



**Landcare Research**  
**Manaaki Whenua**



# Refining Operational Practices for Controlling Rabbits



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# Introduction

- Introduced rabbits are significant pests of agriculture and environment in New Zealand
- Historically controlled by poisoning until illegal release of RHD in 1997
- Numbers are increasing again as effect of RHD wanes
- Need to reinstate widespread aerial poison control operations – most commonly 1080 (sodium fluoroacetate)

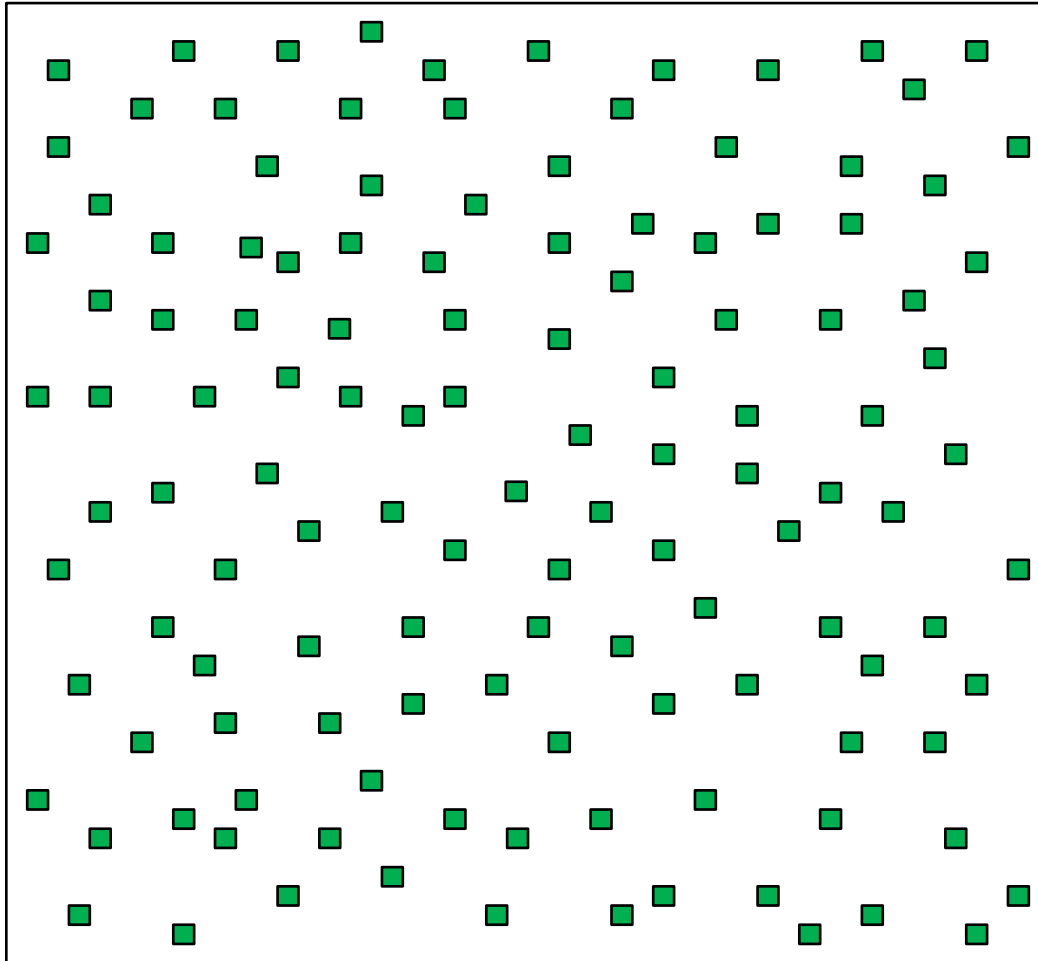




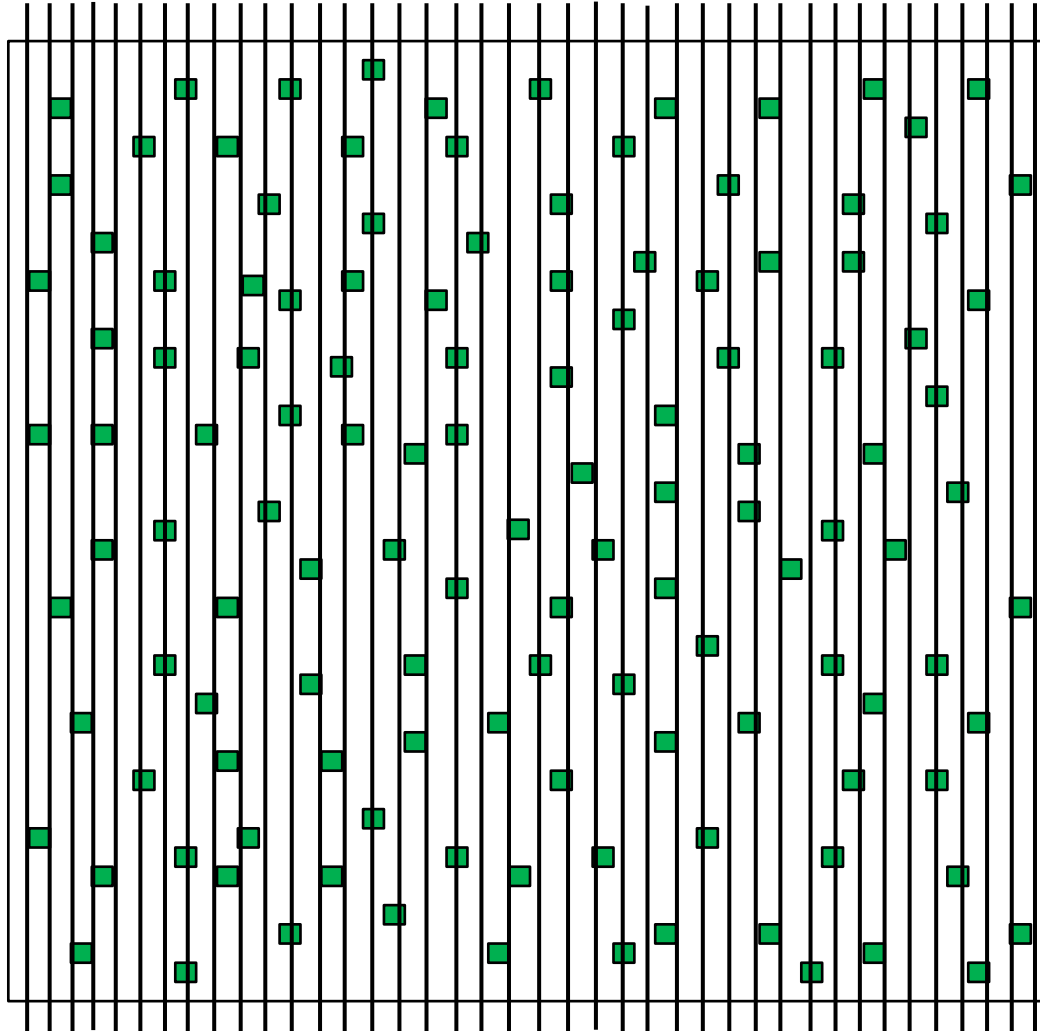
# Current Practice for Aerial 1080

- 2 prefeeds of non-toxic carrot baits sown at 30 kg / ha
  - 1 application of toxic carrot baits sown at 30 kg / ha
  - Baits broadcast for complete coverage of treated area
  - About 1 week between each application
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- Density of ~5,000 toxic baits / ha or ~0.5 baits / m<sup>2</sup> for about 100 rabbits / ha

- 100 ha block (1 km × 1 km) and 30 kg of bait / ha broadcast



- Fixed-wing aircraft: 40 lines 25 m apart



# Current Practice

- High per ha flight time results in high rabbit control costs (\$70–\$100 / ha)
- So why do 5,000 baits need to be sown per ha?
- Why do baits need to be broadcast?
- Bait quality historically poor, i.e. highly variable bait size and toxicity (Nugent et al. 2012)
- High number of baits broadcast to maximise the likelihood that all rabbits encounter and consume a lethal quantity of bait prior to toxicosis (~20–30 min)



