

DOUBLE STANDARDS IN SPRING TRAP WELFARE: ENDING INEQUALITY FOR RATS (RODENTIA: MURIDAE), MICE (RODENTIA: MURIDAE) AND MOLES (INSECTIVORA: TALPIDAE) IN THE UNITED KINGDOM

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Abstract Spring traps require welfare approval in the UK, but break-back traps, for rats and mice, and mole traps are exempt. Mechanical tests on a wide range of these unregulated traps showed that impact momentum varied 6-8-fold, and clamping force varied 4-5.5-fold, among traps for use with each of rats, mice and moles. There was considerable overlap between the strongest mouse traps and weakest rat traps for each force. A post-mortem and x-ray study of 50 spring-trapped moles revealed that none sustained damaged skulls or cervical vertebrae; they were, therefore, unlikely to have become unconscious immediately. Some moles appeared superficially to have broken spines, but in fact they had incurred only soft tissue damage and no broken vertebrae. The primary identifiable cause of death in trapped moles was acute haemorrhage. A minority of moles may have asphyxiated, but evidence for this was weak. Given the scale of rat, mouse and mole trapping in the UK, the wide range of unregulated traps available, and doubts raised regarding their humaneness, this research suggests an urgent imperative to abandon a puzzling double standard, and thereby to reduce the welfare impact of unregulated spring traps for rats, mice and moles. There is a strong case that all traps should be subjected to comparable approval standards. In the meantime, we propose a Voluntary Trap Approval (VTA) scheme under which manufacturers would submit traps for approval testing in the same way as for regulated traps. All approved traps could be given a certification mark and trap suppliers might choose to sell only approved traps, thus edging non-approved traps out of the market.

Key words *Apodemus sylvaticus*, *Mus musculus*, *Rattus norvegicus*, *Talpa europaea*, voluntary trap approval scheme

INTRODUCTION

Spring traps are widely used for killing small mammals in the United Kingdom. While most spring traps are, as might be expected, legally required to meet welfare approval standards, break-back traps (for killing rats [*Rattus norvegicus* (B.)] and mice [e.g. *Mus musculus* (L.), *Apodemus sylvaticus* (L.)]), and mole (*Talpa europaea* (L.)) traps, have been exempt since the 1950s, when welfare approval for spring traps was first introduced.

In 1951, the UK Committee on Cruelty to Wild Animals produced a report which concluded that, “*It should be made illegal for any spring trap to be used, the design of which has not been approved by the Minister of Agriculture and Fisheries and the Secretary of State for Scotland, and those Ministers should approve only spring traps which will catch and kill wild animals without causing them unnecessary suffering*” (Scott Henderson, 1951). However, the Committee remarked that the rat was “*regarded as one of the greatest animal pests...a menace to public health*” and that “*its control and destruction are essential*”; they then concluded, without evidence, that break-back traps caused no unnecessary suffering. The Committee also said that they had no evidence that mole trapping caused unnecessary suffering, although one (unnamed) organisation had raised the possibility that “*the ordinary*

type of mole-trap was too weak to kill instantaneously”; they consequently concluded that there was no need to make special recommendations regarding mole trapping.

In 1954, The Pests Act implemented the Committee’s recommendations, making it illegal to use a spring trap for killing or taking animals in England, Scotland or Wales, other than a trap approved by an order of the Secretary of State, but with the exception of “*traps of any description specified by order of the Minister of Agriculture and Fisheries as being adapted solely for the destruction of rats, mice or other small ground vermin*” (<http://www.legislation.gov.uk/ukpga/Eliz2/2-3/68/section/8>). Four years later, The Small Ground Vermin Traps Order 1958 defined these exempt traps as: “(1) *Spring traps known as break-back traps and commonly used for the destruction of rats, mice or other small ground vermin; (2) Spring traps of the kind commonly used for catching moles in their runs*”.

Sixty years on, these exemptions seem difficult to justify, when welfare approval *is* required both for: (a) other (non-break-back) spring traps used for rats and mice; and (b) spring traps used for other species with similar capacities for suffering (Mellor et al., 2009). A utilitarian view - one seemingly taken by the 1951 Committee - might be that lower welfare standards are acceptable when an animal is deemed a particularly numerous or serious pest. However, one clearly consistent view is that an absolute welfare standard should be applied (Dubois et al., 2017) and even if pragmatism favours a cost-benefit approach, it does not call for abdication of standards.

