The Conference was organised by the British Crop Protection Council.
The Proceedings may be obtained from Mr. A. W. Billitt, Clacks Farm,
Boreley, Ombersley, Droitwich, Worcester.
CONTENTS

TUESDAY 18th NOVEMBER 1969

VOLUME I

Session 1

PESTS AND DISEASES OF CEREALS (ABOVE GROUND)

Opening address
SIR FREDERICK BAWDEN, President of the British Crop Protection Council (Vol. 3)

Foliar diseases and performance in cereal production
F. R. HORNE .................................................. (Vol. 3)

Observations on the effects of some systemic chemicals applied to cereals in trials at the N.I.A.B.
J. K. DOUDSON and P. J. W. SAUNDERS ........................................ 1

Pathological and physiological aspects of cereal mildew control using ethirimol
M. S. WOLFE .................................................. 8

Effect of Benomyl on some diseases of Spring barley
E. EVANS .......................................................... (Vol. 3)

Response of barley varieties to control of powdery mildew with cyclomorph and tridamorph
J. KRADEL, E. H. POMMER and H. EFFLAND ........................................... 16

Spray timing and the control of mildew in Spring barley
W. R. ROSSER .................................................. 20

Winter barley as a source of mildew for Spring barley crops
D. J. YARHAM and D. PYE .................................................. 25

The appearance of leaf stripe (Cephalosporium gramineum) in cereals grown under conditions of minimum cultivation
M. J. HOWELL .................................................. 34

Session 2

PESTS AND DISEASES OF CEREALS (BELOW GROUND)

Seed and soil-borne pathogens of cereals
PROFESSOR J. COLHOUN .................................................. (Vol. 3)

Effects of soil fumigation on cereal foot and root pathogens
G. A. SALT .................................................. 39

Treatment of cereal seed by the combination of carboxin with copper oxyquinolate
G. RICHARD and J. P. VALLIER .................................................. 45

Laboratory and field trials in the United Kingdom with the systemic fungicide carboxin
R. C. F. MACER, I. K. COOK and C. R. DASH ........................................... 55

Quantitative estimation of soil-borne inoculum of the take-all fungus (Phialophora graminis (Sacc.) Sacc.)
D. HORNBY .................................................. 65

vii
Studies on the inter-relationships of Ophiobolus graminis and Heterodera avenae in barley
R. COOK .......................................................... (Vol. 3)

Chemical control of leatherjackets (larvae of Tipula spp) in Spring cereals with special reference to alternatives to persistent organochlorine insecticides
J. M. RAYNER ......................................................... 71

Effect of combined seed treatments of chlormequat and organo-mercury on foot rot and Winter growth of oats
C. J. RAWLINSON .................................................. 78

Session 3A
MONITORING RESISTANCE TO INSECTICIDES AND ACARICIDES

Some problems connected with monitoring for resistance
R. M. SAWICKI .................................................. (Vol. 3)

Monitoring for insecticide resistance in root flies
K. G. GOSTICK and T. H. COAKER .................................. 89

Differences in susceptibility of different strains of chrysanthemum leaf miner (Phytomyza syngenesiae), to BHC and diazinon
N. W. HUSSEY .......................................................... 93

Methods for monitoring resistance in aphids
F. L. BARANYOVITS and R. C. MUIR ................................. 98

Monitoring for resistance of fruit tree red spider mite (Panonychus ulmi) to acaricides
J. E. CRANHAM ...................................................... 104

Session 3B
DISEASES OF SOFT FRUIT AND THEIR CONTROL

The economic importance of fungal diseases of soft fruit
M. A. B. DEAKIN .................................................. (Vol. 3)

Experiences with fourteen organic fungicides for the control of blackcurrant leaf spot
F. O'RIOHDAIN .......................................................... 111

Fungicidal control of American gooseberry mildew on blackcurrants
P. WIGGELL, CAROL J. SIMPSON and J. INGRAM .................. 115

The control of American gooseberry mildew on blackcurrants
V. W. L. JORDAN ...................................................... 127

Field trials with benomyl on soft fruit in 1969
R. G. TAPLEY, R. WOODROFFE and P. S. ATKINS .................. 130

A comparison of fungicides for the control of Botrytis of outdoor and protected strawberries
T. KAVANAGH and T. F. O'CALLAGHAN ............................. 139
### Session 3C

