

DISCUSSION SESSION 1

FUTURE CROP PROTECTION NEEDS

Chairman and Dr Pat Ryan
Session Organiser: *Syngenta Crop Protection UK, Cambridge, UK*

Future crop protection needs

The old certainty that the purpose of crop protection was to deliver increasing crop yields has been swept away by the economic, political and societal changes of the last ten years.

The reality for the future, of which the mid-term reform of the Common Agricultural Policy is a guide, is that subsidies will be removed from production and re-deployed to gain environmental benefits and provide rural employment. In partial contradiction to this, consumers expect the real cost of food to decline, for production to be at worst environmentally neutral, and for food to be both more nutritious and 'life-style' appropriate.

Future crop protection must evolve from our current practices to assist producers of food, (and fibre and energy), to remain competitive at world prices, whilst meeting the constraints imposed by regulators, processors and retailers, and meeting consumer aspirations.

This Discussion Session will debate crop protection needs for an apparently contradictory future. To provide a structure for the debate, in the months leading up to this Congress, a forum of experts has been asked to provide their opinions of future crop protection needs. The output of this forum is included in the following pages.

Future crop protection needs

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ABSTRACT

Future crop protection needs are entirely dependent on the future roles of farming and agriculture. Unfortunately these future roles are unclear and the subject of contradictory debate. This paper which forms the basis of a discussion session, seeks to identify the needs, constraints and opportunities for future crop protection.

INTRODUCTION

It has now become almost a cliché to state that “agriculture is in a state of unparalleled uncertainty and change”. The priorities of the latter part of the last century, those of increasing total agricultural production and productivity, at least in Europe, were beginning to unravel in the early 1990’s as subsidies and import barriers distorted world agricultural trade and the cost of maintaining the *status quo* in agriculture became unsustainable. Changing consumer and society attitudes to farming, and to methods of food production introduced further uncertainty and contributed to a continued decline in real farm incomes.

Farming *per se* has become peripheral to a Government policy founded on market forces and the compromises required by EU driven principles and funding. The reality for the future, of which the mid-term reform of the Common Agricultural Policy is a guide, is that subsidies will be removed from production and re-deployed to gain environmental benefits and providing rural employment. In partial contradiction to this, consumers expect the real cost of food to decline, for production to be at worst environmentally neutral, and for food to be both more nutritious and “life-style” appropriate.

Future crop protection must evolve from our current practices to assist producers of food, (and fibre and energy), to remain competitive at world prices, whilst meeting the constraints imposed by Regulation, Processors and Retailers, and meeting consumer aspirations.

Future crop protection needs will only be met by the research undertaken now and in the immediate future. The principles and funding for research are largely uncoordinated. Both funding and decisions on research projects being provided by a large number of organisations and bodies, such as; DEFRA and HGCA, SAPPPIO-LINK, European Union, University and Institutes, CPA Associate Foresight Programme, Agrochemical companies, and others. This may lead to great dynamism and rapid advance or un-coordinated and piecemeal technological introductions.

To form a structured basis for this discussion session, a number of leading figures in research and technological development were asked for their opinions on the future needs of crop protection. A consolidation of the responses are presented in the table. This summary of the responses is the responsibility of this author and is not attributable to individuals or organisations.

FUTURE CROP PROTECTION NEEDS

| <u>Needs and Opportunities</u> | <u>Constraints</u> | <u>Requirements to meet needs</u> |
|--|---|--|
| <p>New modes of action Chemistry from natural sources Improved environmental and toxicological profiles Simplified input systems Resistance management</p> | <p>New Chemistry Reduction in new chemistry research resourcing, (consolidation amongst research based manufacturers). Increased complexity and cost of new chemistry to meet performance, toxicological and environmental requirements.</p> | <p>Combinatorial techniques High throughput screening University / Institute collaborations</p> |
| <p>New market opportunities Simplified input systems Societal beneficial traits Consumer benefits</p> | <p>Biotechnology Public acceptance Rate of research advance</p> | <p>Control of gene expression Comprehensive marker catalogue Short cut breeding programmes</p> |
| <p>Field resistance to pests and diseases Plant design – efficiency Varieties for organic systems</p> | <p>Plant Breeding Genetic availability Resource and time intensity Royalty / financial return</p> | <p>GM background technologies</p> |
| <p>Reduced pesticide inputs Improved yield and quality Improved output value Resistance management</p> | <p>Decision Systems In-field variability Reliable sensing systems</p> | <p>Existing data mining Knowledge management High sensitivity detection and recognition systems</p> |
| <p>Society / Regulatory need Enhanced biodiversity</p> | <p>Environmental Sustainability Current techniques for measuring impact of farm practice</p> | <p>Biodiversity status measurement techniques Integrated crop management Integration of chemical and non-chemical methods of control</p> |