WELFARE IMPACT OF UNREGULATED TRAPS

Together, rats, mice and moles probably constitute the majority of animals killed in spring traps in the UK, arguably many thousands each year. And spring-trapping is the most frequently reported method of attempting to control moles on British farms and amenities, now that strychnine is banned for this purpose (Baker et al., 2016). Under the exemption from regulation, a plethora of break-back trap designs has become available and mole traps of three main types (scissors, Duffus, talpa) are made by several different manufacturers (Baker et al., 2012). These unregulated traps vary widely in price and apparent quality, and their humaneness has been questioned (Rudge, 1963; Atkinson et al., 1994; Baker et al., 2012, 2015).

Mechanical trap performance is widely accepted as an indicator of trap welfare performance (International Organization for Standardization, 1999; Talling and Inglis 2009). We measured impact momentum and clamping force to examine the scope for improving the welfare standards of unregulated traps (Baker et al., 2012). We sourced 41 types of break-back trap (18 for rats, 23 for mice) and 14 combinations of mole trap types and brands. Mole traps were manufactured from metal, while break-back traps consisted of wooden, plastic or metal bodies and either plastic or metal striking bars. Break-back traps also varied in terms of spring type and trap-opening angle (as measured in the set position). We found that impact momentum varied 6-8-fold, and clamping force 4-5.5-fold, among traps intended for killing each species, and there was considerable overlap between the strongest mouse and weakest rat traps for each force (Figures 1 and 2). Both impact momentum and clamping force differed significantly between mole trap types (scissors, Duffus and alpa), and among brands within each of the three types (Figure 2). Of course, it is possible that the strongest traps were greatly over-engineered and that even the weakest traps for each species were sufficiently powerful to cause irreversible unconsciousness within an acceptable time. However, given that, on average, brown rats are 20 times heavier than mice (Macdonald and Barrett, 1993), it is of particular concern that the weakest rat traps were less powerful than some mouse traps. We found no relationship between trap price and the mechanical performance of rat, mouse or mole traps, except in the case of one type of mole trap - the talpa trap - where more expensive brands of talpa trap produced greater clamping forces. This research indicates significant scope for reducing the welfare impact of unregulated spring traps for rats, mice and moles and suggests that exemption from regulation has encouraged the proliferation of ineffective and inhumane traps (Baker et al., 2012).

Different types of break-back trap, in our study, contained one of four different types of spring, while their opening angles, when set, ranged between 45 and 180 degrees. We found that both spring type and opening angle were important predictors of impact momentum and clamping force (Baker et al., 2012). In general, larger opening angles were associated with greater impact momentums, and smaller opening angles with greater clamping forces, while both impact momentum and clamping force were greater in traps with ‘double-peg’ springs. Spring traps that crush the skull are considered the most efficient and humane (Proulx and Barrett, 1991; Mason and Littin, 2003), and damage to the skull or upper cervical vertebrae may cause immediate unconsciousness (Parrott et al., 2009). While both clamping force and impact momentum may contribute to the death of a trapped animal, traps with larger impact momentums are likely to cause more immediate damage (see Warburton and Hall, 1995), so our study indicates that, in our sample, traps with large opening angles and ‘double-peg’ springs were likely to have better welfare impacts. The recent proliferation of weaker, plastic break-back traps - often with ‘jaw’ type springs and smaller opening angles (designed so that users avoid touching working parts and dead animals), is of particular welfare concern.

In an effort to examine the welfare impact of mole traps in the field, we conducted a separate post-mortem study of 50 moles, spring-trapped by pest controllers using either scissors or Duffus traps in the course of their normal business (Baker et al., 2015). X-rays revealed that none of the trapped moles had sustained damaged skulls or upper cervical vertebrae, and so moles were unlikely to have become unconscious immediately (see Parrott et al., 2009). Indeed, while no moles had broken vertebrae, some had sufficient soft tissue damage around the capture point that, upon external inspection, their spine appeared broken. However, any possible spinal cord damage would have been unlikely to cause unconsciousness in a short time-frame. Mole trappers finding moles in this condition might believe they are killing moles quickly (Baker et al., 2015).

