

APPENDICES

INSECT PATHOLOGY MANUAL



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ABBREVIATIONS

ACDI • Agricultural Research Services Collection of Entomopathogenic Fungi USDA

BY/SUC • Brewers' yeast and sucrose medium

CBS • Central Bureau von Schimmelkultur

CDA • Controlled droplet application

CIDA • Canadian International Development Agency

CP • centiPoise

DFFPV • Département en formation pour la protection des végétaux

DGIS • Directorate General for Development Cooperation

DMI • distance moyenne entre insectes

DNA • Deoxy ribo Nucleic Acid

GIFAP • Groupement International des Associations Nationales de Fabricants des Produits Agrochimiques

IIBC • International Institute of Biological Control

IITA • International Institute of Tropical Agriculture

IMI • International Mycological Institute

IPARC • International Pesticide Application Research Centre

MDI • mean distance between insects

ODA • Overseas Development Administration

SPV • Service pour la protection des végétaux

SU • Suspension par ULV

ULV • Ultra low volume

USAID • United States Agency for International Development

USDA • United States Department of Agriculture

VAD • Volume average diameter

VMD • Volume median diameter

W/V • weight/volume

GLOSSARY

- ADIPOSE TISSUE • fatty tissue
- ALIPHATIC HYDROCARBON • simple carbon chain containing only carbon and hydrogen
- BACILLIFORM • rod-shaped bacteria
- BLASTOSPORE • yeast-like cell
- CATALASE • enzyme produced by some bacteria
- CHITINISED CELLS • cells reinforced with chitin
- CONIDIA • non-sexual infective spore of fungus
- CP - CENTIPOISE • a measure of viscosity
- DESICCATED • dry
- DEUTEROMYCETES • a group of fungi with no known sexual stage
- ENDOSPORE • spore formed inside cell
- ENDOTOXIN • toxin found inside the bacterial cell
- ENTOMOPATHOGEN • insect pathogen
- EUKARYOTE • organisms with membrane-limited nuclei which divide by mitosis
- FLACCID • not stiff
- GAMETE • mature germ cell
- HAEMOCOEL • insect body cavity containing haemolymph
- HAEMOCYTE • specialised cells circulating in the haemolymph
- HAEMOLYMPH • fluid circulating in the haemocoel
- HOMOGENEOUS • similar throughout
- HYALINE HYPHAE • transparent hyphae
- HYDROPHOBIC • repels water
- HYPHAE • strands of mycelium
- HYPHAL FISSION • division of hyphae
- HYPODERMIS • underneath the epidermis
- INCLUSION BODY • protein coat of a virus particle
- INTRACELLULAR • between cells
- LIPOPHILIC • soluble in oils
- LYOPHILISED • freeze dried
- MACROSCOPIC • visible to the naked eye
- MICROSCOPIC • visible under a microscope
monorefringent
- MYCELIAL COLONISATION • invasion by fungus
- OBLIGATELY PATHOGENIC • unable to grow outside of the living host
- OCCLUDED VIRUS • virus with a protein coat
- OCCLUSION BODY • crystalline protein structure
- ORGANELLE • sub cellular body
- ORIFICE • body aperture or hole
- PATHOGENIC • causing disease
- PATHOGENICITY • the ability to cause disease in a host
- PHYTOPHAGOUS • plant eating
- POLYPEPTIDE • peptide formed by a combination of several amino acids
- PROKARYOTE • organism without membrane, limited nuclei and not exhibiting mitosis
- PRONOTUM • chitin shield on thorax of an insect
- SAPROPHYTE • organism which can eat dead material
- SORPTION • adsorbtion and absorbtion
- SUBMICROSCOPIC • cannot be seen with a microscope
- SUBSTRATE • growth or support medium
- SUPERNATANT • clear liquid remaining after spores have settled in solution
- SURFACTANT • chemical which aids solubility
- SYMBIOTIC • living together to the mutual benefit of both
- TRIVET • small stand in a pressure cooker or similar apparatus
- TERATOGEN • an agent which causes abnormalities in fetus growth
- TWEEN • a surfactant chemical
- VECTOR • organism carrying disease
- VIRION • virus particle
- VIRULENCE • a degree or measure of pathogenicity
- ZYGOTE cell formed by the union of two gametes

REFERENCES

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- A collection of research and review papers.

