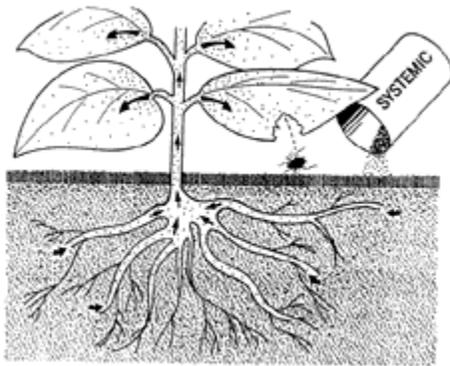


## Grouped by How or When They Work

Pesticides can also be classified according to how or when they work. Some groups that describe how or when pesticides work are:

- **Contact pesticides** generally control a pest as a result of direct contact. Insects are killed when sprayed directly or when they crawl across surfaces treated with a residual contact insecticide. Weed foliage is killed when enough surface area is covered with a contact herbicide.
- **Systemic pesticides** are pesticides which are absorbed by plants or animals and move to untreated tissues. Systemic or translocated herbicides move within the plant to untreated areas of leaves, stems or roots. They may kill weeds with only partial spray coverage. Systemic insecticides or fungicides move throughout treated plants and kill certain insects or fungi. Some systemic insecticides are applied to animals and move through the animal to control pests such as warble grubs, lice, or fleas. Some pesticides only move in one direction within the plant, either up or down. Knowing what direction the pesticide moves will help guide your decisions. For example some insecticides only move upwards in plants. If applied to the root zone, it will travel throughout the plant, but if applied to the leaves it will not move throughout the plant. Some pesticides are considered locally systemic. These will only move a short distance in a plant from the point of contact.



- **Foliar pesticides** are applied to plant leaves, stems and branches. Note, they may be either a contact pesticide or a systemic pesticide.
- **Soil-applied pesticides** are applied to the soil. Some are taken up by roots and translocated inside the plant. Other soil-applied herbicides kill weed seedlings by contact with young shoots or leaves as they break through the soil.
- **Fumigants** are chemicals that are applied as toxic gas or as a solid or liquid which forms a toxic gas. The gas will penetrate cracks and crevices of structures or soil or the spaces between products stored in containers.
- **Preplant herbicides** are applied to the soil before seeding or transplanting.
- **Preemergent herbicides** are applied to the soil after planting but before emergence of the crop or weed. The pesticide label should indicate if a pesticide is preemergent to the crop or weed.
- **Postemergent herbicides** are applied after the crop or weed has emerged.

- **Translocated herbicides** enter the roots or above ground parts of plants and move within the plants. They are also called systemic herbicides.
- **Eradicant fungicides** destroy fungi that have already invaded plants and begun to damage plant tissues. They inhibit metabolic processes of growing fungal organisms.
- **Protectant fungicides** prevent fungal infections. They retard fungal growth or prevent the organisms from entering treated plants. They must be used before the fungi reach the infection stage. Once a plant is infected, the fungicide will normally not kill the fungi inside the plant.
- **Selective pesticides** will only control certain pests.
- **Non-selective pesticides** will control a wide range of pests.
- **Suffocating insecticides** clog the breathing system of insects and may affect eggs.
- **Residual pesticides** do not break down quickly and may control pests for a long time (i.e. several weeks or a year).
- **Non-residual pesticides** are quickly made inactive after application and do not affect future crops.

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## Grouped by Mode of Action (Site of Action)

Pesticides can be grouped according to their mode of action or the way a pesticide destroys or controls the target pest. This is also referred to as the primary site of action. For example, one insecticide may affect an insect's nerves while another may affect moulting. One herbicide may mimic the plant's growth regulators and another may affect the plant's ability to convert light into food. One fungicide may affect cell division and another may slow the creation of an important compound in the fungus. There are a limited number of different modes of action, but there are many pesticides. Some pesticides have the same mode of action. Scientists have grouped pesticides according to their mode of action or the target site of action.

