



**Crop Protection**  
Association

# An introduction to plant protection products





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# Introduction

PLANT PROTECTION PRODUCTS PLAY A CRUCIAL ROLE IN MAINTAINING ADEQUATE SUPPLIES OF HIGH QUALITY, AFFORDABLE FOOD. WITHOUT THESE PRODUCTS TO KEEP WEED, PEST AND DISEASE PRESSURES IN CHECK, CROP YIELDS WOULD FALL BY AROUND A THIRD.

At a time of rising food prices, population growth and concerns over global food security, farmers need to use every available technology - including plant protection products - to meet future food needs and tackle the emerging challenges of climate change and resource conservation.

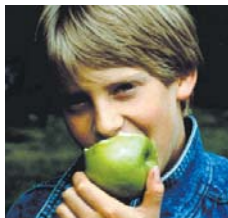
Plant protection products are also widely used outside crop production, for example in maintaining the quality of gardens, golf courses and sports pitches, and ensuring the safety of our railways and roads.



Put simply, plant protection products are life-saving medicines for plants. When attacked by disease or pests, a plant's natural response is to produce its own chemical protection. Man-made pesticides are only used when a plant's own chemical defences do not work well enough.

But like human and veterinary medicines, plant protection products can pose some risks if they are not used with due care. Their registration and use is therefore strictly regulated and controlled.

This booklet provides a brief guide to why we need plant protection products to safeguard our food supply and improve our quality of life.



## Plant protection products - key facts

Plant protection products, also called pesticides, are chemical or biological substances used to control pests that harm our food, health or environment.

**There are three main types of pesticide:**

**Herbicides** control weeds and unwanted vegetation such as thistles and nettles;

**Fungicides** combat harmful crop diseases, such as potato blight;

**Insecticides** control insect pests such as aphids.

# Plant protection products - the benefits






## SUPPORTING CROP PRODUCTION

Plant protection products help farmers protect their crops against yield losses and damage caused by weeds, diseases and insects.

Keeping problem pests under control is essential to provide a sustainable supply of safe, affordable, wholesome food.

Without plant protection products, crop yields would fall, many foodstuffs would be in short supply, and food prices would rise. Maintaining food production levels would therefore require more land, leaving less available for amenity, recreation and wildlife conservation.



SECTOR	TREATMENTS	BENEFITS
AGRICULTURE AND HORTICULTURE 	Seed treatments Herbicides Fungicides Insecticides Desiccants Plant growth regulators	Pre-sowing protection against disease and insects Protect yield and quality against weed competition Minimise yield loss and keep crops free of harmful fungi and their toxins Prepare crops from insect attack and insect-borne disease infestation Prepare crops for harvest to avoid yield loss Optimise productive yield, improve harvest efficiency and keep crops standing
FORESTRY 	Herbicides	Control undergrowth Prevent stump re-growth
AMENITY, SPORTS AND RECREATION 	Herbicides Fungicides Insecticides	Keep streets, pavements and urban areas weed-free Maintain quality, weed-free playing surfaces Keep grass healthy and disease free Protect turf from insect attack
TRANSPORT AND UTILITIES 	Herbicides	Maintain safe accessible transport routes, power transmission lines and pipelines
HOME AND GARDENS 	Herbicides Fungicides Insecticides	Maintain weed-free gardens, paths and drives Protect plants from insect attack Keep garden plants disease-free

Without plant protection products...

# 65 to 200%

extra land would be required to produce the same amount of food

## PRODUCING SAFER, MORE NUTRITIOUS FOOD

Life expectancy in the UK has almost doubled in the past century. A major contributory factor is the availability of a healthy, nutritious food supply - thanks to modern crop production methods.

Plant protection products can help improve food safety and reduce the number of food-related illnesses by controlling levels of harmful toxins produced by fungi and bacteria in crops.

## TACKLING CLIMATE CHANGE

Increased food productivity in the UK reduces the amount of food we need to import so reducing carbon emissions during transport.

More efficient weed control allows farmers to use fewer cultivations such as ploughing, so reducing both fuel used in farm machinery and the release of soil carbon into the atmosphere.

Looking forward, a change in climate will bring new pests and diseases - plant protection products will be vital to maintain and increase food production in the face of these new challenges.

## PRESERVING THE NATURAL ENVIRONMENT

Plant protection products allow farmers to grow more per unit area of land, using fewer cultivations - so alleviating pressure on uncultivated habitats and reducing the damaging effects of soil erosion.

They are also essential to control the aggressive spread of alien weed species and injurious plants, such as giant hogweed and Japanese knotweed, which would otherwise threaten our native wild plants.