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- A collection of research and review papers. The international meetings of the Society of Invertebrate Pathology are held every four years.

BATEMAN, R.P. • "Simple, standardised methods for recording droplet measurements and estimation of deposits from controlled droplet applications." *Crop Protection*, **12** (1993) 201-206.

BURGE, M.N., • ed. *Fungi in biological control systems*. Manchester University Press, 1989.

- A good review.

BURGES, H.D. • and N.W. Hussey, eds. *Microbial control of insects and mites*. Academic Press, 1971.

- A standard work. Should be read in conjunction with Burges (1981); these two books are a complete review of the subject from the 1950s up to 1981.

BURGES, H.D., • ed. *Microbial control of pests and plant diseases 1970 - 1980*. Academic Press, 1981, 949 pp.

- A standard work covering all aspects. See also previous entry.

CFI • *Plant pathologists' handbook*. Second ed. Commonwealth Mycological Institute, 1983, 439 pp.

- Microbiological techniques.

COURSHEE, R.J. • "Desert locusts and their control." *International Pest Control*, **32** No.1 (1991), 16-18.

DAVIDSON, E.W., • ed. *Pathogenesis of invertebrate microbial diseases*. Allanheld, Osmun, Montclair, 1981.

- Concentrates on the details of infection and the hosts' responses.

DEACON, J.W. • *Microbial control of plant pests and diseases*. Van Nostrand, UK., 1983.

- A good introductory text.

DOBSON, H., • comp. *Guide-lines for Pesticide Trials on Desert Locust Hoppers*: Rome:FAO , 1991, 16 pp.

DOBSON, H., • comp. *Guide-lines for Pesticide*

Trials on Grasshoppers: Rome:FAO , 1991, 16 pp.

ENTWISTLE, P.F., J.S. CORY, M.J. BAILEY, and S. HIGGS • *Bacillus thuringiensis, an environmental biopesticide: theory and practice*. John Wiley & Sons, 1993.

- Excellent all-round overview of the biology and use of Bt.

FORD, M.G. and SALT, D.W. • "The behaviour of pesticide deposits and their transfer from plant to insect surfaces." In: *Pesticides on Plant Surfaces: Critical Reports on Applied Chemistry*, Wiley & Sons, 18 (1987) 26-81.

FUXA, J.R. and Y. TANADA, • eds. *Epizootiology of insect diseases*. 1987.

GOMEZ, K.A., and A.A. GOMEZ • *Statistical Procedures for Agricultural Research*. John Wiley & Sons with IRRI, 1984, 2nd ed., 680 pp.

GREATHEAD, D.J., KOOYMAN, C. LAUNOIS-LUONG, M.H. and POPOV, G.B. • *Les Ennemies Naturels des Criquets du Sahel*. Collection Acridologie Operationelle No. 8, DGIS-CIRAD-GERDAT-PRIFAS 1994.

HAWKSWORTH, D.L., P.M. KIRK, B.C. SUTTON and D.N. PEGLER • *Ainsworth & Bisby's Dictionary of the Fungi*. CAB International, Wallingford, UK. 616 pp. 1995. ISBN 085198885

- Mycology.

HEINRICHS, E.A., S. CHELLIAH., S.L. VALENCIA, M.B. ARCEO, L.T. FABELLAR, G.B. AQUINO, and S.R. PICKIN • *Manual for testing insecticides on rice.*, Los Banos, Philippines: IRRI, 1981.

HUSSEY, N.W. and N. SCOPES, • eds. *Biological pest control: the glasshouse experience*. Blandford Press, 1985.

- Includes some chapters on the use of pathogens to control glasshouse pests.

