

BULLETIN
OF
ENTOMOLOGICAL RESEARCH

ISSUED BY THE COMMONWEALTH
INSTITUTE OF ENTOMOLOGY

EDITOR : THE DIRECTOR

VOL. 58
(1967)

LONDON :
COMMONWEALTH INSTITUTE OF ENTOMOLOGY,
56, QUEEN'S GATE, S.W.7

1969

Commonwealth Agricultural Bureaux

EXECUTIVE COUNCIL

R. F. TURNBULL, Chairman	Australia
M. K. A. AGYEMAN, Vice-Chairman	Ghana
W. G. ALEXANDER, C.B.E.	United Kingdom
W. L. HANEY	Canada
V. ARMSTRONG, Ph.D.	New Zealand
A. J. KIDWAI	India
M. NABI BUKHSH, Ph.D.	Pakistan
A. NESARATNAM	Ceylon
MRS. ZAIBEDAH ZULKIFLI	Malaysia
O. A. SOETAN	Nigeria
S. PHYLAKTIS	Cyprus
H.E. THE HIGH COMMISSIONER	Sierra Leone
<i>To be appointed</i>	Tanzania
THE DEPUTY HIGH COMMISSIONER	Jamaica
THE DEPUTY HIGH COMMISSIONER	Trinidad and Tobago
J. NTIMBA	Uganda
H.E. THE HIGH COMMISSIONER	Kenya
F. C. MAKOZA	Malawi
E. S. KAPOTWE	Zambia
M. B. WADDA	The Gambia
A. A. MOHAMED	Guyana
THE DEPUTY HIGH COMMISSIONER	Barbados
R. L. BAXTER	Rhodesia
Sir THOMAS SCRIVENOR, C.M.G., <i>Secretary</i>	Dependent Territories
N. G. JONES, <i>Assistant Secretary</i>	Farnham House, Farnham Royal, Slough, Bucks.

COMMONWEALTH INSTITUTE OF ENTOMOLOGY

Director and Editor

R. G. FENNAH, Sc.D., M.A.

Assistant Editor

J. R. METCALFE, M.A., Ph.D.

Headquarters, Publication Office and Library—56, Queen's Gate, London, S.W.7

Identification Service—c/o British Museum (Natural History), Cromwell Road,
London, S.W.7

CONTENTS

	PAGE
ADEYEMI, S. A. O.	
A laboratory study of competition between <i>Tribolium castaneum</i> (Hbst.) (Coleoptera, Tenebrionidae) and three moth species ...	31
BAKER, C. R. B.	
Apparatus for studying nocturnal patterns of oviposition and larval eclosion, and diel patterns of moth emergence	553
BALDRY, D. A. T.	
Distribution and trypanosome infection rates of <i>Glossina morsitans submorsitans</i> Newst. along a trade cattle route in south-western Nigeria	537
BÄNZIGER, H.	
Preliminary observations on a skin-piercing, blood-sucking moth (<i>Calyptra eustrigata</i> (Hmps.) (Lep., Noctuidae) in Malaya ...	159
BARKAI, A. & SALITERNIK, Z.	
Anopheline mosquitos found breeding in Israel in 1963–1965 during the last stage of the malaria eradication project ...	353
BEDFORD, G. O.	
Observations on the ecology of <i>Oryctes</i> (Coleoptera: Scarabaeidae: Dynastinae) in Madagascar	83
BEESLEY, J. S. S. (see IRVING, N. S.)	
BELL, J. D.	
Patterns of cross resistance to organophosphates and carbamates in <i>Musca domestica</i>	137
BELL, J. D.	
Genetical investigations on a strain of house-flies resistant to organophosphates and carbamates	191
BENNETT, F. D. (see CLEMENTS, A. N.)	
BETTS, E. (see BROWN, E. S.)	
BIGGER, M. & TAPLEY, R. G.	
Prediction of outbreaks of coffee leaf-miners on Kilimanjaro ...	601
BOYLE, J. A. (see JORDAN, A. M.)	
BRADLEY, J. D.	
Two new species of clearwing moths (Lepidoptera, Sesiidae) associated with sweet potato (<i>Ipomoea batatas</i>) in East Africa ...	47
(L 3887)	<i>a*</i>

