LANDCARE RESEARCH
MANAAKI WHENUA

18 February 2016

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Dear Malcolm

RE: MECHANICAL TESTING OF PCR DOC 200 TRAPS

Please find below the results of the mechanical testing as requested.

Yours faithfully

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1 Introduction

Landcare Research, Lincoln, reviewed the mechanical performance of DOC 200 and PCR DOC 200 kill traps, for Pest Control Research LP between July 2015 and March 2016.

2 Objective

- To compare the mechanical performance of PCR DOC 200 traps with DOC 200 kill traps and provide comment on comparative killing performance.

3 Methods

Six new traps of each type (PCR DOC 200 and DOC 200) were supplied by Pest Control Research LP (PCR) and these were provided to SAI GLOBAL (an international standard testing organisation) for mechanical testing. The tests carried out included:

1. Impact momentum: Each trap was activated two times and the velocity of the killing arm was measured 40 mm above the trap trigger pan (i.e. at the height estimated to be the point at which the killing arm would first apply some impact). The killing bar

velocity was measured using high-speed (1500 frames per second) Motion Pro X3 video camera. The theoretical effective mass of the killing arm was calculated using the dimensions measured from the trap (that is length, width and thickness of all parts of the killing arm) and multiplying this by the assumed steel density (7800kg/m^3).

2. Clamping force: This was measured twice for each trap using an electronic strain gauge (50 kg strain gauge (IMT 384) at a point 10 mm above and in the centre of the fully depressed trigger plate.

3. Trigger force: This was measured twice for each trap using 2 kg digital scales (IMT184) while depressing the centre of the trigger plate at a speed of 5mm/min. This was carried out with the trap set but with the killing arm restrained so it could be triggered but not close.

4 Results

The mechanical test results for each trap (mean of two tests) are listed in Table 1.

Impact momentum: The mean impact momentum of the PCR DOC 200 traps was 2.52 kg.m/sec and 2.37 kg.m/sec for the DOC 200 traps. This difference was not significant (t = -1718, p = 0.2705).

Clamping force: The mean clamping force for the PCR DOC 200 traps was 8.85 kg compared to 7.68 kg for the DOC 200 traps with this difference being statistically significant (t = -6.510, p = <001).

Trigger force: The mean trigger force for the PCR DOC 200 trap was 0.138 kg compared to 0.096 kg for the DOC 200 traps. This difference was not significant (t = -1.908, p = 0.099).

Table 1 Mechanical values from testing PCR DOC 200 and DOC200 kill traps.

Trap model	Impact force	Clamping Force	Trigger Force
PCR	2.560	9.1	0.122
PCR	2.792	8.6	0.126
PCR	2.676	9.1	0.113
PCR	2.327	8.4	0.101
PCR	2.327	8.5	0.238
PCR	2.443	9.4	0.132
DOC	2.210	7.4	0.134
DOC	2.557	7.9	0.092
DOC	1.950	7.8	0.086
DOC	2.644	7.6	0.103
DOC	2.470	7.7	0.094
DOC	2.384	7.7	0.069

5 Conclusions

The mechanical test results show that the PCR DOC 200 traps deliver similar impact momentum to the DOC 200 traps and slightly more clamping force. It can therefore be concluded that the PCR DOC 200 traps should kill appropriate target species as effectively as the DOC 200 traps (given both traps have identical dimensions). The pressure required to trigger the trap could influence the strike location, and although the results showed that the difference between the mean trigger pressures (43 g) was not statistically different it could be high enough to influence the trigger performance if not adjusted. It is therefore recommended that the triggering sensitivity of PCR DOC 200 traps is reduced to 100 g. This can be done by trap users adjusting the sear prior to traps being deployed in the field (see: *How to properly calibrate the spring off weight of a DOC 200*; https://www.youtube.com/watch?v=11t9lI2FpFk accessed 18 February 2016).

These results therefore indicate that the PCR DOC 200 trap should be expected to have an equivalent performance to the DOC 200 traps both in terms of killing and capture performance.