

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

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Online Resource 12: Welfare assessment for glue trapping followed by a concussive blow to the head. Median confidence score is given.

CONTROL METHOD: GLUE TRAPPING AND CONCUSSIVE BLOW TO THE HEAD

UKRAT003

Assumptions

Best practice is followed in accordance with the Standard Operating Procedure UKRAT003.

Rats are captured using glue traps that are designed and sold for use with for rats.

Glue traps are used indoors only. They are deployed and existing food sources are left undisturbed.

Traps are checked every 12 hours.

Part A: Assessment of welfare impact excluding killing method: capture

Domain 1 Water or food restriction, malnutrition				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact
<i>Evidence</i>				
No bait can be provided in glue traps and because rats have a relatively high metabolic rate they will generally experience a moderate impact in this domain. Water and food restrictions may impact their physiological state or body condition but such effects would remain within the capacity of the body to recover if a good quality diet was restored. Animals left for a very long time may die of starvation or dehydration (Mason & Littin 2003).				
Domain 2 Environmental challenge				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact
<i>Evidence</i>				
Glue traps are used indoors where rats would not normally experience environmental conditions beyond their physiological adaptive capacity. However, once trapped in glue, rats are likely to experience a moderate impact under Domain 2 because they may not be able to thermoregulate effectively as a result of being unable to move and because large areas of their skin may be covered with glue. Mice (<i>Mus musculus</i>) have been found covered in faeces and urine after 3-5 hours of being trapped on a glue traps (Frantz & Padula 1983).				
Domain 3 Injury, disease, functional impairment				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact
<i>Evidence</i>				
Glue traps cause moderate to extreme debility or incapacity. Rats become stuck to glue by their feet, body, head and fur (Frantz & Padula 1983; Mason & Littin 2003), often ending up lying on their side in the glue. As they attempt to escape the glue they become more firmly stuck. Impacts may include physical effects of the glue on functioning, e.g. trauma caused by panic and efforts to escape (glue trapped mice have been found with fur pulled out, skin torn, limbs broken (Frantz & Padula 1983)). Eyes may be damaged and mouths glued shut (Fenwick 2014). Some rodents bite through their own limbs to escape (Franz & Padula 1983). They may defecate and urinate excessively from panic and distress (MAF, 2008). Rats become exhausted from struggling (Mason & Littin, 2003) and may die of exhaustion or suffocation (Mason & Littin 2003).				

Domain 4 Behavioural or interactive restriction				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact
<i>Evidence</i>				
Rats are observed to run onto glue traps without noticing them so no effects of neophobia or neophilia are recorded here. Glue traps have an extreme impact on the behaviour and movement of trapped rats. Rats may become agitated because they are prevented from conducting behaviour that they are highly motivated to perform, e.g., hiding/escaping from predators (cats or dogs) or from cannibalism by other trapped rats, foraging, moving and lactating females may be agitated by being prevented from caring for pups. Self-mutilation may occur when rats are trapped for long periods (Mason & Littin 2003). Lactating females may be agitated by being prevented from caring for young.				
Domain 5 Anxiety, fear, pain, distress, thirst, hunger				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact
<i>Evidence</i>				
Rats will experience extreme inescapable anxiety, fear and pain, and breathlessness if suffocation occurs on glue traps (Mason & Littin 2003; Beausoleil & Mellor, 2015). Trapped rodents will experience fear and perhaps pain if subjected to aggression or predation by other animals. They are also likely to experience hunger and thirst (Mason & Littin 2003).				

Overall impact
Extreme impact
Confidence score = 3

Duration of impact				
Immediate to seconds	Minutes	Hours	Days	Weeks
		Confidence score = 3		
<i>Evidence</i>				
Rats may survive for hours after being caught on glue traps (Tripathi et al 1994, in Fenwick 2014) and may be trapped for up to 12 hours before being found and killed, if best practice is followed.				

Score Part A
7

CONTROL METHOD: CONCUSSIVE BLOW TO THE HEAD UKRAT003
Part B: Assessment of killing method

Level of suffering				
No impact	Mild impact	Moderate impact	Severe impact	Extreme impact
		Confidence score = 3		

Time to insensibility				
Immediate to seconds	Minutes	Hours	Days	Weeks
		Confidence score = 3		

Score Part B
B-D

Summary of evidence

Duration

The time for an operator to approach a rodent on a glue trap, handle the glue trap as necessary, apply a concussive blow to the head (CBH), and for the rat to reach irreversible unconsciousness, is likely to be between seconds and a few minutes.

Suffering

There is no impact under Domains 1 and 2. CBH can destroy or render non-functional the brain regions responsible for cortical integration, in which case instantaneous unconsciousness will be caused with no impact under Domain 3 (AVMA 2020). However, in some cases, the position of the rat on the glue trap could interfere with achieving an optimal strike, resulting in some impact. There will be an impact under Domain 4 when the trapped rat is unable to avoid the approaching operator. Rats trapped alive are likely to experience fear and distress under Domain 5 when the operator approaches the trap and dispatches the rat (Mason & Littin 2003); glue trapped rodents may be squealing when approached (Mason & Littin 2003). No direct handling of the rat is involved but the animal is held in a fixed position on the glue trap, which may need to be manipulated before killing takes place. However, the impact of the whole killing process is likely to be 'mild suffering' to 'moderate suffering'. The Part B score here (B-d) is less than that for CBH applied after cage trapping (D) because CBH can be applied to a rat caught on a GT, while a rat in a CT will need to be moved to a sack before CBH can be applied.

Summary

CONTROL METHOD	GLUE TRAPPING AND CONCUSSIVE BLOW TO THE HEAD	UKRAT003
OVERALL HUMANENESS SCORE	7B-D	
Comments		
<p>This assessment assumes that the SOP is followed but if glue traps are checked less often than specified, or trapped rats not killed quickly after discovery, then impacts could be increased. Prolonged periods of being trapped will lead to dehydration, starvation, exhaustion and exposure. If glue traps were inspected much more frequently the level of pain/distress would be reduced.</p> <p>The killing process should last a few minutes at most. The skill and confidence of the operator will have a significant effect on welfare. If not performed correctly there will be varying degrees of consciousness with associated pain (Close et al 1996). Operators performing CBH must be properly trained and monitored for proficiency with this method of euthanasia. Repeatedly performing CBH can result in operator fatigue, loss of efficacy and welfare concerns (AVMA 2020). Death should be confirmed and if necessary a second blow quickly deployed.</p> <p>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.</p>		

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