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## Types of Pesticide Formulations

When a pesticide active ingredient (a.i.) is manufactured, it is not in a usable form. The a.i. may not mix with water or may be unstable. Therefore the a.i. is mixed with other compounds to improve its effectiveness, safety, handling and storage. The other compounds can include solvents, mineral clays, stickers, wetting agents, or other adjuvants. This mixture of a.i. and inert (inactive) ingredients is called a pesticide formulation. Some formulations come ready to use while others must be mixed before use. One a.i. is often made into several different formulations. When choosing between formulations consider:

- If it is registered for the use (pest/crop)
- Which will be most effective against the pest and current life stage
- What formulation works best in your application equipment
- Which will result in less drift or runoff
- Whether the proper safety equipment is available

- Which is safest for workers, bystanders or nearby sensitive areas or organisms
- The cost

The trade name of a pesticide may tell you about the formulation. It may include an abbreviation of the formulation. For example WP means wettable powder; E or EC means emulsifiable concentrate. Not all companies use the same abbreviations. Check the label if you do not understand the abbreviation. The exact name and amount of a.i. in the formulation is listed beside the guarantee.

Pesticide formulations can be divided into three main types: solids, liquids or gases. The most commonly used formulations are listed in the following table. The formulations abbreviation is shown below in parentheses.

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### Table of Common Pesticide Formulations

Name	Description	Advantages	Disadvantages	Typical Use
<b>Solids</b>				
Bait	Mixture of a.i. and food that attracts pests. Usually <5% a.i. Made as meal, pellets, or liquid; Most are solids.	Easy to spottreat. Easy to apply by hand. Usually, ready to use.	Children, pets, or wildlife could eat it.	Baits for: insects (i.e. weevils, ants), rodents, birds, or slugs.
Dry flowable (DF) or Water Dispersible Granules (WDG)	Mixture of a.i. and inert material made into small pellets or granules. Forms a suspension in water.	Less dusty than WP. Easier to measure and mix than WP. Less inhalation hazard than WP.	Spray mix requires constant agitation. Abrasive (increases wear on nozzles and pumps).	Sprays for insect, disease, and weed control.
Dust (D or DU)	Finely ground inert particles (i.e. talc, clay, volcanic ash) with a 10% a.i.	Ready to use. No mixing Easily drifts.	Visible on plants. Easily inhaled.	Spot treatment. Animal powder. Seed treatment.
Ear Tag / Vapour Strips	Solid material with volatile or solid a.i. Slowly releases vapour or releases on skin contact.	Ready to use.		Animal ear tags. Fly control
Granules (G or GR)	Dry inert materials (i.e. clay, walnut shell, corn cob) combined with 2 to	Ready to use. No mixing. Minimal drift.	Some dust produced. May be eaten by	Soil treatment for insect or weed control.

	25% a.i.		birds. May need incorporation.	
Impregnated Fertilizer	A granular fertilizer containing a little pesticide (usually herbicides).	One step application.	Could clog equipment. Applicators usually need special equipment.	Agricultural soil application
Pellets (P)	Inert material containing a.i. Like granules, but has more uniform shape and weight.	Easy to spot treat. No mixing. Ready to use. Minimal drift.	Some dust produced during handling may be inhaled. Needs special application equipment.	Baits to control rodents, slugs
Soluble powder (SP)	Dry powder or granules which dissolve in water to make spray solution. Often > 50% a.i.	Agitation not needed after mixing.	Dust can be hazardous to applicator if inhaled.	Mostly sprays for insect and weed control. Few SP formulations available.
Wettable powder (WP or W)	Finely ground inert ingredients with usually 50+ % a.i. Forms a suspension in water.	Less skin absorption than EC's.	Hazardous if inhaled. Dusty. Needs pre-mixing and constant agitation. Abrasive so increases nozzle and pump wear. May clog screens and filters.	Sprays for insect, disease, and weed control.

