

Investigating the Mitochondrial Genome of the Biological Control Agent

Phasmarhabditis hermaphrodita

Laura Sheehy¹, Gareth Weedall¹ and Robbie Rae¹

¹Liverpool John Moores University, School of Biological and Environmental Sciences, Byrom Street, Liverpool.

Introduction

- Slugs can cause significant damage to crops and ornamental plants (South 1992) (Figure 1)
- A common slug control method, metaldehyde bait pellets, will be banned in the UK from 2022
- P. hermaphrodita* (Figure 2) is a parasitic nematode with the ability to find and kill slugs (Wilson et al 1993) (Figure 3)
- Available for 25 years as a biological control, it is currently sold as Nemaslug® by BASF Agricultural Specialties (Rae et al 2007)
- Current issues** – Recent reports indicate that *P. hermaphrodita* does not grow in culture or kill slugs as efficiently as it used to
- To improve the effectiveness of *P. hermaphrodita* as a biological control genomic data is required



Figure 1 Plant leaf damaged by slugs

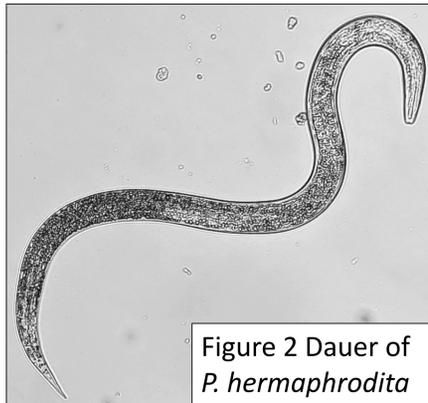


Figure 2 Dauer of *P. hermaphrodita*



Figure 3 Infected Slug

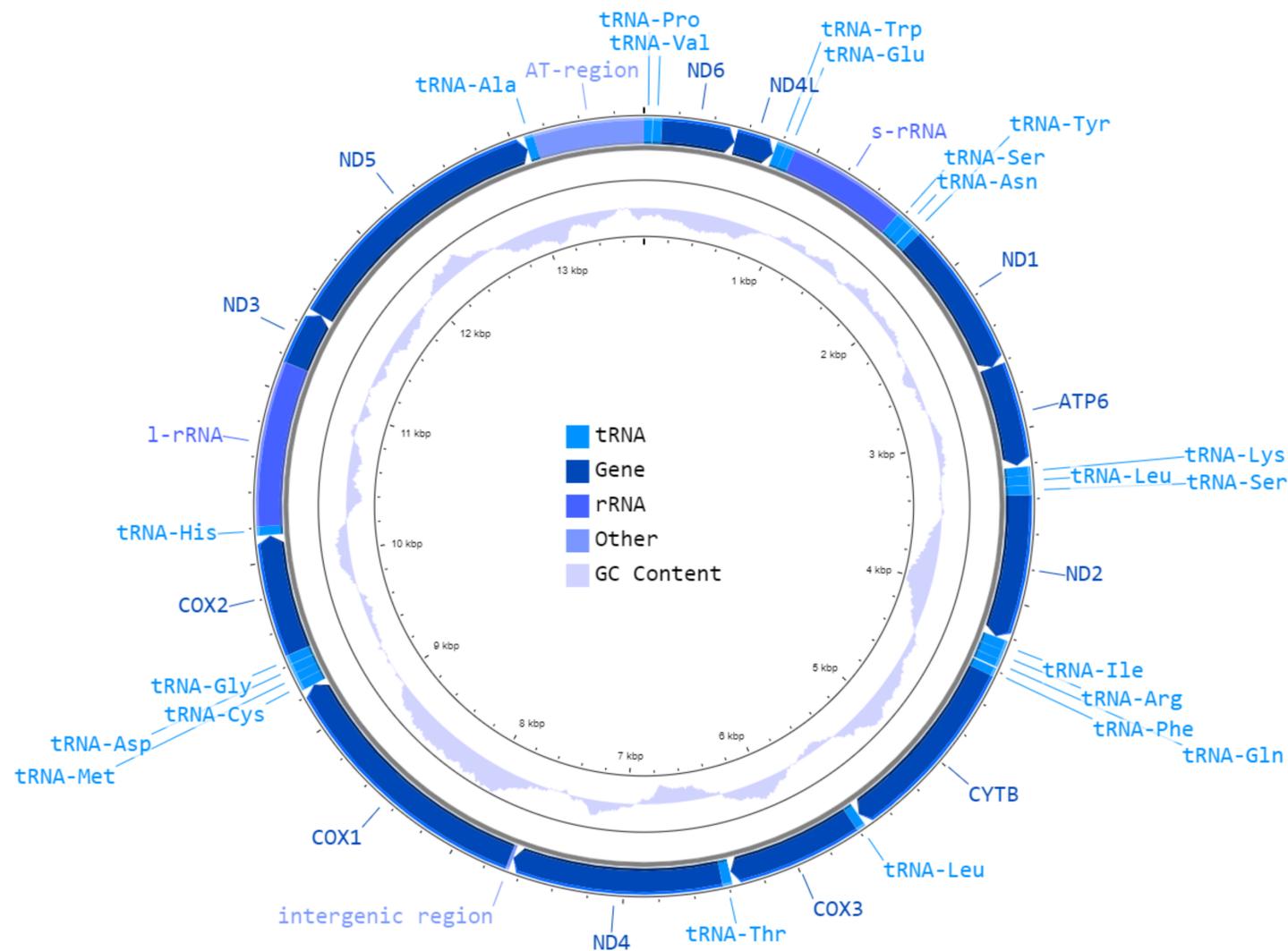
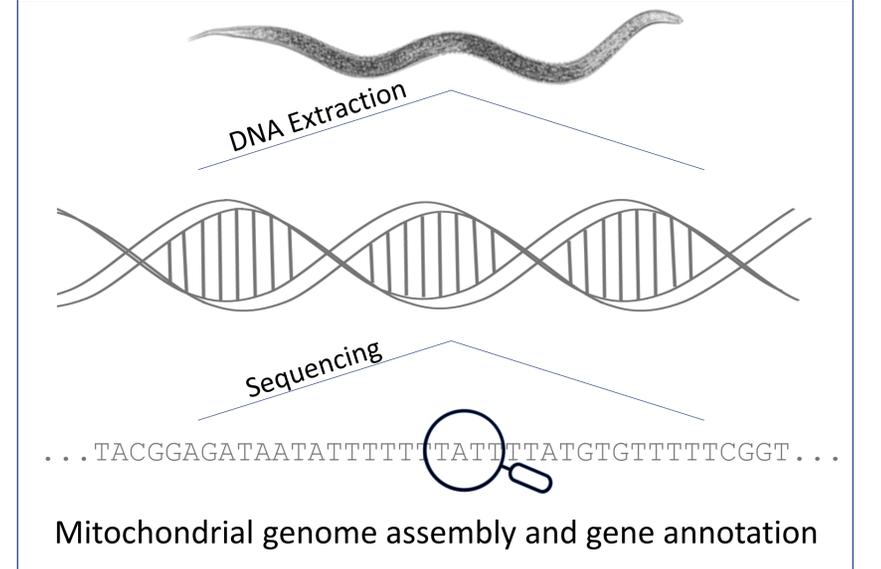


Figure 4 Mitochondrial Genome of *P. hermaphrodita*. Annotated with 12 genes, 2 rRNA coding regions and 22 tRNA coding regions plus two other features an AT rich region and an intergenic region. The GC content for the mitochondrial genome is also shown.

