



Manaaki Whenua  
Landcare Research

# **Pen testing the kill efficacy of the BT200 trap when used for capturing ship rats**

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# Pen testing the kill efficacy of the BT200 trap when used for capturing ship rats

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# Summary

## Project and client

- Manaaki Whenua – Landcare Research, Lincoln, was contracted by National Springs & Wire Products NZ Ltd to assess the killing performance of the BT200 kill trap against ship rats. The work was undertaken between November 2021 and January 2022.

## Objective

- To test the killing performance of the BT200 trap against ship rats using the National Animal Welfare Advisory Committee (NAWAC) trap-testing guideline.

## Methods

- This work was carried out with the approval of the Landcare Research Animal Ethics Committee (AEC 18/12/02).
- National Springs & Wire Products NZ Ltd provided BT200 kill traps. The traps were set in single-set wooden tunnels.
- Wild-caught rats were penned individually and trialled in a free-approach test. Once the rat was struck by the trap, the time to loss of palpebral (blinking) reflex was measured to determine whether the trap rendered the captured animal irreversibly unconscious within 3 minutes. For the trap to pass the NAWAC trap-testing guidelines, 10 of 10 rats needed to be rendered irreversibly unconscious within 3 minutes.
- Rats that were trapped but remained conscious for longer than 3 minutes were euthanised and, for all captures, the trap jaw-strike location was identified and recorded.

## Results

- Six ship rats were killed successfully with the BT200 trap set in the wooden tunnel. The seventh rat was caught by the tail and remained conscious beyond 3 minutes. The spring-off weight of this trap was found to be c. 120 g, which was 20% greater than recommended; therefore, this rat capture was excluded from the test. The plate spring-off weights were recalibrated for each trap used, and testing was restarted. Four more ship rats were killed successfully.
- All 10 successful ship rat captures were assessed as being rendered irreversibly unconscious in under 54 seconds due to the length of time it took to reach the rats and assess their levels of consciousness once they had been captured. All the rats had significant skull fractures and showed no other signs of life, which indicates they were likely to be irreversibly unconscious from impact. Therefore, it is considered that the trap qualifies as a Class A trap for welfare performance.

## Conclusion

- The BT200 kill trap met the NAWAC trap-testing test criteria when tested on ship rats, and it qualifies as a Class A trap.

## Recommendations

- The BT200 kill trap can be promoted as having met the NAWAC trap-testing criteria for ship rats but cannot be promoted as having been approved or certified by NAWAC. Traps can now be labelled as passing the NAWAC guideline (Class A).<sup>1</sup>
- The spring-off weight of the BT200 kill trap needs to be calibrated by the manufacturer before sale to ensure traps are fit for purpose.

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<sup>1</sup> We can confirm that the BT200 traps provided to Manaaki Whenua – Landcare Research, when assessed under test conditions, met the NAWAC trap-testing criteria to a Class A classification standard. Please note that as the NAWAC guidelines are not legally binding and there is no approval scheme, NAWAC traps may not be marketed as NAWAC approved/certified. The content of this report, and confirmation by Manaaki Whenua – Landcare Research that a trap has met the NAWAC trap-testing criteria, may not be used in any way that could suggest that Manaaki Whenua – Landcare Research, or any Ministry or other government entity, is endorsing a particular trap.



## 1 Introduction

Manaaki Whenua – Landcare Research, Lincoln, was contracted by National Springs & Wire Products NZ Ltd to assess the killing performance of the BT200 kill trap against ship rats. The work was undertaken between November 2021 and January 2022.

## 2 Objective

- To test the killing performance of the BT200 when capturing ship rats, using the National Animal Welfare Advisory Committee (NAWAC) trap-testing guideline.<sup>2</sup>

## 3 Methods

The client provided four BT200 kill traps to test their killing performance on ship rats. The traps required adjustment of the trigger arm so that they could be set, and calibration of the spring-off weight of the trap treadles. The spring-off weight for the traps was adjusted to 100 g using the methods described for the DOC200 trap in the Predator Free 2050 *Practical Guide to Trapping*.<sup>3</sup> In addition the traps were set and fired 10 times each using a substitute target prior to animal testing, as per the preparation of traps recommended in the NAWAC guideline.

Wild-caught rats were acclimatised to captivity in cages before being transferred to test arenas (L 2.5 m, H 1.0 m, W 0.8 m) for the trap testing. Rats were confined individually in each arena and tested in a free-approach test during the evening. In each arena, a trap was screwed into and set in a single-set wooden tunnel (manufactured to Department of Conservation design specifications by Haines Pallets, Lower Hutt). The trap was baited with either Nutella® or smooth peanut butter smeared on standard rodent feed pellets (ProLab RHM 1800 LabDiet, PMI Nutrition International, MO, USA), which were placed beyond the trap in the tunnel, and a small amount of the paste bait was applied on the external mesh by the entrance hole to encourage entry by rats.

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<sup>2</sup> National Animal Welfare Advisory Committee (NAWAC) 2019. Guideline 09: Assessing the welfare performance of restraining and kill traps 2019. <https://www.mpi.govt.nz/dmsdocument/8521-nawac-guideline-09-assessing-the-welfare-performance-of-restraining-and-kill-traps> (accessed 16 August 2021).

<sup>3</sup> <https://www.doc.govt.nz/globalassets/documents/conservation/threats-and-impacts/pf2050/pf2050-trapping-guide.pdf> (accessed 16 August 2021).



