ISSN 0007-4853 Vol. 72(3), 345-533

# Bulletin of Entomological Research



Commonwealth Institute of Entomology

#### **COMMONWEALTH INSTITUTE OF ENTOMOLOGY**

#### Director and Editor

N. C. PANT, M.Sc., PH.D., D.J.C., F.N.A.

Assistant Director
A. H. PARKER, M.Sc., Ph.D.

#### **Assistant Editor**

J. M. B. HARLEY, B.Sc.

Headquarters, Publication Office and Library—56 Queen's Gate, London SW7 5JR, UK. Telephone: 01-584-0067. Telegrams: Entinfo London SW7.

Identification Service—c/o British Museum (Natural History), Cromwell Road, London SW7 5BD, UK.

The Commonwealth Institute of Entomology is one of 10 Bureaux and 4 Institutes that together form the Commonwealth Agricultural Bureaux, an organisation sponsored by the Commonwealth governments for the dissemination of information on agricultural research.

The Bulletin of Entomological Research is a quarterly journal prepared by the Institute and published by the Commonwealth Agricultural Bureaux.

#### Annual Subscription Rate

To	subscribers	in	countries	that	are	members of CAB	£42·00
To	subscribers	in	countries	that	are	not members of CAB	£65·00

#### Back Numbers

Back volumes of the *Bulletin of Entomological Research* are available and there are discounts up to a maximum of 50% on orders of more than 10 volumes.

Orders and enquiries concerning subscriptions and back numbers should be sent to

CENTRAL SALES,
COMMONWEALTH AGRICULTURAL BUREAUX,
FARNHAM ROYAL, SLOUGH SL2 3BN, UK.

[Note: Prices are subject to change without notice.]

© Commonwealth Agricultural Bureaux 1982. All rights reserved. No part of this publication may be reproduced in any form or by any means, electronically, mechanically, by photo-copying, recording or otherwise, without the prior permission of the copyright owner.

The Executive Council of the Commonwealth Agricultural Bureaux is a signatory to the Fair Copying Declaration, details of which can be obtained from The Royal Society, 6 Carlton House Terrace, London S.W.1.

The Commonwealth Agricultural Bureaux organisation does not accept responsibility for any trade advertisement included in this publication.

## Review of Applied Entomology

prepared by the Commonwealth Institute of Entomology

A monthly abstracting journal in two parts: Series A (Agricultural) covering the world literature on insects, mites and other arthropods harmful to cultivated plants of every kind including forest trees, and also beneficial arthropods; Series B (Medical and Veterinary) covering the world literature on insects, mites, ticks and other arthropods that transmit diseases to man or livestock or cause any other form of injury to them.

Annual subscriptions: Series A £130, Series B £65 (£85 and £42 in member countries of the Commonwealth Agricultural Bureaux).

Further details and free sample copies from: Central Sales, Commonwealth Agricultural Bureaux, Farnham House, Farnham Royal, Slough SL2 3BN, UK.

# Distribution maps of pests

Issued by the Commonwealth Institute of Entomology, London

Each of these maps (size  $27 \times 17$  cm) gives the world distribution, together with supporting references, of a particular arthropod pest. Those at present being issued (Series A) deal with pests of importance in relation to agriculture or forestry or their products. Eighteen maps are issued each year in two batches of nine each. Up to May 1982, a total of 437 maps has been issued.

Annual Subscription for 18 maps	£19.00
Complete set (including revisions and index up to 1981)	£70.00
Loose-leaf binder (maps are punched ready for insertion)	£8.50
Single maps (min. order: UK £2, elsewhere £3)	£1.00

## Central Sales, Commonwealth Agricultural Bureaux, Farnham House, Farnham Royal, Slough SL2 3BN, UK.

#### COMMONWEALTH INSTITUTE OF ENTOMOLOGY

# Leading World Information Service on Insects & Mites of Economic Importance

#### **PUBLICATIONS**

- Review of Applied Entomology: an abstract journal covering the world literature on pests and beneficial arthropods. In two monthly parts: Series A (Agricultural) and Series B (Medical and Veterinary).
- Bulletin of Entomological Research: a quarterly journal of original research papers on arthropods of economic importance.
- Distribution Maps of Pests: giving the world distribution, with supporting references, of individual arthropod pests.
- Books and Monographs: on various subjects. Current list available on request.