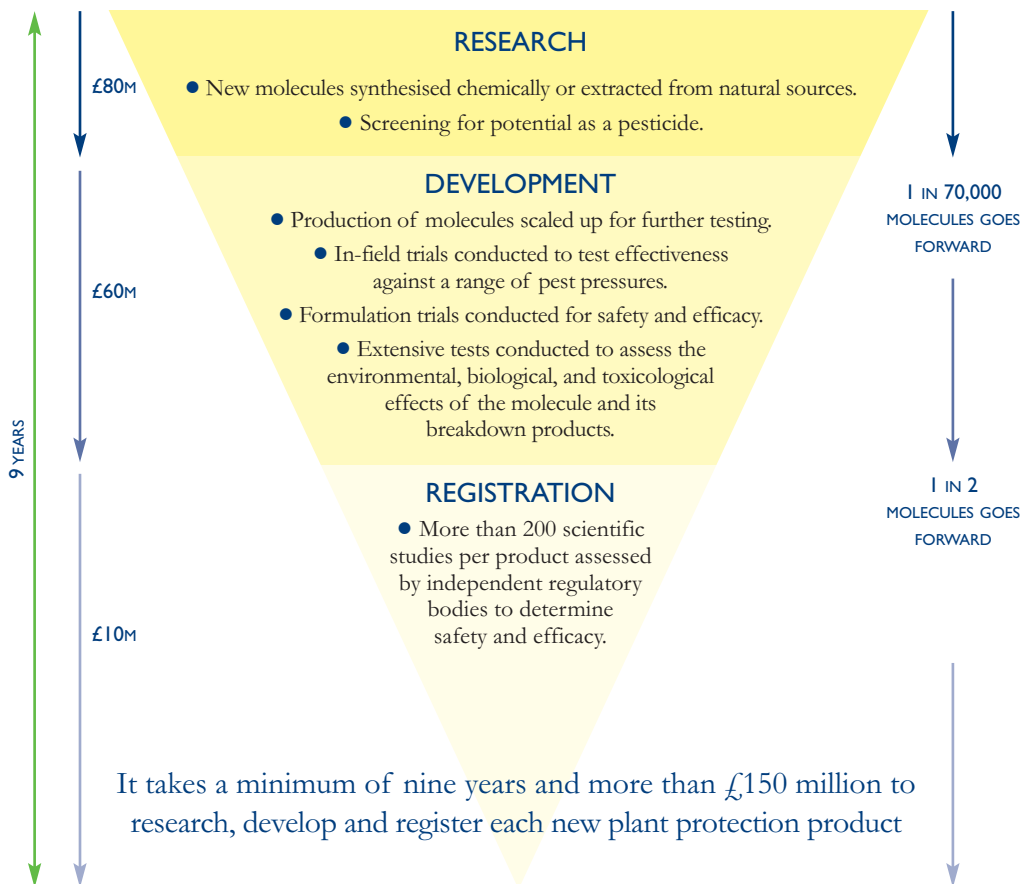
# Product development and testing

PRODUCING A NEW PLANT PROTECTION PRODUCT INVOLVES RESEARCH, DEVELOPMENT AND REGISTRATION.



When developing a new pesticide, scientists are seeking to identify a chemical substance which will target a weakness in the problem weed, insect or disease without affecting other organisms. These chemicals can be naturally occurring or man-made.

In recent years, enormous progress has been made to research and develop products that are target-specific, degrade quickly in the environment and do not accumulate in the food chain.



# Regulation of plant protection products

PLANT PROTECTION PRODUCTS ARE AMONG THE MOST THOROUGHLY TESTED AND STRICTLY REGULATED CHEMICALS IN EUROPE. UNDER EU AND UK LAW, ALL PLANT PROTECTION PRODUCTS MUST RECEIVE GOVERNMENT APPROVAL BEFORE THEY CAN BE SOLD, ADVERTISED OR USED.

The regulatory process involves rigorous scrutiny by independent scientific experts to ensure plant protection products are safe for consumers, for the people who use them and for the environment.

Typically more than 200 scientific studies on a pesticide's impact on human health and the environment are required as part of this approval process.

In the UK, independent scientific assessment of pesticide applications is overseen by the Advisory Committee on Pesticides, working closely with other expert bodies such as the Food Standards Agency and Department of Health.

Once a plant protection product has gained approval, it remains subject to regular review. If there are any areas of concern, more data can be requested by the regulatory authorities. At any stage the approval can be modified or withdrawn completely.



# Agriculture and horticulture

PESTICIDES ARE MAINLY USED IN AGRICULTURE AND HORTICULTURE TO KEEP CROPS HEALTHY AND PREVENT THEM BEING DAMAGED OR DESTROYED BY DISEASE, WEED INFESTATION AND PEST ATTACK.

