INVESTIGATION INTO ASPECTS OF THE BIOLOGY OF TUBULAR BLACK THRIPS, *Haplothrips victoriensis* BAGNALL (THYSANOPTERA: PHLAEOTHRIPIDAE), IN SOUTH AUSTRALIA

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The first instar larva of tubular black thrips with "pollen disguise" feeding on *Tyrophagus* mite.

The thesis submitted for the degree of Master of Science

Discipline of Ecology and Evolutionary Biology

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DECLARATION

This thesis contains no material that has been accepted for the award of any other degree or diploma in any university. To the best of knowledge and belief, this thesis contains no material previously published or written by another person, except where due reference is made in the text of the thesis.

I consent to this thesis being made available for photocopying and loan when deposited in the University Library.

Signature:  
Date:
(changing this page by a yellow blank sheet here)
Dedicated in loving memories

to my mum & older brother

Pham Thi Tung  (10/01/1945 - 08/10/1998)

Le Cao Nguyen (22/06/1971 – 29/12/2005)
Acknowledgement

Two years can never be a satisfactory time to get everything for done in life but is long enough for every one to do many things successfully. For me, I am also happy to finish this entomological project at the University of Adelaide. The results I found may/may not be significant for future research but in my belief, I have deeply focused on my research and have given it my best efforts. Importantly, I have been very lucky to learn about new things, gain new experiences and have received so much support from my supervisors, the lab groups of Prof. Andy Austin, Assoc. Prof. Mike Keller and the SARDI entomological section, academic staff and my sponsor, friends and families.

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THESIS SUMMARY

_Haplothrips victoriensis_ Bagnall (Thysanoptera: Phlaeothripidae) is an indigenous thrips of southern Australia. It is known as a predator of two-spotted mite. This project investigated various biological characteristics of _H. victoriensis_ as a precursor to its potential use in biological control. In addition, _H. victoriensis_ is very difficult to distinguish from other _Haplothrips_ species in terms of morphology, especially as there are no keys to larvae. DNA barcoding and morphology of the larval stages are used to address these issues.

The thesis is divided into seven chapters comprising an introduction, four main research chapters, conclusion and reference chapters.

Chapter 2 covers the culturing techniques for _H. victoriensis_. Some new cases and rearing processes were designed to culture _H. victoriensis_ and its prey. These were following series of rearing techniques investigated including rearing _H. victoriensis_ for egg collection, _H. victoriensis_ larvae and adults for biological and morphological observations, mass rearing of _H. victoriensis_, WFT and _Tyrophagus_ mites, and rearing WFT for egg collection. Predatory _H. victoriensis_ was reared in the laboratory with various diets of honey, pollen, _Tyrophagus_ mites and western flower thrips (WFT).

Chapter 3 investigates the biological development of _H. victoriensis_, including egg, larva, prepupa, pupa and adult stages. _Haplothrips victoriensis_ fed with 10% honey solution, mixed pollen and _Tyrophagus_ eggs took about 16-22 days to develop from eggs to adults at 25 °C. Developmental times of immature _H. victoriensis_ varied when fed on different food sources. The longevity of _H. victoriensis_ was significantly different with different diets.
Chapter 4 examines predatory and cannibalistic characteristics and consumption of *H. victoriensis* on various prey. *Haplothrips victoriensis* was found to feed on many kinds of common prey; Two spotted mite (TSM), *Tyrophagus* mite, WFT, spotted alfalfa aphid, greenhouse whitefly and diamond back moth but not on ash whitefly. Importantly, *H. victoriensis* was also found to be cannibalistic which might affect population fluctuations in the laboratory and in the field.

Chapter 5 examines the ecology and hosts of *H. victoriensis* in South Australia and taxonomy of *H. victoriensis* and some other *Haplothrips* species being similar to *H. victoriensis*. *Haplothrips victoriensis* was found to live on flowers from a range of different plant families. Morphological characteristics of the immature stages of *H. victoriensis* and a key developed to separate common *Haplothrips* in S.A. As well, COI was used to possibly identify *H. victoriensis* and its morphologically similar taxa and investigate whether *H. victoriensis* is a single species or perhaps contains cryptic species. None of the specimens of *H. victoriensis* included in the analyses showed any variation in COI indicating a single species for horticultural areas in S.A.