The primary identifiable cause of death among moles in our study was acute haemorrhage, and moles were likely to have experienced something between the two extremes of: (a) a major blood vessel being severed, with the animal losing consciousness and dying very quickly through exsanguination and shock; and (b) a minor blood vessel being severed, with the animal taking longer to die but becoming unconscious before dying (Baker et al., 2015). Moles were unlikely to have bled to death over several hours because, if bleeding was that slow, clotting mechanisms would have come into play and there would have been evidence that moles died of other causes, such as dehydration and starvation. Most moles (94%) were captured at the thorax, abdomen or both, and the rest at the shoulders or hip. One mole, captured at the thorax/abdomen, had broken ribs. A minority of moles (those captured at the shoulder, thorax or thorax-abdomen) may have died of asphyxiation, but we would have expected to find more evidence of this, such as damage to the trachea or larynx, haemorrhage in the respiratory tract or more animals with fractured ribs. If some moles did asphyxiate, they were likely to experience something between the two extremes of: (a) complete obstruction of the airways; and (b) slight compression of the ribcage reducing the amount of oxygen entering the bloodstream (Baker et al., 2015).

In their mole trapping studies, Rudge (1963) and Atkinson et al. (1994) reported moles trapped by the skin and forelimbs. While none of the moles presented to us for our study were caught by extremities, it is possible that pest-controllers withheld any animals that they felt were not trapped humanely (Baker et al., 2015).

NO LEGISLATION CHANGE

The exemption of traps from regulation has facilitated neglect of welfare standards (Baker et al., 2012). Given the scale of rat, mouse and mole trapping in the UK, the wide range of unregulated traps available for this, and the doubts raised about their humaneness, it is evident that all traps should be subjected to equal approval standards. Besides, higher welfare traps are probably more effective than lower welfare alternatives, and there is no reason to believe they should cost more (Baker et al., 2012).

Clearly, on grounds of logic, efficacy and ethics, the law should be changed such that all traps need to be tested. In 1998, the European Community signed the Agreement on International Humane Trapping Standards (AIHTS) with Canada and the Russian Federation. The IAHTS prohibits the use of leghold traps for killing certain species and the importation of pelts of those species from countries that use leghold traps. While the AIHTS is not directly relevant to rats, mice and moles, it did lead the European Commission, in 2004, to propose a European Union trapping Directive, the goal being to set new standards for the approval and use of traps more widely in Europe, and potentially to reconsider which species were covered. A report commissioned by the EU to examine options for such a Directive, and released in 2011, recommended *inter alia* that traps for all species should be regulated (Talling and Inglis, 2009). In 2012 the European Commission withdrew the proposed Directive. Recently, UK wildlife law has been under review by the Law Commission (<http://www.lawcom.gov.uk/project/wildlife-law/>). The related consultation exercise included (among many other issues) consideration of The Pests Act and more general inconsistencies in law (The Law Commission, 2012), but no changes have been proposed in the final report regarding spring trap regulation. In 2006, The Animal Welfare Act made it an offence in the UK to cause ‘unnecessary suffering’ to any animal ‘under the control of man’ which includes a wild animal held in a trap (Natural England, 2010). Surely, in the light of this Act, there is an obligation for all lethal traps in the UK to meet equivalent welfare standards?