### Liquids

Aerosol (A)	Usually contain small amounts of a.i. and a petroleum solvent. Two main types: 1. Ready-to-use are under pressure, in small containers, and when nozzle is triggered fine droplets with pesticide are driven through a	Mixing not usually required. Low concentration of a.i.	Inhalation hazard. Pressurized containers hazardous if punctured.	Used mainly inside greenhouses or for mosquito control.
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small hole  
 2. Fog generators are not under pressure, equipment breaks the liquid into fine mist or fog using spinning discs or heat.

Emulsifiable concentrate (EC or E)	Contains a.i., petroleum solvent, and emulsifiers. Pesticide is suspended in spray which is milky coloured	High concentration of a.i. so less product to store, purchase, or transport. Easily mixed. Non-abrasive.	Amount of a.i. increases mixing hazard. May cause leaf burn, be flammable or easily absorbed through skin.	Sprays for insect, disease, and weed control.
Flowable (F)	Finely ground particles suspended in an inert liquid carrier. Forms suspension in spray mix like WP.	No dust. Pre-mix not needed.	Needs agitation before mixing as a.i. may settle out. Spray mix needs constant agitation. Abrasive, wears nozzles.	Sprays for insect, disease and weed control.
Gel	Semi liquid emulsifiable concentrate	Used with water soluble packaging.	Cannot measure amounts smaller than package size.	Herbicides and insecticides.
Micro-encapsulated Materials	Consist of pesticide surrounded by a plastic coating. Mixed with water and sprayed. Breaks down slowly.	Reduced hazard to applicator. Easy to mix and apply.	Agitation needed. Can be very hazardous to bees.	Insecticide and pheromone sprays.
Solution (SN)	A.i. comes dissolved in liquid. Forms a solution in spray mix.	High concentration of a.i. means less product to store and transport. Easily mixed. Non-abrasive. Agitation not needed.	High concentration of a.i. increases mixing hazard.	Sprays for weed control.
Ultra low volume concentrate or sprayable	Liquid with very high concentration of a.i. Designed to be used as it is or slightly diluted in	Requires little or no mixing. Few formulations available.	Needs special application equipment.	Insecticide sprays inside greenhouses or for forestry.

concentrate (ULV) ULV equipment.

### Gases

Fumigants

Volatile liquids or solids packaged to release a toxic gas.

Toxic to many types and stages of pests. Good penetration of structures and soils under proper conditions.

Highly toxic. Treated area must be well sealed.

Greenhouses, mushroom houses, graineries. Pre-plant soil treatment for hard-to-control pests.

### Packaging

Water-Soluble Packets

Pre weighed amount of WP or SP formulation in a special plastic bag which dissolves in spray tank and releases contents.

Low applicator exposure during mixing and loading Convenient for measuring. No container to dispose.

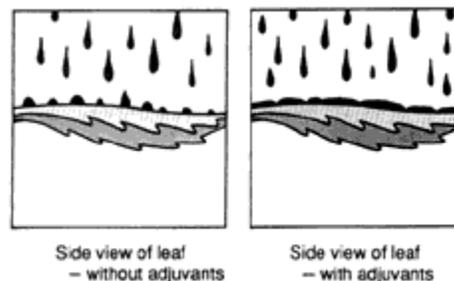
All quantities are pre-measured and may not be the correct amount for a field.

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## Adjuvants

Adjuvants are materials added to a pesticide formulation or tank mix to increase the effectiveness or change the properties of the pesticide in the spray mix. They may improve the effectiveness of a pesticide by:

- Wetting the surface so the spray sticks better
- Increasing or decreasing evaporation so it prevents the spray from drying too fast or help it dry quicker
- Increasing absorption into the plant
- Making the spray droplets more uniform to improve coverage



Adjuvants which directly improve the efficacy or enhance performance of a pesticide must be registered by Health Canada before they can be used. These are called Activators or spray modifiers. They either modify or enhance the physical or chemical characteristics of the pesticide. Adjuvants which are activators or spray modifiers include:

- Surfactants which are used to improve the wetting, spreading, dispersing and emulsifying properties of pesticide mixtures
- Wetting agents which help wettable powders and dry flowables mix with water and stick on surfaces

