

**STUDY OF TEA PESTS OF TEMI TEA ESTATE, SOUTH SIKKIM,
INDIA.**

SUBMITTED BY:

SUDARSHAN CHHETRI.

M.Sc. ZOOLOGY, (ENTOMOLOGY).

EXAM ROLL NO: - 349.

REGD. NO. . 5-3-28-82-2006 .

BATCH: - 2063 – 2064.

A DISSERTATION SUBMITTED FOR THE PARTIAL FULFILLMENT OF THE
REQUIREMENT FOR MASTER'S DEGREE OF SCIENCE IN ZOOLOGY.

(CENTRAL DEPARTMENT OF ZOOLOGY, ENTOMOLOGY)

INSTITUTE OF SCIENCE AND TECHNOLOGY.

TRIBHUVAN UNIVERSITY,

KRITIPUR, KATHMANDU,

NEPAL.

2010.

ACKNOWLEDGEMENT

Firstly, I would like to express my deep gratitude to my esteemed Research Advisor **Prof. Dr. Ananda S. Tamrakar**, Central Department of Zoology, Tribhuvan University, Kritipur for her keen guidance, priceless suggestions and incessant cooperation.

I am also indebted to **Prof. Dr. Ranjana Gupta, Head**, Central Department of Zoology, Tribhuvan University, Kritipur. My special thankfulness to **Prof. Dr. V.K. Thapa** for his kind suggestions and help. I do be thankful for the help and encouragement received from my Entomology teachers.

I highly concede the help rendered to me by TTE staffs, especially **Mr. M.P Chamling**, Manager TTE, for permitting me to inspect the tea garden. I am obliged to **Mr. T.B Gurung**, Senior Field Supervisor, who helped me to collect the pests with intense ideas for my study and **Mr. B.B Chamling**, Clerk TTE, for providing me with all the necessary information and data required for my dissertation.

My earnest thanks go to **Mr. Baihya Khanal**, Natural History Museum, for his suggestions and help during the identification process. I am also thankful to the other staffs of TTE, for their valuable help. I would like to recognise the contribution of both the teaching and administrative staffs of Central Department of Zoology, Tribhuvan University, Kritipur, for all sorts of help during my academic years.

I take this opportunity to pay my heartiest thanks to my parents, brothers, sister, for all their blessings, love, support and being my strength and inspiration. I express my sincere appreciation and thanks to my dear sister **Miss Sitoshna Chhetri**, brothers **Dr. Dinesh Chhetri**, **Mr. Degendra Basnett**, **Mr. Saroj Rai** (advocate), **Mr Sujendra Chhetri**, for all their support, inspiration and cooperation during my research work.

I would also like to thank my roommates **Mr. Prakash Sharma**, **Mr. Tika Duttah Sharma**, **Mr. Binod Bhattarai**, **Mr. Mandip Chhetri** and other persons who are directly or indirectly related to my dissertation work.

Sudarshan Chhetri.

M.Sc. (Entomology).

Batch 2063 - 2064.

Exam Roll No: - 349

Regd.No. 5-3-28-82-2006.

ABSTRACT

*Tea is the agricultural product of leaves, leaf buds and internodes of **Camellia sinensis** plant, prepared and cured by various methods. It is a woody perennial plant grown as a monoculture. It provides a stable microclimate and a suitable habitat for number of pests and diseases in different parts of plant in different seasons with different damage pattern and intensity.*

A random questionnaire survey and interview was made with the experienced person, TTE officials working at the garden and personal visit and collection resulted 8 species of Arthropod pests and 2 predator species belonging to 8 orders and 16 different families.

A total of 205 species, were collected. 125 specimens collected during autumn and 80 during monsoon season. Maximum species belonged from Aphididae, Formicidae and Thripidae families and minimum species from Scarabaeidae and Chrysomelidae families. Hemiptera was found to be the most dominant Order with the value of 0.2683, likewise Coleoptera was found to be recessive Order with the value of 0.0244.

The Species Diversity was 1.662 with the evenness of 0.807 for autumn season and was 1.798 with the evenness of 0.968 for monsoon season, while the Community Dominance was 0.9121.

*Out of them, Thrips (**Scirtothrips** sp.), Aphids (**Toxoptera aurantii**) was considered as a major enemy of the tea. It was also reported that tea plant suffered from natural calamity i.e. hailstones affecting the tea production in the fiscal year 2009.*

TTE has been graded as Organic Tea Estate, from April 2008 by Institute of Market logy (IMO) of Switzerland, and has been adopting traditional synthetic pesticide, cattle manure, vermin compost as well as Neem based botanicals for the control of the pests. The Estate has been exporting tea overseas. Many European nations and Japan have shown preference for tea produced by adopting organic manuring method. It is suggested to monitor the pests and disease complex regularly and use IPM techniques as far as possible.

CONTENTS

	Page
ACKNOWLEDGEMENT	i
LIST OF TABLES	ii
LIST OF FIGURES	iii
LIST OF PLATES	iv
CONTENTS	v-vi
ABBREVIATIONS AND ACRONYMS	vii
ABSTRACT	viii
1. INTRODUCTION	1-4
1.1 History of Tea.	2
1.2 Tea in India.	3-4

2. OBJECTIVES	5
3. LITERATURE REVIEW	6-10
4. STUDY AREA	11-13
4.1 Climate.	12-13
5. MATERIALS AND METHODOLOGY	17-20
5.1 Methodology.	17
5.2 Materials for Pests Collection.	17
5.3 Data Collection.	17-18
5.4 Pests Collection.	18-19
5.5 Slide Preparation/ Photography.	19

5.6 Identification.	19
5.7 Data Analysis	20
(i) Species Diversity.	20
(ii) Evenness.	20
(iii) Dominance.	20
6. EXPERIMENTAL RESULTS	21-36
6.1 Characteristic Features of Recorded Pests.	23-26
6.2 Diversity of Tea Pest.	32
6.3 Species Diversity of Tea Pest.	33-34
6.4 Community Dominance.	35
6.5 Control Measures.	36
7. DISCUSSION	37-40

8. CONCLUSION	41-42
9. RECOMMENDATION	43
REFERENCES	44-47
APPENDIX	48-49

LIST OF TABLES

	Pg.No.
Table 1: Production of Tea by TTE in last three years.	12
Table 2: Pests collected, time of collection and nature of damage.	21
Table 3: Seasonal Distribution of Tea Pests at TTE.	22

Table 4: Site of attack and time of occurrence of arthropod pests.	26
Table 5: Shannon's Index for Species Diversity of Autumn Season.	33
Table 6: Shannon's Index for Species Diversity of Monsoon Season.	34
Table 7: Simpson's Community Dominance within each Order.	35
Table 8: Control Schedule Practiced against Tea Pests at TTE.	36