# Experimental Trials

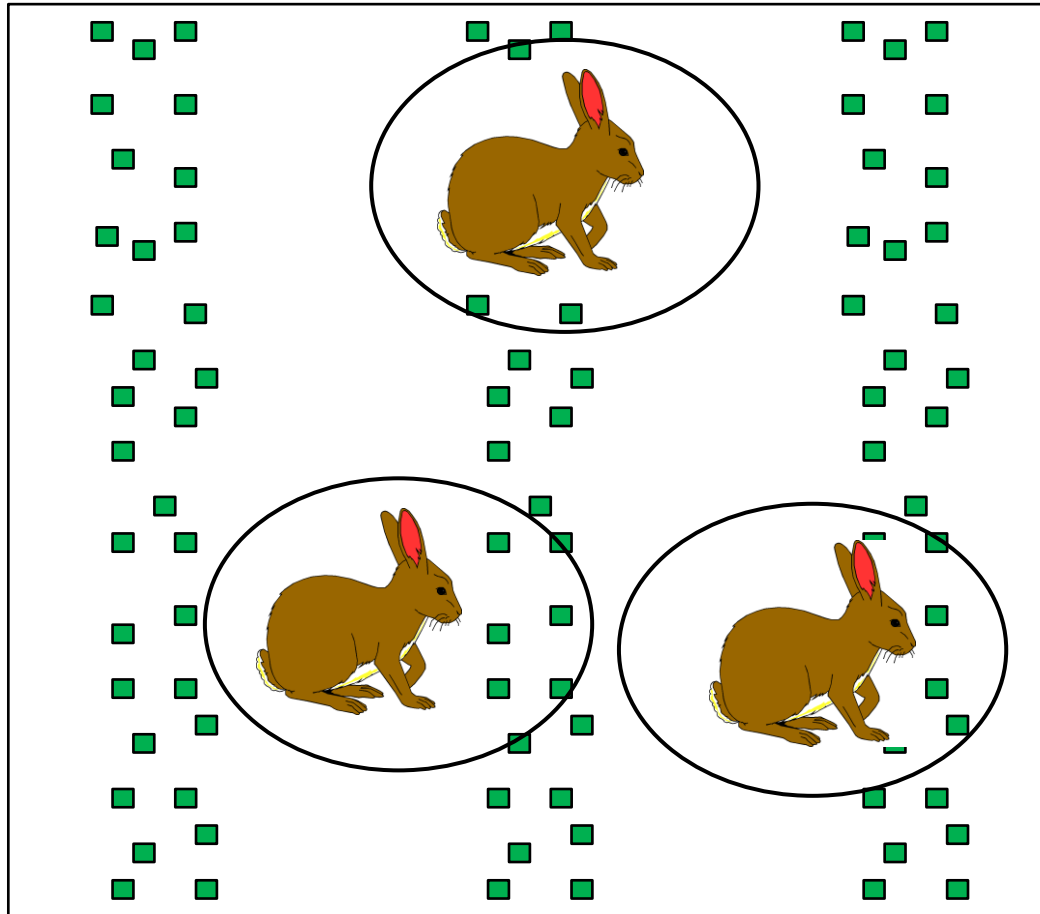
- Aim: reduce per ha control costs and per ha use of 1080 without a loss of efficacy
- Sow 10 kg / ha (cf. 30 kg) in strips, i.e. increase flight path spacing
- Requirement: improved bait quality



# Experimental Trials

- Hypothesis: efficacy of refined operational practices will be dependent on (a.) the relationship between rabbit home range size and flight path spacing and (b.) bait density in the treated area

