the goat's chin. Register whether the goat accepts that you place your hand on its chin or whether she turns her head away/avoids the hand:

- 1 = Full acceptance
- 2 = Brief touch or contact with only part of the palm before the goat turns its head away
- 3 = Full avoidance

Health: Perform clinical examinations on the 20 goats that have been marked by the stockperson. Wear disposable gloves and change these when necessary. Start at the front of the animal, beginning with observations of the head. Finish all goats before moving to the back of the animals. Make sure to note the animals' eartag numbers correctly.

Nasal discharge:

Definition: Clearly visible discharge from the nostrils; transparent to yellow/green, often thick consistency.

Score:

- 0 = Dry nostrils, or < 1cm transparent discharge
- 1 = transparent discharge > 1cm
- 2 = yellow/green discharge, regardless of amount (may be dried up)



Yellow/green, dried up nasal discharge

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Ocular discharge:

Definition: Clearly visible discharge from the eye, at least 1 cm long.

Score:

- 0 = No ocular discharge
- 1 = Ocular discharge, transparent fluid > 1 cm (may be greyish/white as, but not yellow/green)
- 2 = Yellow/green discharge regardless of amount (may be dry), or evidence of swelling (chemosis) or redness of the eye (hyperaemia)



Transparent ocular discharge, >1 cm

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Pinnae pathologies:

Definition: Signs of inflammation or damage to the ear, caused by ear tags.

Score:

0 = Normal (no signs of inflammation or damage/laceration)

1 = Clearly enlarged hole or signs of inflamed skin (red, thickened or with a scab) around the eartag perforation

2 = Completely lacerated ear due to fully torn out ear tag



Completely lacerated ear due to fully torn out ear tag

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Lips/mouth:

Definition: Lesions on the lips or in the corner or the mouth.

Score:

0 = Normal

1 = Lesion/scab on the lips/in the corner or the mouth



Lip lesions

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Integument alterations on head/neck:

Definition: Patches with hair loss or lesions/swellings.

For mild alterations: only register alterations with a diameter > 2 cm at the largest extent.

For severe alterations: register ALL alterations, regardless of size.

Exceptions:

- *Skin changes/lesions on ears (separate variable)*
- *Skin changes/lesions on carpal (knee) and tarsal (hock) joints (separate variables)*
- *Teat lesions (separate variable under udder health)*
- *Skin changes/lesions on udder (separate variable)*

Criteria

a. Mild skin change: register the number of lesions observed with diameter > 2 cm largest extent

- Patch with hair loss
- Skin not damaged
- Hyperkeratosis possible

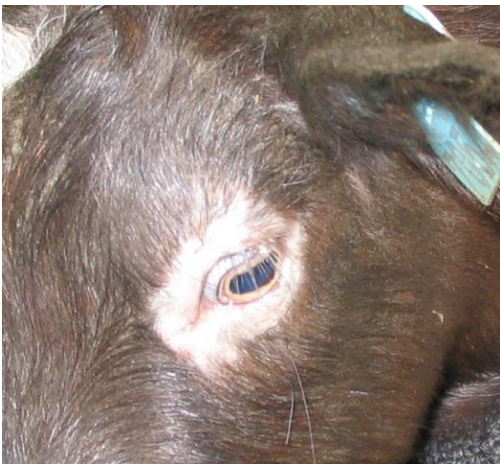
b. Severe skin change: register the number of lesions observed regardless of size

- Damaged skin either in form of wound or scab
- Swellings (in integument; not joints, lymph nodes etc.)
- Ulcerations (including orf)
- Severe thinning of the coat or dermatitis (e.g. due to ectoparasites)

Register:

- Number of observed mild integument alterations
- Number of observed severe integument alterations

If necessary, fill in details under «Remarks».



Mild skin change on head (hair loss)

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Severe skin change on head (wound)

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Abscessed/clearly enlarged lymph nodes:

Parotid and submandibular lymph nodes: Palpate gently with a flat hand and register the number of clearly enlarged or abscessed lymph nodes (including ruptured abscesses). (NB: abscesses may be tender/painful upon touch, or may have ruptured, and thus leak pus. Think hygiene!)



Abscess in submandibular LN

© N. Leine



Ruptured abscess in submandibular LN

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Observations from posterior end:

Integument alterations on trunk and limbs:

Definition: Patches with hair loss or lesions/swellings.

For mild alterations: only register alterations with a diameter > 2 cm at the largest extent.

For severe alterations: register ALL alterations, regardless of size.