Alongside improvements in plant breeding and fertiliser technology, the use of modern plant protection products has supported significant gains in agricultural productivity. Wheat yields, for example, have more than trebled in the past 50 years.

Farmers use plant protection products to deal with a range of pest problems. Pesticides can be formulated as liquids, granules or powders. Some are applied as seed treatments, but most

are diluted in water and sprayed onto crops using specialised machinery. Today's modern pesticides use very low amounts of active ingredient to target specific weeds, insects or diseases. Products can be applied at different stages in a crop's development. They also vary in their mode of action, from molecules that take effect on contact, through to systemic products that are absorbed by the target pest or plant.

PEST TYPE	EXAMPLES	PROBLEM	RESULT
WEEDS	Wild oats	Compete with growing crop for sunlight, water and soil nutrients	Reduced crop growth
	Blackgrass		Crop failure
	Cleavers	Can physically smother and restrict growth of crop plants	Lower yields
	Bindweeds		Lower quality
	Thistles	Provide a habitat for problem pests that could also harbour diseases	Harvesting problems
	Chickweed		
SOIL-BORNE PESTS	Leatherjackets	Eat and hollow out seed in the soil	Crop failure
	Slugs	Eat seedling plants	Reduced yields
	Nematodes		
AIR-BORNE INSECT PESTS	Aphids	Eat crop	Crop damage
	Beetles	Can carry viral diseases	Increased diseased risk
	Midges	Damage the plant allowing fungal attack	Lower yields
	Mites		Reduced quality
FUNGAL AND BACTERIAL DISEASES	Mildew	Reduce seed germination in the soil	Rotting of produce in storage
	Eyespot	Grow and spread on harvested produce in storage	Reduced crop growth
	Rusts		Lower yields
	Ergot		Reduced quality
	Blackspot		



## SOLUTION

Herbicides

Insecticides  
Molluscicides  
Nematicides

Insecticides

Fungicides

## TREATMENT MODE OF ACTION/TIMING

FUNGICIDE	Curative	Applied to the plant after initial infection
	Eradicant	Applied when disease symptoms have become visible to prevent the spread of disease
	Protectants	Applied to the plant surface before infection
HERBICIDES	Pre-sowing	Applied before the crop is sown
	Pre-emergence	Applied before crop germinates
	Post-emergence	Applied after crop germinates
ALL PRODUCTS	Selective	Affects a narrow range of species - the target pests. The pesticide may be selective because either: - non-target species are unaffected by the pesticide; or - non-target species do not come into contact with the pesticide
	Non-selective	A wide range of plants, insects or fungi are killed
	Systemic	Pesticide is absorbed by the plant under attack. The product then moves through the plant to reach parts remote from the point of application
	Contact	Directly affect the parts of the plant, insect or fungus to which they are applied. These cause localised damage to the target plant or pest on contact

## PART OF AN INTEGRATED APPROACH

On the farm, plant protection products are used alongside a range of other agricultural practices to control pests. Integrated Crop Management (ICM) encourages farmers to combine responsible use of pesticides with other approaches, such as careful choice of crop

rotation and managing field margins to encourage beneficial species that help control pests. An integrated approach allows farmers to optimise the benefits of all inputs, such as the selection of resistant varieties, plant protection products, seed and fertiliser.

# Gardens

IN GARDENS AND ALLOTMENTS, PLANT PROTECTION PRODUCTS ARE USED TO CONTROL A WIDE RANGE OF PROBLEM PESTS INCLUDING INSECTS, DISEASES, WEEDS, MOSS AND SLUGS.

For example, insecticides control aphids on roses and herbicides control problem weeds such as thistles and dandelions in the lawn. Fungicides are also used by gardeners to protect flowers and vegetables against disease attack.

Plant protection products for home and garden use are strictly regulated by Government agencies in the same way as agricultural and horticultural products. Because they are available to the general public, garden products are supplied either in diluted, 'ready-to-use'



form or as concentrates containing low levels of active ingredient compared with equivalent professional products. A number of additional safeguards apply:

They must:

- Be suitable for use without protective clothing;
- Have a specially detailed 'instructions for use' label.





## Amenity

PLANT PROTECTION PRODUCTS PLAY A KEY ROLE IN MAINTAINING OUR TRANSPORT AND AMENITY INFRASTRUCTURE, FROM ROADS AND RAILWAYS TO PARKS, GOLF COURSES AND SPORTS GROUNDS.