a.) All rabbit home ranges overlap bait strip

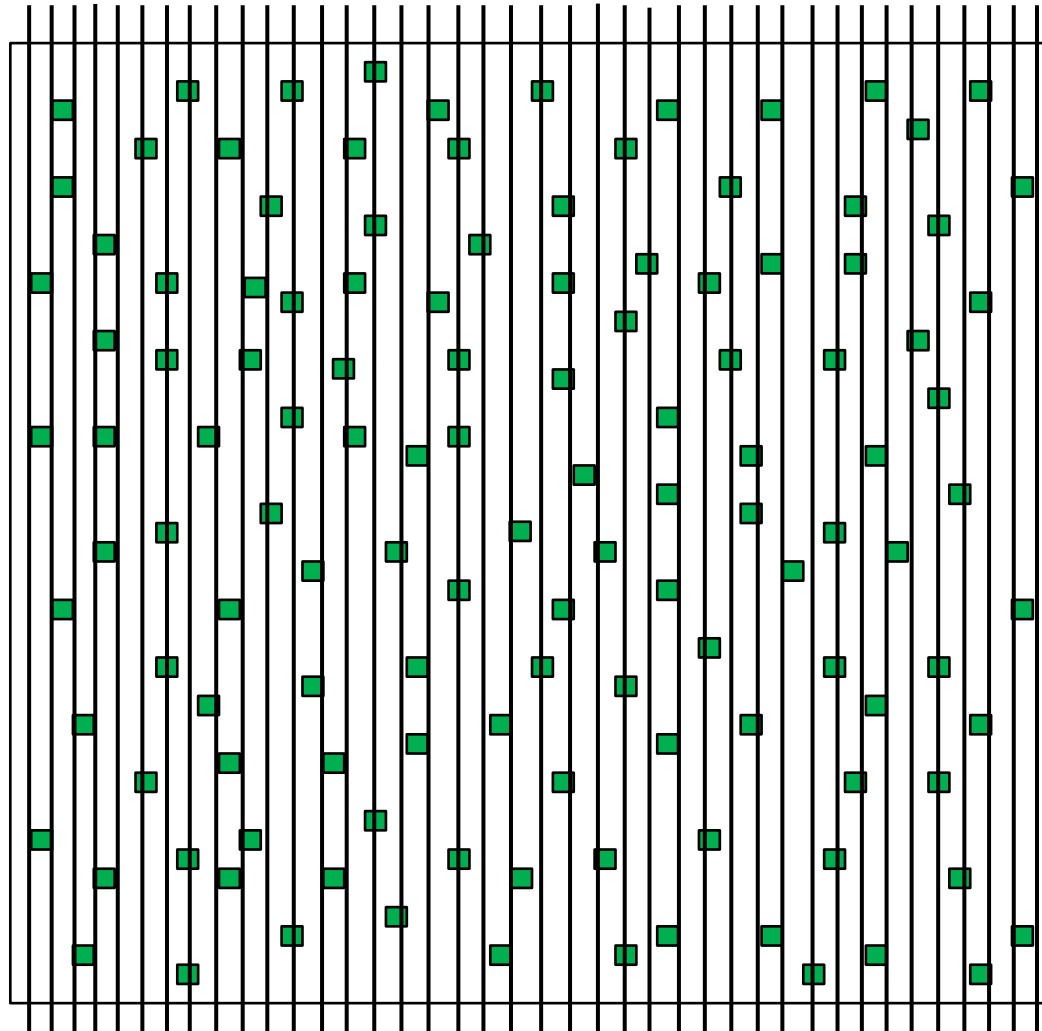


# Experimental Trials

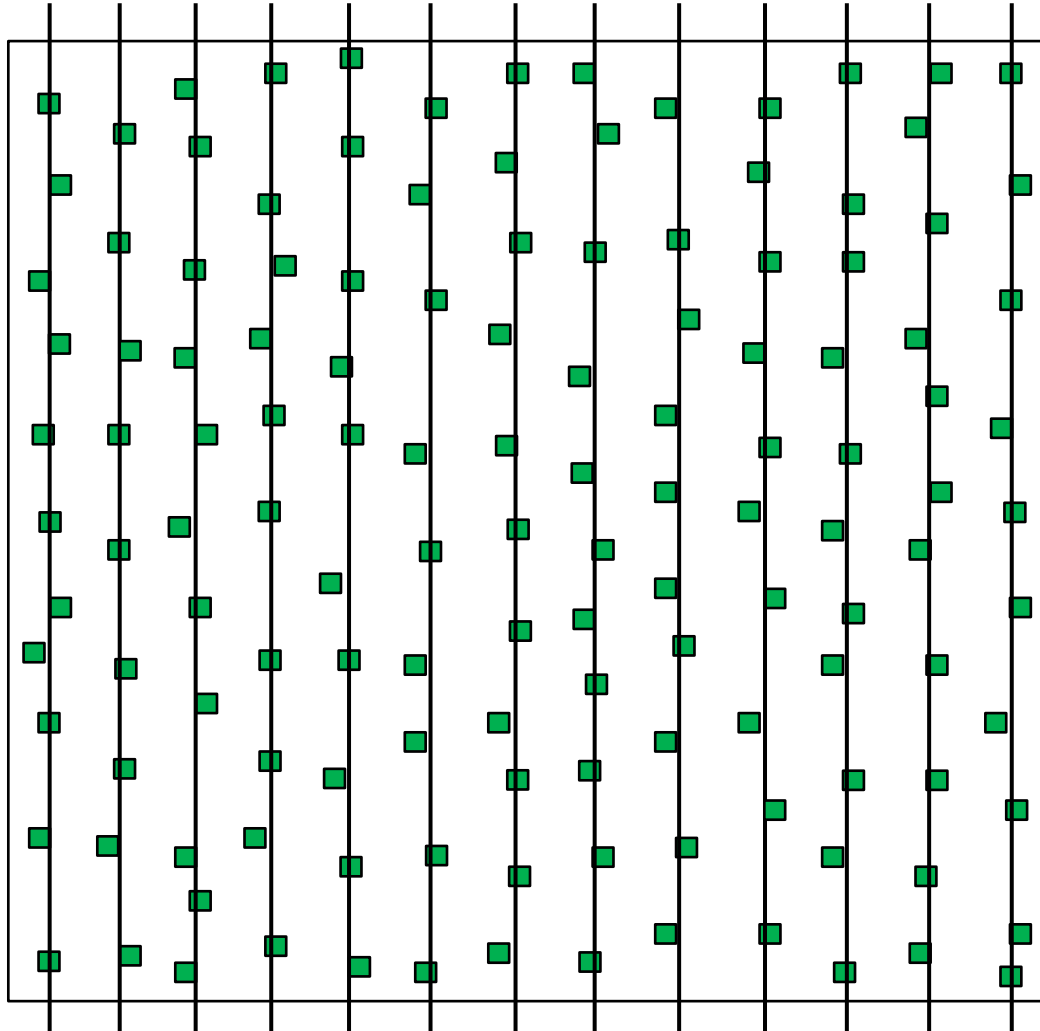
b.) Bait density within the treated area

- Current practice:  $\sim 0.5$  baits per  $m^2$
- Experimental trials:  $\geq 0.5$  baits per  $m^2$
  
- Functional Response Theory, i.e. intake rate of individual rabbits in relation to bait density
- Each rabbit must encounter and consume sufficient baits to obtain lethal dose prior to toxicosis

- 25 m flight path spacing: 40 lines per 100 ha



- 75 m flight path spacing: ~13 lines per 100 ha



# Experimental Trials, 2011

Treatment (100 ha)	Pre-feed 1	Pre-feed 2	Toxic SR (kg/ha)	Toxic SW (m)	Flight Path Spacing (m)
T1	Current Practice	Current Practice	30	Broadcast	25
T2	Current Practice	Current Practice	10	25	75
T3	Current Practice	Strip sown	10	25	75
T4	Current Practice	Strip sown	10	10	75

