BRIGHTON CROP PROTECTION CONFERENCE

Pests and Diseases - 1994 Volume 1

Proceedings of an international conference organised by The BRITISH CROP PROTECTION COUNCIL held at the Brighton Centre and the Brighton Metropole Hotel,
Brighton, England

21 - 24 November 1994

BCPC Registered Office: 49 Downing Street Farnham Surrey GU9 7PH, UK.

The British Crop Protection Council Members XXIII The British Crop Protection Council ObjectivesXXIV Programme Committee and Conference Co-ordinating Group......XXV AbbreviationsXXVI **VOLUME 1** Session SESSION 1 Page THE TWENTY-FIRST BAWDEN LECTURE Commitment to long-term agricultural research: a message for science, sponsors and industry **SESSION 2** NEW COMPOUNDS, FORMULATIONS AND USES - INSECTICIDES **Papers** Diofenolan - a new insect growth regulator for the control of scale insects and important lepidopterous pests in deciduous fruit and citrus Water dispersible granule: a novel formulation for nematode-based bioinsecticides R GEORGIS and D B DUNLOP 31 YI-5301, a novel oxazoline acaricide Evaluation of Naturalis-L for control of cotton insects Relative residual activities of azadirachtin, dihydroazadirachtin and tetrahydroazadirachtin NC-196, a new systemic juvenile hormone mimic; its practical performance as a control agent for the brown planthopper, Nilaparvata lugens Extruded starch contact baits for the formulation of grasshopper and locust entomopathogens SZI121 - chemical and biological evaluation of a new acaricide

Page

CONTENTS

PESTICIDE RESIDUES - CONCERN OR COMPLACENCY?	
Papers	
The food safety paradox - perspective vs reality J W WELLS	
Pesticide residue surveillance by the food industry C KNIGHT	
Pesticide residues in food; complacency is premature R J HANCE and A HASSAN	
Tecnazene - a case study of contentment or concern C TURNER, G N CRISP, M GIBBARD and C P SMITH	
SESSION 3B INTEGRATED PEST AND DISEASE MANAGEMENT - THEORY AND PRACTICE	
Papers	
Strategic management in the development of integrated pest and disease management programmes S A COLLINS	
The TALISMAN experiment - observations and implications for integrated pest and disease management of arable crops in the UK	
J E B YOUNG, P BOWERMAN, S K COOK et al	
A first-stage integrated pest management system for kiwifruit D STEVEN, A R TOMKINS, R H BLANK and J G CHARLES 3B-3	
Cooperation - a key factor to improved pest management? G NORTON	
SESSION 3C PLANT HEALTH AND INTERNATIONAL TRADE	
Papers	
Trade and plant quarantine J HEDLEY	
The potential for geographical information systems in analysing the risks posed by exotic pests R H A BAKER	
Plant health in the European Single Market - a UK view of the first year	
20 Q 167	

SESSION 3A

Assessing the potential use of biological control agents in the UK against plant pests of quarantine concern S CHEEK
Plant quarantine treatments: are there alternatives to methyl bromide? O C MACDONALD and K A MILLS
SESSION 3D ADVANCES IN ARABLE CROP PROTECTION
Poster Papers
Forecasting the abundance of orange wheat blossom midge in wheat J N OAKLEY, D I GREEN, A E JONES <i>et al.</i>
Evaluation of the use of baited traps to assess the risk of wireworm damage to potato W E PARKER, T COX and D JAMES
New worldwide expert interviewing system for target
Pest selection R G B PARKER
Control of pea aphid on combining peas and improved management strategies K F A WALTERS, A LANE, J N OAKLEY and M C HEATH
Tefluthrin - a cereal seed treatment for the control of wheat bulb fly, <i>Delia coarctata</i> M J FROST, S G ELSWORTH and A MORAN
Suppression of the spread of potato leafroll virus and potato virus Y by aphicide sprays G N FOSTER, D PALLETT and J A T WOODFORD
Effects of mineral oil applications on aphid behaviour and transmission of potato virus Y G POWELL and J HARDIE
A semi-field method to assess the efficacy of insecticides for the control of the lentil seed beetle <i>Bruchus lentis</i>
M DE LOS MOZOS PASCUAL and M ROLDÁN CLEMENTE 3D-8 235
Population dynamics of the potato tuber moth, <i>Phthorimea</i> operculella, in Yemen and its effects on yield J KROSCHEL
Effects of seed coating formulation no. 17 on the histopathology and ultrastructure of <i>Puccinia striiformis</i> in wheat
IVII OV SHEN VI IIII et al 3D-10