CONTENTS

	PAGE
BROWN, E. S., BETTS, E. & RAINY, R. C.	
Seasonal changes in distribution of the African armyworm, <i>Spodoptera exempta</i> (Wlk.) (Lep., Noctuidae), with special reference to eastern Africa	661
BRUST, R. A. (see LEFKOVITCH, L. P.)	
BULLOCK, J. A. & SMITH, R. G.	
The bionomics and control of <i>Argyrostagma niobe</i> (Weym.) and <i>Dasychira georgiana</i> Fawc. (Lep., Lymantriidae) on black wattle in Kenya	255
BURSELL, E. & SLACK, E.	
Indications concerning the flight activity of tsetse flies (<i>Glossina morsitans</i> Westw.) in the field	575
CLEMENTS, A. N. & BENNETT, F. D.	
The structure and biology of a new species of <i>Mallophora</i> Macq. (Diptera, Asilidae) from Trinidad, W.I.	455
CLEMENTS, S. A. (see DEAN, G. J. W.)	
COAKER, T. H. (see FINCH, S.)	
COLBO, M. H. (see MATTHYSSE, J. G.)	
CURTIS, C. F. (see JORDAN, A. M.)	
DAME, D. A. & FORD, H. R.	
Multiple mating of <i>Glossina morsitans</i> Westw. and its potential effect on the sterile male technique	213
DAVIDSON, R. L. & ROBERTS, R. J.	
Species differences in scarab—pasture relationships	315
DAVIDSON, R. L. & ROBERTS, R. J.	
Scarab damage to grass and clover as influenced by depth of feeding	559
DEAN, G. J. & WORTHAM, S. M.	
Effect of gamma-radiation on the tsetse fly <i>Glossina morsitans</i> Westw.	505
DEAN, G. J., WILSON, F. & WORTHAM, S.	
Some factors affecting eclosion of <i>Glossina morsitans</i> Westw. from pupae	367
DEAN, G. J. W. & CLEMENTS, S. A.	
Effect of gamma-radiation on <i>Glossina pallidipes</i> Aust. ...	755
DEAN, G. J. W., PAGET, J. & WILLIAMSON, B. R.	
Survival and reproduction of <i>Glossina morsitans</i> Westw. in different types of cages exposed to variable and constant climatic conditions	773

CONTENTS

	PAGE
DEAN, G. J. W., WILLIAMSON, B. R. & PHELPS, R. J.	
Behavioural studies of <i>Glossina morsitans</i> Westw. using tantalum-	
182	763
DUTT, D. K.	
Bionomics of <i>Agrilus acutus</i> (Thnb.) (Col., Buprestidae) on mesta (<i>Hibiscus cannabinus</i>) in India	421
ENTWISTLE, P. F.	
The biology of <i>Earias biplaga</i> Wlk. (Lep., Noctuidae) on <i>Theo-</i> <i>broma cacao</i> in western Nigeria	521
FENNAH, R. G.	
Revisionary notes on the new world genera of Cercopid frog- hoppers (Homoptera: Cercopoidea)	165
FERNANDO, H. E. (see PERERA, N.)	
FERRAR, P.	
Interplant movement of apterous aphids with special reference to <i>Myzus persicae</i> (Sulz.) (Hem., Aphididae)	653
FINCH, S. & COAKER, T. H.	
A method for the continuous rearing of the cabbage root fly <i>Erioischia brassicae</i> (Bch.) and some observations on its biology	619
FORD, H. R. (see DAME, D. A.)	
GIBBS, D. G., PICKETT, A. D. & LESTON, D.	
Seasonal population changes in cocoa capsids (Hemiptera, Miridae) in Ghana	279
GREATHEAD, D. J.	
Supplementary notes on the <i>orbitalis</i> (Westw.) group of <i>Antestiopsis</i> (Hemiptera, Pentatomidae)	227
GREENBERG, S. (see KEHAT, M.)	
GRIFFITHS, D. C. & SCOTT, G. C.	
Timing of insecticidal sprays to control wheat-bulb fly, <i>Lepto-</i> <i>hylemyia coarctata</i> (Fall.)	793
KAMYA, E. P. (see MATTHYSSE, J. G.)	
HARLEY, K. L. S.	
Assessment of the suitability of <i>Plagiohammus spinipennis</i> (Thoms.) (Col., Cerambycidae) as an agent for control of weeds of the genus <i>Lantana</i> (Verbenaceae). I. Life-history and capacity to damage <i>L. camara</i> in Hawaii	567