#### Control of Nematodes

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical aspects of nematode control</td>
<td></td>
</tr>
<tr>
<td>F. G. W. JONES</td>
<td></td>
</tr>
<tr>
<td>Breeding potatoes resistant to cyst-nematode</td>
<td>159</td>
</tr>
<tr>
<td>H. W. HOWARD</td>
<td></td>
</tr>
<tr>
<td>Cereal varieties resistant to <em>Heterodera avenae</em> and <em>Ditylenchus dipsaci</em></td>
<td>164</td>
</tr>
<tr>
<td>J. COTTEN</td>
<td></td>
</tr>
<tr>
<td>Chemical control of the cereal cyst-nematode – can it be economic?</td>
<td>169</td>
</tr>
<tr>
<td>T. D. WILLIAMS</td>
<td></td>
</tr>
<tr>
<td>Chemical control of <em>Longidorus</em> and <em>Xiphinema</em></td>
<td>177</td>
</tr>
<tr>
<td>C. E. TAYLOR</td>
<td></td>
</tr>
<tr>
<td>The control of nematodes in mushroom compost</td>
<td>185</td>
</tr>
<tr>
<td>J. J. HESLING and R. J. KEMPTON</td>
<td></td>
</tr>
</tbody>
</table>

### Session 4A

#### Applications by Ultra Low Volume Techniques

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The principles of, and new developments in, ultra low volume spraying</td>
<td>189</td>
</tr>
<tr>
<td>E. J. BALS</td>
<td></td>
</tr>
<tr>
<td>The ULV ground application of dilute oil based formulations</td>
<td>194</td>
</tr>
<tr>
<td>E. D. HEATH</td>
<td></td>
</tr>
<tr>
<td>Ultra-low volume spray application to fruit crops</td>
<td>201</td>
</tr>
<tr>
<td>H. R. MAPOTHER and N. G. MORGAN</td>
<td></td>
</tr>
<tr>
<td>The effects of meteorological conditions on the spray distribution of</td>
<td>204</td>
</tr>
<tr>
<td>a coarse aerosol</td>
<td></td>
</tr>
<tr>
<td>H. H. COUTTS</td>
<td></td>
</tr>
<tr>
<td>Control of some pests of citrus, date palm, wheat and cotton with ULV</td>
<td>213</td>
</tr>
<tr>
<td>sprays</td>
<td></td>
</tr>
<tr>
<td>C. D. LINDLEY</td>
<td></td>
</tr>
<tr>
<td>Recent developments in ULV spraying</td>
<td>221</td>
</tr>
<tr>
<td>R. J. V. JOYCE</td>
<td></td>
</tr>
<tr>
<td>Preliminary observations on safety in ULV spraying</td>
<td>225</td>
</tr>
<tr>
<td>P. FULLER LEWIS</td>
<td></td>
</tr>
</tbody>
</table>
**Session 4B**

**PEST CONTROL IN VEGETABLES**

Insecticide usage on vegetable crops

J. M. A. SLY .......................................................... (Vol. 3)

Developments in vegetable production and marketing; their influence on insecticide requirements and usage

R. F. CLEMENTS ...................................................... (Vol. 3)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabbage root fly damage to cauliflowers and brussels sprouts in the West Midlands</td>
<td>234</td>
</tr>
<tr>
<td>Co-ordinated insecticide evaluation for cabbage root fly control</td>
<td>238</td>
</tr>
<tr>
<td>Formulations and control of cabbage root fly</td>
<td>244</td>
</tr>
<tr>
<td>The problem of carrot fly control on carrots</td>
<td>248</td>
</tr>
<tr>
<td>Effects of times and methods of application on the performance of insecticides against carrot fly and carrot-willow aphid</td>
<td>255</td>
</tr>
</tbody>
</table>

**Session 4C**

**CONTROL OF NEMATODES (contd.)**

A practical method for economic control of potato cyst nematodes

H. M. NOLLEN and A. MULDER ................................... (Vol. 3)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The effect of soil fumigation and nitrogen on docking disorder of sugar beet</td>
<td>260</td>
</tr>
<tr>
<td>Trials on the control of docking disorder in sugar beet; seed and row treatments with nematicides</td>
<td>265</td>
</tr>
<tr>
<td>Control of stem nematode (<em>Ditylenchus dipsaci</em>) in flower bulbs with hot water or thionazin</td>
<td>274</td>
</tr>
<tr>
<td>The effect of thionazin on <em>Ditylenchus dipsaci</em></td>
<td>284</td>
</tr>
<tr>
<td>Soil fumigation with small doses of dazomet in field vegetable crops</td>
<td>290</td>
</tr>
<tr>
<td>Investigations into the activity of aldicarb for the control of some nematode pests of sugar beet, potatoes and roses</td>
<td>293</td>
</tr>
</tbody>
</table>
### Session 5

