

# Field Methods for the Study of Environmental Effects of Pesticides

BCPC Monograph No. 40

Proceedings of a Symposium organised by  
The British Crop Protection Council, held at  
Churchill College, Cambridge, UK 28th–30th March, 1988

Edited by M. P. GREAVES, P. W. GREIG-SMITH  
and B. D. SMITH

BCPC Publications  
20 Bridport Road,  
Thornton Heath CR4 7QG



# Contents

	Page
PREFACE	viii
ACKNOWLEDGEMENTS	ix
ORGANISING COMMITTEE	x
CHAIRMEN OF SESSIONS and DISCUSSION WORKSHOP	x
ABBREVIATIONS	xi
<b>1. EFFECTS ON BIRDS</b>	
Avian mortality in agro-ecosystems. I. The case against granular insecticides in Canada P. MINEAU	3
Avian mortality in agro-ecosystems. II. Methods of detection P. MINEAU and B. T. COLLINS	13
Strategies for assessing pesticide hazards to birds A. D. M. HART	29
Esterases as indicators of avian exposure to insecticides H. M. THOMPSON, C. H. WALKER and A. R. HARDY	39
The use of direct observations in assessing pesticide hazards to birds M. R. FLETCHER and P. W. GREIG-SMITH	47
An appraisal of the methods used to assess the effect on birds and mammals of chlorpyrifos applied to grassland R. O. CLEMENTS, J. S. BALE and C. A. JACKSON	57
Discussion	63
<b>2. EFFECTS ON MAMMALS</b>	
Methods for studying populations of wild mammals J. R. FLOWERDEW	67
Field methods for studying non-target hazards of rodenticides P. J. EDWARDS, R. A. BROWN, A. BUCKLE and J. M. COULSON	77
Development of methods to assess the hazards of rodenticides to non-target vertebrates E. G. HARRISON, A. J. PORTER and S. FORBES	89
The potential for radio-tagging in trials of agrochemicals R. E. KENWARD	97
Discussion	105
<b>3. EFFECTS ON INVERTEBRATES (1)</b>	
Effects of scale on the measurement of pesticide effects on invertebrate predators and predation A. J. BURN	109
Effects of pesticide use and farm management on carabids in arable crops C. J. H. BOOIJ and J. NOORLANDER	119
Farm scale evaluation of the long-term effects of different pesticide regimes on the arthropod fauna of winter wheat G. P. VICKERMAN	127

	How does an autumn-applied pyrethroid affect the terrestrial arthropod community? R. A. BROWN, J. S. WHITE and C. J. EVERETT	137
	Appropriate technology for measuring environmental effects of insecticides in the tropics I. F. GRANT	147
	Discussion	155
4.	<b>EFFECTS ON INVERTEBRATES (2)</b>	
	Methods for studying abundance and species diversity of invertebrates in arable soils A. EL TITI	159
	A method to study the effects of chlorpyrifos on predatory ground beetles in grassland R. O. CLEMENTS, E. ASTERAKI and C. A. JACKSON	167
	The use of multivariate ordination techniques to assess the effects of chlorpyrifos on ground beetle and spider communities in grassland S. P. RUSHTON and M. L. LUFF	175
	Criteria for the design, execution and analysis of terrestrial non-target invertebrate field tests N. W. SOTHERTON, P. C. JEPSON and A. J. PULLEN	183
	Ecological characteristics and the susceptibility of non-target invertebrates to long term pesticide side effects P. C. JEPSON	191
	Discussion	199
5.	<b>EFFECTS ON AQUATIC ECOSYSTEMS</b>	
	Recent attempts to measure the behaviour and impact of pesticides in aquatic environments P. MATTHIESSEN	203
	Assessing the effects of herbicides on aquatic flora P. R. F. BARRETT and P. M. WADE	213
	Prochloraz – environmental impact of production effluent on <i>Macoma baltica</i> in the River Mersey L. SOMERVILLE, D. J. ARNOLD, K. L. BARRETT, I. A. GARNER and P. J. SNOWDON	223
	Experimental design of pond studies N. O. CROSSLAND	231
	Testing insecticides for use in rice/fish cultivation R. R. STEPHENSON	237
	Discussion	245
6.	<b>EFFECTS ON PLANTS</b>	
	Plant dispersal M. D. HOOPER	251
	Methods to investigate sub-lethal effects of herbicides on plant species V. G. BREEZE	255
	Assessment of herbicide effects on interactions of weeds, crop plants, pathogens and pests R. HEITEFUSS	265

Problems in the interpretation of effects of herbicides on plant communities R. COUSENS, E. J. P. MARSHALL and G. M. ARNOLD	275
Interpreting the results of terrestrial impact studies with references to modelling an ecologically-significant event R. A. BROWN and C. J. SHARP	283
Discussion	293
<b>7. POSTERS</b>	
Poisoning of woodpigeons on Woodwalton Fen A. S. COOKE	297
Approaches to hazard assessment for small mammals in cereal fields P. W. GREIG-SMITH and G. E. WESTLAKE	303
Histological identification of the effects of pesticides on non-target species K. A. TARRANT	313
Effects of the foliar fungicide pyrazophos on cereal collembola G. K. FRAMPTON	319
Effects of the fungicide pyrazophos on predatory insects in winter barley S. D. WRATTEN, M. MEAD-BRIGGS, G. P. VICKERMAN and P. C. JEPSON	327
The use of polythene barriers to study the long term effects of pesticides on ground beetles (Carabidae: Coleoptera) in small scale field experiments P. KENNEDY	335
<b>8. DISCUSSION WORKSHOP</b>	
(i) Use of whole-farm systems in pesticide impact studies	343
(ii) Methods for interpretation of data from field studies of pesticide impact	357