

THE BIOLOGY OF THE FALSE SPIDER MITE  
DOLICHOTETRANYCHUS FLORIDANUS:

A PEST OF  
PINEAPPLES IN CENTRAL QUEENSLAND

Richard C.D. Poli.  
B.App.Sci. (Biol.)

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A thesis submitted in part fulfilment of the requirements for the degree  
Master of Applied Science.

by

Richard C.D. Poli.  
B.App.Sci. (Biol.)

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Biology Department.  
School of Applied Science.  
University of Central Queensland.

Table of Contents:	Page
TITLE	I
TABLE OF CONTENTS	II
LIST OF FIGURES	VI
LIST OF TABLES	IX
DECLARATION	X
STATEMENT OF ACCESS	XI
ACKNOWLEDGEMENTS	XII
DEDICATION	XIII
ABSTRACT	XIV
1.0 INTRODUCTION	
1.1 History of the False Spider Mites in Australia	1
1.2 Mite Description and General Distribution	1
1.3 Economic Impact Assessment	6
1.4 Background to the study	6
1.5 Project Aims	7
2.0 MATERIALS AND METHODS	9
2.1 Extraction Methodology	9
2.2 Enumeration Procedure	10
2.3 Mite Identification	10
2.4 A Preliminary Investigation; Mite Distribution along the Plant Axis	10
2.5 Establishment of Field Trials	11
2.6 Selection of Sampling Sites	12
2.7 Sampling Procedure	12
2.8 Soil Moisture	16
2.9 Assessing Mite Presence in Soil	16
2.10 Weather and Micro-climate Data	17
2.11 Mite Movements	18

	Page
2.12 Volunteer Assessment	19
2.13 Statistics	19
3.0 RESULTS	20
3.1 Extraction Methodology	20
3.2 Mite Distribution in Stored Crowns	21
3.2.1 The False Spider Mite	21
3.2.2 The Predatory Mite	25
3.3 Variation Between Farms and Treatments	25
3.4 Intra-Plant and Inter-Plant Variability	37
3.4.1 Intra-Plant Variability	38
3.4.2 Inter-Plant Variability	40
3.5 Sex Ratios	40
3.6 Soil Moisture	44
3.7 Climate and the Effects on the Mites	45
3.7.1 Rainfall	48
3.7.2 Temperature	48
3.7.3 Correlations of Mite Numbers with Weather Data	48
3.8 Mite Presence in Soil	50
3.9 Mite Movements	51
3.10 Mites in Volunteers	52
3.11 Summary of Results	52
4.0 DISCUSSION	54
4.1 Mite Extractions	54
4.2 Mite Distribution Along the Plant Axis	55
4.2.1 The False Spider Mite Distribution	56
4.2.2 The Predatory Mite Distribution	58
4.3 Geographical Distribution	60

	Page
4.3.1 Variation in the Mite Distribution	60
4.3.2 General Seasonal Abundance Trends	61
4.3.3 Variations between Farms	63
4.4 Variation Between Treatments	65
4.4.1 The Effects of Reduced Pesticide	66
4.4.2 The Effects of Reduced Fertilizer	68
4.4.3 An Overview of Normal Farming Practices	70
4.5 Intra and Inter-Plant Variations in Distribution	73
4.5.1 Intra-Plant Variability	73
4.5.2 Inter-Plant Variability	74
4.6 Sex Ratios	75
4.7 Soil Moisture	76
4.8 The Effects of Rainfall	78
4.8.1 General Rainfall Patterns	78
4.8.2 Effects on the False Spider Mite Population	78
4.8.3 Effects on the Adult Mite	80
4.8.4 Effects on the Non-Motile Stages	82
4.9 The Effects of Temperature	83
4.9.1 An Overview of Response to Temperature	83
4.9.2 Response to Adverse Temperature	84
4.10 Mite Presence in the Soil	86
4.10.1 The False Spider Mite	87
4.10.2 The Predatory Mite	88
4.11 Mite Movements	89
4.11.1 Mite Transport in Crowns	89
4.11.2 Migration into New Crowns	90
4.11.3 Vector Dispersal	92
4.12 Volunteers as a Cause of Dispersal	92

	Page
5.0 CONCLUSION	96
5.1 List of Papers Presented	98
REFERENCES	99
APPENDIX 1: Description of the False Spider Mite	106
APPENDIX 2: Treatments used in the Yeppoon Field Trials	112
APPENDIX 3: The Pineapple Plant	115
APPENDIX 4: Culture of the False Spider Mite	119