- Spreaders which help pesticides form uniform coatings over treated surfaces
- Ammonium and Sulfate Salts which enhance the uptake of some pesticides in hard water
- Oil based adjuvants which affect leaf surfaces to allow better contact with the pesticide
- Stickers which help pesticides resist being washed off by the rain

Adjuvants which do not directly improve efficacy but widen the conditions when a pesticide can be used or maintain the integrity of the spray solution do not need to be registered by Health Canada. These are called Utility modifiers. Adjuvants which are utility modifiers include:

- Buffering agents which change the pH of the water to increase the dispersion or solubility of a pesticide.
- Antifoam agents which decrease the amount of foam in a spray tank.
- Compatibility agents which help pesticides mixed together in a tank blend uniformly. These are often used in herbicide/fertilizer tank mixes.
- Drift retardants or thickeners which are used to increase the size of spray droplet

When to Use an Adjuvant Adjuvants are either incorporated into the formulation by the manufacturer or may be added to the spray by the pesticide applicator. When using adjuvants, always follow label directions. The label will state specifically what the adjuvant can be used for and what products it can be used with. The label will also have directions for use and may list special restrictions. Pesticide labels state the adjuvants that can or must be used with the product. Using an adjuvant that is not on a pesticide label or not according to label directions may:

- Have no effect
- Reduce pest control
- Cause injury to the crop.

## The Global Increase in Counterfeit Pesticides<sup>1</sup>

Frederick M. Fishel<sup>2</sup>

### Introduction

In Europe and other areas of the world counterfeit and illegally traded pesticides are on the increase. These illegal products are produced and distributed by criminal gangs. The products are untested and unregulated, and they threaten the health of farmers and consumers, as well as posing risks to the natural environment. Counterfeit pesticides that make their way into the United States threaten the integrity of those industries which depend on the benefits of pesticide use.

The scale and scope of the illegal manufacture and trade of counterfeit pesticides differs from market to market depending on countries specificities. In a 2008 report, *Counterfeit Pesticides across Europe*, the European Crop Protection Association (ECPA) provides a detailed overview of the problem, as well as possible solutions, including information on the overall problem within various European countries.

Fighting counterfeit pesticides is a complex task. In Europe, although regulations governing pesticide use are abundant, inadequate attention is devoted to enforcement of these regulations. This dichotomy has led in recent years to a dramatic increase in illegal, counterfeit pesticides in European countries.

The grave nature of the problem requires urgent actions by all stakeholders, including state regulatory authorities, the United States Environmental Protection Agency (EPA), commodity/trade associations, national governments and supranational entities, as well as agricultural producers and the food and pesticide industries (Figure 1).



Figure 1.

Herbicide product contained in a 5-liter vegetable oil container ready for sale in Italy.

[Click thumbnail to enlarge.]

## The Growing Problem

In Europe, the growth of counterfeit plant-protection products is worrisome. The ECPA estimates that 5 - 7 percent of annual trade is affected by counterfeiting and illegal trade. At the time of this publication, the value is estimated in U.S. dollars to be \$260 - \$370 million of the European pesticide business across Europe. In some regional hot spots, 25 percent or more of the pesticide market is estimated to be counterfeit based on statistics, market dynamics, percentage of customs seizures and case-by-case country studies. And the problem is growing.

In China and India, illegal pesticides are believed to comprise about 30 - 20 percent of the pesticide markets in these countries, respectively. The rapid growth of chemical-manufacturing capabilities in these countries has made possible this unregulated manufacture and trade of pesticides. Pesticide imports from China into the European Union (EU) are growing eight times faster than average worldwide pesticides imports into the EU. This statistic is concerning, especially considering that 86 percent of all counterfeited goods seized on their way into Europe in 2006 came from China (Table 1).