Aim

- Extract and sequence genomic DNA from *Phasmarhabditis hermaphrodita* to enable the assembly of the mitochondrial genome

Method



Discussion

- Mitochondrial genome for *P. hermaphrodita* is 13,766 base pairs in length, similar in size to closely related *Caenorhabditis elegans*
- 12 genes and 22 tRNA coding regions have been identified and annotated in the mitochondrial genome (Figure 4)
- There is an 85% similarity between the mitochondrial genome of *P. hermaphrodita* and *C. elegans*
- This is the first time genomic data has been generated for *P. hermaphrodita*, a wealth of information is waiting to be discovered in the larger nuclear genome

References

- South, A. (1992) *Terrestrial slugs: Biology, ecology and control*. Springer, Netherlands, (428)
- Wilson, M.J., Glen, D.M. and George, S.K. (1993) The rhabditid nematode *Phasmarhabditis hermaphrodita* as a potential biological control agent for slugs. *Biocontrol Science and Technology*, 3 (4), 503-511
- Rae, R., Verdun, C., Grewal, P.S., Robertson, J.F. and Wilson, M.J. (2007) Biological control of terrestrial molluscs using *Phasmarhabditis hermaphrodita*--progress and prospects. *Pest Manag Sci*, 63 (12), 1153-1164