Histological studies on the fungicidal activity of the strobilurin BAS 490 F R E GOLD and G M E LEINHOS
ICIA5504: effects on development of cereal pathogens J R GODWIN, J E YOUNG and C A HART
Forecasting light leaf spot (<i>Pyrenopeziza brassicae</i>) on winter oilseed rape B D L FITT, P GLADDERS, L FIGUEROA and G MURRAY 3D-13
Occurrence, development and control by fungicides of Septoria nodorum, S. tritici and Pseudocercosporella herpotrichoides on wheat in Poland in 1993 C M SMITH, C JANCZAK, M KORBAS et al
Application of diagnostics as a forecasting tool in British agriculture J A SMITH, A J LEADBEATER, T M SCOTT and G M BOOTH 3D-15 277
Use of fungicide-manipulated epidemics to determine critical periods for disease control and yield response in winter barley M J HIMS and P GLADDERS
Local weather data from a wireless computerised weather station and its potential for use in crop disease management M B HØSTGAARD
Fluazinam - control of potato late blight - UK experience 1992-3 R P TUCKER, D J LEAPER and S T LAIDLER
Development of an integrated control strategy for powdery scab of potatoes P J BURGESS and S J WALE
Control of fungal storage diseases of potato by use of plant-essential oil components L G M GORRIS, J OOSTERHAVEN, K J HARTMANS <i>et al</i>
Air-assisted spraying in winter wheat - results of deposition measurements and the biological effect of fungicides against leaf and ear diseases J C VAN DE ZANDE, R MEIER and M T VAN IJZENDOORN 3D-21
Effectiveness of a novel propiconazole/fenbuconazole mixture for the control of <i>Septoria</i> spp. and <i>Puccinia</i> spp. in wheat A G DU RIEU, R J BURKE and A MURRAY
Control of seed, soil-borne and foliar fungal diseases by triticonazole seed and foliar applications J MUGNIER, M CHAZALET, J M GAULLIARD et al
CGA 219417 - disease control in cereals in western Europe A.J.LEADREATER J. SPEICH G. KNAUE-BEITER et al. 3D-24 333

SESSION 4A PEST AND DISEASE MANAGEMENT IN POTATOES

Papers	
Prospects for controlling nematode pests of potato, particularly potato cyst-nematodes A G WHITEHEAD	4A-1 34
The use of aphid suction-trap data in forecasting the incidence of potato leafroll virus in Scottish seed potatoes J PICKUP and A M BREWER	4A-2 35
Fungus diseases of potato tubers and strategies for their control G A HIDE	4A-3 35
Managing late blight of potatoes in the 1990s S J HOLMES, R FAIRCLOUGH and R A BAIN	4A-4 36
SESSION 4B MODERN APPROACHES TO TOXICITY TESTING	
Papers	
The use of experimental animals: what are the ethical issues? I F H PURCHASE	4B-1 37
A pragmatic approach to the introduction of <i>in vitro</i> techniques into the safety assessment of pesticides P A BOTHAM	4B-2 38
The relevance of metabolism in the safety assessment of agrochemicals DR HAWKINS	4B-3 39
How are regulatory agencies able to use these modern approaches to toxicity testing? M WATSON	4B-4 39
SESSION 4C PEST AND DISEASE RESISTANCE TO AGROCHEMICALS	
Poster Papers	
Effect of triazamate on resistant Myzus persicae on sugar beet under field cages A M DEWAR, L A HAYLOCK, J CHAPMAN et al	4C-1 40
Insecticide resistance due to insensitive acetylcholinesterase in <i>Myzus persicae</i> and <i>Myzus nicotianae</i> G D MOORES, G J DEVINE and A L DEVONSHIRE	4C-2 41
Challenges in producing resistance management strategies for Myzus persicae P.J. WEGE	4C-3 41

