



Question raised by requestor

1. Is there any scientific information available on the need for shelter against unfavourable weather conditions, including heat, of "robust" breeds of cattle, horses and sheep (e.g. Galloway, Konik, Herdwick, ...) and are there any differences with the needs of other breeds? Is there a definition available of what can be considered as a "robust" breed?
2. Nature conservancy organisations have requested a derogation to the obligation to provide shelter for so-called robust breeds used in grazing projects for nature conservation. Their argument is that these robust breeds are more adapted to a life outside and that they would have less need for shelter. We don't know if that's always the case, especially when it comes to heat and the need for shade.



Answer

This answer considers current EU legislation and requirements from four European countries, the definition of robustness and resilience, and adaptive capacity of animals based on phenotypic characteristics of known breeds and behavioural, physiological and thermoregulatory strategies. Based on current knowledge, robust breeds should have access to shelter (natural or artificial) to protect against adverse weather conditions (e.g. red weather alerts), especially in the context of climate change. Assessment of the adaptive capacity of robust breeds used for nature conservation projects is recommended.

Council Directive 98/58/EC concerning the protection of animals kept for farming purposes states, "*Animals not kept in buildings shall where necessary and possible be given protection from adverse weather conditions, predators and risks to their health.*" (Annex, Point 12) (1).

In Sweden, if horses spend more than 16 hours per day outside during the cold season, they must be provided with a building with a dry, clean lying area (2). Free-range cattle (3), sheep and goats (4,5) in Sweden are also required to have shelter during the cold season. In Austria, cattle older than 6 months of age and permanently housed outdoors, are required to have a covered, dry lying area with wind protection (6). German regulations for cattle kept outdoors include opportunities for shelter (7); recommendations include providing pasture-based cattle with a dry, wind-protected lying area (8). Such protection can either be natural (e.g. trees, hedgerows) or artificial. Norway, although not in the EU, requires for animals kept on pasture beyond the normal grazing season to have access to suitable and safe shelter (9). Article 16 of The Council of Europe's (CoE) Recommendation Concerning Cattle (1988) states that cattle kept outdoors should be provided with shelter if natural shelter is not available (10). In Article 20 of the CoE's Recommendation Concerning Sheep (1992), it states that "*Reasonable precautions shall be taken to ensure that the welfare of sheep is not adversely affected by unfavourable weather conditions.*" and that "*Sheep should be prevented from gathering in places where they may be buried by snow, and should be shepherded into safer areas whenever possible. All sheep should be removed in time from any land which is in danger of being flooded*" (11).

Robustness Definition

Robustness and resilience are used to refer to the adaptive capacity of animals to stressors, such as adverse weather conditions (12). Researchers have defined robustness as, "*the capacity to maintain productivity in a wide range of environments without compromising reproduction, health and wellbeing*" (13). Characteristics of animals more adapted to cold conditions include a compact body frame to reduce the skin surface area, a full, thick fleece for heat preservation and moisture repellent. Phenotypic adaptations for hot conditions include lighter skin and coat colours, a thinner fleece, and increased body surface area (e.g. larger ears or dewlap) (14). Another important aspect to robust breeds is resilience, defined as, "*the capacity of animals to cope with short-term perturbations in their environment and return rapidly to their pre-challenge status*" (13). This term relates to locally or non-locally adapted breeds. It is hypothesised that non-locally adapted livestock will be less resilient during climate change events compared to locally adapted breeds (15).



Thermal Comfort on Pasture

EURCAW Ruminants & Equines is preparing two Scientific Reviews on thermal comfort in ruminants and equines (14) and pasture and grazing access for ruminants and equines (16), which contain information pertinent to the current Q2E. Thermal regulation differs between individuals based on species, breed, age, physiological state, health condition, environmental acclimatisation, production-level, body condition and behaviour (14). Maintaining thermal comfort for ruminants and equines is an important consideration when managing animals on pasture (16). Typically, it is recommended that ruminants and equines on pasture have access to shelter, either natural or artificial, especially during extreme cold and heat events (14). Natural shelter includes shrubs and trees or geographic features (i.e., rocks and culverts) that protect the animals from the adverse weather conditions (e.g., wind, precipitation, direct sunlight, etc.) (17). Access to adequate feed and water is also necessary as ruminants will alter their feed and water intake during cold and heat events (14). Ruminants will increase water intake and reduce feed intake during warm temperatures and increase feed intake during cold temperatures (14).

Breed Specific Differences

Cattle

Beef breeds are typically more tolerant to heat events than dairy breeds as milk production creates excess metabolic heat (14). Dairy cattle with higher milk production, typically from more temperate climates tolerate heat stress less well than lower producing breeds from typically warm climates (18). *Bos taurus*, commonly known as European cattle, and *Bos indicus*, commonly known as Zebu cattle, were developed through different evolutionary pressures. While zebu cattle are less common in the EU, they are able to tolerate higher heat than European cattle (18). The Senepol breed, a cross between a *Bos taurus* and *Bos indicus*, are also more heat tolerant (18).

Sheep

Breeds with hair are more heat tolerant compared to wool breeds; however, hair breeds are less common in Europe (14). Breeds derived from the North European Short-tailed sheep, such as the Finnish Landrace (Finnsheep), Icelandic, and Romanov breeds of sheep, are considered robust and tend to thrive in harsh environments (19).

Horses

Some horse breeds are hardy, or robust, and can live on pasture year-round, provided they have access to shelter and, in the winter, grow appropriate, thick winter coats through acclimation in the late summer and autumn (20,21). While horses may be able to withstand continuous outdoor access, they demonstrate a preference for man-made shelter and dry bedding during cold, wet weather, particularly at night (21). Horses also demonstrate a preference for man-made shelter during hot weather (21). Cold-blooded horses are more accustomed to colder climates than warm-blooded horses, and horses with dark coats are more likely to withstand cooler climates better than horses that grey when they age (21).

Assessment of Adaptive Capacity

To determine the adaptive capacity of a breed (i.e. whether it is robust), ongoing monitoring of the coping strategies and consequences is important (12). Coping strategies may differ between individual animals to achieve the same goal e.g. during high temperatures, cattle may seek shelter or reduce feed intake to lower metabolic heat production. The consequences may relate to the body condition of the animal. Using validated and practical measures and ensuring that the assessment is comprehensive are important considerations to properly reflect adaptive capacity (12).

Conclusion

Phenotypic characteristics are key identifiers of breed robustness and their ability to cope with adverse weather conditions. Robust breeds can tolerate a wider range of ambient temperatures than non-robust breeds. However, they should still have access to shelter (natural or artificial) to protect them from adverse weather conditions. Furthermore, monitoring the adaptive capacity of robust breeds managed outdoors throughout the year is important, especially in the context of climate change.



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