#### RETRIEVAL SERVICES

- Computerised Information Retrieval: from the Commonwealth Agricultural Bureaux Abstracts Database, including RAE and all other main CAB abstract journals.
- Annotated Bibliographies: collections of abstracts on particular topics.
   Current list available on request; further bibliographies compiled to order.
- Micrographic Unit: facilities for most types of microform work.
- Library: a major world collection of research literature on arthropods of economic importance. Open to visitors.

#### TAXONOMIC SERVICES

- Identification Service: open to users in all parts of the world. Located in the British Museum (Natural History); over 30 000 insects and mites identified each year.
- International Training Courses: held annually in the applied taxonomy
  of insects and mites.
- Consultancy: advice on specific taxonomic problems and involvement of CIE taxonomists in research projects.

Further information from:

#### COMMONWEALTH INSTITUTE OF ENTOMOLOGY, 56 QUEEN'S GATE, LONDON SW7 5JR, U.K.

Telephone: 01-584 0067 Telegrams: ENTINFO London SW7

### **Annotated Bibliographies**

prepared by the Commonwealth Institute of Entomology

#### SUPPLEMENTARY LIST

These comprise series of abstracts that have appeared in the *Review of Applied Entomology* on a particular subject during the period quoted. Bibliographies can also be compiled in response to specific enquiries. Titles available are:

			No. of	Price
		Coverage	references	£
E47	Culex quinquefasciatus	1973-80	1 <b>6</b> 5	5.50
E48	Pharoah's ant (Monomorium pharaonis)	1973-80	109	4.95
E49	Diatraea saccharalis	1973-80	140	4.95
E50	Acrocercops cramerella	1913-80	41	3.30
E51	Heliothis armigera (control & crop losses)	1976-80	210	6.05
E52	Busseola fusca, Chilo partellus, Sesamia	23.00		
	calamistis (control & crop losses)	197680	62	3.85
E53	Mosquito ovipositing behaviour	1973-81	324	6.60
E54	Biocontrol of termites	1973-81	75	3.85
E55	Forcipomyia as a cocoa pollinator	1956-81	46	3.30
E56	Photoperiodism in Culicidae	1973-81	203	6.05
E57	Rice stem gall midge (Orseolia oryzae)	1973-80	132	4.95
E58	Aphidophagous Cecidomyiidae	1973-81	59	3.85
E59	Insect toxicology & resistance	1973-81	305	6.60
	(Agricultural)			
E60	Insect toxicology & resistance (Medical	1973-81	326	6.60
	& Veterinary)			
E61	Integrated control of insect pests in Chile	1973-81	108	4.75
E62	Beauveria bassiana: culturing &			
	applications	1973-81	331	6.60
E63	Ghanaian entomology	1973-81	244	6.05
E64	Entomology and helminthology in relation			
	to public health in northern Nigeria	1973-81	133	4.95
E65	Liriomyza	1973-81	120	4.95
E66	Nilaparvata lugens	1980-81	243	6.05
E67	Coffee borers	1973-81	48	3.30
E68	Leaf-cutting ants	1973-81	145	4.95
E69	Solenopsis invicta (Agricultural)	1973-81	165	5.50
E70	Solenopsis invicta (Medical & veterinary)	1973-81	95	4.40
E71	Biocontrol of water hyacinth	1973–81	64	3.85
E72	Phlebotomine sandflies	1973-81	684	8.25
E73	Pests of sweet potatoes (Ipomoea batatas)	1973–81	320	6.60
E74	Integrated pest management in Colombia	1973-81	85	4.40
E75	Spodoptera litura	1973–81	376	6.60
E76	Busseola spp.	1973-81	32	3.30
E77	Sesamia spp.	1973–81	229	6.05
E78	Chilo partellus	1973-81	175	5.50
E79	Agromyzidae of economic importance	1973–81	417	7.15
E80	Arthropod pests of pigeon pea	1973–81	177	5.50
E81	Oryctes spp.	1973-81	133	4.95
E82	Cylas formicarius elegantulus	1920-82	35	3.30

Please add 10% of the net price for postage and packing.

All orders and enquiries to:

The Librarian, Commonwealth Institute of Entomology, 56 Queen's Gate, London, SW7 5JR, UK.