Insecticide Resistance Action Committee (IRAC) fruit crops spider mite resistance management guidelines 1994 P J WEGE and P K LEONARD	4C-4	427
Insecticide resistance in <i>Bemisia tabaci</i> from Pakistan M CAHILL, D JOHNSTON, K GORMAN and I DENHOLM	4C-5	431
Insecticide resistance in <i>Helicoverpa armigera</i> in India: recent developments N J ARMES, S K BANERJEE, K R DESOUZA et al	4C-6	437
Interaction of chlordimeform with malathion in resistant and susceptible <i>Tribolium castaneum</i> R M WILKINS and C RAJENDRAN	4C-7	443
The development of a same-day test for detecting resistance to phosphine and its application to fumigation strategies N SAVVIDOU, K A MILLS, C H BELL and I A PACHECO	4C-8	449
The potential for induced extrinsic host plant resistance in IRM strategies targeting the diamondback moth R H J VERKERK and D J WRIGHT	4C-9	457
Resistance of light leaf spot (<i>Pyrenopeziza brassicae</i>) of winter oilseed rape to MBC fungicides K G SUTHERLAND, V GRIFFIN-WALKER, S J P OXLEY	C-10	463
Fungicide resistance can spread in <i>Rhynchosporium secalis</i> populations by asexual recombination LIU BO, S J KENDALL and D W HOLLOMON	C-11	469
Shifts in morpholine sensitivity of the wheat powdery mildew pathogen (Erysiphe graminis f. sp. tritici) and their influence on disease control	G 10	
F G FELSENSTEIN, C STEDEN and J SPEICH		
Cross-resistance among DMI-fungicides and sensitivity distributions of Septoria tritici populations D HERMANN and U GISI	.C-14	487
Multiple fungicide resistance in <i>Botrytis cinerea</i> from commercial greenhouses in south-eastern Spain R RAPOSO J DELCAN P MELGAREJO and V GOMEZ		493

VOLUME 2

SESSION 5A NEW COMPOUNDS, FORMULATIONS AND USES - FUNGICIDES **Papers** CGA 219417 - a novel broad-spectrum fungicide U J HEYE, J SPEICH, H SIEGLE et al 5A-1 5A-1 ICIA5504: a novel broad-spectrum fungicide for use on fruit, nut and horticultural crops S P HEANEY and S C KNIGHT 509 KTU 3616: a novel fungicide for rice blast control T HATTORI, K KURAHASHI, S KAGABU et al 5A-3 517 Activity of pyrimethanil on Venturia inaequalis A DANIELS, R J BIRCHMORE and E H WINTER 5A-4 525 A family of new, non-ETU generating dithiocarbamate microbiocides G MATOLCSY, G OROS, T KÓMÍVES and V ANDRISKA 5A-5 533 MTF 651: A new soil-applied fungicide for the control of plasmodial fungi G R DIXON, M A CRAIG, P J BURGESS and J THOMAS...... 5A-6 541 Towards the rational use of triazole mixtures for cereal disease control S J KENDALL, D W HOLLOMON and D A STORMONTH...... 5A-7 549 SESSION 5B THE BIOLOGY AND CONTROL OF MITES **Papers** Control of the fruit tree red spider mite (Panonychus ulmi) and the apple rust mite (Aculus schlechtendali) in apple orchards G STERK...... 5B-1 559 The development of control strategies for Varroa jacobsoni in colonies of Apis mellifera B V BALL 5B-2 569 The blackcurrant gall mite (Cecidophyopsis ribis): its biology and strategies for control S C GORDON, R M BRENNAN, A T JONES et al...... 5B-3 577 A novel technique for culturing the bulb scale mite (Steneotarsonemus laticeps) and its implications for studies on biology and control S M T LYNCH and A BEDI 583