China is the big growth area for pesticide manufacturing. Chinese capacity for pesticide manufacturing grew in terms of tonnage at an annual rate of 12.5 percent per year from 2000 - 2007. More than 2,000 Chinese companies are formulating pesticides, and more than 400 Chinese companies are involved in manufacturing the active ingredients of pesticides. Active

substances, primarily originating from China, are readily supplied and exported with no controls to countries around the world, including the United States, where the substances are formulated and labeled for onward distribution to consumers and industry.

Likewise, sophisticated copies of proprietary products are manufactured in China and shipped from China with fraudulent documentation to countries around the world, with growing emphasis on Europe.

## Types of Counterfeit and Illegal Pesticides

The nature and extent of counterfeit products and their illegal trade varies by market and can originate from many different sources in many different forms. The three main areas of illegal activity are the following:

- **Fakes:** These are pesticides containing anything from water or talc to diluted and outdated or obsolete pesticide stocks, including banned or restricted chemicals. Some fakes may provide a degree of biological control, as they sometimes contain an illegal and untested copy of the proprietary active substance. These products are often sold in simple packs, such as plain bottles with minimal labeling describing their use, but no health or environmental precautions (Figure 2).



Figure 2.

Fake products on left; legitimate product on right.

[Click thumbnail to enlarge.]

- **Counterfeits:** Sophisticated copies of legitimate, branded products, counterfeits usually have high-quality labeling and packaging. Most counterfeits will contain a copy of the original active ingredient. However, its biological efficacy is often diminished due to high levels of impurities from manufacturing, including process by-products. Counterfeits -- which are often difficult even for experts to distinguish from legitimate products -- are likely to be sold to agricultural producers and may result in adverse side effects, such as crop damage after application (Figure 3).



Figure 3.

Fake products on left; legitimate product on right.

[Click thumbnail to enlarge.]

- **Illegal parallel imports:** These products are illegal, generic copies of legitimate, parallel-traded products. These generic products have been repackaged and sold as brand-name products.

Parallel trade of plant-protection products has been a contentious issue for several years. However, a recent ruling by the European Court of Justice has led to the re-adoption of “common origin,” thus precluding the legitimate substitution of an equivalent registered product.

The repackaging of plant-protection products is still contested by the plant -protection industry because repackaging compromises products integrity and allows for contamination. Additionally, the use of unacceptable packaging can lead to misuse of an inferior product, which may cause harm to crops and pose risks to consumers.

Legitimate pesticides and plant-protection products that are legally sold and used in Europe are extremely well regulated through EU and national regulations and legislation. These pesticides and plant-protection products are thoroughly tested to ensure the maximum safety to farmers, the environment, and to consumers who purchase and eat fresh produce treated with any pesticide.

## Effects of Illegal Trade and Counterfeit Pesticides

- **The health of consumers and farmers is endangered.** Unlike legal, registered products -- which undergo rigorous, government-required testing, illegal products have not been tested for human health impact. Illegal products may contain unknown toxic impurities. Residues of unknown and untested substances could be carried into harvested food and compromise consumer health while also posing health threats to farmers through exposure during application.
- **Harm to the environment.** Many active substances and other constituents used in illegal products are untested for environmental safety and can contain highly toxic impurities. Unregulated use of such substances can compromise the quality of ground water and surface water, can negatively affect natural habitats for indigenous species of flora and fauna, and can leave residues in soil that could be detrimental to subsequent crops.

- **Agricultural producers who unwittingly use such pesticides risk economic damage and damage to their professional reputation.** Illegal products can severely damage crops, decreasing yield or destroying a field. Producers who use illegal products can have (and have had) their produce rejected by food companies. The producer who has used such products must pay for disposal and destruction of the produce and will have insurance claims rejected.
- **Economic damage to governments.** Counterfeit pesticides defraud governments and their taxpayers through lost taxes and levies from the sale of genuine products. Ongoing economic losses to various governments in Europe from trade of illegitimate pesticides are estimated in U.S. dollars at \$15 million - \$22 million annually across Europe.
- **Economic and reputation damage to the food-value chain.** Threats to the health and well-being of consumers who buy fresh fruits and vegetables will negatively impact the reputations of supermarkets and erode public confidence in governments ability to effectively regulate the agricultural sector.
- **Economic and reputation damage to the plant-protection industry.** The negative effects of pesticide counterfeiting include loss of sales, as well as patent and trademark infringement, erosion of data protection, damage to reputation and the undermining of established industry stewardship activities. The manufacture and trade of illegal pesticides negatively affects companies value and reduces producers confidence in legitimate products.
- **Other impacts to industry and society.** The above-described outcomes from the illegal manufacture and trade of counterfeit pesticides undermine economic growth and job creation and stifle innovation and competitiveness, which undermines the EUs knowledge-based economy and creates an investment deterrent.