**SYSTEMIC PESTICIDES, PARTICULARLY FUNGICIDES**

- Systemic fungicides, including recent developments in the agricultural sphere
  - R. J. W. BYRDE

- Control of potato tuber diseases with systemic fungicides
  - G. A. HIDE, J. M. HIRST and R. L. GRIFFITH

- Benomyl applied to soil for the control of some pathogens of tomato and cucumber
  - MARION H. EBBEN and F. T. LAST

- Fate of carboxin in soil, plants and animals
  - W. T. CHIN, G. M. STONE, A. E. SMITH and B. VON SCHMELING

- Seed treatment with carboxin for the control of loose smut of wheat and barley
  - R. B. MAUDE and CATRIONA G. SHURING

- Pyrimidine fungicides
  - M. J. GEOGHEGAN

- Thiabendazole, a new systemic fungicide
  - K. E. WEINKE, J. J. LAUBER, B. W. GREENWALD and F. A. PREISER

- Some results concerning the systemic action of tridemorph
  - E. H. POMMER, S. OTTO and J. KRADEL

---

### Session 6

**CURRENT TRENDS IN TOXICOLOGICAL AND RESIDUE REQUIREMENTS FOR THE REGISTRATION OF PESTICIDES**

- Current trends in toxicological requirements
  - R. GOULDING

- Current trends in residues requirements
  - F. BRO-RASMUSSEN

- Trends in requirements for residues data in wild life and the environment
  - D. S. PAPWORTH

(Vol. 3)
Session 7A
THE PROBLEMS OF ASSESSING POSSIBLE HAZARDS OF PESTICIDES TO WILDLIFE

Can hazards to wild life be assessed by field trials before registration?
N. W. Moore .......................................................... (Vol. 3)

Problems of assessing changes in wild bird populations
J. J. M. Flegg ......................................................... 354

Experience in using Working Document No. 4 of the Pesticide Safety Precautions Scheme
H. J. Terry ............................................................. 362

Evaluating risks of pesticides to fish
J. S. Alabaster .......................................................... 370

Laboryatory and field assessment of pesticide poisoning of honeybees (Apis mellifera)
J. H. Stevenson ....................................................... 378

Session 7B
NEW CONCEPTS OF INSECT CONTROL

New approaches to cabbage root fly control
T. H. Coaker .......................................................... (Vol. 3)

Insect hormones and analogues and their potential contribution to insect control
W. Mordue ............................................................ 386

Evolutionary aspects of insecticide selectivity
C. E. Dyte ............................................................. 393

Some laboratory tests of feeding deterrents and baits against wireworms (Agriotes spp.)
D. C. Griffiths ....................................................... 398

Control of insects by Bacillus thuringiensis
H. D. Burges .......................................................... 405

Control of infestation in stored grain by airtight storage or by cooling
Mary B. Hyde and N. J. Burrell ........................................ 412

Session 7C
PEST AND DISEASE ASSESSMENT AND THE ECONOMICS OF CONTROL

Development of disease assessment methods
Joan Moore ............................................................ (Vol. 3)

Storage losses of apples in the West Midlands during 1968-69
E. J. Evans ............................................................ 420
### Session 8A

#### BIRDS AND LAND MOLLUSCS AND THEIR CONTROL

**Slugs and their control**

P. J. HUNTER .................................................. (Vol. 3)

**Methods of controlling bird damage**

E. N. WRIGHT ................................................ (Vol. 3)

**Development work with methiocarb in Great Britain**

T. J. MARTIN, M. E. DAVIS and D. B. MORRIS .................... 434

**A comparison of methiocarb and metaldehyde baits for the control of four species of slugs**

D. WEBLEY .................................................. 442

**The slug problem in peas for processing**

A. L. WHARTON and H. ENSOR .................................. 445

**Population and control of snails in blackcurrant plantations**

A. STRINGER and N. G. MORGAN ................................. 453

**Some problems involved in the use of stupefying baits to control birds**

R. J. P. THEARLE ............................................. 458

### Session 8B

#### MODE OF ACTION OF PESTICIDES

**Biochemical modes of action of fungicides**

PROFESSOR G. J. M. VAN DER KERK and A. KAARS .......................... (Vol. 3)