- Local authorities use plant protection products to control weeds on streets and pavements
- Herbicides are used to keep our motorways and railways safe by protecting them from weed damage



- Retail parks and industrial sites control weeds to reduce fire risk and create a pleasant environment
- Plant protection products are widely used on sports grounds and golf courses to control problem weeds and diseases, ensuring safe, high quality playing surfaces
- Utility companies use pesticides to maintain the safety and accessibility of power lines and pipelines



## Environmental stewardship



FARMERS UNDERSTAND THE NEED TO STRIKE A SENSIBLE BALANCE BETWEEN PRODUCING HEALTHY, PROFITABLE CROPS AND PROTECTING THE WILDLIFE AND ENVIRONMENT AROUND THEM. THE INDUSTRY PROMOTES GOOD AGRICULTURAL PRACTICE THROUGH FARMER TRAINING AND EDUCATION.

The use of modern plant protection products is generally safer than ever before for people, animals and other non-target species.

Factors that have contributed to this include:

- Enhanced effectiveness of products in targeting specific pests;
- Progress in formulation technology and packaging;
- Better application through improvements in sprayer and nozzle technology;
- Development of technology allowing more targeted pesticide applications;
- Improved stewardship by farmers including adoption of ICM practices;
- Improved advice on when and how best to use pesticides.



## THE VOLUNTARY INITIATIVE

The Voluntary Initiative is a programme of measures, agreed by the crop protection industry and related organisations with Government, to minimise any environmental impacts of pesticides. The programme provides a framework to help protect water quality and enhance farmland biodiversity.

Through the Voluntary Initiative, the UK agricultural industry has invested nearly £70 million in research, training and communication to promote responsible pesticide use. Launched in 2001, more than 80% of the UK arable area is now covered by the Voluntary Initiative.

Already the Voluntary Initiative has delivered significant progress:

- Research showing that the use of unsown skylark plots in cereal crops can deliver a 50% increase in skylark fledgling survival;
- Water catchment initiatives to minimise the incidence of pesticide residues in surface water;
- Introduction of biodiversity training and qualification for farmers and their advisers;
- Greater biodiversity awareness among sprayer operators - resulting in improved practices in the field.



# Food safety

## **NO PESTICIDE CAN BE APPROVED BY REGULATORS IF IT POSES AN UNACCEPTABLE RISK TO CONSUMERS**

Strict conditions are applied to the use of all pesticides, including the rate and timing of application. These conditions are applied to protect the safety of users and the environment, and to ensure food products do not contain potentially harmful levels of residue.

For each approved pesticide, a Maximum Residue Level (MRL) is specified. This is not a safety limit, but the maximum amount of residue that is legally permitted in food products when the pesticide has been used in accordance with its conditions of use. MRLs are set by independent authorities, using very wide safety margins. They are usually expressed in terms of less than one part in a million.

To protect consumers, the Government's Pesticide Residues Committee oversees an extensive monitoring programme to measure pesticide residues in food.

These controls ensure that if residues do occur, they are usually well below legal limits and pose no safety issues. In fact over 70% of food products consumed in the UK contain no pesticide residues at all.

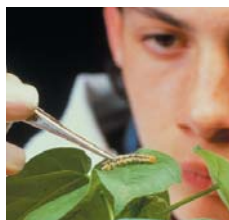
**“The positive effects of eating fresh fruit and vegetables as a part of a balanced, healthy diet are well proven and far outweigh any concerns about pesticide residues.”**



Dr Ian Brown,  
Chairman of the Pesticide Residues Committee

## ACKNOWLEDGEMENTS

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## THE CROP PROTECTION ASSOCIATION

The Crop Protection Association (CPA) represents members active in crop protection, amenity, home and garden with a strong focus on food production.

We are proud to be part of an industry that conducts its business with full commitment to safety and sustainability. Our products deliver beneficial and innovative solutions to farmers, consumers, society and the environment.

Our strength comes from our ability to combine the industry's expertise and skills to analyse and address key issues. We engage in constructive and intensive dialogue with relevant stakeholders to ensure that the benefits of our products are fully recognised and accepted.



Crop Protection Association : [www.cropprotection.org.uk](http://www.cropprotection.org.uk)

CPA Garden Care : [www.garden-care.org.uk](http://www.garden-care.org.uk)

CPA Amenity : [www.amenity.org.uk](http://www.amenity.org.uk)

The Voluntary Initiative : [www.voluntaryinitiative.org.uk](http://www.voluntaryinitiative.org.uk)

CropLife International : [www.croplife.org](http://www.croplife.org)

European Crop Protection Association : [www.ecpa.eu](http://www.ecpa.eu)

Pesticides Safety Directorate : [www.pesticides.gov.uk](http://www.pesticides.gov.uk)

Pesticide Residue Committee : [www.pesticides.gov.uk/prc\\_home.asp](http://www.pesticides.gov.uk/prc_home.asp)

Food Standards Agency : [www.food.gov.uk](http://www.food.gov.uk)

National Farmers Union : [www.nfuonline.com](http://www.nfuonline.com)



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