FUTURE CROP PROTECTION NEEDS (continued)

| <u>Needs and Opportunities</u> | <u>Constraints</u> | <u>Requirements to meet needs</u> |
|---|--|--|
| | Food Chain Collaboration | |
| Quality Consumer aspirations Issue avoidance / management Improved output value | End market price Intense competition Limited opportunities for premium pricing Perception of residues Reduced pesticide options | Residue databases - real case and worst case Decision support systems Traceability Rational / consumer understood risk assessment |
| | Precision Farming | |
| Simplified / reduced input systems Reduced environmental impact Reduced input costs Improved output value | Technology led Costs and complexity of technology Reliability | Threshold for treatment determination |
| | Agronomy | |
| Reduced cost of production Environmental sustainability Enhanced biodiversity | Fixed costs Disease prone varieties Yield limiting varieties Integrated production methodology Plant and disease state diagnoses | Weed, Disease and Pest Surveys Population biology Long term agronomic technique impact studies |
| | Formulation and Packaging | |
| Reduced packaging waste Reduced point source pollution Speed of operation Reduced input costs Reduced operator and environmental impact | Packaging retrieval systems Physio-chemical properties of active ingredients Lack of industry standards | Operator training Recyclable packaging Cross-Industry collaboration |
| | Resistance Management | |
| Integrated input / control systems Reduced input costs Reduced inputs Simplified crop production systems | Limited range of chemistry Use recommendations and advice systems Limited varietal resistance and durability | User and Advisor training Varietal resistance Wide spread ICM adoption New chemistry |

FUTURE CROP PROTECTION NEEDS (continued)

| <u>Needs and Opportunities</u> | <u>Constraints</u> | <u>Requirements to meet needs</u> |
|--|--|--|
| | Society's View of Farming | |
| Unified view of value and purpose of farming | Lack of rational debate Conflicting views on the role of farming and the countryside Media emphasis on "scare" stories | Running forum to debate perceived opposing views Co-ordination between agricultural groupings, e.g. NFU, UKASTA, CPA |
| | Biopesticides | |
| New chemistry Resistance management Perceived environmental approach | Lack of resourcing Lack of successes to date Lack of belief in potential Un-coordinated approach | Environmental compatibility UK expertise Cross-industry / Government funding |
| | "Minor Crops" | |
| Reduced input costs Wider input choice Maintenance of local production of certain crops Improved output value Simplified input systems | Product use losses EC Pesticide Review (91/414/EEC) Development resources curtailed High costs of legislation | Derogations, (temporary) Product use extensions UK regulatory system Product authorisation zones replacing national approvals Non-European approval recognitions Crop uses database |
| | Training and Communication | |
| Increased standards throughout the food chain Reduced input costs Improved output values | <i>Ad hoc</i> communication on issues and benefits Few new entrants | Bursaries and training programmes Co-ordinated communication strategy and programmes |

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DISCUSSION SESSION 2

THE FUTURE EDUCATIONAL NEEDS FOR CROP PROTECTION

Chairman and Professor Bob Naylor
Session Organiser: *Trelareg Consultants, Aberdeen, UK*

The future educational needs for crop protection

In UK, the number of agriculture students is declining and fewer universities are delivering agriculture courses. There are fewer agricultural scientists. Farm size is increasing and the proportion of family farms is declining. Farming is changing in response to policy to give more attention to landscape management and countryside stewardship.

Increasingly, crop managers need to be able to:

1. identify the various biotic (weeds, pests, diseases) and abiotic (various forms of stress) challenges occurring in crop production systems;
2. access and use decision support systems;
3. interpret the output for their own specific circumstances;
4. do this with due regard for biodiversity and landscape.

The latter are becoming more linked to farm income via cross-compliance.

How do crop managers obtain the knowledge and information to be able to carry out these tasks and is agricultural education providing these needs? Can employers of new crop science graduates expect them to have received the necessary education and training?

The aim of this session is to discuss these matters and appraise the current provision.

The session will start with brief contributions from crop protection teachers and crop protection practitioners in order to promote topics for discussion.