CONTENTS

	PAGE
HARLEY, K. L. S.	
The suitability of <i>Ochetoma scabripennis</i> Guér. and <i>Uroplata girardi</i> Pic (Col., Chrysomelidae) for the control of <i>Lantana</i> (Verbenaceae) in Australia	835
HARLEY, K. L. S. & KUNIMOTO, R. K.	
Assessment of the suitability of <i>Plagiohammus spinipennis</i> (Thoms.) (Col., Cerambycidae) as an agent for control of weeds of the genus <i>Lantana</i> (Verbenaceae). II. Host specificity ...	787
HARRY, O. G.	
A jar for maintaining parasite-free insects and for collecting infected faeces	833
HEAVERSEDGE, R. G.	
Variation in the size of insect parasites of puparia of <i>Glossina</i> spp.	153
HODGSON, C. J.	
Soil application of systemic insecticides for control of woolly apple aphid (<i>Eriosoma lanigerum</i> (Hsm.)) in Rhodesia ...	73
HODJAT, S. H.	
The effects of crowding on the survival, rate of development, size, colour and fecundity of <i>Dysdercus fasciatus</i> Sign. (Hem., Pyrhocoridae) in the laboratory	487
IRVING, N. S.	
The absorption and storage of insecticide by the <i>in utero</i> larva of the tsetse fly <i>Glossina pallidipes</i> Aust.	221
IRVING, N. S. & BEESLEY, J. S. S.	
Aircraft applications of insecticides in East Africa. XVII. Air-spray experiment with fenthion against <i>Glossina morsitans</i> Westw., <i>G. swynnertoni</i> Aust. and <i>G. pallidipes</i> Aust. ...	431
JAMES, J. D. (see MAYER, M. S.)	
JORDAN, A. M. & CURTIS, C. F.	
Productivity of <i>Glossina austeni</i> Newst. maintained on lop-eared rabbits	399
JORDAN, A. M., NASH, T. A. M. & BOYLE, J. A.	
Pupal weight in relation to female age in <i>Glossina austeni</i> Newst.	549
KEHAT, M. & GREENBERG, S.	
The biology and phenology of <i>Arenipses sabella</i> Hmps. and <i>Cadra figulilella</i> (Gregson) (Lepidoptera, Pyralidae) on dates in Israel	411
KETTLE, D. S. & LINLEY, J. R.	
The biting habits of some Jamaican <i>Culicoides</i> . I. <i>C. barbosai</i> Wirth & Blanton	729

CONTENTS

	PAGE
KUNIMOTO, R. K. (see HARLEY, K. L. S.)	
LANGLEY, P. A.	
The effect of feeding the tsetse fly <i>Glossina morsitans</i> Westw. on impala blood 295	
LEFKOVITCH, L. P. & BRUST, R. A.	
Locating the eggs of <i>Aedes vexans</i> (Mg.) (Diptera: Culicidae) ... 119	
LESTON, D. (see GIBBS, D. G.)	
LING, K. C.	
Hybrids of <i>Nephrotettix impicticeps</i> Ishihara and <i>N. apicalis</i> (Motsch.) and their ability to transmit the tungro virus of rice 393	
LINLEY, J. R.	
Studies on the larval biology of <i>Leptoconops bequaerti</i> (Kieff.) (Diptera: Ceratopogonidae) 1	
LINLEY, J. R. (see KETTLE, D. S.)	
LOWE, H. J. B.	
Susceptibility of aphids to vamidothion, a systemic insecticide, in relation to their feeding behaviour on broad beans 829	
MATTHYSSE, J. G., COLBO, M. H. & KAMYA, E. P.	
Acaricide trials against <i>Rhipicephalus appendiculatus</i> Neum., <i>Amblyomma variegatum</i> (F.) and <i>Boophilus decoloratus</i> (Koch) (Ixodidae) on cattle in Uganda 465	
MAYER, M. S. & JAMES, J. D.	
Attraction of <i>Aedes aegypti</i> (L.): responses to human arms, carbon dioxide, and air currents in a new type of olfactometer 629	
NASH, T. A. M. (see JORDAN, A. M.)	
NAYAR, J. K.	
Effects of larval and pupal environmental factors on biological status of adults at emergence in <i>Aedes taeniorhynchus</i> (Wied.) 811	
PAGET, J. (see DEAN, G. J. W.)	
PERERA, N. & FERNANDO, H. E.	
Laboratory culture of the rice gall midge <i>Pachydiplosis oryzae</i> (Wood-Mason) 439	
PHELPS, R. J. (see DEAN, G. J. W.)	
PICKETT, A. D. (see GIBBS, D. G.)	
POLLARD, D. G.	
Stylet penetration and feeding damage of <i>Eupteryx melissae</i> Curtis (Hemiptera, Cicadellidae) on sage 55	