## Fighting Counterfeit Pesticides

The fight against counterfeit pesticides is difficult for the following reasons:

- **Politicians dont recognize the problem.** Many politicians still do not recognize the seriousness and extent of the problem. Consequently, civil service administrations are not devoting the attention and resources required to control counterfeit pesticides. Many politicians do not want to admit that a problem of this nature exists since such an admission reflects badly on their country's or their region's ability to control illegal activity. Some politicians are hesitant to take bold steps to fight the problem because they see such action as a public admission that fake, untested pesticides are used in their country – an ongoing situation that local producers and exporters of legitimate pesticides may also prefer to keep quiet. A misperception may also prevail among some politicians that, because pesticides are extensively regulated by the government, the problem of counterfeit pesticides is already being addressed.
- **National enforcement is weak.** National and regional governments are responsible for fighting counterfeits. However, there are five problems here:
  - **Focus on high-profile sectors.** National anti-counterfeit activities tend to focus on high-profile sectors of the economy, such as luxury goods -- including CDs, clothing, software, and pharmaceuticals. Sectors with a lower profile do not typically receive the resources required to effectively combat counterfeiting, even

despite acute environmental and public-health threats posed by counterfeit pesticides.

- **Too many departments – no responsibility.** The complexity of the problem of counterfeit pesticides means that many different governmental ministries and agencies are involved. As a result, responsibility for enforcement of regulations is fractured between different parts of government. Many ministries are involved, but overall coordination necessary for effective control of this crime is lacking. In most countries, at least a half dozen different ministries play a role: agriculture and environment departments for inspections and use; justice and police for criminal prosecution and pursuit; finance/treasury regarding duties; trade/customs regarding imports and controls; public health regarding contaminations; and also port of entry authorities.
- **Regional versus national divisions.** In some countries, responsibility for enforcement is divided between regional and national authorities. Political divisions and sensitivities have led to weak enforcement coordination and insufficient action.
- **Complex problem –multi-faceted solutions.** The nature of the pesticide counterfeiting problem is complex and wide-ranging. At the national level, effective control of pesticide counterfeiting requires teams of multi-disciplined specialists with skills in policing and prosecution, chemicals, agriculture, customs, environment, etc. These skills are generally available, but may not be working together.
- **No European leadership on controlling pesticide counterfeiting.** Despite concern and some actions in some European Commission departments, to date no single entity at the EU level has been charged with a leadership role in coordination and information-sharing for controlling counterfeit pesticides.
- **Inadequate judicial frameworks and penalties.** Some countries do not have adequate legislation to properly prosecute the ongoing practice of pesticide counterfeiting. For example, in some European countries, it is illegal to buy or sell counterfeits, but not illegal to possess them. Some countries have inadequate penalties. In one known case, a convicted counterfeiter found in possession of hundreds of tons of illegal pesticides was given only a very small fine.
- **Challenges of quantifying the problem.** It is difficult to present detailed data of the extent and growth of the problem of counterfeit pesticides because of the illegal nature of the activity. This is the same problem encountered by all sectors that face counterfeiting. Even in areas where judicial authorities devote significant resources, such as in cigarette smuggling or narcotics, estimates of the size of the problem vary wildly.
- **Increasingly easy to operate across borders in Europe.** The single market has decreased internal EU border controls, making it easier to move illegal pesticides around. This ease of mobility is of particular concern in terms of parallel trade abuse. Although parallel trade of pesticides is legal, there has been a steep increase in abuse, with counterfeiters substituting legitimate products with fakes. The growing sophistication of cross-border criminal activity makes cross-border enforcement activity even more critical.
- **Challenges in the food and supply chain.** Food manufacturers and producers are consumer-oriented companies; they do not like speaking publicly about the ongoing