**Figure 1. Unset BT200 kill trap in a Haines Pallets single-entrance tunnel. The lid has been unscrewed and opened to view the trap from above. The trap was firmly screwed to the tunnel base. Standard rodent feed pellets smeared with either Nutella® or smooth peanut butter were placed to the left of the trap.**

When a rat was struck by the trap, the time to loss of palpebral (blinking) reflex was measured to determine whether the trap had rendered the captured animal irreversibly unconscious within 3 minutes. For the trap to pass the NAWAC trap-testing guideline (2019), 10 of 10 rats needed to be rendered irreversibly unconscious within 3 minutes. If a trap renders all captured animals irreversibly unconscious within 3 minutes, but with some or all greater than 30 seconds, then the trap qualifies as a Class B trap for welfare performance. If all 10 animals are rendered irreversibly unconscious in under 30 seconds, then the trap qualifies as a Class A trap. Once unconsciousness was confirmed, a stethoscope was used to determine time to cessation of heartbeat (i.e. to confirm unconsciousness was irreversible).

During the pen tests, the BT200 trigger spring-off weight was recalibrated after failing to kill a rat in the required time frame and then testing restarted.

The test animal that survived was euthanised by cervical dislocation. This work was carried out with the approval of the Landcare Research Animal Ethics Committee (AEC 18/12/02).

## **4 Results**

Six ship rats were killed successfully with the BT200 trap set in the wooden tunnel. The seventh rat entered the trap tunnel and passed over the trap treadle without triggering the trap. The trap fired as the rat exited the tunnel and it was caught by the tail and remained conscious beyond 3 minutes. The spring-off weight of this trap was found to be c. 120 g, which was 20% greater than recommended so this rat capture was excluded from the test. The plate set-off weights were checked and recalibrated for each trap used, and testing was restarted. Four more ship rats were killed successfully.

Five of the rats tested were compressed by four to six kill bars when caught in the trap so it was not possible to access their chests to listen for cessation of heartbeat. These individuals were removed from the trap after 3 minutes and then a stethoscope was used to confirm heart stop. Consequently, for these animals, the recorded heart stop times were greater than the actual heart stop times (Table 1).

All 10 successful ship rat captures were assessed as being rendered irreversibly unconscious in under 54 seconds but for of these were less than 30 seconds. The time it took to assess the level of consciousness was influenced by how long it took to reach and open the test arena, and then open the trap tunnel. The rats all had significant skull fractures and showed no other signs of life, which indicates they were likely to be irreversibly unconscious from impact. Therefore, it is considered that the trap qualifies as a Class A trap for welfare performance (Table 1).

**Table 1. Outcome of a test using the BT200 kill trap for capturing ship rats**

Date	Weight (g)	Sex	Time to loss of palpebral reflex	Time to heart stop	Strike location	Notes
<b>Test</b>						
20/11/2021	168.4	M	<37 s	3 m 17 s	1st bar across back of skull; 2nd bar between ears and eyes; 3rd bar across muzzle.	Major crushing of skull.
24/11/2021	186.4	F	<29 s	2 m 29 s	1st bar across shoulders; 2nd bar back of skull; 3rd bar across eyes.	Major fracture at rear of skull.
27/11/2021	150.2	M	<41 s	2 m 21 s	1st bar across head behind ears; 2nd bar across eyes; 3rd bar across tip of nose.	Major crushing of skull.
30/11/2021	212.3	M	<35 s	<3 m 45 s	1st bar middle of back; bars 2 & 3 across shoulders; 4th bar between ears and eyes.	Compression of body and skull fracture.
30/11/2021	100.0	F	<54 s	<4 m 19 s	All six bars across body from hindquarters to eyes.	Compression of body and skull fracture.
1/12/2021	187.2	M	<29 s	<3 m 30 s	1st bar middle of back; bars 2 & 3 across shoulders; 4th bar across eyes.	Compression of body and skull fracture.
2/12/2021	113.0	F	-	-	Bars 1–3 across tail.	Did not trigger trap entering trap tunnel and passing over plate but caught attempting to exit.
12/12/2021	197.5	M	<37 s	3 m 43 s	1st bar across ears; 2nd bar across nose.	Some reflexive gasping until 1 m; major crushing of skull.
12/12/2021	126.4	F	<29 s	<4 m 19 s	1st bar middle of back; bars 2 & 3 across shoulders; 4th bar across ears.	Compression of body and skull fracture.
13/12/2021	201.3	M	<26 s	<3 m 22 s	All 6 bars across body from middle of back to tip of nose.	Compression of body and skull fracture.
14/12/2021	190.7	M	<47 s	3 m 58 s	All 6 bars across body from hindquarters to between ears and eyes.	Compression of body and skull fracture.

## **5 Conclusions**

The BT200 kill trap met the NAWAC trap-testing test criteria when tested on ship rats, and it qualifies as a Class A trap.

The calibration of the spring-off weight in the BT200 is critical to ensure consistent capture of rats. The individual rat that was caught by the tail was approximately the same weight as the spring-off weight, which means it was able to initially cross the treadle without the trap firing. Presumably the treadle would have partially depressed in the first crossing, so that when the rat crossed it a second time the trap fired. All the traps had been calibrated prior to the test starting using the method described in the *Predator Free 2050 Practical Guide to Trapping*, but this method proved to be too coarse. It is critical that the manufacturer calibrates the traps more accurately in controlled factory conditions before sale.

## **6 Recommendations**

- The BT200 kill trap can be promoted as having met the NAWAC trap-testing criteria for ship rats. Traps can now be labelled as passing the NAWAC guideline (Class A).
- The spring-off weight of the BT200 kill trap needs to be calibrated by the manufacturer before sale to ensure traps are fit for purpose.

## **7 Acknowledgements**

Thanks to Mike Baird from National Springs and Wire Products NZ Ltd for providing traps and funding the pen testing. Thanks also to Animal Facility staff for animal husbandry, Bruce Warburton and Chris Jones for review, Ray Prebble for editing, and Kate Boardman for final formatting of this report.