SESSION 6A RECENT DEVELOPMENTS IN THE USE OF BIOLOGICAL CONTROL AGENTS AGAINST PESTS
Papers
Biological control of pests: current trends and future prospects W J RAVENSBERG
Control of <i>Otiorhynchus sulcatus</i> in soft fruit using drench treatments of <i>Steinernema carpocapsae</i> A C SAMPSON
Controlling brown locust hopper bands in South Africa with a myco-insecticide spray R P BATEMAN, R E PRICE, E J MÜLLER and H D BROWN 6A-3
Discovery and investigation of a novel nematode parasite for biological control of slugs D M GLEN, M J WILSON, J D PEARCE and P B RODGERS
SESSION 6B FATE AND EFFECTS OF PESTICIDES - ASSESSING ENVIRONMENTAL IMPACT AND MANAGING RISK
Papers
Aquatic ecological risk assessment in the USA R A BROWN and J L SHAW
GIS, remote sensing and the new EPA Paradigm C G CRABTREE, R S PEARSON and S A KAY
Assessing the environmental impact of pesticides - a sequential modelling technique to interpret and extrapolate laboratory and field data C D BROWN and J M HOLLIS
Arthropod populations under current and reduced-input pesticide regimes: results from the first four treatment years of the MAFF 'SCARAB' project T ÇILGI and G K FRAMPTON
Pesticide regulatory testing procedures with beneficial arthropods: recommendations arising from the SETAC-ESCORT workshop K L BARRETT, N GRANDY, S HASSAN and P OOMEN
SESSION 6C RATIONALISING FUNGICIDE USE ON CEREALS
Papers
The development of an integrated decision model based on disease threshold to control <i>Septoria tritici</i> on winter wheat U A SCHÖFL D B MORRIS and J A VERREET

Decision support to rationalise wheat fungicide use N D PAVELEY, D J ROYLE, R J COOK et al	. 6C-2	679
Strategies for optimal fungicide use in less intensive cereal growing systems V W L JORDAN and J A HUTCHEON	. 6C-3	687
Reduced fungicide doses for cereals - a practical perspective on their use S J WALE		
Duration of effect of EBI fungicides when using reduced rates in cereals L N JØRGENSEN	. 6C-5	703
SESSION 6D ADVANCES IN HORTICULTURAL CROP PROTECTION		
Poster Papers		
Determination of pea aphid thresholds in vining peas A J BIDDLE, J A BLOOD SMYTH and G TALBOT	. 6D-1	713
Control of cabbage aphid: prolonged efficacy and reduced operator exposure with deep side-placements of disulfoton A A JUKES, D L SUETT and S SIME	. 6D-2	719
Progress towards integrated plant protection in strawberry production in the UK J V CROSS, A M BERRIE, M RYAN and A GREENFIELD	. 6D-3	725
Chemical control of the South American leaf miner, <i>Liriomyza</i> huidobrensis J H BUXTON and O C MACDONALD	. 6D-4	731
Pymetrozine (CGA 215'944) - a novel compound for aphid and whitefly control. An overview of its mode of action H KAYSER, L KAUFMANN, F SCHÜRMANN and P HARREWIJN		
Use of diafenthiuron against diamondback moth (Plutella xylostella) and other lepidopterous pests in cruciferous crops H P STREIBERT and D KAEDING	. 6D-6	743
Additive effects of soil-applied insecticides and partial host-plant resistance against carrot fly (Psila rosae) on carrots A R THOMPSON, K PHELPS and P R ELLIS	. 6D-7	749
Organosilicone surfactants: tools for horticultural crop protection P J G STEVENS, J T S WALKER, P W SHAW	. 6D-8	755