**Metabolism of some organophosphorus insecticides by strains of housefly**

J. B. LEWIS and K. A. LORD .................................. 465

**Investigations with some bio-degradable dieldrin analogues**

G. T. BROOKS .................................................. 472

**The protective and vapour-phase activities of some dinitrophenol fungicides**

D. R. CLIFFORD and E. C. HISLOP .............................. 478

**The mode of action of a new group of species specific pyrimidine fungicides**

M. J. SAMPSON ................................................. 483
### Session 8C

**PEST AND DISEASE ASSESSMENT AND THE ECONOMICS OF CONTROL (contd.)**

Some novel approaches to crop loss assessment in Germany
H. H. CRAMER ........................................... (Vol. 3)

The effect of fruit tree red spider mite on yields of apple
K. J. COGHILL ........................................... 495

Recent work on wheat bulb fly
R. BARDNER, K. E. FLETCHER and P. HUSTON .................. 500

Damage assessment aspects of *Aphis fabae* on spring-sown field beans
H. J. GOULD and C. W. GRAHAM .......................... 505

Assessment of leatherjacket damage to grassland and economic aspects of control
N. FRENCH .................................................. 511

**THURSDAY 20th NOVEMBER 1969**

### Session 9

**NEW FORMULATIONS AND TECHNIQUES - PART 1 (MAINLY INSECTICIDES)**

**Formetanate - a new acaricide**
S. B. WAKERLEY and D. M. WEIGHTON .......................... 522

**Iodofenphos - a broad review of a promising new insecticide**
B. C. HADDO and T. G. MARKS ................................ 531

**C.8514, N-(2-methyl-4-chlorophenyl)-N',N'-dimethylformamidine, a promising new acaricide**
B. C. HADDO and G. R. SHANKLAND .......................... 538

**Pirimicarb: a new specific aphicide for use in integrated control programmes**
J. H. PROCTOR and F. L. BARANYUVITS ....................... 546

**Control of cotton leaf-worm in Egypt**
A. K. AZAB .................................................. 550

**A new insecticide: 5-Benzyl 3-furymethyl d-trans-ethanochrysanthemate**
J. LHOSTE, J. MARTEL and F. RAUCH ........................ 554

**The use of cycloheximide for the control of *Didymascella thujina* on Western red cedar (Thuja plicata)**
D. A. BURDEKIN ........................................... 558
Mebemil (BAS 3050 F), a new compound with specific action against some Basidiomycetes
E. H. POMMER and J. KRADEL  ........................................... 563

A new systemic, Cela-W 524 (N,N'-bis(1-formamide-2,2,2-trichloroethyl) piperazine) with action against powdery mildew, rust and apple scab
P. SCHICKE and K. H. VEEN ........................................... 569

Characteristics and field performance of a new, broad-spectrum systemic fungicide
J. V. GRAMLICH, J. F. SCHWER and I. F. BROWN (JNR.) ................. 576

Azepines — a new class of fungicides
F. J. SCHWINN .......................................................... 584

A systemic fungicide for rice blast control
E. YOSHINAGA .......................................................... 593

Pyridinitrile, a new organic fungicidal compound
J. BERKER, O. HIERHOLZER and S. LUST  ................................ 600

PH 50-82, a new fungicide
P. I. FOURSOFF and H. ELINGS ........................................... (Vol. 3)
CONTENTS

VOLUME III

Session 1

PESTS AND DISEASES OF CEREALS (ABOVE GROUND)

Opening Address
SIR FREDERICK BAWDEN, President of the British Crop Protection Council

Foliar diseases and performance in cereal production
F. R. HORNE .......................................................... 604

Effect of Benomyl on some diseases of Spring barley
E. EVANS, M. RICKARD and R. WHITEHEAD ...................... 605

Session 2

PESTS AND DISEASES OF CEREALS (BELOW GROUND)

Seed and soil-borne pathogens of cereals
PROFESSOR J. COLHOUN ........................................... 610