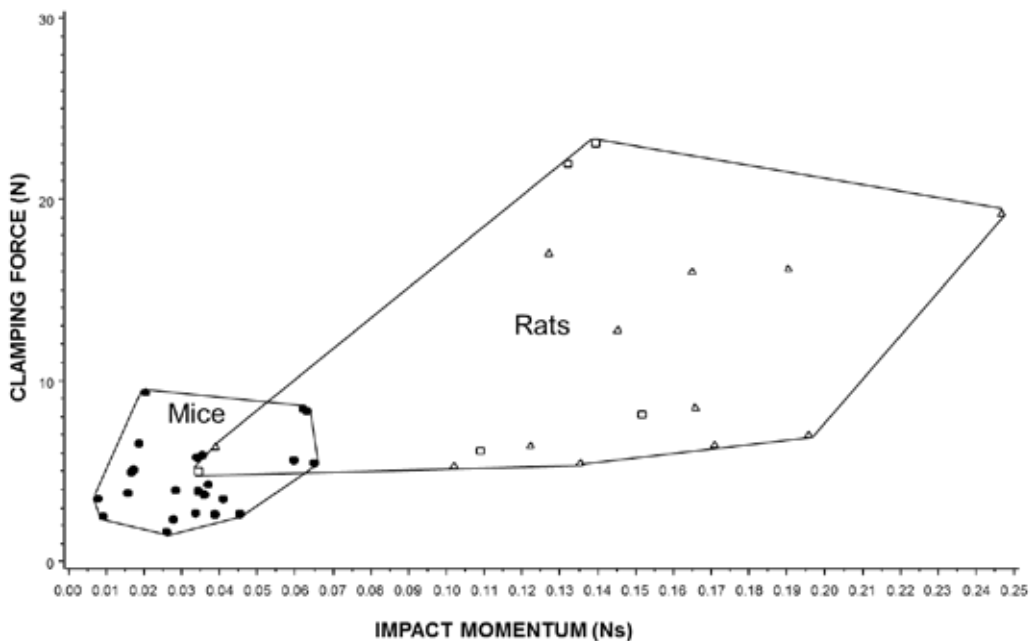


Figure 1. Impact momentum versus clamping force for mouse and rat traps. Mouse trap types ($n=23$) are represented by circles and rat trap types ($n=17$) by triangles or squares. Each point represents a different trap type and is the mean of five measurements on one trap. From Baker et al. (2012).

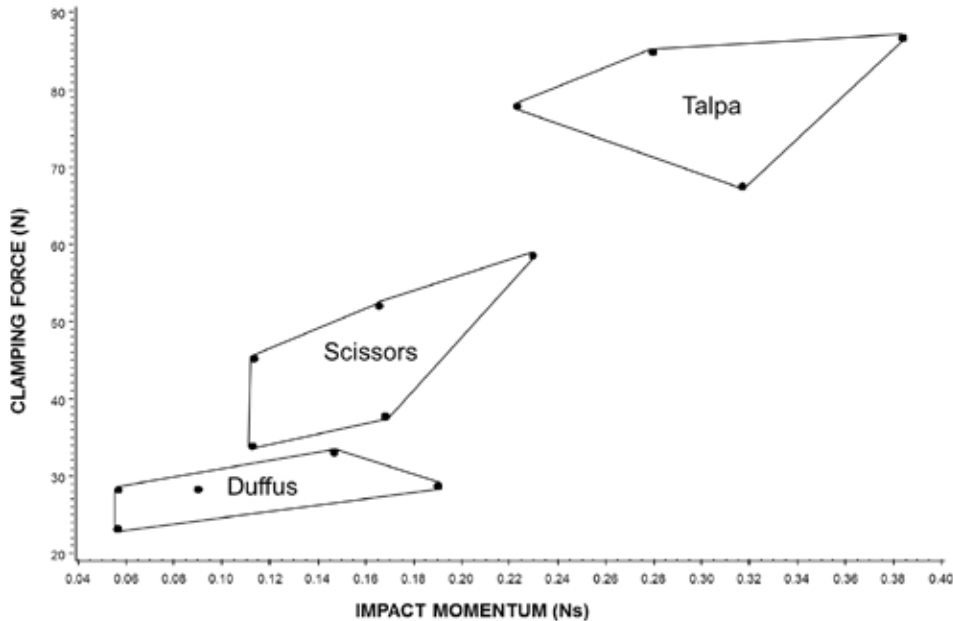


Figure 2. Impact momentum versus clamping force for mole traps. Each point represents a different trap type/brand combination and is the mean of measurements on 10 individual traps for impact momentum and 20 traps for clamping force. Points for traps of the same type but different brands are enclosed within a polygon. From Baker et al. (2012).

THE SOLUTION

Insofar as the legislature has, so far, failed to reform the trap legislation, while awaiting reform we propose a Voluntary Trap Approval (VTA) scheme, in which trap manufacturers submit unregulated lethal traps (not necessarily only spring traps) for approval in the same way as regulated (non-exempt) spring traps. The approval of traps is a devolved issue in the UK, and in England and Wales, for example, traps are submitted to the Animal and Plant Health Agency (APHA) for testing. To meet approval standards, traps must cause irreversible unconsciousness within 5 minutes, in $\geq 80\%$ of 12 tests (Baker et al., 2012). The costs of testing unregulated traps would need to be met by the manufacturer, as they are for regulated (non-exempt) traps, but once approved the trap could be marketed as ‘welfare approved’ and display a formal certification mark. For consistency, non-exempt traps that already require approval could also be given the certification mark. Such a scheme would not only deliver more effective traps to the market, but would also highlight to the public the issue of unregulated traps, as well as providing them with a choice and the opportunity to express demand for more welfare-friendly traps. Suppliers eager to demonstrate attention to both efficiency and ethics would stock only approved traps, which might lead to a cascade effect, with more manufacturers submitting their unregulated (exempt) traps for testing and more suppliers deciding to sell only approved traps, until non-approved traps are edged out of the market. (UK retail industry concern to avoid selling poor-welfare rodent control products was demonstrated recently when the Humane Society International UK persuaded more than 200 UK suppliers of pest control products not to stock lethal rodent glue traps on welfare grounds [Claire Bass, HSI-UK, personal communication 2016]. Notably, manufacturer concern to avoid producing poor-welfare rodent control products has been demonstrated by STV International Ltd, who, after seeing our 2012 mechanical trap performance study, have altered their approach by: (a) focussing marketing on higher impact momentum traps with ‘double-peg’ springs; (b) redesigning one of their plastic traps which previously had a small opening angle and a ‘jaw’ type spring; (c) implementing minimum standards for the materials and