Crop covering to prevent pest damage to field vegetables, and the feasibility of pesticides application through polyethylene nets A ESTER, J C VAN DE ZANDE and A J P FROST	31
Pesticide application to plant propagating material P C H MILLER and O C MACDONALD	37
Control of sciarid fly (Lycoriella auripila) with the entomopathogenic nematode Steinernema feltiae, in commercial mushroom crops J A SMITH, A J LEADBETTER, C WILLEY and S COLLINS 6D-11	73
The effect of fungicide sprays on the incidence of apple canker (Nectria galligena) in CV. Bramley's seedling L R COOKE and B S WATTERS	79
Evaluation of fungicides for control of ring spot (Mycosphaerella dianthi) on hybrid pinks T M O'NEILL and K D LOCKLEY	35
Chemical control of rust on mint R A HAGAN and D R WALTERS) 1
The possible control of <i>Botrytis cinerea</i> Pers. using paraffinic oils V A BOURBOS, M T SKOUDRIDAKIS, V C HAITIS and K S FOTIADIS	97
Protection of flower bulbs using antifungal plant metabolites E J SMID and L G M GORRIS)1
Integrated control of root diseases on ornamental ericaceous plants A M LITTERICK and S J HOLMES)7
Biological control of Fusarium wilt of basil (Ocimum basilicum L.) G MINUTO, A GARIBALDI and M L GULLINO	11
Integrated control of downy mildew in crisp lettuce J M LI DAVIES	17
SESSION 7A PROBLEMS OF PESTICIDE AVAILABILITY FOR MINOR CROPS	
Papers	
UK experiences with the co-ordination of minor use registration C J C WISE	25
Minor uses in plant protection - settlement proposals for problems in the Federal Republic of Germany W PALLUTT	33
Authorizations for minor use in the Netherlands - problems and progress L A M KUIJPERS and H DE HEER	39

The challenge of maintaining pesticides for minor crops: a US perspective		
R M HOLLINGWORTH and S MIYAZAKI	7A-4	845
SESSION 7B BENEFITS AND IMPLICATIONS OF PESTICIDE USE ON AMI GRASSLAND	ENITY	
Papers		
Fungicide usage on golf course turf: the implications in a growing world market N JACKSON	7B-1	857
Disease problems of amenity grass in France and southern Europe M G E J VAN MAANAN	7B-2	865
ICIA5504: a novel, broad spectrum, systemic turfgrass fungicide J A FRANK and P L SANDERS	7B-3	871
Reduced-rate, three component fungicide mixtures for control of $Sclerotinia$ dollar spot on $Agrostis\ palustris\ turf$ P L SANDERS and M D SOIKA	7B-4	877
Current practices and future opportunities for dissease and pest control of amenity turf in the UK M J DRINKALL, R BALOCH-HAQ and J PERKINS	7B-5	883
SESSION 7C MANAGEMENT OF MITES, PLANT PARASITIC NEMATODES PATHOGENIC VIRUSES	S AND	
Poster Papers		
Novel methods for rearing and testing European red mite (Panonychus ulmi) with acaricides in the laboratory J C WHITE, E A COOK, A W FARNHAM et al	7C-1	893
Managing potato cyst nematode (Globodera pallida) in intensive potato cropping systems M HANCOCK	7C-2	899
A strategy for maintaining effective host-plant resistance to potato cyst nematodes S J TURNER, C C FLEMING, R J MARKS and P J WATTS	7C-3	905
Bemisia tabaci- potential infestation, phytotoxicity and virus transmission within European agriculture I D BEDFORD, M PINNER, S LIU and P G MARKHAM	7C-4	911
Detection of viruses and insecticide resistance in sugar beet aphids caught in suction traps M STEVENS, H G SMITH, P B HALLSWORTH et al	7C-5	917