Chapter 6 provides an overall discussion of the main results and indicates areas of future research.
Table of contents

<table>
<thead>
<tr>
<th>Contents</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgements</td>
<td>iii</td>
</tr>
<tr>
<td>Thesis summary</td>
<td>vi</td>
</tr>
<tr>
<td>Table of contents</td>
<td>viii</td>
</tr>
</tbody>
</table>

Chapter 1: General Introduction ............................................................... 1
  1.1. Thysanoptera – general review ............................................................. 2
  1.2. Common pest thrips in SA ................................................................. 3
    1.2.1. Western flower thrips (WFT) .......................................................... 4
    1.2.2. Plague thrips .................................................................................. 6
    1.2.3. Other pest thrips .......................................................................... 7
  1.3. Current control(s) .......................................................... 8
  1.4. Haplothrips species in Australia .......................................................... 11
  1.5. Haplothrips victoriensis Bagnall (Thysanoptera: Phlaeothripidae) .......... 11
  1.6. COI Barcoding .................................................................................. 13
  1.7. The aims of the study ...................................................................... 14

Chapter 2: Culturing Techniques for H. victoriensis and its prey .............. 16
  2.1. Introduction ..................................................................................... 17
  2.2. Materials and Methods .................................................................... 18
    2.2.1. Rearing prey .............................................................................. 18
      2.2.1.1. Rearing Tyrophagus mites ....................................................... 18
      2.2.1.2. Rearing western flower thrips (WFT) ....................................... 19
    2.2.2. Culturing Haplothrips victoriensis ........................................... 25
      2.2.2.1. Haplothrips victoriensis culture – for egg collection ............. 25
      2.2.2.2. Haplothrips victoriensis culture - rearing larvae for observations... 27
2.2.2.3. Haplothrips victoriensis culture - rearing adults for observations...28

2.2.2.4. Haplothrips victoriensis population culture.................................29

2.3. Results and Discussion ................................................................................31

Chapter 3: Biological Development of H. victoriensis .................................35

3.1. Development and life history of H. victoriensis ........................................36

3.1.1. Materials and Methods .......................................................................37

3.1.2. Results ..................................................................................................38

3.1.3. Discussion of development and life history ............................................45

3.2. Effect of different food sources on development and longevity of H. victoriensis .................................................................47

3.2.1. Effect of different food sources on H. victoriensis development 47

3.2.1.1. Materials and Methods ..................................................................48

3.2.1.2. Results ............................................................................................49

3.2.2. Effect of the addition of WFT to a basic diet on longevity of H. victoriensis .................................................................52

3.2.2.1. Materials and Methods ..................................................................52

3.2.2.2. Results ............................................................................................53

3.3. Discussion of the effect of different food sources on H. victoriensis development and longevity .................................................................54

Chapter 4: Predation and Feeding of H. victoriensis .................................56

4.1. Introduction ..................................................................................................57

4.2. Materials and Methods ............................................................................58

4.2.1. Observations of predatory characteristics of H. victoriensis ..........58

4.2.2. Observation of Cannibalism in H. victoriensis .................................59

4.2.3. Consumption of prey by H. victoriensis ..............................................60

4.3. Results ........................................................................................................61
4.3.1. Predatory characteristics of *H. victoriensis* ........................................... 61

4.3.2. Cannibalism .......................................................................................... 66

4.3.3. Consumption of *H. victoriensis* on *Tyrophagus* mites and WFT eggs .... 70

4.4. Discussion .................................................................................................. 72

Chapter 5: Larval Morphology, Barcoding, Distribution and Hosts ................. 76

5.1. Introduction .............................................................................................. 77

5.2. Materials and Methods ......................................................................... 79

5.3. Results ..................................................................................................... 83

5.3.1. Plant hosts for *H. victoriensis* in South Australia ............................... 83

5.3.2. Immature morphology ........................................................................ 85

5.3.3. Phylogenetic tree of *H. victoriensis* and several of its similar taxon .................................................. 89

5.4. Discussion ................................................................................................ 91

Chapter 6: General Conclusions and Future Research ................................... 97

Chapter 7: References .................................................................................. 104

Appendices ..................................................................................................... 113