JOHNSON A., and C. BOOTH • eds. *IMI, Plant Pathologist's Pocketbook*. Commonwealth Agricultural Bureaux, UK. 439 pp. Second Edition ISBN 0 85198 517 3

LAIRD, M., L.A. LACEY, and E.W. DAVIDSON • *Safety of microbial insecticides*. CRC Press, 1990.

- A very detailed account of safety assessments and safety requirements. Legislation changes rapidly and statements on registration requirements may already need updating.

LOMER, C.J. and PRIOR, C. • eds *Biological control of locusts and grasshoppers*. Proceedings of a workshop held at the International Institute of Tropical Agriculture, Cotonou, Republic of Benin, 29 April-1 May 1991. Wallingford: CAB International, ,

UK. 1992 394 pp.

MATTHEWS, G.A. • Pesticide Application Methods. Harlow, Essex: Longman Scientific and Technical, 1992, 405 pp - 2nd ed.

- All being well, a more comprehensive account by this author: "The Controlled Droplet Application of Pesticides" will be published in 1995-96.

POINAR, G.O., and G.M. THOMAS, • eds. Laboratory guide to insect pathogens and parasites. Plenum Press, second edition, 1984.

- A well illustrated diagnostic guide.

SAMSON, R.A., H.C. EVANS, and J-P. LATGE • Atlas of entomopathogenic fungi. Springer Verlag, 1988.

- An excellently illustrated guide which incorporates the most up-to-date taxonomy.

SAMSON, R.A., J.M. VLAK, and D. PETERS, • eds. Fundamental and applied aspects of invertebrate pathology: proceedings of the fourth international colloquium on invertebrate pathology. Foundation of the Fourth International Colloquium on Invertebrate Pathology, 1986.

- A collection of research and review papers.

STEEDMAN, A. • (ed.) Locust Handbook (2nd ed). London: Natural Resources Institute, 1988, vii+180 pp.

SYMMONS, P. • "Strategies to combat the desert locust." Crop Protection, **11** (1992): 206-211.

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TANADA, Y., and H.K. KAYA • Insect pathology. Academic Press, 1993.

- An authoritative and up-to-date book reference book. It has a strong bias towards the biology of pathogens rather than their use in control. The chapter on microbial control is useful but is not the best part of the book.

U.S. CONGRESS, • Office of Technology Assessment A plague of locusts - special report, Washington DC: U.S. Government Printing Office **OTA-F-450**, 1990, 129 pp.

WILEY, J. • Authoritative reviews of the major pathogen groups in the context of their ecology and epidemiology.

See also the Journal of Invertebrate Pathology (6 issues per year) for the most recent coverage of all aspects of pathogens in invertebrates. It is important to be selective, as many of the papers in this journal discuss fundamental or descriptive aspects of invertebrate pathology and are not necessarily directly relevant to pest control.

Other journals which publish research papers and reviews on the use of pathogens include Biocontrol News and Information, Biocontrol Science and Technology, Biological Control, Annals of Applied Biology, as well as most entomology journals.

ADDRESSES

EQUIPMENT SUPPLIES

BDH, Laboratory Chemicals,**Merck Ltd, Head Office,**

Broom Road Poole, Dorset, BH12
4NN
UK

Tel: +44-(0)1202-745520

Fax +44-(0)1202-738299

Tlx: 41186 & 418123 TETRA G

BDH Merck Ltd.,

Hunter Boulevard, Magna Park,
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UK

(Laboratory equipment and Chemical supplies)

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Sigma Chemical Company

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Tel. +1 314 771 5750

Fax. +1 314 771 5757

**Sigma-Aldrich Quimica, S.A. de
C.V.**

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Fax. +52 5 631 3780

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Four Throws, Hawkhurst, Kent,
UK

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Tlx: 95451

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'C5' and 'C8' sprayers are made by

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D 7032

Sindelfingen 6, Germany

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Fax: +49 7031 301 149

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9RS, UK

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Polyester/Aluminium/LDPE sachets
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American Type Culture Collection,

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**CAB International Mycological
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Ministry of Agriculture, Plant

Protection & Regulatory Services,
Dept of Crop Services, P.O. Box M37,
Accra,
Ghana

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