Pymetrozine, a novel agent for reducing virus transmission by <i>Myzus persicae</i> P HARREWIJN and P G M PIRON
SESSION 7D POSTGRADUATE STUDENT POSTERS
Poster Papers
Effect of mode of entry on the susceptibility of Egyptian cotton leafworm to imidacloprid A W SCARR, L D LEAKE, R GREENWOOD <i>et al</i>
Control of leatherjackets by natural enemies: the potential role of the ground beetle <i>Pterostichus melanarius</i> P A CHAPMAN
Biocontrol of Sclerotinia sclerotiorum by manipulation of petal microflora
J D HUTCHINS and S A ARCHER 7D-3
Development of immunolabelling tools to study interactions between micro-organisms in the biocontrol of seed-borne diseases of linseed G MUKHERJEE and P C MERCER
Potency and ultrastructural effects of tebufenozide on Spodoptera exigua G SMAGGHE, D DEGHEELE, E VIÑUELA and F BUDIA
The effects of beet western yellows virus on the growth and yield of winter oilseed rape C N JAY and H G SMITH
The biodiversity of Coleoptera overwintering in arable field boundaries R C W BEARD and J R MAUREMOOTOO
Factors affecting the control of <i>Otiorhynchus sulcatus</i> with entomopathogenic nematodes, in strawberries grown on raised beds T KAKOULI, A SCHIROCKI and N G M HAGUE
An analytical approach towards the design of pesticide regulation E GREEN
Overwintering and early disease development of Rhododendron powdery mildew P A BEALES and A M HALL
Spatial and temporal changes in aphid/parasitoid distributions following an insecticide application to winter wheat M LONGLEY and J I IZQUIERDO

VOLUME 3

SESSION 8A

SUSTAINING THE EFFECTIVENESS OF PESTICIDES AND HOST PLANT RESISTANCE
Papers
Sustaining the efficacy of dicofol against citrus rust mite, Phyllocoptruta oleivora: a case-history of industrial and academic collaboration T J DENNEHY and C OMOTO
Phylloxera (Daktulosphaira vitifoliae) adaptation to some rootstocks of the grapevine D BOUBALS
Can plant resistance genes be used to engineer broad-spectrum disease control? J JONES
Resistance management - making it happen P K LEONARD and R M PERRIN
SESSION 8B ADVANCES IN PESTICIDE TECHNOLOGY
Papers
Novel formulations for locust and grasshopper control C BATES
New formulation technology applied to diazinon S UK, A SUTTON, H HASSLIN, F BOURGEOIS and L SCHWAGER
LinkPak - a refillable packaging system for crop protection products T H ROBINSON and J P COWLAND
Intermediate bulk containers for agrochemicals: experiences and lessons from pilot studies in Europe J M OGILVY and K L TYLER
The use of the North American (PHED) and United Kingdom (POEM) worker exposure models in pesticide registration C LUNCHICK, P HAMEY and S IYENGAR
SESSION 8C ADVANCES IN THE CONTROL OF PUBLIC HEALTH PESTS
Papers
Development of the first cat flea biological control product employing the entomopathogenic nematode Steinernema carpocapsae S A MANWEILER

Effect of the chitin synthesis inhibitor lufenuron on the German cockroach, Blattella germanica (L.) R SCHENKER and E W MOYSES
The effectiveness of prallethrin against public health pests Y ABE, S SENBO, Y TAKADA et al
A new approach for the control of insects in industrial premises J M GROOME, R MARTIN and D LESIEWICZ
Enhancing rodenticide performance by understanding rodent behaviour D C COWAN, D S BULL, I R INGLIS et al
SESSION 8D BIOLOGICAL CONTROL AND INTEGRATED CROP MANAGEMENT
Poster Papers
Developments in the market for biopesticides S G LISANSKY and J COOMBS
Effects of different bacterial isolates on growth and pathogenicity of the slug-parasitic nematode Phasmarhabditis hermaphrodita M J WILSON, D M GLEN, J D PEARCE and P B RODGERS
A comparison of baits containing different isolates of entomopathogenic nematodes for the control of the housefly (Musca domestica) in large-scale laboratory enclosures N RENN
Biological control of sciarid flies and shore flies in glasshouses R LINDQUIST, J BUXTON and J PIATKOWSKI
Control of sciarids in glass and propagation houses, with Steinernema feltiae
D H GOUGE and N G M HAGUE
Nematode control of leafminers: efficacy, temperature and timing E C WILLIAMS and K F A WALTERS
The effects of temperature and ultra-violet irradiation on conidia of <i>Metarhizium flavoviride</i> D MOORE and J MORLEY- DAVIES
Improved biological control by changing polyols/trehalose in conidia of entomopathogens J E HALLSWORTH and N MAGAN
The potential of oil-based suspensions of <i>Metarhizium</i> anisopliae conidia for the control of the housefly (<i>Musca domestica</i>), a pest of intensive animal units
A F BYWATER G BARSON and N RENN 8D-9 1097