problem of counterfeit pesticides. Many food companies recognize the challenges of this problem, but prefer to try to resolve these problems quietly and directly with their suppliers. The disadvantage of this approach is that thousands of food producers affected by this problem are not benefiting from shared knowledge of the problem and how to control it. Producers are under increasing pressure to provide quality produce for better prices. For some, this pressure has led to the use of illegal pesticides because of the lower prices of these pesticides. In some countries, as a result of a dysfunctional approval processes for legitimate pesticides, few appropriate pesticides are available. This practical limitation has led some farmers to use illegal pesticide products.

- **Negative influence of revision of EU pesticides legislation.** European Union legislation has slowly diminished the number of legitimate pesticide products that producers have at their disposal for pest control. Additionally, EU legislation governing pesticides has not helped companies bring new pesticide products to the market in a timely manner. It is reasonable to expect that this legislation will take many currently available and registered products off the market, leading to a sharp increase in the use of illegal pesticides.

## Solving the Problem

Pesticide producers are dedicating significant human and financial resources to fighting illegal trade and counterfeits. But pesticide producers cannot succeed alone. Those responsible and affected need to lead—governments, farmers, the food value chain and the plant protection industry. The growing problem urgently requires increased attention and intensified human and financial resources.

### National Governments and Authorities

1. Politicians need to recognize the problem of illegal pesticides and instruct their administrations to devote more resources to controlling this problem.
2. National authorities need to:
  - step up their anti-counterfeit enforcement activities, including better enforcement of existing anti-counterfeit regulations and plant-protection-product regulations.
  - coordinate and exchange information on better enforcement.
  - ensure that appropriate legislation to tackle the problem is in place.
  - improve registration and authorization timings for new products, enforce new EU legislation on anti-counterfeiting and intellectual property rights, and make the use of legitimate products a mandatory requirement in farmer cross-compliance programs.
  - adopt specifications from the Food and Agriculture Organization of the United Nations (FAO) for active substances/products as a minimum requirement and regularly monitor production and distribution of these substances/products.

### European Authorities

1. The European Commission and national authorities need to harmonize and codify parallel trade guidelines to stop illegal traders abuse of parallel trade rules; registration procedures should be enhanced across the EU.

2. European Commissions need to instruct their administration to designate a coordination point at the EU level; the coordinator would act as center for best-practices sharing on how to effectively fight counterfeit and illegal products.
3. The European Commission should:
  - better monitor the proper implementation of EU legislation by expanding the mandate of the Food and Veterinary Office,
  - integrate the awareness and control of illegal pesticides as part of the EUs sustainable-use initiative,
  - ensure continued monitoring of implementation and enforcement of relevant EU legislation.

## **Producers and the Food Chain**

1. Producers need to be more vigilant about what products they buy and from whom and report to authorities illegal sellers/distributors of counterfeit pesticides. Producers should ensure they buy from trusted sources, check that the pesticide product is approved, and be vigilant towards suspicious labels, odors, colors, low prices, etc.
2. Farmer organizations and co-ops should play a leading role in increasing public awareness about risks of using counterfeits.
3. The food chain—including manufacturers, distributors, producers, and consumers—should:
  - actively promote only the use of government registered and approved products in their supplier contracts,
  - report to authorities incidents of illegal pesticide products,
  - strengthen traceability and audit programs,
  - play an active role in raising awareness and educating growers on the risks.
4. Pesticide distributors need to be more vigilant about illegal products and need to report such products, eventually through anonymous channels.

