

THE USE OF PIT TAG TECHNOLOGY TO ASSESS INDIVIDUAL USE OF SUPPLEMENTARY FEED

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INTRODUCTION: There is little doubt that food availability can ultimately limit or regulate vertebrate populations. However, other proximate factors may limit population growth before food availability becomes important. Supplementary feeding has been widely used to assess the role of food availability in limiting vertebrate populations but to date these studies have failed to show that food addition alone can alter a populations' underlying dynamics.

Food addition experiments have been criticised on a number of grounds, in particular; whether supplementary feed reaches its target population, how individuals react and interact in response to food addition, and how food addition translates into individual life history parameters.

As part of a study to assess the role of food and parasites in causing unstable population dynamics in mountain hare populations in Scotland we investigated the effects of over winter food addition on survival and breeding success of mountain hares at the individual level using Passive Integrated Transponder (PIT) tags to monitor individual use of supplementary feed.



METHODS: Mountain hares were live trapped on two 25 ha trapping grids in September to November 2005. Each hare was weighed, hind foot measured, aged, sexed and fitted with a PIT tag.

Each of the two study areas was equipped with four feeding stations comprising a covered trough, PIT tag reader, data logger and battery.

The feeders were provisioned with commercial rabbit chow from September 2005 to April 2006. The PIT tag reader detected and logged the presence of a PIT tag while a hare fed recording the identification of the tag, date, and time.



RESULTS: Only 47% of the PIT tagged hares used the feeding stations (Fig. 1). Binary regression analysis showed that age sex, age and body condition had no significant effect on whether hares used the feeders or not.

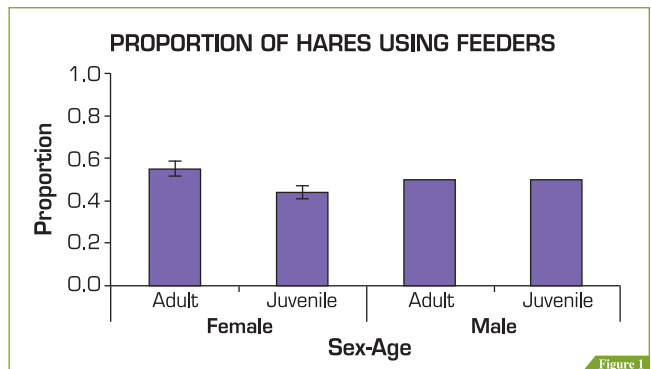


Figure 1. The proportion of PIT tagged hares that used feeding stations.

Among those hares that used the feeding stations there was large variation in the time spent at feeding stations (Fig. 2). Regression analysis showed that sex, age and body condition had no significant effect on the time spent feeding.

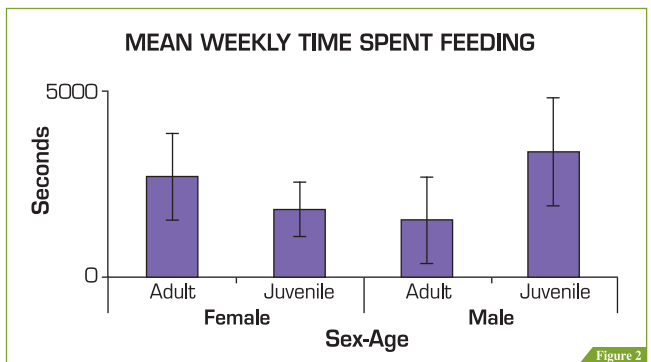


Figure 2. The mean weekly time spent feeding by PIT tagged hares that used supplementary feed.

SUMMARY: This study demonstrates that there was considerable variation within the hare population in individual use of supplementary feed and therefore indicates that caution is needed interpreting the results of supplementary feeding experiments. The automated surveillance system successfully developed here offers a powerful tool to:

- (i) test the assumptions of supplementary feeding experiments,
- (ii) rigorously investigate the role of food limitation in wild vertebrates, and
- (iii) study the factors that determine individual use of supplementary feed.



Key References: Boutin, S. (1990) Food supplementation experiments with terrestrial vertebrates: patterns, problems and future. *Canadian Journal of Zoology* 68, 203-220; Gibbons, J. W. & Andrews, K. M. (2004) PIT tagging: Simple technology at its best. *BioScience* 54, 447-454; Keith, L. B. (1983) Role of Food in Hare Population Cycles. *Oikos* 40, 385-395; Krebs, C. J. (2002) Beyond population regulation and limitation. *Wildlife Research* 29, 1-10; Newey, S., Dahl, F., Willebrand, T. & Thirgood, S. (2007) Unstable dynamics and population limitation in mountain hares. *Biological Reviews*. In Press; Newey, S., Willebrand, T., Haydon, D. T., Dahl, F., Aebischer, N. J., Smith, A. & Thirgood, S. (2007) Do mountain hare populations cycle? *Oikos*. In Press.