

Zeitschrift: Acta Tropica
Herausgeber: Schweizerisches Tropeninstitut (Basel)
Band: 19 (1962)
Heft: (7): Pests of crops in warm climates and their control

Artikel: Pests of crops in warm climates and their control
Autor: Wyniger, R.

Inhaltsverzeichnis

DOI: <https://doi.org/10.5169/seals-311035>

Nutzungsbedingungen

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

Conditions d'utilisation

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

Terms of use

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

Download PDF: 20.08.2025

ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>

Contents

<i>Foreword</i>	vii
<i>Preface</i>	xi
<i>Acknowledgments</i>	xii

I. INTRODUCTION

1. Structure, general characteristics and development of insects	1
External morphology of insects	1
Anatomy and physiological functions of inner organs	5
Forms of development	6
1. Ametabolous development	7
2. Hemimetabolous development or incomplete metamorphosis . .	7
3. Holometabolous development or complete metamorphosis . .	7
a) acephalous-apode larvae	8
b) eucephalous-apode larvae	8
c) eucephalous-oligopode larvae	8
d) eucephalous-polypode larvae	8
a) exarate pupae = pupa libera	9
b) obtected pupae = pupa obtecta	9
c) coarctate pupae = pupa coarctata	9
2. Synopsis of the classification of the most important plant pests	10
INSECTA	10
 ORDER ORTHOPTERA	10
Family Blattidae	10
Family Gryllidae	11
Family Gryllotalpidae	11
Family Forficulidae	11
Family Tettigoniidae	12
Family Acridiidae	12
 ORDER ISOPTERA	12
 ORDER THYSANOPTERA	12

ORDER LEPIDOPTERA	25
A. Microlepidoptera	26
Family Tineidae	26
Family Pyralididae	26
Family Tortricidae	27
Family Lyonetiidae	27
Family Hyponomeutidae	28
Family Coleophoridae	28
B. Macrolepidoptera	28
Family Geometridae	28
Family Noctuidae	29
Family Lasiocampidae	29
Family Lymantriidae	30
Family Arctiidae	30
Family Limacodidae	31
Family Sphingidae	31
Family Papilionidae	31
ORDER DIPTERA	32
Suborder Orthorrhapha	32
Family Cecidomyiidae	32
Family Tipulidae	32
Suborder Cyclorrhapha	33
Family Chloropidae	33
Family Trypetidae	33
Family Agromyzidae	33
ARACHNIDA	34
ORDER ACARINA	34
Suborder Trombidiformes	34
Family Tetranychidae	34
Family Eriophyidae	35
MYRIAPODA	35
NEMATHELMINTHES	36
ORDER NEMATODA	36
Family Anguillulidae	36
Leaf nematodes	37
Stem nematodes	37
Root knot nematodes	37
Root cyst nematodes	38
Ectoparasitic root nematodes	38

II. IDENTIFICATION OF PLANT PESTS

<i>1. How pests cause damage</i>	<i>41</i>
<i>2. How pests are identified in the field</i>	<i>42</i>
a) Isolating attacked plant material	42
b) Odour attractants	43
c) Optical attractants	44
d) Traps	46
e) Other equipment for capturing insects	46
f) Insecticidal sprays	47
<i>3. Evidence of plant parasitic nematodes</i>	<i>47</i>
a) Leaf and stem nematodes	47
b) Root knot nematodes	48
c) Cyst-forming nematodes	48
d) Free living root nematodes	49
<i>4. Killing, preserving and packing insects</i>	<i>49</i>
a) Equipment for killing insects	49
b) Preserving	51
1. Method for insects with a strongly chitinized body wall .	51
2. Method for soft, fragile insects, mites and nematodes .	52
3. Methods for green plants	53
c) Packing and dispatching	53
<i>5. How to make simple microscope slide mounts</i>	<i>54</i>
a) Mounting media	55
b) Mounting for quick identification	55
c) Mounting for permanent preservation	56

III. PESTS OF CROPS IN WARM CLIMATES

BEVERAGES	61
Coffee	63
Cocoa	87
Tea	105
Kola-nut	123
FOOD CROPS	129
Maize	131
Sorghum	145
Rice	151
Sugar cane	167
Beans	187
Cassava (Manioc)	199
Sweet Potato	205

FRUITS	217
Pineapple	219
Date-palm	225
Banana	229
Papaw	237
Mango	241
Citrus	257
OIL PLANTS	295
Olive	297
Coco-nut and Oil-palm	305
Sesame	325
Castor	333
Ground-nuts	341
TOBACCO, PYRETHRUM, SPICES AND DRUGS	353
Tobacco	355
Pyrethrum	375
Pepper	377
Chillies	383
Quinine	387
RUBBER AND FIBRES	393
Rubber	395
Cotton	403
Sisal	428
Roselle Hibiscus	431
Ramie	435
Jute	437
Kapok	441
LOCUSTS	447
Locusts and their role as plant pests	447
Locust life history	449
Control	452
A. Baiting	453
B. Dusting	453
C. Ground spraying	453
D. Aircraft spraying	454
TERMITES	457
Termites and their role as plant pests	457
Termite castes	457
Differences between termites and ants	459
Termite nests	460
Economic importance of termites	461
Causes of termite attacks on plants	462
Control	462
A. Preventive measures	462
B. Curative measures	463

ANTS	465
Ants and their role as plant pests	465
Nests and castes	466
Ants of economic importance	467
Control of leaf-cutting ants	469
Ants causing direct damage to roots, trunks, shoots, and flowers	470
Control	471
Ants indirectly injurious	472
Control	473
Driver ants	473

IV. METHODS AND EQUIPMENT FOR PEST CONTROL

<i>Direct method</i>	475
1. Mechanical control	475
2. Chemical control	475
a) Feeding or stomach poisons	476
b) Systemics	476
c) Direct or contact poisons	476
d) Contact poisons with local penetration properties	476
e) Fumigants	477
Synergists	477
Attractants	477
Repellents	477
f) Product formulation	478
a) Dusts	478
b) Granulate	478
c) Wettable powders	479
d) Pastes	479
e) Emulsifiable solutions	479
f) Aerosols	480
g) Fog solutions	480
h) Fumigants	480
i) Glues	481
g) Method of Application	481
a) Application of dusts with dusting machines	481
b) Application of liquid insecticides with spraying equipment	482
High volume method	482
Low volume method	484
c) Application of insecticides by aircraft	486

<i>5. Action of pesticides on the plant</i>	487
<i>6. Organization of phytosanitary campaigns</i>	488
<i>7. Biological control</i>	490
<i>8. Timing of phytosanitary campaigns</i>	490
1. Preventive control	491
2. Curative control	491
<i>9. Examination of insecticides and field trials</i>	492
<i>10. Assessment of insecticidal residues on plants and stored products</i>	495
Method of assessing insecticide residues	496
<i>11. Development and causes of resistance to insecticides</i>	499
<i>12. Glossary</i>	501
<i>13. Conversion tables for weights, measures and temperatures</i>	505
<i>References</i>	512
<i>Index</i>	537

V. CONTROL-MEASURES

(Appendix)

1. *Table of active ingredients*
2. *Precautions*
3. *First-aid measures*
4. *Mixing tables*
5. *Recommendations for control measures
against the described pests*

