Sampling for New Zealand Flatworm

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Fig 1. New Zealand flatworm

The New Zealand flatworm is an alien terrestrial planarian which is a predator of our native earthworms (Fig 1). The detrimental impact on earthworm numbers has the potential to reduce wildlife biodiversity e.g. eradicate moles (Boag 2000) and possibly reduce agricultural production (Boag and Neilson 2006, Murchie 2008).

While sampling procedures have been developed for other alien soil inhabiting pests e.g. potato cyst nematodes, no protocols have been developed for an organism with characteristics similar to those possessed by the New Zealand flatworm.

An investigation into the aggregated distribution of the New Zealand flatworm over a 17 month period was analysed and allowed the accuracy of error associated with flatworm counts to be estimated.

Materials and Methods

On 25 occasions over a seventeen month period New Zealand flatworm numbers were counted beneath 40 or 64 traps (Fig 2) which had been set out in a regular 2m grid. The traps were made from black plastic bags, measured 30cm x 60cm and were filled with c.5kg gravel. The data were analysed by bootstrapping with sample sizes of 10, 25, 40 and 60.

Fig 2. Polythene trap

Results

The results showed the New Zealand flatworm had an over-dispersed distribution and that this variability increased with the sample mean (Fig 3).
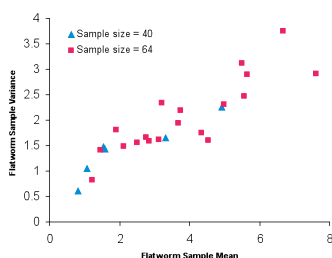
However a log transformation was able to correct for this and left the variance independent of the mean (Fig 4).

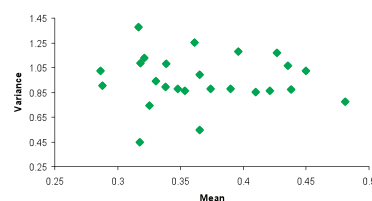An analysis of the 2.5 and 97.5 percentiles from 1000 bootstrapped estimates of the variance showed the variance decrease significantly as the number of samples increased (Fig 5).

Fig 3. Flatworm sample variance plotted against sample mean indexed by sample number

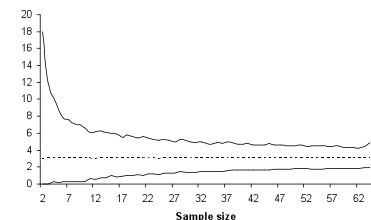Fig 4. Variance versus mean for transformed flatworm counts

Fig 5. 2.5 and 97.5 percentile and mean of 1000 bootstrapped estimates of s^2 for one of the data sets

Conclusions

The New Zealand flatworm has been shown to have an aggregated distribution which can be corrected for by a log transformation. From this study it is suggested that, for practical reasons, the minimum sample size used to determine New Zealand flatworm populations under polythene traps should be at least 15.

References

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Boag B and Neilson R 2006. Proceedings Crop Protection in Northern Britain 2006 51-56.

Murchie A K 2008.Proceedings Crop Protection in Northern Britain 2008 51-56.