Beauveria bassiana (ATCC 74040): control of insects in field crops and ornamentals T A KNAUF and J E WRIGHT	8D-10 1103	3
Trichoderma harzianum T39 integrated with fungicides: improved biocontrol of grey mould Y ELAD, D SHTIENBERG and A NIV	8D-11 1109	9
Use of antagonistic fungi to control <i>Armillaria</i> root rot R T V FOX, A M McQUE, J S WEST and F RAZIQ	8D-12 1118	5
Biocontrol of willow rusts with the hyperparasite $Sphaerellopsis\ filum$ R A C MORRIS, D J ROYLE, M J WHELAN and G M ARNOLD	8D-13 112	1
Lytic enzymes in the biological control of Fusarium wilt of tomato A DE CAL, S PASCUAL and P MELGAREJO	8D-14 112'	7
Control of the pine processionary moth (Thaumetopoea pityocampa) by Bacillus thuringiensis-based commercial products A LOPATEGI, J SALAZAR, M EIZAGIRRE and M de RENOBALES	8D-15 113	3
Eulophus pennicornis: a potential biocontrol agent against the tomato moth G C MARRIS and J P EDWARDS	8D-16 113	9
Wasp-induced infections in a parasitoid-host association G C MARRIS, J NAYLOR, N PARKINSON and J P EDWARDS	8D-17 114	5
The effects of polyphagous predators on spiders and mites in cereal fields K D SUNDERLAND, S J ELLIS, A WEISS et al	8D-18 115	1
The aphid sex pheromone: a novel host location cue for the parasitoid <i>Praon volucre</i> R LILLEY, J HARDIE, W POWELL and L J WADHAMS	8D-19 115	7
A study of the effectiveness of crop covering within IPM, using an Amoco non-woven fleece as a barrier to aphids, whiteflies and their associated plant viruses I D BEDFORD, P G MARKHAM and P A STRAUSS	8D-20 116	3
The role of crop husbandry practices in wheat production for disease control L BASTIAANS and R A DAAMEN	8D-21 116	9
Undersowing brassicas with clover to increase the activity of carabid beetles G ARMSTRONG and R G McKINLAY	. 8D-22 117	5
The influence of food plants on food utilisation and midgut microsomal oxidases in larvae of the cotton leafworm Spodoptera littoralis (Lepidoptera: Noctuidae)		
P FISCIAN and R M WILKINS	8D-23 118	1

Use of pymetrozine in IPM vegetable programs R SENN, B SECHSER and C R FLÜCKIGER	1187
Selectivity of diofenolan (CGA 59 205) and its potential for integrated scale control	1109
B SECHSER, B REBER and H WESIAK 8D-25	. 1195
Development of insecticides for integrated pest management of kiwifruit in New Zealand A R TOMKINS	1999
IPM for cacao production R N WILLIAMS and R H FULTON	. 1205
SESSION 9A DEVELOPMENTS IN PHEROMONES AND OTHER SEMIOCHEMICALS	
Papers	
The current and future prospects for semiochemicals in integrated management of insect pests O T JONES	1919
	. 1213
The interaction of sex pheromone and plant volatiles for field attraction of male bird-cherry aphid, <i>Rhopalosiphum padi</i> J HARDIE, J R STORER, S F NOTTINGHAM <i>et al</i>	. 1223
The use of pheromones for mating disruption of cotton bollworms and rice stemborer in developing countries D R HALL, D J CHAMBERLAIN, A CORK et al	. 1231
Attempts to control aphid pests by integrated use of semiochemicals	1000
J A PICKETT, L J WADHAMS and C M WOODCOCK 9A-4	. 1239
SESSION 9B BIOLOGICAL CONTROL OF PLANT PATHOGENS: PRE- AND POST-HARVEST	
Papers	
Prospects for biological control of foliar pathogens N J FOKKEMA, M GERLAGH, J KÖHL <i>et al</i>	. 1249
Advances in biological control in protected crops J M WHIPPS	. 1259
Successful biocontrol of postharvest pathogens of fruits and vegetables S DROBY and E CHALUTZ	. 1265
Development of production, formulation and delivery systems	
R HOFSTFIN and R FRIDI FNDFR 9R.4	1273