List of Figures	Page
Figure 1: The False Spider Mite, <u>Dolichotetranychus floridanus</u> , adult male.	3
Figure 2: The False Spider Mite, <u>Dolichotetranychus floridanus</u> , adult female, (top); stage 2, (middle); stage 1, (bottom).	3
Figure 3: The False Spider Mite, <u>Dolichotetranychus floridanus</u> , egg.	4
Figure 4: The Predatory Mite, <u>Amblyseius benjamini</u> , adult.	4
Figure 5: Pineapple Growing Regions along the East Coast of Queensland, Australia.	5
Figure 6: Formal Arrangement and Block Layout for the Field Trials Conducted on the Three Farms in the Yeppoon District.	13
Figure 7: Field Trials and Sampling Site Situated at Farm One.	14
Figure 8: Field Trials and Sampling Site Situated at Farm Two.	14
Figure 9: Field Trials and Sampling Site Situated at Farm Three.	15
Figure 10: Spread of Adult Mites Along the Central Axis of the Pineapple Crown.	22
Figure 11: Spread of Juvenile Mites Along the Central Axis of the Pineapple Crown.	22
Figure 12: Spread of Mite Eggs Along the Central Axis of the Pineapple Crown.	23
Figure 13: Spread of Adult Predatory Mites Along the Central Axis of the Pineapple Crown.	23
Figure 14: Spread of Juvenile Predatory mite Along the Central Axis of the Pineapple Crown.	24

Figure 15: Spread of Predatory Mite Eggs Along the Central Axis of the Pineapple Crown.	24
Figure 16: Comparison of Crops 17 Months after Planting, a) this Crop is Relatively Healthy Despite Mite Infestations, b) this Crop has Failed due to Severe mite infestations.	26
Figure 17: Total Number of Male Mites. Treatments 1 to 3 on Farm One.	27
Figure 18: Total Number of Female Mites. Treatments 1 to 3 on Farm One.	27
Figure 19: Total Number of Stage 2 Mites. Treatments 1 to 3 on Farm One.	28
Figure 20: Total Number of Stage 1 Mites. Treatments 1 to 3 on Farm One.	28
Figure 21: Total Number of Mite Eggs. Treatments 1 to 3 on Farm One.	29
Figure 22: Total Number of Mites. Treatments 1 to 3 on Farm One.	29
Figure 23: Total Number of Male Mites. Treatments 1 to 3 on Farm Two.	30
Figure 24: Total Number of Female Mites. Treatments 1 to 3 on Farm Two.	30
Figure 25: Total Number of Stage 2 Mites. Treatments 1 to 3 on Farm Two.	31
Figure 26: Total Number of Stage 1 Mites. Treatments 1 to 3 on Farm Two.	31
Figure 27: Total Number of Mite Eggs. Treatments 1 to 3 on Farm Two.	32
Figure 28: Total Number of Mites. Treatments 1 to 3 on Farm Two.	32

Figure 29: Soil Moisture (%) over Time. Farm One.	46
Figure 30: Soil Moisture (%) over Time. Farm Two.	46
Figure 31: Soil Moisture (%) over Time. Farm Three.	47
Figure 32: Average Soil Moisture at Sample Date. Taken from Farms 1,2 and 3.	47
Figure 33: Mean Daily Rainfall Three Weeks Prior to the Sample Date.	49
Figure 34: Mean daily Temperatures Three Weeks prior to The Sample Date	49
Figure 34a: Comparison of Figures 22, 28, 33 and 34.	49a
Figure 35: Standard Pineapple Crop Cycle for the Spring and Autumn Plantings.	114

