

Dietary effects on fitness in captive-reared Hawaiian tree snails

BACKGROUND

The native terrestrial snail fauna of the Hawaiian Islands faces numerous threats that have led to severe range reductions, population declines, and species extinction. A crucial component of preserving Hawaiian terrestrial snail biodiversity is through captive rearing programs.

Rare and endangered tree snails in the family Achatinellidae, which feed on epiphytic microbial communities, are maintained in captivity with a diet that includes native vegetation brought in from nearby forests, as well as a cultured fungus, originally isolated from native host trees. **Due to risks associated with wild-collected leaves there is increased interest in developing a completely manufactured or cultured diet** that would eliminate the need for exposure to wild-gathered plants.



PARTULINA PROXIMA



ACHATINELLA PUPUKANIOE



PARTULINA MIGHELSIANA

METHODS

This study compared survival and egg production in *Auriculella diaphana* provided with lab-cultured fungus, and those provided with wild vegetation.

We compared the number of eggs laid and number of deaths among three treatments.

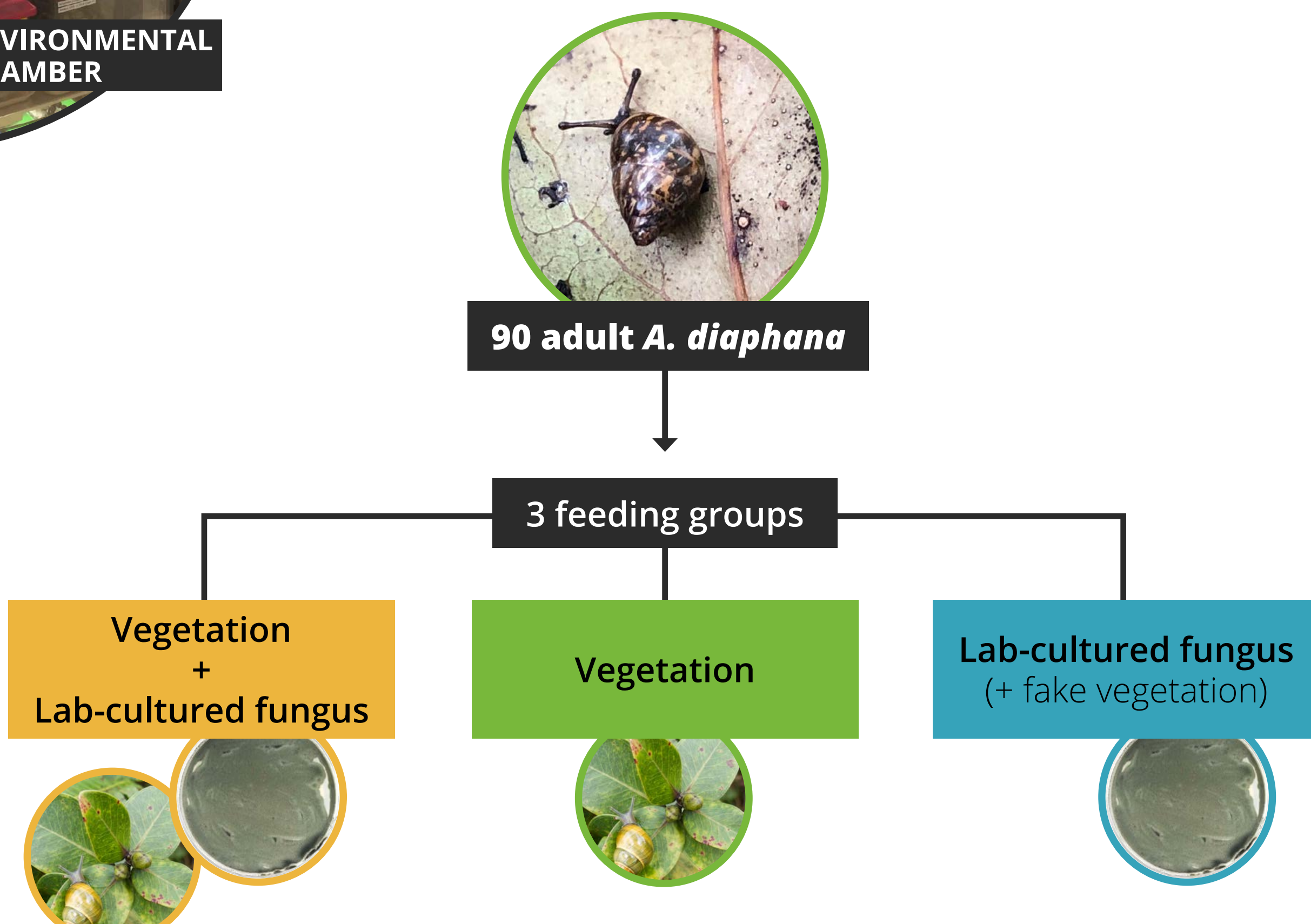


FUNGUS ON AGAR PLATE



ENVIRONMENTAL CHAMBER

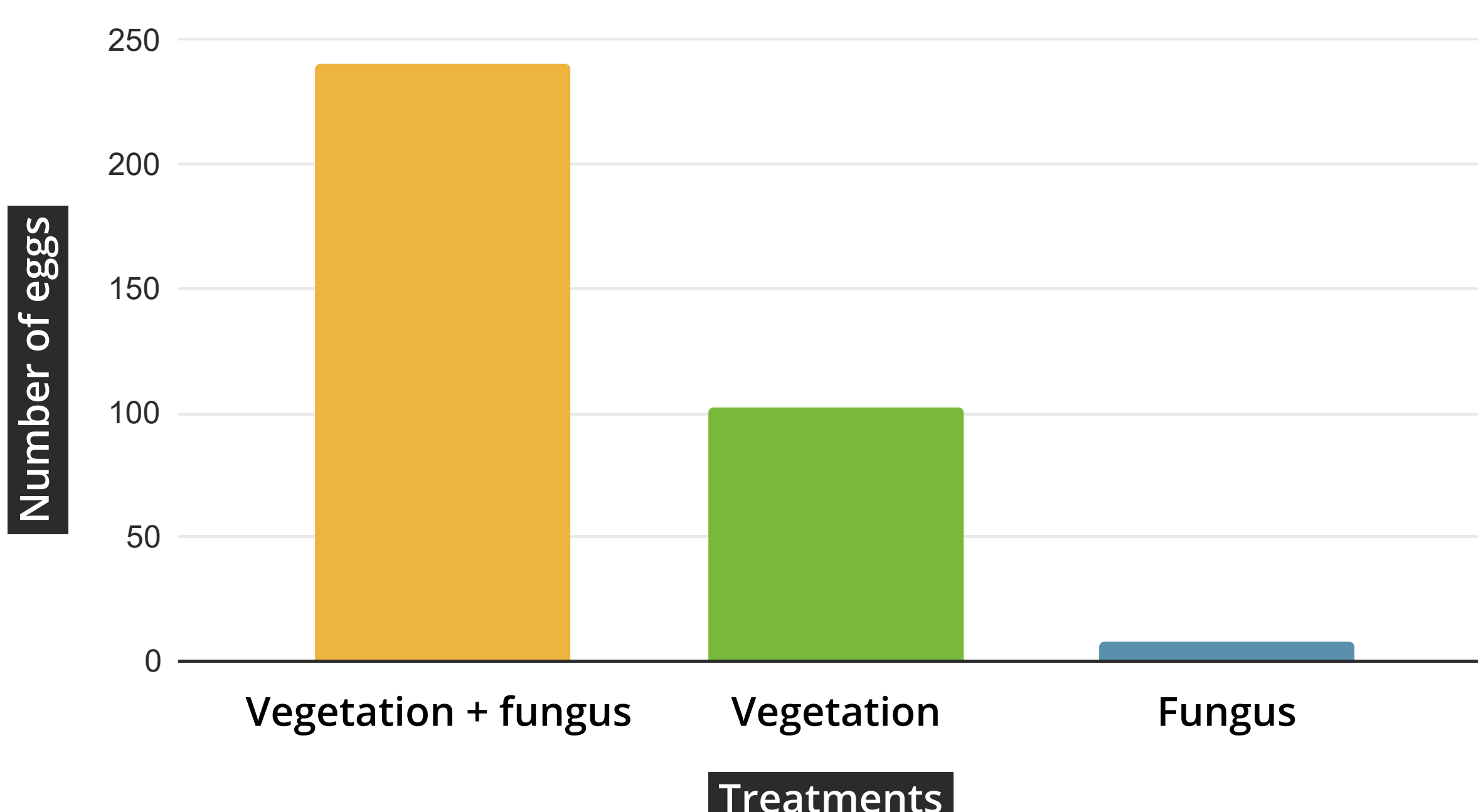
LAYOUT OF EXPERIMENT DESIGN



RESULTS

Mortality did not significantly differ among treatments, but the number of eggs laid was significantly higher in snails provided wild vegetation and cultured fungus ($F=24.998$; $P<0.001$), compared with those provided with only wild vegetation ($t=1.88$, $P=0.032$) or only cultured fungus ($t=4.530$, $P=0.004$).

TOTAL EGGS LAID



Our results suggest:

1. The existing strain of cultured fungus alone is not sufficient to maintain captive-reared snail populations.
2. The additional energy or calcium provided by the cultured fungus appears to enhance egg reproduction in captive-reared populations.
3. The presence or absence of live vegetation influences snail behavior, including aestivation and egg laying.

CONCLUSION

These results highlight the importance of ongoing research regarding snail diets and behavior to optimize captive propagation and lower exposure risks associated with wild gathered food items.