Exceptions:

- *Skin changes/lesions on ears (separate variable)*
- *Skin changes/lesions on carpal (knee) and tarsal (hock) joints (separate variables)*
- *Teat lesions (separate variable under udder health)*
- *Skin changes/lesions on udder (separate variable)*

Criteria

a. Mild skin change: register the number of lesions observed with diameter > 2 cm largest extent

- Patch with hair loss
- Skin not damaged
- Hyperkeratosis possible

b. Severe skin change: register the number of lesions observed regardless of size

- Damaged skin either in form of wound or scab
- Swellings (in integument; not joints, lymph nodes etc.)
- Ulcerations (including orf)
- severe thinning of the coat or dermatitis due to ectoparasites

Register:

- number of observed mild integument alterations
- number of observed severe integument alterations

If necessary, fill in details under «Remarks».



Mild (hair loss, bottom left) and severe (damaged skin, upper left and bottom right) skin changes on trunk

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Severe skin changes on trunk (severe thinning of the coat)

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Mild skin changes on limb (hair loss)

© K. Muri



Severe skin changes on limb (skin damage)

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Abscesses/clearly enlarged lymph nodes:

Parotid and submandibular lymph nodes: Palpate gently with a flat hand and register the number of clearly enlarged or abscessed lymph nodes (including ruptured abscesses). (NB: abscesses may be tender/painful upon touch, or may have ruptured, and thus leaking pus. Think hygiene!)

Coat:

A. Short haired

0 = Even

1 = Ruffled

B. Long haired

0 = Even, few tangles

1 = Many or large tangles

Lice:

0 = No

1 = Yes

Body condition score (BCS):

Register in quarter points (e.g. 1.75 – 2.0 – 2.25- 2.5 – 2.75 – 3.0 etc.). A BCS of 2 corresponds to a thin goat, and BCS of 3 corresponds to a good BCS for a goat at drying off. Palpate the lumbar region and the sternum, as described by the following references:

From Smith and Sherman (2009):

Lumbar score:

- 0 The animal is extremely emaciated. The intervertebral articulations are easily felt and the skin seems to be in direct contact with the bones.
- 1 Muscle extends at most two-thirds of the distance out along the transverse spinal processes. Intervertebral articulations are still palpable but barely visible.
- 2 Dorsal and transverse spinous processes are prominent, and the skin forms a concave line between them.
- 3 Spinous processes are still easily felt. The space in the vertebral angle is filled with muscle and the skin determines a straight line between dorsal and transverse processes.
- 4 Dorsal and transverse spinous processes are difficult to detect and the skin forms a convex line between them.
- 5 There is a prominent groove down the back line and the fat and muscles mound up on each side of this groove.

Sternal score:

- 0 Costo-sternal articulations are very prominent. The bony surface of the sternum is easily felt. The skin callous over the sternum lacks mobility.
- 1 Costo-sternal articulations are more rounded but still easily felt. The depression over the sternum is not filled in but the callous is movable.
- 2 Costo-sternal articulations are difficult to feel. Internal fat pads develop under the muscle layers on each side of the sternum, and the subcutaneous fat partially fills the central depression.
- 3 The central depression is completely filled with a thin and mobile mass of subcutaneous fat. Distinct depressions are palpable on each side between the mass of fat and muscles and the bones. The costo-chondral articulations are palpable.
- 4 Sternum and ribs are no longer palpable but a depression is still palpable on each side of a thick mass of subcutaneous fat.
- 5 Subcutaneous fat is no longer mobile. No depressions are palpable laterally or caudally.

(See also Villaquiran et al.)

Chest girth: Use a tape measure and measure the girth at the level immediately behind the elbow joint. Make sure the tape measure is close to the skin, but do not pull tight. Register the girth in cm.

Udder (partially based on Fossing et al, 2006 og Klaas et al, 2004):

Visual inspection: Look at the udder from behind.

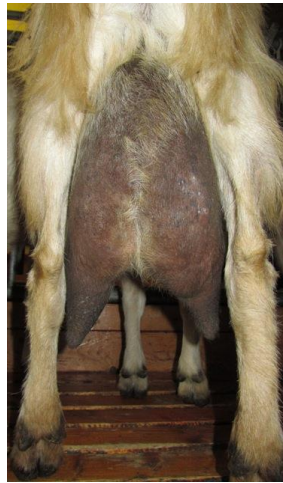
Asymmetry: Assess whether the udder is symmetrical (equal size of the two glands).