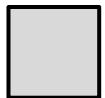
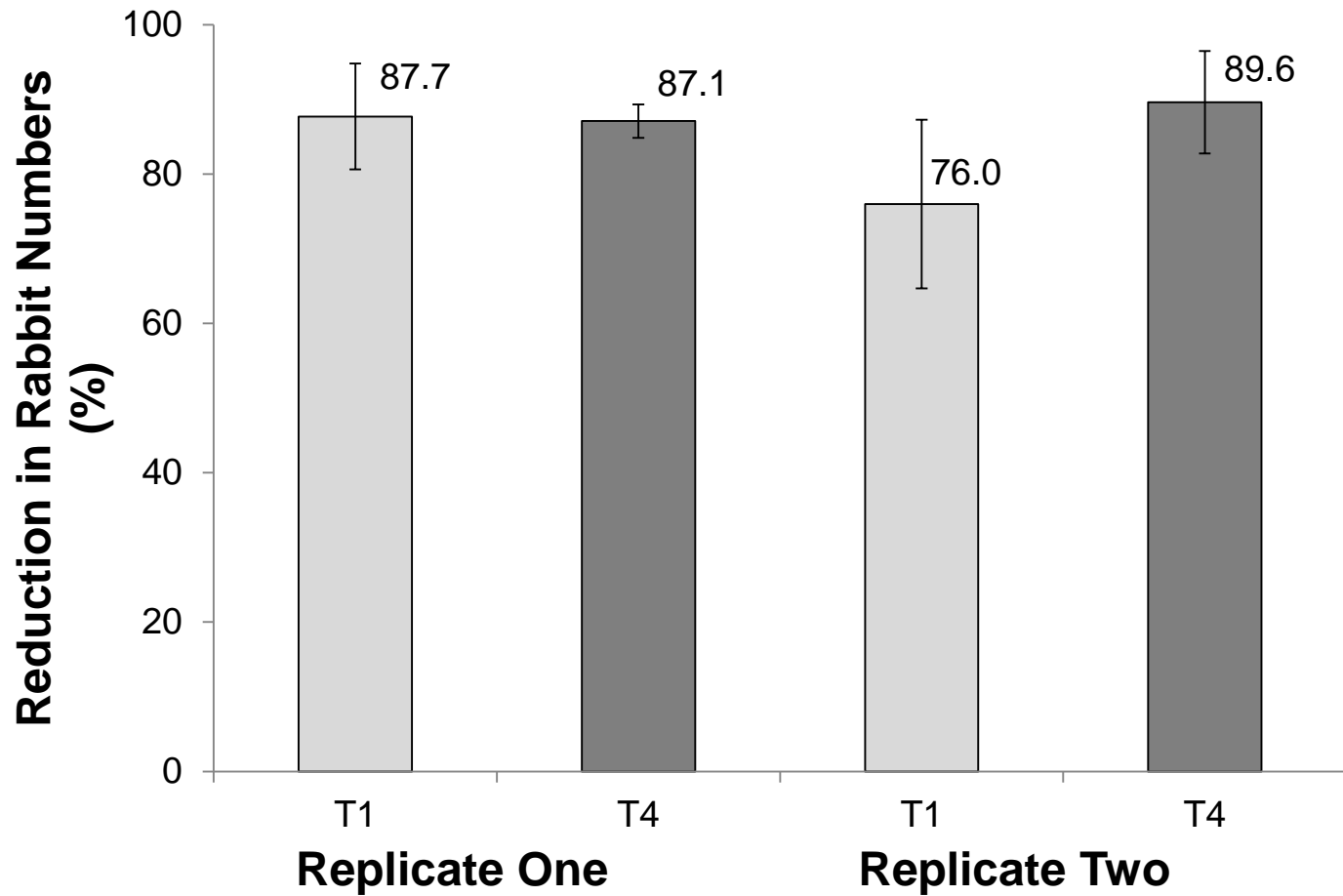
- Two replicates of each experimental treatment and two replicates of experimental control (i.e. current practice)

# Experimental Trials, 2011

- Central Otago, South Island, New Zealand
- Monitored using 4 × 800 m spotlight transects per 100 ha
- Dependent variable: change in the relative abundance of rabbits before and after control







Current Practice: 30 kg bait per ha broadcast



Experimental: 10 kg bait per ha sown in strips

# Experimental Trials, 2011

Treatment	Toxic SR (kg/ha)	Toxic SW (m)	FPS (m)	Rel. cost per ha	Rel. quantity of Bait
T1	30	Broadcast	25	100	100
T4	10	10	75	54	33

- 50% reduction in per ha control costs
- 67% reduction in bait AND 1080 sown

# Experimental Trials, 2012

- Funding received from Ministry for Primary Industries Sustainable Farming Fund
- 2 × T4 – 75 m flight path spacing
- 2 × T4 – 100 m flight path spacing
- 2 × T4 – 125 m flight path spacing
- 2 × T4 – 75 m flight path spacing, but with both non-toxic pre-feeds also sown at a flight path spacing of 75 m
- 50–67% reduction in per ha control costs
- 67–80% reduction in toxic bait AND 1080 sown

# Acknowledgements

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- Rabbit Coordination Group



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