Studies on the interrelation of the cereal cyst nematode (Heterodera
avenae) and the take-all fungus (Ophiobolus graminis) on barley
R. COOK ............................................................... 610

Session 3A

MONITORING RESISTANCE TO INSECTICIDES AND ACARICIDES

Some problems connected with monitoring for resistance
R. M. SAWICKI ...................................................... 635

Session 3B

DISEASES OF SOFT FRUIT AND THEIR CONTROL

The economic importance of fungal diseases of soft fruits
M. A. B. DEAKIN ................................................... 641

Session 3C

CONTROL OF NEMATODES

Integrated control of the potato cyst nematode
F. G. W. JONES .................................................... 646

Session 4B

PEST CONTROL IN VEGETABLES

Insecticide usage on vegetable crops
J. M. A. Sly .......................................................... 657

Developments in vegetable production and marketing: their influence
on insecticide requirements and usage
R. F. CLEMENTS .................................................... 665
### Session 4C
**CONTROL OF NEMATODES (contd.)**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A practical method for economic control of potato cyst nematodes</td>
<td>671</td>
</tr>
<tr>
<td>H. M. NOLLEN and A. MULDER</td>
<td></td>
</tr>
</tbody>
</table>

### Session 5
**SYSTEMIC PESTICIDES, PARTICULARLY FUNGICIDES**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systemic fungicides, including recent developments in the agricultural sphere</td>
<td>675</td>
</tr>
<tr>
<td>R. J. W. BYRDE</td>
<td></td>
</tr>
</tbody>
</table>

### Session 6
**CURRENT TRENDS IN TOXICOLOGICAL AND RESIDUE REQUIREMENTS FOR THE REGISTRATION OF PESTICIDES**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current trends in toxicological requirements</td>
<td>680</td>
</tr>
<tr>
<td>R. GOULDING</td>
<td></td>
</tr>
<tr>
<td>Current trends in residues requirements</td>
<td>685</td>
</tr>
<tr>
<td>F. BRO-RASMUSSEN</td>
<td></td>
</tr>
<tr>
<td>Trends in requirements for residues data in wildlife and the environment</td>
<td>691</td>
</tr>
<tr>
<td>D. S. PAPWORTH</td>
<td></td>
</tr>
</tbody>
</table>

### Session 7A
**THE PROBLEMS OF ASSESSING POSSIBLE HAZARDS OF PESTICIDES TO WILDLIFE**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can hazards to wildlife be assessed by field trials before registration?</td>
<td>699</td>
</tr>
<tr>
<td>N. W. MOORE</td>
<td></td>
</tr>
</tbody>
</table>

### Session 7B
**NEW CONCEPTS OF INSECT CONTROL**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>New approaches to cabbage root fly control</td>
<td>704</td>
</tr>
<tr>
<td>T. H. COAKER</td>
<td></td>
</tr>
</tbody>
</table>

### Session 7C
**PEST AND DISEASE ASSESSMENT AND THE ECONOMICS OF CONTROL**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The development of disease assessment methods</td>
<td>711</td>
</tr>
<tr>
<td>F. JOAN MOORE</td>
<td></td>
</tr>
</tbody>
</table>

### Session 8A
**BIRDS AND LAND MOLLUSCS AND THEIR CONTROL**

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slugs and their control</td>
<td>715</td>
</tr>
<tr>
<td>P. J. HUNTER</td>
<td></td>
</tr>
<tr>
<td>Session 8B</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Methods of preventing bird damage</td>
<td>720</td>
</tr>
<tr>
<td>E. N. WRIGHT</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session 8C</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biochemical modes of action of fungicides</td>
<td>724</td>
</tr>
<tr>
<td>PROFESSOR G. J. M. VAN DER KERK and A. KAARS SIjpSTEIJN</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Session 10</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEW COMPOUNDS AND FORMULATIONS - PART 2 (fungicides)</td>
<td>737</td>
</tr>
<tr>
<td>PH 50-82, a new fungicide</td>
<td></td>
</tr>
<tr>
<td>P. I. FOURSOFF, H. ELINGS and G. MEIJER</td>
<td></td>
</tr>
<tr>
<td>Closing remarks</td>
<td>742</td>
</tr>
<tr>
<td>SIR FREDERICK BAWDEN</td>
<td></td>
</tr>
</tbody>
</table>