Score:

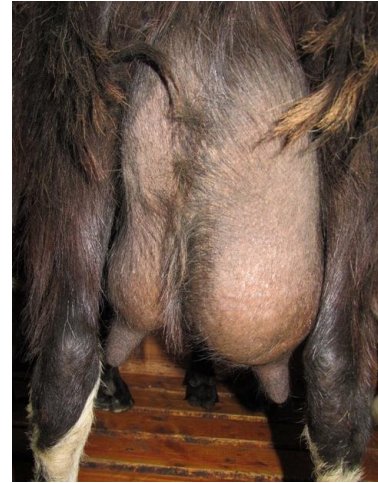
- 0 = No asymmetry
- 1 = Mild asymmetry
- 2 = Severe asymmetry
- 3 = One gland missing (resulting from gangrene or amputation)



Mild asymmetry
© K. Muri



Severe asymmetry
© K. Muri



Severe asymmetry
© K. Muri



Missing gland
© K. Muri

Udder conformation:

Score:

- 0 = Normal: the lowest part of the udder (apart from the teats) is above or at the level of the hocks.
- 1 = Pendulous udder: the lowest part of the udder (apart from the teats) is below the hocks.

Palpation: Be aware that not all goats like being touched on the udder, and if they have mastitis any touch may be painful. If the goat becomes stressed by the udder palpation, evaluate without touching. This should be noted under “comments”.



Pendulous udder

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Clinical mastitis:

Definition: Redness, swelling, signs of pain, heat, firmer than normal udder tissue.

Score:

0 = No

1 = Yes

Clear, superficial nodules in the udder:

Definition: Distinct nodules, visible or noticeable on light palpation.

Score:

0 = No

1 = Yes



Udder nodule

© K. Muri

Teat lesions:

Damage caused by stepping or milking machine.

Score:

0 = No

1 = Yes



Teat lesions

© K. Muri

Hygiene - udder:

Score:

0 = Clean

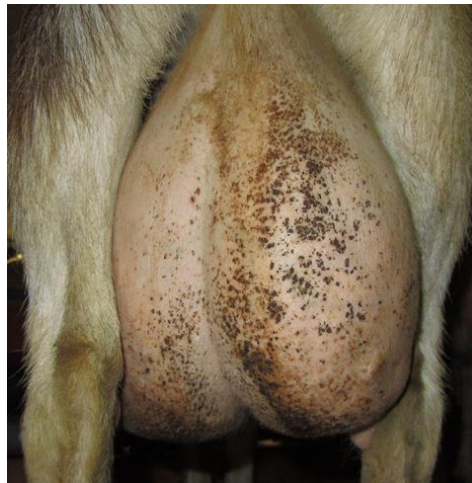
1 = Traces of vaginal discharge on posterior side of udder (may be amniotic fluid from parturition, brown mucus or discharge from vaginitis/metritis), or small patches with dirt (<5x5cm)

2 = Distinct patches (> 5x5cm) or diffuse soiling with dirt (faeces) on the udder; any dirt on the teats



Diffuse soiling with dirt

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Traces of vaginal discharge

© K. Muri

Skin lesions or impetigo on udder and teats:

Score:

0 = Normal, healthy skin

1 = Sporadic or diffusely scattered dry nubs without redness, weeping or scab formation.

2 = Sporadic nubs/vesicles with redness, weeping or scabs

3 = Diffusely scattered nubs/vesicles with redness, weeping or scabs, covering more than 1/3 of the posterior surface of the udder (impetigo)



Sporadic nubs/vesicles
with redness
© K. Muri



Diffusely scattered nubs/vesicles
© K. Muri

Limbs and claws:

Skin changes on front knees (carpus):

Score:

- 0 = No skin change, or only hair loss on patch < 1 cm diameter
- 1 = Hair loss on patch > 1 cm diameter
- 2 = Hyperkeratosis (thickened, hard skin) on patch > 1 cm diameter
- 3 = Wound, broken or damaged skin of any size

Skin changes on hocks (tarsus):

Score:

- 0 = No skin change, or only hair loss on patch < 1 cm diameter
- 1 = Hair loss on patch > 1 cm diameter
- 2 = Hyperkeratosis (thickened, hard skin) on patch > 1 cm diameter
- 3 = Wound, broken or damaged skin of any size



Hock with hair loss > 1 cm diameter
© K. Muri

Joints:

Register swollen joints, defined as clearly increased diameter of the joint due to accumulation of extra fluid. May feel warm.

NB: Beware that swollen joints may be painful, so touch carefully initially. Compare with other animals' joints, if in doubt.

Palpate the following joints:

- Elbows
- Front knees (carpal joints)
- Hind knees (stifles)
- Hocks (tarsal joints)
- Fetlocks (fore and hind limbs)

Register the number of swollen/enlarged joints.