Telephone: 01-584 0067. Telegrams: ENTINFO LONDON SW7.

### CAB ABSTRACT JOURNALS AND SERIAL PUBLICATIONS ANNUAL SUBSCRIPTION RATES 1982

MINIOAL SOBJEKII IIO	· KAIL		
		Annual rates (paper or microform)	New subscriber rates
	Frequency	£	£
Main abstract journals Agricultural Engineering Abstracts	M	81	81
Animal Breeding Abstracts	M	146	95
Arid Lands Development Abstracts	M	146	146
Dairy Science Abstracts	M M	151	98
Dairy Science Abstracts Field Crop Abstracts Forestry Abstracts Forest Products Abstracts	M	189 146	123 95
Forest Products Abstracts	M	, 70	46
Helminthological Abstracts.			
A—Animal Helminthology B—Plant Nematology	M Q	124 43	81 28
Herbage Abstracts	м	108	70
Horticultural Abstracts	M	205	133
Index Veterinarius	M	211	137
† Leisure Recreation & Tourism Abstracts Nutrition Abstracts & Reviews.	Q	43	43
A—Human & Experimental	M	184	120
B—Livestock Feeds & Feeding	M	124	81
Plant Breeding Abstracts Protozoological Abstracts	M	227	148
Review of Applied Entomology.	М	86	86
A—Agricultural	M	130	85
B—Medical & Veterinary	M	65	42
Review of Medical & Veterinary Mycology	Q M	54 130	35
Review of Plant Pathology Rural Development Abstracts	O O	43	85 43
Rural Extension, Education and Training Abstracts	8	40	4ŏ
Soils & Fertilizers	M	184	120
Veterinary Bulletin	M M	167	109
Weed Abstracts World Agricultural Economics and Rural Sociology	IVI	92	60
Abstracts	M	146	95
Primary journal			
Bulletin of Entomological Research	Q	65	42
Specialist abstract journals	`		
Cotton & Tropical Fibres Abstracts	M	35	23
Crop Physiology Abstracts	M	102	66
Faba Bean Abstracts (New in 1981)	M Q	28 42	18 27
Irrigation & Drainage Abstracts Maize Quality Protein Abstracts	ŏ	12	8
Maize Quality Protein Abstracts Ornamental Horticulture	M	42	27 35
Plant Growth Regulator Abstracts	M	54	35
Potato Abstracts Poultry Abstracts	M M	43 72	28 47
Poultry Abstracts Rice Abstracts	M	54	35
Seed Abstracts	M	60	39
Small Animal Abstracts Sorghum and Millets Abstracts	Q M	30 24	20 16
Soyabean Abstracts	M	42	27
Triticale Abstracts	0	18	12
Tropical Oil Seeds Abstracts	M	30	20
Serial publications	**	42	
Animal Disease Occurrence Bibliography of Systematic Mycology	H H	43 8	
Biocontrol News & Information		36	23
Descriptions of Pathogenic Fungi and Bacteria	Q Q A	11	
Descriptions of Plant Viruses	A	.5	
Distribution Maps of Pests Distribution Maps of Plant Diseases	អ៊	19 11	
Index of Fungi	Ĥ	i i	_
Lentil Abstracts	Α	6	
Forestry Card Title Service: Full Service (FA & FPA)	M	103	67
Forestry Abstracts only (FA)	M	78	51
Forest Products Abstracts only (FPA) Comprehensive Pig Information Service (write for details)	M	43	28 75 10
Comprehensive Pig Information Service (write for details)	_	75	75
Index of Current Research on Pigs only Pig News and Information only	A Q	10 25	10 25
Food Science and Technology Abstracts Complete	M	330	
Single parts	_	33	
Annual Cumulated Index	Α	72	
A—Annual H—Half year M—M † Formerly Rural Recreation & Tourism Abstracts.	onthly	QQu	arterly
CENTERAL CALES COMMONWEALTH ACRICULTURE		132 TA	

CENTRAL SALES, COMMONWEALTH AGRICULTURAL BUREAUX, FARNHAM HOUSE, FARNHAM ROYAL, SLOUGH SL2 3BN, U.K.

Tel.: Farnham Common (02814) 2281. Telex: 847964. Cables: Compa Slough https://doi.org/10.1017/S000748530001350X Published online by Cambridge University Press