List of Tables:	Page
Table 1: Probabilities calculated from Two-way ANOVA on cohort by farm and treatment.	35
Table 2: Probabilities calculated from one-way ANOVA on cohort by treatment.	35
Table 3: Scheffe Multiple Range test performed on the means of each cohort, in each of the three treatments. Mean Values were taken from the one-way ANOVA.	36
Table 4: Probabilities calculated from ANOVA, mean number of mites per leaf and homogeneous groupings, calculated on mite numbers obtained from leaf samples during "high" mite infestation levels on farms one and two.	39
Table 5: Probabilities calculated from ANOVA, mean number of mites per leaf and homogeneous groupings, calculated on mite numbers obtained from leaf samples during "low" mite infestation levels on farms one and two.	39
Table 6: Probabilities calculated from ANOVA, mean number of mites per sample site and homogeneous treatments, calculated on mite numbers obtained from leaf samples during "high" mite infestation levels on farms one and two.	41
Table 7: Probabilities calculated from ANOVA, mean number of mites per sample site and homogeneous treatments, calculated on mite numbers obtained from leaf samples during "low" mite infestation levels on farms one and two.	42
Table 8: Mean sex ratio for farm one and two calculated at each sample date. Mean Sex ratios fro each treatment on farms one and two.	43
Table 9: Analysis results of average maximum and minimum temperature, and average rainfall correlated at each cohort. Adjusted Coefficient of Determination, Standard Error of Estimates and Regression Equations summarized.	43

Declaration:

I declare that the work described in this thesis is entirely my own and has not previously been submitted in any other form at any other university, institution or tertiary education centre for the award of a higher degree. The information derived from the published or unpublished work of any other person has been acknowledged.

A handwritten signature in black ink, appearing to read "R Poli", written over a horizontal dotted line.

Richard C.D. Poli.

Statement of Access.

I, the undersigned author of this thesis understands that the University College of Central Queensland will make this work available within the library, and that it will be accessible to library users and other approved libraries. This thesis should not be copied, or closely paraphrased without the consent of the author, and written acknowledgement of the assistance gained from this work. Beyond this, I do not wish to place any restrictions on this thesis.

*R Poli*  
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Richard C.D. Poli.

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Dedication:

*Their wisdom and knowledge was bestowed on me, their courage and strength was not all they gave.*

Dino and Rose Poli.

## Abstract

The false spider mite (or red mite) Dolichotetranychus floridanus has been recorded on pineapple crops throughout the world. It reaches pest proportions sporadically, particularly in areas with hot dry weather patterns. In the late 1980's D. floridanus caused significant economic losses in the Yeppoon district of Central Queensland. Current literature on the false spider mite biology is limited with most publications orientated to taxonomy or records of presence/absence in crops. Anecdotal evidence is often vague or contradictory.

In the current study, field populations of D. floridanus and the predatory mite, Amblyseius benjamini were studied using three experimental regimes: normal horticultural practices, reduced pesticide treatment and reduced fertilizer treatments. Extraction and sampling procedures were developed to estimate field populations of all life cycle stages. Populations were sampled at six week intervals on 3 farms \* 3 treatments \* 5 plants \* three leaves \* 2 duplicates.

The false spider mites distribution along the axis of the pineapple crown was highly aggregated on the fifth and sixth basal leaf axils. The predatory mite A. benjamini did not develop substantial and aggregated populations within the leaf axils of the crown. In contrast it was prevalent on the subterranean stems and root material.

A high degree of seasonality within the false spider mite population was evident as population densities increased to damaging levels during the summer months and decreased in the winter months. The correlations of population densities with seasonal weather agreed broadly with anecdotal evidence but the statistical level of significance was not high. The coefficients of determination between mite numbers and rainfall, maximum and minimum temperatures were 0.28, 0.21 and 0.081 respectively.

The intra-plant variability and inter-plant variability were high when populations were low (during winter) but markedly less during periods of high population densities (summer).

Normal farming practice incorporates high levels of fertilizer application and use of a wide range of pesticides directed at various insect pests. Populations densities of D. floridanus were reduced by routine pesticide regimes, however residual populations are always present. Population densities were also lower on minimal fertilizer treatments. Juvenile stages were generally more sensitive to these treatments than the adult stages.

Predatory mite numbers were low in all treatments and probably exerted minimal control on the false spider mite populations. The pathogenic fungus Hirsutella sp. was sporadically present on false spider mites but exerted minimal control.

False spider mite dispersal in space and time is strongly linked with the use of crowns for plant propagation. New crowns are colonized early by mites from both the parent plant and adjacent plants. Storage of the crowns influenced both the condition of the crowns and the mite infestation levels.

Significant populations of false spider mites were found in soil and 'volunteer' plants. They provide intercrop and temporal dispersal. An additional important determinant of crop health and mite population densities is soil moisture. The level of which at planting and the time of year, may promote false spider mite infestations.

The results of the study provide foundations for future research into the effective control of the false spider mite. Further research is required on the detailed effects of temperature and rainfall (soil moisture and humidity) on population dynamics of D. floridanus. Such research will be required before an IPM program can be developed.