SESSION 9C

THE ASSESSMENT AND INTERPRETATION OF THE FATE AND EFFECTS OF PESTICIDES IN THE ENVIRONMENT

Poster Papers

A comparison of the use and regulatory interpretation of a predictive model, lysimeter and field studies to determine the leaching potential of a seed dressing P FOGG, A D CARTER and C D BROWN
The effects on earthworm populations of reducing pesticide use: part of the SCARAB project K A TARRANT, S A FIELD, A JONES <i>et al</i>
Monitoring and modelling pesticide occurrences in a rural source of drinking water M FIELDING, D B OAKES, C CABLE et al
A microcosm system for evaluating the effects of pesticides on dynamic soil processes and soil organisms C A EDWARDS, S SUBLER and S-K CHEN
The QuantaCount: quantum yields and modelling direct aqueous photolysis F MOFFAT and A WADLEY
Biological effects of the pesticide SAN 527 I 240 EW in freshwater ponds M CRANE, P WHITEHOUSE, B LEFEBRVRE et al
Impact on non-target aquatic ecosystems by pesticides W KÖRDEL, H KLÖPPEL, I RÖNNEFAHRT and M KLEIN 9C-7 1319
Leaching patterns of pesticides as related to sorption and porosity properties of soils L COX, R CELIS, M C HERMOSIN and J CORNEJO
Relationships between sediment handling techniques an emergence success for the midge <i>Chironomus riparius</i> K M THIRKETTLE and K L BARRETT
"Physicochemical evaluation: the environment", an expert system for pesticde preregistration assessment P H NICHOLLS
Dissipation of chlorpyrifos and 3,5,6-trichloropyridin-2-ol in German soils A KHOSHAB and A NICHOLSON
The use of a compartment model for evaluating the fate of pesticides in sediment/water systems R R CARLTON and R ALLEN

Aquatic microcosms as a tool for assessing fate and effects of pesticides I RÖNNEFAHRT, A FLEIDNER, A REMDE et al	C-13	1355
The effect of a polymeric adjuvant on the off-target movement of a pesticide spray JRM THACKER, RDF YOUNG, IALLEN and DJ CURTIS	C-14	1361
Effects of chlorpyrifos on aquatic microcosms over a range of off-target spray drift exposure levels R C BIEVER, J M GIDDINGS, M KIAMOS et al	C-15	1367
Field methods to assess the effects of pesticides on beneficial arthropods J N REBOULET	C-16	1373
A field and experimental study of the composition of surface crusts and lysimeter leachates as a means of assessing pesticide transport by suspended and colloidal matter in by-pass flow F WORRALL, A PARKER, J E RAE and A C JOHNSON	C-17	1379
SESSION 10 INTERNATIONAL HARMONISATION IN PESTICIDE REGISTRA LEGISLATION	ATION AN	ND
Papers		
Should we reduce the politics of registration: by harmonisation or by better science A M HOUGHTON	10-1	1389
International harmonisation in biopesticide registration and legislation S G LISANSKY	10-2	1397
Agrochemical registration in Japan H HOSODA, T SASAKI and T MIYAKAWA	10-3	1403
International harmonisation of pesticide control procedures - the OECD pesticides programme N J GRANDY and J RICHARDS	10-4	1409