CONTENTS

	PAGE
PONT, A. C.	
A new Japanese species of <i>Atherigona</i> Rond. (Diptera : Muscidae), reared from sugar-cane	201
RAINEY, R. C. (see BROWN, E. S.)	
READSHAW, J. L.	
Damage to swedes by the swede midge, <i>Contarinia nasturtii</i> (Kieff.), and a possible method of cultural control	25
REUBEN, R.	
A redescription of <i>Culex vishnui</i> Theo., with notes on <i>C. pseudo-</i> <i>vishnui</i> Colless and <i>C. tritaeniorhynchus</i> Giles, from southern India	643
ROBERTS, H.	
Notes on the biology of ambrosia beetles of the genus <i>Trachyostus</i> Schedl (Coleoptera : Platypodidae) in West Africa	325
ROBERTS, R. J. (see DAVIDSON, R. L.)	
ROTHSCHILD, G. H. L.	
Notes on <i>Diconocoris hewitti</i> (Dist.) (Hemiptera : Tingidae), a pest of pepper in Sarawak (Malaysian Borneo)	107
ROULSTON, W. J., STONE, B. F., WILSON, J. T. & WHITE, L. I.	
Chemical control of an organophosphorus- and carbamate-resistant strain of <i>Boophilus microplus</i> (Can.) from Queensland ...	379
SALITERNIK, Z. (see BARKAI, A.)	
SAMARAWICKREMA, W. A.	
Biting cycles and parity of the mosquito <i>Mansonia</i> (<i>Mansonioides</i>) <i>uniformis</i> (Theo.) in Ceylon	299
SCOTT, G. C. (see GRIFFITHS, D. C.)	
SCUDDER, G. G. E.	
The identity of <i>Naphius</i> seed bug pests in Africa (Hemiptera : Lygaeidae)	205
SHAW, M. J. P.	
Studies on alternate hosts of <i>Myzus persicae</i> (Sulz.) in Rhodesia	123
SLACK, E. (see BURSELL, E.)	
SMITH, R. G. (see BULLOCK, J. A.)	
STONE, B. F. (see ROULSTON, W. H.)	
SYMMONS, P. M.	
A morphometric measure of phase in the desert locust, <i>Schisto-</i> <i>cerca gregaria</i> (Forsk.)	803

CONTENTS

	PAGE
TAPLEY, R. G. (see BIGGER, M.)	
TUNSTALL, J. P.	
Pupal development and moth emergence of the red bollworm (<i>Diparopsis castanea</i> Hmps.) in Malawi and Rhodesia ...	233
WARD, L. K.	
A survey of the Arthropod fauna of plum trees at East Malling in 1966	581
WHITE, L. I. (see ROULSTON, W. J.)	
WILLIAMSON, B. R. (see DEAN, G. J. W.)	
WILSON, F. (see DEAN, G. J.)	
WILSON, J. T. (see ROULSTON, W. J.)	
WORTHAM, S. M. (see DEAN, G. J.)	

DATES OF PUBLICATION IN PARTS

Part I pp. 1-190	September 1968
Part II pp. 191-410	November 1968
Part III pp. 411-660	February 1969
Part IV pp. 661-843	May 1969

ERRATA

Vol. 57

p. 543, for "Hesperiidae" read "Lycaenidae"

Vol. 58

p. 92, lines 4, 24 and p. 101, line 16, for "Coq." read "Coquerel"

p. 157, 10 lines from bottom, for "Bembix" read "Bembex"

p. 181, lines 13 and 14, for "R. dimorpha" read "A. dimorpha"

p. 185, line 2 from bottom, for "fimbriolata" read "fimbriolata"

p. 189, line 1, for "Chinanana" read "Chinana"

p. 199, summary, line 4, for "organophosphate and carbamate inheritance" read "inheritance of organophosphate and carbamate resistance"

p. 199, reference to "BELL, J. D. (1968)" add "pp. 137-151."

p. 274, line 22, p. 275, line 27, p. 276, summary, 4 lines from end, for "Compsophorus fumosus" read "Epijoppa fumosa"

p. 333, line 4, for "Deliopygus" read "Doliopygus"

p. 368, line 27, for "Mutillia" read "Mutilla"

p. 374, Fig. 3 caption, for "pupal survival" read "pupal mortality"

p. 381, Table I should read:

Chemical	LC50 and fiducial limits		Resistance factor
	Yeerongpilly strain	Ridgelands strain	
carbaryl	0.0016 (0.0013-0.0020)	0.021 (0.017-0.026)	13
carphenothon	0.41 (0.36-0.46)	6.8 (6.0-7.7)	17
coumaphos	0.048 (0.023-0.11)	0.079 (0.052-0.13)	1.6
diazinon	0.012 (0.011-0.013)	0.12 (0.11-0.14)	10
dioxathion	0.075 (0.064-0.087)	0.54 (0.47-0.62)	7.2
ethion	0.15 (0.13-0.17)	0.41 (0.35-0.47)	2.7

p. 406, formula (10) should read:

$$f [l_3 \sum_0^{24} (q_x m_x) - \frac{1}{6} q_3]$$

p. 597, Appendix, line 4, for "Anurophus" read "Anuraphis"

p. 610, line 3, for "meyriciki" read "meyricki"