## **Plant Protection Industry**

1. The industry is actively engaged to increase awareness and enforcement. At the European level, industry is working to broaden awareness across a wide audience and to improve legislation to control counterfeit and illegal imports.
2. At national levels, members of the industry are working with enforcement agencies to fight counterfeit pesticides and also working to develop dialogue with appropriate enforcement authorities and provide training and technical support. The industry is also lobbying to increase penalties for pesticide counterfeiting.
3. Industry is raising awareness of the problems and solutions throughout the supply chain.
4. Companies are working on innovative product design, packaging and labeling measures to counter illegal activities and are also developing best practices through the supply chain.
5. New policy proposals are intended to allow better management of the whole supply chain - manufacture, customs, exporter/importer, and suppliers/distributors. A proposal is also under way to stop the re-packaging of legitimate plant-protection products when this repackaging relates to parallel imports.

## **Example I: Producers' Fields Destroyed**

In 2004, in Italy, France and Spain, hundreds of hectares of maize, potatoes and tomatoes were damaged by producers using a fake pesticide product. The case came to light when a distributor indicated that a pesticide product was being offered in the market at a cost 20 percent lower than the original product. The distributor questioned whether this discounted price was a special offer or whether something more sinister was going on. Subsequent investigations discovered that the crops of producers who had treated their produce with the discounted pesticide product were dying. The illegal product was packaged to look identical to the original. The fake product contained metsulfuron-methyl, instead of rimsulfuron. Rimsulfuron has approved uses that are safe for use on potatoes and tomatoes, but metsulfuron-methyl is not appropriate on any of these crops. The producers who used the discounted, illegal pesticide product suffered extensive economic damage.

## **Example II: Uncovering a Counterfeit Facility**

In June 2008, regional police in Russia uncovered a major pesticide-counterfeiting facility. The police raided premises near the city of Kursk, where around 100 tons of counterfeit and illegal pesticide products were found with an estimated market value of nearly \$1 million (U.S. dollars). Most of the products were illegal copies of patented and branded products from major legitimate manufacturers pre-packed into containers ready for commercial sale. Adjacent to the warehouse, the police uncovered equipment designed to apply labels and stickers to the bottles, as well as other packaging equipment. Initial examination of the symbols on the seized product containers indicated that the products were manufactured in China. There are also indications that the transport routes to Kursk may be different for differing consignments, with some arriving by sea and others by road and some possibly running through an EU port. As of January 2009, the original publication date of this document, the case remained open with possible prosecutions to come.

## **Example III: Openly Selling Counterfeit Pesticides**

Every year Glasgow, Scotland, hosts a plant protection products trade show, the Crop Science and Technology Exhibition. Hundreds of companies exhibit their products, make contact with buyers, and sell pesticides.

At this exhibition in 2005, 37 injunctions were served on 20 Chinese companies, and two display booths advertising illegal substances or infringing patents were closed down. In 2006, exhibitors at this trade show were required to undersign a written agreement not to undertake such activities. Even despite the signed agreement, however, 24 companies—23 of which were Chinese—were given injunctions at the exhibition that year, and three were ordered to close for promoting illegal products.

## **Conclusion**

The United States produces the most abundant and safest food and fiber commodities in the world. Crop-protection products greatly assist agricultural producers in meeting growing demand. In the United States, state and federal laws and regulations governing pesticides and their use are vital to protecting this effort, as well as providing protection of human and animal health while minimizing the impact on the natural environment.

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Florida Department of Agriculture and Consumer Services Bureau of Compliance Monitoring.  
 3125 Conner Drive, Bldg. 8, L-29, Tallahassee, FL 32399-1650. Phone: 850-617-7850,  
<http://www.flaes.org/complimonitoring/index.html> (accessed January, 2012).

## Tables

Table 1.

Origin of counterfeited goods imported into Europe.

National Origin	% Counterfeit Goods Caught by European Customs
China	86
Malaysia	4
U.A.E.	2
India	1
Algeria	1
Hong Kong	1
Egypt	1
Turkey	1
Other	3

## Footnotes

1.

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