

An assessment of animal welfare impacts in wild Norway rat (*Rattus norvegicus*) management

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Online Resource 10: Welfare assessment for snap trapping. Median confidence score is given.

**CONTROL METHOD: SNAP TRAPPING UKRAT001**

**Assumptions**

Best practice is followed in accordance with the Standard Operating Procedure UKRAT001.

It is assumed for this assessment that rats are captured using snap traps (break-back traps) that meet the AIHTS standards for regulated traps (at least 80% of 12 tests cause irreversible unconsciousness within 5 minutes).

Traps are deployed (in boxes or tunnels where needed) and set straight away; traps are not baited though many break-back traps come pre-treated with a lure. Existing food sources are left undisturbed.

Traps are checked once every day, between sunrise and sunset.

**Part A: Assessment of overall welfare impact prior to killing method**

Domain 1 Water or food restriction, malnutrition				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact
<i>Evidence</i>				
No impact				
Domain 2 Environmental challenge				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact
<i>Evidence</i>				
No impact				
Domain 3 Injury, disease, functional impairment				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact
<i>Evidence</i>				
No impact				
Domain 4 Behavioural or interactive restriction				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact
<i>Evidence</i>				
Rats are often described as neophobic but their foraging behaviour is the outcome of conflicting motivations between curiosity (neophilia) and caution (neophobia), known as ‘the omnivore’s paradox’ (Berdoy & Drickamer, 2007). Exposure of rats to an unfamiliar environment interferes with object recognition, and opposing drives to avoid and explore novel objects (Ennaceur et al, 2009) are likely to have a mild impact under this domain when boxes/tunnels are first deployed.				

Domain 5 Anxiety, fear, pain, distress, thirst, hunger				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact
<i>Evidence</i> Rats may experience mild anxiety because of opposing drives to explore novel objects (Ennaceur et al, 2009).				

Overall impact
Mild impact
Confidence score = 3

Duration of impact				
Immediate to seconds	Minutes	Hours	Days	Weeks
Confidence score = 3				
<i>Evidence</i> Observations indicate that rats take a few days to become sufficiently habituated to the presence of the boxes/tunnels, to enter these and potentially become trapped.				

Score Part A
5

**CONTROL METHOD: SNAP TRAPPING UKRAT001**  
**Part B: Assessment of killing method**

Level of suffering				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact
Confidence score = 1				

Time to insensibility				
Immediate to seconds	Minutes	Hours	Days	Weeks
Confidence score = 2				

Score Part B
A-F

*Summary of evidence*

Duration

In this assessment, snap traps are likely to cause irreversible unconsciousness within 300 seconds (5 minutes) in most cases, as they are assumed to meet the International Agreement on Humane Trapping Standards (IAHTS). However, the best available rat traps are known to cause irreversible unconsciousness in <30 seconds if the striking bar strikes the rat on the back of the cranium or the back of the neck with sufficient force (upper cervical vertebrae) (German Environment Agency, 2020).

## Suffering

There are no impacts under Domains 1 and 2. A wide range of physical impacts may occur under Domain 3. For example, an effective trap will kill by striking the correct anatomical location with sufficient impact momentum to fracture the cranium or upper cervical vertebrae, causing unconsciousness immediately or rapidly, followed by death (Mason & Littin 2003; Parrott et al., 2009; Morriss & Warburton 2014). If the trap strikes the neck, the clamping force may kill by occluding blood vessels supplying the brain or, if partially occluded carotids/jugulars are accompanied by a collapsed trachea, through hypercapnia (Nutman et al, 1998 ). If the trap strikes the body, thoracic compression may kill by causing asphyxiation resulting in hypoxia and hypercapnia (Parrott et al., 2009; Beausoleil & Mellor, 2015). In general, the impact momentum of a trap damages the nervous system, blood vessels and organs. Where this damage is not immediately lethal, haemorrhaging and swelling results in pain through the accumulation of pressure or restricted venous return, where inflammatory mediators cannot be eliminated from the injured area. Trapped animals may also experience cardiogenic shock (due to heart failure) and haemorrhagic shock (Gregory 2004). An animal dying from blood loss is likely to become unconscious before death and both time to unconsciousness and time to death will depend on the rate of blood loss and, where a body strike occurs, on whether there is any fatal compression of the heart and lungs, neurological damage, or other physical injury impairing core functions such as respiration. If the spinal cord is damaged this may be extremely painful or the rat could be paralysed and feel no direct pain. While a trapped rat remains conscious it will be prevented from performing normal behaviours, e.g., escape behaviour, and will experience impacts under Domain 4 as a result. Trapped animals that are not killed instantly are likely to experience at least pain and fear and potentially other unpleasant experiences leading to severe distress (Parrott et al 2009) under Domain 5. Impacts may change over time. Overall, the AIHTS threshold, of irreversible unconsciousness within 5 minutes, is not sufficient to rule out the possibility of the killing action causing impacts from 'no suffering' through to 'extreme suffering'.

## Summary

CONTROL METHOD	SNAP TRAPPING	UKRAT001
<b>OVERALL HUMANENESS SCORE</b>		<b>5-AF</b>
Comments		
This assessment assumes that the SOP is followed but if traps do not meet the AIHTS standard, or they are poorly positioned or set, then impacts could be increased through animals taking longer than 5 minutes to reach irreversible unconsciousness or to die.		
Rats can be trapped year-round and may breed at any time depending on conditions. Trapping during breeding, as assessed here, could have welfare impacts for dependent pups. If lactating females are killed, efforts should be made to find any nests containing dependent pups and humanely kill them to prevent them from dying of starvation or dehydration.		

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