manufacture of wooden traps; and (d) introducing quality assurance testing for the resilience of spring strength with repeated use [Edwin Allingham, STV International Ltd, personal communication 2016]). Ultimately, successful implementation of a VTA scheme might lead to legislative change to formalise trap welfare equality in the UK.

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REFERENCES CITED

- Atkinson, R.P.D., D.W. Macdonald, and P.J. Johnson. 1994.** The status of the European mole *Talpa europaea* L. as an agricultural pest and its management. *Mamm. Rev.* 24: 73-90.
- Baker, S.E., S.A. Ellwood, P.J. Johnson, and D.W. Macdonald. 2016.** Moles and mole control on British farms, amenities and gardens after strychnine withdrawal. *Anim.* 6: 39. Special edition on: Ethical and Welfare Dimensions of the Management of Unwanted Wildlife.
- Baker, S.E., S.A. Ellwood, V.L. Tagarielli, and D.W. Macdonald. 2012.** Mechanical Performance of Rat, Mouse and Mole Spring Traps, and Possible Implications for Welfare Performance. *PLoS ONE.* 7: e39334.
- Baker, S.E., R.F. Shaw, R.P.D. Atkinson, P. West, and D.W. Macdonald. 2015.** Potential welfare impacts of kill-trapping European moles (*Talpa europaea*) using scissor traps and Duffus traps: a post-mortem examination study. *Anim. Welf.* 24: 1-14.
- Dubois, S., N. Fenwick, L. Baker, S.E. Baker, N.J. Beausoleil, S. Carter, B. Cartwright, F. Costa, C. Draper, J. Griffin, A. Grogan, G. Howald, B. Jones, K.E. Littin, A.T Lombard, D.J. Mellor, D. Ramp, E.A. Ryan, C.A. Schuppli, T.M. Sharp, and D. Fraser. 2017.** International consensus principles for ethical wildlife control. *Conserv. Biol.* 10.1111/cobi.12896.
- International Organization for Standardization [ISO]. 1999.** TC191. Animal (mammal) traps. Part 4: methods for testing killing trap systems used on land or underwater. International Standard ISO/DIS 10990-4. Geneva: ISO.
- Macdonald, D.W. and P. Barrett. 1993.** Mammals of Britain and Europe. London: Harper Collins.
- Mason, G. and K. Littin. 2003.** The humaneness of rodent pest control. *Anim. Welf.* 12: 1-37.
- Mellor, D.J., E. Patterson-Kane, and K.J. Stafford. 2009.** The Sciences of Animal Welfare. Oxford: Wiley-Blackwell.
- Natural England. 2010.** The Animal Welfare Act 2006: what it means for wildlife; Technical Information Note TIN072. Sheffield: Natural England.
- Parrott, D., R. Quy, K. Van Driel, P. Lurz, S. Rushton, J. Gurnell, N. Aebischer, and J. Reynolds. 2009.** Review of red squirrel conservation activity in northern England. A Report by Fera to Natural England (NECR019). Sheffield: Natural England.
- Proulx, G. and M. Barrett. 1991.** Evaluation of the Bionic trap to quickly kill mink (*Mustela vison*) in simulated natural environments. *J. Wild. Dis.* 27: 276-280.
- Rudge, A.J.B. 1963.** A study of mole-trapping. *Proc. Zool. Soc. Lond.* 149: 330-334.
- Scott Henderson, J. 1951.** Report of the Committee on Cruelty to Wild Animals. Home Office/Scottish Home Department, Cmd 8266, June 1951. London: HMSO.

- Talling, J.C. and I.R. Inglis. 2009.** Improvements to trapping standards. DG ENV, <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.306.7379&rep=rep1&type=pdf>.
- The Law Commission. 2012.** Wildlife Law: A Consultation Paper. London: Her Majesty's Stationery Office.
- Warburton, B. and J. Hall. 1995.** Impact momentum and clamping force thresholds for developing standards for possum kill traps. N.Z. J. Zool. 22: 39-44.