Swollen carpus

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Claw conformation:

Lift the feet and look at the ventral aspect. If the goat kicks or becomes stressed, attempt to inspect the claws visually from the side and above instead. If the claws differ in terms of score, give the score that corresponds best to the worst claw.

Score:

- 0= Normal
- 1= Mildly overgrown. Side walls somewhat turned under the soles, covering < 50% of the surface of the sole. Toe length likely extended.
- 2= Severely overgrown. Sidewalls markedly turned under the foot, covering > 50% of the sole surface. Claws in this category also have clearly extended toe length (which may bend upwards) and may be asymmetrical/crooked.
- 3= Extremely overgrown, to the extent that the toe length is severely extended and not touching the floor and the foot tipped backwards, AND/OR cork screw claws, where the turned side wall extends beyond the opposite side of the sole (and may continue bending upwards). This is usually possible to see without lifting the foot.
- 4= Other severe claw abnormalities that are not possible to correct by trimming (could be congenital or the result of chronic problems with the claws or skeletal deviations).



Normal claws
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Mildly overgrown claws
© K. Muri



Severely overgrown claws
© K. Muri



Severely overgrown claws
© K. Muri



Severely overgrown claws
© K. Muri



Other claw abnormality, not possible to correct by trimming
© K. Muri

For more claw photos:

<http://www.goatworld.com/articles/feet/footcare.shtml#photos>

<http://www.danekeclublams.com/FootDisordersAndHowtoTrimHooves.html>

<http://www.freewebs.com/bustershaven/trimminggoathoofs.htm>

Cleanliness of hind quarters:

Include all patches of dirt of > 5x5 cm, or diffuse soiling of the entire area (does not include discolouration of white coat).

Score:

0 = Clean

1 = Separate or continuous patches of dirt above the coronary band

Diarrhoea:

Based either on witnessing the animal defaecate or observing clear signs of diarrhoea around the perineum.

Score:

0 = No

1 = Yes

Comments: If you find other abnormalities you consider relevant in terms of animal welfare (e.g. vaccination granulomas, rib fractures, damaged/disfigured horns), make a note of this under "Remarks".

Resource based indicators

Identify the pens in the forms when you register the data based on the sketch you drew before the group level observations.

House type:

1 = Insulated

2 = Non-insulated

For each pen:

Number of animals

Space:

Measure pen size with laser distance meter

Lying area:

Separate lying area?

0 = No

1 = Yes

Lying shelves?

0 = No

1 = Yes

Lying space with non-draining floor for kids?

0 = No

1 = Yes

Floor type

Proportion (%) of each type:

Deep litter

Wooden slats

Plastic/composite slats

Expanded metal grating

Other (describe)

Number of spaces at feeder

Feed space (cm)

Automatic feeder:

0 = No

1 = Yes

Number of sharp protrusions in the pen

Signs of gnawing/nibbling on interior:

0 = No

1 = Yes

Type of drinkers – number of each type:

- Nipples
- Water bowls
- Other (describe)

The parameters below should be measured at several places, where the animals stay. In each farm building; measure at least one place in the lying area, one place at the feeder, and one place in the middle of the pen. Measure more places if the building is large. Pay attention to areas of higher risk, such as close to doors and windows where it may be colder/more draught.

Temperature

Remember also to measure in kid pen, close to floor.

Draught

Along the wall, close to windows/doors. Also kid pen, close to floor.

Air humidity

Sufficient with two measures, at central areas of the building.

Lux

At the feeder, and at the height of the animals' heads where they stand or lie.

NH₃

At nose height, 2-3 places in the building. Be attentive to areas in the pens with risk of higher concentrations.

CO₂

At nose height, 2-3 places in the building. Be attentive to areas in the pens with risk of higher concentrations.

Hygiene

General impression of the overall hygiene in the building. Consider ceiling, walls and floors as a whole.

Score:

- 1 = Clean: may be some areas with dirt, but the building is obviously cleaned regularly
- 2 = Dirty: clear soiling of large areas and maybe cob web in the ceiling.
- 2 = Very dirty: dirt/soiling all over the place.



Clean goat housing
© K. Muri



Dirty goat housing
© K. Muri



Very dirty goat housing
© N. Leine

Fire protection:

Fire alarm:

- 0 = No
- 1 = Yes

Fire extinguisher/hose:

- 0 = No
- 1 = Yes

Emergency exit:

- 0 = No
- 1 = Yes

Outdoor registrations at departure:

Date

Time

Lux

Temperature

Air humidity

After the visit:

Describe in your own words your general impression of the herd (i.e. health, indoor environment, human-animal relationships).

Some key references:

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